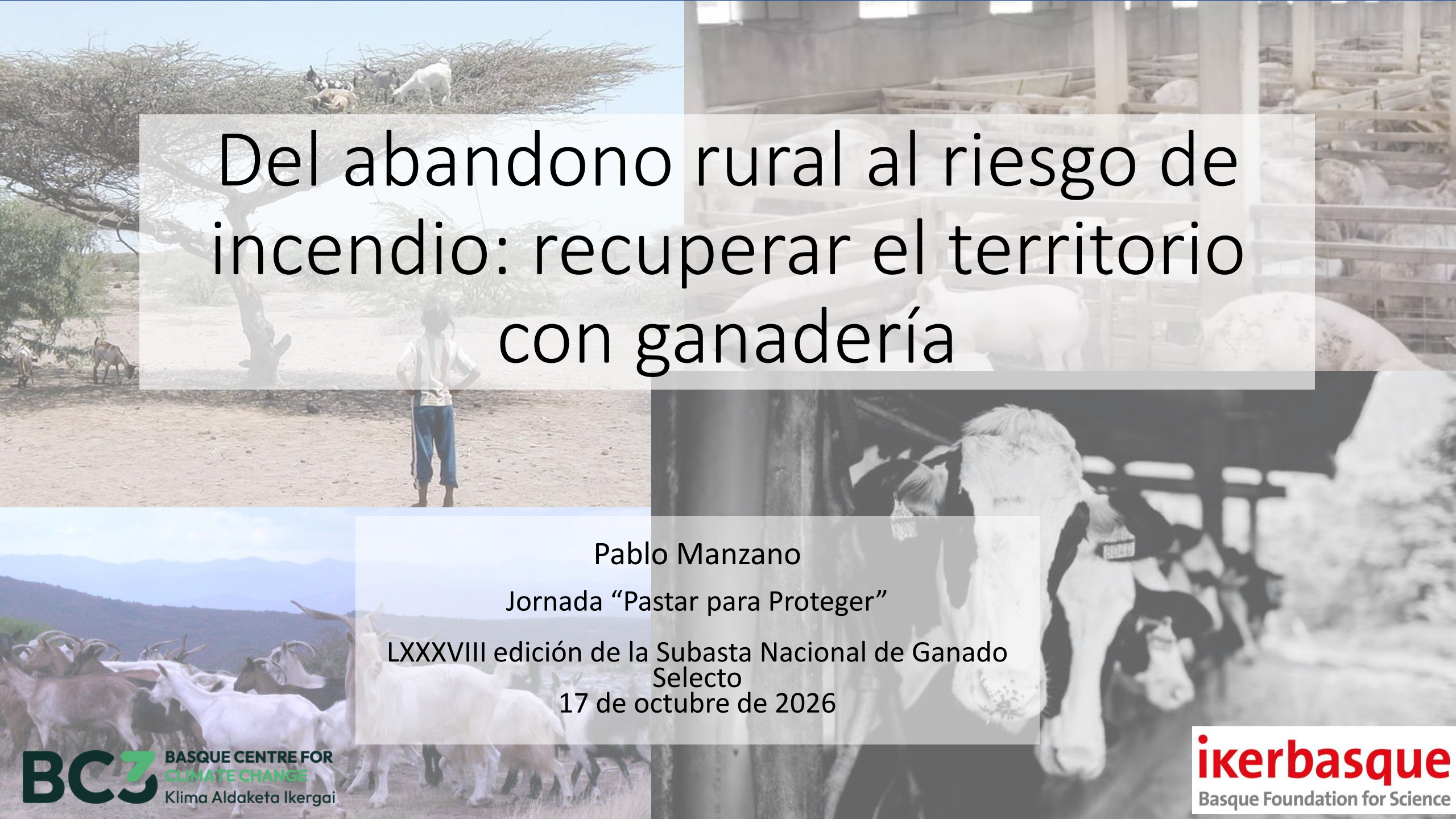


Del abandono rural al riesgo de incendio: recuperar el territorio con ganadería

Pablo Manzano

Jornada “Pastar para Proteger”

LXXXVIII edición de la Subasta Nacional de Ganado Selecto
17 de octubre de 2026

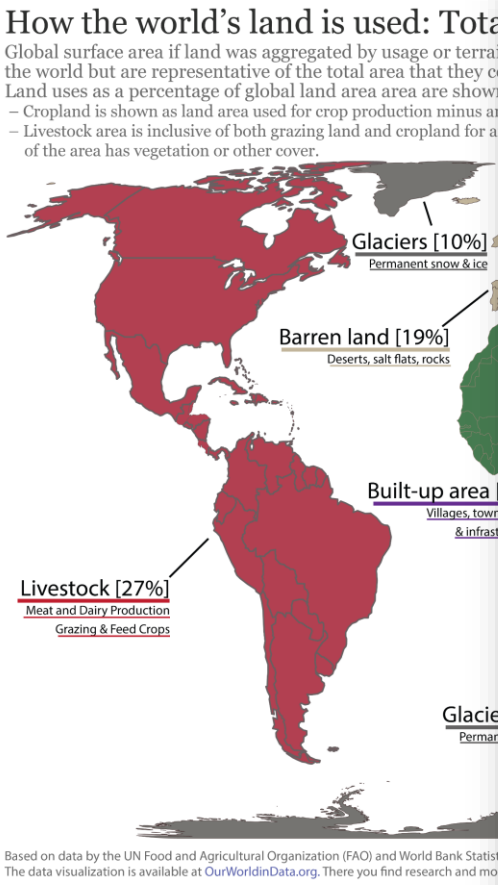
BC3 BASQUE CENTRE FOR CLIMATE CHANGE
Klima Aldaketa Ikergai

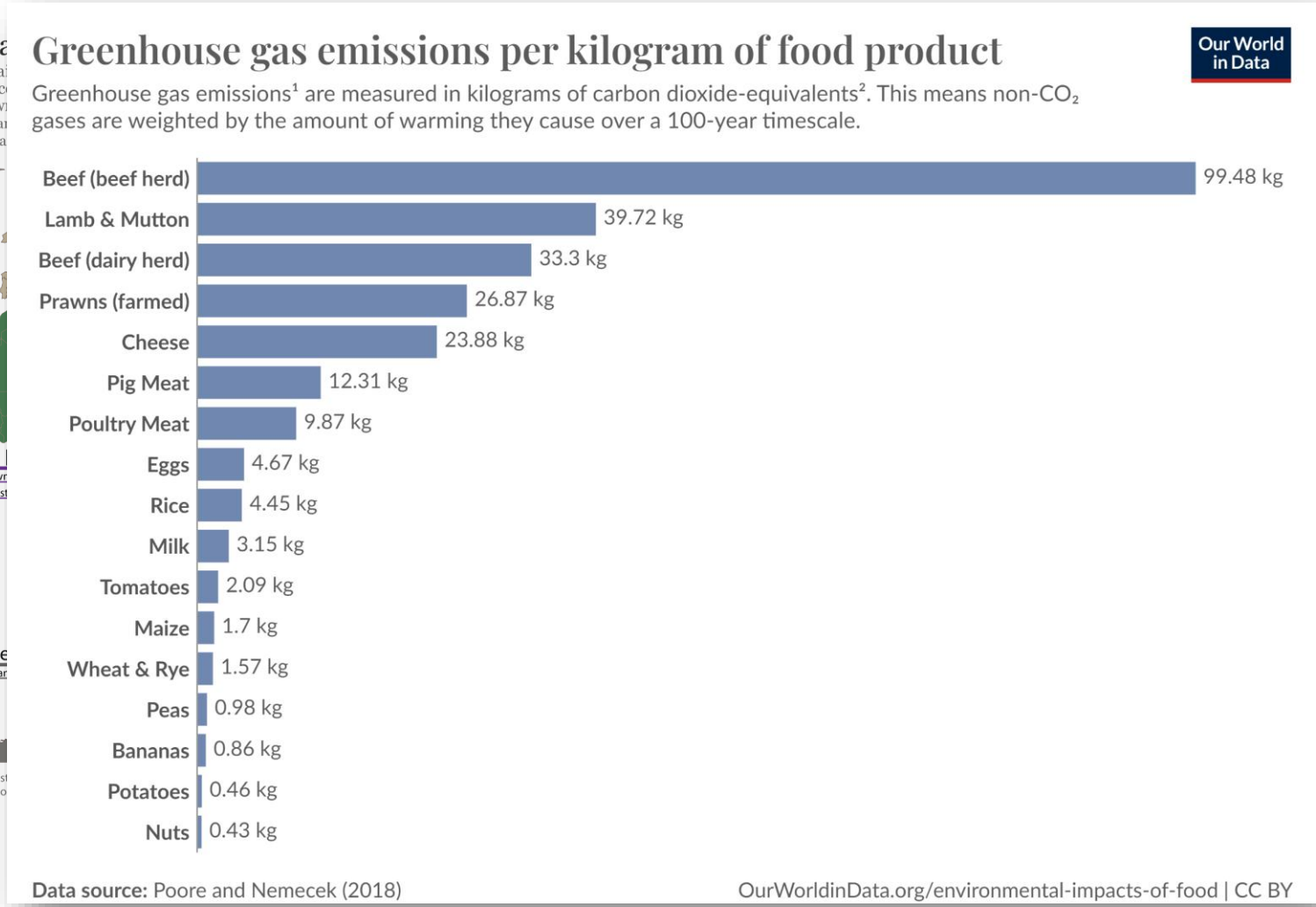
ikerbasque
Basque Foundation for Science

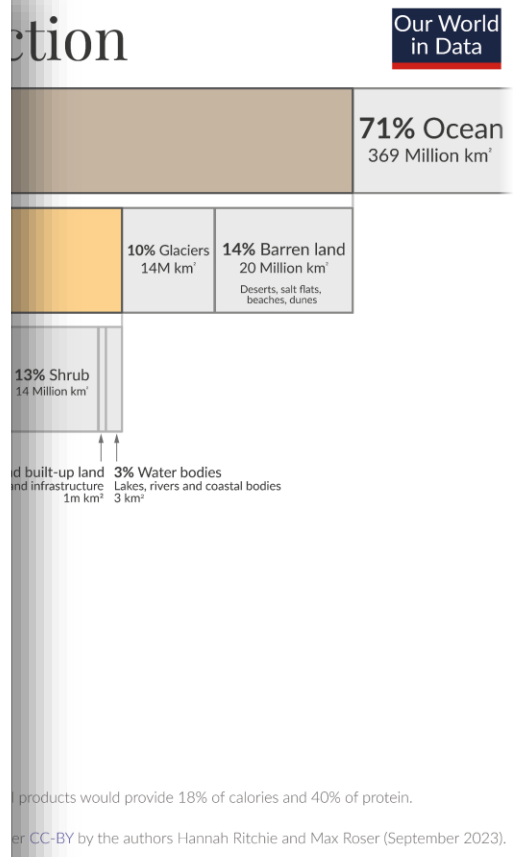
Presentación

- Ecología y Medio Ambiente, Universidad Autónoma de Madrid: Máster (2004), Doctorado (ecología de pastizales, 2015).
- Experiencia en organizaciones internacionales (2010-2019)
  - Unión Internacional para la Conservación de la Naturaleza
  - Organización de Naciones Unidas para la Agriculture y la Alimentación
  - consultorías
- Post-doc en la Universidad de Helsinki (2020-21), científico visitante
- Ikerbasque Research Fellow, Basque Centre for Climate Change – BC3 (desde 2022), Ikerbasque Associate Profesor (desde 2027)
- Colaborador voluntario en la Facultad de Veterinaria, UGent, Bélgica

