San Esteban S.A. 1 kg Beef Meat

Enviromental Product Declaration





This EPD has been developed in conformity with ISO 14025.

From:







CPC code:

Program:

Valid until:

Program operator:

Publication date:

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D	ARGENTINA	EFU
	S-P-07361	
	2111.2113 Me	at of mammals, fresh
	EPD Internat	ional EPD® System
	EPD Internat	ional AB
	2024-01-29	
	2029-01-28	

EDP Programme Information

Program:

The International EPD System

www.environdec.com info@environdec.com



EPD www.epd.inti.gob.ar



Argentina

Geographical Scope: Argentina

Contacts:

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

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

Product Category Rules (PCR)

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

x EPD verification by individual verifier.

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

Approved by: The International EPD [®] System Procedure for follow-up of data during EPD validity involves third-party verifier:

Yes 🛛 🗙 No

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.









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 is mission is putting in place several actions **always respecting its values** ...



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 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.



the economy.

Clear goals in line with Agenda ONU 2030 in terms of sustainability ambition the base for our future strategies: > **SDGs** (*)

 \rightarrow 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.







San Esteban S.A. | Argentine Meat

Quality & Sustainability

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





Product Information 1 kg bovine live weight



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 CO_2 emission.

San Esteban Protocol



unsaturated fatty acids Ω and Vitamin E elements contained in large quantities in the grass.

through total self-production.

(lysine, methionine...).

Minimization of water consumption. Soil conservation through the fight

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.





- 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 sewed 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.





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.





• 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...





• 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:** Biofisical 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.



Core-process and dowstream process.



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	1 PROCESS	
PARA	METER	UNIT	Feed production	Animal breeding	TOTAL
	Fossil	kg CO2 eq.	4.58E+00	0.00E+00	4.58E+00
Clabel we may in a	Biogenic	kg CO2 eq.	4.72E-03	2.66E+01	2.66E+01
potential (GWP)	Land use and land transformation	kg CO2 eq.	5.69E-03	0.00E+00	5.69E-03
	TOTAL	kg CO2 eq.	4.59E+00	2.66E+01	3.12E+01
Ozone layer depletior	n (ODP)	kg CFC 11 eq.	2.66E-07	0.00E+00	2.66E-07
Acidification potentia	I (AP)	mol H ⁺ eq.	1.39E-02 2.17E+00		2.31E-01
	Aquatic freshwater	kg P eq.	5.91E-02	1.89E-02	7.79E-02
potential (EP)	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 oxidar potential (POCP)	nt creation	kg NMVOC eq.	1.03E-02	1.21E-02	2.24E-02
Abiotic depletion	Metals and minerals	kg Sb eq.	2.44E-05	0.00E+00	2.44E-05
potential (ADP)*	Fossil resourses	MJ, net calorific value	3.07E+01	0.00E+00	3.07E+01
Water deprivation pot	tential (WDP)*	m ³ world eq. deprived	2.21E+00	0.00E+00	2.21E+00





Environmental Performance Indicators (2/3)

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



Carbon Foot print of 1kg beaf meat LW



Enteric fermentacion CH; 80.8% Effluent managment and others emisions; 4.5% Feed; **14.1%** Water; 0.6%



Environmental Performance Indicators (3/3)

Comparison Environmental Results

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

		UPSTREA	M PROCESS	
IMPACT INDIC	ATORS	kg Live Weight	1 kg bonless meat	
GLOBAL WARNING POTENTIAL (GWP) Totale	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 (EP) Aquatic freshwater	kg P eq.	2.02E-03	7.79E-02	
EUTROPHICATION POTENTIAL (EP) Aquatic marine	kg N eq.	9.68E-01	5.14E-03	
EUTROPHICATION POTENTIAL (EP) Aquatic terrestrial	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 (ADP) Metals and minerals	kg Sb eq.	9.58E-06	2.44E-05	
ABIOTIC DEPLETION POTENTIAL (ADP) Fossil resources	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 IND	OICATORS	UNIT	Feed production	Animal breeding	
	Use as energy carrier	MJ, net calorific value	1.04E+00	0.00E+00	
Primary energy resources	Use as raw materials	MJ, net calorific value	4.40E+00	0.00E+00	
Renewable	TOTAL	MJ, net calorific value	5.44E+00	0.00E+00	
Primary energy	Use as energy carrier	MJ, net calorific value	0.00E+00	0.00E+00	
resources Non-renewable	Use as raw materials	MJ, net calorific value	1.99E-01	0.00E+00	
	TOTAL	MJ, net calorific value	1.99E-01	0.00E+00	



TOTAL	
1.04+00	
4.40+00	
5.44+00	
0.00E+00	
1.99E-01	
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 grassland management results in a total reduction of **-14.01 kg CO₂ eq, for each kilogram of live-weight** animals produced by San Esteban.

	Re	edi	r'						-		
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	
Land use factor FLU	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	
Carbon inputs Fi	1.00	1.11	1.11	1.00	1.00	1.00	1.00	1.00	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	
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	
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	
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
									V	/erify by:	

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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 KG CO ₂ eq	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 managment 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	

	1 kg Live Weight	1 kg Bonless meat
IMPACT INDICATORS	TOTAL	TOTAL
TOTAL GWP kg CO ₂ eq	12.24	31.18
Total annual animal production kg	471.000	164.00
Total annual animal production kg/ha	130.67	45.50
Total annual carbon removal kg CO ₂ eq	-6.59	8.355
Total annual carbon removal kg CO ₂ eq Removal for 1 kg kg CO ₂ eq	-6.59 -14.01	8.355 -35.69
Total annual carbon removal kg CO ₂ eq Removal for 1 kg kg CO ₂ eq Balance GWP for 1kg kg CO ₂ eq	-6.59 -14.01 -1.77	8.355 -35.69 -4.51
Total annual carbon removal kg CO2 eq Removal for 1 kg kg CO2 eq Balance GWP for 1kg kg CO2 eq Live animal yield to boneless meat	-6.59 -14.01 -1.77	8.355 -35.69 -4.51 2.7080

Contact

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

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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).







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

Ecolnvent. (2022). EcolnventDatabase. General Program Instructions (GPI) of the International EPD® System, version 4.0 ISO 14025: 2006 Environmental labels and declarations -Type III environmental declarations -Principles and procedures. ISO 14040: 2006 Environmental management -Life cycle assessment -Principles and Framework. 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)

