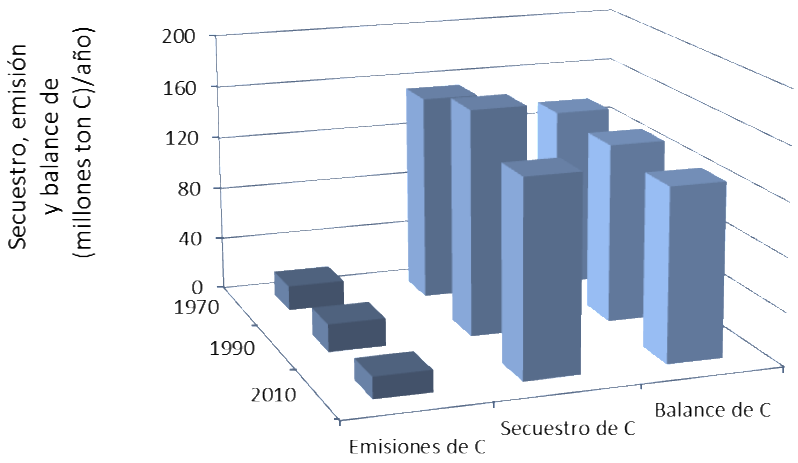
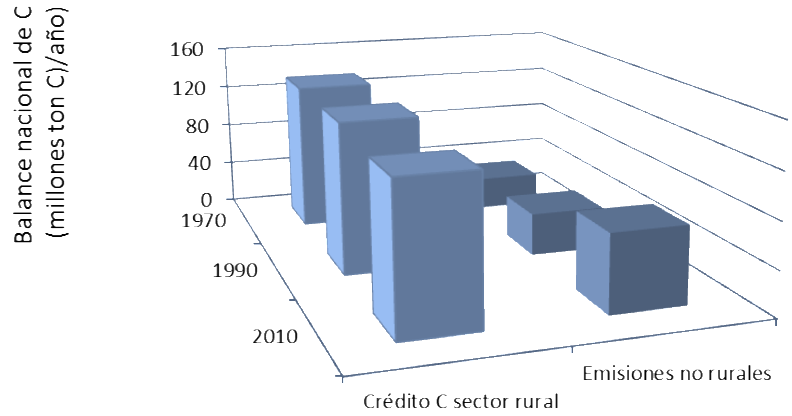
Do livestock systems have a role in sustanability?

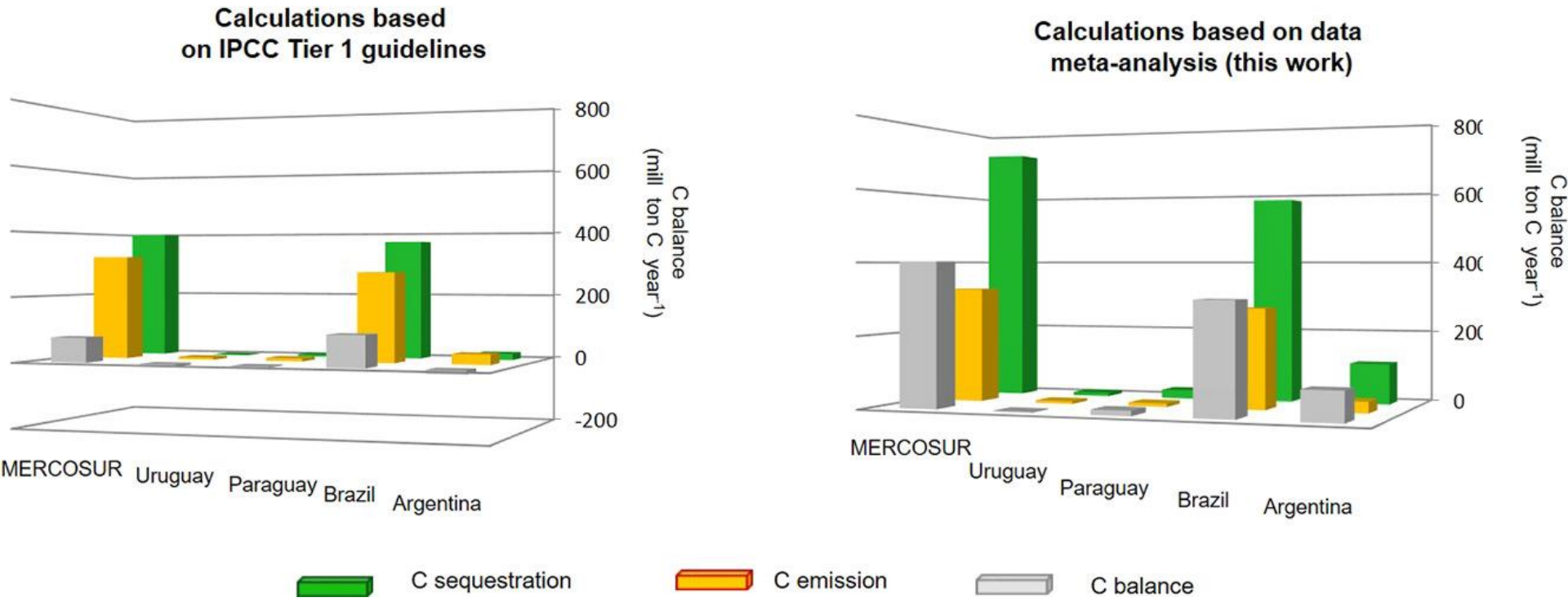
Anibal Pordomingo
INTA Anguil
La Pampa
Argentia
2020