“Ganadería” como fuente de impacto negativo

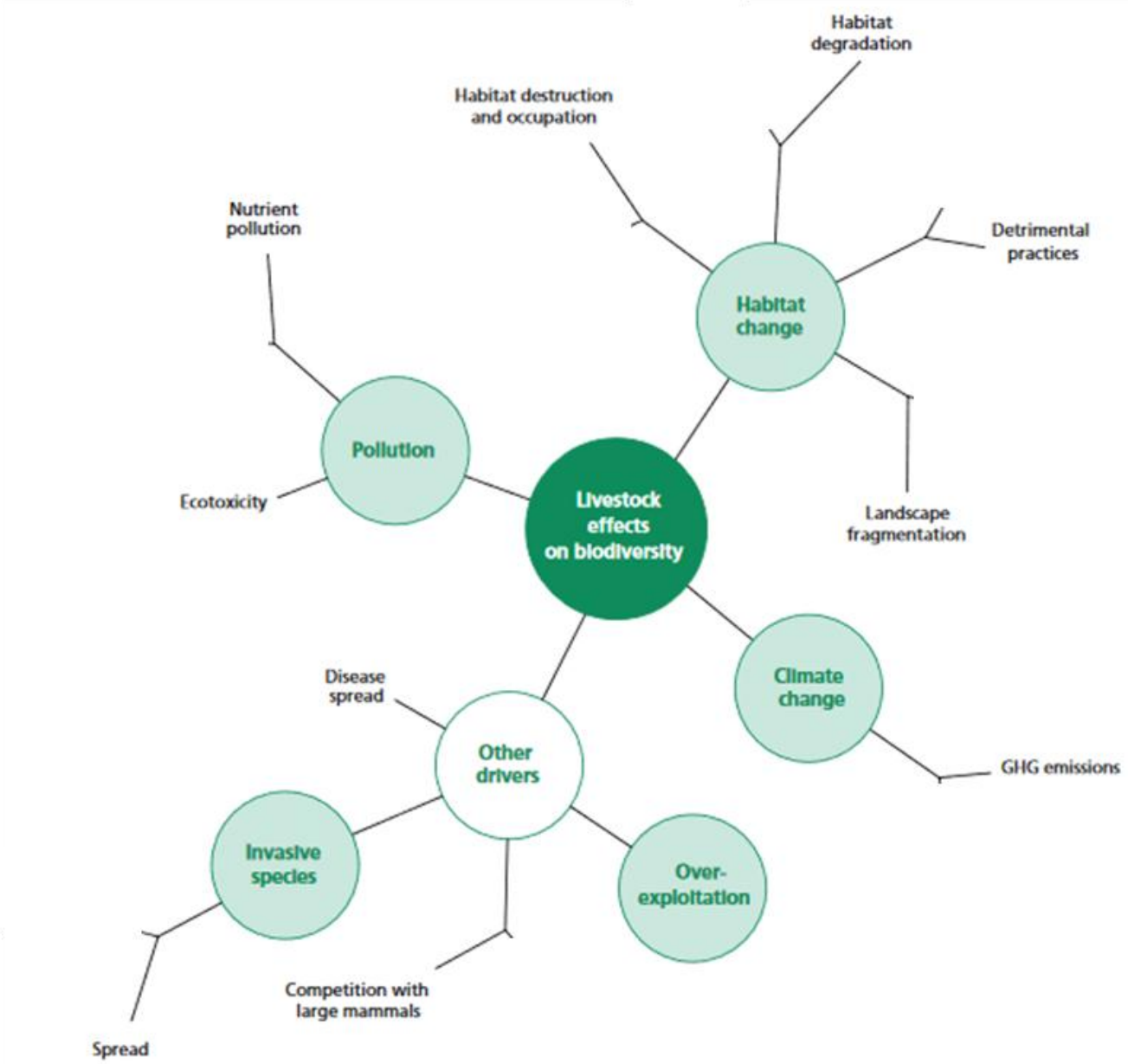




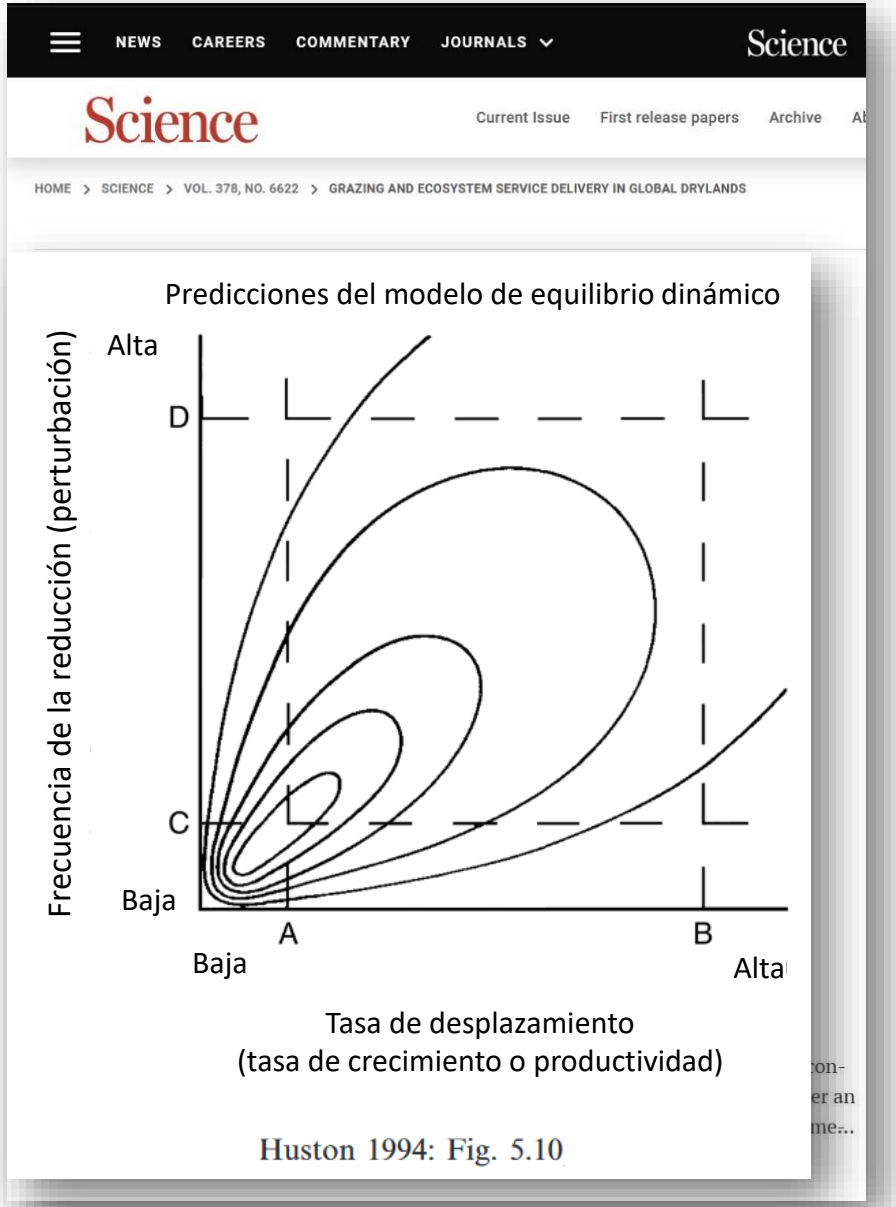


“El Mal”

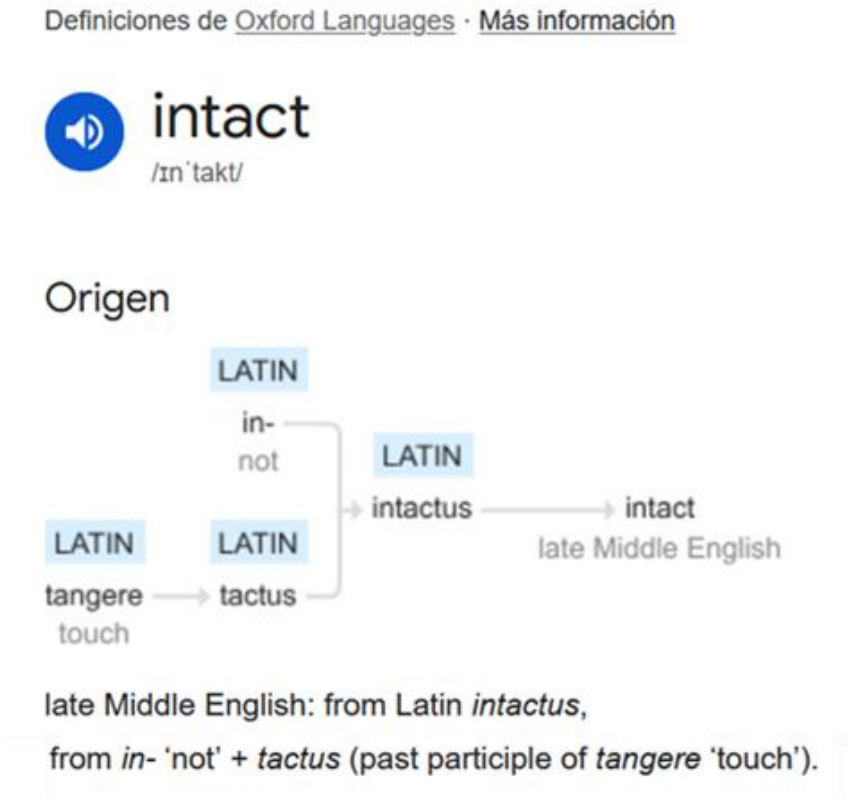




Teillard et al 2016 https://www.fao.org/3/av151e/av151e.pdf#page=34



Reconsiderar la naturaleza 'intacta’ de los ecosistemas silvestres.



= Naturaleza intacta

- Si las perturbaciones son naturales, los ecosistemas naturales no están intactos. En realidad, necesitan ser tocados = **perturbados** para ser naturales.

⇒ Perturbaciones positivas, diferentes de las negativas

- Sistemas circulares

ANIMAL FRONTIERS OXFORD ACADEMIC

Feature Article

Vast extension but positive outcomes, reduced but negative: complexity and nuances in evaluating land use by livestock and crops

Pablo Manzano,[†,‡,●] Mariana de Aragão Pereira,[‖,●] and Wilhelm Windisch[§,●]

[†]Basque Centre for Climate Change (BC3), Leioa, Spain
[‡]Ikerbasque—Basque Foundation of Science, Bilbao, Spain
[‖]Embrapa Beef Cattle, Campo Grande, Brazil
[§]Technical University of Munich, Chair of Animal Nutrition, Freising, Germany

https://doi.org/10.1093/af/vfae051









https://timelessmoon.getarchive.net/amp/media/chickens-farm-dung-animals-c3a2cc

ANIMAL FRONTIERS
OXFORD ACADEMIC

Manzano et al 2025

- Modelos lineares



https://commons.wikimedia.org/wiki/File:2012_,_Spreading_fertilizer_near_Mayshill_-_geograph.org.uk_-_2882867.jpg



Diferencias

- Efectos en la biodiversidad
- Emisiones de gases de efecto invernadero y efectos climáticos
- Pérdida de nutrientes

- Soberanía alimentaria
- Equidad
- Resiliencia climática

Table 1. Multidimensional setting that configures the five broad types of farming livestock worldwide

Livestock type	Extensive grazing	Intensive farming reliant on the territory	Backyard systems	Improved pastures	CAFOs
Nutrient path	Circular	Circular	Circular	Linear	Linear
Productivity	Moderate	Low to Moderate	Low to Moderate	Very high	Very high
Food sovereignty	High	High	High	Moderate	Low
Predominant species type	Ruminants	Ruminants	Monogastrics	Ruminants	Monogastrics
Farm management type	Free-range & mobile	Confined	Confined	Free-range	Confined
Attributed climate impacts	High	High	Low	High	Low
Predominant LCA setting	Ecosphere	Ecosphere	Technosphere	Technosphere	Technosphere
Dependence on fossil energy	Low	Low	Low	High	High
Labor demands	High	High	High	Medium	Low
Nutrient pollution	Low	Low	Medium	High	High
Replaceability of natural ecosystem processes	Very high	High	Low	Medium-low	Low

Ganado en positivo: imita herbívoros

- Bond

Journal of Vegetation Science 16: 261-266, 2005
© IAVS; Opulus Press Uppsala.

INVITED PERSPECTIVE

Large parts of the world are brown or black: A different view on the 'Green World' hypothesis

Bond, William J.

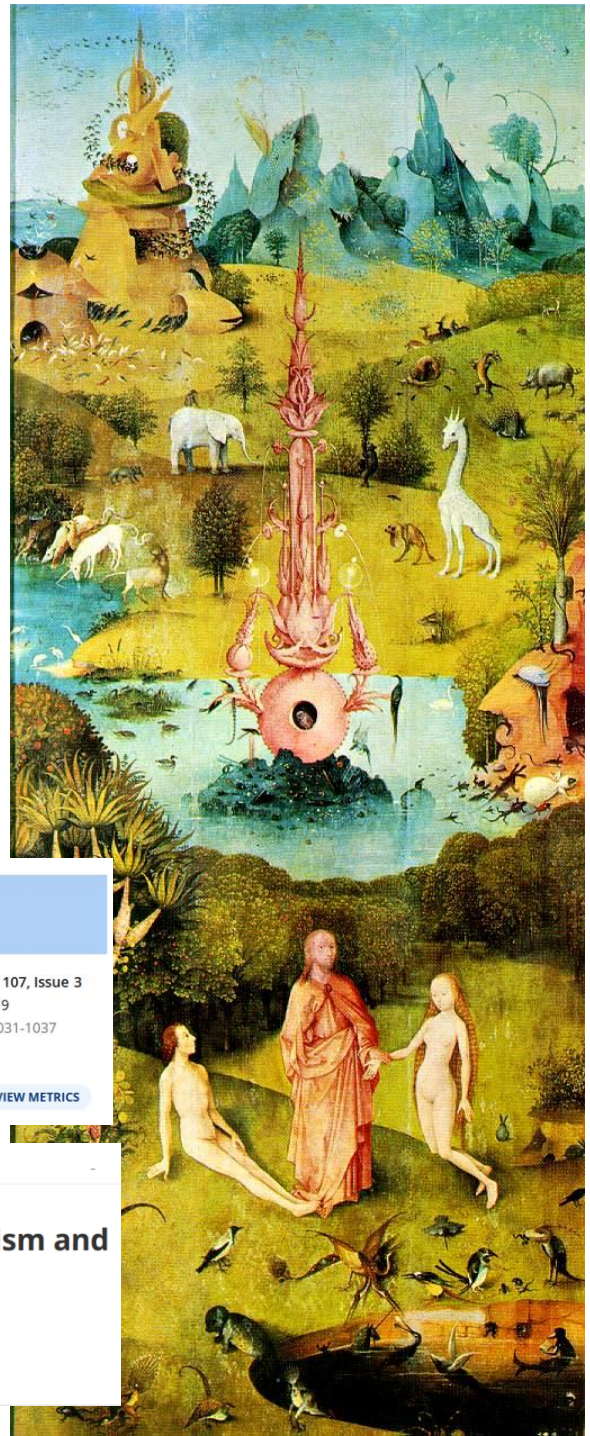
Botany Department, University of Cape Town, Private Bag, Rondebosch, 7701, South Africa; Fax +27 216504041; E-mail bond@botzoo.uct.ac.za



Abstract. Climate sets the limits to plant growth but does climate determine the global distribution of major biomes? I suggest methods for evaluating whether vegetation is largely climate or consumer-controlled, focusing on large mammal herbivores and fire as influential consumers. Large parts of the world appear not to be at equilibrium with climate. Consumer-controlled ecosystems are ancient and diverse. Their distinctive ecology warrants special attention.

