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Standard**



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## COMPOSTING PROJECT IN SANTA CATARINA

SUSTAINABLE  
**CARBON**

Document Prepared by Sustainable Carbon – Projetos Ambientais Ltda.

|                          |                                                                                                                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>     | Composting Project in Santa Catarina                                                                                                                                                                                                                    |
| <b>Version</b>           | 06                                                                                                                                                                                                                                                      |
| <b>Report ID</b>         | 04                                                                                                                                                                                                                                                      |
| <b>Date of Issue</b>     | 10-December-2024                                                                                                                                                                                                                                        |
| <b>Project ID</b>        | 1144                                                                                                                                                                                                                                                    |
| <b>Monitoring Report</b> | 01-May-2019 to 31-December-2020                                                                                                                                                                                                                         |
| <b>Prepared By</b>       | Sustainable Carbon – Projetos Ambientais Ltda.                                                                                                                                                                                                          |
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# 1 PROJECT DETAILS

## 1.1 Summary Description of the Implementation Status of the Project

The Composting Project in Santa Catarina was developed by Sustainable Carbon – Projetos Ambientais Ltda along with 13 swine confinement farms in Brazil, aiming to improve animal manure management systems, reduce greenhouse gases (GHG) emissions and improve the living conditions of the population on the project sites.

The project replaces the baseline Animal Waste Management Systems (AWMS) by a lower GHG emitting AWMS. All farms are located in the State of Santa Catarina, in the south region of Brazil.

The farms involved in the present project are divided into two groups:

- **Brownfield farms:** in these farms, swine waste was previously treated in anaerobic lagoons, which result in high GHG emissions. As part of the project activity, farmers shifted their AWMS to mechanized composting units, thus avoiding methane (CH<sub>4</sub>) emissions.
- **Greenfield farms:** as part of the project activity, these farmers installed the composting unit since the beginning of their swine confinement operations. This means the composting unit was chosen instead of building anaerobic lagoons, which would be the most likely scenario in the absence of the present Project Activity.

Each farm started the full operation of the automated composting unit in a specific date, i.e., when the composting unit was installed, and farm owners received training for its operation; or when the first batch of animals was received following installation. However, the project start date was defined as the date when the first farm included in this project began reducing GHG emissions by applying the composting unit, which was Fazenda Altenor on 21-May-2010.

By replacing the baseline system, the present project activity reduces methane emissions from anaerobic decay through composting, which is a controlled aerobic treatment. Therefore, the Composting Project in Santa Catarina resulted in a GHG emission reduction of **4,100 tonnes of CO<sub>2</sub>e** during the current monitoring period, from **01-May-2019 to 31-December-2020**. In addition, this new AWMS technology treats the manure under a more controlled and economically sustainable manner.

As part of this project, animal waste is treated in a mechanized composting unit, where the liquid wastes are incorporated with dry solid substrate to be submitted to the mechanical stirring process. This process mixes the liquid and solid parts, maintaining appropriate levels of oxygen, moisture content, and temperature to ensure that organic matter degradation occurs under aerobic conditions. The final compost obtained is used to fertilize cultivated soil within each farm or sold to local consumers.

Besides reducing GHG emissions, the project activity promotes other benefits, such as: improvement of health and working conditions; enhancement of the organic matter stabilization

for later soil application; reduction of surface runoff risks from animal manure, which also reduces soil leaching and river pollution; odor reduction, thus combating vector proliferation; income distribution; access to innovative technology; capacity building of the people involved in the project; encouragement of regional integration and development of similar projects with a view to sustainable development.

The project has been fully operational on all farms since the project start date described above, except for Fazenda Sítio Pickler, Fazenda Helena, Fazenda Gilmar, Fazenda Suruvy, Fazenda Colônia Suspiro, Fazenda Colônia Zuffo, Fazenda Pissaia, Fazenda Baccin and Fazenda Andretta. These farms were not included in the current monitoring report following a personal decision from farm owners. The current operational status of the project in these farms is unknown.

## 1.2 Sectoral Scope and Project Type

The project is associated to the following scope, as per UNFCCC definitions:

### 13 - Waste handling and disposal

This is not an AFOLU project. This is not a grouped project. This is a bundled project involving 13 swine farms located in the State of Santa Catarina, in the south region of Brazil.

## 1.3 Project Proponent

|                   |                                                                                                        |
|-------------------|--------------------------------------------------------------------------------------------------------|
| Organization name | Sustainable Carbon - Projetos Ambientais LTDA.                                                         |
| Contact person    | Aline de Paulo Costa<br>Lara de Paula                                                                  |
| Title             | Aline de Paulo Costa – Technical Analyst<br>Lara de Paula - Technical Analyst                          |
| Address           | R. Doutor Bacelar, 368 – Conj. 23 – Vila Clementino<br>São Paulo/SP – Brazil<br>Postal Code: 04026-001 |
| Telephone         | +55 11 2649 0036                                                                                       |
| Email             | <a href="mailto:tecnica@sustainablecarbon.com">tecnica@sustainablecarbon.com</a>                       |

|                   |                                                                 |
|-------------------|-----------------------------------------------------------------|
| Organization name | Fazenda Sítio Pickler <sup>1</sup>                              |
| Contact person    | Mr. Adelmo Pickler                                              |
| Title             | Farm owner                                                      |
| Address           | Linha São Roque, S/N<br>Zona Rural<br>Arroio Trinta/SC - Brazil |
| Telephone         | +55 49 3535-1138                                                |
| Email             | Not available                                                   |

|                   |                                                                  |
|-------------------|------------------------------------------------------------------|
| Organization name | Fazenda Altenor                                                  |
| Contact person    | Mr. Altenor José Basso                                           |
| Title             | Farm owner                                                       |
| Address           | Linha Pinheirinho, S/N<br>Zona Rural<br>Nova Erechim/SC - Brazil |
| Telephone         | +55 49 3333-0122                                                 |
| Email             | Not available                                                    |

|                   |                                                                  |
|-------------------|------------------------------------------------------------------|
| Organization name | Fazenda Ramella                                                  |
| Contact person    | Mr. Antônio Carlos Ramella                                       |
| Title             | Farm owner                                                       |
| Address           | Linha Barreiros, S/N<br>Zona Rural<br>Herval d'Oeste/SC - Brazil |

---

<sup>1</sup> Fazenda Sítio Pickler was not included in the current monitoring report, following a personal decision from Mr. Pickler, the farm owner.

|           |                  |
|-----------|------------------|
| Telephone | +55 49 3554-0692 |
| Email     | Not available    |

|                   |                                                               |
|-------------------|---------------------------------------------------------------|
| Organization name | Sítio Santa Lúcia                                             |
| Contact person    | Mr. Belmiro Secco                                             |
| Title             | Farm owner                                                    |
| Address           | Linha Banhado Grande, S/N<br>Zona Rural<br>Jaborá/SC - Brazil |
| Telephone         | +55 49 3525-1196                                              |
| Email             | secco_@brturbo.com.br                                         |

|                   |                                                               |
|-------------------|---------------------------------------------------------------|
| Organization name | Fazenda Helena <sup>2</sup>                                   |
| Contact person    | Mr. Diacir Coradi                                             |
| Title             | Manager                                                       |
| Address           | Linha Santo Antônio, S/N<br>Zona Rural<br>Vargeão/SC - Brazil |
| Telephone         | +55 49 3434-0447                                              |
| Email             | Not available                                                 |

|                   |                             |
|-------------------|-----------------------------|
| Organization name | Fazenda Gilmar <sup>3</sup> |
| Contact person    | Mr. Gilmar José Sinigaglia  |

<sup>2</sup> Fazenda Helena was not included in the current monitoring report, following a personal decision from Mr. Diacir Coradi, the farm owner.

<sup>3</sup> Fazenda Gilmar was not included in the current monitoring report, following a personal decision from Mr. Gilmar Sinigaglia, the farm owner.

|           |                                                                                |
|-----------|--------------------------------------------------------------------------------|
| Title     | Farm owner                                                                     |
| Address   | <p>Linha Pedreira, S/N</p> <p>Zona Rural</p> <p>Rio das Antas, SC - Brazil</p> |
| Telephone | +55 49 99134-1119                                                              |
| Email     | gilmar@contavi.com.br                                                          |

|                   |                                                                               |
|-------------------|-------------------------------------------------------------------------------|
| Organization name | Fazenda Suruvy <sup>4</sup>                                                   |
| Contact person    | Mr. Airton Piovezan                                                           |
| Title             | Farm owner                                                                    |
| Address           | <p>Linha Rui Barbosa, S/N</p> <p>Zona Rural</p> <p>Concórdia /SC - Brazil</p> |
| Telephone         | +55 49 3425-8001                                                              |
| Email             | Not available                                                                 |

|                   |                                                                             |
|-------------------|-----------------------------------------------------------------------------|
| Organization name | Fazenda Granja Silva                                                        |
| Contact person    | Mr. Jair da Silva                                                           |
| Title             | Farm owner                                                                  |
| Address           | <p>Linha Gomercindo, S/N</p> <p>Zona Rural</p> <p>Concórdia/SC - Brazil</p> |
| Telephone         | +55 49 3442-8484                                                            |
| Email             | Not available                                                               |

<sup>4</sup> Fazenda Suruvy was not included in the current monitoring report, following a personal decision from Mr. Airton Piovezan, the farm owner.

|                   |                                                                      |
|-------------------|----------------------------------------------------------------------|
| Organization name | Fazenda Colônia Suspiro <sup>5</sup>                                 |
| Contact person    | Mr. Nóbile Tomazi                                                    |
| Title             | Farm owner                                                           |
| Address           | Linha Pinheirinho, S/N<br>Zona Rural<br><br>Nova Erechim/SC - Brazil |
| Telephone         | +55 49 98860-0650                                                    |
| Email             | Not available                                                        |

|                   |                                                                        |
|-------------------|------------------------------------------------------------------------|
| Organization name | Fazenda Colônia Zuffo <sup>6</sup>                                     |
| Contact person    | Mr. Dario Marcos Zuffo                                                 |
| Title             | Farm owner                                                             |
| Address           | Linha Vista Alegre, S/N<br>Zona Rural<br><br>Rio das Antas/SC - Brazil |
| Telephone         | +55 49 3564-2044                                                       |
| Email             | Not available                                                          |

|                   |                                                              |
|-------------------|--------------------------------------------------------------|
| Organization name | Fazenda Pissaia <sup>7</sup>                                 |
| Contact person    | Mr. Neimar Pissaia                                           |
| Title             | Farm owner                                                   |
| Address           | Linha Chapada, S/N<br>Zona Rural<br><br>Arvoredo/SC - Brazil |

<sup>5</sup> Fazenda Colônia Suspiro was not included in the current monitoring report, due to inactivity during the monitored period.

<sup>6</sup> Fazenda Colônia Zuffo was not included in the current monitoring report, following a personal decision from Mr. Dario Zuffo, the farm owner.

<sup>7</sup> Fazenda Pissaia was not included in the current monitoring report. The farm was sold to a relative of Mr. Pissaia, and the current status of the project is unknown.

|           |                  |
|-----------|------------------|
| Telephone | +55 49 3356-3560 |
| Email     | Not available    |

|                   |                                                                   |
|-------------------|-------------------------------------------------------------------|
| Organization name | Fazenda Baccin <sup>8</sup>                                       |
| Contact person    | Mr. Renato Baccin                                                 |
| Title             | Farm owner                                                        |
| Address           | Linha 24 de Fevereiro, S/N<br>Zona Rural<br>Concórdia/SC - Brazil |
| Telephone         | +55 49 99109-0087                                                 |
| Email             | baccin.baccin@yahoo.com.br                                        |

|                   |                                                                |
|-------------------|----------------------------------------------------------------|
| Organization name | Fazenda Andretta <sup>9</sup>                                  |
| Contact person    | Mr. Selvino Andretta                                           |
| Title             | Farm owner                                                     |
| Address           | Linha Amizade, S/N<br>Zona Rural<br>Nova Itaberaba/SC - Brazil |
| Telephone         | +55 49 3327-0076                                               |
| Email             | fabianeandretta@hotmail.com                                    |

## 1.4 Other Entities Involved in the Project

|                     |                                                                                                                                                                                                      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Organization name   | LPC Tecnologia Ambiental                                                                                                                                                                             |
| Role in the Project | Developer and provider of the Mechanized and Automated Composting Unit (UMAC <sup>10</sup> ), which is used in the farms included in this project activity. Moreover, LPC provides assistance to the |

<sup>8</sup> Fazenda Baccin was not included in the current monitoring report, due to inactivity during the monitored period.

<sup>9</sup> Fazenda Andretta was not included in the current monitoring report, following a personal decision from Mr. Selvino Andretta, the farm owner.

<sup>10</sup> UMAC – Unidade Mecanizada e Automatizada de Compostagem. For more information, please check the website <www.umac.com.br>.

|                |                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------------------------------|
|                | operation and maintenance of the composting unit on each farm, and support to the monitoring of the carbon project. |
| Contact person | Mr. Renato Baccin                                                                                                   |
| Title          | Director                                                                                                            |
| Address        | Rua Padres Franciscanos, s/n,<br>Bairro Nra Salete, Concórdia / SC - Brazil<br>Postal Code: 89.700-000              |
| Telephone      | +55 49 3442-2208                                                                                                    |
| Email          | baccin@umac.com.br                                                                                                  |

## 1.5 Project Start Date

The full operation<sup>11</sup> of the automated composting unit was defined to be the starting date at each farm, i.e., when the farm began reducing GHG emissions. Furthermore, one of the two criteria below was considered to determine the starting date at each farm:

- (a) When the composting unit was installed, and farm owners received training for its operation; or
- (b) When the first batch of animals following event (a) was received.

Table below provides the starting date and the criteria used for each farm.

| Farm Name                           | Starting Date | Criteria used to define the project start date (as described above) |
|-------------------------------------|---------------|---------------------------------------------------------------------|
| Brownfield farms <sup>12</sup>      |               |                                                                     |
| Fazenda Altenor                     | 21/05/2010    | (b)                                                                 |
| Fazenda Pissaia <sup>13</sup>       | 20/12/2010    | (b)                                                                 |
| Fazenda Sitio Pickler <sup>14</sup> | 27/01/2011    | (b)                                                                 |
| Fazenda Granja Silva                | 14/04/2011    | (a)                                                                 |
| Fazenda Helena <sup>15</sup>        | 18/10/2011    | (b)                                                                 |

<sup>11</sup> Prior to this date, only tests and field settings were performed, but the composting unit was not available to properly treat animal manure.

<sup>12</sup> A definition of brownfield and greenfield farms is available at Section 1.1.

<sup>13</sup> Fazenda Pissaia was not included in the current monitoring period.

<sup>14</sup> Fazenda Sítio Pickler was not included in the current monitoring report, following a personal decision from Mr. Pickler.

<sup>15</sup> Fazenda Helena was not included in the current monitoring report, following a personal decision from Mr. Diacir Coradi, the farm owner.

|                                       |            |     |
|---------------------------------------|------------|-----|
| Fazenda Andretta <sup>16</sup>        | 26/10/2011 | (a) |
| Fazenda Suruvy <sup>17</sup>          | 28/11/2011 | (a) |
| Fazenda Gilmar <sup>18</sup>          | 11/01/2012 | (b) |
| <b>Greenfield farms</b>               |            |     |
| Fazenda Ramella                       | 21/10/2010 | (b) |
| Sítio Santa Lucia                     | 29/11/2010 | (b) |
| Fazenda Colônia Zuffo <sup>19</sup>   | 29/11/2010 | (a) |
| Fazenda Colônia Suspiro <sup>20</sup> | 27/07/2011 | (b) |
| Fazenda Baccin <sup>21</sup>          | 20/09/2012 | (b) |

However, the project start date was defined as the date when the first farm included in this project began reducing GHG emissions by applying the composting unit under full operation, which was Fazenda Altenor on 21-May-2010.

## 1.6 Project Crediting Period

The project has a crediting period of 10 years, from 01-January-2011 until 31-December-2020. According to VCS rules, the project crediting period may be renewable at most twice.

The crediting period start date was chosen to simplify the emission reductions calculation and to allow for retroactive credits generated since 2011, in accordance with VCS procedures.

<sup>16</sup> Fazenda Andretta was not included in the current monitoring report, following a personal decision from Mr. Selvino Andretta, the farm owner.

<sup>17</sup> Fazenda Suruvy was not included in the current monitoring report, following a personal decision from Mr. Airton Piovezan, the farm owner.

<sup>18</sup> Fazenda Gilmar was not included in the current monitoring report, following a personal decision from Mr. Gilmar Sinigaglia, the farm owner.

<sup>19</sup> Fazenda Colônia Zuffo was not included in the current monitoring report, following a personal decision from Mr. Dario Zuffo, the farm owner.

<sup>20</sup> Fazenda Colônia Suspiro was not included in the current monitoring report, due to inactivity during the monitored period.

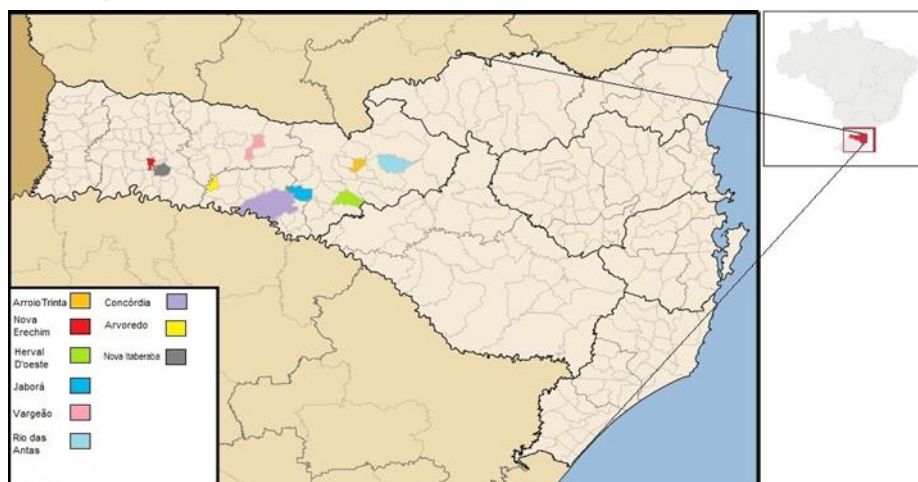
<sup>21</sup> Fazenda Baccin was not included in the current monitoring report, due to inactivity during the monitored period.

## 1.7 Project Location

The project activity was implemented in the municipalities of Arroio Trinta, Nova Erechim, Herval d'Oeste, Jaborá, Vargeão, Rio das Antas, Concórdia, Arvoredo and Nova Itaberaba, as presented in Figure 1 and Table 2 below.

During the current monitoring period, farmers have operated the animal manure management system in accordance to the monitoring plan specified in the VCS PD. However, as described above, the farms Fazenda Sítio Pickler, Fazenda Helena, Fazenda Gilmar, Fazenda Suruvy, Fazenda Colônia Suspiro, Fazenda Colônia Zuffo, Fazenda Pissaia, Fazenda Baccin and Fazenda Andretta, located in Arroio Trinta, Vargeão, Rio das Antas, Concórdia, Nova Erechim, Rio das Antas, Arvoredo and Nova Itaberaba, respectively, were not included in the current monitoring report.

**Figure 1.** Location of the farms participating in the project activity



**Table 2.** Location of the farms participating in the project activity

| State          | City           | Participating Farm      |
|----------------|----------------|-------------------------|
| Santa Catarina | Arroio Trinta  | Fazenda Sítio Pickler   |
|                | Arvoredo       | Fazenda Pissaia         |
|                | Concórdia      | Fazenda Granja Silva    |
|                |                | Fazenda Baccin          |
|                |                | Fazenda Suruvy          |
|                | Herval d'Oeste | Fazenda Ramella         |
|                | Jaborá         | Sítio Santa Lucia       |
|                | Nova Erechim   | Fazenda Altenor         |
|                |                | Fazenda Colônia Suspiro |
|                | Nova Itaberaba | Fazenda Andretta        |
|                | Rio das Antas  | Fazenda Colônia Zuffo   |
|                |                | Fazenda Gilmar          |

| State | City    | Participating Farm |
|-------|---------|--------------------|
|       | Vargeão | Fazenda Helena     |

The precise location of farms is identified by means of global positioning system (GPS) as displayed on Table 3 below:

**Table 3.** Farms location and contact information

| ID | Farm Name               | Farm owner             | Address                    | Town           | Contact                | Global Positioning System <sup>22</sup> |            |
|----|-------------------------|------------------------|----------------------------|----------------|------------------------|-----------------------------------------|------------|
|    |                         |                        |                            |                |                        | S                                       | W          |
| 1  | Fazenda Sítio Pickler   | Adelmo Pickler         | Linha São Roque, S/N       | Arroio Trinta  | Adelmo Pickler         | -26.905787                              | -51.302095 |
| 2  | Fazenda Altenor         | Altenor José Basso     | Linha Pinheirinho, S/N     | Nova Erechim   | Altenor José Basso     | -26.913729                              | -52.932355 |
| 3  | Fazenda Ramella         | Antônio Carlos Ramella | Linha Barreiros, S/N       | Herval d'Oeste | Antônio Carlos Ramella | -27.187098                              | -51.395069 |
| 4  | Sítio Santa Lucia       | Belmiro Secco          | Linha Banhado Grande, S/N  | Jaborá         | Clodoaldo Secco        | -27.128526                              | -51.688554 |
| 5  | Fazenda Helena          | Diacir Coradi          | Linha Santo Antônio, S/N   | Vargeão        | Diacir Coradi          | -26.905891                              | -52.145477 |
| 6  | Fazenda Gilmar          | Gilmar José Sinigaglia | Linha Pedreira, S/N        | Rio das Antas  | Gilmar José Sinigaglia | -26.916379                              | -51.083891 |
| 7  | Fazenda Suruvy          | Airton Piovezan        | Linha Rui Barbosa, S/N     | Concórdia      | Gilmar Piovezan        | -27.308228                              | -52.068764 |
| 8  | Fazenda Granja Silva    | Jair da Silva          | Linha Gomercindo, S/N      | Concórdia      | Jair da Silva          | -27.293422                              | -51.900758 |
| 9  | Fazenda Colônia Suspiro | Nóbile Tomazi          | Linha Pinheirinho, S/N     | Nova Erechim   | Lenize Tomazi          | -26.903279                              | -52.931321 |
| 10 | Fazenda Colônia Zuffo   | Dario Marcos Zuffo     | Linha Vista Alegre, S/N    | Rio das Antas  | Dario Marcos Zuffo     | -26.974623                              | -51.068915 |
| 11 | Fazenda Pissaia         | Neimar Pissaia         | Linha Chapada, S/N         | Arvoredo       | Neimar Pissaia         | -27.108491                              | -52.411704 |
| 12 | Fazenda Baccin          | Renato Baccin          | Linha 24 de Fevereiro, S/N | Concórdia      | Renato Baccin          | -27.169646                              | -52.103517 |
| 13 | Fazenda Andretta        | Silvino Andretta       | Linha Amizade, S/N         | Nova Itaberaba | Fabiana Andretta       | -26.934749                              | -52.833069 |

## 1.8 Title and Reference of Methodology

The present project activity applies small scale methodologies approved under the Clean Development Mechanism, as follows:

<sup>22</sup> All GPS coordinates were taken near the location where the composting machines are installed.

- Category AMS-III.F. - “Avoidance of methane emissions through composting”, version 10, valid from 04-March-2011 to 24-May-2012<sup>23</sup>.

Calculations of baseline emissions were determined using relevant sections of:

- Category AMS-III.D. – “Methane recovery in animal manure management systems”, version 18, valid from 13-October-2011 to 06-December-2012<sup>24</sup>.

Furthermore, procedures for the calculation of project emission from electricity consumption were determined according to:

- TOOL 05 - "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", version 01, valid from 16-May-2008 onwards<sup>25</sup>.
- TOOL 07 - “Tool to calculate the emission factor for an electricity system” –, version 3.0.0, valid from 23-November-2012 onwards<sup>26</sup>

In addition, the SOCIALCARBON Methodology<sup>27</sup> is being applied as a sustainability tool in association with the present VCS project.

## 1.9 Participation under other GHG Programs

- Emission Trading Programs and Other Binding Limits: The project activity is not included in an emission trading program or any other mechanism that includes GHG allowance trading.
- Other Forms of Environmental Credit: The project activity is not creating any other form of environmental credit under any specific program.
- Participation under Other GHG Programs: The project activity is not registered under any other GHG program.

