

San Esteban S.A.

1 kg Beef Meat

Enviromental Product Declaration



This EPD has been developed in conformity with ISO 14025.

From:



San Esteban S.A.
ARGENTINE MEAT



EPD registration number:	S-P-07361
CPC code:	2111.2113 Meat of mammals, fresh
Program:	EPD International EPD® System
Program operator:	EPD International AB
Publication date:	2024-01-29
Valid until:	2029-01-28

EDP Programme Information

Program:

The International EPD System

www.environdec.com

info@environdec.com



The International EPD® System

EPD

www.epd.inti.gob.ar



Argentina

Geographical Scope: Argentina

Contacts:

For additional information relative to **San Esteban S.A.** activities or in regard to this environmental declaration, please contact:

Paolo Fontana

sanesteban@gruposanesteban.com.ar

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see ISO 14025.

Product Category Rules (PCR)

PCR 2012:11: Meat of mammals (fresh, chilled or frozen)

PCR 2012:11 version 4.0, 2022-10-19

UN CPC code: 2111.2113

PCR review was conducted by: Adriana Del Borghi, Chair of The Technical Committee of the International EPD® System (www.environdec.com).

Life Cycle Assessment (LCA)

LCA accountability: Leticia Tuninetti, Instituto Nacional de Tecnología Industrial; Rodolfo Bongiovanni, Instituto Nacional de Tecnología Agropecuaria.

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier.

Third-party verifier: Javier Martín Echazarreta Instituto Nacional de Tecnología Industrial (INTI).

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third-party verifier:

Yes No



About San Esteban S.A.

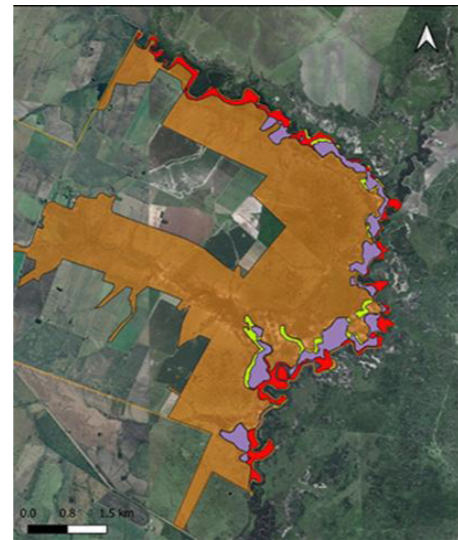
Our Vision

To be the leading livestock company in Argentina
Produce meat of excellent quality
due to respect for the soil,
the natural environment and animal welfare.



Natural Enviroments

San Esteban S.A. ("San Esteban"- 30° 54' 3.28" S, 58° 31' 3.42" W) is located in the area of Paso Gallo, on the banks of Provincial Route N. 28 in the Federal Department, in the **center-north of the Province of Entre Ríos**, its western limit is represented by the Gualeguay River, the north by the Caraballo Grande stream, to the south along Provincial Route n°28, to the east along a local road.



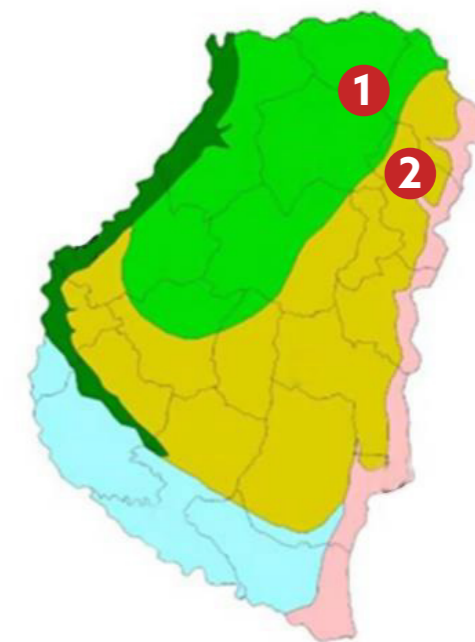
NATURAL ENVIRONMENTS

- Marginal forest of the Gualeguay River and Caraballo Grande stream.
- Semi-mixed forest.
- Scrublands.
- Riparian scrublands.

The property has a total area of 4024 hectares.

In the Province of Entre Ríos three phytogeographic provinces converge, subdivided into five regions; The phytogeographic province that is represented in the San Esteban area is that of Espinal, the forests that make up the Espinal in the north of Entre Ríos are locally called "**Selva de Montiel**", although they do not strictly constitute a jungle, are divided into two areas : **Montiel Xerophilous Forest 1** and **Grasslands dominated by grasses 2**

The complete cycle of cattle (rearing, raising, fattening) **is carried out by the property as the main productive activity.** In addition, corn, grassland and sorghum are grown.



Reserva Natural: Selva de Montiel



Marginal Forest of the Galeguay river



Caraballo Grande stream



Bushes ribereños



*Semi-erophilous forest **



Scrublands

* It's main components arboreal are: White Quebracho, (*Aspidosperma* 'Quebracho-blanco), Espinillo (*Vachellia Caven*), Ñandubay (*Prosopis affnis*) and Black Carob (*Prosopis nigra*).