El origen del dilema:

Raíces culturales:
El paraíso y el Jardín del Edén





BRITISH ECOLOGICAL SOCIETY | Journal of Ecology

MINI-REVIEW | Free Access

Humboldt and the reinvention of nature

Juli G. Pausas, William J. Bond

First published: 25 November 2018 | https://doi.org/10.1111/1365-2745.13109 | VIEW METRICS

Volume 107, Issue 3
May 2019
Pages 1031-1037

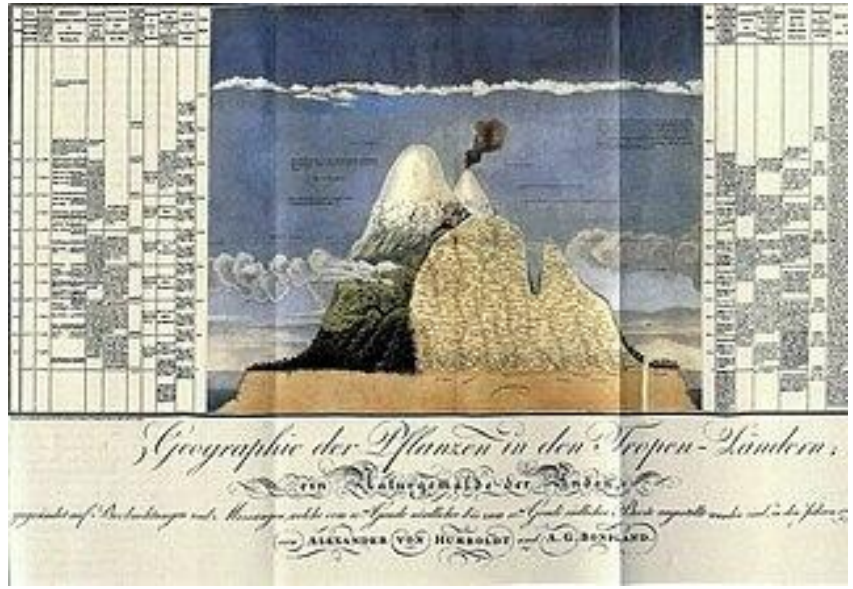
Comparative Studies in Society and History > Volume 48 Issue 1

Cultivating Wilderness: Environmentalism and Legacies of Early Christian Asceticism

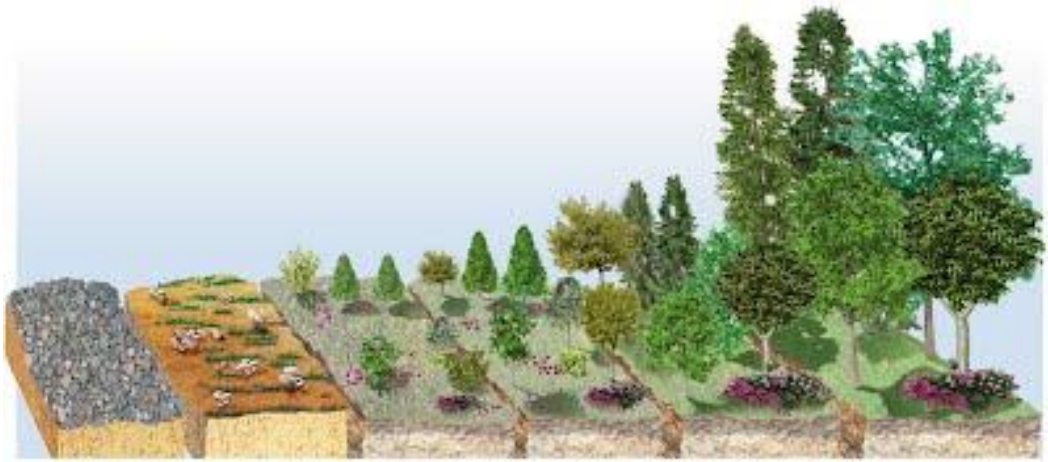
Published online by Cambridge University Press: **14 March 2006**

Judith Adler

Sucesión ecológica
(Humboldt, 1805)



(F.E. Clements, 1916)



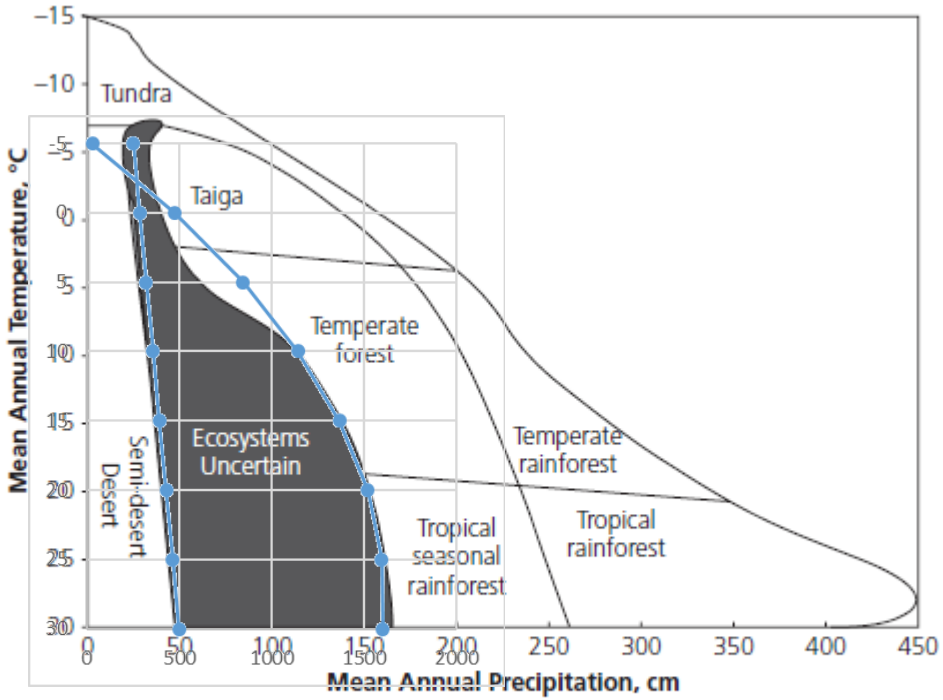
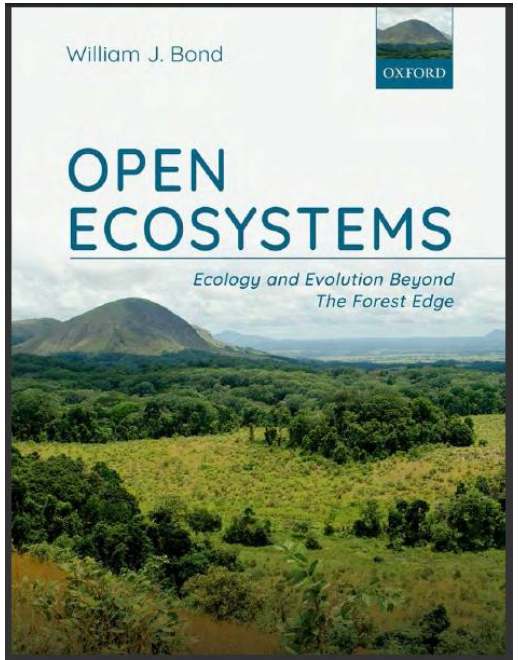
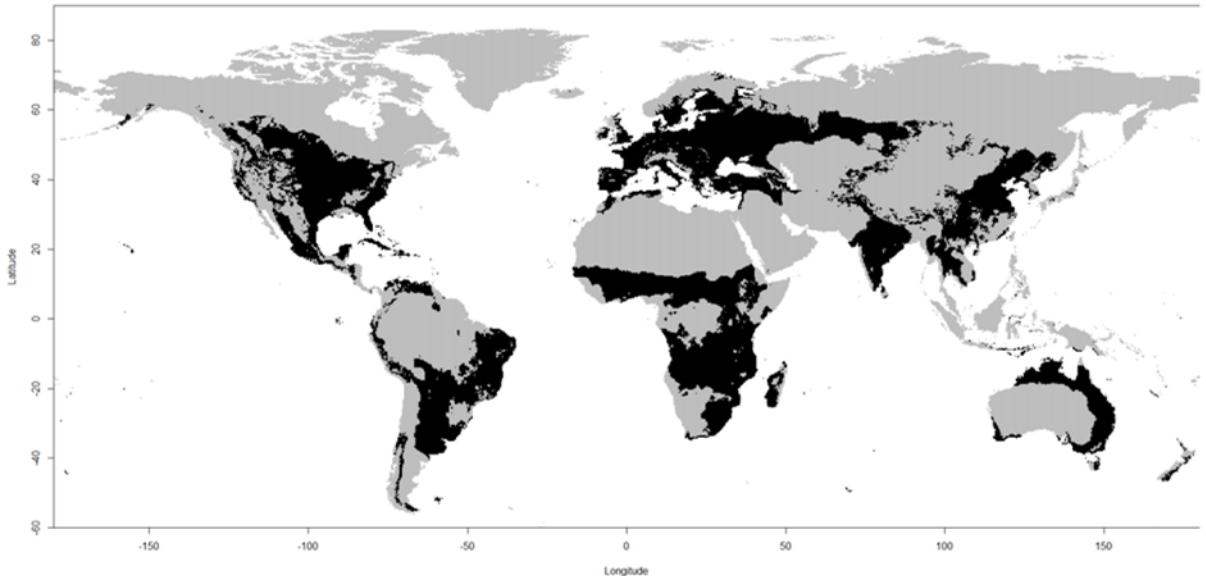
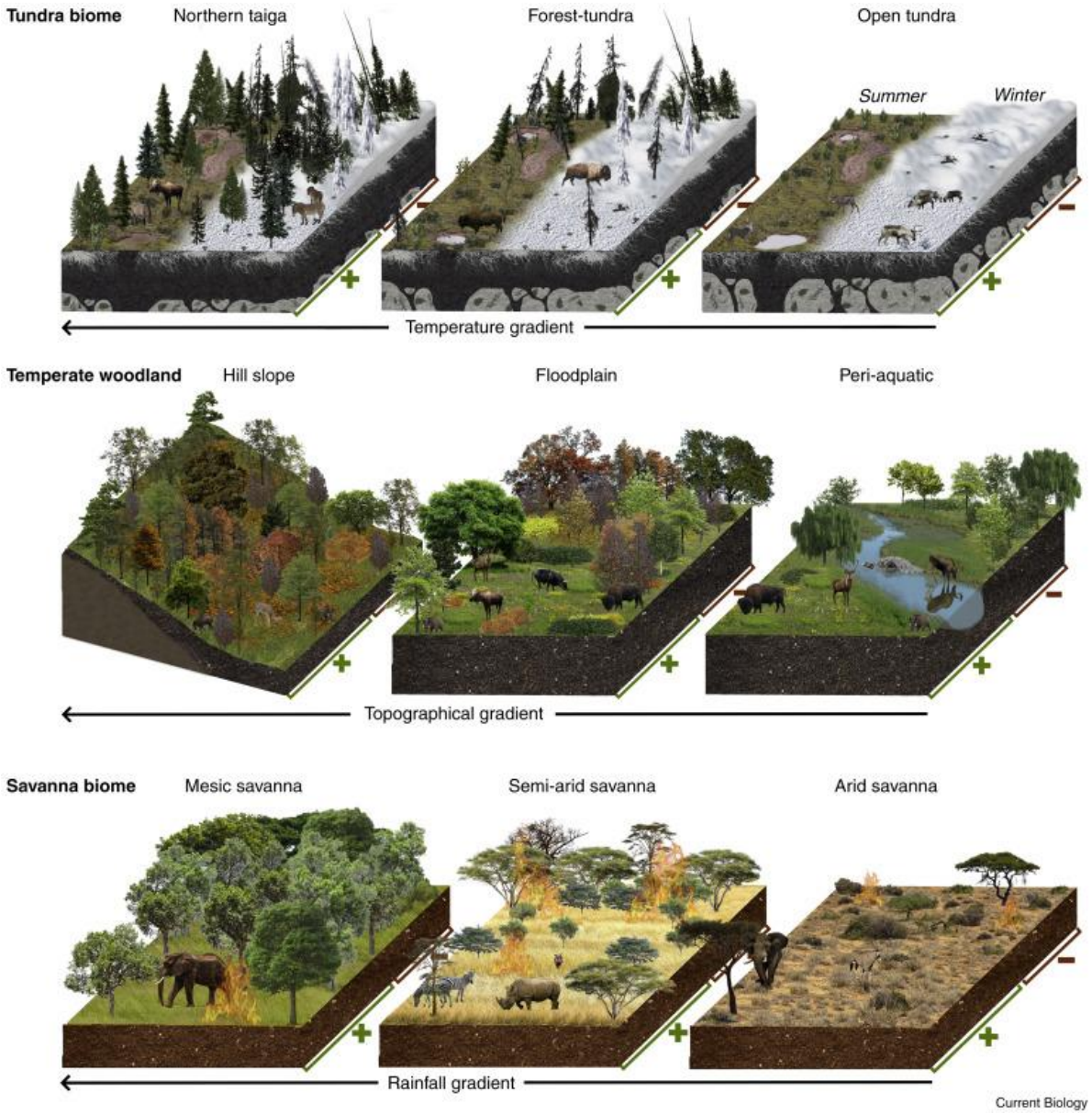


Figure 2.2 Whittaker's climate envelopes for major world vegetation formations. The shaded area is the climate envelope where ecosystems are uncertain and 'either grassland, or one of the types dominated by woody plants, may form the prevailing vegetation in different areas' (redrawn from Whittaker 1975, p. 65).