## 1.10 Other Forms of Credit

<sup>23</sup> This version of the methodology is available at:

<<https://cdm.unfccc.int/UserManagement/FileStorage/DYABR6QZTOW9SH2FM1J3GP5XVKL48N>>. Last visited on February 06th, 2023.

<sup>24</sup> This version of the methodology is available at: <<https://cdm.unfccc.int/UserManagement/FileStorage/9KYSPHV51TNF6M08LRICJAB0GX3Z27>>. Last visited on February 06th, 2023.

<sup>25</sup> Tool available at: <<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf>>. Last visited on August 06th, 2015.

<sup>26</sup> Tool available at: <<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v3.0.0.pdf>>. Last visited on April 26, 2024.

<sup>27</sup> SOCIALCARBON Methodology was developed by Ecológica Institute ([www.ecologica.org.br](http://www.ecologica.org.br)). It was founded on the principle that transparent assessment and monitoring of the social and environmental performance of projects improves their long-term effectiveness. The methodology uses a set of analytical tools that assess the social, environmental and economic conditions of communities affected by the project, and demonstrates through continuous monitoring the project's contribution to sustainable development.

The project is not creating any other form of environmental credit under any specific program. SOCIALCARBON® Methodology is being applied only as a Sustainability tool in association with VCS.

SOCIALCARBON Methodology was developed by Instituto Ecológica ([www.ecologica.org.br](http://www.ecologica.org.br)). It was founded on the principle that transparent assessment and monitoring of the social and environmental performance of projects improves their long-term effectiveness. The methodology uses a set of analytical tools that assess the social, environmental and economic conditions of communities affected by the project and demonstrates through continuous monitoring the project's contribution to sustainable development.

### 1.11 Sustainable Development

Besides reducing greenhouse gas emissions, the project activity will provide better treatment and stabilization of the organic matter for later soil application, reduction of the surface runoff risks of the waste and leaching in to the soil, odor reduction, combating vector proliferation, improved working conditions and net generation of jobs (temporary and permanent), income distribution, access to technology, capacity building of the people involved and encouraging regional integration and the development of similar projects with a view to sustainable development. The sustainable development benefits described above are an outcome from the composting process and the project activities. In addition, these measures contribute to nationally stated sustainable development priorities, such as the objectives from the Brazilian Government related to the UN Sustainable Development Goals (SDGs). By assessing the six resources from the SOCIAL CARBON methodology – Social, Human, Financial, Natural, Technology and Carbon – the sustainable development benefits described can be thoroughly monitored. The sustainable development benefits, their corresponding SDG, and related SOCIAL CARBON resources and indicators are listed below:

- SDG 13: Climate action – GHG reduction and encouraging regional integration and the development of similar projects with a view to sustainable development:
  - Carbon Resource: The type of carbon project developed, encompassing the methodologies utilized and project performance; Indicator – “Project performance”.
- SDG 3: Good health and well-being; SDG 6: Clean Water and Sanitation; SDG 12: Responsible consumption and production – Better treatment and stabilization of the organic matter for later soil application, Reduction of the surface runoff risk of the waste and leaching into the soil, Odor reduction, Combating vector proliferation:
  - Technology Resource - evaluates the conditions of access to new technologies, as well as its contribution to the economic development; Indicators - “Maintenance of composting site” and “Compost quality”;
  - Natural Resource - The stock of natural resources (soil, water, air, etc.) and environmental services (soil protection, maintenance of hydrological cycles, pollution sinks, pest control, pollination, among others), from which resources for livelihoods are derived; Indicator - “Physical and chemical analysis of the compost”;

- Human Resource - The skills, knowledge, capacities for work and good health that people have. Taken together, these become fundamental for the successful pursuit of different strategies; Indicator - “Disease agents” indicator.
- SDG 8: Decent work and economic growth – Improved working conditions, Net generation of jobs, Income distribution, Access to technology, Capacity building of the people involved:
  - Financial Resource - The basic capital in the form of cash, credit/debt and other economic goods which are available or potential; Indicators – “Commercialization of carbon credits” and “Generation and commercialization of the compost”;
  - The Social Resource – The working networks, the social duties, social relations, relationships of trust, affiliations, and associations; Indicator – “Economic dependency”.

## 2 SAFEGUARDS

### 2.1 No Net Harm

The SOCIALCARBON indicators evaluated if there were positive social and environmental impacts from the Project Activity. The SOCIALCARBON methodology uses a set of analytical tools that assess the social, environmental and economic conditions of communities affected by the project and demonstrates the project’s contribution to sustainable development through continuous monitoring.

The project attends all legal requirements, and no negative environmental impacts are predicted or identified during this monitoring period. Swine waste is considered a serious environmental concern in the project region. The environmental impacts of the project activity are considered positive since they improve the treatment practices for wastes from agro industrial activity besides the requirements of environmental agencies.

### 2.2 Local Stakeholder Consultation

Before implementing any farm or composting unit, a consultation with the environmental agency was carried out and only with the release of the licenses was the project undertaken. The formal stakeholder consultation was carried out during the validation of the project. Letters were sent to the stakeholders informing them about the project on 10/02/2012. During this monitoring period, no complaints, suggestions and/or comment about the project was received. Currently, the farmers and the Sustainable Carbon Team are available to receive any kind of suggestions and comments from the community through telephone, website, e-mail, and even in personally, remaining prepared for analysis and response the observation points.

## 2.3 AFOLU-Specific Safeguards

Not Applicable, this is not an AFOLU project.

# 3 IMPLEMENTATION STATUS

## 3.1 Implementation Status of the Activity

The VCS PD was validated by the Designated Operational Entity TÜV Rheinland (China) Ltd and this present monitoring report is being verified by Earthood Services Private Limited.

The project activity reduces methane emissions and treats manure produced by small and medium swine farms in a correct manner. Mechanized composting units (UMAC system) were installed instead of using anaerobic lagoons on swine farms. Composting is an aerobic process producing little or no GHG. Emission reductions occurs because of the low methane emissions resulting from composting compared to the large amount of this GHG that would be released to the atmosphere if anaerobic lagoons were used to treat animal manure.

As described in the VCS PD, the project faces difficulties concerning both the current lack of more rigorous legislation and the common practices in the region. Therefore, without the incentive of the carbon credits, the farms involved in the project would install or maintain anaerobic lagoons to treat manure, instead of installing a mechanized composting system. This scenario would ensure compliance with local regulations but would result in higher GHG emissions.

Besides being more economically attractive than the AWMS proposed by the project activity, anaerobic lagoons were already built in brownfield farms in accordance with Santa Catarina State environmental legislation. Even where there is the need for further investments, anaerobic lagoons would be more economically attractive because the costs would be lower than implementing a new AWMS.

Before implementing the project activity, manure was disposed in anaerobic lagoons over 1 meter deep, causing methane emissions to the atmosphere due to the anaerobic decaying of the organic matter. This occurred in all Brownfield farms and was considered the baseline scenario for all Greenfield farms, as explained in the VCS PD, version 06.1. Besides, wastes generated by anaerobic lagoons were used in liquid form for soil application onsite.

Eight swine farms involved in the current project activity operated anaerobic lagoons prior to the project initiation, since they are less expensive systems and easier to maintain and operate than composting units. The other five farms are considered Greenfield Projects, which means that they started the project activity already using the mechanized composting unit.

As part of this project activity, animal waste is treated in a mechanized composting unit, where liquid wastes are incorporated with dry solid substrate to be submitted to the mechanical stirring process. This process mixes the liquid and solid parts, maintaining appropriate levels of oxygen,

moisture content, and temperature to ensure that organic matter degradation occurs under aerobic conditions. The final compost obtained is used to fertilize cultivated soil within each farm or sold to local consumers nearby.

The project has been fully operational on all farms since the start date described above, except for Fazenda Sítio Pickler, Fazenda Helena, Fazenda Gilmar, Fazenda Suruvy, Fazenda Colônia Suspiro, Fazenda Colônia Zuffo, Fazenda Pissaia, Fazenda Baccin and Fazenda Andretta. These farms were not included in the current monitoring report following a personal decision of the farm owners. The current operational status of the project in these farms is unknown.

Moreover, the project also adopts the SOCIALCARBON® Methodology, an innovative concept developed by the Ecológica Institute to measure the contribution of carbon projects to sustainability. The Methodology is based in six main pointers: Technology; Natural; Financial; Human; Social and Carbon Resources<sup>28</sup>.

## 3.2 Deviations

### 3.2.1 Methodology Deviations

1. During this 4<sup>th</sup> Monitoring Period, the methodology deviation validated in the PD v. 06.1 has been discontinued. The calculation of the NLT<sub>y</sub> parameter has been updated to follow Equation (3), as specified in version 18 of the AMS-III.D methodology as well as section 3.1.2 and section 3.20 of the VCS Standard v.4.7, ensuring conservativeness.

According to VCS rules, deviations shall be reported in all verification reports. This section describes the methodology deviation validated in the VCS PD version 06.1

During the past monitoring periods, 1<sup>st</sup> (01-January-2011 to 31-December-2012), 2<sup>nd</sup> (01-January-2013 to 30-June-2015), and 3<sup>rd</sup> (01-July-2015 to 30-April-2019), as described in the VCS PD version 06.1, Project Proponents applied a minor deviation to the equation used for determining the annual average number of animals of type LT in year y (parameter NLT<sub>y</sub>)<sup>29</sup>. This adaptation increased the accuracy of emission reduction quantification, since it allows PPs to use reliable third-party information to monitor key parameters related to animal production. Third party information is sourced from entities that are directly responsible for measuring monitored data, such as integrators (food companies that manage the complete meat production cycle) and State Agencies.

As farms usually operate in batches lasting from 3 to 4 months, all data on animal production is documented by integrators after each batch is delivered. Batches and related documents do not follow a yearly calendar.

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<sup>28</sup> More information on SOCIALCARBON is available at: <<http://www.socialcarbon.org>>. Last visit on 10/06/2022.

<sup>29</sup> Please check equation 4 at Section 3.1 of the VCS PD.

This deviation did not negatively impact the quantification of GHG emission reductions or removals; rather, it increased the accuracy of monitoring and emission reduction calculations, as described above. Moreover, this deviation was related to the criteria and procedures for monitoring or measurement and did not related to any other part of the applied methodology.

2. Project Proponents have also used a deviation in the monitoring of the quantity of electricity consumed by the project, which is related to emissions from electricity consumption. AMS-III.F version 10 determines it shall be assumed that all relevant electrical equipment operate at a full rate capacity, plus 10% to account for distribution losses, for 8,760 hours per year in case electricity consumption is not directly monitored.

However, given the farms management processes and their low energy consumption, a conservative value was applied. Such value is based on monitored data collected in part of this monitoring period and on LPC judgment about the expected time of operation of the manure pump and the UMAC equipment<sup>30</sup>, which are the two only equipment demanding electricity consumption in the AWMS. Values applied on the emission reduction calculation were conservatively defined as the highest value from either:

- LPC judgement corrected with the use of a conservative factor of 125%, meaning an operation time 25% higher than expected by LPC; or
- The average operation time of each AWMS equipment, which was monitored by each farmer during part of the monitored period.

This estimate is also considered conservative given that electricity is a significant cost for the operation of the composting unit and farmers would have no interest in using the equipments longer than necessary.

This deviation will not negatively impact the conservativeness of the quantification of GHG emission reductions or removals, since conservative estimated values were applied in case monitoring data was incomplete<sup>31</sup>. Moreover, this deviation only relates to the criteria and procedures for monitoring or measurement and does not relate to any other part of the applied methodology.

3. Project Proponents have also used a deviation regarding the monitoring of the quantity of manure treated in the year y (parameter Q<sub>y</sub>) and the quantity of compost produced in year y (parameter Q<sub>y,treatment</sub>). The applied version of the methodology establishes these parameters should be monitored by on-site data measurement using weigh bridges. However, the project

<sup>30</sup> Estimates from LPC took into consideration the design of each individual farm. Estimates were based on the size of each composting site and the typical operating conditions of the UMAC system.

<sup>31</sup> Evidence on the expected time of operation of electric equipments of each farm was provided to the Validation and Verification Body responsible for project verification.

does not involve the transportation of waste by vehicles<sup>32</sup> and the compost is mostly used as fertilizer within the farm or on nearby farms, where weigh bridges are not available.

Project Proponents have proposed to determine the amount of waste composted by monitoring the number of operating hours of the pump that sends manure to the composting unit and/or applying default values. However, as data were incomplete, a conservative value was applied based on monitored data collected in part of this monitoring period and on a scientific study about the quantity of swine manure produced per animal type per day. Values applied on the emission reduction calculation were conservatively defined as the highest value of:

- Embrapa study<sup>33</sup>; or
- The average quantity of manure treated per day monitored by each farmer during part of the monitored period.

Since this parameter is only used to calculate project emissions, using default values is conservative as long as values are higher than monitored data. Also, the CDM Methodological Tool "Project and leakage emissions from composting" (EB 65 Annex 09) allows for a different procedure in case there are no weighing device. The tool recommends estimating the amount of waste based on the number of trucks and their capacity. Under this option, no direct measurement or calibrated equipment are used for the monitoring of the amount waste composted.

Also, since no project emissions from the produced compost are expected (as explained at Section 4.2 below), this deviation will not negatively impact the conservativeness of the quantification of GHG emission reductions or removals, as a conservative approach was chosen to monitor  $Q_y$  and  $Q_{y, treatment}$ . The approach is considered conservative since it is based either on on-site data or on reliable EMBRAPA default values that are applicable to local conditions. Moreover, this deviation is only related to criteria and procedures for monitoring or measurement and is not relate to any other part of the methodology. All methodology deviations mentioned above are already part of the valid version of Project Description, version 06.1, issued on 10/01/2014, and have been applied along the previous monitoring periods.

### 3.2.2 Project Description Deviations

As outlined in the VCS PD Version 06.1, during the validation process, Project Proponents applied a minor methodology deviation to the equation 3 of the AMS-III-D v. 18 used for determining the annual average number of animals of type LT in year y (parameter NLT,y). However, during this

<sup>32</sup> Waste is carried to composting units by gravity and electrical pumps. Compost is usually removed with wheelbarrow or small vehicles (tractors). This is applicable to all farms included in the project.

<sup>33</sup> OLIVEIRA, Paulo Armando V. de. Produção e manejo de dejetos de suínos. Concórdia: Embrapa, 2003. 83 p. Information taken from Table 1. Value adopted to the current monitoring for the amount of solid waste (in kilogram): average daily production of swine manure, including manure and urine, according to animals weight.

4th Monitoring Period, the methodology deviation has been discontinued. The project now applies a deviation to the Project Description (PD), and the calculation of NLT<sub>y</sub> follows Equation 3 of the AMS-III.D methodology. For a detailed explanation, please refer to Section 3.2.1.

According to the VCS PD, Version 06.1, the parameters  $VS_{\text{default}}$ ,  $W_{\text{default}}$ , and  $B_{0,LT}$  for breeding swine can follow the values of developed countries, since farrowing farms comply with all conditions of paragraph 10 (d) of AMS-III.D, version 18, allowing the use of default values from Western Europe. However, during this 4<sup>th</sup> monitoring period, the values for these parameters were changed to those of Latin America, as provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, since the composting project is developed in Latin America.

This alteration does not impact the applicability of the methodology, as the AMS III.D methodology allows for such changes. Substituting the values of the parameters  $VS_{\text{default}}$ ,  $W_{\text{default}}$ , and  $B_{0,LT}$  with those of Latin America achieves a higher level of accuracy and is more conservative.

The project's additionality is also unaffected, as this change does not interfere with the additionality assessment related to Technological Barrier, Investment Barrier, or Barriers due to prevailing practices already conducted during validation.

Furthermore, changing the values of  $VS_{\text{default}}$ ,  $W_{\text{default}}$ , and  $B_{0,LT}$  does not affect the appropriateness of the baseline scenario, since the baseline scenario remains the same — the installation and use of anaerobic lagoons.

Therefore, this alteration does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario. Substituting the values of the parameters  $VS_{\text{default}}$ ,  $W_{\text{default}}$ , and  $B_{0,LT}$  with those of Latin America achieves a higher level of accuracy and is more conservative.

### 3.3 Grouped Projects

Not applicable. This is not a grouped project.

### 3.4 Safeguards

Not applicable.

## 4 DATA AND PARAMETERS

### 4.1 Data and Parameters Available at Validation

|                  |                                            |
|------------------|--------------------------------------------|
| Data / Parameter | Annual average temperature                 |
| Data unit        | °C                                         |
| Description      | Annual average temperature at project site |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source of data                                                                               | National Institute of Meteorology (Instituto Nacional de Meteorologia – INMET).                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Value applied                                                                                | 18°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Justification of choice of data or description of measurement methods and procedures applied | The annual average temperature at the western region of Santa Catarina State was determined according to the data available at INMET.                                                                                                                                                                                                                                                                                                                                                                                                 |
| Purpose of Data                                                                              | According to AMS.III.D version 18, this parameter is necessary to comply with the requirement described in the first paragraph of item (c): “The annual average temperature of baseline site where anaerobic manure treatment facility is located must be higher than 5 °C”. The annual average temperature at western region of Santa Catarina State is 18°C according to data available from. This parameter follows the conditions of applicability of AMS.III.D. It is not used in the quantification of GHG emission reductions. |
| Comments                                                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | <b>GWP<sub>CH4</sub></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Data unit                                                                                    | tCO <sub>2</sub> e/tCH <sub>4</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Description                                                                                  | Global Warming Potential of CH <sub>4</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Source of data                                                                               | Table 2: Selected GWP values from the IPCC Fifth Assessment Report, Table 8.A.1 of the VCS Standard v4.4 <sup>34</sup> , page 36, based on the effects of greenhouse gases over a 100-year time horizon.                                                                                                                                                                                                                                                                                                                                                         |
| Value applied                                                                                | 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Justification of choice of data or description of measurement methods and procedures applied | <p>Although the value of 21 was indicated in version 18 of the methodology AMS-III.D, this parameter shall be updated according to the VCS Standard v4.4., as it states that “for GHG emission reductions occurring on or before 31 December 2020, all ex-ante estimates and ex-post calculations may be converted to CO<sub>2</sub>e using either the GWP values from the IPCC Fourth Assessment Report (AR4) or those from AR5”.</p> <p>Therefore, the GWP adopted is from AR5, as values are also available at Table 2 of the same VCS Standard document.</p> |
| Purpose of Data                                                                              | This parameter is used to convert methane emissions to tCO <sub>2</sub> e for calculation of baseline and project emissions.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Comments                                                                                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

<sup>34</sup> <https://verra.org/wp-content/uploads/2022/12/VCS-Standard-v4.4-FINAL.pdf>

|                                                                                              |                                                                                                                                 |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | <b>DCH<sub>4</sub></b>                                                                                                          |
| Data unit                                                                                    | t/m <sup>3</sup>                                                                                                                |
| Description                                                                                  | Density of CH <sub>4</sub>                                                                                                      |
| Source of data                                                                               | Methodology AMS-III.D., version 18<br>Information available on Page 3.                                                          |
| Value applied                                                                                | 0.00067 at room temperature (20°C) and 1 atm pressure.                                                                          |
| Justification of choice of data or description of measurement methods and procedures applied | Value proposed by the methodology.                                                                                              |
| Purpose of Data                                                                              | This parameter is used to convert methane emissions from cubic meters to tonnes regarding the calculation of baseline emissions |
| Comments                                                                                     | -                                                                                                                               |

|                                                                                              |                                                                                                                    |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | <b>UF<sub>b</sub></b>                                                                                              |
| Data unit                                                                                    | Fraction                                                                                                           |
| Description                                                                                  | Correction factor to account for model uncertainties.                                                              |
| Source of data                                                                               | Methodology AMS-III.D., version 18<br>Information available on Page 3.                                             |
| Value applied                                                                                | 0.94                                                                                                               |
| Justification of choice of data or description of measurement methods and procedures applied | Value proposed by the methodology.                                                                                 |
| Purpose of Data                                                                              | This parameter is a correction factor to account for model uncertainties on the calculation of baseline emissions. |
| Comments                                                                                     |                                                                                                                    |

|                                                   |                                                                                                                                                                                                |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                  | <b>MCF<sub>j</sub></b>                                                                                                                                                                         |
| Data unit                                         | Fraction                                                                                                                                                                                       |
| Description                                       | Annual methane conversion factor for the baseline animal manure management system j.                                                                                                           |
| Source of data                                    | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, table 10.17.                                                                                               |
| Value applied                                     | Uncovered anaerobic lagoons: 77%                                                                                                                                                               |
| Justification of choice of data or description of | The methane conversion factor of 77% for anaerobic lagoons was determined according to IPCC (2006), considering 18°C as the annual average temperature at the region where project is located. |

|                                            |                                                                                                                                                           |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| measurement methods and procedures applied |                                                                                                                                                           |
| Purpose of Data                            | This parameter is used to calculate baseline emissions, providing the methane conversion factor from the use of anaerobic lagoons to treat animal manure. |
| Comments                                   |                                                                                                                                                           |

| Data / Parameter                                                                             | B <sub>0,LT</sub>                                                                                                                                                                                                                                                                                                                                   |               |  |             |       |           |              |      |               |                |      |               |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--|-------------|-------|-----------|--------------|------|---------------|----------------|------|---------------|
| Data unit                                                                                    | m <sup>3</sup> CH <sub>4</sub> /kg dm                                                                                                                                                                                                                                                                                                               |               |  |             |       |           |              |      |               |                |      |               |
| Description                                                                                  | Maximum methane producing potential of the volatile solid generated for animal type LT.                                                                                                                                                                                                                                                             |               |  |             |       |           |              |      |               |                |      |               |
| Source of data                                                                               | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, table 10.A-7 and 10A-8.                                                                                                                                                                                                                                         |               |  |             |       |           |              |      |               |                |      |               |
| Value applied                                                                                | <div>The following values are applied:</div> <table><tr><th>Animal Type</th><th>Value</th><th>Reference</th></tr><tr><td>Market swine</td><td>0.29</td><td>Latin America</td></tr><tr><td>Breeding swine</td><td>0.29</td><td>Latin America</td></tr></table> <div>During the monitoring period, only values from Latin America were applied.</div> |               |  | Animal Type | Value | Reference | Market swine | 0.29 | Latin America | Breeding swine | 0.29 | Latin America |
| Animal Type                                                                                  | Value                                                                                                                                                                                                                                                                                                                                               | Reference     |  |             |       |           |              |      |               |                |      |               |
| Market swine                                                                                 | 0.29                                                                                                                                                                                                                                                                                                                                                | Latin America |  |             |       |           |              |      |               |                |      |               |
| Breeding swine                                                                               | 0.29                                                                                                                                                                                                                                                                                                                                                | Latin America |  |             |       |           |              |      |               |                |      |               |
| Justification of choice of data or description of measurement methods and procedures applied | Brazil does not have published data of the maximum methane producing potential from manure. Hence, default values sourced from IPCC (2006) were applied.                                                                                                                                                                                            |               |  |             |       |           |              |      |               |                |      |               |
| Purpose of Data                                                                              | This parameter is used to calculate baseline emissions. Provides the maximum methane producing potential of volatile solids present in manure, depending on the animal type.                                                                                                                                                                        |               |  |             |       |           |              |      |               |                |      |               |
| Comments                                                                                     | Farrowing farms included in the present project activity are in compliance with all conditions described in paragraph 10 (d) of AMS-III.D version 18. Hence, default values from developed countries can be utilized to define B <sub>0,LT</sub> .                                                                                                  |               |  |             |       |           |              |      |               |                |      |               |

|                  |                                                                          |
|------------------|--------------------------------------------------------------------------|
| Data / Parameter | <b>MS%<sub>BLj</sub></b>                                                 |
| Data unit        | %                                                                        |
| Description      | Fraction of manure handled in baseline animal manure management system j |