Global warming Agricultural systems?





Viglizzo et al., 2019. Reassessing the role of grazing lands in carbon-balance estimations: Meta-analysis and review. Science of the Total Environment 661: 531–542.



Viglizzo et al. 2019. Reassessing the role of grazing lands in carbon-balance estimations: Meta-analysis and review. Science of the total environment. 661:531-542.

Ricard, M. F. and Viglizzo, E. F. 2020. Improving carbon sequestration estimation through accounting carbon stored in grassland soil. MethodsX, 100761

Rotolo et al. 2007. Emergy evaluation of grazing cattle in Argentina's Pampas. Agriculture, Ecosystems and Environment 119 (2007) 383–395





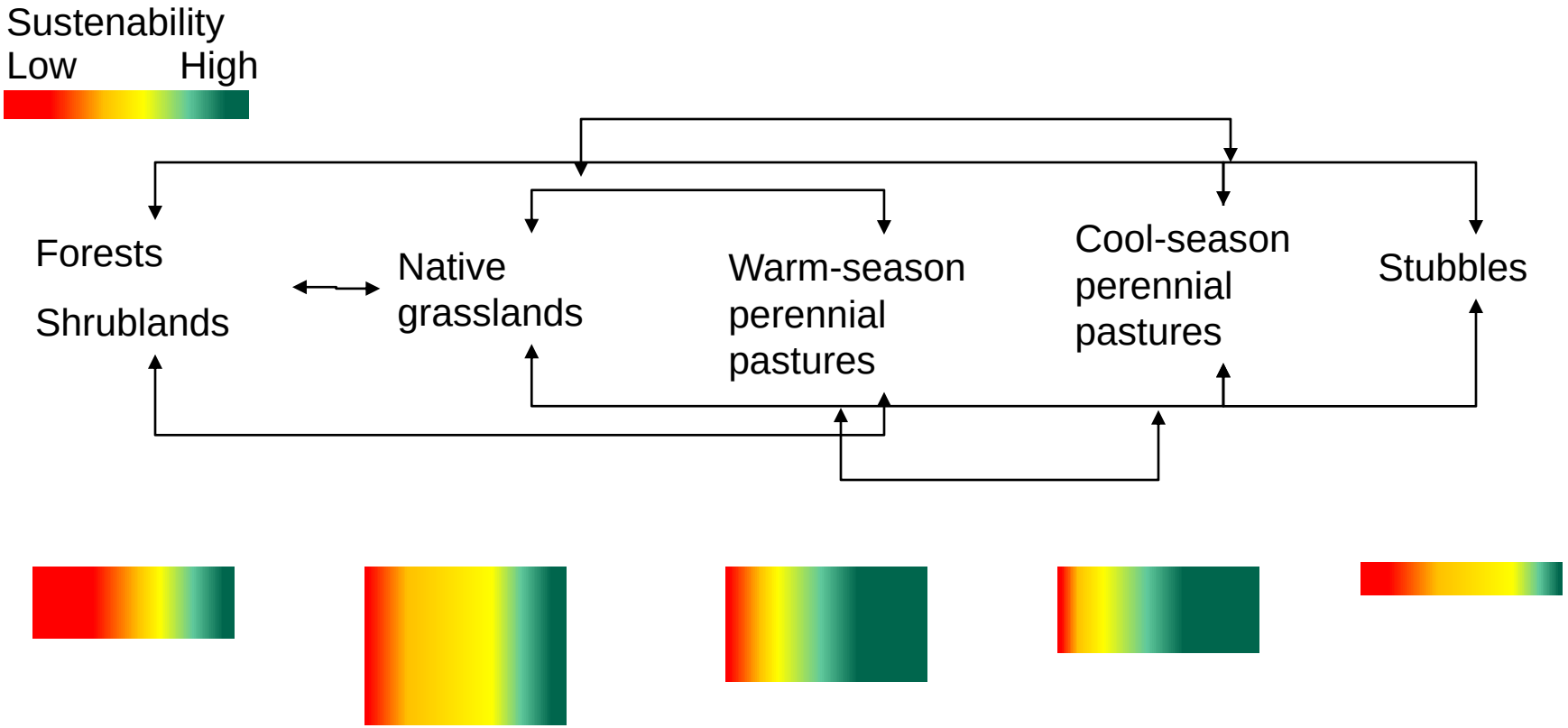


10 1 2007

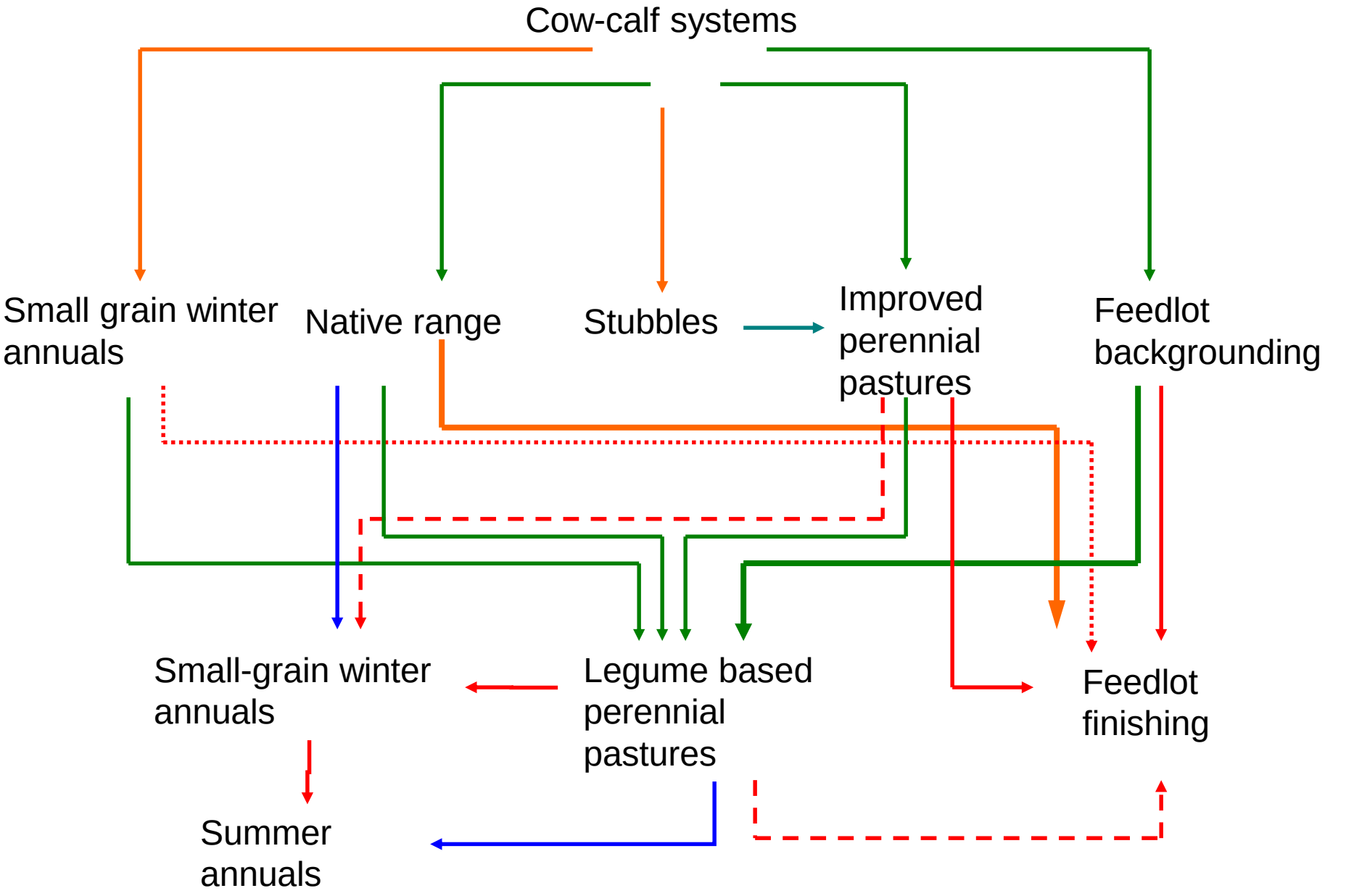
Market

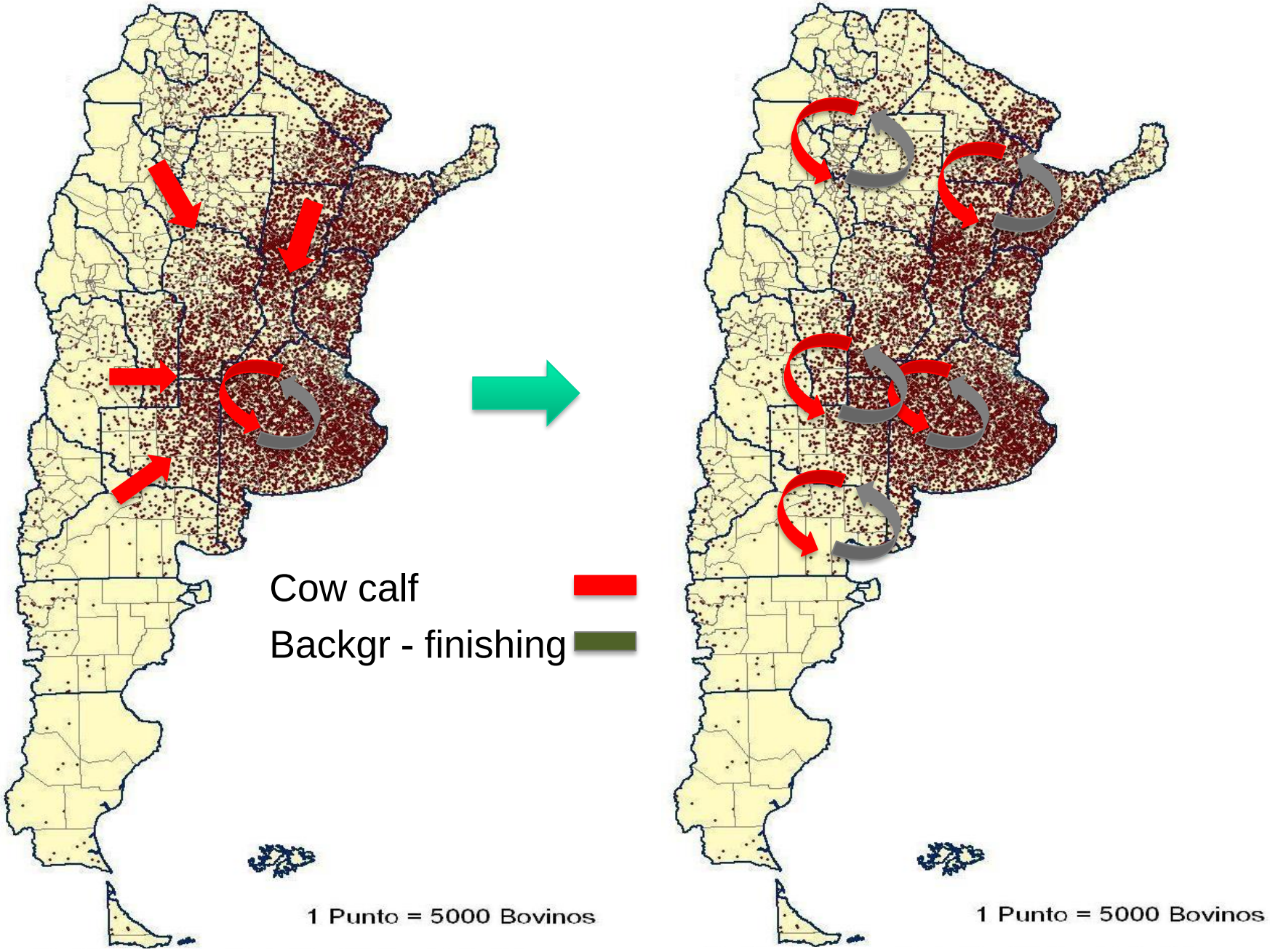


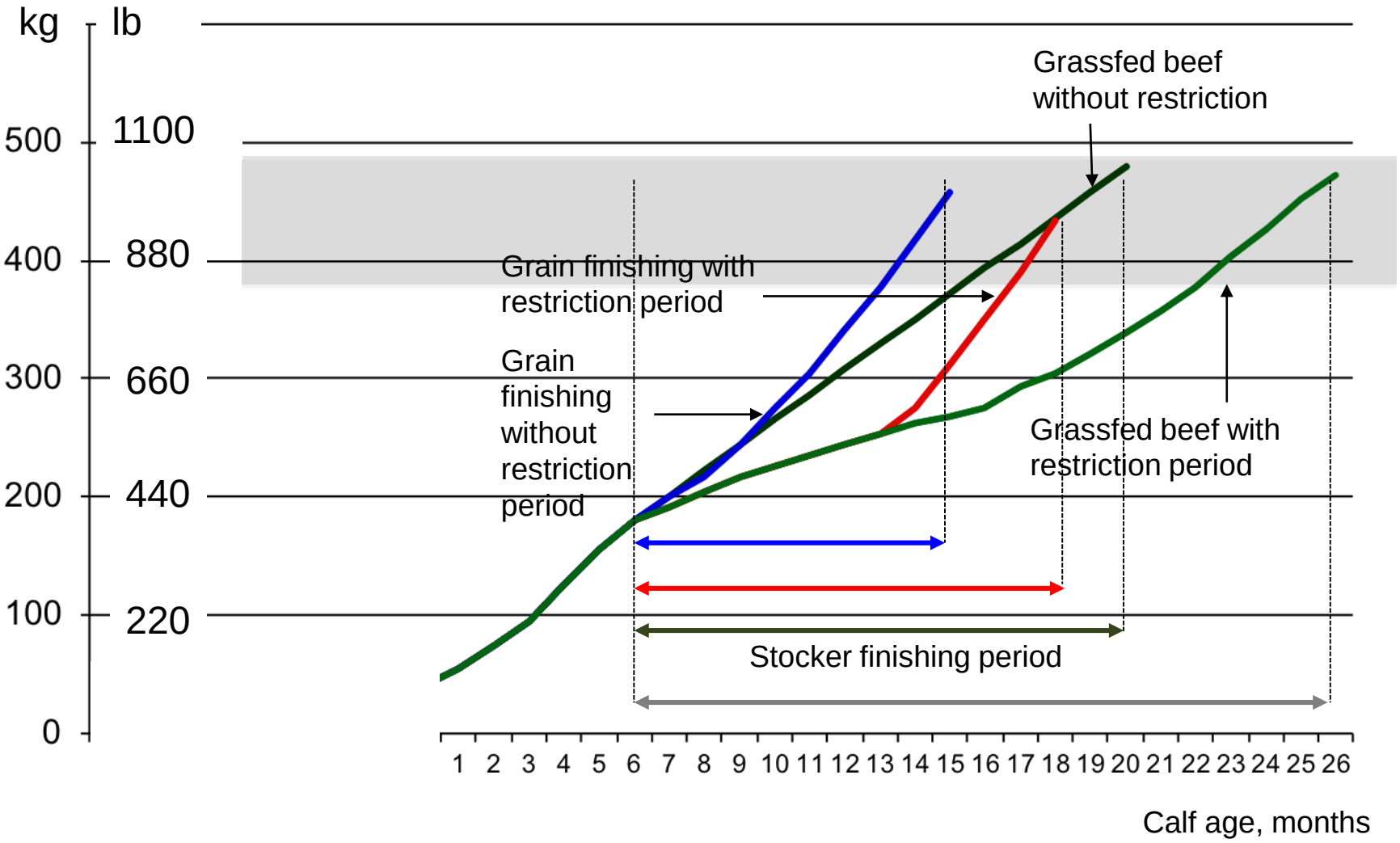

Cow-calf systems

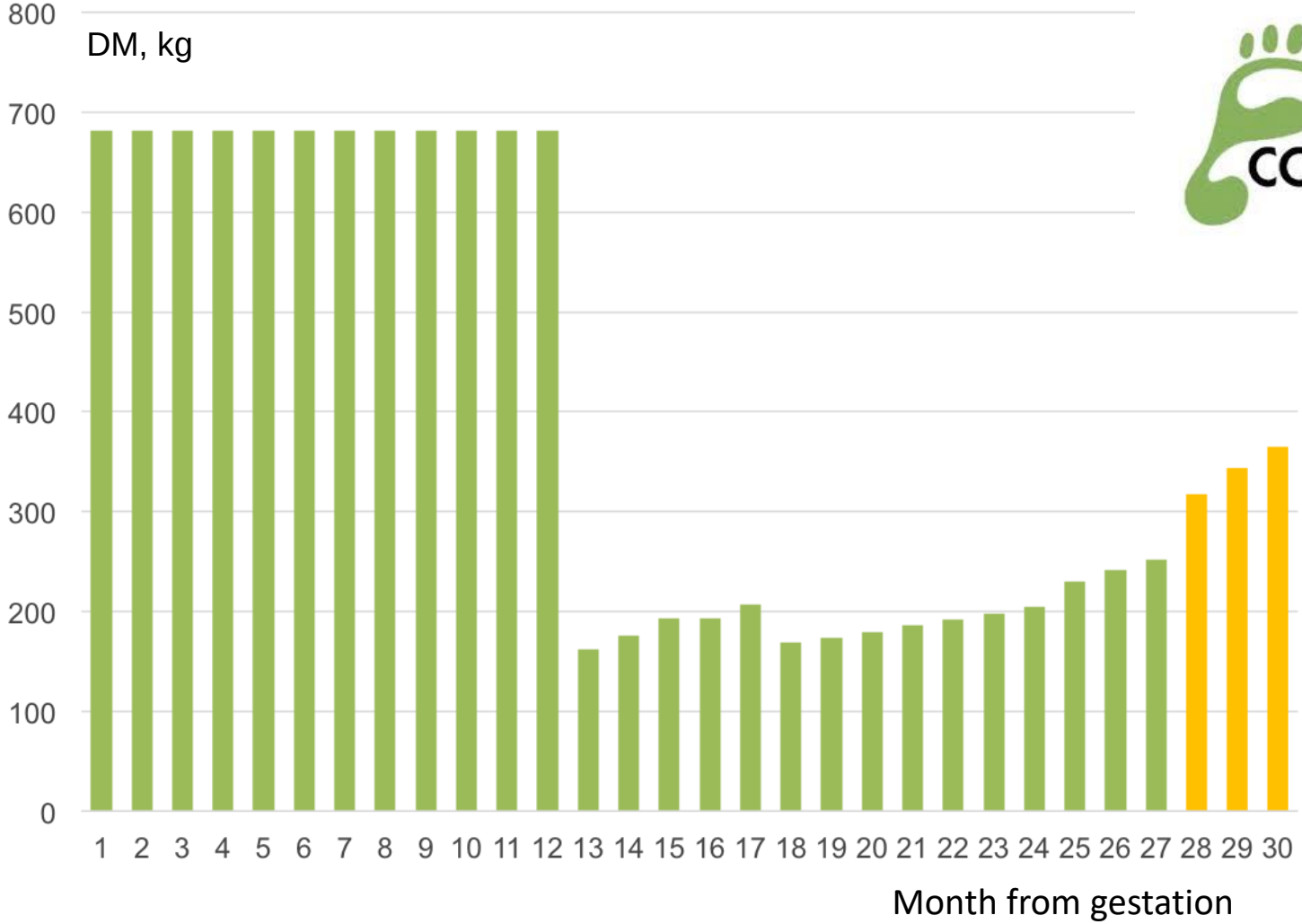


Beef growing-finishing systems



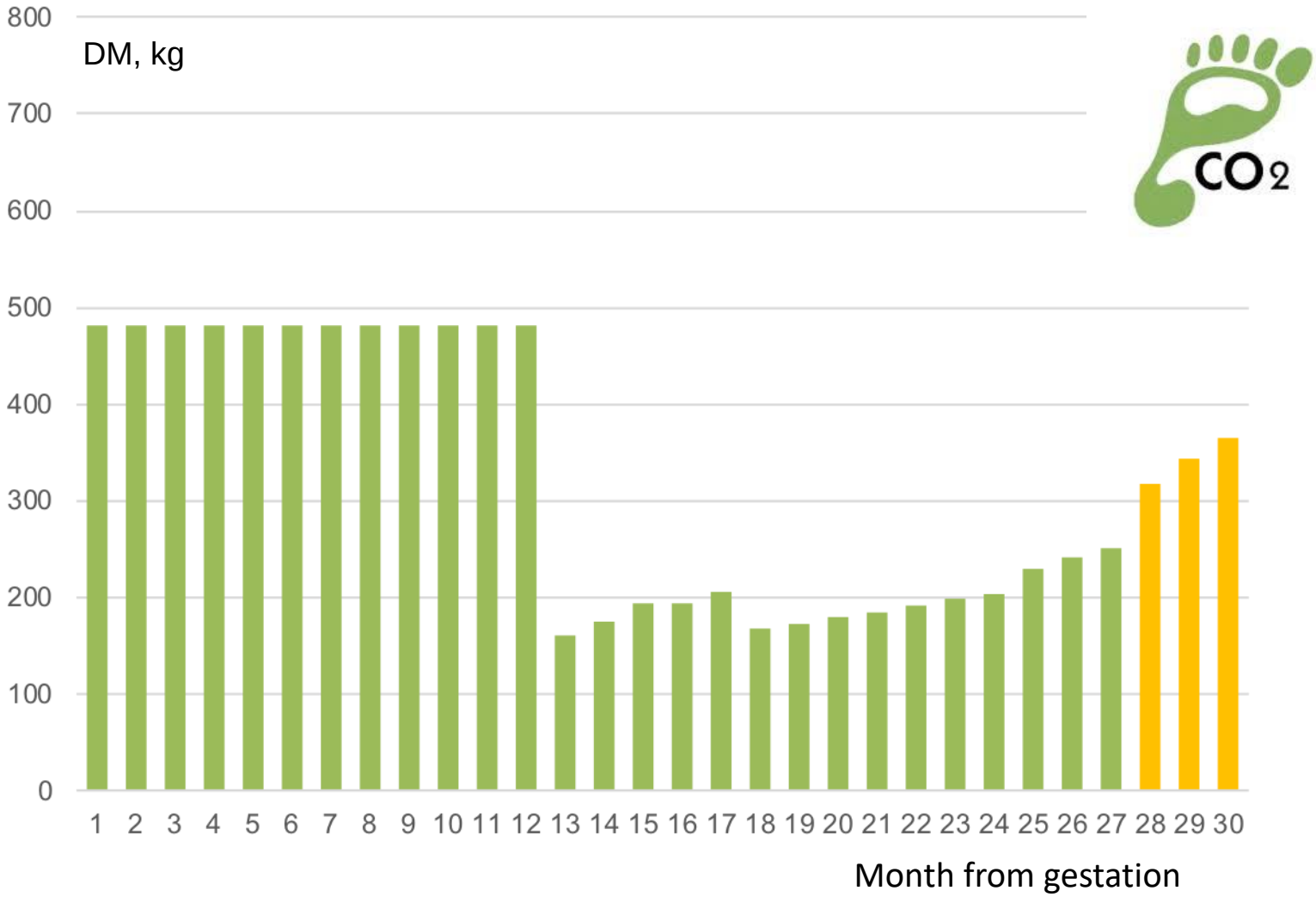

Cow calf
Backgr - finishing
1 Punto = 5000 Bovinos
1 Punto = 5000 Bovinos