Our Mission and Our Values

San Esteban has a clear **mission**: the **production of high-quality beef** for the market **with a balance between emission and removal of CO₂**, guaranteeing the **highest health-nutritional standards** and ensuring **traceability** from the field to the table.

.... by **findings the best balance** and respect between nature, food systems and biodiversity with a strong attention on environmental and social elements.

San Esteban to reach its mission is putting in place several actions **always respecting its values ...**



Long Term Ownership

Supply chain as a key priority

- Continuing developing a production model that encourage transparency and traceability alongside the different actors (internal and external) across the supply chain.

Environmental and animal welfare

- Producing high quality beef for the market, minimizing environmental impacts and protecting the soil, respect of animal welfare across the entire life-cycle.

Territory

- Guarantee high-level professional conditions that enhance the workforce and encourage the permanence and return of people to rural areas.



People & Technology

People and **technology** development has always been a **fundamental combination** for San Esteban and the **basis of its future development.**

Ensure continuous training for all.

Continuity through **careful management** of **generational change.**



Quality & Sustainability

Our ability **to maintain** or **improve quality** over time minimizing impacts on the environment, society, and the economy.

Clear goals in line with Agenda ONU 2030 in terms of sustainability ambition the base for our future strategies:

- > **SDGs** (*)
- > **CO₂ neutrality**

(*) Sustainable Development Goals (UN in 2015)

.... **in line** with the **SDGs**, objectives that have guided our activity and that translate into the quality of the animals we produce.





Product Information
1 kg bovine live weight

Protocol

In line with our mission, over the years we **have developed our own protocol** for the meat sector which is based on two axes: achieving the nutritional return and producing sustainable meat with neutral CO₂ emission.

San Esteban Protocol



Animal Feed

Diet based on natural prairies, alfalfa; winter cereals and grasses; silage, cereals and oilseeds produced on the farm.



Health Program

Preventive program without use antibiotics or growth promoters. Antibiotics allowed only for clinical diseases.



Quality

Defined constant quality through international scores that determine:

- Maturity- Marbling
- Flavor - Meat color
- Fat color - Terneza

Plus of the Angus which produces a very rich meat in myostatin.



Green Balance

Achieving Nutritional Return

Production of sustainable meat with neutral CO₂ emission

80% free natural pasture, 20% controlled confined diet. 100% self-production with attention on:

- Water leakages
- Soil erosion

99% internal production, significantly reduces CO₂ emissions due to transport, External food allowed only for weanings animals.

The diet offers a higher amount of unsaturated fatty acids $\Omega 3$ and Vitamin E elements contained in large quantities in the grass.

Food safety and Health Program are at the heart of the project. The abolition of antibiotics and growth promoters is achieved through total self-production.

Internal production of all the sewing seeds with the exception maize/soja seeds OGM and avoid or lower the use of agrochemicals insecticides and fungicides.

Convert vegetable proteins into animal proteins, more efficient with a higher biological value due to richness essential amino acids (lysine, methionine...).

Limitation the Natural Area address to livestock > 50%. Animal load < 1.0 EV/ha. Minimization of water consumption. Soil conservation through the fight against erosion.

Achieving the goal of meat production in a environment **Carbon negative.** Enhance the wooded and natural surface create a rotation between cereal crops, forage, leguminous and intercalary grasses capable of guaranteeing proper nutrition.



Animal Feed

- We follow the entire life cycle of the animal.
- Our animals live in freedom in their natural habitat, 80% in the free natural landscape (mountain/meadow) and 20% in a corral with controlled feeding.
- They are raised 100% in the forest with native natural grasslands and cultivated pastures.
- The grazing planner (winter and summer greening) makes possible the regeneration of soil organic matter.
- Agricultural areas are sowed with the purpose of producing hay and cereals rich in starch, essential ingredients in the final part of the cycle to guarantee the flavor and tenderness characteristics necessary to obtain high-quality meat.
- Our meat has optimal levels of fatty acids for human consumption.



Green Balance

To obtain **dry matter** production that guarantees the production of meat of sustainable quality and with **CO₂ neutral parameters**, we use the following **factors and cultivation practices**:

A. We follow the following factors:

- carbon storage operated primarily by harvest Index,
- the size of the root system,
- the humification and mineralization coefficients,
- the initial organic matter content of the soil,
- the cover of ground with crop residues,
- ensure the highest number of days of covert ground,
- the use of processes aimed to maintain the structure of the soil,
- the presence of wooden areas,
- forest rejuvenation with aerial sowing.

B. We adopt the following practices:

- crop rotation (cereals / legumes),
- double crops during the year (winter cereal + corn or sorghum or soybean),
- sowing of perennial/multiannual prairies,
- adoption of minimum tillage techniques,
- adoption the green manure techniques.

