

BERCA S.A.

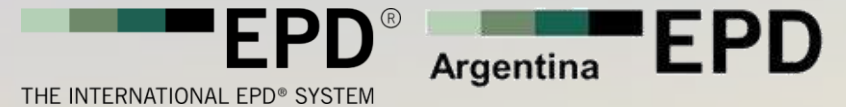
Estancia Ralicó – Argentine meat



1 kg Beef Meat

Environmental Product Declaration

This EPD has been
developed in conformity
with ISO 14025



EPD Registration Number:	S-P-07362
CPC code:	2111 Meat of mammals, fresh
Program:	The International EPD® System
Program Operator:	EPD International AB
Publication date:	2024-02-20
Valid until:	2029-02-19



EPD Program Information



Program

The International EPD® System

www.environdec.com

info@environdec.com



THE INTERNATIONAL EPD® SYSTEM

EPD

www.epd.inti.gob.ar



Geographical Scope: Argentina

Contacts

For additional information relative to our activities or in regard to this document, please contact:

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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

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

EPDs within the same product category but registered in different EPD programs 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 characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see ISO 14025.



About us
BERCA S.A.
Estancia Ralicó



Our vision: 4 key words



We work to produce meat of excellent **quality**.

We leverage our **history** and **people**, protecting the natural environment for the **welfare** of animals and future generations.



Our history: over 100 years, breeding and more



COMPANY PROFILE

BERCA S.A. Comercial Inmobiliaria Rural y Financiera is a family business organized for **agricultural and livestock production**, as well as **urban real estate and financial activities**.

The cattle farm **Estancia Ralicó** is located 30 km West of Villa Huidobro, Córdoba, Argentina, in the Subhumid Pampas Region, where we carry out a typical full-cycle production system: breeding, rearing and fattening.

The establishment is part of a **natural reserve of native trees**, mainly Caldén (*Prosopis Caldenia*), unique in the world.

ESTANCIA RALICÓ

Estancia Ralicó was acquired in 1910 by the Bernasconi family, Italian immigrants from the previous century. For many years the farm was rented and the Bernasconi Administration began to exploit its agricultural establishments in the 1950s.

From that time on, production in Ralicó, with **permanent pastures and woodlands**, became very unstable due to the scarcity of rainfall. In the 80's alfalfa cultivation was developed, which greatly changed the countryside, allowing a greater cattle raising capacity.

At all times, **the forest has been an essential resource** for all livestock production objectives. Likewise, the practice of **early weaning** allowed a very important improvement of the breeding system. In the last 20 years, a continuous growth of **agricultural management** has led to a very efficient and at the same time sustainable production.

Since always, the countryside maintains a strong **connection between Italy and Argentina**, both supporting the same objective.

Estancia Ralicó: a Natural Forest Reserve

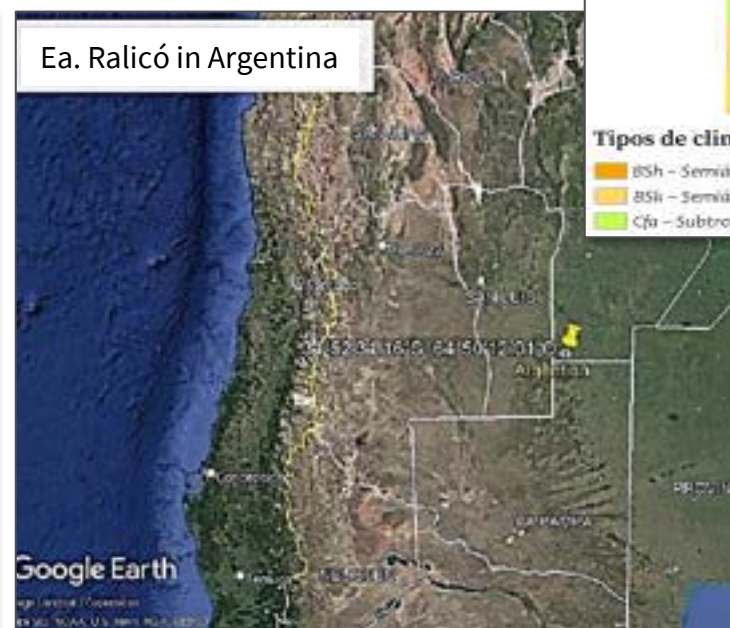


Livestock production is carried out at Estancia Ralicó (34° 51' 36.48" S, 64° 45' 19.42" W), which is located 30 km west of the town of **Villa Huidobro** and 5 km south of the Malmen Station, of the General San Martín Railway, in the General Roca Department, **Province of Córdoba, Argentina**.