| Source of data                                                                               | Project proponent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                               |      |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------|
| Value applied                                                                                | Farm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | MS%BL <sub>j</sub><br>From 01/May/2019 to<br>31/December/2020 |      |
|                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2019                                                          | 2020 |
|                                                                                              | Fazenda Altenor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 100%                                                          | 100% |
|                                                                                              | Fazenda Granja Silva                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 100%                                                          | 100% |
|                                                                                              | Fazenda Ramella                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 100%                                                          | 100% |
|                                                                                              | Sítio Santa Lúcia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 100%                                                          | 100% |
| Justification of choice of data or description of measurement methods and procedures applied | All waste was sent to the baseline treatment system (anaerobic lagoons) prior to the project initiation in Brownfield farms. This is also considered the baseline scenario for Greenfield farms, since it is the common practice in the region.                                                                                                                                                                                                                                                                                                                                                                                                           |                                                               |      |
| Purpose of Data                                                                              | This parameter is used to calculate baseline emissions, providing the fraction of manure that would otherwise be handled on the considered baseline treatment system (anaerobic lagoon).                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                               |      |
| Comments                                                                                     | As described at Section 3.1 above - Implementation Status of the Activity, three farms operated anaerobic lagoons during this monitoring period. The operation of anaerobic lagoons in these farms was measured by the parameter Fraction of manure handled in baseline animal manure management system j (MS%BL <sub>j</sub> ), based on the period within the monitoring period that each farm operated anaerobic lagoons. This approach has been carried out in order to claim emission reductions only for the manure treated by the composting process during the monitoring period, as this parameter directly impacts the GHG emission reductions. |                                                               |      |

| Data / Parameter | W <sub>default</sub>                                                                                        |       |           |
|------------------|-------------------------------------------------------------------------------------------------------------|-------|-----------|
| Data unit        | Kg                                                                                                          |       |           |
| Description      | Default average animal weight of a defined population                                                       |       |           |
| Source of data   | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, tables 10A-7 and 10A-8. |       |           |
| Value applied    | The following values are applied:                                                                           |       |           |
|                  | Animal Type                                                                                                 | Value | Reference |

|                                                                                              |                                                                                                                                                                                                                                                       |    |               |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------|
|                                                                                              | Market swine                                                                                                                                                                                                                                          | 28 | Latin America |
|                                                                                              | Breeding swine                                                                                                                                                                                                                                        | 28 | Latin America |
|                                                                                              | During the monitoring period, only values from Latin America were applied.                                                                                                                                                                            |    |               |
| Justification of choice of data or description of measurement methods and procedures applied | Default average animal weight value was obtained from IPCC (2006).                                                                                                                                                                                    |    |               |
| Purpose of Data                                                                              | This parameter is used to calculate baseline emissions by providing the estimated amount of volatile solid excretion rate for each animal type according to the average animal weight.                                                                |    |               |
| Comments                                                                                     | Farrowing farms included in the present project activity are in compliance with all conditions described in paragraph 10 (d) of AMS-III.D version 18. Hence, default values from developed countries can be utilized to define $W_{\text{default}}$ . |    |               |

|                                                                                              |                                                                                                                                                                                                                                |       |               |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------|
| Data / Parameter                                                                             | VS <sub>default</sub>                                                                                                                                                                                                          |       |               |
| Data unit                                                                                    | Kg dm/animal/day                                                                                                                                                                                                               |       |               |
| Description                                                                                  | Default value for the volatile solid excretion rate per day on a dry-matter basis for a defined livestock population                                                                                                           |       |               |
| Source of data                                                                               | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 4, chapter 10, tables 10A-7 and 10A-8.                                                                                                                    |       |               |
| Value applied                                                                                | The following values are applied:                                                                                                                                                                                              |       |               |
|                                                                                              | Animal Type                                                                                                                                                                                                                    | Value | Reference     |
|                                                                                              | Market swine                                                                                                                                                                                                                   | 0.3   | Latin America |
|                                                                                              | Breeding swine                                                                                                                                                                                                                 | 0.3   | Latin America |
|                                                                                              | During the monitoring period, only values from Latin America were applied.                                                                                                                                                     |       |               |
| Justification of choice of data or description of measurement methods and procedures applied | Brazil does not have published data of the volatile solid excretion rate by animal type. Hence, default values sourced from 2006 IPCC were applied. Values for Latin America are used for market swine and for breeding swine. |       |               |

|                 |                                                                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Purpose of Data | This parameter is used to calculate baseline emissions by providing the estimated amount of volatile solid excretion rate for each animal type according to average animal weight. |
| Comments        |                                                                                                                                                                                    |

|                                                                                              |                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $EF_{composting}$                                                                                                                                                           |
| Data unit                                                                                    | gCH <sub>4</sub> / kg of waste treated on a wet basis                                                                                                                       |
| Description                                                                                  | Emission factor for composting of manure                                                                                                                                    |
| Source of data                                                                               | 2006 IPCC Guidelines for National Greenhouse Gas Inventories, table 4.1, chapter 4, Volume 5                                                                                |
| Value applied                                                                                | 4                                                                                                                                                                           |
| Justification of choice of data or description of measurement methods and procedures applied | This emission factor is described in the applied methodology to calculate methane emissions from composting                                                                 |
| Purpose of Data                                                                              | This parameter is used to calculate project emissions from composting. It is a default value that provides composting emissions from the amount of waste composted per year |
| Comments                                                                                     |                                                                                                                                                                             |

|                                                                                              |                                                                                                                                                              |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | $TDL_{j,y}$                                                                                                                                                  |
| Data unit                                                                                    | Percentage                                                                                                                                                   |
| Description                                                                                  | Average technical transmission and distribution losses for providing electricity to source $j$ in year $y$                                                   |
| Source of data                                                                               | Approved methodology AMS-III.F, version 10.                                                                                                                  |
| Value applied                                                                                | 10%                                                                                                                                                          |
| Justification of choice of data or description of measurement methods and procedures applied | This value is recommended by the applied methodology AMS-III.F, version 10, as described on Table III.F.1.                                                   |
| Purpose of Data                                                                              | This parameter is used calculate project emissions from electricity consumption taking into consideration the expected transmission and distribution losses. |
| Comments                                                                                     |                                                                                                                                                              |

|                  |      |
|------------------|------|
| Data / Parameter | $MD$ |
|------------------|------|

|                                                                                              |                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data unit                                                                                    | Kg/m <sup>3</sup>                                                                                                                                                                                                                                                                              |
| Description                                                                                  | Manure density                                                                                                                                                                                                                                                                                 |
| Source of data                                                                               | OLIVEIRA, Paulo Armando V. de. Produção e manejo de dejetos de suínos. Concórdia: Embrapa, 2003. 83 p.                                                                                                                                                                                         |
| Value applied                                                                                | 1,016                                                                                                                                                                                                                                                                                          |
| Justification of choice of data or description of measurement methods and procedures applied | The density of 1,016 kg per m <sup>3</sup> was obtained from a publication of an EMBRAPA researcher (Mr. Paulo Armando V. de Oliveira). Such density is applicable for swine manure with 3% of solid matter, which is the expected value for the farms included in the project <sup>35</sup> . |
| Purpose of Data                                                                              | This density is used to convert monitored values of $Q_y$ (Quantity of manure treated in the year $y$ ) from volume to weight, regarding calculations of project emissions.                                                                                                                    |
| Comments                                                                                     | More information on the calculation of $Q_y$ is available at Sections 4.2 and 5.2, below.                                                                                                                                                                                                      |

## 4.2 Data and Parameters Monitored

|                                                                 |                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $VS_{LT,y}$                                                                                                                                                                                                                                                                                                   |
| Data unit                                                       | kg dm/animal/year                                                                                                                                                                                                                                                                                             |
| Description                                                     | Volatile solids for livestock LT entering the animal manure management system in year $y$                                                                                                                                                                                                                     |
| Source of data                                                  | <ul style="list-style-type: none"> <li>- IPCC default value from: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, chapter 10, tables 10 A-7 and 10 A-8;</li> <li>- Wsite: Farmers, based on documents provided by integrators, State Agencies or other internal documents.</li> </ul> |
| Description of measurement methods and procedures to be applied | Values from IPCC were applied ( $W_{\text{default}}$ and $VS_{\text{default}}$ ); however, they were adjusted considering the weight of animals in the project sites ( $W_{\text{site}}$ ). The parameter $W_{\text{site}}$ was monitored as described on the section below.                                  |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                                                                                                                                                                      |
| Value monitored                                                 | Detailed information on Appendix.                                                                                                                                                                                                                                                                             |
| Monitoring equipment                                            | No monitoring equipment is used. Since this is a default value from IPCC, it is not possible to quantify the accuracy. However, the correction of this parameter with $W_{\text{site}}$ ensures values are consistent to the project situation.                                                               |

<sup>35</sup> This value is used by LPC Tecnologia Ambiental on the Technical Project of the composting unit. Hence, it is considered applicable to the farms conditions.

|                                |                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QA/QC procedures to be applied | This parameter was calculated with monitored data on $nd_y$ and $W_{site}$ . More information about QA/QC procedures can be found at the respective description of each parameter.                                                                                                                                                                                                       |
| Purpose of the data            | This parameter is used to calculate baseline methane emissions from animal manure treatment system.                                                                                                                                                                                                                                                                                      |
| Calculation method             | Calculated through Equation 3 of VCS PD v06.1, considering the average animal weight at the project site ( $W_{site}$ ), the default average animal weight ( $W_{default}$ ) according to IPCC (2006), the default value of volatile solid excretion rate ( $VS_{default}$ ) also according to IPCC (2006), and the number of days the system is operational during year $y$ ( $nd_y$ ). |
| Comments                       | Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.                                                                                                                                                                                                                          |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $nd_y$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Data unit                                                       | Days                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Description                                                     | Number of days in year $y$ in which the animal manure management system is operational.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Source of data                                                  | Project proponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Description of measurement methods and procedures to be applied | During this monitoring period, the number of days the manure management system is operational were obtained from third party information; specifically batch production reports from integrators. The treatment plant is considered to be operational whenever manure is applied and/or the composting windrows are mixed with substrate to produce compost. As third party information was used, $nd_y$ was considered as the number of days animals are alive in the farm per year, since farmers need to operate the composting unit on a daily basis when animals are confined in the farms. |
| Frequency of monitoring/recording                               | Batch production reports from integrators (third party information).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Value monitored                                                 | Detailed information on Appendix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Monitoring equipment                                            | No equipment is used to monitor this parameter. Farmers stored third party information regarding animal confinement to monitor this parameter.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| QA/QC procedures to be applied | Farmers were trained for the monitoring of this parameter. Monitoring spreadsheets were cross-checked with third party information to avoid possible errors.                                                                                                                                                                                                                                                                                                                                                                                                        |
| Purpose of the data            | This parameter is used to calculate baseline methane emissions from animal manure treatment system. It is also used to calculate project emissions resulting from electricity consumption and from composting process.                                                                                                                                                                                                                                                                                                                                              |
| Calculation method             | The $nd_y$ was obtained by counting the days in the years in which monitoring data indicates that the animal manure management system was operational on each farm. It is calculated by measuring the difference between the entry and exit dates for each batch, ensuring that no date is counted more than once. This method guarantees that each day is counted only once, even if multiple batches overlap, providing a precise measure of operational days. This approach results in a more conservative estimate, avoiding overestimation of system activity. |
| Comments                       | Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.                                                                                                                                                                                                                                                                                                                                                                                                     |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $W_{site}$                                                                                                                                                                                                                                                                                                                                                     |
| Data unit                                                       | Kg                                                                                                                                                                                                                                                                                                                                                             |
| Description                                                     | Average animal weight of a defined livestock population at the project site                                                                                                                                                                                                                                                                                    |
| Source of data                                                  | Project proponents                                                                                                                                                                                                                                                                                                                                             |
| Description of measurement methods and procedures to be applied | <p>The average animal weight by animal type was obtained from the following sources:</p> <ol style="list-style-type: none"> <li>1. Third party information - Batch production reports from integrators</li> <li>2. Conservative default values given the project conditions - this approach was adopted on Fazenda Granja Silva for Breeding Swine.</li> </ol> |
| Frequency of monitoring/recording                               | <p>Periodic records provided by integrators for each batch.</p> <p>Integrators provide documents (batch production reports) for each batch. Thus, animal weight controls do not follow an annual schedule; instead they are based on each batch period.</p>                                                                                                    |
| Value monitored                                                 | Detailed information on Appendix.                                                                                                                                                                                                                                                                                                                              |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                | <p><math>W_{site}</math> for Finishing Unit farms were mostly obtained from third party information, as integrators are responsible to measure animal weight.</p> <p><math>W_{site}</math> for breeding swine found in Farrowing Unit farms were based on IPCC (2006) default values, as these are considered conservative given the project conditions. This approach is considered conservative, since breeding swine in the project region usually weight from 220kg to 250kg<sup>36</sup>.</p> |
| Monitoring equipment           | No monitoring equipment is used. Animal weight is usually measured by integrators for commercial purposes, in order to determine due financial compensations for farmers.                                                                                                                                                                                                                                                                                                                          |
| QA/QC procedures to be applied | Control forms and registration documents provided by third parties (integrators) are considered reliable sources, once data are used for financial purposes. Sustainable Carbon - Projetos Ambientais Ltda. kept a database with the information provided for each farm.                                                                                                                                                                                                                           |
| Purpose of the data            | This parameter is used to calculate baseline methane emissions from animal manure treatment system, specifically for calculating the volatile solids for livestock entering the animal manure management system ( $VS_{LT,y}$ ).                                                                                                                                                                                                                                                                   |
| Calculation method             | Calculated based on a weighted average of the initial medium weight and the final medium weight of animal batches at each farm per year.                                                                                                                                                                                                                                                                                                                                                           |
| Comments                       | Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.                                                                                                                                                                                                                                                                                                                                    |

|                                                                 |                                                                                                                                                       |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $N_{da,y}$                                                                                                                                            |
| Data unit                                                       | Days                                                                                                                                                  |
| Description                                                     | Number of days animal is alive in the farm in the year y                                                                                              |
| Source of data                                                  | Project proponents                                                                                                                                    |
| Description of measurement methods and procedures to be applied | Market swine: this parameter was monitored using registries from third parties (integrators) regarding input and output data of animals in each farm. |

<sup>36</sup> According to TALAMINI, T J D; MARTINS, F M; ARBOIT, C; WOLOSZYNS, N. Custos agregados da produção integrada de suínos nas fases de leitões e de terminação. **Custos e @gronegocio online**. v. 02, October/2006. Information available at Page 75. This study was performed with farms located within the project region and the report states sows usually weight 220Kg and boars weight 250kg. Document available at: <<http://www.custoseagronegocioonline.com.br/especialv2/custos%20agregados%20de%20producao.pdf>>. Last visited on 19/08/2015.

|                                                                   | <p>Breeding swine: this parameter was also monitored using registries from third parties (integrators) regarding input and output data of animals in each farm. However, some breeding swine (i.e. boars and sows) usually spend their entire time alive on the farm. Therefore, the value considered to this parameter could be the same as 365 days.</p> <p>Table below was retrieved from the tab “Animal Data – Ramella” of ER sheet as an example.</p> <table><tr><th colspan="4">Animal Data</th></tr><tr><th>Year</th><th>Type of animal</th><th>2019</th><th>2020</th></tr><tr><td rowspan="7">Average number of days animal is alive in the farm (<math>N_{da,y}</math>)</td><td>Gilts</td><td>0</td><td>0</td></tr><tr><td>Sows in gestation</td><td>0</td><td>0</td></tr><tr><td>Sows</td><td>18</td><td>0</td></tr><tr><td>Boars</td><td>0</td><td>0</td></tr><tr><td>Piglets</td><td>0</td><td>0</td></tr><tr><td>Nursery</td><td>0</td><td>0</td></tr><tr><td>Finishers</td><td>82</td><td>141</td></tr></table> | Animal Data |      |  |  | Year | Type of animal | 2019 | 2020 | Average number of days animal is alive in the farm ( $N_{da,y}$ ) | Gilts | 0 | 0 | Sows in gestation | 0 | 0 | Sows | 18 | 0 | Boars | 0 | 0 | Piglets | 0 | 0 | Nursery | 0 | 0 | Finishers | 82 | 141 |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|--|--|------|----------------|------|------|-------------------------------------------------------------------|-------|---|---|-------------------|---|---|------|----|---|-------|---|---|---------|---|---|---------|---|---|-----------|----|-----|
| Animal Data                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Year                                                              | Type of animal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2019        | 2020 |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Average number of days animal is alive in the farm ( $N_{da,y}$ ) | Gilts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0           | 0    |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
|                                                                   | Sows in gestation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0           | 0    |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
|                                                                   | Sows                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 18          | 0    |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
|                                                                   | Boars                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0           | 0    |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
|                                                                   | Piglets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0           | 0    |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
|                                                                   | Nursery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0           | 0    |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
|                                                                   | Finishers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 82          | 141  |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Frequency of monitoring/recording                                 | <p>Periodic records provided by integrators for each batch.</p> <p>Integrators provide document control and financial arrangements for each batch, which do not follow an annual schedule; instead the frequency of monitoring is based on each batch period.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Value monitored                                                   | Detailed information on Appendix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Monitoring equipment                                              | No monitoring equipment is used. This parameter is usually based on third party information, in this case, on documents from integrators. Therefore, although it is not feasible to quantify accuracy, a high level of accuracy is expected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| QA/QC procedures to be applied                                    | Control forms and registration documents provided by third parties, in this case, integrators, are considered reliable sources, once data are used for financial purposes. Sustainable Carbon - Projetos Ambientais Ltda. kept a database with the information provided for each farm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Purpose of the data                                               | This parameter is used to calculate baseline methane emissions from animal manure treatment system, specifically for calculating the annual average number of animals ( $N_{LT,y}$ ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Calculation method                                                | Calculated based on a weighted average of the period that animal batches stay in each farm per year.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |
| Comments                                                          | The current monitoring period starts on 01/May/2019, thus the number of days animals are alive in the farm ( $N_{da,y}$ ) start only from this date, regardless if the batch entry date was before May 2019. This approach has been carried out in order to claim emission reductions only during the current monitoring period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |      |  |  |      |                |      |      |                                                                   |       |   |   |                   |   |   |      |    |   |       |   |   |         |   |   |         |   |   |           |    |     |

|  |                                                                                                                                                                                                                                                                                                                |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>In addition, the Number of days animal is alive in the farm was also limited to the final date of the current monitoring period.</p> <p>Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.</p> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $N_{p,y}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Data unit                                                       | Number of animals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description                                                     | Number of animals produced annually of type LT for the year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Source of data                                                  | Project proponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Description of measurement methods and procedures to be applied | <p>Market swine: this parameter was monitored using registries from third parties (integrators, State Agencies, etc) regarding input and output data of animals in each farm.</p> <p>Breeding swine: this parameter was also monitored using registries from third parties (integrators, State Agencies, etc) regarding input and output data of animals in each farm. However, some breeding swine (i.e. boars and sows) usually stay in the farm during the whole year, and thus are not included in registries from third parties. Therefore, this parameter was monitored using internal registries from farmers. The number of animals produced was considered the annual average.</p> |
| Frequency of monitoring/recording                               | <p>Periodic records provided by integrators for each batch.</p> <p>Integrators provide document control and financial arrangements for each batch, which do not follow an annual schedule; instead, the frequency of monitoring is based on each batch period.</p>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Value monitored                                                 | Detailed information on Appendix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Monitoring equipment                                            | No monitoring equipment is used. This parameter is usually based on third party information, such as documents from integrators and State Agencies. Therefore, although it is not feasible to quantify accuracy, a high level of accuracy is expected.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| QA/QC procedures to be applied                                  | Control forms and registration documents provided by third parties (integrators, State Agencies, etc) are considered reliable sources, once data are used to financial purposes. Sustainable Carbon - Projetos Ambientais Ltda. kept a database with the information provided for each farm.                                                                                                                                                                                                                                                                                                                                                                                                |
| Purpose of the data                                             | This parameter is used to calculate baseline methane emissions from animal manure treatment system, specifically for calculating the annual average number of animals ( $N_{LT,y}$ ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                    |                                                                                                                                                                 |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Calculation method | Total of animals LT produced at each farm per year (or in a specific period of time according to the current monitoring period).                                |
| Comments           | Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later. |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $N_{LT,y}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Data unit                                                       | Number of animals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Description                                                     | Annual average number of animals of type LT in year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Source of data                                                  | Project proponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Description of measurement methods and procedures to be applied | This parameter was monitored based on parameters $N_{da,y}$ and $N_{p,y}$ previously described.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Frequency of monitoring/recording                               | Annually, based on periodic records.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Value monitored                                                 | Detailed information on Appendix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Monitoring equipment                                            | No monitoring equipment is used. This parameter is calculated based on third party information, such as documents from integrators and State Agencies. Therefore, although it is not feasible to quantify accuracy, a high level of accuracy is expected.                                                                                                                                                                                                                                                                        |
| QA/QC procedures to be applied                                  | Farmers are responsible for storing data regarding animal production, such as control forms and registration documents provided by integrators. Sustainable Carbon - Projetos Ambientais Ltda. kept a database with the information provided for each farm.                                                                                                                                                                                                                                                                      |
| Purpose of the data                                             | This parameter is used to calculate baseline methane emissions from animal manure treatment system.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Calculation method                                              | <p>The annual average number of animals of type LT was calculated using Equation 3 from the AMS-III.D Methodology, version 18. This calculation considers the number of days animals are alive in the farm (<math>N_{da,y}</math>) and the total number of animals produced (<math>N_{p,y}</math>) in year y. The annual average number of animals (<math>N_{LT,y}</math>) was calculated by Sustainable Carbon technical team, using the following formula:</p> $N_{LT,y} = N_{da,y} \times \left( \frac{N_{p,y}}{365} \right)$ |

| Comments                                                        | Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.                                                                                                                                                                                                                                                                                                                   |      |                   |                       |     |      |     |       |       |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------|-----------------------|-----|------|-----|-------|-------|
| Data / Parameter                                                | $Q_{y,treatment}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                   |                       |     |      |     |       |       |
| Data unit                                                       | Tonnes                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                   |                       |     |      |     |       |       |
| Description                                                     | Quantity of compost produced in year y                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                   |                       |     |      |     |       |       |
| Source of data                                                  | Project proponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                   |                       |     |      |     |       |       |
| Description of measurement methods and procedures to be applied | Farmers monitored the amount of compost produced per year using spreadsheets. Compost was measured using standard storage units with known volume or weight. In addition, farmers measured the amount of storage units every time compost is used or sold.                                                                                                                                                                                                                        |      |                   |                       |     |      |     |       |       |
| Frequency of monitoring/recording                               | Annually, based on monthly records.                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                   |                       |     |      |     |       |       |
| Value monitored                                                 | <table border="1"> <thead> <tr> <th>Year</th><th><math>Q_{y,treatment}</math></th></tr> </thead> <tbody> <tr> <td>2019<br/>(From 01-May)</td><td>459</td></tr> <tr> <td>2020</td><td>665</td></tr> <tr> <td>Total</td><td>1,124</td></tr> </tbody> </table> <p>Values monitored and spreadsheet template were available to Auditor team during the site visit.</p>                                                                                                                | Year | $Q_{y,treatment}$ | 2019<br>(From 01-May) | 459 | 2020 | 665 | Total | 1,124 |
| Year                                                            | $Q_{y,treatment}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                   |                       |     |      |     |       |       |
| 2019<br>(From 01-May)                                           | 459                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                   |                       |     |      |     |       |       |
| 2020                                                            | 665                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                   |                       |     |      |     |       |       |
| Total                                                           | 1,124                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                   |                       |     |      |     |       |       |
| Monitoring equipment                                            | Storage bags with predefined weight or volume. The indirect measurement procedure chosen to monitor this parameter is expected to result in low levels of accuracy. However, procedures with higher precision are not feasible given the farmers reality. Also, no project emissions from the produced compost are expected. Hence, the low accuracy of this parameter is not expected to affect the calculation of GHG emission reductions during the current monitoring period. |      |                   |                       |     |      |     |       |       |
| QA/QC procedures to be applied                                  | Farmers were trained on the project monitoring in order to achieve a higher accuracy in the determination of this parameter.                                                                                                                                                                                                                                                                                                                                                      |      |                   |                       |     |      |     |       |       |
| Purpose of the data                                             | This parameter is monitored as requested by the applied methodology. However, since compost is not subject to anaerobic treatment or disposal, no emissions are associated to the amount of compost produced. Therefore, it is not used in the quantification of GHG emission reductions.                                                                                                                                                                                         |      |                   |                       |     |      |     |       |       |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Calculation method | The total quantity of compost produced per year was monitored through farmers' records, which also detailed the final destination of compost (i.e. usage, sale, etc).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Comments           | <p>As previously described at Section 3.2.1 (Methodology Deviations), project proponents applied a deviation regarding the monitoring of the quantity of compost produced in year y (parameter <math>Q_{y,treatment}</math>). The applied version of the methodology establishes this parameter should be monitored by on-site data measurement using weigh bridges. However, compost is mostly used as fertilizer within the farm or on nearby farms, where weigh bridges are not available.</p> <p>Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.</p> |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | $EC_{PJ,j,y}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Data unit                                                       | MWh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Description                                                     | Quantity of electricity consumed by the project electricity consumption source j in year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Source of data                                                  | Project proponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description of measurement methods and procedures to be applied | <p>As predicted in the VCS PD v.06.1, farmers would record the frequency of operation of the manure pumps and of the mixing equipment (Mechanized and Automated Composting Unit - UMAC) in spreadsheets on a daily basis. These are the only two equipment demanding electricity consumption in the AWMS.</p> <p>Since monitoring data is incomplete for the current monitoring period, this parameter was conservatively defined as the highest value of:</p> <ul style="list-style-type: none"> <li>LPC judgment corrected with the use of a conservative factor of 125%, meaning an operation time 25% higher than expected by LPC was considered.</li> <li>The average operation time of each equipment as monitored by each farmer during part of the monitored period.</li> </ul> <p>The approach used and the value applied for each farm is available at Section 4.4 – Monitoring Plan, below.</p> |
| Frequency of monitoring/recording                               | Daily                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Value monitored                                                 | Detailed information on Appendix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Monitoring equipment           | No equipment is used to monitor this parameter. Monitoring is based on default value applied to all farms. The indirect measurement procedure chosen to monitor this parameter is expected to result in low levels of accuracy. However, procedures with higher precision are not feasible to apply given the farmers reality. Project emissions from electricity are expected to be quite low compared to emission reductions (around 1%). Hence, the low accuracy is not expected to significantly affect the calculation of emission reductions during the crediting period.                                                                                                                                                                                                                                     |
| QA/QC procedures to be applied | <p>Farmers were trained on the project monitoring in order to achieve a higher accuracy in the determination of this parameter. In addition, Sustainable Carbon shall manage the project database and check possible errors.</p> <p>Estimated values were only applied when it was possible to ensure that their use resulted in a conservative calculation of emission reduction. In addition, estimated values were compared either to existing data of the same farm (for different periods of time) or to data from other farms with similar operating conditions. Such comparison confirmed that estimated values were in most cases conservative.</p>                                                                                                                                                         |
| Purpose of the data            | This parameter is used to calculate project emissions from electricity consumption.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Calculation method             | Farmers recorded the exact time period per day they operated the mixing equipment (UMAC) and the manure pump only during part of the monitored period. Thus, estimated value was also applied. Estimated values were defined by LPC and are described on Annex 2 of the VCS PD v06.1. However, when those default values could not be considered conservative, project proponents utilized the existing data (average operation time of each equipment), which was then extrapolated for the whole monitoring period.                                                                                                                                                                                                                                                                                               |
| Comments                       | <p>Currently, electricity consumption is measured for the whole farm, which includes several components that are not within the project boundary.</p> <p>Project Proponents have used a deviation in the monitoring of the quantity of electricity consumed by the project. This monitoring approach has been chosen since it is not feasible to measure the electricity consumption separately for the operation of each AWMS. This would require installing equipment and making changes to electricity systems within the farm, which are costly.</p> <p>Given the farms management processes and their low energy consumption, a conservative value was applied. Such value is based on monitored data collected in part of this monitoring period and on LPC judgment about the expected time of operation</p> |