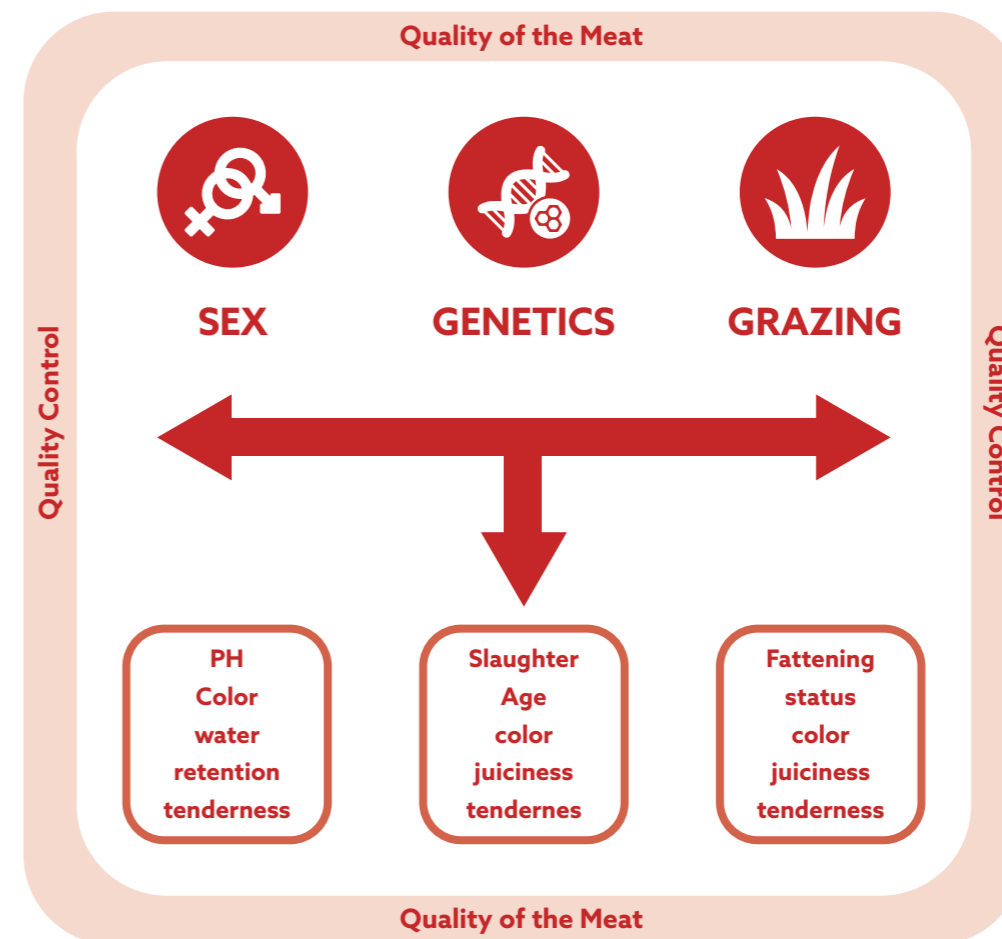
Health Program

- Preventive health program (vaccination) with ban of growth promoters. The use of antibiotics is only permitted in diseases situations.
- The diet offers a higher quantity of unsaturated fatty acids **Ω3** and **Vitamin E** as these elements are contained in large quantities both in grass and through integration with flaxseeds.
- Attention to animal welfare is also linked to the guarantee of safety and food quality in all phases of reproduction, weaning, fattening, growth, grazing, age, etc...