Average annual rainfall is **600 mm**. The area occupied by cattle production is **13.360 hectares**. The vegetation corresponds to the semi-arid transition sector between the Pampa and the Monte, in the extreme southwest of Córdoba. This region is part of the **Espinal Phytogeographic Province**. The farm is in the **Caldén Biogeographic Corridor**, constituting a protected area as the Estancia Ralicó Natural Forest Reserve. Caldén is a species of the Genus *Prosopis* (*Prosopis Caldenia*), native to Argentina.



Types of climate according to Köppen



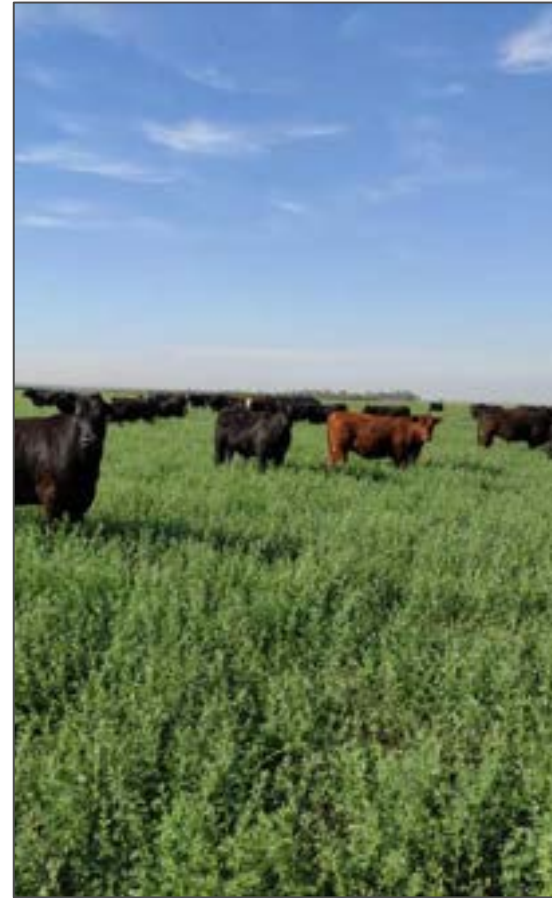
Estancia Ralicó: our environments



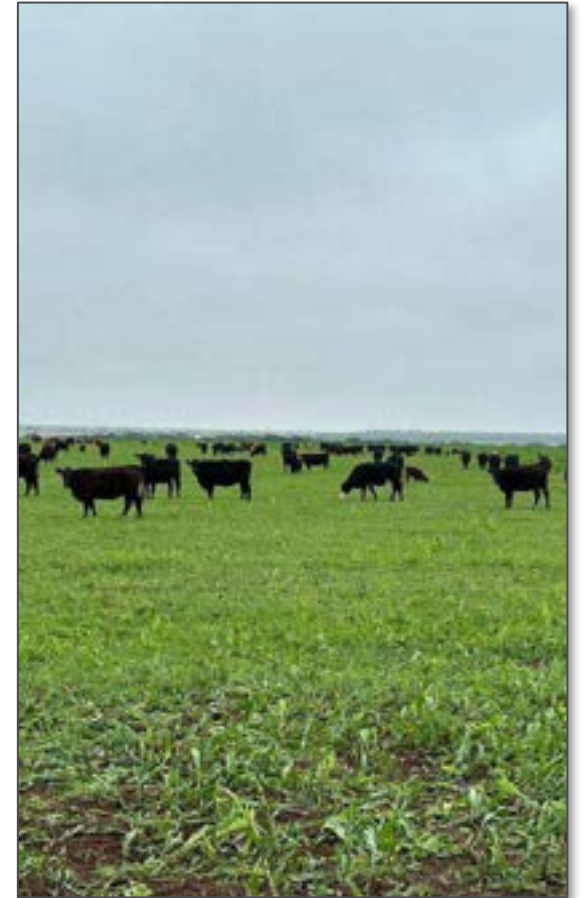
CALDÉN NATIVE FOREST



SORGHUM



ALFALFA



WINTER GRASSES

Our foundations: mission and management principles



MISSION

*Producing high-quality meat obtained by guaranteeing a sustainable use of **natural resources**, the protection of **biodiversity**, the right balance between green house gas emissions and **carbon sequestration**. Business goals are achieved through the adoption of new **technologies**, **innovative processes** and **people skills**.*

Efficiency and quality of animal production



- Bovine strength through genetics and herd health.
- Product of an efficient breeding system in reproduction.
- Use of zootechnical tools such as artificial insemination.
- Early weaning, strategic supplementation, care in the management of the animals during their life.
- Strategy in the management of the animal charge (rotational grazing).

Environmental sustainability and biodiversity



- Contribute to climate change mitigation and environmental protection through:
- water/wind erosion prevention;
 - sow of natural prairies and intercropping to ensure soil cover;
 - natural woodlands regeneration with aerial seeding;
 - regrowth through intensive grazing and natural woodland's reseedling;
 - supply of high-quality water and reservoirs using renewables;
 - rational use of grasslands with production of reserves.