Malhi et al 2022 https://doi.org/10.1016/j.cub.2022.01.041

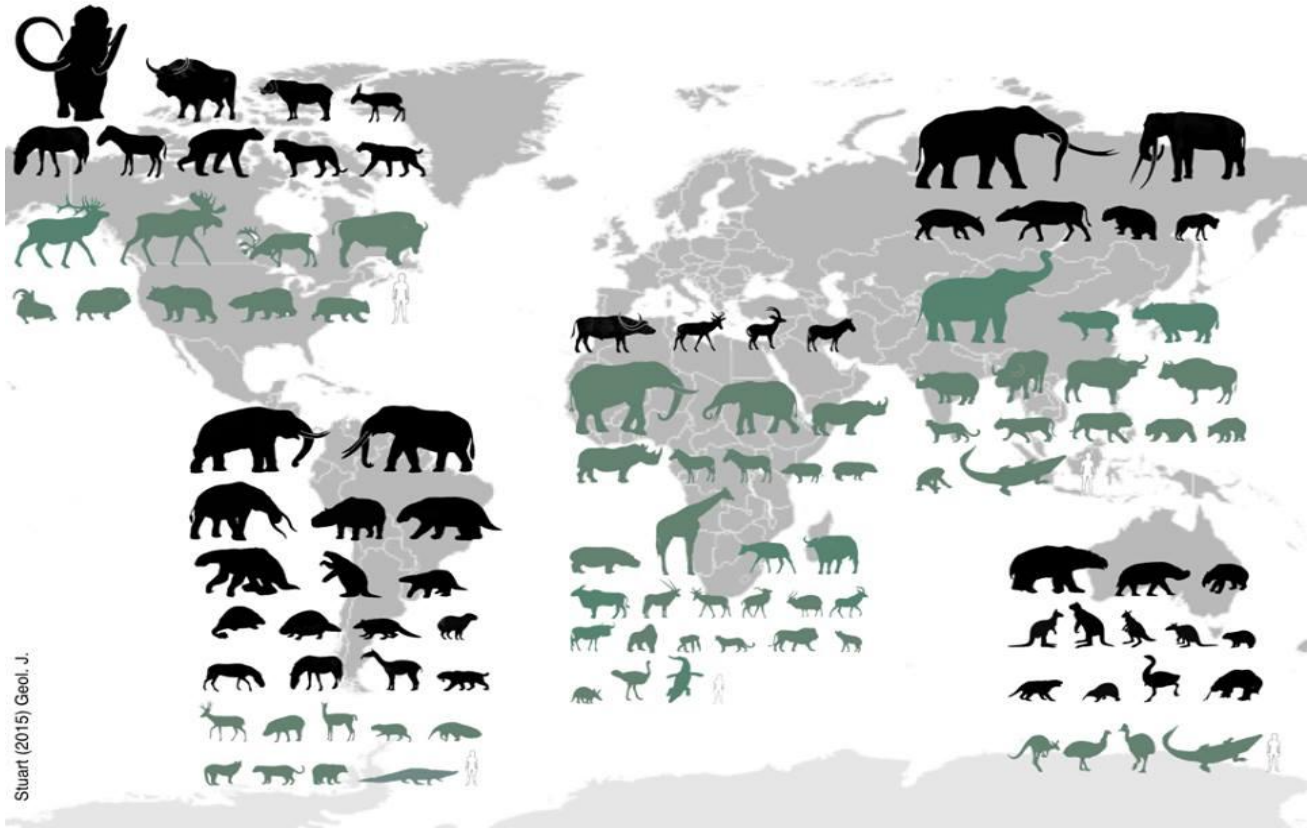




Fuente de la imagen: :Pablo Manzano, trabajo propio







Fuente de la imagen: :Pablo Manzano, trabajo propio





Fuente de la imagen: Pablo Manzano, trabajo propio





Tipos funcionales de herbívoros

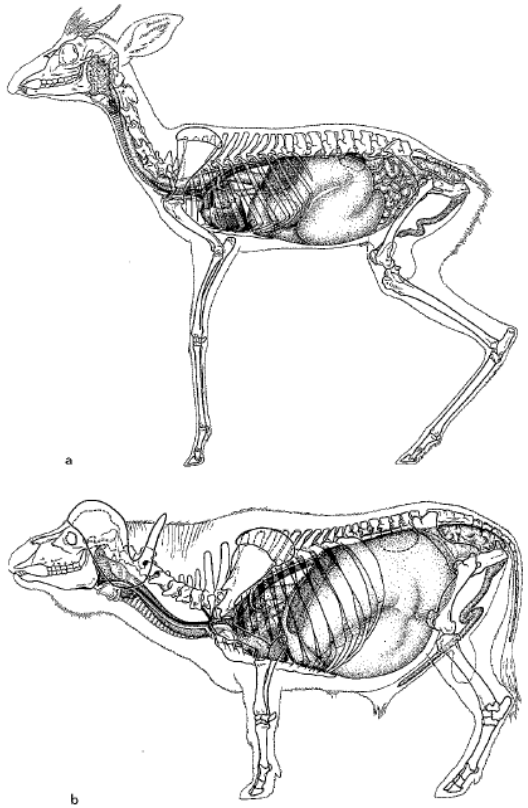
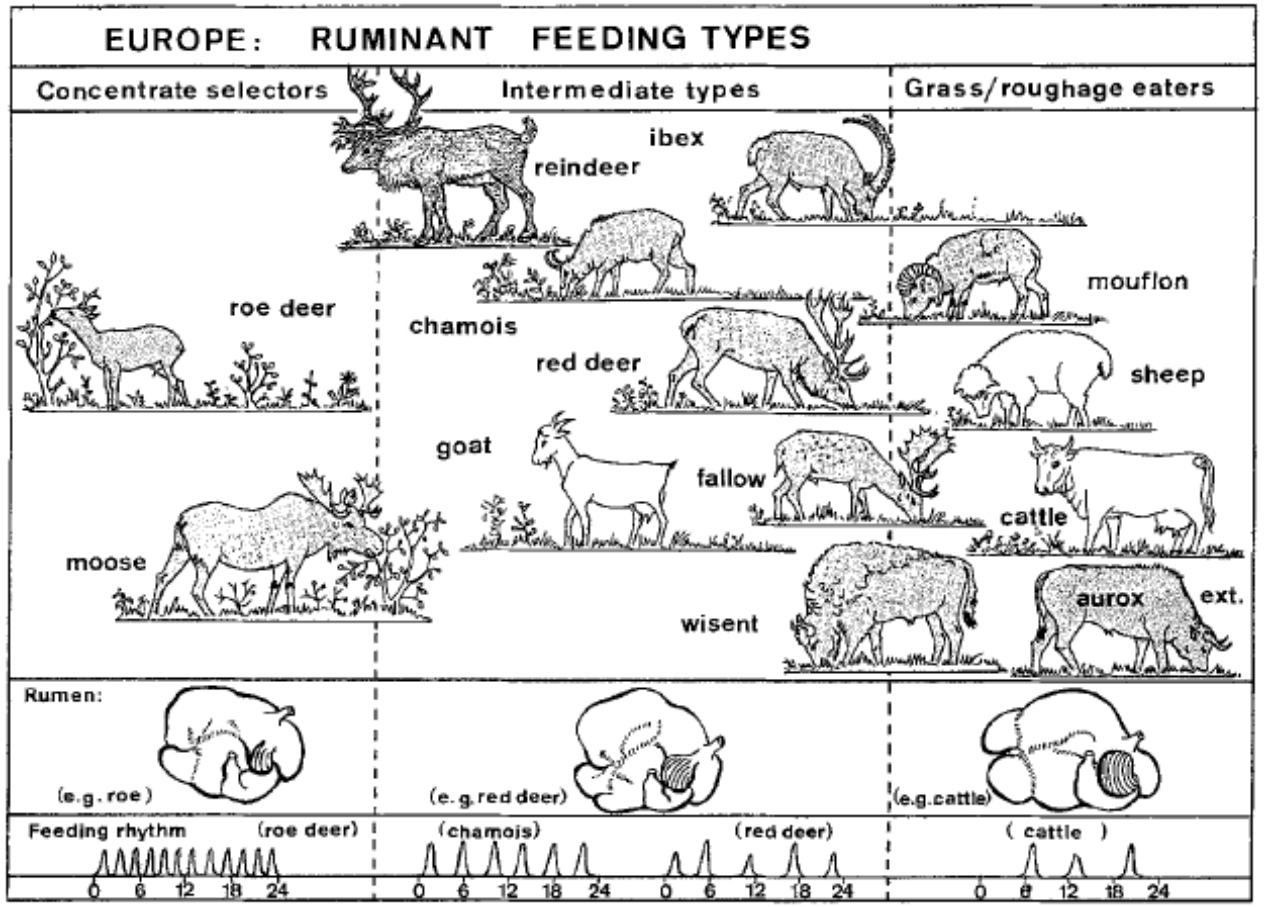


Fig. 1a, b. Comparison of ruminant extremes scaled to equal size irrespective of weight: Günther's dik-dik (**a**), 3–4 kg, early evolved concentrate selector; African buffalo (**b**), 800–1000 kg, late evolved grass and roughage eater; note relative dimensions of forestomach (from Hofmann 1973, redrawn)





- Manejo por pueblos indígenas

  - Cazadores recolectores
    Nikulina et al 2025
    https://doi.org/10.1371/journal.pone.0328218

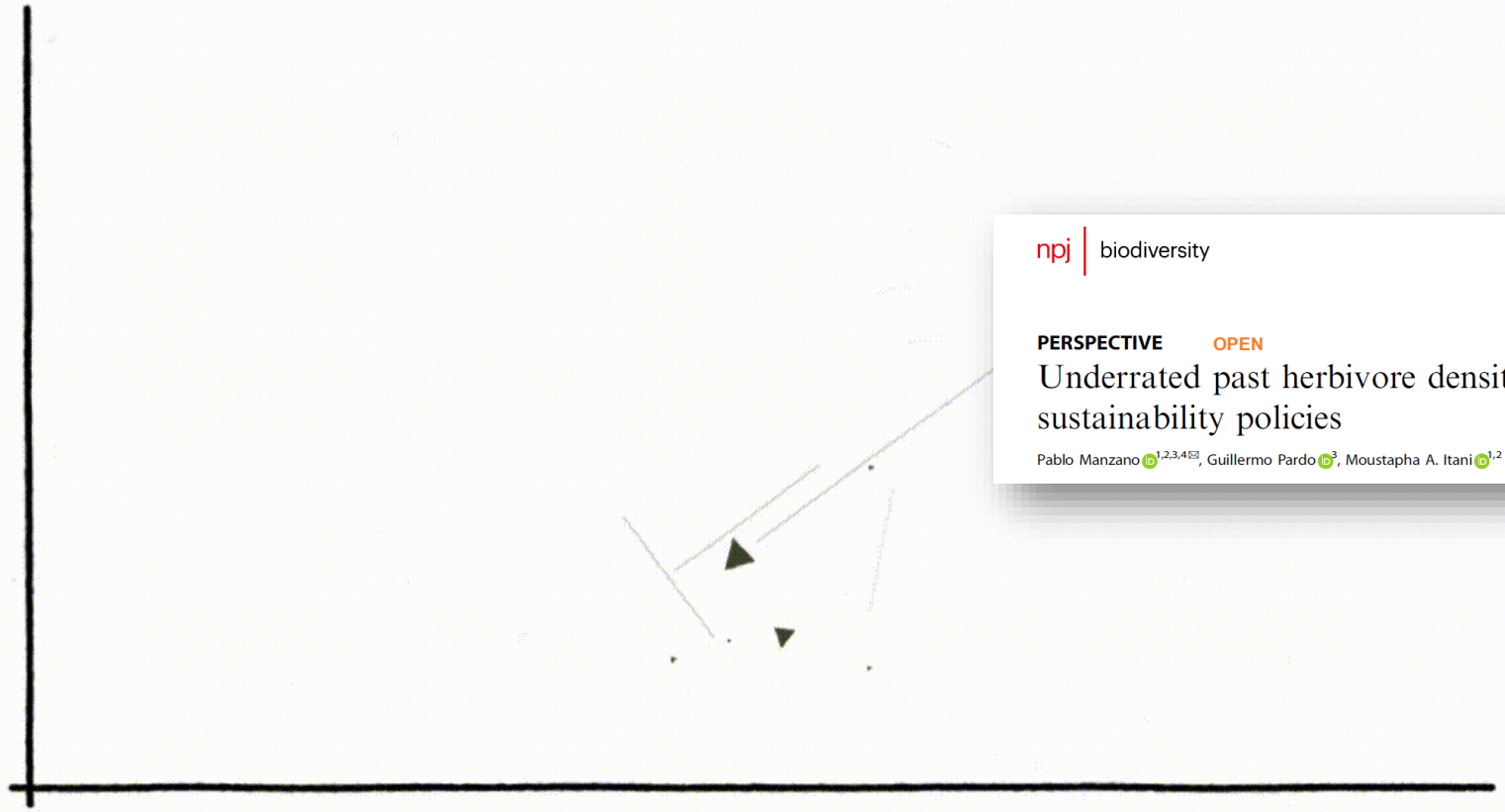


  - Pastores



⇒ ¡Todos queriendo crear pasto!

https://youtu.be/KYDk5xlQ7_4



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PERSPECTIVE OPEN

Check for updates

Underrated past herbivore densities could lead to misoriented sustainability policies

Pablo Manzano[1,2,3,4]✉, Guillermo Pardo[3], Moustapha A. Itani[1,2] and Agustín del Prado[3,4]

Funciones ecológicas

⇒ dispersión de semillas



https://doi.org/10.1890/1540-9295(2006)004[0244:ELSDVS]2.0.CO;2



⇒ ciclo de nutrientes

- senescencia ecosistémica
- animales asociados





https://doi.org/10.1111/j.1600-0706.2010.18602.x

PeerJ

Herbivore corridors sustain genetic footprint in plant populations: a case for Spanish drove roads

Alfredo García-Fernández[1], Pablo Manzano[2,3,4], Javier Seoane[3], Francisco M. Azcárate[3], Jose M. Iriondo[1] and Begoña Peco[3]

[1] Área de Biodiversidad y Conservación, Universidad Rey Juan Carlos, Móstoles, Madrid, Spain
[2] Commission on Ecosystem Management, International Union for Conservation of Nature, Nairobi, Kenya
[3] Terrestrial Ecology Group—Departamento de Ecología, Centro de Investigación en Biodiversidad y Cambio Global (CIBC), Universidad Autónoma de Madrid, Madrid, Spain
[4] HELSUS, Faculty of Biological and Environmental Sciences, University of Helsinki, Helsinki, Finland