Meat Quality

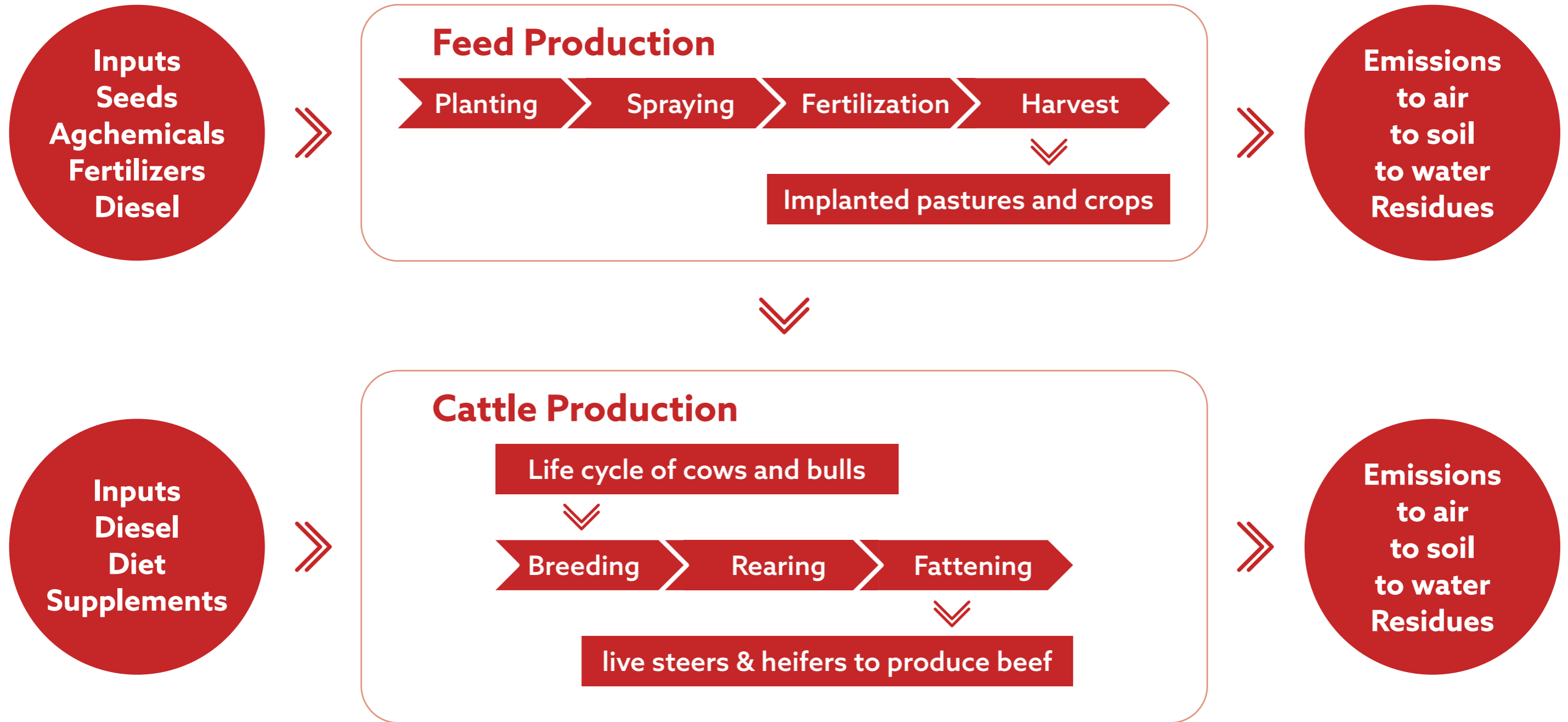
- The protocol of Sant Esteban is very focused on its three basic aspects that determine the quality that, combined with other factors, allow the slaughtered animals to supply high-quality cuts of meat.
- Quality is the sum of many factors that determine consumer appreciation: tenderness, juiciness, smell and texture; These factors depend mainly on the maturity of the carcass and the amount and distribution of marbling (intramuscular fat).
- In the case of Angus cattle, the characteristic of high amounts of myostatin must be remembered, which guarantees strong muscle growth with a high content of intramuscular marbling.