People and socioeconomic development



- Orientation to innovation and support to technological change.
- Creation of work teams and training of all employees in their functions.
- Ensure continuous growth for all through the transfer of multidisciplinary competences.
- Historical continuity of the company management through generational change.



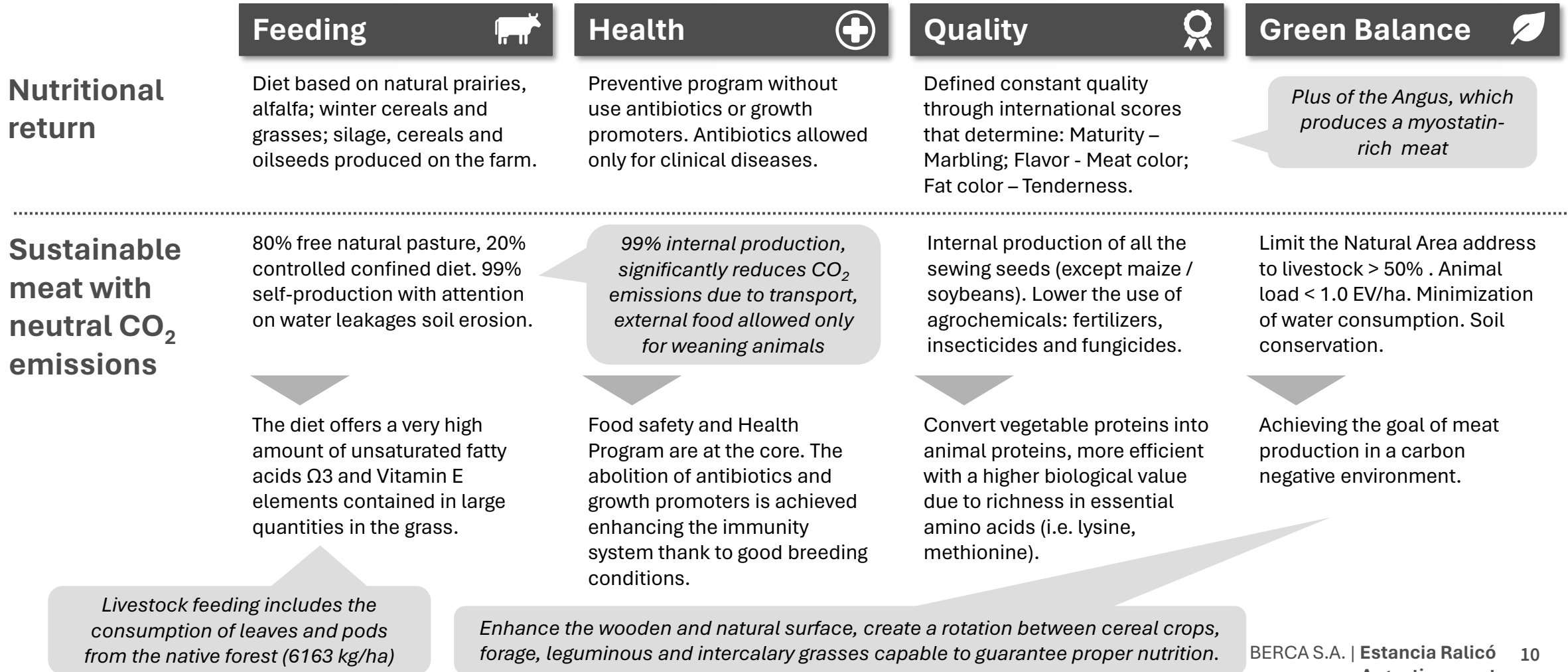
Product
Information
1 kg bovine live
weight



Ralicó Protocol: 4 areas of analysis



In line with our mission, we have developed our own protocol for meat production based on two principles: achieving nutritional value while producing sustainable meat, with neutral CO₂ emissions



4 areas of analysis: focus on



Feeding



- We follow the entire **life cycle** of the animal living in **freedom**.
- Animals are raised 100% in natural **grasslands** and cultivated **pastures**. The grazing planner (winter and summer greening) makes possible the **regeneration** of soil organic matter.
- Agricultural areas are sowed to produce hay and cereals rich in **starch**, essential ingredients in the final part of the cycle to guarantee the **flavor** and **tenderness** to obtain high-quality meat.
- Our meat has optimal levels of **fatty acids** for consumption.

Health



- Company's livestock management has a **sanitary program** for each production stage thanks to which all necessary resources are efficiently allocated.
- No growth promoters are used and, in particular, antibiotics are applied only in front of a **clinical disease**.
- Special care is dedicated to **animal welfare, food safety** and **quality** during reproduction, weaning, rearing and fattening.