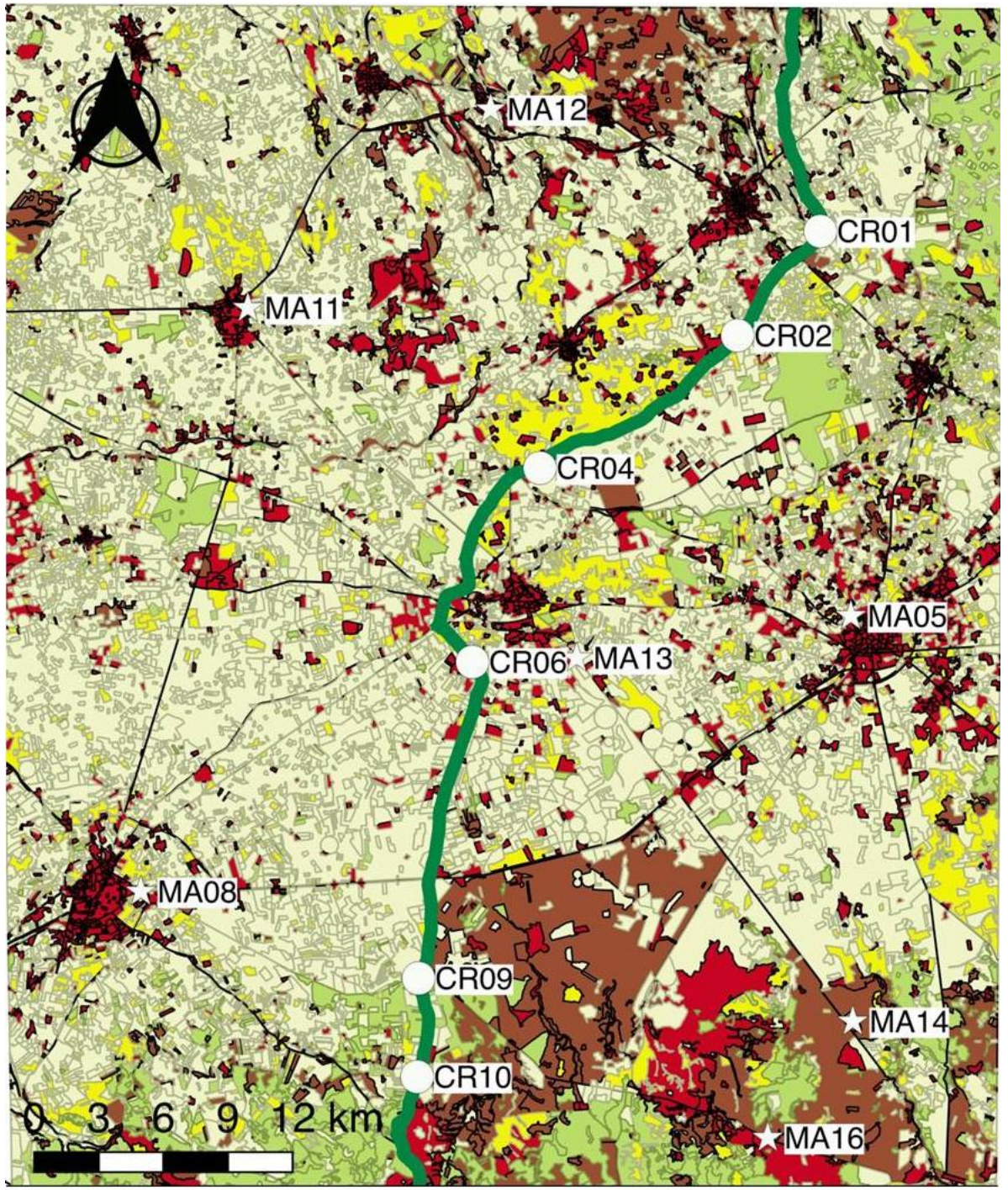
- Puntos calientes de dispersion en asentamientos

⇒Invasoras

- Uso tangencial por rebaños residentes
- Ganado trashumante

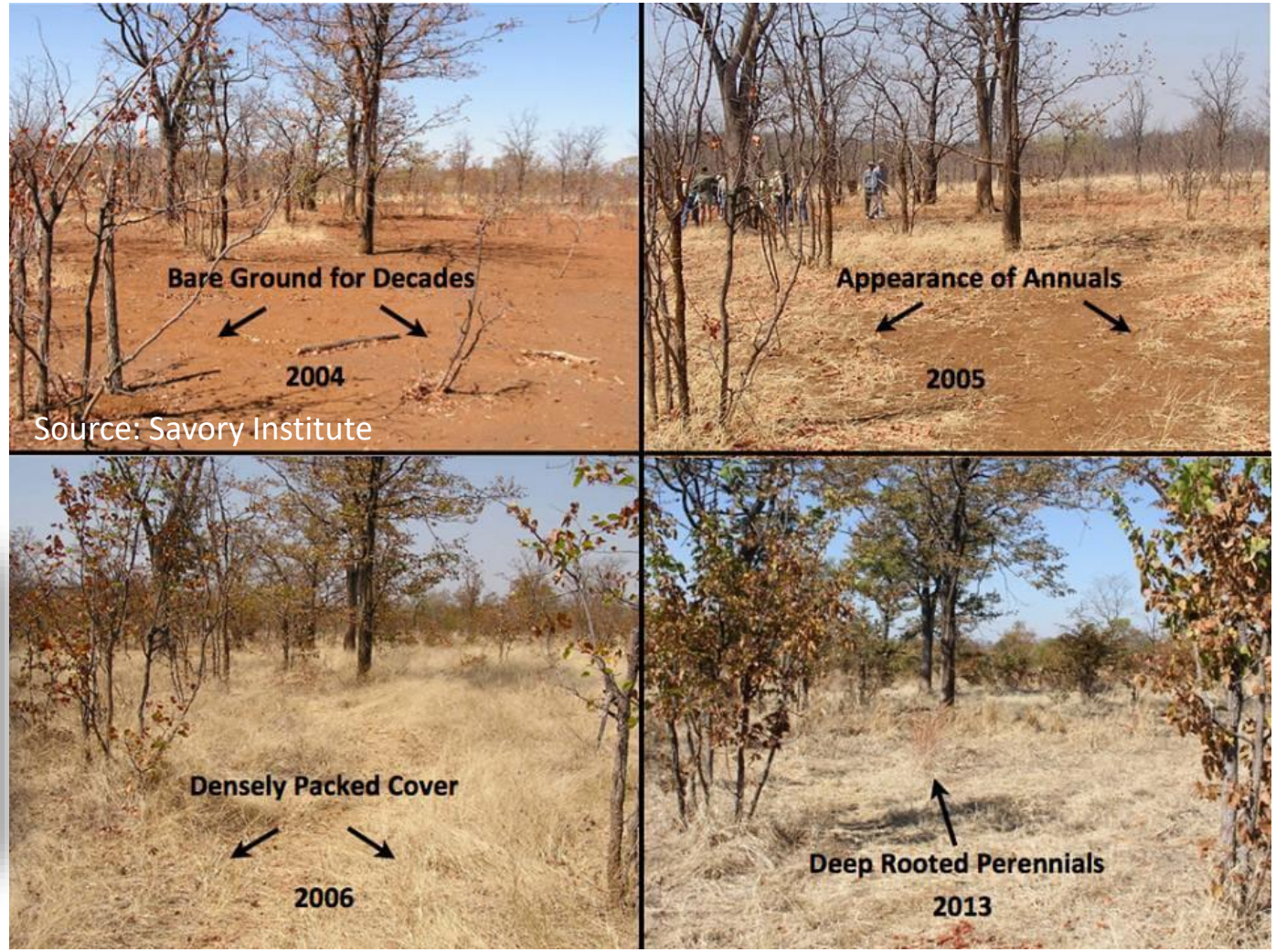
⇒ polen

⇒ semillas



- Restauración
- Productividad

$\Rightarrow$ win-win



Source: Savory Institute


Featured Article

Ecosystem management using livestock: embracing diversity and respecting ecological principles

Logan Thompson,[†] Jason Rowntree,[‡] Wilhelm Windisch,[‖] Sinéad M. Waters,[§] Laurence Shalloo,[§] and Pablo Manzano[¶,**]

IUCN 2012 http://www.iucn.org/wisp/?9442/

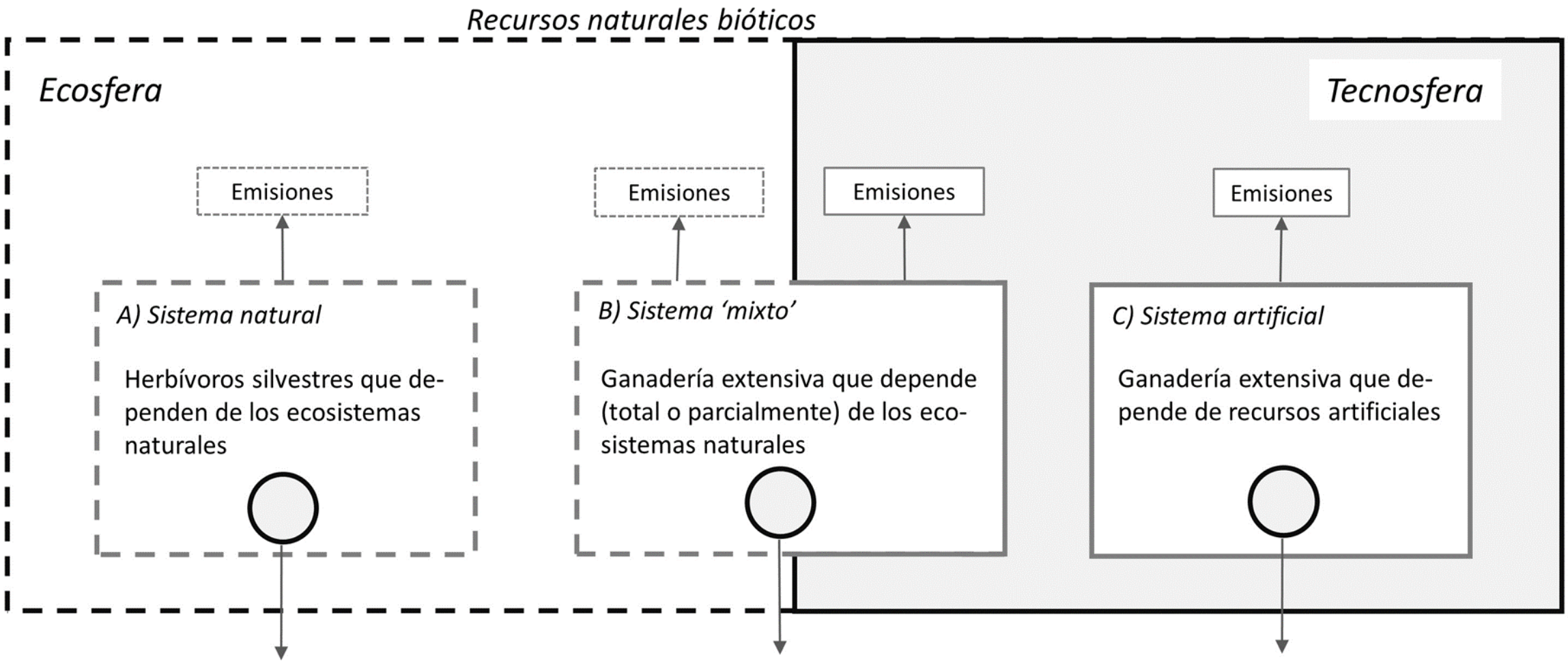
Manzano-Baena & Salguero-Herrera 2018 https://tinyurl.com/yalgh87o



Manzano & White (2019) https://doi.org/10.3354/cr01555

https://redremedia.wordpress.com/2019/10/17/niveles-de-referencia-en-sistemas-ganaderos-claves-para-identificar-impactos/

The International Journal of Life Cycle Assessment
https://doi.org/10.1007/s11367-023-02135-3



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BRIEF COMMUNICATION OPEN

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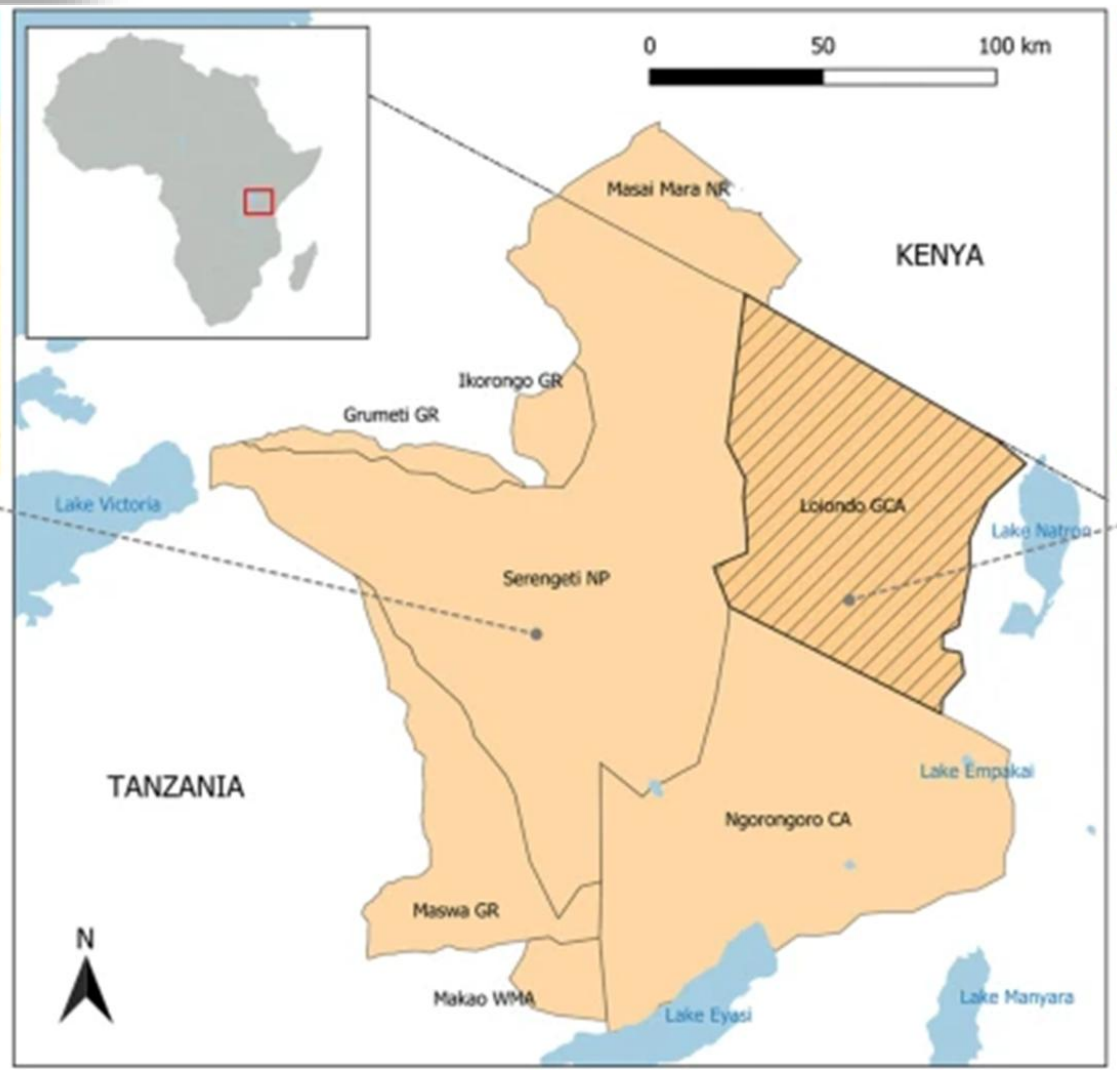
Comparable GHG emissions from animals in wildlife and livestock-dominated savannas