LCA Information

Production Chain



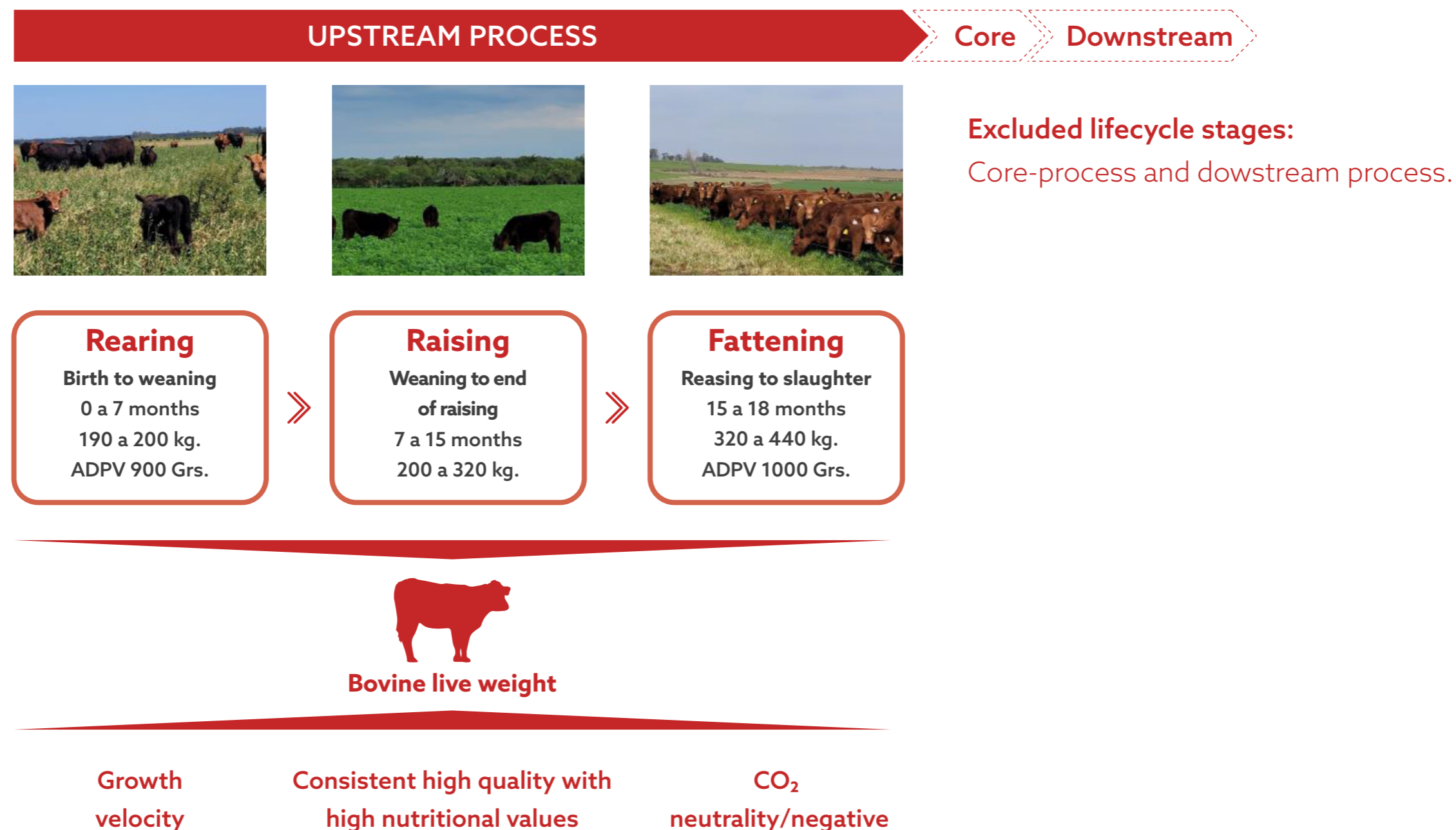
General System Boundaries

The animals produced by San Esteban S.A. are slaughtered in slaughter house located about 200 km from the farmgate of the hacienda San Esteban S.A. and exported or consumed in the domestic market.

Scope: PCR bullet 4.3 (meat of mammals) allow to study to intermediate products the upstream process with the scope cradle to gate.

Allocation: Biofiscal to upstream process.

Database(s) and LCA software used: Agri-footprint version 5.0; December 2019; ecoinvent 4.0. November 2022; SimaPro® 9.5.0.1 April 2023.





Enviromental Performance

Environmental Performance Indicators (1/3)

Impact category indicators of fresh, boneless, bovine beef, produced by San Esteban S.A.

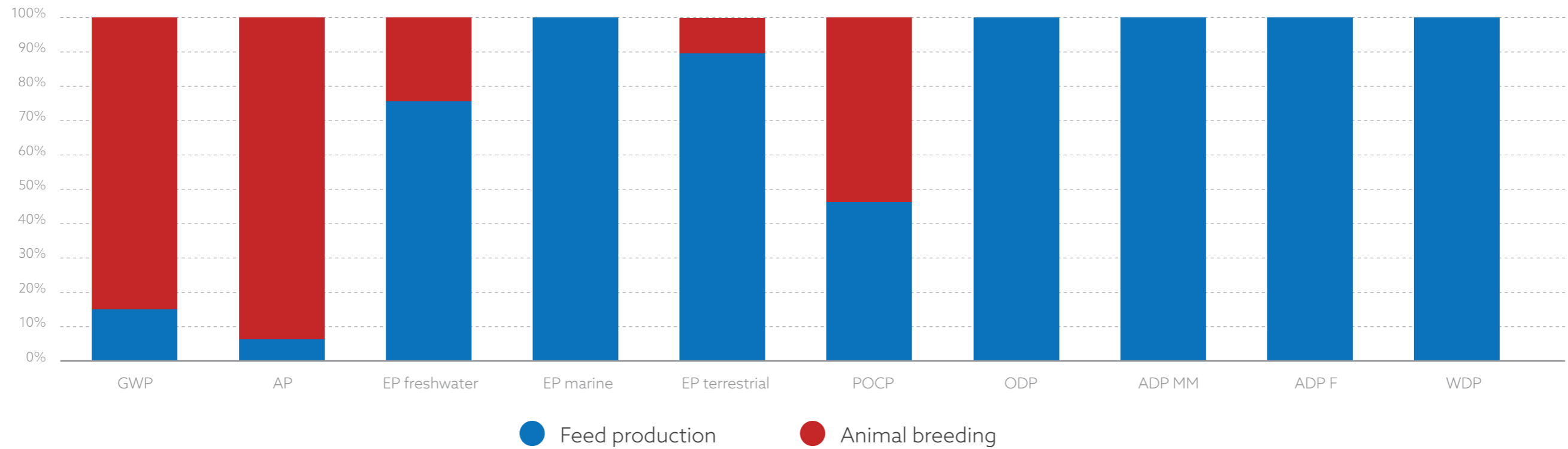
Declared Unit: 1 kg of packaged boneless beef, European breed.