Quality



- Quality is the sum of many factors that determine consumer appreciation: **tenderness, juiciness, odor** and **texture**.
- These factors depend mainly on the maturity of the carcass and the amount and distribution of **marbling**.
- Marbling - intramuscular fat - is the mixture of fat within the meat, representing the main parameter for **quality grade**.
- Maturity refers to the **physiological age** of the animal rather than **chronological age**. Indicators are bone characteristics, ossification of cartilage, color and texture of ribeye muscle.

Green Balance



- **Carbon storage** by alfalfa, winter greenery and woodlands, improving soil structure with their root system.
- Validation of soil **humification** and **mineralization** coefficients, allowing to measure the percentage of organic matter.
- **Soil cover** by maintaining crop residues, avoiding water and wind erosion.
- **Green bridge** to ensure the greatest number of days of soil cover.
- Preservation of the **native forest**.

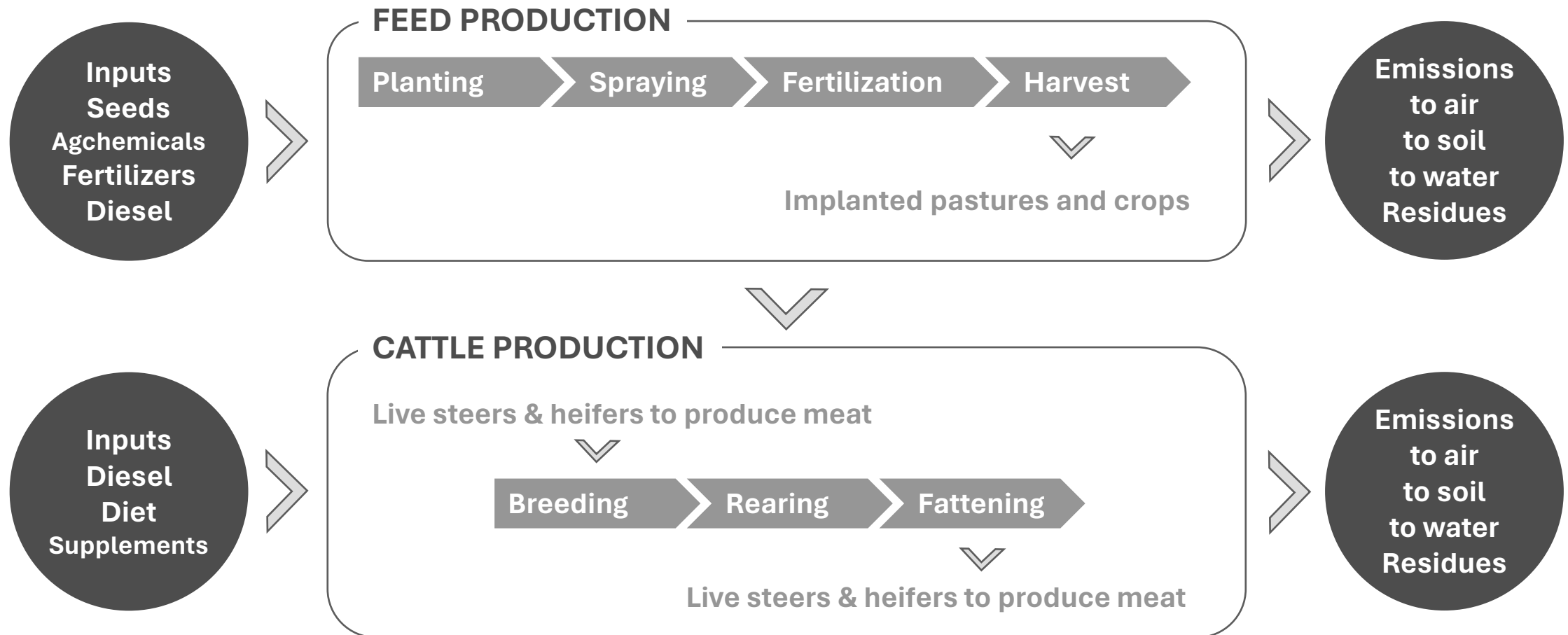
***Management practices:** crop rotation, planting of permanent pastures, adoption of direct seeding, adoption of biological fertilizers, intensive grazing of the woodlands.*



LCA Information



Production Chain



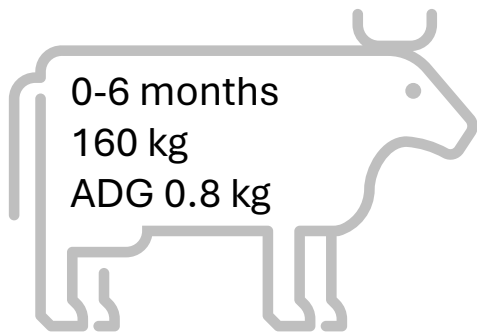
General System Boundaries



REARING

BIRTH TO WEANING

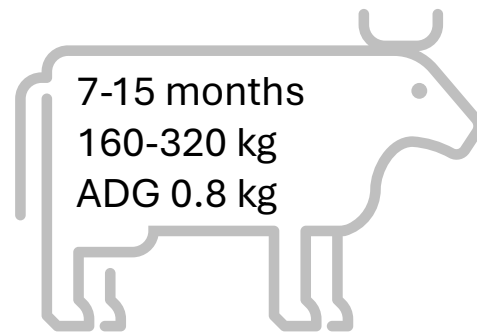
100% in the field, in Alfalfa and natural pastures. Eventual **early weaning** to promote cows' fertility.