|  |                                                                                                                                                                                                                                                                                                   |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>of the manure pump and the UMAC equipment. More information is available at Section 3.2.1 – Methodology Deviations.</p> <p>Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Data / Parameter                                                | $EF_{EL,j,y}$                                                                                                                                                                                                                                                    |      |                                       |      |        |      |        |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------|------|--------|------|--------|
| Data unit                                                       | tCO <sub>2</sub> /MWh                                                                                                                                                                                                                                            |      |                                       |      |        |      |        |
| Description                                                     | Emission factor for electricity generation for source j in year y (tCO <sub>2</sub> /MWh)                                                                                                                                                                        |      |                                       |      |        |      |        |
| Source of data                                                  | Brazilian Designated National Authority (DNA) <sup>37</sup>                                                                                                                                                                                                      |      |                                       |      |        |      |        |
| Description of measurement methods and procedures to be applied | Sustainable Carbon – Projetos Ambientais Ltda. was responsible to organize the emission factor of the grid available in the Brazilian DNA website.                                                                                                               |      |                                       |      |        |      |        |
| Frequency of monitoring/recording                               | Annually                                                                                                                                                                                                                                                         |      |                                       |      |        |      |        |
| Value monitored                                                 | <p>The annual emission factor for electricity consumption is described below:</p> <table> <tr> <th>Year</th><th><math>EF_{EL,j,y}</math> (tCO<sub>2</sub>/MWh)</th></tr> <tr> <td>2019</td><td>0.3100</td></tr> <tr> <td>2020</td><td>0.2759</td></tr> </table>  | Year | $EF_{EL,j,y}$ (tCO <sub>2</sub> /MWh) | 2019 | 0.3100 | 2020 | 0.2759 |
| Year                                                            | $EF_{EL,j,y}$ (tCO <sub>2</sub> /MWh)                                                                                                                                                                                                                            |      |                                       |      |        |      |        |
| 2019                                                            | 0.3100                                                                                                                                                                                                                                                           |      |                                       |      |        |      |        |
| 2020                                                            | 0.2759                                                                                                                                                                                                                                                           |      |                                       |      |        |      |        |
| Monitoring equipment                                            | No monitoring equipment is used. As this parameter is calculated by the Brazilian Designated National Authority following CDM methodologies, a high accuracy level is expected.                                                                                  |      |                                       |      |        |      |        |
| QA/QC procedures to be applied                                  | The grid emission factor will be obtained directly from the Brazilian DNA website. No QA/QC procedures are applied to this parameter.                                                                                                                            |      |                                       |      |        |      |        |
| Purpose of the data                                             | This parameter is used to calculate project emissions from electricity consumption.                                                                                                                                                                              |      |                                       |      |        |      |        |
| Calculation method                                              | <p>Emission factor is calculated by the Brazilian DNA according to current CDM tools and guidelines.</p> <p>The calculation of the combined margin (CM) emission factor (<math>EF_{grid,CM,y}</math>) is based on a weighted average of the Build Margin and</p> |      |                                       |      |        |      |        |

<sup>37</sup> Available at: < <https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao#:~:text=Fatores%20de%20emiss%C3%A3o%20MDL%2FSIN,-Info&text=Ele%20calcula%20a%20m%C3%A9dia%20das,que%20estejam%20funcionando%20na%20margem> >. Last visited on: 23/05/2023.

|                                                                                                                                                                | the Operating Margin, using a 0.5 weight for each parameter, as detailed below:                                                                                                                                                                                                                                                                                  |                                                           |           |           |              |        |        |                  |        |        |                                                            |        |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------|-----------|--------------|--------|--------|------------------|--------|--------|------------------------------------------------------------|--------|--------|
|                                                                                                                                                                | <table><tr><th>Emission factors – annual average (tCO<sub>2</sub>/MWh)</th><th>Year 2019</th><th>Year 2020</th></tr><tr><td>Build Margin</td><td>0.1020</td><td>0.0979</td></tr><tr><td>Operating Margin</td><td>0.5181</td><td>0.4539</td></tr><tr><td>Combined margin emission factor (EF<sub>grid,CM,y</sub>)</td><td>0.3100</td><td>0.2759</td></tr></table> | Emission factors – annual average (tCO <sub>2</sub> /MWh) | Year 2019 | Year 2020 | Build Margin | 0.1020 | 0.0979 | Operating Margin | 0.5181 | 0.4539 | Combined margin emission factor (EF <sub>grid,CM,y</sub> ) | 0.3100 | 0.2759 |
|                                                                                                                                                                | Emission factors – annual average (tCO <sub>2</sub> /MWh)                                                                                                                                                                                                                                                                                                        | Year 2019                                                 | Year 2020 |           |              |        |        |                  |        |        |                                                            |        |        |
|                                                                                                                                                                | Build Margin                                                                                                                                                                                                                                                                                                                                                     | 0.1020                                                    | 0.0979    |           |              |        |        |                  |        |        |                                                            |        |        |
|                                                                                                                                                                | Operating Margin                                                                                                                                                                                                                                                                                                                                                 | 0.5181                                                    | 0.4539    |           |              |        |        |                  |        |        |                                                            |        |        |
| Combined margin emission factor (EF <sub>grid,CM,y</sub> )                                                                                                     | 0.3100                                                                                                                                                                                                                                                                                                                                                           | 0.2759                                                    |           |           |              |        |        |                  |        |        |                                                            |        |        |
| For more detailed information on the calculation method of the grid emission factor please check the individual VCS MR Calculation Spreadsheets for each farm. |                                                                                                                                                                                                                                                                                                                                                                  |                                                           |           |           |              |        |        |                  |        |        |                                                            |        |        |
|                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                  |                                                           |           |           |              |        |        |                  |        |        |                                                            |        |        |
|                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                  |                                                           |           |           |              |        |        |                  |        |        |                                                            |        |        |
| Comments                                                                                                                                                       | All farms included in the project exclusively use electricity from the Brazilian Interconnected System. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.                                                                                          |                                                           |           |           |              |        |        |                  |        |        |                                                            |        |        |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | Q <sub>y</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Data unit                                                       | Tonnes (wet basis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Description                                                     | Quantity of manure treated in the year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Source of data                                                  | Project Proponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Description of measurement methods and procedures to be applied | <p>The amount of waste produced per year was monitored by registering the operating hours of the pump that destine the manure from the storage tank to the composting unit. Spreadsheets were used to record the operation time per day of manure pumps.</p> <p>Nevertheless, during the current monitoring period, default values of animal waste production had to be used to obtain the quantity of manure treated (Q<sub>y</sub>), since monitoring data was incomplete.</p> <p>Given the farms management processes, a conservative value was applied. Such value is based on monitored data collected in part of this monitoring period and on a scientific study about the quantity of manure produced per animal type per day. Values</p> |

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | <p>applied on the emission reduction calculation were conservatively defined as the highest value of:</p> <ul style="list-style-type: none"> <li>• Embrapa scientific study<sup>38</sup>.</li> <li>• The average quantity of manure treated per day monitored by each farmer during part of the monitored period.</li> </ul> <p>The most conservative value was then multiplied by the number of days where animal manure management system is operational (<math>nd_y</math>), achieving the quantity of manure treated per year (<math>Q_y</math>).</p> <p>The approach used and the value applied for each farm is available at Section 4.4 – Monitoring Plan, below.</p>                                                                                    |
| Frequency of monitoring/recording | Annually, based on monthly records                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Value monitored                   | Detailed information on Appendix.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Monitoring equipment              | The indirect measurement procedure chosen to monitor this parameter is expected to result in low levels of accuracy. However, procedures with higher precision are not feasible to apply given the farmers reality. The installation of hour meters or data loggers to record information automatically will increase accuracy, but this will only be possible in a near future. Please see calculation method below for more information.                                                                                                                                                                                                                                                                                                                      |
| QA/QC procedures to be applied    | Values were cross-checked with estimated data from Embrapa. These values are based in Santa Catarina State Environmental Agency (FATMA) normative and specific literature and were also used by LPC in the design of the composting units.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Purpose of the data               | This parameter is used to calculate project emissions resulting from the composting process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Calculation method                | <p>The amount of waste (in wet basis) was calculated by multiplying the most conservative value found of average daily production of swine manure by the number of days in a year in which the treatment plant is operational (<math>nd_y</math>).</p> <p>If data monitored by each farmer during part of the monitored period is more conservative, the amount of waste (in wet basis) is calculated by the nominal flow rate of the pump multiplied by the time of operation, as monitored by the farmers with manual spreadsheets. Thus, the value is estimated in liters and then, converted to weight, using a default value for the density of the waste. This parameter was also corrected to discount water that is flushed to the composting site.</p> |

<sup>38</sup> OLIVEIRA, Paulo Armando V. de. **Produção e manejo de dejetos de suínos**. Concórdia: Embrapa, 2003. 83 p. Information taken from Table 1. Value adopted to the current monitoring for the amount of solid waste (in kilogram): average daily production of swine manure, including manure and urine, according to animals weight.

|                                | <p>However, if Embrapa default values are more conservative, a scientific study<sup>39</sup> developed by this Institution is utilized to obtain default values on the average production of swine manure, which are established according to the swine weight, as described in table below:</p> <table><tr><th>Animal</th><th>Average daily production of swine manure (manure and urine, in kg)</th></tr><tr><td>Swine weight from 25 to 100 kg</td><td>4.90</td></tr><tr><td>Sows in gestation</td><td>11.00</td></tr><tr><td>Sows</td><td>18.00</td></tr><tr><td>Boars</td><td>6.00</td></tr><tr><td>Nursery</td><td>0.95</td></tr><tr><td>Average</td><td>5.80</td></tr></table> <p>In case these values are used, they are multiplied by the annual average number of animals of each type and by the number of days in year y where the animal manure management system was operational, thus obtaining the quantity of manure treated in the year y.</p> <p>Embrapa publication indicates that wastes from swine confinements are composed of dung, urine and flushed water. Swine manure (both dung and urine) consist of nearly 70% of total wastes (i.e., 4.9kg out of 7 liters, or 7.112 kg considering a density of 1.016 kg per liter). Such density is expected for swine manure with 3% of solid matter, which is the expected value for the farms included in the project<sup>40</sup>.</p> <p>The predicted value of manure and urine to be processed by the LPC equipment is 7 liters of liquid waste, following Embrapa's reference values.</p> <p>More information about the Q<sub>y</sub> calculation method applied at each farm is described at Section 4.4 – Monitoring Plan, below.</p> | Animal | Average daily production of swine manure (manure and urine, in kg) | Swine weight from 25 to 100 kg | 4.90 | Sows in gestation | 11.00 | Sows | 18.00 | Boars | 6.00 | Nursery | 0.95 | Average | 5.80 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------|--------------------------------|------|-------------------|-------|------|-------|-------|------|---------|------|---------|------|
| Animal                         | Average daily production of swine manure (manure and urine, in kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |
| Swine weight from 25 to 100 kg | 4.90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |
| Sows in gestation              | 11.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |
| Sows                           | 18.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |
| Boars                          | 6.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |
| Nursery                        | 0.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |
| Average                        | 5.80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |
| Comments                       | <p>As previously described at Section 3.2.1 – Methodology Deviations, Project Proponents applied a deviation regarding the monitoring of the quantity of manure treated in the year y. The applied version of the methodology establishes this parameter should be monitored by on-site data measurement using weigh</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |                                                                    |                                |      |                   |       |      |       |       |      |         |      |         |      |

<sup>39</sup> OLIVEIRA, Paulo Armando V. de. **Produção e manejo de dejetos de suínos**. Concórdia: Embrapa, 2003. 83 p. Information taken from Table 1. Value adopted to the current monitoring for the amount of solid waste (in kilogram): average daily production of swine manure, including manure and urine, according to animals weight.

<sup>40</sup> This value is used by LPC Tecnologia Ambiental on the Technical Project of the composting unit. Hence, it is considered applicable to farms conditions.

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|  | <p>bridges. However, the project does not involve the transportation of waste by vehicles<sup>41</sup>.</p> <p>Project Proponents have proposed to calculate the amount of waste composted by monitoring the number of hours that the pump that sends manure to the composting unit operates and/or applying default values.</p> <p>The amount of wash water was not considered as it does not present organic matter and does not result in methane emissions. This approach is considered appropriate, given that the UNFCCC Methodological Tool "Project and leakage emissions from composting" v.01.0.0<sup>42</sup> provides the following information:</p> <p>(i) Composting converts biodegradable organic carbon to mostly carbon dioxide (CO<sub>2</sub>) and a residue (compost) that can be used as a fertilizer. Other outputs from composting can include, inter alia, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and run-off wastewater (in case of co-composting). Therefore, emissions from composting are only expected for the degradation of biodegradable organic carbon.</p> <p>(ii) Even in cases of co-composting (a type of composting where solid wastes and wastewater are composted together), wastewater should not be accounted for the estimation of Q<sub>y</sub>.</p> <p>The current project does not involve co-composting. Instead, the project involves the composting of animal manure diluted with wash water from the barns. Such water does not contain organic carbon and, therefore, should not result in project emissions from composting.</p> <p>Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.</p> |
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| Data / Parameter | Conditions of the composting process                                                                                                                                                         |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data unit        | °C for temperature; moisture level (qualitative analysis), ranging from very humid to very dry; Frequency of time for operation of the mixing equipment.                                     |
| Description      | Conditions of the composting process include monitoring the following parameters: temperature and moisture of the composting mass and frequency of operation of the mixing equipment (UMAC). |

<sup>41</sup> Waste is carried to the composting units by gravity and electrical pumps. Compost is usually removed with wheelbarrow or small vehicles (tractors). This is applicable to all farms included in the project.

<sup>42</sup> Available at: <<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-13-v1.pdf>>. Last visited on 20/08/2015.

| Source of data                                                  | Project proponents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                      |                                                 |       |                                                                     |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------|-------|---------------------------------------------------------------------|--|--|------|--------------------------|--|-------------------------------------------------|--|---------------------------------------------------------------------|------|------|------|------|-----------------|------|------|-------|-------|-----|----------------------|------|------|-------|-------|-----|-----------------|------|------|-------|-------|-----|-------------------|------|------|-------|-------|-----|
| Description of measurement methods and procedures to be applied | Farmers followed technical recommendations from LPC to ensure that the composting unit was operating according to a quality control program. Farmers periodically monitored the temperature and moisture of the composting mass in composting windrows. In addition, they also recorded the operation frequency of the UMAC equipment, which mixes the composting mass. Farmers took notes of the measurements on manual spreadsheets (paper copies).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                      |                                                 |       |                                                                     |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
| Frequency of monitoring/recording                               | <p>The average monitoring/recording frequency of the temperature and moisture in the composting mass was around 15 days.</p> <p>Frequency of operation of the composting equipment was monitored on a daily basis.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                                 |       |                                                                     |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
| Value monitored                                                 | <p>Not applied for calculations. The average temperature (°C), moisture content of the composting mass (% wet, or dry), as well as the frequency of operation of the mixing equipment (hours/day) monitored during this period, are summarized in the table below:</p> <table><tr><th colspan="6">Conditions of the composting process</th></tr><tr><th rowspan="2">Farm</th><th colspan="2">Average Temperature (°C)</th><th colspan="2">Average Moisture level (% very humid, very dry)</th><th rowspan="2">Frequency of time for operation of the mixing equipment (hours/day)</th></tr><tr><th>2019</th><th>2020</th><th>2019</th><th>2020</th></tr><tr><td>Fazenda Altenor</td><td>49.0</td><td>50.0</td><td>Wet +</td><td>Wet +</td><td>0.9</td></tr><tr><td>Fazenda Granja Silva</td><td>54.9</td><td>55.5</td><td>46.9%</td><td>47.0%</td><td>0.5</td></tr><tr><td>Fazenda Ramella</td><td>53.9</td><td>49.8</td><td>48.1%</td><td>51.1%</td><td>0.5</td></tr><tr><td>Sítio Santa Lúcia</td><td>45.7</td><td>45.3</td><td>Dry +</td><td>Dry +</td><td>1.8</td></tr></table> <p>Spreadsheet template was made available to the auditing team during the site visit.</p> <p>According to PD v.06.1, the compost produced is not stored under anaerobic conditions and/or disposed of in landfills, and this remained consistent throughout this monitoring period. All compost produced is intended for soil application. Before soil application, the compost typically remains on the composting unit, subject to low humidity, frequent mixing, and high temperatures (due to insulation and microbial activity).</p> <p>Farmers usually remove the compost "on demand," as the UMAC system allows the compost to remain on-site for as long as desired.</p> | Conditions of the composting process |                                                 |       |                                                                     |  |  | Farm | Average Temperature (°C) |  | Average Moisture level (% very humid, very dry) |  | Frequency of time for operation of the mixing equipment (hours/day) | 2019 | 2020 | 2019 | 2020 | Fazenda Altenor | 49.0 | 50.0 | Wet + | Wet + | 0.9 | Fazenda Granja Silva | 54.9 | 55.5 | 46.9% | 47.0% | 0.5 | Fazenda Ramella | 53.9 | 49.8 | 48.1% | 51.1% | 0.5 | Sítio Santa Lúcia | 45.7 | 45.3 | Dry + | Dry + | 1.8 |
| Conditions of the composting process                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |                                                 |       |                                                                     |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
| Farm                                                            | Average Temperature (°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      | Average Moisture level (% very humid, very dry) |       | Frequency of time for operation of the mixing equipment (hours/day) |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
|                                                                 | 2019                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2020                                 | 2019                                            | 2020  |                                                                     |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
| Fazenda Altenor                                                 | 49.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 50.0                                 | Wet +                                           | Wet + | 0.9                                                                 |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
| Fazenda Granja Silva                                            | 54.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 55.5                                 | 46.9%                                           | 47.0% | 0.5                                                                 |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
| Fazenda Ramella                                                 | 53.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 49.8                                 | 48.1%                                           | 51.1% | 0.5                                                                 |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |
| Sítio Santa Lúcia                                               | 45.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 45.3                                 | Dry +                                           | Dry + | 1.8                                                                 |  |  |      |                          |  |                                                 |  |                                                                     |      |      |      |      |                 |      |      |       |       |     |                      |      |      |       |       |     |                 |      |      |       |       |     |                   |      |      |       |       |     |

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|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                | Eventually, some farmers store the compost for short periods of time (less than a month), following recommendations from LPC and Sustainable Carbon to avoid anaerobic storage or disposal. Hence, both the composting activity and the technical aspects of the composting units prevent anaerobic conditions, as observed during validation and verification site visits.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Monitoring equipment           | Thermometers and moisture meters. Measurement accuracy is expected to be high (above 90%), given the technical specification of the equipment and the fact that farmers were trained for the measurement of these parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| QA/QC procedures to be applied | Farmers performed the measurement of the temperature and moisture of the composting mass using thermometers and moisture meters. Sustainable Carbon controlled the database of the project (spreadsheet, measurements, etc.) LPC gave support on how to control the moisture of the composting process. The moisture of the composting mass was monitored by each farmer using visual inspections to check whether the composting mass is too dry (crumbling in the hand), or too wet (dripping liquid). In addition, a moisture meter was used to indicate the level of moisture in the composting mass. Farmers were trained to ensure that these parameters were correctly measured. Farmers were instructed to contact LPC for assistance in case the temperature or moisture of the composting mass is outside desired ranges. |
| Purpose of the data            | This parameter is monitored as requested by the applied methodology. However, it is not used for the calculation of GHG emission reductions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Calculation method             | Thermometers and moisture meters provide direct measurement of these parameters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Comments                       | Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

|                                    |                                                                                                                                                                         |
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| Data / Parameter                   | <b><i>Soil application of the compost for agricultural purposes</i></b>                                                                                                 |
| Data unit                          | Numerical frequency                                                                                                                                                     |
| Description                        | Number of times that the compost is removed from the treatment system, providing a description of the soil application.                                                 |
| Source of data                     | Project proponents                                                                                                                                                      |
| Description of measurement methods | Swine farmers controlled the final destination of the compost (control of sales, consumer records, distance, etc.) using a spreadsheet developed by Sustainable Carbon. |

|                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                            |                     |                                                                                                                                                       |
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| and procedures to be applied                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                            |                     |                                                                                                                                                       |
| Frequency of monitoring/recording                                                                                                          | Annually, based on monthly records                                                                                                                                                                                                                                                                                                                                                |                                                                            |                     |                                                                                                                                                       |
| Value monitored                                                                                                                            | Not applied for calculations.                                                                                                                                                                                                                                                                                                                                                     |                                                                            |                     |                                                                                                                                                       |
|                                                                                                                                            | Soil application of the compost for agricultural purposes                                                                                                                                                                                                                                                                                                                         |                                                                            |                     |                                                                                                                                                       |
|                                                                                                                                            | Farm                                                                                                                                                                                                                                                                                                                                                                              | Number of times that the compost was removed during this monitoring period | Quantity            | Soil Application                                                                                                                                      |
|                                                                                                                                            | Fazenda Altenor                                                                                                                                                                                                                                                                                                                                                                   | 1                                                                          | 300 m³              | Compost used for soil application on-site (on the farm itself)                                                                                        |
|                                                                                                                                            | Fazenda Granja Silva                                                                                                                                                                                                                                                                                                                                                              | -                                                                          | 300 tons            | 70% of the compost was used for soil application on-site (on the farm itself). 30% of the compost sold for soil application in the neighboring region |
|                                                                                                                                            | Fazenda Ramella                                                                                                                                                                                                                                                                                                                                                                   | 2                                                                          | 300 tons            | Compost used for soil application on-site (on the farm itself)                                                                                        |
|                                                                                                                                            | Sítio Santa Lúcia                                                                                                                                                                                                                                                                                                                                                                 | 10                                                                         | 450 m³ and 900 bags | Compost sold for soil application in the neighboring region, within a maximum distance of 50 km                                                       |
|                                                                                                                                            | Monitoring Spreadsheet was made available to the auditing team during the site visit.                                                                                                                                                                                                                                                                                             |                                                                            |                     |                                                                                                                                                       |
| The compost was applied in a manner to avoid methane emissions. Part of the compost was sold to rural properties located nearby the farms. |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                            |                     |                                                                                                                                                       |
| Monitoring equipment                                                                                                                       | No monitoring equipment is used. The indirect monitoring procedure chosen for this parameter is expected to result in medium to low levels of accuracy. However, procedures with a higher precision are not feasible to apply given the farmers reality. Also, no project emissions from the produced compost are expected. Hence, the low accuracy is not expected to affect the |                                                                            |                     |                                                                                                                                                       |