Pablo Manzano[1,2,3,4], Agustín del Prado[3,4] and Guillermo Pardo[3]✉

Caso de estudio en África Oriental

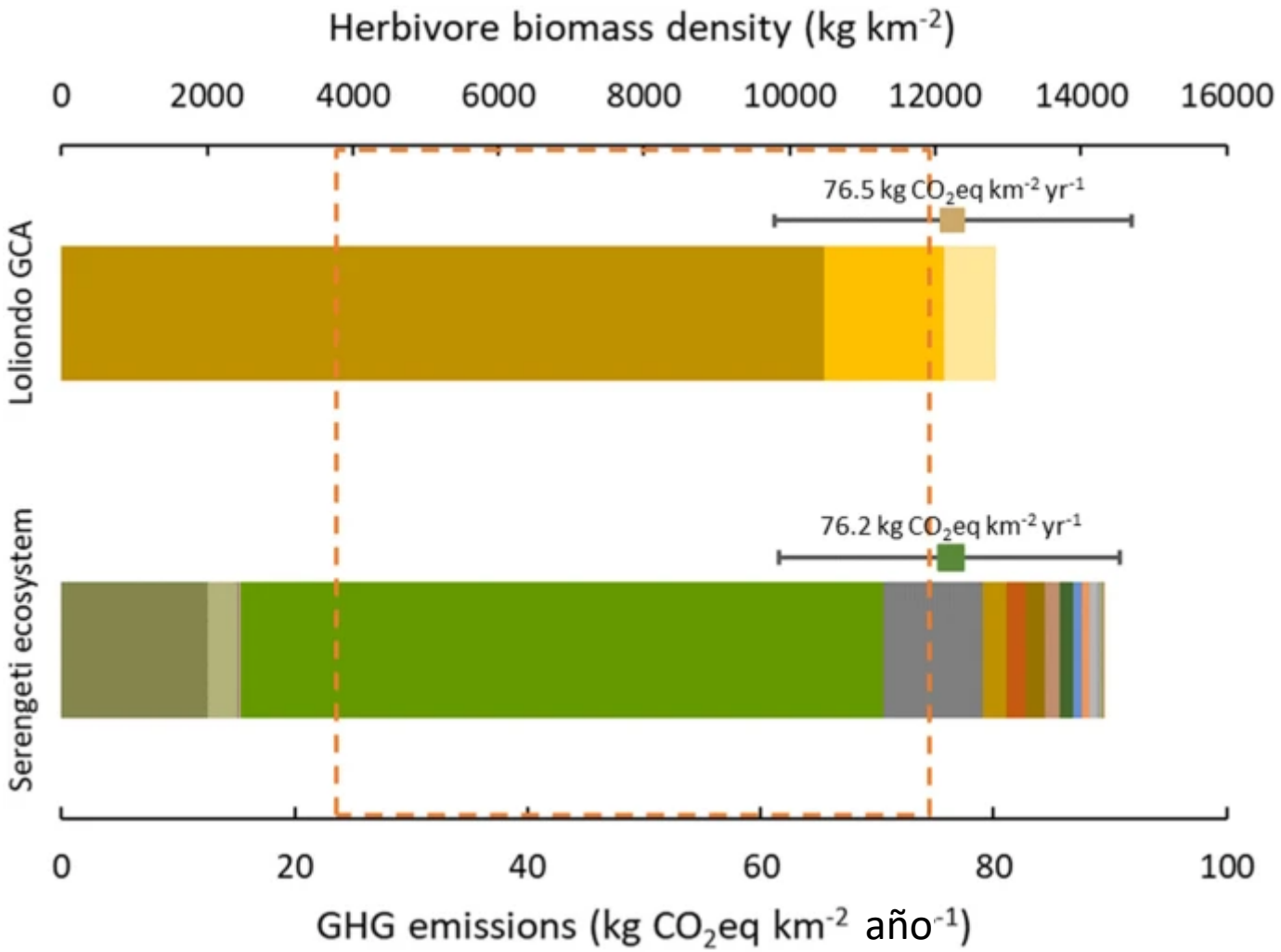


Wild herbivores





Pastoralism


Herbivore biomass density (kg km-2)
0
2000
4000
6000
8000
10000
12000
14000
16000
76.5 kg CO2eq km-2 yr-1
Loliondo GCA
76.2 kg CO2eq km-2 yr-1
Serengeti ecosystem
0
20
40
60
80
100
GHG emissions (kg CO2eq km-2 año-1)


Wild hindgut fermenters
Zebra
Elephant
Black rhinoceros
Warthog
Wild ruminants
Wildebeest
Buffalo
Giraffe
Thomson's gazelle
Eland
Topi
Impala
Reedbuck
Grant's gazelle
Kongoni
Steenbok
Waterbuck
Duiker
Oribi
Dikdik
Wild non-ruminant foregut fermenters
Hippopotamus
Livestock
Cattle
Sheep & goats
Donkey

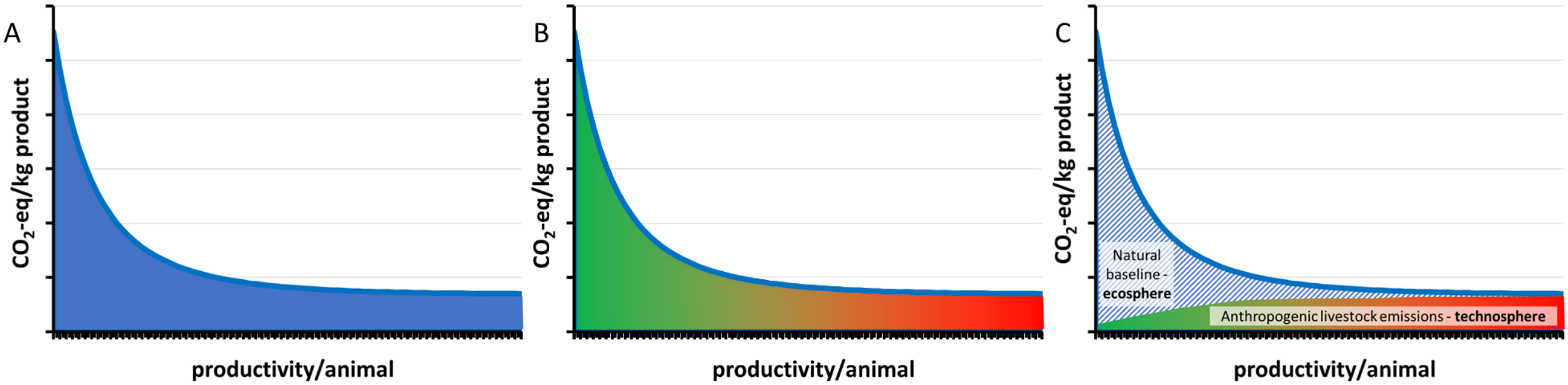


Figure 1. Interpretation of livestock emissions per product in different literature sources, with pastoralism at the left side of the spectrum and the most industrialized systems at the right one. A) Fig 5 in Gerber et al 2011 doesn't differentiate among types and sources of emissions. B) Fig 15 in FAO et al 2023 captures the weight of biogenic (mostly green) and fossil (increased amount of red) origins, showing the heavier weight of fossil fuel footprint in the most industrialized livestock systems. C) Fig 1 in Manzano et al 2023b adds a distinction on ecosphere/technosphere components (cf. Pardo et al. 2024).

https://doi.org/10.4324/9781003487852-17 (upcoming publication in mid-2026)

Transición a sistemas alimentarios lineares

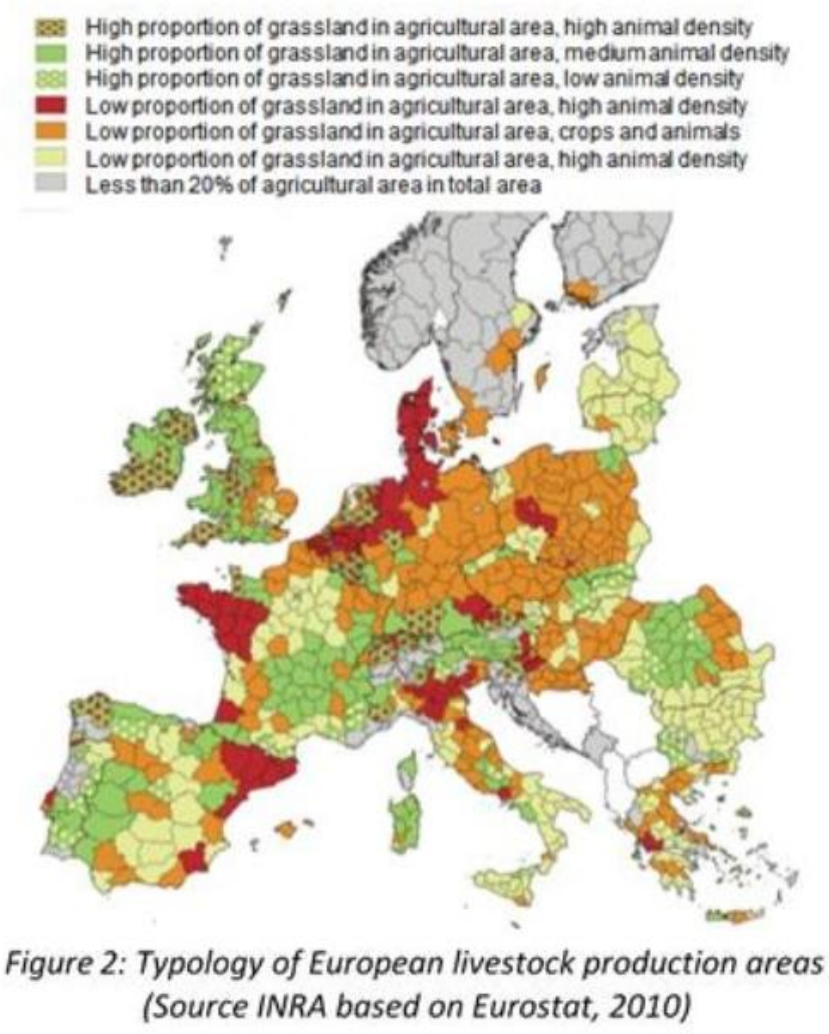
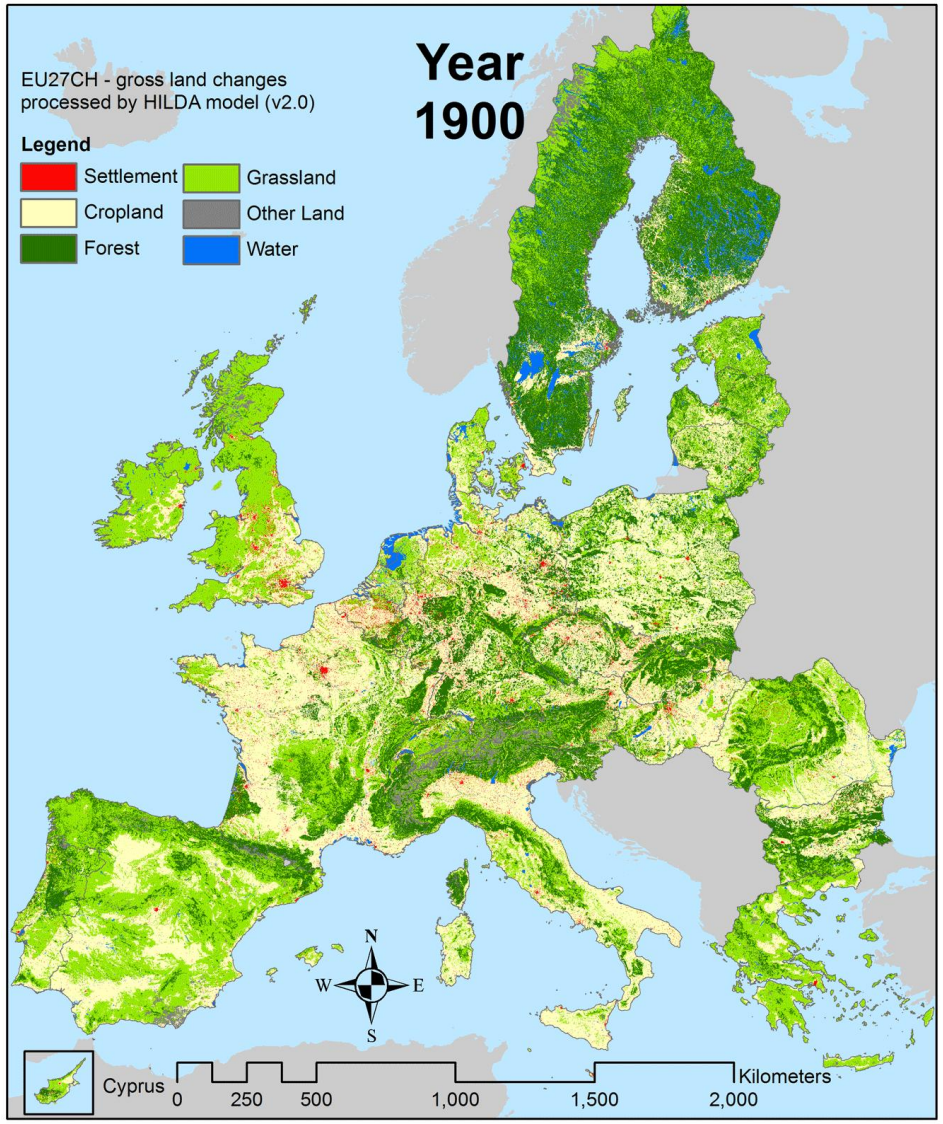