RAISING

WEANING TO END RAISING

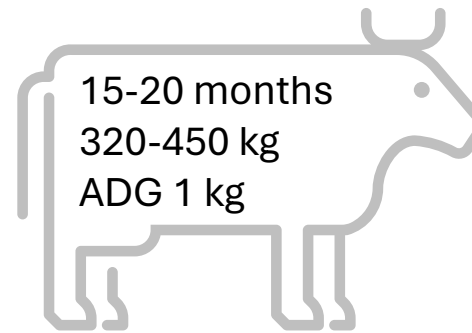
After **weaning** all the calves are raised in alfalfa pastures and winter herbage as the main **forage resource**.



FATTENING

REASING TO SLAUGHTER

Growing steers and **cull heifers** are located on green pastures and alfalfa with **strategic supplementation**.



Excluded lifecycle stages: Core-process and downstream process.

Climatic conditions may determine the changes for each production stage.

Scope: The PCR 2012:11, 4.3: Meat of mammals, allows the impact assessment for intermediate products in the upstream process, with the scope cradle-to-gate.

Allocation: Biophysical to upstream process.

Tools: 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.



Environmental Performance



Environmental Performance Indicators (1/3)



Impact category indicators* of fresh, boneless, bovine beef, produced by BERCA S.A. Estancia Ralicó

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

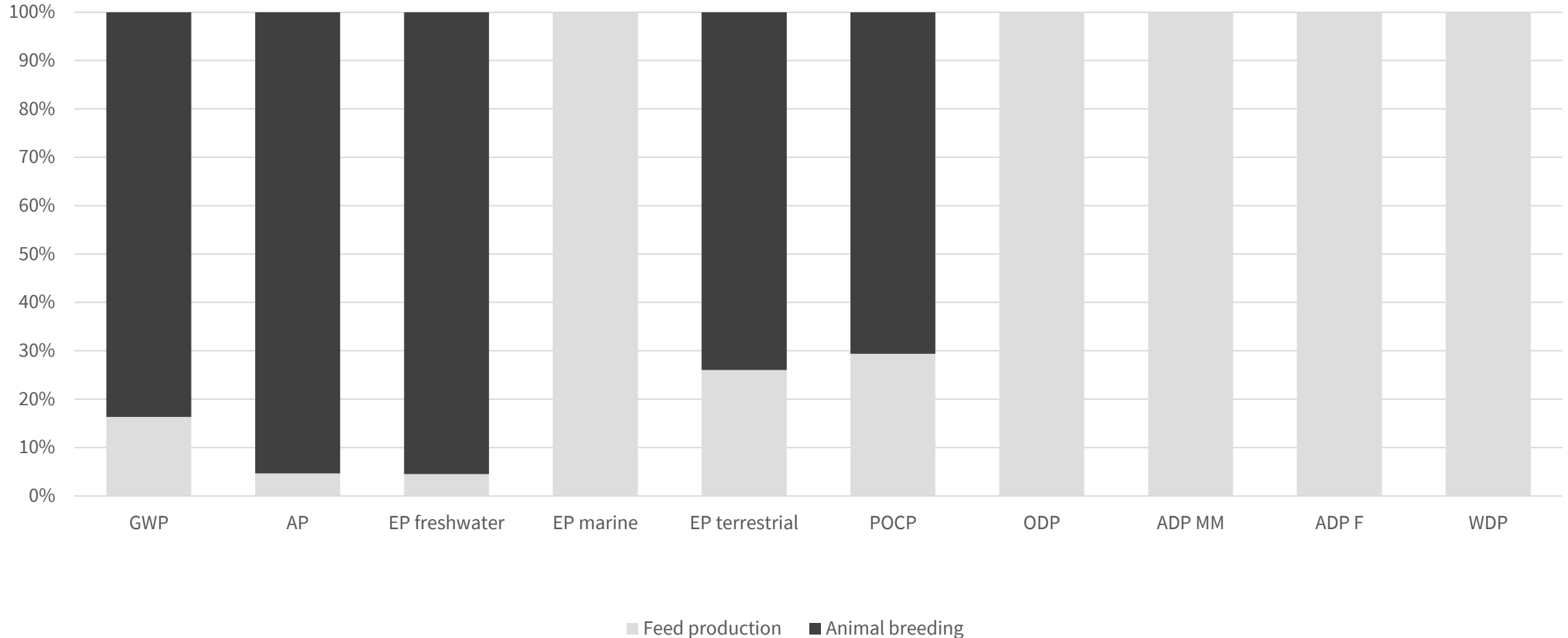
PARAMETER		UNIT	Upstream process		TOTAL
			Feed production	Animal production	
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	4.86E+00	0.00E+00	4.86E+00
	Biogenic	kg CO ₂ eq.	1.03E-02	0.00E+00	1.03E-02
	Land use and land transformation	kg CO ₂ eq.	4.72E-03	2.50E+01	2.50E+01
	TOTAL	kg CO ₂ eq.	4.87E+00	2.50E+01	2.98E+01
Ozone layer depletion (ODP)		kg CFC 11 eq.	2,67E-07	0.00E+00	2.67E-07
Acidification potential (AP)		mol H ⁺ eq.	1,19E-02	2.44E-01	2.56E-01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	9.54E-04	2.02E-02	2.11E-02
	Aquatic marine	kg N eq.	6.04E-03	0.00E+00	6.04E-03
	Aquatic terrestrial	mol N eq.	9.31E-02	2.65E-01	3.58E-01
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	1,01E-02	2.44E-02	3.45E-02
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq.	1.66E-05	0.00E+00	1.66E-05
	Fossil resources	MJ, net calorific value	2.45E+01	0.00E+00	2.45E+01
Water deprivation potential (WDP)*		m ³ world eq. deprived	1.20E+00	2.81E-01	1.48E+00