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|                                | calculation of emission reductions during the current monitoring period.                                                                                                                                                                   |
| QA/QC procedures to be applied | An annual verification was carried out by a technician in a sample of users, who analyzed the compost application in the farms.                                                                                                            |
| Purpose of the data            | This parameter is monitored as requested by the applied methodology. It is used to confirm that the compost is not subject to anaerobic treatment or disposal and thus, verifying if project emissions could be expected from this source. |
| Calculation method             | The soil application of the compost was monitored through a sheet fed by the farmers, who are responsible for controlling the final destination of the compost in each farm.                                                               |
| Comments                       | Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.                                                                            |

### 4.3 Data Monitored and SOCIALCARBON

#### SOCIAL RESOURCE

|                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator                                                                  | <b>Association and Cooperatives</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Data unit                                                                  | Number of association and cooperative initiatives.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description                                                                | <p>Evaluates if the swine farmer is involved in sector associations or cooperatives.</p> <p>Association: Group of two or more people that are organized for defending common interests, non profit with a legal personality (IE, 2011)</p> <p>Cooperative: Organization of, at least, seven physical people, united through cooperation and mutual support, with democratic and participative management, with common social and economic goals, which legal aspects are distinct from other societies (IE, 2011).</p> |
| Source of data                                                             | Swine farmers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Description of methods to collect information and procedures to be applied | Documents and photos                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Purpose of the data                                                        | The swine farmer is involved in associations or cooperatives, though his participation is not active.                                                                                                                                                                                                                                                                                                                                                                                                                  |

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| Comments | No comments. |
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| Indicator                                                                  | <b>Economic Dependency</b>                                                                                                                                               |
| Data unit                                                                  | Number of new activities introduced due to the compost production.                                                                                                       |
| Description                                                                | Evaluates financial dependency of the swine farmer regarding his production, as well as the income generated by new activities introduced due to the compost production. |
| Source of data                                                             | Swine farmers                                                                                                                                                            |
| Description of methods to collect information and procedures to be applied | Documents and Site visit                                                                                                                                                 |
| Purpose of the data                                                        | The swine farmer relies on swine production, which is not generating profit and carries on: Subsistence activities; AND Depend on another economic activity.             |
| Comments                                                                   | No comments                                                                                                                                                              |

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| Indicator                                                                  | <b>Satisfaction of the farmer</b>                                                       |
| Data unit                                                                  | Number of benefits identified by the project proponent.                                 |
| Description                                                                | Evaluates the satisfaction of the farmer regarding the GEE emissions reduction project. |
| Source of data                                                             | Swine farmers                                                                           |
| Description of methods to collect information and procedures to be applied | Interviews and questionnaires                                                           |
| Purpose of the data                                                        | The swine farmer is satisfied with the carbon Project and composting.                   |
| Comments                                                                   | No comments.                                                                            |

## HUMAN RESOURCE

| Indicator                                                                  | Control of Microorganisms                                                                                                                                                                                                                                                                                                                                                                                    |
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| Data unit                                                                  | Number of initiatives to evaluate biological characteristics of the compost regarding risks for human, animal and environmental health.                                                                                                                                                                                                                                                                      |
| Description                                                                | Evaluates biological characteristics of the compost regarding risks for human, animal and environmental health. The parameters evaluated are the presence and amount of the following: total amount of coliforms (bacteria that indicates contamination of the compost-CT), faeces coliform (bacteria commonly found in faeces-CF), faeces streptococcus (EF) and Salmonella (EMBRAPA, 2007; EMBRAPA, 2008). |
| Source of data                                                             | Swine farmers                                                                                                                                                                                                                                                                                                                                                                                                |
| Description of methods to collect information and procedures to be applied | Documents                                                                                                                                                                                                                                                                                                                                                                                                    |
| Purpose of the data                                                        | There is no concern in undertaking biologic analysis of the compost.                                                                                                                                                                                                                                                                                                                                         |
| Comments                                                                   | No comments.                                                                                                                                                                                                                                                                                                                                                                                                 |

| Indicator   | Diseases Agents                                                                                                                                                                                                                                                                                         |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data unit   | Number of actions undertaken in order to control diseases.                                                                                                                                                                                                                                              |
| Description | <p>Evaluate actions undertaken in order to control diseases within the swine farm boundaries.</p> <p>Mechanical Control: Actions hindering the Access to diseases agents and that avoid that the agents enter the plant site through gaps in the physical structure.(EMBRAPA, 2007; EMBRAPA, 2008).</p> |

|                                                                            |                                                                                                                                                                                                                                |
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|                                                                            | Chemical Control: Use of chemical products, such as anticoagulant, poison, among others (EMBRAPA, 2007; EMBRAPA, 2008).<br><br>Biologic Control: Use of natural enemies of the diseases agents (EMBRAPA, 2007; EMBRAPA, 2008). |
| Source of data                                                             | Swine farmers                                                                                                                                                                                                                  |
| Description of methods to collect information and procedures to be applied | Documents; Site Visit; Interviews                                                                                                                                                                                              |
| Purpose of the data                                                        | The diseases agents control uses at least two kinds of actions: mechanical, chemical and biologic.                                                                                                                             |
| Comments                                                                   | No comments.                                                                                                                                                                                                                   |

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| Indicator                                                                  | <b>Health and Safety Practices</b>                                                                                                                                                                                |
| Data unit                                                                  | Number of healthy and safety practices adopted.                                                                                                                                                                   |
| Description                                                                | Evaluates health and safety practices adopted in the swine farm.                                                                                                                                                  |
| Source of data                                                             | Swine farmers                                                                                                                                                                                                     |
| Description of methods to collect information and procedures to be applied | Documents; Site Visit                                                                                                                                                                                             |
| Purpose of the data                                                        | The safety equipments are available, though they are used inadequately (i.e., there are no control of the use and withdraw). AND there are few actions geared towards Hygiene OR Health issues in the swine unit. |
| Comments                                                                   | No comments.                                                                                                                                                                                                      |

#### FINANCIAL RESOURCE

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|-----------|--------------------------|
| Indicator | <b>Number of Animals</b> |
|-----------|--------------------------|

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| Data unit                                                                  | Number of animals during project cycle.                                                                                                      |
| Description                                                                | Evaluates the control of the swine unit regarding amount of animals and if this amount is increasing or decreasing during the Project cycle. |
| Source of data                                                             | Swine farmers                                                                                                                                |
| Description of methods to collect information and procedures to be applied | Documents; Interviews                                                                                                                        |
| Purpose of the data                                                        | The amount of animals increased insignificantly after the project implementation.                                                            |
| Comments                                                                   | No comments.                                                                                                                                 |

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| Indicator                                                                  | <b>Generation and commercialization of the compost</b>                                                                           |
| Data unit                                                                  | Amount of compost commercialized.                                                                                                |
| Description                                                                | Evaluates the amount of compost generated as well as its commercialization by the farmer.                                        |
| Source of data                                                             | Swine farmers                                                                                                                    |
| Description of methods to collect information and procedures to be applied | Documents; Interviews                                                                                                            |
| Purpose of the data                                                        | The compost was generated but it was not commercialized due to lack of buyers, or because it was used to supply internal demand. |
| Comments                                                                   | No comments.                                                                                                                     |

|           |                                                    |
|-----------|----------------------------------------------------|
| Indicator | <b>Commercialization of the carbon credits</b>     |
| Data unit | Context of commercialization of the carbon credits |

|                                                                            |                                                                                                        |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Description                                                                | Evaluates the context of the carbon credits commercialization during the period analyzed by the report |
| Source of data                                                             | Swine farmers                                                                                          |
| Description of methods to collect information and procedures to be applied | Documents                                                                                              |
| Purpose of the data                                                        | In addition to last item, the Project has its future credits already in process of negotiation.        |
| Comments                                                                   | No comments.                                                                                           |

#### NATURAL RESOURCE

|                                                                            |                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator                                                                  | <b>Environmental Management</b>                                                                                                                                                                                                                                                                                             |
| Data unit                                                                  | Number of procedures for environmental management adopted.                                                                                                                                                                                                                                                                  |
| Description                                                                | Evaluates procedures for environmental management adopted by the swine farmer, including the organization and coordination of actions and documents regarding the swine activities: nutrition, water use, installations, use of the waste for other activities (EMBRAPA, 2007; EMBRAPA, 2008; SOCIALCARBON STANDARD, 2011b) |
| Source of data                                                             | Swine farmers                                                                                                                                                                                                                                                                                                               |
| Description of methods to collect information and procedures to be applied | Documents; Interviews                                                                                                                                                                                                                                                                                                       |
| Purpose of the data                                                        | Less than 50% of the environmental aspects of the swine farm are considered through the implementation of some actions, but with no documentation.                                                                                                                                                                          |
| Comments                                                                   | No comments.                                                                                                                                                                                                                                                                                                                |

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| <b>Indicator</b>                                                                  | <b>Environmental Legislation</b>                                                                                                                                                                     |
| <b>Data unit</b>                                                                  | Brazilian environmental standards and legislation.                                                                                                                                                   |
| <b>Description</b>                                                                | Evaluates if the swine farm is in accordance with Brazilian environmental standards and legislation (Ex: Operational License, Forestry Legislation Requirements, etc) (SOCIALCARBON STANDARD, 2011b) |
| <b>Source of data</b>                                                             | Swine farmers                                                                                                                                                                                        |
| <b>Description of methods to collect information and procedures to be applied</b> | Documents;                                                                                                                                                                                           |
| <b>Purpose of the data</b>                                                        | The swine farmer accomplishes all Brazilian environmental rules and legislation.                                                                                                                     |
| <b>Comments</b>                                                                   | No comments.                                                                                                                                                                                         |

|                                                                                   |                                                                                                          |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                  | <b>Chemical and Physical Analysis of the Compost</b>                                                     |
| <b>Data unit</b>                                                                  | Number of chemical and physical analysis of the compost.                                                 |
| <b>Description</b>                                                                | Evaluates if, during the period analyzed, chemical and physical analysis of the compost were undertaken. |
| <b>Source of data</b>                                                             | Swine farmers                                                                                            |
| <b>Description of methods to collect information and procedures to be applied</b> | Documents;                                                                                               |
| <b>Purpose of the data</b>                                                        | There is no concern in regard with chemical and physical analysis of the compost.                        |
| <b>Comments</b>                                                                   | No comments.                                                                                             |

#### BIODIVERSITY/TECHNOLOGY RESOURCE

|                                                                                   |                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                  | <b>Compost Quality</b>                                                                                                                                                                                                     |
| <b>Data unit</b>                                                                  | Parameters for maintenance of soil, water and vegetation quality.                                                                                                                                                          |
| <b>Description</b>                                                                | Evaluates the level of dry matter, the concentration of nutrients (C, N, P2O5, K2O, Ca e Mg), and the presence of heavy metal; and if these parameters are adequate for maintenance of soil, water and vegetation quality. |
| <b>Source of data</b>                                                             | Swine farmers                                                                                                                                                                                                              |
| <b>Description of methods to collect information and procedures to be applied</b> | Documents; Interviews                                                                                                                                                                                                      |
| <b>Purpose of the data</b>                                                        | The quality of the compost was never assessed.                                                                                                                                                                             |
| <b>Comments</b>                                                                   | No comments.                                                                                                                                                                                                               |

|                                                                                   |                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                  | <b>Maintenance of the composting site</b>                                                                                                                                        |
| <b>Data unit</b>                                                                  | Number of maintenances of the composting site.                                                                                                                                   |
| <b>Description</b>                                                                | Evaluates if the maintenance of the composting site (Mechanic and Automatic Composting Unit) is carried out periodically, even by the swine farmer or by an independent Company. |
| <b>Source of data</b>                                                             | Swine farmers                                                                                                                                                                    |
| <b>Description of methods to collect information and procedures to be applied</b> | Documents; Interviews                                                                                                                                                            |
| <b>Purpose of the data</b>                                                        | The swine farmer carries on practices towards maintenance of the composting site, and sporadically, the maintenance is made by a specialized company.                            |
| <b>Comments</b>                                                                   | No comments.                                                                                                                                                                     |

|                                                                            |                                                                                                                                                 |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator                                                                  | <b>Technology Diffusion</b>                                                                                                                     |
| Data unit                                                                  | Number of actions to disseminate the technologies.                                                                                              |
| Description                                                                | Evaluates the contribution of the project for technology diffusion, which comprises knowledge diffusion and implementation of new Technologies. |
| Source of data                                                             | Swine farmers                                                                                                                                   |
| Description of methods to collect information and procedures to be applied | Documents; Interviews                                                                                                                           |
| Purpose of the data                                                        | The technology diffusion approaches are informal.                                                                                               |
| Comments                                                                   | No comments.                                                                                                                                    |

#### CARBON RESOURCE

|                                                                            |                                                                                                                                                      |
|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator                                                                  | <b>Project Performance</b>                                                                                                                           |
| Data unit                                                                  | Emission Reductions (ERs)                                                                                                                            |
| Description                                                                | Evaluates the Project performance analyzed by the SCR in comparison with the emission reductions estimated by the PD. (SOCIALCARBON STANDARD, 2011b) |
| Source of data                                                             | Swine farmers                                                                                                                                        |
| Description of methods to collect information and procedures to be applied | Documents;                                                                                                                                           |
| Purpose of the data                                                        | Excellent. More than 95% of emission reductions were verified.                                                                                       |
| Comments                                                                   | No comments.                                                                                                                                         |

|                                                                                   |                                                                                                                                         |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                  | <b>Stakeholders Consultation</b>                                                                                                        |
| <b>Data unit</b>                                                                  | Number of Stakeholders Consultation                                                                                                     |
| <b>Description</b>                                                                | Evaluates if stakeholders were informed and consulted regarding Project activity and its impacts, during the analyzed period.           |
| <b>Source of data</b>                                                             | Swine farmers                                                                                                                           |
| <b>Description of methods to collect information and procedures to be applied</b> | Documents; Interviews                                                                                                                   |
| <b>Purpose of the data</b>                                                        | Stakeholders were informally communicated, though they did not have access to send comments and suggestions for the project developers. |
| <b>Comments</b>                                                                   | No comments.                                                                                                                            |

|                                                                                   |                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                  | <b>Validation and Verification</b>                                                                                                                                                                                                                    |
| <b>Data unit</b>                                                                  | Third Part Validations and Verifications.                                                                                                                                                                                                             |
| <b>Description</b>                                                                | Evaluates if the Project was partially or totally validated/verified by a third part and if the third part is accredited by the UNFCCC, as well as if the national and international Standards are being accomplished (SOCIALCARBON STANDARD, 2011b). |
| <b>Source of data</b>                                                             | Swine farmers                                                                                                                                                                                                                                         |
| <b>Description of methods to collect information and procedures to be applied</b> | Documents;                                                                                                                                                                                                                                            |
| <b>Purpose of the data</b>                                                        | The validation and verification are made by DOE, using methods and procedures recognized internationally.                                                                                                                                             |
| <b>Comments</b>                                                                   | No comments.                                                                                                                                                                                                                                          |

#### 4.4 Monitoring Plan

Sustainable Carbon – Projetos Ambientais Ltda. is responsible for managing the monitoring plan during the current monitoring period and also for carrying out on-site inspections on each individual farm to confirm that the monitoring plan is being executed properly. Sustainable Carbon also provided training on data collection and storage, as well as emergency reporting procedures.

In case of emergencies, farmers contact LPC Tecnologia Ambiental immediately, usually requiring maintenance or repairs on the composting unit. Farmers also contact Sustainable Carbon to inform on the type of emergency, its cause, its consequences and any information needed to allow Sustainable Carbon determining the impact of such emergency on the project emission reductions for the corresponding monitoring period.

In general terms, farmers apply the monitoring plan on a regular basis and are responsible to store data regarding animal production and to record and store monitoring data on the operation of the composting unit. This includes filling monitoring spreadsheets prepared by Sustainable Carbon, taking notes on animal production and storing documents provided by the integrators.

In case the monitoring data on  $EC_{PJ,j,y}$  and  $Q_y$  is incomplete, in general, alternative procedures described on the VCS PD version 06.1 allowed for conservative estimates of emission reductions generation. These procedures involve applying estimated values based on LPC judgment and/or scientific studies to determine the quantity of electricity consumed and the quantity of manure treated by the Project. Tables below provide more information on which procedure method was chosen for each farm:

**Table 4.** Assessment of monitoring data on the manure pump daily operating time (hours)

| Farm                 | (A) Average Manure pump daily operating time (hours) <sup>43</sup> | (B) LPC estimated data | Conservative estimate: manure pump operating time (hours) | Approach used |
|----------------------|--------------------------------------------------------------------|------------------------|-----------------------------------------------------------|---------------|
| Fazenda Altenor      | 0.46                                                               | 0.67                   | 0.67                                                      | (B)           |
| Fazenda Granja Silva | 0.0                                                                | 0.73                   | 0.73                                                      | (B)           |
| Fazenda Ramella      | 0.10                                                               | 0.73                   | 0.73                                                      | (B)           |
| Sítio Santa Lúcia    | 1.73                                                               | 0.96                   | 1.73                                                      | (A)           |

**Table 5.** Assessment of monitoring data on the daily operating time of the UMAC equipment (hours)

| Farm            | (A) Average UMAC equipment daily operating time (hours) <sup>44</sup> | (B) LPC estimated data | Conservative estimate: UMAC equipment daily operating time (hours) | Approach used |
|-----------------|-----------------------------------------------------------------------|------------------------|--------------------------------------------------------------------|---------------|
| Fazenda Altenor | 0.91                                                                  | 4.38                   | 4.38                                                               | (B)           |

<sup>43</sup> Based on monitored data collected in part of the current monitoring period.

<sup>44</sup> Based on monitored data collected in part of the current monitoring period.

|                      |      |      |      |     |
|----------------------|------|------|------|-----|
| Fazenda Granja Silva | 0    | 3.29 | 3.29 | (B) |
| Fazenda Ramella      | 0.10 | 3.33 | 3.33 | (B) |
| Sítio Santa Lúcia    | 1.80 | 3.96 | 3.96 | (B) |

**Table 6.** Assessment of monitoring data on the quantity of manure treated (tonnes per day).

| Farm                 | (A) Average $Q_y$<br>(tonnes/day) <sup>45</sup> | (B) Embrapa<br>estimated data | Conservative<br>estimate:<br>$Q_y$ (tonnes/day) | Approach<br>used |
|----------------------|-------------------------------------------------|-------------------------------|-------------------------------------------------|------------------|
| Fazenda Altenor      | 6.49                                            | 10.22                         | 10.22                                           | (B)              |
| Fazenda Granja Silva | 0                                               | 4.89                          | 4.89                                            | (B)              |
| Fazenda Ramella      | 0.82                                            | 7.60                          | 7.60                                            | (B)              |
| Sítio Santa Lúcia    | 15.99                                           | 8.46                          | 15.99                                           | (A)              |

According to Section 4.2 of the VCS PD v.06.1, third parties (i.e. integrators and State agencies) were the direct responsible for measurement and recording of some monitoring parameters (such as  $nd_y$ ,  $W_{site}$ ,  $N_{da,y}$  and  $N_{p,y}$ ). Such information is used to determine farms' productivity and to calculate financial compensations. For these reasons, third party information is considered the most reliable data source.

In general terms, farmers do not control animal production on a consistent and regular basis, as this is the responsibility of integrators, according to predefined agreements and procedures. Fazenda Andretta is an exception to this statement as the animal production is monitored through software. In such case, data from this software is used instead of third-party information.

Integrators are agribusiness companies responsible for the productive cycle of animals and food products. They establish partnerships with farmers to outsource stages of the production cycle (such as animal fattening). Furthermore, these enterprises are responsible for providing feed, medicines and technical assistance to producers in order to ensure swine quality and production. They have control of the number and weight of animals, which generates documents with information related to each batch of animals. In finishing unit farms, the animals usually remain for a period of approximately 04 months, whereas in farrow to nursery farms, this period varies from 30 to 60 days for piglets/ nursery and 02 years for other animals (gilts, sows in gestation, sows and boars).

Monitored variables are described at Section 4.2, above. In addition, each farm has an authority for organizing the monitoring data, as described in table below:

**Table 7.** Monitoring authority on each farm.

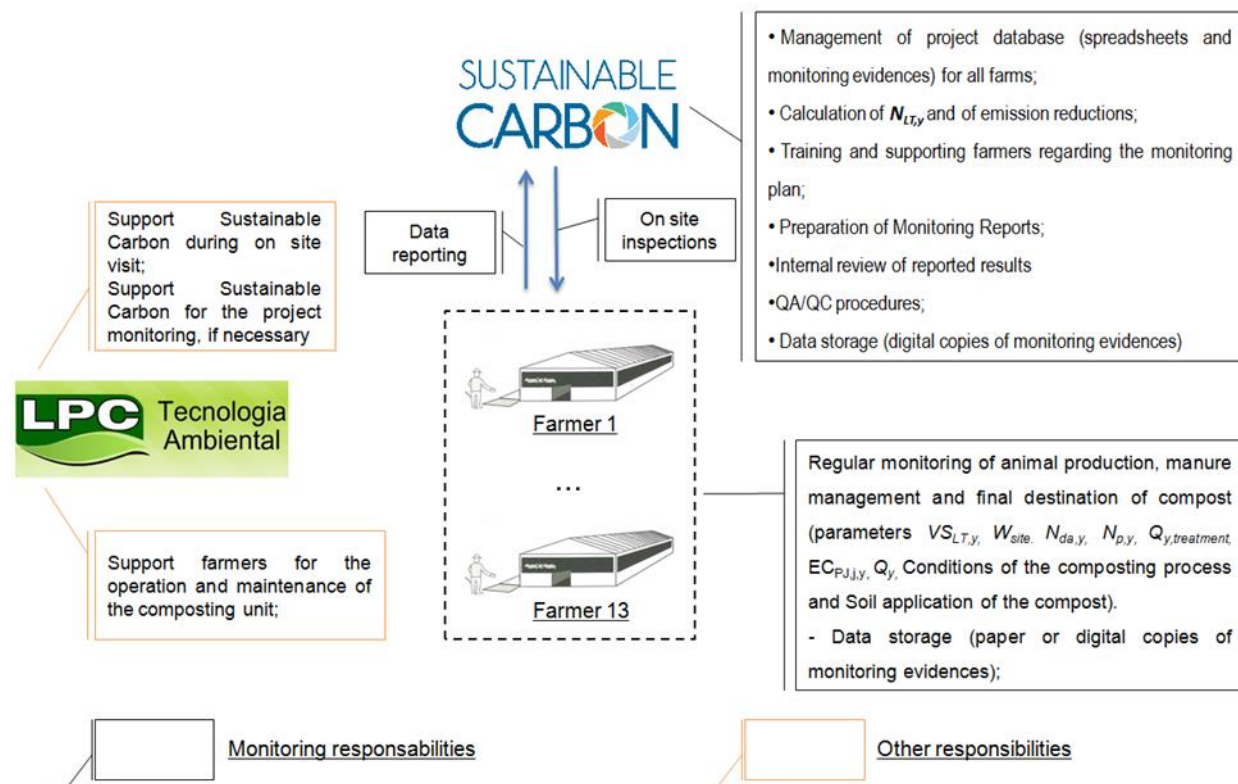
| Farm Name | Town | Monitoring authority |
|-----------|------|----------------------|
|-----------|------|----------------------|

<sup>45</sup> Based on monitored data collected in part of the current monitoring period.

|                      |                |                            |
|----------------------|----------------|----------------------------|
| Fazenda Altenor      | Nova Erechim   | Mr. Altenor José Basso     |
| Fazenda Ramella      | Herval d'Oeste | Mr. Antônio Carlos Ramella |
| Sítio Santa Lucia    | Jaborá         | Mr. Belmiro Secco          |
| Fazenda Granja Silva | Concórdia      | Mr. Jair da Silva          |

The organizational structure of the project regarding the monitoring plan is illustrated on the figure below:

**Figure 2.** Organizational structure for the project monitoring



During the preparation of the current monitoring report, Sustainable Carbon carried out internal reviews of collected data. The calculation of emission reductions was made based on existing documentation, taking into account the most conservative assumption in case of incompleteness of the monitoring data.