kg
lb
500
1100
400
880
300
660
200
440
100
220
0
Grassfed beef without restriction
Grain finishing with restriction period
Grain finishing without restriction period
Grassfed beef with restriction period
Stocker finishing period
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Calf age, months



Monthly forage demand of a 450-kg LV steer that reaches slaughter from a cow-calf herd with 60% weaning rate

Pordomingo, A. J. 2020. Dimensión de la demanda de MS para la producción individual. Modelización de efectos tecnonógicos (no publ.)



Monthly forage demand of a 450-kg LV steer that reaches slaughter from a cow-calf herd with 85% weaning rate

Pordomingo, A. J. 2020. Dimensión de la demanda de MS para la producción individual. Modelización de efectos tecnonógicos (no publ.)

Improved livestock systems (cow-calf and stocker)

Diversification into low/input systems

Re-estructure land use rotational systems

Environment services:

1. Water cycle
2. C cycle
3. N cycle

Re-coupling systems in rotational programs

Viglizzo, E. F. y Riccard. 2019. ¿HAY UN ESLABÓN PERDIDO EN EL CÁLCULO DEL BALANCE DE CARBONO EN LOS SISTEMAS PASTORILES DE LA GANADERÍA ARGENTINA? Rev. Arg. Prod. Anim. 39(2): 105-111

Improved livestock systems (cow-calf and stocker)

Diversification into low/input systems

Re-structure land use rotational systems

Environment services:

1. Water cycle
2. C cycle
3. N cycle

Ecosystem functions:

1. Mitigation of water eccess (leguminous pastures)
2. Nutrient dinamics
3. Biomass control / wild fires
4. Biodiversity
5. C sink (neutral to positive C balance)