UPSTREAM PROCESS					
PARAMETER		UNIT	Feed production	Animal breeding	TOTAL
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	4.58E+00	0.00E+00	4.58E+00
	Biogenic	kg CO ₂ eq.	4.72E-03	2.66E+01	2.66E+01
	Land use and land transformation	kg CO ₂ eq.	5.69E-03	0.00E+00	5.69E-03
	TOTAL	kg CO ₂ eq.	4.59E+00	2.66E+01	3.12E+01
Ozone layer depletion (ODP)		kg CFC 11 eq.	2.66E-07	0.00E+00	2.66E-07
Acidification potential (AP)		mol H ⁺ eq.	1.39E-02	2.17E+00	2.31E-01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	5.91E-02	1.89E-02	7.79E-02
	Aquatic marine	kg N eq.	5.14E-03	0.00E-01	5.14E-03
	Aquatic terrestrial	mol N eq.	2.22E+00	2.47E-01	2.47E+00
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1.03E-02	1.21E-02	2.24E-02
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	2.44E-05	0.00E+00	2.44E-05
	Fossil resources	MJ, net calorific value	3.07E+01	0.00E+00	3.07E+01
Water deprivation potential (WDP)*		m ³ world eq. deprived	2.21E+00	0.00E+00	2.21E+00

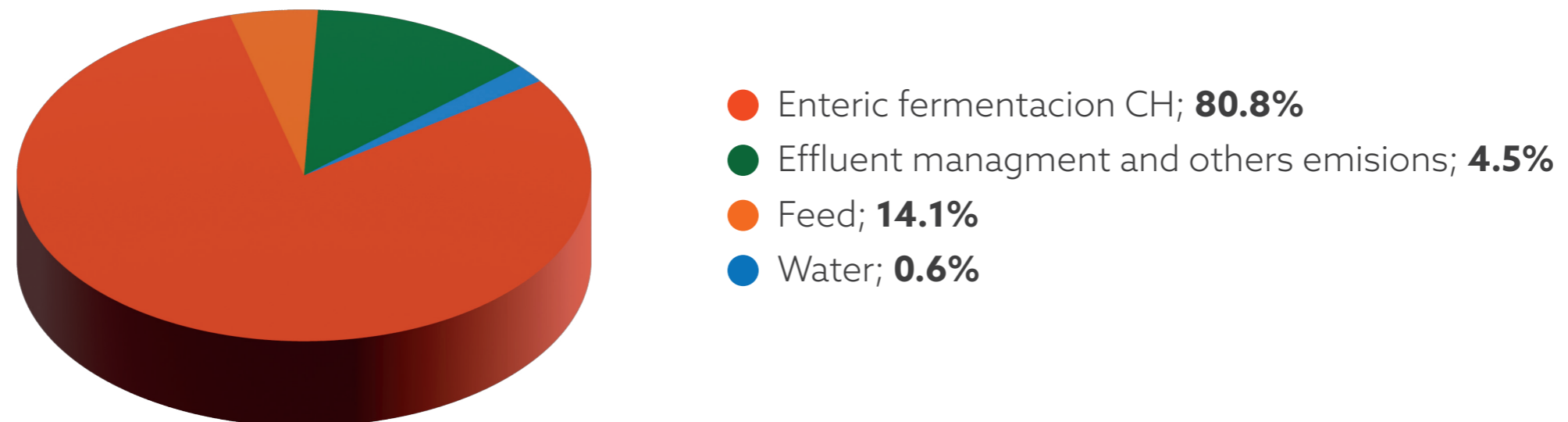
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Environmental Performance Indicators (2/3)

Percentage distribution of contributions to the Global Warming Potential (GWP) indicator



Carbon Foot print of 1kg beef meat LW



Environmental Performance Indicators (3/3)

Comparison Environmental Results

Between 1kg of live weight and 1kg of boneless meat (declared unit).

UPSTREAM PROCESS

Core

IMPACT INDICATORS		kg Live Weight	1 kg bonless meat
GLOBAL WARNING POTENTIAL <i>(GWP) Totale</i>	kg CO ₂ eq.	1.22+01	3.12E+01
OZONE LAYER DEPLETION (ODP)	kg CFC 11 eq.	9.07E-02	2.66E-07
ACIDIFICATION POTENTIAL (AP)	mol H ⁺ eq.	3.06E-02	2.31E-01
EUTROPHICATION POTENTIAL <i>(EP) Aquatic freshwater</i>	kg P eq.	2.02E-03	7.79E-02
EUTROPHICATION POTENTIAL <i>(EP) Aquatic marine</i>	kg N eq.	9.68E-01	5.14E-03
EUTROPHICATION POTENTIAL <i>(EP) Aquatic terrestrial</i>	mol N eq.	8.81E-03	2.47E+00
PHOTOCHEMICAL OXIDANT CREATION POTENTIAL (EP)	kg NMVOC eq.	1.04E-07	2.24E-02
ABIOTIC DEPLETION POTENTIAL <i>(ADP) Metals and minerals</i>	kg Sb eq.	9.58E-06	2.44E-05
ABIOTIC DEPLETION POTENTIAL <i>(ADP) Fossil resources</i>	MJ, net calorific value	1.21E+01	3.07E+01
WATER DEPRIVATION POTENTIAL (WDP)	m ³ world eq. deprived	8.68E-01	2.21E+00



Use of Resource

Indicators of fresh, boneless, bovine meat produced by San Esteban S.A.