Sustainable Carbon also assists farmers in double checking monitored parameters. Sustainable Carbon double checks several monitoring parameters, especially those related to animal production and compost management (such as  $N_{p,y}$ ,  $N_{da,y}$ ,  $Q_{y,treatment}$ , among others). Double check is performed by comparing different sources of information (when available). Sustainable

Carbon also double checks the monitoring information of each farm with monitoring checklists to ensure monitoring data was complete.

Non-conformities identified during double check procedures are clarified between Sustainable Carbon's technical team, LPC, and the monitoring responsible on the farms.

## 5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

### 5.1 Baseline Emissions

Baseline emissions are calculated according to AMS-III.F. Version 10, paragraph 14. According to such paragraph of the methodology, baseline emissions are calculated as:

$$BE_y = BE_{CH_4,SWDS,y} + BE_{ww,y} + BE_{CH_4,manure,y} - MD_{y,reg} * GWP_{CH_4}$$

Equation 1

Where,

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $BE_{CH_4,SWDS,y}$   | Yearly methane generation potential of the solid waste composted by the project activity during the years x from the beginning of the project activity (x=1) up to the year y estimated as per the latest version of the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" (tCO <sub>2e</sub> ). The tool may be used with the factor "f=0.0" assuming that no biogas is captured and flared. With the definition of year x as 'the year since the project activity started diverting wastes from landfill disposal, x runs from the first year of crediting period (x=1) to the year for which emissions are calculated (x=y)' |
| $MD_{y,reg}$         | Amount of methane that would have to be captured and combusted in the year y to comply with the prevailing regulations (tonne)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| $BE_{CH_4,manure,y}$ | Baseline emissions from manure composted by the project activities, as per the procedures of AMS-III.D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| $BE_{ww,y}$          | Where applicable, baseline emissions from the wastewater co-composted, calculated as per the procedures in AMS-III.H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| $GWP_{CH_4}$         | GWP for CH <sub>4</sub> (value of 28 is used)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Only baseline emissions from animal manure composted by the project activities are considered. Hence, baseline emissions are calculated in accordance to procedures from approved methodology AMS-III.D, version 18. Procedures from paragraph 9(a) are used, since data needed to apply option 9(b) is not available.

The baseline emissions are calculated by Equation 2 below:

$$BE_y = GWP_{CH_4} * D_{CH_4} * UF_b * \sum_{j,LT} MCF_j * B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{Bl,j}$$

Equation 2

Where:

|               |                                                                                                                                               |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| $BE_y$        | Baseline emissions in year $y$ (tCO <sub>2</sub> e)                                                                                           |
| $GWP_{CH_4}$  | Global Warming Potential (GWP) of CH <sub>4</sub> (28)                                                                                        |
| $D_{CH_4}$    | CH <sub>4</sub> density (0.00067 t/m <sup>3</sup> at room temperature (20 °C) and 1 atm pressure)                                             |
| $LT$          | Index for all types of livestock                                                                                                              |
| $j$           | Index for animal manure management system                                                                                                     |
| $MCF_j$       | Annual methane conversion factor (MCF) for the baseline animal manure management system $j$                                                   |
| $B_{0,LT}$    | Maximum methane producing potential of the volatile solid generated for animal type $LT$ (m <sup>3</sup> CH <sub>4</sub> / kg dm)             |
| $N_{LT,y}$    | Annual average number of animals of type $LT$ in year $y$ (numbers)                                                                           |
| $VS_{LT,y}$   | Volatile solids for livestock $LT$ entering the animal manure management system in year $y$ (on a dry matter weight basis, kg dm/animal/year) |
| $MS\%_{Bl,j}$ | Fraction of manure handled in baseline animal manure management system $j$                                                                    |
| $UF_b$        | Model correction factor to account for model uncertainties (0.94)                                                                             |

The value of  $VS_{LT,y}$  is adjusted according to the average animal weight of project activity, by means of Equation 3 below, considering the default value of IPCC ( $VS_{default}$ ):

$$VS_{LT,y} = \left( \frac{W_{site}}{W_{default}} \right) * VS_{default} * nd_y$$

Equation 3

Where:

|                |                                                                                                                                         |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| $W_{site}$     | Average animal weight of a defined livestock population at the project site (kg)                                                        |
| $W_{default}$  | Default average animal weight of a defined population, this data is sourced from 2006 IPCC (kg)                                         |
| $VS_{default}$ | Default value for the volatile solid excretion rate per day on a dry-matter basis for a defined livestock population (kg dm/animal/day) |

$nd_y$  Number of days in year  $y$  where the animal manure management system is operational.

The average number of animals ( $N_{LT,y}$ ) is calculated by Equation 4:

$$N_{LT,y} = N_{da,y} * \left( \frac{N_{p,y}}{365} \right)$$

Equation 4

$N_{day}$  Number of days animal is alive in the farm in the year  $y$  (numbers)

$N_{p,y}$  Number of animals produced annually of type  $LT$  for the year  $y$  (numbers)

As described in section 4.2, the parameters  $N_{da,y}$  and  $N_{p,y}$ , used to calculate  $N_{LT,y}$ , are monitored using records from third parties (integrators, state agencies, etc.) related to the input and output data of animals at each farm. Project Proponents consider documents provided by integrators to be the most reliable and conservative source of monitoring data. Hence, monitoring is done based on documents for each batch.

The parameters  $GWP_{CH4}$ ,  $D_{CH4}$ ,  $UF_b$ ,  $MCF_j$ ,  $B_{0,LT}$ ,  $MS\%_{Bl,j}$ ,  $W_{default}$ , and  $VS_{default}$  are used to calculate baseline emissions, which values are described above at Section 4.1 – Data and Parameters Available at Validation. The number of days animals is alive in the farm ( $N_{da,y}$ ), the number of days in year  $y$  in which the animal manure management system is operational ( $nd_y$ ), the number of animals produced in year  $y$  ( $N_{p,y}$ ), and the annual average number of animals per type ( $N_{LT,y}$ ) are also used to calculate baseline emissions, and their values are shown in Appendix 1.

Example of  $BE_y$  calculation of Fazenda Altenor in 2020:

**$BE_y = 824 \text{ tCO}_2\text{e}$**

$$BE_y = GWP_{CH4} * D_{CH4} * UF_b * \sum_{j,LT} MCF_j * B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{Bl,j}$$

Where:

$GWP_{CH4} = 28$  (Please check Section 4.1)

$D_{CH4} = 0.00067 \text{ ton/m}^3$  (Please check Section 4.1)

$UF_b = 0.94$  (Please check Section 4.1)

$MCF_j = 0.77$  (Please check Section 4.1)

$B_{0,LT} = 0.29 \text{ m}^3\text{CH}_4/\text{kg dm}$  (Default value for Market swine in Latin America; Please check Section 4.1 and "BE – Altenor" tab in the VCS MR Calculation spreadsheet)

$N_{LT,y} = 1,288$  (Please check "BE – Altenor" tab in the VCS MR Calculation spreadsheet)

$VS_{LT,y} = 163$  kg/animal/year (Please check "BE – Altenor" tab in the VCS MR Calculation spreadsheet)

$MS\%_{BL,j} = 1$  (Please check Section 4.1)

$VS_{LT,y}$  parameter was calculated according to the equation below:

$$VS_{LT,y} = \left( \frac{W_{site}}{W_{default}} \right) * VS_{default} * nd_y$$

Where:

$W_{site} = 79$  kg/animal (Please check "BE – Altenor" and "Animal Data – Altenor" tabs in the VCS MR Calculation spreadsheet)

$W_{default} = 28$  kg (Please check "BE – Altenor" tab in the VCS MR Calculation spreadsheet)

$VS_{default} = 0.3$  kg/animal/day (Please check "BE – Altenor" tab in the VCS MR Calculation spreadsheet)

$nd_y = 192$  (Please check "BE – Altenor" and "Animal Data – Altenor" tabs in the VCS MR Calculation spreadsheet)

$N_{LT,y}$  parameter was calculated according to the equation below:

$$N_{LT,y} = N_{da,y} * \left( \frac{N_{p,y}}{365} \right)$$

Where:

$N_{da,y} = 107$  (Please check "BE – Altenor" tab in the VCS MR Calculation spreadsheet)

$N_{p,y} = 4,395$  (Please check "BE – Altenor" tab in the VCS MR Calculation spreadsheet)

Baseline emissions during the monitored period are summarized in the following table. More detailed information can be seen in tables on Appendix.

**Table 8.** Total baseline emissions for the Composting Project in Santa Catarina during the current monitoring period

| Year | Baseline emissions or removals (tCO <sub>2</sub> e) |
|------|-----------------------------------------------------|
|------|-----------------------------------------------------|

|                              |              |
|------------------------------|--------------|
| 2019<br>(Starting on 01-May) | 1,938        |
| 2020                         | 3,899        |
| <b>Total</b>                 | <b>5,837</b> |

## 5.2 Project Emissions

According to the methodology AMS-III.F., version 10, project activity emissions consist of:

- (i). CO<sub>2</sub> emissions due to the incremental transportation distances;
- (ii). CO<sub>2</sub> emissions from electricity and/or fossil fuel consumption by the project activity facilities;
- (iii). Methane emissions during composting process;
- (iv). Methane emissions from runoff water; and
- (v). Methane emissions due to compost storage.

The equation for project emission calculation is:

$$PE_y = PE_{y,transp} + PE_{y,power} + PE_{y,comp} + PE_{y,runoff} + PE_{y,res\ waste}$$

Equation 5

Where:

|                     |                                                                                                                                                                                       |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $PE_y$              | Project activity emissions in the year y (tCO <sub>2</sub> e)                                                                                                                         |
| $PE_{y,transp}$     | Emissions from incremental transportation in the year y (tCO <sub>2</sub> e)                                                                                                          |
| $PE_{y,power}$      | Emissions from electricity or fossil fuel consumption in the year y (tCO <sub>2</sub> e)                                                                                              |
| $PE_{y,comp}$       | Methane emissions during composting process in the year y (tCO <sub>2</sub> e)                                                                                                        |
| $PE_{y,runoff}$     | Methane emissions from runoff water in the year y (tCO <sub>2</sub> e)                                                                                                                |
| $PE_{y,res\ waste}$ | In case produced compost is subjected to anaerobic storage or disposed in a landfill: methane emissions from the anaerobic decay of the residual organic content (tCO <sub>2</sub> e) |

Among the project emissions listed by the methodology AMS-III.F., version 10, the proposed project activity will not produce emissions referring to the consumption of fossil fuels, emissions due to incremental transportation distances, emissions due to runoff water, and emissions related to compost storage. This is justified by the following:

- ✓ There is no fossil fuel consumption by the equipment installed as part of the project; the project will not result in additional transportation of waste or compost;
- ✓ The project results in a significant reduction in the volume of treated manure, since the composting process evaporates most of the water content on the treated manure. This reduction in volume also reduces associated consumption of fossil fuels for its transportation until final destination.
- ✓ The mechanized composting units are automated and designed to not apply excessive wastes on the substrate. In addition, sheds are covered, avoiding rainwater percolation onto the substrate. Any runoff water is recirculated into the composting mass;
- ✓ Finally, the compost is not stored in anaerobic conditions nor sent to landfills. Thus, the equation to be applied to determine project activity emissions takes the following structure:

$$PE_y = PE_{y,power} + PE_{y,comp}$$

Equation 6

- a) Emissions from electricity or fossil fuel consumption in the year y ( $PE_{y,power}$ )

Emissions from grid electricity consumed by the project are determined according to the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 01<sup>46</sup>. Emissions from electricity are calculated as the product of the energy consumed by the CO2 emission factor of the grid, according to the equation below:

$$PE_{y,power} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

Equation 7

Where:

|               |                                                                                                            |
|---------------|------------------------------------------------------------------------------------------------------------|
| $EC_{PJ,j,y}$ | Quantity of electricity consumed by the project electricity consumption source $j$ in year $y$ (MWh/yr)    |
| $EF_{EL,j,y}$ | Emission factor for electricity generation for source $j$ in year $y$ (tCO <sub>2</sub> /MWh)              |
| $TDL_{j,y}$   | Average technical transmission and distribution losses for providing electricity to source $j$ in year $y$ |

Therefore,  $PE_{y,power}$  (as defined on Equation 6, above) is equal to  $PE_{EC,y}$  as provided by the referred tool. Please note that in Equation 7 the term  $PE_{EC,y}$  was replaced by  $PE_{y,power}$  to ensure consistency with the applied methodology. The quantity of electricity consumed by the project activity on each farm ( $EC_{PJ,j,y}$ ) is determined considering the combined power capacity of the all equipment in the

<sup>46</sup> Tool available at: <<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-05-v1.pdf>>. Last visited on June 10th, 2022

mechanized composting unit and a conservative estimate on the time of operation of each equipment.

All farms included in the present project consume electricity exclusively from the grid. Grid emission factors shall be calculated through the Brazilian combined margin (CM) emission factor ( $EF_{grid,CM,y}$ ), which is based on a weighted average of the Build Margin and the Operating Margin, using a 0.5 weight for each parameter, in accordance with procedures described in version 18 of AMS-III.D. Both parameters are calculated by the Brazilian DNA (Interministerial Commission on Global Climate Change - Comissão Interministerial de Mudança Global do Clima - CIMGC). Thus, the Brazilian combined margin emission factor ( $EF_{grid,CM,y}$ ) is calculated through the equation below<sup>47</sup>:

$$EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$$

Equation 8

Where,

|                  |                                                                                    |
|------------------|------------------------------------------------------------------------------------|
| $EF_{grid,CM,y}$ | Combined margin CO <sub>2</sub> emission factor in year y (tCO <sub>2</sub> /MWh)  |
| $EF_{grid,OM,y}$ | Operating margin CO <sub>2</sub> emission factor in year y (tCO <sub>2</sub> /MWh) |
| $W_{OM}$         | Weighting of operating margin emissions factor (%)                                 |
| $EF_{grid,BM,y}$ | Build margin CO <sub>2</sub> emission factor in year y (tCO <sub>2</sub> /MWh)     |
| $W_{BM}$         | Weighting of build margin emissions factor (%)                                     |

Furthermore, according to Table III.F.1, paragraph 27 of methodology AMS-III.F., version 10,  $TDL_{i,y}$  is defined as 10%.

a) Methane emissions during composting process in the year y ( $PE_{y,comp}$ )

Methane emissions generated during the composting process ( $PE_{y,comp}$ ) are determined according to Equation 9 below:

$$PE_{y,comp} = Q_y * EF_{composting} * GWP_{CH_4}$$

Equation 9

Where:

|       |                                                             |
|-------|-------------------------------------------------------------|
| $Q_y$ | Quantity of raw waste/manure treated in the year y (tonnes) |
|-------|-------------------------------------------------------------|

<sup>47</sup> UNFCCC. Methodological tool: Tool to calculate the emission factor for an electricity system. Version 03.0.0. Equation 14. Document available at: <<http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v3.0.0.pdf>>. Last visit: 10/06/2022.

$EF_{composting}$  Emission factor for composting of manure (tCH<sub>4</sub>/ton waste treated). Emission factors can be based on site measurements, country specific values or IPCC default values (table 4.1, chapter 4, Volume 5, 2006 IPCC Guidelines for National Greenhouse Gas Inventories). IPCC default values are 10 gCH<sub>4</sub>/kg waste treated on a dry basis and 4 gCH<sub>4</sub>/kg waste treated on a wet basis.  $EF_{composting}$  can be set zero in case the monitored oxygen content during of the composting process within the windrow is above 8%.

During the current monitoring period,  $EF_{composting}$  was considered as 4 gCH<sub>4</sub>/kg of waste treated on a wet basis, sourced from 2006 IPCC as referred in the methodology. This approach was taken since the level of oxygen in the composting windrows had not been monitored.

The quantity of raw manure treated per year ( $Q_y$ ) was monitored by registering the operating hours of the pump that destine the manure from the storage tank to the composting unit. Nevertheless, during the current monitoring period, default values of animal waste production had also to be used to obtain the quantity of manure treated, since monitoring data was incomplete. The most conservative value was applied for calculating GHG emission reductions, as described above at Section 4.2 – Data and Parameters Monitored.

$$Q_y = P_{NF} * P_{TO,y} * MD * 0.7$$

Equation 10

Where:

$P_{NF}$  Pump nominal flow (m<sup>3</sup>/hour)  
 $P_{TO,y}$  Pump time of operation in year y (hours)  
 $MD$  Manure density (tonnes/m<sup>3</sup>)  
 $0.7$  Fraction of waste from confinement that is manure

Example of  $PE_y$  calculation of Fazenda Altenor in 2020:

**$PE_y = 142.31$  tCO<sub>2</sub>e**

$$PE_y = PE_{y,power} + PE_{y,comp}$$

Where:

$PE_{y,power} = 2.84$  tCO<sub>2</sub>e (Please check “PE – Altenor” tab in the VCS MR Calculation spreadsheet)

$PE_{y,comp} = 139.47$  tCO<sub>2</sub>e (Please check “PE – Altenor” tab in the VCS MR Calculation spreadsheet)

$$PE_{y,power} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TD L_{j,y})$$

Where:

$EC_{PJ,j,y} = 9.36$  MWh (Please check “PE – Altenor” tab in the VCS MR Calculation spreadsheet)

$EF_{EL,j,y} = 0.2759 \text{ tCO}_2/\text{MWh}$  (Please check “PE – Altenor” tab in the VCS MR Calculation spreadsheet)

$TDL_{j,y} = 10\%$  (Please check “PE – Altenor” tab in the VCS MR Calculation spreadsheet)

$$PE_{y,comp} = Q_y * EF_{composting} * GWP_{CH_4}$$

Where:

$Q_y = 1,245$  tonnes. As explained above, this parameter was calculated using a conservative value. The  $Q_y$  value of 6.09 tonnes/day was multiplied by the 192 days ( $nd_y$ ), resulting in 1,245 tonnes of manure treated in 2020 (Please check Section 4.2 and “PE – Altenor” tab in the VCS MR Calculation spreadsheet)

$EF_{composting} = 0.004 \text{ tCH}_4/\text{ton waste composted}$  (Please check Section 4.1)

$GWP_{CH_4} = 28 \text{ tCO}_2/\text{tCH}_4$  (Please check Section 4.1)

Project emissions during the monitored period are summarized in the following table. More detailed information is also available on Appendix.

**Table 9.** Total project emissions for the Composting Project in Santa Catarina during the current monitoring period

| Year                         | Project emissions or removals (tCO <sub>2</sub> e) |
|------------------------------|----------------------------------------------------|
| 2019<br>(Starting on 01-May) | 776                                                |
| 2020                         | 961                                                |
| <b>Total</b>                 | <b>1,737</b>                                       |

### 5.3 Leakage

As the project does not involve equipment transference from another activity, there is no leakage to be considered, according to methodology AMS-III.F., version 10.

### 5.4 Net GHG emission reductions and removals

According to the methodology AMS-III.F., version 10, GHG emission reductions achieved by the project activity are calculated as the difference between the baseline emissions and the project emissions, as described below:

$$ER_y = BE_y - PE_y$$

Equation 11

Where,

$ER_y$  Emission reduction in year  $y$  (tCO<sub>2</sub>e)

The specific annual summary of GHG reductions and removals for each farm composing the *Composting Project in Santa Catarina* can be seen on Tables 10 and 11, below, they include baseline emissions ( $BE_y$ ), project emissions ( $PE_y$ ), leakage emissions, and the resulting GHG emissions reduction ( $ER_y$ ) per farm.

**Table 10.** Emission Reductions for Composting Project in Santa Catarina – Year 2019

| Emission reductions 2019 |                      |                      |                      |                      |
|--------------------------|----------------------|----------------------|----------------------|----------------------|
| Farm                     | $BE_y$               | $PE_y$               | Leakage              | $ER_y$               |
|                          | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) |
| Fazenda Altenor          | 915                  | 165                  | 0                    | 750                  |
| Fazenda Granja Silva     | 91                   | 102                  | 0                    | 0                    |
| Fazenda Ramella          | 480                  | 93                   | 0                    | 387                  |
| Sítio Santa Lúcia        | 452                  | 416                  | 0                    | 36                   |
| <b>TOTAL</b>             | <b>1,938</b>         | <b>776</b>           | <b>0</b>             | <b>1,173</b>         |

**Table 11.** Emission Reductions for Composting Project in Santa Catarina – Year 2020

| Emission reductions 2020 |                      |                      |                      |                      |
|--------------------------|----------------------|----------------------|----------------------|----------------------|
| Farm                     | $BE_y$               | $PE_y$               | Leakage              | $ER_y$               |
|                          | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) |
| Fazenda Altenor          | 824                  | 143                  | 0                    | 681                  |
| Fazenda Granja Silva     | 209                  | 166                  | 0                    | 43                   |
| Fazenda Ramella          | 1,138                | 173                  | 0                    | 965                  |
| Sítio Santa Lúcia        | 1,728                | 479                  | 0                    | 1,249                |
| <b>TOTAL</b>             | <b>3,899</b>         | <b>961</b>           | <b>0</b>             | <b>2,938</b>         |

**Table 12.** Emission Reductions for Composting Project in Santa Catarina during the monitored period/farm

| Total emission reductions during monitoring period |                      |                      |                      |                      |
|----------------------------------------------------|----------------------|----------------------|----------------------|----------------------|
| Farm                                               | BE <sub>y</sub>      | PE <sub>y</sub>      | Leakage              | ER <sub>y</sub>      |
|                                                    | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) | (tCO <sub>2</sub> e) |
| Fazenda Altenor                                    | 1,739                | 308                  | 0                    | 1,431                |
| Fazenda Granja Silva                               | 300                  | 268                  | 0                    | 32                   |
| Fazenda Ramella                                    | 1,618                | 266                  | 0                    | 1,352                |
| Sítio Santa Lúcia                                  | 2,180                | 895                  | 0                    | 1,285                |
| <b>TOTAL</b>                                       | <b>5,837</b>         | <b>1,737</b>         | <b>0</b>             | <b>4,100</b>         |

Table 13 below demonstrates the comparison between the ex ante estimated emission reductions with the current NET GHG emissions in this monitoring period.

**Table 13.** Emission reductions comparison with estimated in PDD

| Year                         | Estimated net GHG emission reductions or removals (tCO <sub>2</sub> e) | Net GHG emission reductions or removals (tCO <sub>2</sub> e) |
|------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------|
| 2019<br>(Starting on 01-May) | 8,936                                                                  | 1,162                                                        |
| 2020                         | 13,405                                                                 | 2,938                                                        |
| <b>Total</b>                 | <b>22,341</b>                                                          | <b>4,100</b>                                                 |

During the current monitoring period, the farms Fazenda Sítio Pickler, Fazenda Helena, Fazenda Gilmar, Fazenda Suruvy, Fazenda Colônia Suspiro, Fazenda Colônia Zuffo, Fazenda Pissaia, Fazenda Baccin and Fazenda Andretta, located in Arroio Trinta, Vargeão, Rio das Antas, Concórdia, Nova Erechim, Rio das Antas, Arvoredo and Nova Itaberaba, respectively, were not included in the current monitoring period. This fact directly influenced the total emission reduction, since the estimate proposed ex ante, included the active participation of all proponents. During the period, the project faced several difficulties in relation to common

practices in the region, in addition to being directly affected by the economic consequences of the COVID-19 pandemic between the end of 2019 and the year 2020. All these aspects corroborated for emissions reductions to be considerably lower in this monitoring period than estimated ex ante.