Re-coupling systems in rotational programs

Viglizzo, E. F. y Riccard. 2019. ¿HAY UN ESLABÓN PERDIDO EN EL CÁLCULO DEL BALANCE DE CARBONO EN LOS SISTEMAS PASTORILES DE LA GANADERÍA ARGENTINA? Rev. Arg. Prod. Anim. 39(2): 105-111

Emission GEI (kg CO_2e/kg carcass)

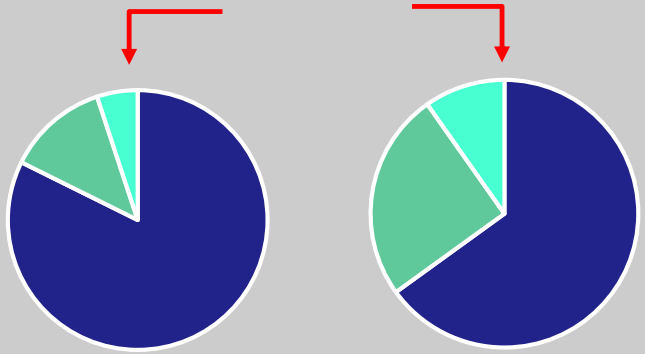
Stockr	Weaning, %	
ADG, g/d	60	85
600	29.6	26.4
350	39.3	35.0

Stockr 600 g/d, 8 m; 350 g/d 13 m

Finish 1262 g/d, 3 m

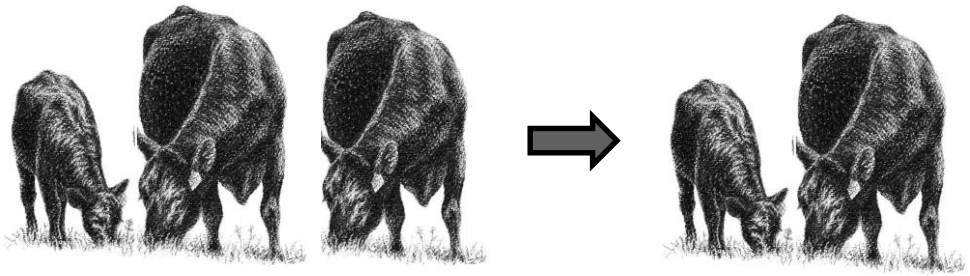
Composition contribution to CO_2 eq emission