Declared Unit: 1 kg of packaged boneless meat, European breed.



UPSTREAM PROCESS

IMPACT INDICATORS		UNIT	Feed production	Animal breeding	TOTAL
Primary energy resources Renewable	Use as energy carrier	MJ, net calorific value	1.04E+00	0.00E+00	1.04+00
	Use as raw materials	MJ, net calorific value	4.40E+00	0.00E+00	4.40+00
	TOTAL	MJ, net calorific value	5.44E+00	0.00E+00	5.44+00
Primary energy resources Non-renewable	Use as energy carrier	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00
	Use as raw materials	MJ, net calorific value	1.99E-01	0.00E+00	1.99E-01
	TOTAL	MJ, net calorific value	1.99E-01	0.00E+00	1.99E-01

Additional environmental performance indicators (1/2)

For the parameter **Global warming potential (GWP)**, a sensitivity analysis of the results, including carbon sequestration due to improved grass-land management results in a total reduction of **-14.01 kg CO₂ eq**, for each kilogram of live-weight animals produced by San Esteban.



Crop/Pasture	Natural grassland	Sown grassland (Mix)	Sown grassland (Alfa Alfa)	Corn Silage	Sorgum Silage	Corn Grain	Soybeans	Intercalary grasses (summer) sorgum	Intercalary grasses (winter) ray grass	Intercalary grasses (winter) oat	Total removal (t CO ₂ eq)
Farm	San Esteban	San Esteban	San Esteban	San Esteban	San Esteban	San Esteban	San Esteban	San Esteban	San Esteban	San Esteban	
Province	Entre Ríos	Entre Ríos	Entre Ríos	Entre Ríos	Entre Ríos	Entre Ríos	Entre Ríos	Entre Ríos	Entre Ríos	Entre Ríos	
Department	Federal	Federal	Federal	Federal	Federal	Federal	Federal	Federal	Federal	Federal	
Year	2023	2023	2023	2023	2023	2023	2023	2023	2023	2023	
Production Dry Matter kg/ha	2620	7000	6000	9000	9000	6500	2500	10.000	6.000	7.000	

Calculation

Carbon existence Initial t C/ha	76.87	76.87	76.87	76.87	76.87	76.87	76.87	76.87	76.87	76.87	76.87
Land use factor FLU	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Grassland/Natural area managment Fmg	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Carbon inputs Fi	1.00	1.11	1.11	1.00	1.00	1.00	1.00	1.00	1.11	1.11	1.11

Results

Final carbon stock calculationn t C/ha	77.41	77.29	77.29	76.87	76.87	76.87	76.87	76.87	77.29	77.29	77.29
Change in carbon stock in the soil t C/ha	0.54	0.42	0.42	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42
Change in the existence of carbon in the atmosphere - t CO₂ eq/ha	1.97	1.55	1.55	0.00	0.00	0.00	0.00	0.00	1.55	1.55	1.55

Removal System

Surface ha	2391	629	75	62	120	88	80	159	392	117	
Total annual removal t CO₂ eq	4718.50	974.95	116.45	0.00	0.00	0.00	0.00	0.00	607.08	181.38	6598.35

Verify by:  

Additional environmental performance indicators (2/2)

This value determines that the carbon footprint of the meat produced by San Esteban, considering the carbon removals according to Tier 1 of the IPCC methods, is reduced from **12.24 kg CO₂** equivalent per kg of live weight to **-1.77 kg CO₂** equivalent **per kg of live weight**.

- Furthermore, taking into account the yield and the allocation, the final value of the parameter Global warming potential (GWP) is **-4.51 kg CO₂ eq** for **each kilogram of meat** (*declared unit*).

IMPACT INDICATORS	1 kg Live Weight		
TOTAL GWP <i>KG CO₂ eq</i>	12.24		
	Fossil	LULUC	Biogenic
	1.80E+00	2.24E-03	1.05E+01
	14.67%	0,02%	85.31%
Enteric fermentation CH4	0.00E+00	0.00E+00	9.90E+00
Effluent management and other emissions	0.00E+00	0.00E+00	5.50E-01
Feed	1.70E+00	2.10E-03	1.70E-03
Water	7.60E-02	1.70E-04	1.80E-04
Transportation	0.00E+00	0.00E+00	0.00E+00