The net GHG Emission Reductions in the Composting Project in Santa Catarina during the monitored period are summarized in the following table. More detailed information can be seen in tables on Appendix.

| Year                         | Baseline emissions or removals (tCO <sub>2</sub> e) | Project emissions or removals (tCO <sub>2</sub> e) | Leakage emissions (tCO <sub>2</sub> e) | Net GHG emission reductions or removals (tCO <sub>2</sub> e) |
|------------------------------|-----------------------------------------------------|----------------------------------------------------|----------------------------------------|--------------------------------------------------------------|
| 2019<br>(Starting on 01-May) | 1,938                                               | 776                                                | 0                                      | 1,162                                                        |
| 2020                         | 3,899                                               | 961                                                | 0                                      | 2,938                                                        |
| <b>Total</b>                 | <b>5,837</b>                                        | <b>1,737</b>                                       | <b>0</b>                               | <b>4,100</b>                                                 |

## 6 SOCIALCARBON RESULTS

### 6.1 Results

#### 6.1.1 Social Resource

| Indicator   | Association and Cooperatives                                                                                                                                                                                                                 |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description | Evaluates if the swine farmer is involved in sector associations or cooperatives. Describe the current situation of the project, providing the evidence used to ascertain the scenario chosen below Association: Group of two or more people |

|                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                            |                                                                                                       |                                                                         |                                                                                                                                          |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                       | <p>that are organized for defending common interests, nonprofit with a legal personality (IE, 2011).</p> <p>Cooperative: Organization of, at least, seven physical people, united through cooperation and mutual support, with democratic and participative management, with common social and economic goals, which legal aspects are distinct from other societies (IE, 2011).</p>                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                            |                                                                                                       |                                                                         |                                                                                                                                          |
| <b>Situation</b>                                                      | <p>Nine farm owners (Sítio Pickler, Pissaia Farm, Fazenda Andretta, Fazenda Colônia Zuffo, Fazenda Gilmar, Fazenda Helena, Fazenda Suruvy, Fazenda Baccin and Fazenda Colônia Suspiro) decided not to participate in the current monitoring period.</p> <p>All the Four swine farmers included in this monitoring period showed active involvement with local associations and cooperatives. Almost all swine farmers believe that associations and cooperatives generate some benefit to the farm.</p> <p>The main organizations that have some involvement with the swine farmers are:</p> <p>Altenor Farm: Alfa, Itaipu and Coperaguas cooperative;</p> <p>Ramella Farm: Copérdia cooperative;</p> <p>Santa Lucia Farm: Coperavisa cooperative; Silva Farm: Coopermarc cooperative.</p> |                                                                                                                                                            |                                                                                                       |                                                                         |                                                                                                                                          |
| Absence of associations or cooperatives; individualism is predominant | There are associations and cooperatives in the region, though the swine farmer is not involved in any of them.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | The swine farmer is involved in associations or cooperatives, though it was observed internal conflicts and/or lack of structure among these organizations | The swine farmer is involved in associations or cooperatives, though his participation is not active. | The swine farmer is actively involved in associations and cooperatives. | In addition to the last item, the participation in associations or cooperatives resulted in positive benefits for the farmer's business. |
| <b>Score</b>                                                          | 5.5 (five-point-five)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                            |                                                                                                       |                                                                         |                                                                                                                                          |

|                  |                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prospects</b> | In the next monitoring period, all farmers intend to be involved with associations and cooperatives using this as a tool to diffuse the composting technology. |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |                                                                                                                                                                                     |                                                                                                                                                                                 |                                                                                                     |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                       | <b>Economic Dependency</b>                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                      |                                                                                                                                                                                     |                                                                                                                                                                                 |                                                                                                     |
| <b>Description</b>                                                                     | Evaluates financial dependency of the swine farmer regarding his production, as well as the income generated by new activities introduced due to the compost production.                                                                                                                                                                                                                                                |                                                                                                                                                      |                                                                                                                                                                                     |                                                                                                                                                                                 |                                                                                                     |
| <b>Situation</b>                                                                       | <p>All the four swine farmers (Santa Lucia Farm, Ramella Farm, Silva Farm and Altenor Farm) practice subsistence or depend on other economic activities that generate income, such as:</p> <p>Altenor Farm: milk production;</p> <p>Ramella Farm: cattle production and corn farming;</p> <p>Santa Lucia Farm: aviary and cattle productions and rentals;</p> <p>Silva Farm: agroindustry and eucalyptus wood sale.</p> |                                                                                                                                                      |                                                                                                                                                                                     |                                                                                                                                                                                 |                                                                                                     |
| The farmer relies only on the swine production and this activity brought him injuries. | The farmer relies only on the swine production and this activity brought him financial instability (some months the performance brought injuries and others, incomes).                                                                                                                                                                                                                                                  | <p>The swine production is not generating profit and carries on:</p> <p>-Subsistence activities; OR</p> <p>-Depend on another economic activity.</p> | <p>The swine farmer relies on swine production, which is not generating profit and carries on:</p> <p>-Subsistence activities; AND</p> <p>-Depend on another economic activity.</p> | <p>The swine farmer relies on swine production, which is generating profit, and carries on:</p> <p>-Subsistence activities; OR</p> <p>-Depend on another economic activity.</p> | The swine farmer relies on more than two economic activities (in addition to the swine production). |
| <b>Score</b>                                                                           | 5 (Five)                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                      |                                                                                                                                                                                     |                                                                                                                                                                                 |                                                                                                     |

|                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                            |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--|
| Prospects                                                                                                                            | There are currently no foreseen improvements.                                                                                                                                                                                                                                                                                                                              |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |
|                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                            |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |
| Indicator                                                                                                                            | Satisfaction of the Farmer                                                                                                                                                                                                                                                                                                                                                 |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |
| Description                                                                                                                          | Evaluates the satisfaction of the farmer regarding the GHG emissions reduction project.                                                                                                                                                                                                                                                                                    |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |
| Situation                                                                                                                            | All the Four swine farmers are satisfied with the composting activity. The main reason is due to the fact that the proposed technology is a solution to the swine waste and reduces the environmental impacts, so they can still practice their profession while preserving it for future generations. Another benefit is that it adds economic value to their properties. |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |
| The swine farmer is not satisfied at all and is planning to quit:<br><br>- The composting activity, AND<br><br>- The carbon markets. | The swine farmer is not satisfied at all and is planning to quit:<br><br>- The composting activity, OR<br><br>- The carbon markets.                                                                                                                                                                                                                                        | The swine farmer is indifferent to the composting and/or the carbon Project. | The swine farmer is satisfied with composting, but it was observed difficulty to apply to carbon markets. | The swine farmer is satisfied with the carbon Project and composting.. | In addition to the last item, the swine farmer shares his experience and support with other farmers to use the same technology. |  |
| Score                                                                                                                                | 5 (Five)                                                                                                                                                                                                                                                                                                                                                                   |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |
| Prospects                                                                                                                            | There are currently no foreseen improvements.                                                                                                                                                                                                                                                                                                                              |                                                                              |                                                                                                           |                                                                        |                                                                                                                                 |  |

### 6.1.2 Human Resource

|                    |                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>   | <b>Control of microorganisms</b>                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b> | Evaluates biological characteristics of the compost regarding risks for human, animal and environmental health. The parameters evaluated are the presence and amount of the following: total amount of coliforms (bacteria that indicates contamination of the compost- CT), faeces coliform (bacteria commonly found in faeces-CF), faeces streptococcus (EF) and Salmonella (EMBRAPA, 2007; EMBRAPA, 2008). |

|                                                                      |                                                                                                                                                                                                             |                                                                                                                                                   |                                                                                                                                                |                                                                                                                                   |                                                                                  |  |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--|
| Situation                                                            | The Four swine farms used to have biological analysis of the compost undertaken. However, after having all tests' results negative for these parameters for some time, they stopped in order to save money. |                                                                                                                                                   |                                                                                                                                                |                                                                                                                                   |                                                                                  |  |
| There is no concern in undertaking biologic analysis of the compost. | The swine farmer is looking for resources to undertake the biologic analysis of the compost; currently barriers, such as prices, hinder this possibility                                                    | The biologic analysis is undertaken sporadically, though it presents irregularities regarding the patterns recommended by Public Health Agencies. | The biologic analysis is undertaken periodically, but the parameters analyzed do not accomplish Public Health Official Standards all the time. | The biologic analysis is undertaken periodically and the parameters analyzed accomplish Public Health Official Standards all the. | In addition to the last item, the analysis results are available for the public. |  |
| Score                                                                | 1.00 (One)                                                                                                                                                                                                  |                                                                                                                                                   |                                                                                                                                                |                                                                                                                                   |                                                                                  |  |
| Prospects                                                            | There are currently no foreseen improvements.                                                                                                                                                               |                                                                                                                                                   |                                                                                                                                                |                                                                                                                                   |                                                                                  |  |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>   | <b>Diseases Agents</b>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b> | <p>Evaluate actions undertaken in order to control diseases within the swine farm boundaries.</p> <p>Mechanical Control: Actions hindering the Access to diseases agents and that avoid that the agents enter the plant site through gaps in the physical structure.</p> <p>Chemical Control: Use of chemical products, such as anticoagulant, poison, among others.</p> <p>Biologic Control: Use of natural enemies of the disease agents.</p> |
| <b>Situation</b>   | All swine farms presented some control of diseases agents. Among the possibilities to control such diseases, the mechanical and chemical one was the most used, being almost all four producers that undertake this action, i.e. using disinfectants. As mechanical control, two farmers mentioned practices that refer to the use of PPE materials.                                                                                            |

|                                                               |                                                                                                                               |                                                                                                                                        |                                                                                                         |                                                                                                    |                                                                                                                    |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| There is no concern regarding the control of diseases agents. | The swine farmer is trying to overcome barriers to undertake control of diseases agents (i.e. obtaining financial resources). | There are some initiatives to control diseases agents, though they are not sufficient; since presence of diseases agents was observed. | The control of diseases agents includes one of the following actions: mechanical, chemical or biologic. | The diseases agents control uses at least two kinds of actions: mechanical, chemical and biologic. | There is a structured program for controlling diseases agents, with Performance Indicators and/or Monitoring Plan. |
| <b>Score</b>                                                  | 5.00 (Five)                                                                                                                   |                                                                                                                                        |                                                                                                         |                                                                                                    |                                                                                                                    |
| <b>Prospects</b>                                              | There are currently no foreseen improvements.                                                                                 |                                                                                                                                        |                                                                                                         |                                                                                                    |                                                                                                                    |

|                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                             |                                                                                                                             |                                                                                                               |                                                                                                               |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                                         | <b>Health and Safety Practices</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                             |                                                                                                                             |                                                                                                               |                                                                                                               |
| <b>Description</b>                                                                                       | Evaluates health and safety practices adopted in the swine farm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                             |                                                                                                                             |                                                                                                               |                                                                                                               |
| <b>Situation</b>                                                                                         | All the four producers carried out actions to promote hygiene in the swine farm (since most of them follow requirements from integrators) such as washing, blower sweep and disinfection. The swine farms operate within the norms that regulate this category, thus complying with workers' regulation and providing PPEs, as much as searching to maintain the work environment as healthy as possible. However, regarding safety practices, most safety equipment is available, though it is used inadequately and without withdrawal control. |                                                                                                                             |                                                                                                                             |                                                                                                               |                                                                                                               |
| Safety equipments are not available. There are no hygiene and health practices regarding the swine unit. | Safety equipments are not available OR there are no hygiene and health practices regarding the swine unit.                                                                                                                                                                                                                                                                                                                                                                                                                                        | The safety equipments are available, though they are used inadequately (i.e. there are no control of the use and withdraw). | The safety equipments are available, though they are used inadequately (i.e. there are no control of the use and withdraw). | The swine unit undertakes a program for disinfection and cleaning in order to guarantee a healthy environment | The swine unit undertakes a program for disinfection and cleaning in order to guarantee a healthy environment |

|                  |                                                                                                                                                                                                                     |                                                                                      |                                                                                       |                                                                    |                                                                     |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------|
|                  |                                                                                                                                                                                                                     | AND there are few actions geared towards Hygiene OR Health issues in the swine unit. | AND there are few actions geared towards Hygiene AND Health issues in the swine unit. | OR all the safety equipments are available and are used correctly. | AND all the safety equipments are available and are used correctly. |
| <b>Score</b>     | 3.00 (Three)                                                                                                                                                                                                        |                                                                                      |                                                                                       |                                                                    |                                                                     |
| <b>Prospects</b> | Regarding safety practices, most safety equipment is available, although it is used inappropriately. All farmers intend to control the use and remove the equipment and intend to evaluate the correct use of them. |                                                                                      |                                                                                       |                                                                    |                                                                     |

### 6.1.3 Financial Resource

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>   | <b>Number of animals</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b> | Evaluates the control of the swine unit regarding amount of animals and if this amount is increasing or decreasing during the Project cycle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Situation</b>   | <p>Three of the four swine farms had an increase in the number of animals (Altenor Farm, Ramella Farm and Silva Farm), the other farm (Secco) had an decrease in the number of animals.</p> <p>Altenor Farm: In this monitoring period, the average of animals produced annually on the farm was 4,395, while in the last monitoring was 3,452 animals. (increased less than 1,000 animals) (Score 5)</p> <p>Ramella Farm: In this monitoring period, the average of animals produced annually on the farm was 3,023, while in the last monitoring was 3,007 animals. (increased less than 1,000 animals) (Score 5)</p> <p>Silva Farm: In this monitoring period, the average of animals produced annually on the farm was 6,642, while in the last monitoring was 5,589 animals (increased more than 1,000 animals) (Score 6)</p> <p>Secco Farm: In this monitoring period, the average of animals produced annually on the farm was 3,771, while in the last monitoring was 4,172 animals (decreased less than 1,000 animals) (Score 3)</p> <p>Average between the Score of each farm: 4.75</p> |

|                                                                 |                                                            |                                                               |                                                    |                                                                                   |                                                                                 |
|-----------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| There is no control of the amount of animals in the swine farm. | There was a significant decrease in the number of animals. | There was an insignificant decrease in the number of animals. | Amount of animals is the same as project baseline. | The amount of animals increased insignificantly after the project implementation. | The amount of animals increased significantly after the Project implementation. |
| <b>Score</b>                                                    | 4.75 (Four-point-seventy-five)                             |                                                               |                                                    |                                                                                   |                                                                                 |
| <b>Prospects</b>                                                | There are currently no foreseen improvements.              |                                                               |                                                    |                                                                                   |                                                                                 |

|                                     |                                                                                                                                                                                                                          |                                                                                                                                  |                                           |                                                  |                                                             |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------|-------------------------------------------------------------|
| <b>Indicator</b>                    | <b>Generation and commercialization of the compost</b>                                                                                                                                                                   |                                                                                                                                  |                                           |                                                  |                                                             |
| <b>Description</b>                  | Evaluates the amount of compost generated as well as its commercialization by the farmer.                                                                                                                                |                                                                                                                                  |                                           |                                                  |                                                             |
| <b>Situation</b>                    | In this monitoring period, about 661 tonnes of compost was generated. All the four swine farms, commercialize the compost, with an average commercialization rate in the market about 40% of the total compost produced. |                                                                                                                                  |                                           |                                                  |                                                             |
| There was no generation of compost. | The compost generated was not commercialized, since its characteristics were not adequate.                                                                                                                               | The compost was generated but it was not commercialized due to lack of buyers, or because it was used to supply internal demand. | A part of the compost was commercialized. | More than 50% of the compost was commercialized. | In addition to last item, demand for the compost increased. |
| <b>Score</b>                        | 4.25 (Four-point-twenty-five)                                                                                                                                                                                            |                                                                                                                                  |                                           |                                                  |                                                             |
| <b>Prospects</b>                    | Farmers intend to assess conditions to market more than 50% of the compost produced during the next monitoring period.                                                                                                   |                                                                                                                                  |                                           |                                                  |                                                             |

| Indicator                                              | Commercialization of carbon credits:                                                                                                                                                                                                                             |                                                                |                                                                              |                                                       |                                                                                                 |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Description                                            | Evaluates the context of the carbon credits commercialization during the period analyzed by the report.                                                                                                                                                          |                                                                |                                                                              |                                                       |                                                                                                 |
| Situation                                              | All carbon credits generated during the last monitoring periods were sold. In addition, future credits that will be generated during this monitoring period (which the present SOCIALCARBON Report – Point 03 corresponds to) will be available for negotiation. |                                                                |                                                                              |                                                       |                                                                                                 |
| During current period, no credits were commercialized. | During current period, credits were already negotiated, though no sales were concluded.                                                                                                                                                                          | During current period, less than 50% of the credits were sold. | During the current period, more than 50% of the credits were commercialized. | During the current period, all the credits were sold. | In addition to last item, the Project has its future credits already in process of negotiation. |
| Score                                                  | 6 (six)                                                                                                                                                                                                                                                          |                                                                |                                                                              |                                                       |                                                                                                 |
| Prospects                                              | There are currently no foreseen improvements.                                                                                                                                                                                                                    |                                                                |                                                                              |                                                       |                                                                                                 |

#### 6.1.4 Natural Resource

| Indicator               | Environmental Management:                                                                                                                                                                                                                                                                                             |                      |                       |                         |                         |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------------|-------------------------|
| Description             | Evaluates procedures for environmental management adopted by the swine farmer, including the organization and coordination of actions and documents regarding the swine activities: nutrition, water use, installations, energy and use of the waste for other activities.                                            |                      |                       |                         |                         |
| Situation               | None of the swine farms has an environmental management system. The majority of them have just two or three procedures regarding environmental management. The main activities carried out by farmers are related to feed and energy, water control and correct waste disposal (Ex. garbage removal on the property). |                      |                       |                         |                         |
| None of the environment | Less than 50% of the                                                                                                                                                                                                                                                                                                  | More than 50% of the | There is a management | There is an environment | There is an environment |

|                                                                     |                                                                                                                                 |                                                                                                                                 |                                                          |                                                       |                                               |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|
| al aspects of the swine farm are considered in the management plan. | environment al aspects of the swine farm are considered through the implementation of some actions, but with no documentati on. | environment al aspects of the swine farm are considered through the implementation of some actions, but with no documentati on. | system, though it is difficult to implement the actions. | al management system efficient with periodic reports. | al management system certified by third part. |
| <b>Score</b>                                                        | 2 (Two)                                                                                                                         |                                                                                                                                 |                                                          |                                                       |                                               |
| <b>Prospects</b>                                                    | There are currently no foreseen improvements.                                                                                   |                                                                                                                                 |                                                          |                                                       |                                               |

|                                                                           |                                                                                                                                                                                                            |                                                                                                                                                                               |                                                                                                                                                                     |                                                                                                                                                                                   |                                                                                  |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Indicator</b>                                                          | <b>Environmental Legislation</b>                                                                                                                                                                           |                                                                                                                                                                               |                                                                                                                                                                     |                                                                                                                                                                                   |                                                                                  |
| <b>Description</b>                                                        | Evaluates if the swine farm is in accordance with Brazilian environmental standards and legislation (Ex: Operational License, Forestry Legislation Requirements, etc.)                                     |                                                                                                                                                                               |                                                                                                                                                                     |                                                                                                                                                                                   |                                                                                  |
| <b>Situation</b>                                                          | Altenor and Secco (Santa Lucia)farms have operational licenses and accomplish with Forest Code. Ramella Farm and Silva Farm have operational licenses but they are not in compliance with the Forest Code. |                                                                                                                                                                               |                                                                                                                                                                     |                                                                                                                                                                                   |                                                                                  |
| The entrepreneur is not aware of the Brazilian environmental legislation. | The entrepreneur is aware of his legal duties, though he has no License, or the License was suspended since the demands were not                                                                           | During the period analyzed, the swine farm needs to accomplish a Term for Conduct Adjustment (in Portuguese, TAC); this means that the farm has some pre-defined deadline for | There is an environmental license, though the entrepreneur faces difficulties to accomplish the demands. The License does not accomplish, temporarily, the demands. | There is an environmental license and all the demands are accomplished, though the entrepreneur faces difficulties to accomplish other Brazilian legislations (i.e. forest code). | The swine farmer accomplishes all Brazilian environmental rules and legislation. |

|                  |                                               |                                              |  |  |  |
|------------------|-----------------------------------------------|----------------------------------------------|--|--|--|
|                  | accomplished.                                 | accomplishing the environmental legislation. |  |  |  |
| <b>Score</b>     | 5.505 (Five-point-seventy-five)               |                                              |  |  |  |
| <b>Prospects</b> | There are currently no foreseen improvements. |                                              |  |  |  |

|                                                                                   |                                                                                                                                                                                                                                                                                                                |                                                                        |                                                                            |                                                                            |                                                                                                                   |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                                  | <b>Chemical and Physical Analysis of the Compost</b>                                                                                                                                                                                                                                                           |                                                                        |                                                                            |                                                                            |                                                                                                                   |
| <b>Description</b>                                                                | Evaluates if, during the period analyzed, chemical and physical analysis of the compost were undertaken.                                                                                                                                                                                                       |                                                                        |                                                                            |                                                                            |                                                                                                                   |
| <b>Situation</b>                                                                  | During this monitoring period only Altenor swine farm carry out chemical or physical analysis of the compost in his own field and stated that the result was positive. In order to save money, especially during the COVID-19 Pandemic crisis, all the others 3 farms did not carry out the analysis formally. |                                                                        |                                                                            |                                                                            |                                                                                                                   |
| There is no concern in regard with chemical and physical analysis of the compost. | The swine farmer faces difficulties to obtain resources to undertake chemical and physical analysis of the compost. The farmer is looking for possible alternatives.                                                                                                                                           | Either a chemical or a physical analysis of the compost is undertaken. | Chemical and Physical Analysis of the compost are undertaken sporadically. | Physical and Chemical analysis of the compost are undertaken periodically. | In addition to this, information regarding chemical and physical parameters analyzed are available to the public. |
| <b>Score</b>                                                                      | 1.5 (One-point-five)                                                                                                                                                                                                                                                                                           |                                                                        |                                                                            |                                                                            |                                                                                                                   |
| <b>Prospects</b>                                                                  | Farmers intend to implement more frequently the specific analyzes of the physical and chemical aspects of the compost during the next years of monitoring.                                                                                                                                                     |                                                                        |                                                                            |                                                                            |                                                                                                                   |

#### 6.1.5 Biodiversity/Technology Resource

| Indicator                                      | Compost quality                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                       |                                                                                                      |                                                                                                   |                                                                                           |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Description                                    | Evaluates the level of dry matter, the concentration of nutrients (C, N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O, Ca e Mg), and the presence of heavy metal; and if these parameters are adequate for maintenance of soil, water and vegetation quality.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                       |                                                                                                      |                                                                                                   |                                                                                           |
| Situation                                      | <p>The compost is considered an organic fertilizer mixed of Classe “A”, which means an organic fertilizer from animal or vegetal source without the use of toxic material, resulting in a product of safe use in agriculture<sup>48</sup>.</p> <p>The Normative Instruction of Ministry of Agriculture, Livestock and Supply<sup>49</sup> establish specifications about the physical and chemical characteristics of the compost.</p> <p>All producers tested the compost generated in their own crops and stated that the result was positive at the beginning of project implementation. The swine farmer evaluated conditions such as dry matter, presence of heavy metal and concentration of nutrients, which indicated that they had around 1.5mg/L for N, 2.5 to 3mg/L for P 2.5mg/L for K and between 30% and 40% of organic matter. After having all tests’ results turn out positive and the same for these parameters for some time, they made the decision to keep producing the compost with the same specifications, saving the budget for testing „especially in times of crisis. As the specifications and conditions of the compost are always the same, it is possible to guarantee the quality of the compost, since the objective is to make them available for sale to generate a source of income.</p> |                                                                                                       |                                                                                                      |                                                                                                   |                                                                                           |
| The quality of the compost was never assessed. | The quality of the compost was not assessed by laboratorial tests, however it was tested in crops and it was positive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The compost is not in accordance with the specification s of water levels and levels of nutrients (C, | The compost is not in accordance with the specification s of water levels OR levels of nutrients (C, | The compost is in accordance with the specification s of water levels AND levels of nutrients (C, | In addition to this, information regarding quality of compost is available to the public. |

<sup>48</sup> EMBRAPA. Regulamentação de Insumos - Fertilizantes orgânicos, condicionadores de solo e

substratos agrícolas. Available at: [http://www.cnpma.embrapa.br/eventos/2007/workshop/organica/download/insumos\\_fertilizantes.pdf](http://www.cnpma.embrapa.br/eventos/2007/workshop/organica/download/insumos_fertilizantes.pdf). Last visit on: 16-October-2019.