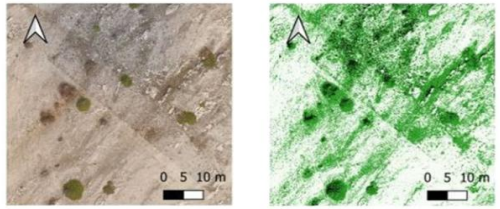
Figure 2: Typology of European livestock production areas (Source INRA based on Eurostat, 2010)

Source: ATF Vision Paper – February 2019
http://animaltaskforce.eu/Portals/0/ATF_Vision_Paper_2019.pdf

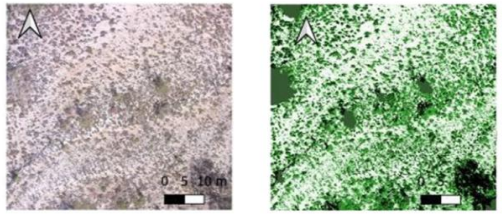


Source: http://www.geo-informatie.nl/fuchs003/#

- Pastadores y ramoneadores actúan diferente en plantas y paisajes



Ganado + ungulados silvestres



Ungulados silvestres

- Otra categoría: desbrozadores

Velamazán et al 2023 (España)

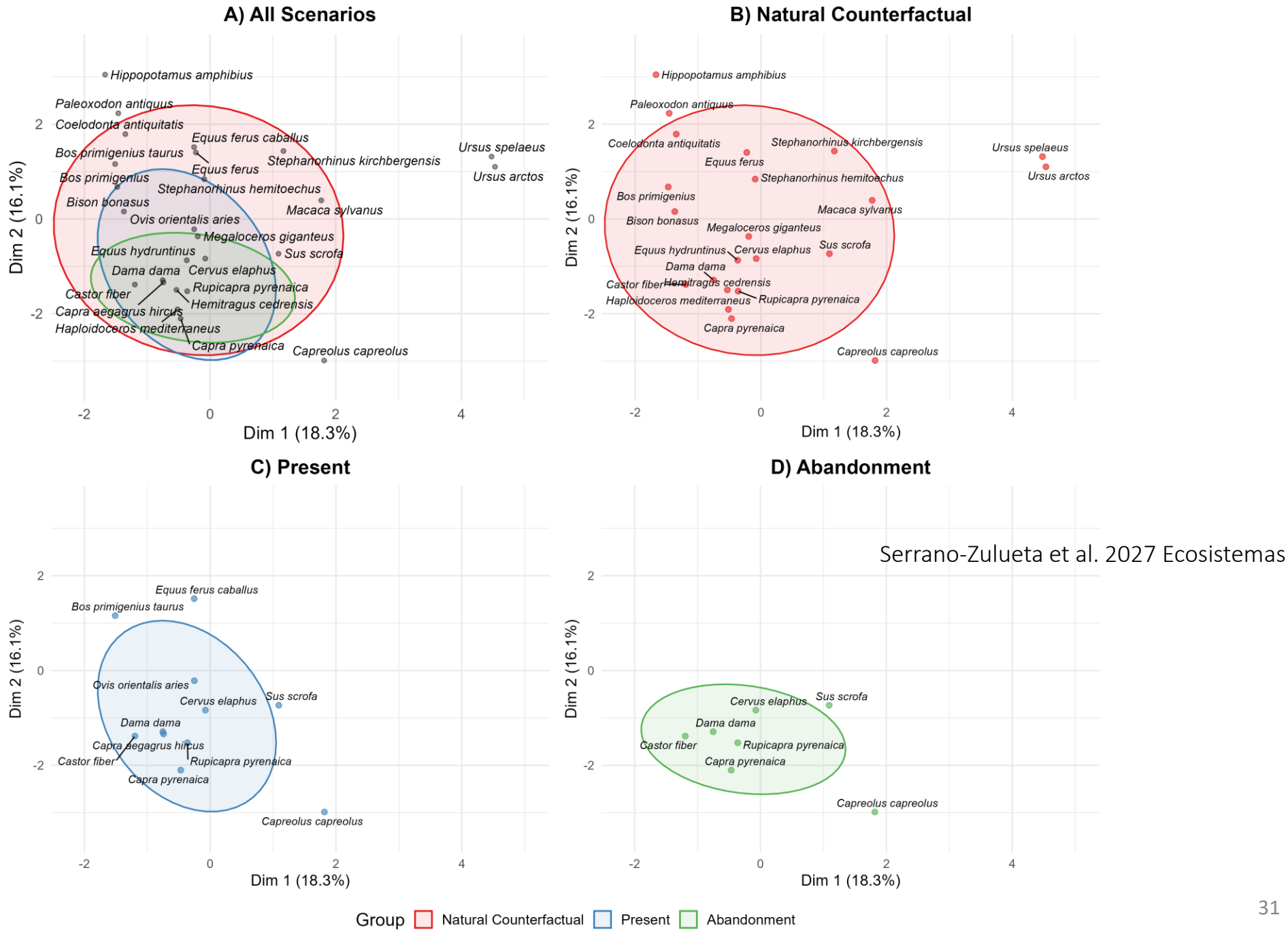
https://doi.org/10.1007/s10980-023-01676-0

- ¿Qué desbrozadores quedan?





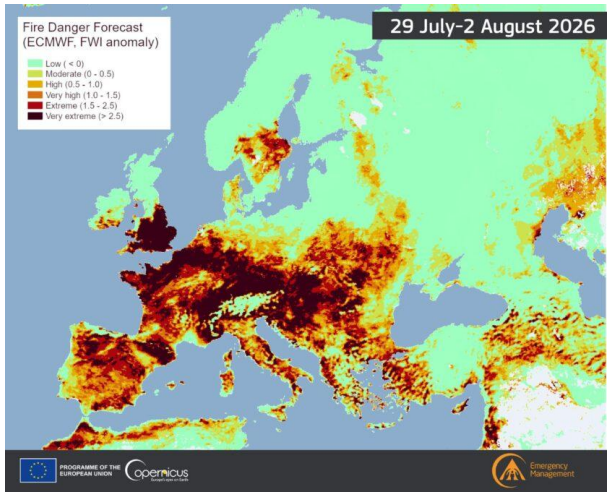
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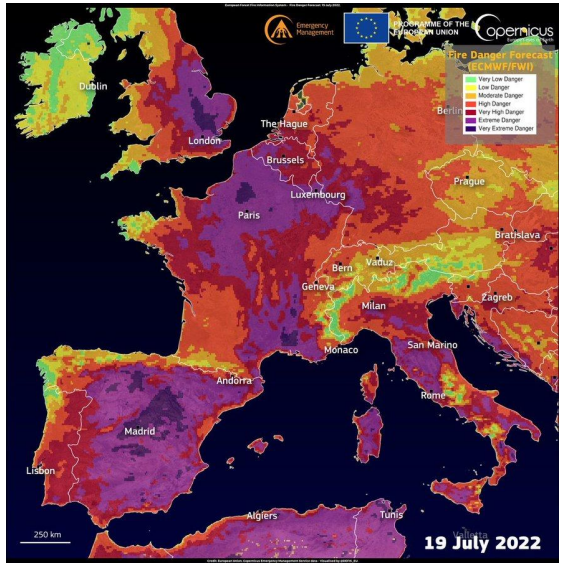


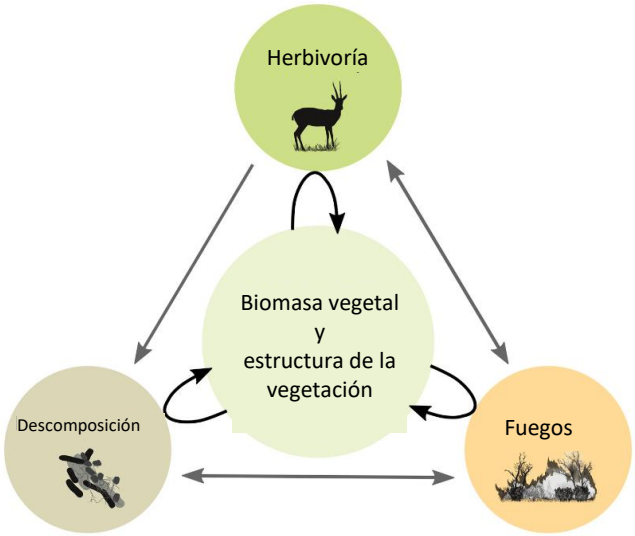
Serrano-Zulueta et al. 2027 Ecosistemas

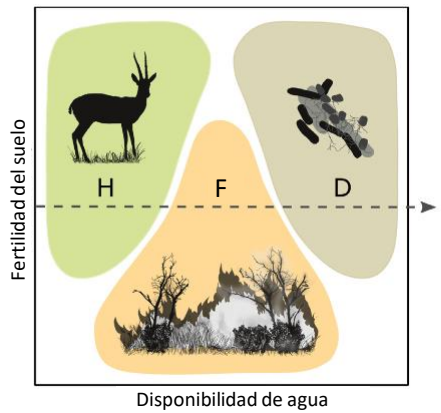
Problema de sustitución del herbívoro por el fuego