IMPACT INDICATORS	1 kg Live Weight TOTAL	1 kg Bonless meat TOTAL
TOTAL GWP <i>kg CO₂ eq</i>	12.24	31.18
Total annual animal production <i>kg</i>	471.000	164.00
Total annual animal production <i>kg/ha</i>	130.67	45.50
Total annual carbon removal <i>kg CO₂ eq</i>	-6.598.355	
Removal for 1 kg <i>kg CO₂ eq</i>	-14.01	-35.69
Balance GWP for 1kg <i>kg CO₂ eq</i>	-1.77	-4.51
<i>Live animal yield to boneless meat</i>		2.7080
<i>% of meat compared to by-products</i>		0.9407

Contact

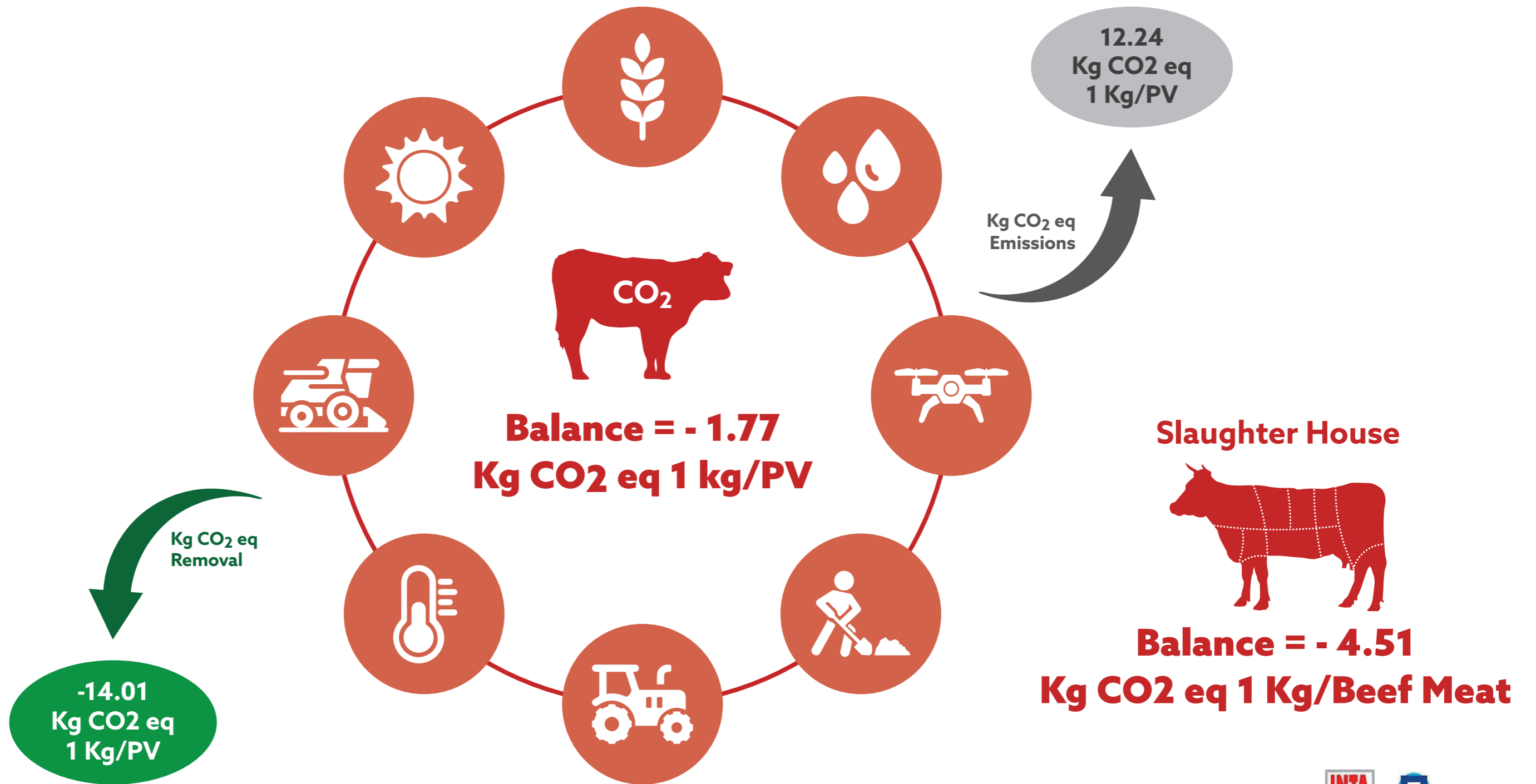
For additional information relative to San Esteban S.A. activities or regarding this environmental declaration please contact:

Paolo Fontana | sanesteban@gruposanesteban.com.ar

Analysis of the Results

Global Warming Potential (GWP) of San Esteban S.A.

1 kg of bovine live weight (labelled of 1 kg of beef meat corresponds 2.701 kg of live weight).



Verify by:  

References

General Program Instructions of the International EPD® System. Version 4.0
PCR 2012:11 Meat of mammals, version 4.0, 2022-10-19.
CPC 2111, 2113.

Other References

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ISO 14044: 2006 Environmental management -Life cycle assessment -Requirements and guidelines.

IPCC (2019). Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

PCR Meat of mammal's product. Version 4.0.1 (24/10/22)