<sup>49</sup> BRAZIL. Ministry of Agriculture, Livestock and Supply. Normative Instruction nº 46, from 06 January 2011. Estabelece O Regulamento Técnico Para Os Sistemas Orgânicos de Produção Animal e Vegetal. Brasília, Available at: <<http://www.legisweb.com.br/legislacao/?id=78910>>. Last visit on: 25-August-2015.

|                  |                                               |                                                                |                                                                |                                                                |  |
|------------------|-----------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|--|
|                  |                                               | N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O, Ca e Mg). | N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O, Ca e Mg). | N, P <sub>2</sub> O <sub>5</sub> , K <sub>2</sub> O, Ca e Mg). |  |
| <b>Score</b>     | 2 (two)                                       |                                                                |                                                                |                                                                |  |
| <b>Prospects</b> | There are currently no foreseen improvements. |                                                                |                                                                |                                                                |  |

|                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                         |                                                                                                                                                       |                                                                                    |                                                                                                  |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                                                  | <b>Maintenance of the composting site</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                         |                                                                                                                                                       |                                                                                    |                                                                                                  |
| <b>Description</b>                                                | Evaluates if the maintenance of the composting site (Mechanic and Automatic Composting Unit) is carried out periodically, even by the swine farmer or by an independent Company.                                                                                                                                                                                                                                                                                                                                        |                                                                                                         |                                                                                                                                                       |                                                                                    |                                                                                                  |
| <b>Situation</b>                                                  | <p>Some producers stated that they had no difficulties in carrying out the maintenance of the composting site. Occasionally maintenance is also carried out by a specialized company, in case of reform. However, the financial cost of maintenance is very high, which was highlighted by farmers.</p> <p>The other producers said they had some difficulties in maintaining the composting site, as it requires a lot of control. During the period of the COVID-19 Pandemic, the difficulty became even greater.</p> |                                                                                                         |                                                                                                                                                       |                                                                                    |                                                                                                  |
| It was not observed maintenance practices in the composting site. | The swine farmer carries on practices towards the maintenance of the composting site, though he faces difficulties, for instance: bad smell due to lack of water or problems during aeration.                                                                                                                                                                                                                                                                                                                           | The swine farmer carries on practices towards maintenance of the composting site, with no difficulties. | The swine farmer carries on practices towards maintenance of the composting site, and sporadically, the maintenance is made by a specialized company. | The maintenance of the composting site is made regularly by a specialized Company. | In addition to last scenario, the equipment's are calibrated according to established deadlines. |
| <b>Score</b>                                                      | 4.0 (Three-point-Twenty-Five)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                         |                                                                                                                                                       |                                                                                    |                                                                                                  |

|                                                              |                                                                                                                                                                                                  |                                                   |                                                                                                  |                                                                                                                                                                             |                                                                                                                                                  |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prospects</b>                                             | There are currently no foreseen improvements.                                                                                                                                                    |                                                   |                                                                                                  |                                                                                                                                                                             |                                                                                                                                                  |
| <b>Indicator</b>                                             | <b>Technology Diffusion</b>                                                                                                                                                                      |                                                   |                                                                                                  |                                                                                                                                                                             |                                                                                                                                                  |
| <b>Description</b>                                           | Evaluates the contribution of the project for technology diffusion, which comprises knowledge diffusion and implementation of new Technologies.                                                  |                                                   |                                                                                                  |                                                                                                                                                                             |                                                                                                                                                  |
| <b>Situation</b>                                             | Three farmers have just informally explained the composting technology to neighbors and friends (Altenor Farm, Ramella Farm and Silva Farm), at schools and municipal departments (Basso Farm)   |                                                   |                                                                                                  |                                                                                                                                                                             |                                                                                                                                                  |
| The swine farmer is not committed with technology diffusion. | The swine farmer would commit to support technology diffusion, though he is not aware which procedures should be undertaken.                                                                     | The technology diffusion approaches are informal. | Project contributes for technology diffusion through knowledge transfer, through formal methods. | Besides contributing with knowledge transfer, it also contributes for technology diffusion through the implementation of Technologies which differs from baseline scenario. | In addition to previous scenario, the project contributes for the technical capacitating and implementation and operation of these technologies. |
| <b>Score</b>                                                 | 3.0 (Three)                                                                                                                                                                                      |                                                   |                                                                                                  |                                                                                                                                                                             |                                                                                                                                                  |
| <b>Prospects</b>                                             | All farmers intend to seek to disseminate information about composting technology. As an example, to neighbors and friends, in cooperatives and associations, events and distributing pamphlets. |                                                   |                                                                                                  |                                                                                                                                                                             |                                                                                                                                                  |

#### 6.1.6 Carbon Resource

|                  |                            |
|------------------|----------------------------|
| <b>Indicator</b> | <b>Project Performance</b> |
|------------------|----------------------------|

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                             |                                                                                 |                                                                               |                                                                |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Description</b>                       | Evaluates the Project performance analyzed by the corresponding Monitoring Report in comparison with the emission reductions estimated by the PD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                             |                                                                                 |                                                                               |                                                                |
| <b>Situation</b>                         | <p>Comparing the estimates from VCS PD and the 4<sup>th</sup> Monitoring period, it is possible to affirm that the performance of the project was directly affected by the nine proponents that not participate on this monitoring period, as the emission reductions achieved during the current monitoring period were only 29% from those estimated in the VCS PD.</p> <p>The main reasons of this difference were:</p> <ul style="list-style-type: none"> <li>- Nine farm owners (Sítio Pickler, Pissaia Farm, Fazenda Andretta, Fazenda Colônia Zuffo, Fazenda Gilmar, Fazenda Helena, Fazenda Suruvy, Fazenda Baccin and Fazenda Colônia Suspiro) decided not to participate in the current monitoring period.</li> </ul> |                                                                             |                                                                                 |                                                                               |                                                                |
| 0% of emission reductions were verified. | Very Low. From 1 to 25% of the emission reductions during the period were verified.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Low. From 26 to 50% of the emission reductions of the period were verified. | Reasonable. From 51 to 75% the emission reductions of the period were verified. | Great. From 76 to 95% of the emission reductions of the period were verified. | Excellent. More than 95% of emission reductions were verified. |
| <b>Score</b>                             | 3.00 (three)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                             |                                                                                 |                                                                               |                                                                |
| <b>Prospects</b>                         | There are currently no foreseen improvements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                             |                                                                                 |                                                                               |                                                                |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>   | <b>Stakeholders Consultation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b> | Evaluates if stakeholders were informed and consulted regarding Project activity and its impacts, during the period analyzed.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Situation</b>   | <p>Before implementing any farm or composting unit, a consultation with the environmental agency is carried out and only with the release of the licenses is the project undertaken. The formal consultation was carried out during the validation of the project with letters sent for the mainly community stakeholders.</p> <p>During this monitoring period, as all farms included in the project are mostly composed of small families, informal conversations was the most common way of informing about the project activity. In addition, the farmers and the</p> |

|                                                       |                                                                                                                                                                                                                                                                                    |                                                                                                                                             |                                                                                                                                       |                                                                                                           |                                                                                                                            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|                                                       | Sustainable Carbon team kept the main general communication channels available via telephone, email and even personally to receive any kind of suggestions and comments from the community. No complaints, suggestions and/or comment about the project was received through them. |                                                                                                                                             |                                                                                                                                       |                                                                                                           |                                                                                                                            |
| Stakeholders are not aware of the project activities. | Stakeholders were informally communicated, though they did not have access to send comments and suggestions for the project developers.                                                                                                                                            | Stakeholders were communicated through formal letters, and they had opportunity to send comments and suggestions to the Project developers. | In addition to the letters, other methods were carried out for engaging stakeholders, such as lectures, group activities, and others. | In addition to previous scenario, the project provides permanent channels for stakeholder's consultation. | There are evidences that the stakeholder's suggestions and comments were considered and realized by the project developer. |
| Score                                                 | 2 (two)                                                                                                                                                                                                                                                                            |                                                                                                                                             |                                                                                                                                       |                                                                                                           |                                                                                                                            |
| Prospects                                             | The farmers will be studied and presented the implementation of a permanent channel for stakeholder's consultation in the next monitoring period.                                                                                                                                  |                                                                                                                                             |                                                                                                                                       |                                                                                                           |                                                                                                                            |

|                                                         |                                                                                                                                                                                                             |                                                                  |                                                                              |                                                    |                                                                    |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------|
| Indicator                                               | Validation and Verification                                                                                                                                                                                 |                                                                  |                                                                              |                                                    |                                                                    |
| Description                                             | Evaluates if the Project was partially or totally validated/verified by a third part and if the third part is accredited by the UNFCCC, as well as if the national and international Standards are being    |                                                                  |                                                                              |                                                    |                                                                    |
| Situation                                               | The Composting Project in Santa Catarina was validated and verified by a third part accredited by the UNFCCC. Currently, this project is under verification by another third part accredited by the UNFCCC. |                                                                  |                                                                              |                                                    |                                                                    |
| The Project was not validated/verified by a third part. | Only some aspects of the Project were validated/verified.                                                                                                                                                   | The Project was validated/verified by a third part, which is not | The Project was validated by a third part, but it is registered in more than | The validation and verification are made by a DOE, | The validation and verification are made by DOE, using methods and |

|                  |                                               |                       |                  |                           |                                        |
|------------------|-----------------------------------------------|-----------------------|------------------|---------------------------|----------------------------------------|
|                  |                                               | accredited to UNFCCC. | one GHG Program. | accredited by the UNFCCC. | procedures recognized internationally. |
| <b>Score</b>     | 6.00 (Six)                                    |                       |                  |                           |                                        |
| <b>Prospects</b> | There are currently no foreseen improvements. |                       |                  |                           |                                        |

## 6.2 Analysis of Results

### 6.2.1 Current Performance

| Resource          | Critical | Satisfactory | Sustainable | Average Score | Performance  |
|-------------------|----------|--------------|-------------|---------------|--------------|
| Social            | 0.0%     | 66.7%        | 33.3%       | 5.17          | Sustainable  |
| Human             | 33.3%    | 66.7%        | 0.0%        | 3.00          | Satisfactory |
| Financial         | 0.0%     | 66.7%        | 33.3%       | 5.00          | Satisfactory |
| Natural           | 66.7%    | 0.0%         | 33.3%       | 3.00          | Satisfactory |
| Biodiversity/Tech | 33.3%    | 66.7%        | 0.0%        | 3.00          | Satisfactory |
| Carbon            | 33.3%    | 33.3%        | 33.3%       | 3.67          | Satisfactory |

### 6.2.2 Historical Performance

The general performance of the Composting Project in Santa Catarina was satisfactory, showing an increase of around 20% from the Point Zero to the Point 01. The most significant increase was the financial indicator, with almost 90% increase, followed by the human resource, with 70% increase. The worse result was in the social resource, with a 4% decrease. Table 3 below depicts the performance by resource. Furthermore, the Figure 2 below shows the historic performance of the six resources analyzed in this project in this monitoring period.

| Social | Point Zero | Point One | Point Two | Point Three |
|--------|------------|-----------|-----------|-------------|
|        | 4.18       | 4.03      | 5.39      | 5.17        |

Historic Analysis: The small decrease of this indicator is mostly related to the lesser participation in association and cooperatives, comparing point two to point three. In addition, the number of farms participating in this monitoring period was also lower.

| Human | Point Zero | Point One | Point Two | Point Three |
|-------|------------|-----------|-----------|-------------|
|       | 1.61       | 2.76      | 3.44      | 3.00        |

Historic Analysis: Control related to disease agents is the main point that must be improved in human resources. As required by the integrating company, all producers must develop a disease control program. In addition, farmers need to obtain better health and safety practices compared to the last analyzed period.

| Financial | Point Zero | Point One | Point Two | Point Three |
|-----------|------------|-----------|-----------|-------------|
|           | 2.47       | 4.67      | 5.00      | 5.0         |

Historic Analysis: Despite the commercialization of all the credits generated in the last monitoring period, there is a concern to obtain and seek better results in the generation and sale of compost, which also decreased among producers.

| Natural | Point Zero | Point One | Point Two | Point Three |
|---------|------------|-----------|-----------|-------------|
|         | 2.58       | 2.73      | 3.61      | 3.00        |

Historic Analysis: In this period the farmers were not able to carry out Chemical and Physical Analysis of the Compost. The COVID-19 pandemic hampered the evolution of Environmental Management actions.

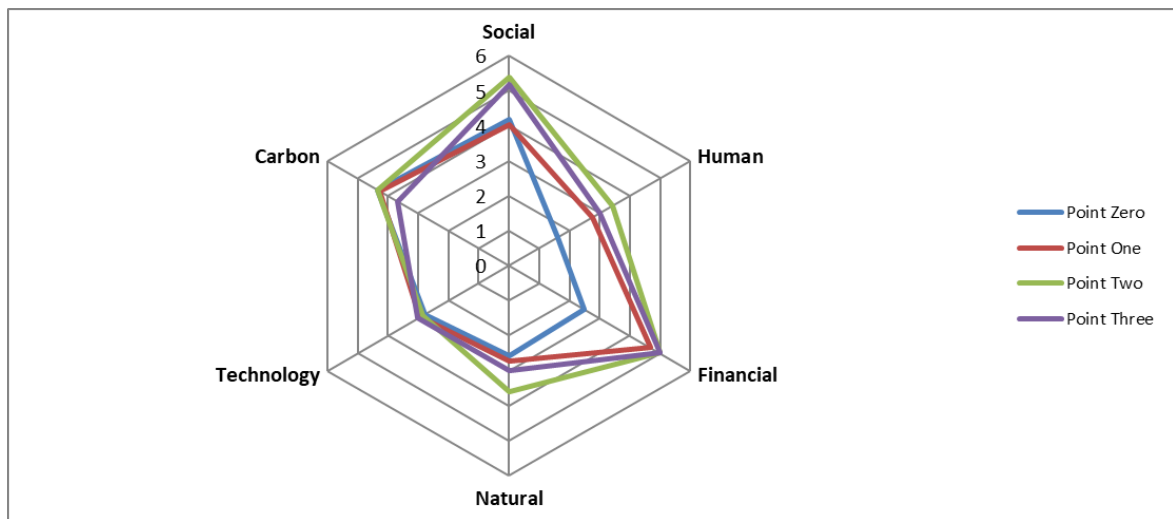
| Biodiversity | Point Zero | Point One | Point Two | Point Three |
|--------------|------------|-----------|-----------|-------------|
|              | 2.77       | 2.94      | 2.83      | 3.00        |

Historic Analysis: During this monitoring, producers did not formally test the compost to verify its quality and the diffusion of the technology was hampered due to the COVID-19 Pandemic, leading to a small drop in the rating of this resource.

| Carbon | Point Zero | Point One | Point Two | Point Three |
|--------|------------|-----------|-----------|-------------|
|        | 4.33       | 4.27      | 4.33      | 3.67        |

Historic Analysis: During this current monitoring period, the project faced several difficulties in relation to common practices in the region, in addition to being directly affected by the economic consequences of the COVID-19 pandemic. All these aspects corroborate for the decrease of this resource mainly in relation to the difference between the emission reductions estimated ex ante and those achieved in this period.

### 6.2.3 Performance Hexagon



## 6.3 Prospect Status

### 6.3.1 Achieved Prospects

| Social    |                                                                                                                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator | Association and Cooperatives                                                                                                                                                                             |
| Prospect  | Each farmer commits to be actively involved with at least one association or cooperative, using this as a tool to diffuse the composting technology. The swine farmers intend to implement this by 2020. |
| Details   | Farmers were able to establish involvement with associations and cooperatives in the monitoring period.                                                                                                  |

| Financial |                                                                                                                                                                             |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicator | Generation and Commercialization of the Compost                                                                                                                             |
| Prospect  | The farmers will make efforts to commercialize more than 50% of the compost produced during the next monitoring period. The swine farmers intend to implement this by 2020. |
| Details   | Farmers commercialized more than 50% of the compost produced during the monitoring period.                                                                                  |

### 6.3.2 Not Achieved Prospects

| Human            |                                                                                                                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b> | <b>Control of Microorganisms</b>                                                                                                                                                        |
| <b>Prospect</b>  | The producers commit to undertake at least 2 (two) biologic analyses during the next monitoring period. The swine farmers intend to implement this by 2020.                             |
| <b>Follow-up</b> | Producers did not performed at least 2 (two) biological analysis during the monitoring period mainly due to financial difficulties influenced by the unfolding of the Covid-19 pandemic |

| Natural          |                                                                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b> | <b>Chemical and Physical Analyses of the Compost</b>                                                                                                                                                                                                          |
| <b>Prospect</b>  | Analyses of the compost will be undertaken twice in the next monitoring period. The first analysis will take chemical aspects into consideration, on the second time physical aspects must be considered. The swine farmers intend to implement this by 2020. |
| <b>Details</b>   | Compost analysis were not performed during the monitored period.                                                                                                                                                                                              |

| Biodiversity/Technology Resource |                                                                                                                                                                                              |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator</b>                 | <b>Quality of the Compost</b>                                                                                                                                                                |
| <b>Prospect</b>                  | The swine farmers will have the quality of their compost assessed by laboratorial tests at least once during the next monitoring period. The swine farmers intend to implement this by 2021. |
| <b>Details</b>                   | The swine farmers did not have the quality of their compost evaluated by specific laboratory tests during the monitored period.                                                              |

| Carbon           |                                  |
|------------------|----------------------------------|
| <b>Indicator</b> | <b>Stakeholders Consultation</b> |

|                 |                                                                                                                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prospect</b> | The implementation of a permanent channel for stakeholder's consultation will be studied and presented in the next monitoring period. The swine farmers intend to implement this by 2021. |
| <b>Details</b>  | The implementation of a permanent stakeholder consultation channel wasn't implemented.                                                                                                    |

### 6.3.3 Identified Prospects

| Social                                         |                                                                                                                                                               |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator: Association and Cooperatives</b> | In the next monitoring period, all farmers intend to be involved with associations and cooperatives using this as a tool to diffuse the composting technology |
| <b>Responsible</b>                             | Swine farmers                                                                                                                                                 |
| <b>Timescale</b>                               | 2023                                                                                                                                                          |

| Human                                         |                                                                                                                                                                                                                     |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator: Health and Safety Practices</b> | Regarding safety practices, most safety equipment is available, although it is used inappropriately. All farmers intend to control the use and remove the equipment and intend to evaluate the correct use of them. |
| <b>Responsible</b>                            | Swine farmers                                                                                                                                                                                                       |
| <b>Timescale</b>                              | 2023                                                                                                                                                                                                                |

| Financial                                                         |                                                                                                                        |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator: Generation and Commercialization of the Compost</b> | Farmers intend to assess conditions to market more than 50% of the compost produced during the next monitoring period. |
| <b>Responsible</b>                                                | Swine farmers                                                                                                          |
| <b>Timescale</b>                                                  | 2023                                                                                                                   |

| Natural                                                            |                                                                                                                                                            |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator:</b><br>Chemical and Physical analyses of the compost | Farmers intend to implement more frequently the specific analyzes of the physical and chemical aspects of the compost during the next years of monitoring. |
| <b>Responsible</b>                                                 | Swine farmers                                                                                                                                              |
| <b>Timescale</b>                                                   | 2023                                                                                                                                                       |

| Biodiversity/Technology Resource          |                                                                                                                                                                                                  |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator:</b><br>Technology Diffusion | All farmers intend to seek to disseminate information about composting technology. As an example, to neighbors and friends, in cooperatives and associations, events and distributing pamphlets. |
| <b>Responsible</b>                        | Swine farmers                                                                                                                                                                                    |
| <b>Timescale</b>                          | 2023                                                                                                                                                                                             |

| Carbon                                         |                                                                                                                                                   |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicator:</b><br>Stakeholders Consultation | The farmers will be studied and presented the implementation of a permanent channel for stakeholder's consultation in the next monitoring period. |
| <b>Responsible</b>                             | Swine farmers and Sustainable Carbon                                                                                                              |
| <b>Timescale</b>                               | 2023                                                                                                                                              |

# APPENDIX

Data and parameters monitored of the Composting Project in Santa Catarina can be verified on the following tables. These parameters are described at Section 4.2 of the current monitoring report.

**Table 15.** Parameters monitored for the Composting Project in Santa Catarina – Year 2019

| Data and parameters monitored - Year 2019 (May-December) |                        |                   |                   |                  |                   |                   |                     |                 |                          |                     |                |
|----------------------------------------------------------|------------------------|-------------------|-------------------|------------------|-------------------|-------------------|---------------------|-----------------|--------------------------|---------------------|----------------|
| Farm Name                                                | Farm owner             | Animal Type       | N <sub>da,y</sub> | N <sub>p,y</sub> | N <sub>LT,y</sub> | W <sub>site</sub> | VS <sub>LT,y</sub>  | nd <sub>y</sub> | Q <sub>y,treatment</sub> | EC <sub>P,J,y</sub> | Q <sub>y</sub> |
|                                                          |                        |                   | (number)          | (number)         | (number)          | (Kg)              | (Kg dm/animal/year) | (number)        | (tonnes)                 | (MWh)               | (tonnes)       |
| Fazenda Altenor                                          | Altenor José Basso     | Finishers         | 99                | 4,395            | 1,196             | 82                | 194                 | 221             | 56                       | 11                  | 1,433          |
| Fazenda Granja Silva                                     | Jair da Silva          | Gilts             | 0                 | 0                | 0                 | 0                 | 0                   | 0               | 150                      | 8.23                | 884            |
|                                                          |                        | Sows in gestation | 245               | 388              | 260               | 28                | 74                  | 245             |                          |                     |                |
|                                                          |                        | Sows              | 0                 | 0                | 0                 | 0                 | 0                   | 0               |                          |                     |                |
|                                                          |                        | Boars             | 245               | 4                | 3                 | 28                | 74                  | 245             |                          |                     |                |
|                                                          |                        | Piglets           | 27                | 5,235            | 389               | 4.25              | 10                  | 217             |                          |                     |                |
| Fazenda Ramella                                          | Antônio Carlos Ramella | Sows              | 18                | 209              | 10                | 120               | 223                 | 173             | 250                      | 6.63                | 807            |
|                                                          |                        | Finishers         | 82                | 2,909            | 654               | 99                | 183                 | 173             |                          |                     |                |
| Sítio Santa Lucia                                        | Belmiro Secco          | Finishers         | 106               | 1,879            | 547               | 85                | 210                 | 230             | 3                        | 11.57               | 3,677          |

**Table 2 .Parameters monitored for the Composting Project in Santa Catarina – Year 2020**

| Data and parameters monitored - Year 2020 |                        |                   |                   |                  |                   |                   |                                 |                  |                          |                     |                |
|-------------------------------------------|------------------------|-------------------|-------------------|------------------|-------------------|-------------------|---------------------------------|------------------|--------------------------|---------------------|----------------|
| Farm Name                                 | Farm owner             | Animal Type       | N <sub>da,y</sub> | N <sub>p,y</sub> | N <sub>LT,y</sub> | W <sub>site</sub> | V <sub>S</sub> L <sub>T,y</sub> | n <sub>d,y</sub> | Q <sub>y,treatment</sub> | EC <sub>P,J,y</sub> | Q <sub>y</sub> |
|                                           |                        |                   | (number)          | (number)         | (number)          | (Kg)              | (Kg dm/animal/year)             | (number)         | (tonnes)                 | (MWh)               | (tonnes)       |
| Fazenda Altenor                           | Altenor José Basso     | Finishers         | 107               | 4,395            | 1,288             | 79                | 163                             | 192              | 113                      | 9                   | 1,245          |
| Fazenda Granja Silva                      | Jair da Silva          | Gilts             | 0                 | 0                | 0                 | 0                 | 0                               | 0                | 300                      | 13.42               | 1,442          |
|                                           |                        | Sows in gestation | 366               | 388              | 389               | 28                | 110                             | 366              |                          |                     |                |
|                                           |                        | Sows              | 0                 | 0                | 0                 | 0                 | 0                               | 0                |                          |                     |                |
|                                           |                        | Boars             | 366               | 4                | 4                 | 28                | 110                             | 366              |                          |                     |                |
|                                           |                        | Piglets           | 28                | 8,050            | 626               | 4.25              | 16                              | 354              |                          |                     |                |
| Fazenda Ramella                           | Antônio Carlos Ramella | Sows              | 0                 | 0                | 0                 | 0                 | 0                               | 0                | 250                      | 12.42               | 1,511          |
|                                           |                        | Finishers         | 141               | 3,137            | 1,212             | 69                | 239                             | 324              |                          |                     |                |
| Sítio Santa Lucia                         | Belmiro Secco          | Finishers         | 126               | 5,662            | 1,951             | 79                | 225                             | 265              | 3                        | 13.33               | 4,237          |