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Environmental Performance Indicators (2/3)



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



Environmental Performance Indicators (3/3)

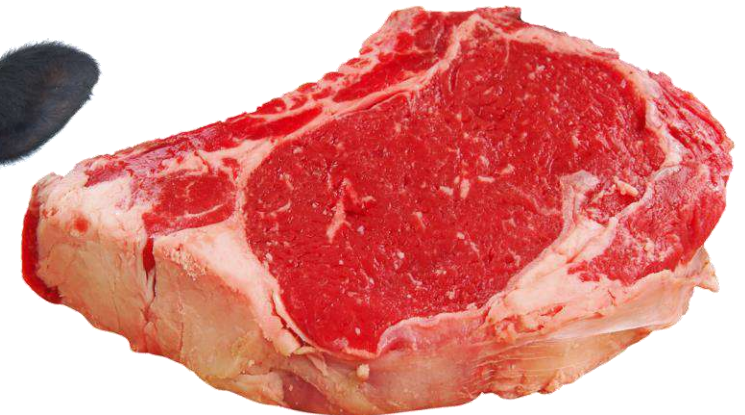


Upstream process

Core

IMPACT INDICATORS		1 kg live weight	1 kg boneless meat
Global Warming Potential (GWP) Total	kg CO ₂ eq.	1,17E+01	2,98E+01
Ozone Layer Depletion (ODP)	kg CFC 11 eq.	1,05E-07	2,67E-07
Acidification Potential (AP)	mol H ⁺ eq.	1,00E-01	2,56E-01
Eutrophication Potential (EP) Aquatic freshwater	kg P eq.	8,29E-03	2,11E-02
Eutrophication Potential (EP) Aquatic marine	kg N eq.	2,37E-03	6,04E-03
Eutrophication Potential (EP) Aquatic terrestrial	mol N eq.	1,40E-01	3,58E-01
Photochemical Oxidant Creation Potential (EP)	kg NMVOC eq.	1,36E-02	3,45E-02
Abiotic Depletion Potential (ADP) Metals and minerals	kg Sb eq.	6,52E-06	1,66E-05
Abiotic Depletion Potential (ADP) Fossil resources	MJ, net calorific value	9,61E+00	2,45E+01
Water Deprivation Potential (WDP)	m ³ world eq. deprived	5,81E-01	1,48E+00

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



Use of Resource



Indicators of fresh, boneless, bovine meat produced by BERCA S.A. Estancia Ralicó

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

PARAMETER		UNIT	Upstream process		TOTAL
			Feed production	Animal production	
Primary energy resources Renewable	Use as energy carrier	MJ, net calorific value	9.84E-01	0.00E+00	9.84E-01
	Used as raw materials	MJ, net calorific value	7.90E+00	0.00E+00	7.90E+00
	TOTAL	MJ, net calorific value	8.88E+00	0.00E+00	8.88E+00
Primary energy resources Non-renewable	Use as energy carrier	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00
	Used as raw materials	MJ, net calorific value	3.18E-01	0.00E+00	3.18E-01
	TOTAL	MJ, net calorific value	3.18E-01	0.00E+00	3.18E-01

Additional environmental performance indicators (1/2)