	%	%
Cow-calf	82	65
Stckr	13	25
Finishing	5	10



60% weaning 85% weaning

	kg CO_2e/kg eq carcasa
Cow calf	28 - 47
Stckr	25 - 29
Pasture finish	9 - 28
Feedlot	8 - 12



Subak, 1999

Peters et al., 2010

Beauchemin et al., 2010

Veysset et al., 2010

Pelletier et al. 2010

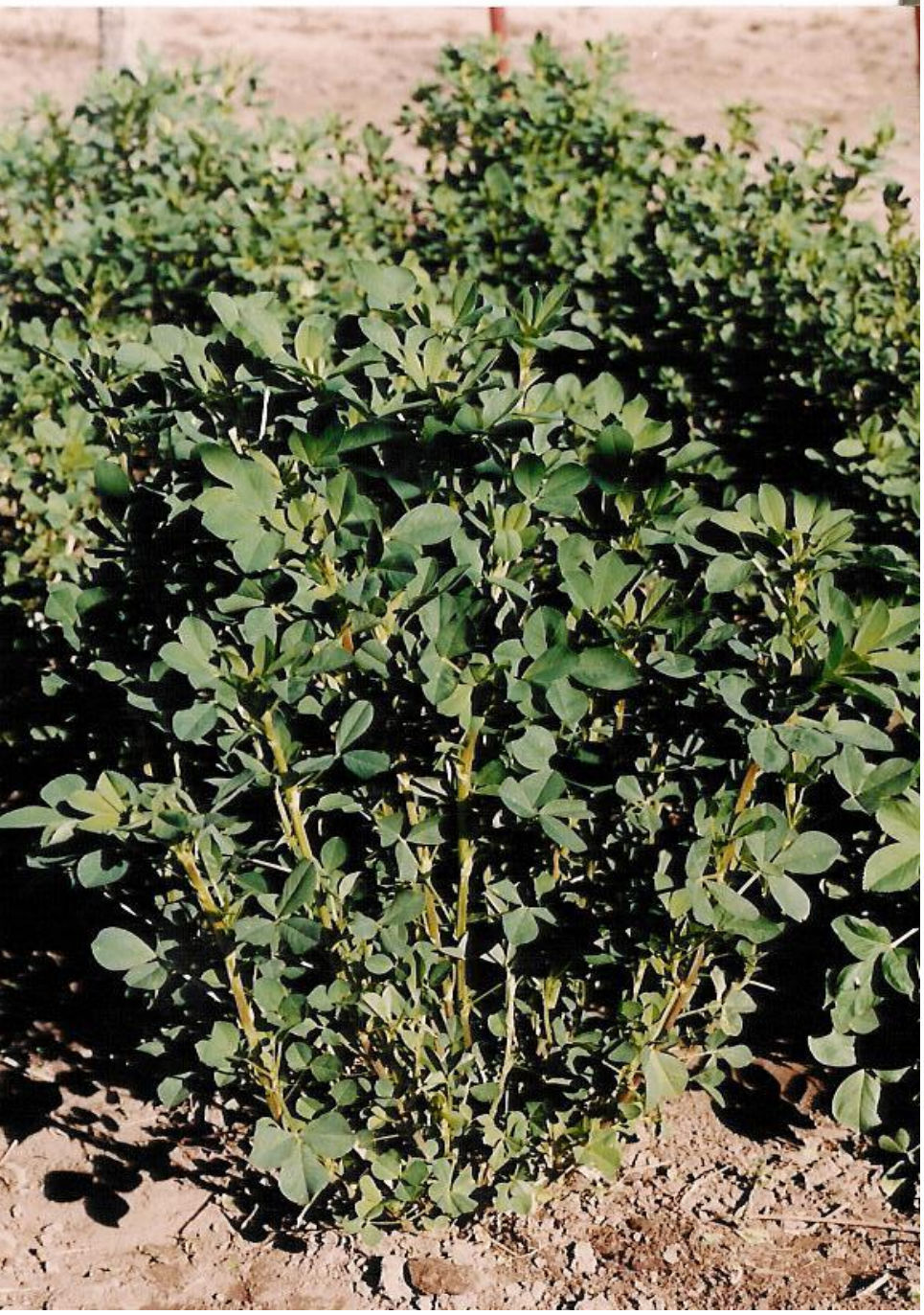
Phetteplace et al., 2001

Stewart et al., 2009

Crosson et al., 2010

Grazing intensity (+ C to – C?)

Zhou et al. 2017. Grazing intensity significantly affects belowground carbon and nitrogen cycling in grassland ecosystems: a meta-analysis. Global Change Biology (2017) 23, 1167–1179 (doi: 10.1111/gcb.13431)



1. Diversified farms
2. Flexible LM programs
3. From the soil-up designs
4. Low-input pasture based livestock systems
5. Perennial legumes are the core in low input systems

5.1. Improve system physical resilience

5.2. Increase system economic resilience

Knowledge-intensive livestock management systems → Beyond beef