Totals		
100%		
GWP-total kg CO _{2eq}		
11.71		
Fossil	LULUC	Biogenic
1.91E+00	4.06E-03	9.80E+00
16.28%	0.03%	83.69%
Enteric fermentation CH ₄	0.0E+00	9.3E+00
Effluent management and other emissions	0.0E+00	5.3E-01
Feed	1.8E+00	3.9E-03
Water	8.1E-02	1.8E-04
Transportation	0.0E+00	0.0E+00

Enteric fermentation CH₄

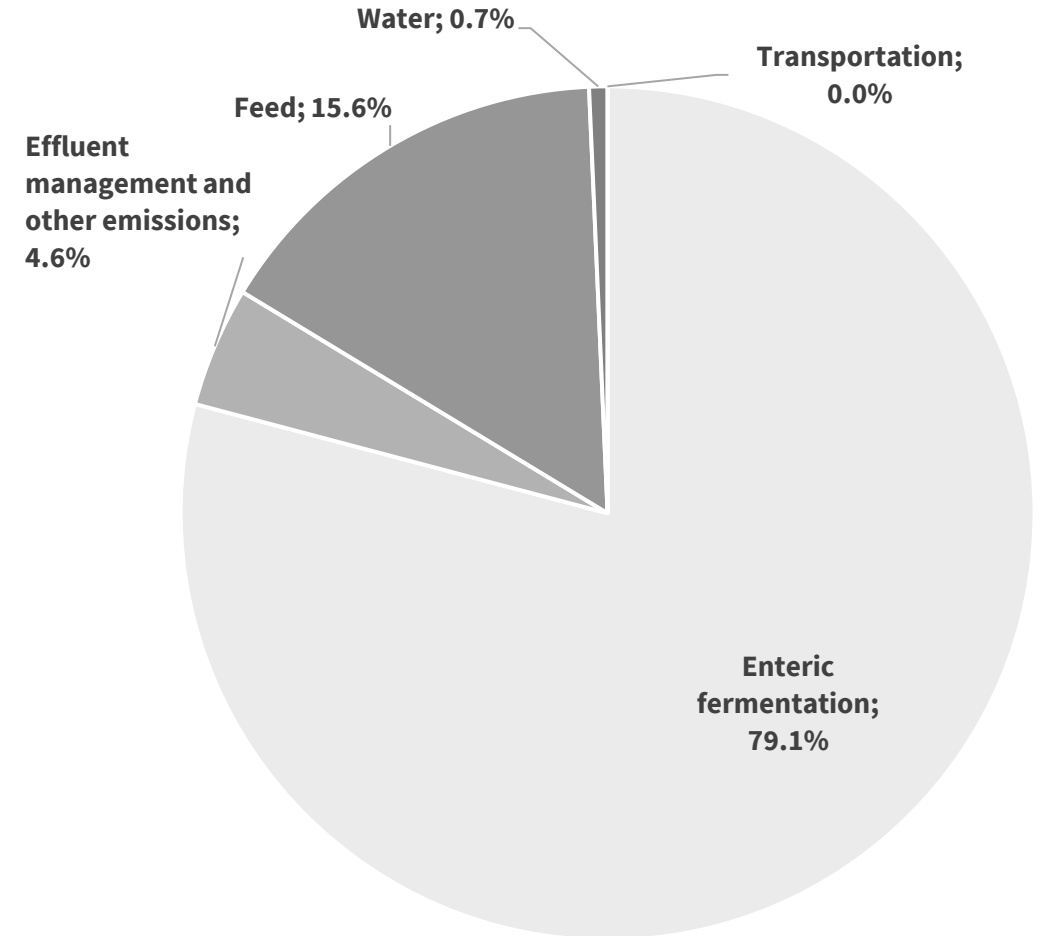
Effluent management and other emissions

Feed

Water

Transportation

Carbon footprint of 1 kg beef meat LW



Carbon Footprint

1,105,650 kg LW x 11.71 kg CO_{2eq} = **12,947 t CO_{2eq}**

Additional environmental performance indicators (2/2)



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 -11.84 kg CO_{2eq}** for each kilogram of live-weight animals produced.

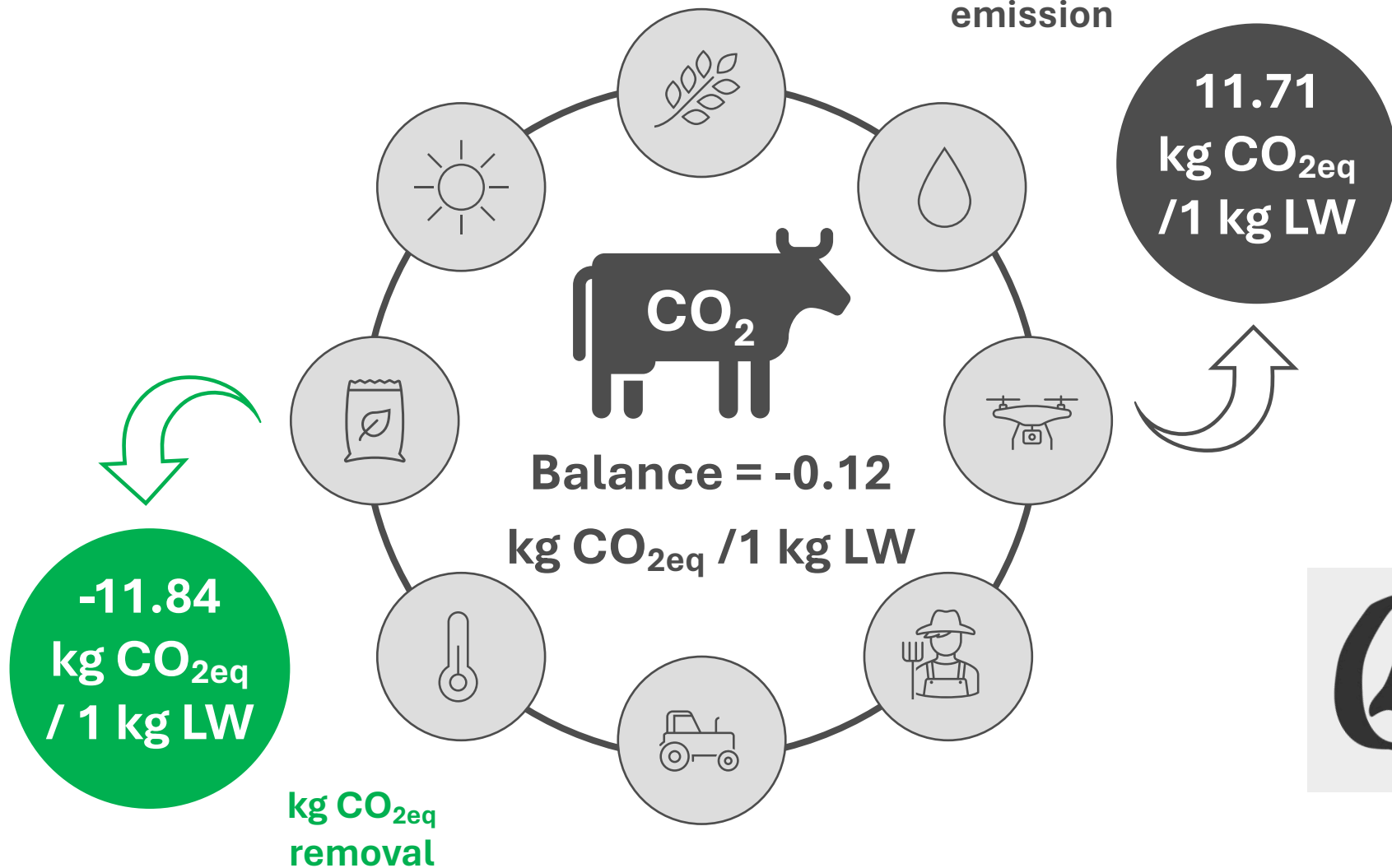
Crop/pasture	Natural grassland	Alfalfa pasture	Sorghum pasture	Alfaalfa hay	Corn pasture	Sorghum silage	Grass hay	Winter pasture	Corn grain	Soy grain
Production(kg dm/ha)	3500	8000	10000	6000	4000	9000	7000	7000	6500	2800
Date/calculations										
Initial carbon stock (t C/ha)	42.41	42.41	42.41	42.41	42.41	42.41	42.41	42.41	42.41	42.41
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/woodlands management (Fmg)	1.14	1.00	1.00	1.00	1.00	1.00	1.00	100	1.00	1.00
Carbon inputs (Fi)	1.01	1.11	1.00	1.11	1.11	1.00	1.11	1.11	1.00	1.00
Results										
Final carbon stock calculation (t C/ha)	42.73	42.64	42.41	42.64	42.64	42.41	42.64	42.64	42.41	42.41
Change in soil carbon stock (t C/ha)	0.32	0.23	0.00	0.23	0.23	0.00	0.23	0.23	0.00	0,00
Change in atmospheric carbon stock (- t CO_{2eq}/ha)	-1.17	-0.86	0.00	-0.86	-0.86	0.00	-0.86	-0.86	0.00	0.00
Removal system										
Surface (ha)	9720.00	450.00	10000	200.00	300.00	200.00	70.00	1000.00	670.00	650.00
	-11,360.45	-384.87	0.00	-171.05	-256.58	0.00	-59.87	-855.27	0.00	0.00

Total removal = 13,088 t CO_{2eq}

Analysis of the Results



kg CO₂eq
emission



Boneless beef meat
balance = -0.31
kg CO₂eq / 1 kg beef meat



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

EcolInvent. (2022). EcolInventDatabase.
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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)