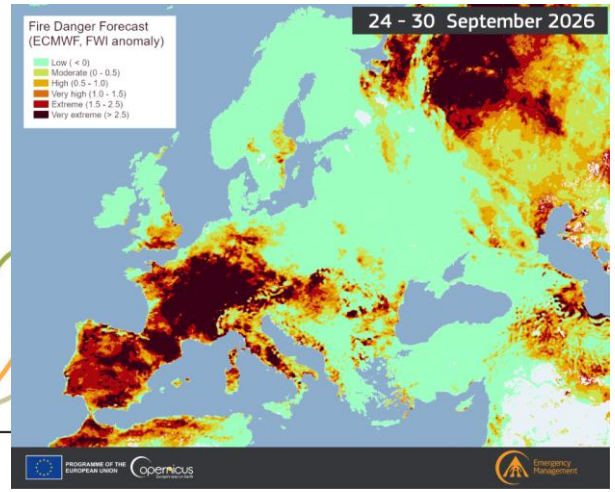


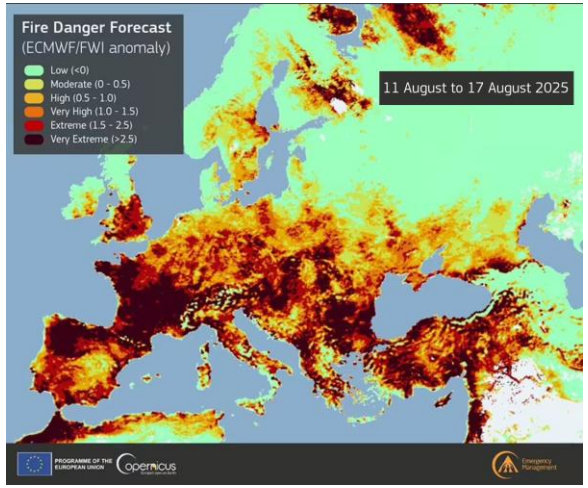




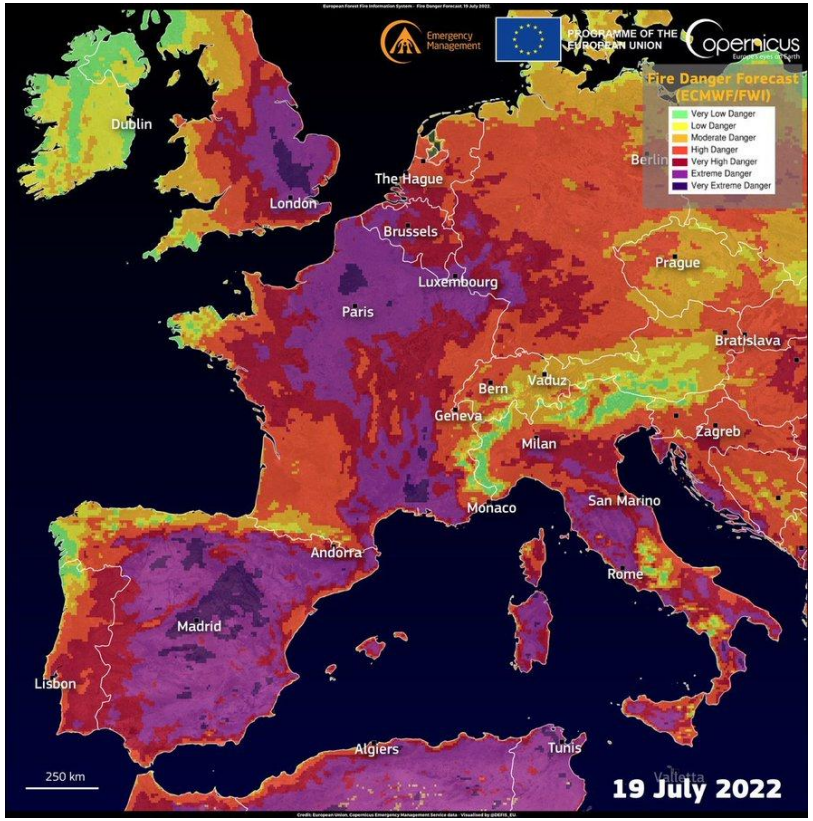


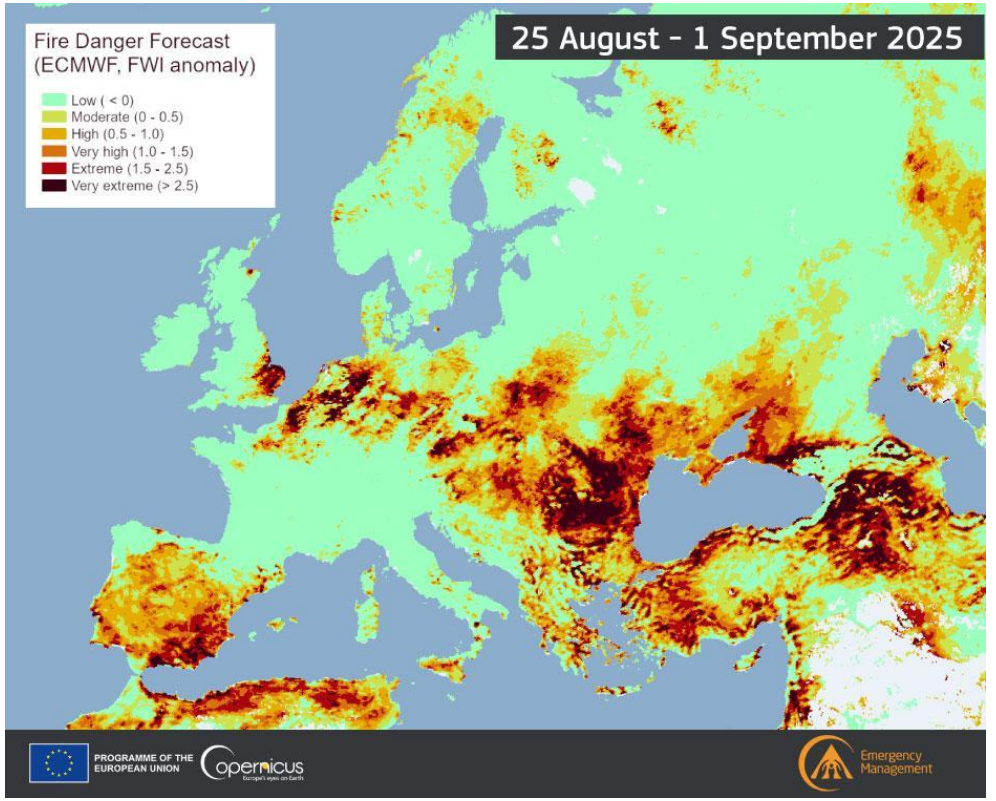






Pausas & Bond https://doi.org/10.1016/j.tree.2020.04.004







ANIMAL FRONTIERS OXFORD ACADEMIC

Ecosystem management using livestock: embracing diversity and respecting ecological principles

Logan Thompson, Jason Rowntree, Wilhelm Windisch, Sinéad M Waters, Laurence Shalloo, Pablo Manzano

Animal Frontiers, Volume 13, Issue 2, April 2023, Pages 28–34, https://doi.org/10.1093/af/vfac094

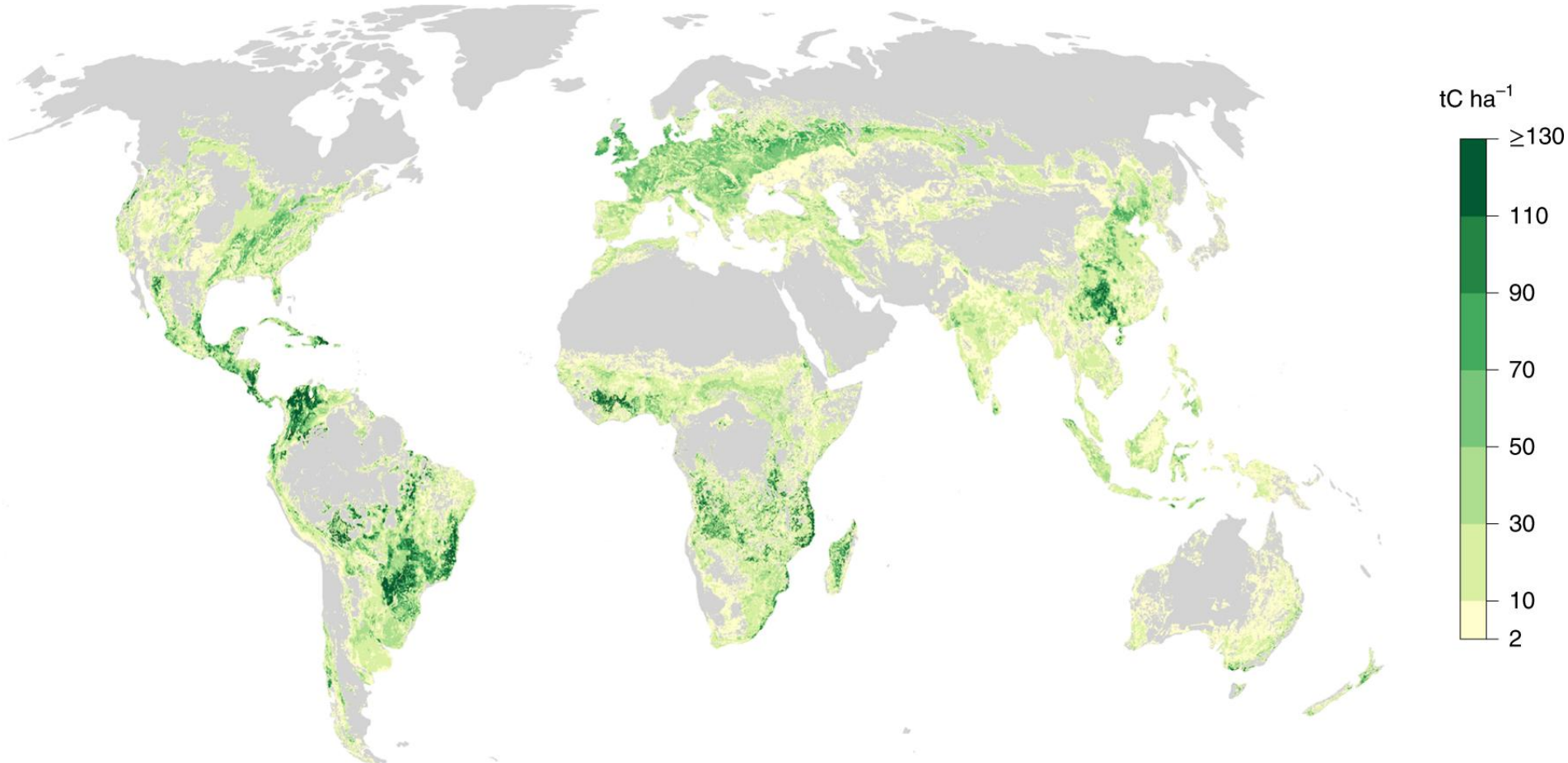
nature sustainability

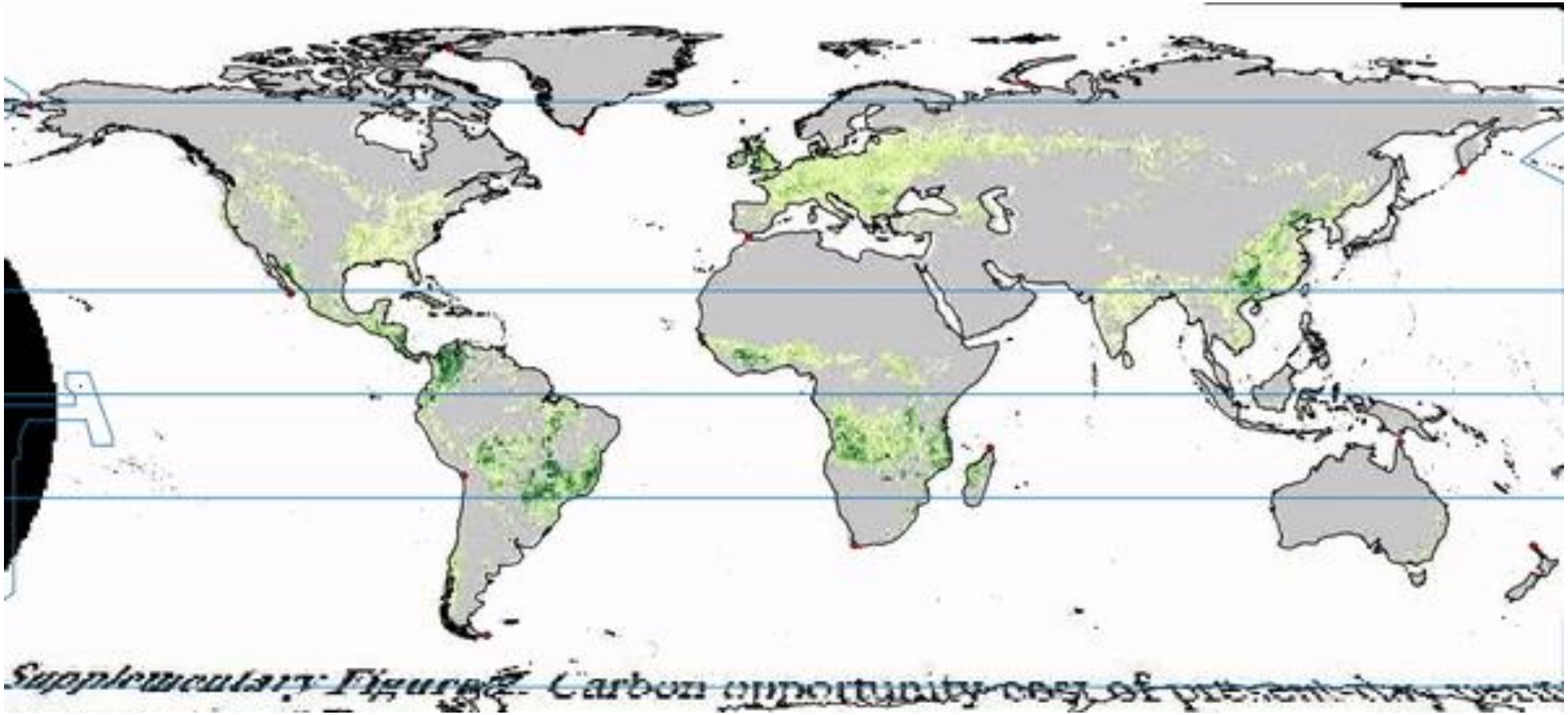
BRIEF COMMUNICATION

https://doi.org/10.1038/s41893-020-00603-4

Check for updates

The carbon opportunity cost of animal-sourced food production on land





Ejemplo: “**pastos permanentes** a bosque”.

¿Quién gana?

- Petroleras
- Aerolíneas
- Automóviles

shifts in global food production to plant-based diets by 2050 could lead to sequestration of 332–547 $GtCO_2$, equivalent to 99–163% of the CO_2 emissions budget consistent with a 66% chance of limiting warming to 1.5 °C.

Cumulative CO_2 emissions (anthropogenic emissions minus removal) must remain below 335 $GtCO_2$ after 2019 to limit warming to 1.5 °C at a 66% likelihood level[14]. CO_2 removal from terrestrial vegetation following ELC or VGN dietary shifts would increase permissible CO_2 emissions by 99% (63%–137%) or 163% (107%–222%), respectively. Adding net CO_2 uptake by native ecosystem soil and litter to this total increases the 1.5 °C budget by 139% or 230%, respectively.





Complejidad y necesidad de transdisciplinariedad



One Earth

Gold Standard for the Global Goals | 1 ton of CO_2 offset

CellPress

Perspective

Toward a holistic understanding of pastoralism

Pablo Manzano,[1,2,16] Daniel Burgas,[3,16] Luis Cadahía,[4,16] Jussi T. Eronen,[2,5,6] Álvaro Fernández-Llamazares,[1,2] Slimane Bencherif,[7] Øystein Holand,[8] Oula Seitsonen,[9,10] Bayarmaa Byambaa,[11] Mikael Fortelius,[12] María E. Fernández-Giménez,[13] Kathleen A. Galvin,[14,15] Mar Cabeza,[1,2,17,*] and Nils Chr. Stenseth[4,*]

[1]Global Change and Conservation Lab, Organismal and Evolutionary Biology Research Programme, Faculty of Biological and Environmental Sciences, University of Helsinki, P.O. Box 65, 00014 Helsinki, Finland
[2]Helsinki Institute of Sustainability Science (HELSUS), Faculty of Biological and Environmental Sciences, University of Helsinki, P.O. Box 65, 00014 Helsinki, Finland
[3]Department of Biological and Environmental Sciences, University of Jyväskylä, 40014 Jyväskylä, Finland
[4]Centre for Ecological and Evolutionary Synthesis (CEES), Department of Biosciences, University of Oslo, P.O. Box 1066 Blindern, 0316 Oslo, Norway
[5]Ecosystems and Environment Research Programme, Faculty of Biological and Environmental Sciences, University of Helsinki, P.O. Box 65, 00014 Helsinki, Finland
[6]BIOS Research Unit, 00170 Helsinki, Finland
[7]Faculty of Nature and Life Sciences, Department of Agronomic and Veterinary Sciences, University of Djelfa, P.O. Box 3117, 17000 Djelfa, Algeria
[8]Faculty of Biosciences, Norwegian University of Life Sciences, 1430 Ås, Norway
[9]Archaeology, Faculty of Humanities, University of Oulu, 90570 Oulu, Finland
[10]Cultural Heritage Studies, Faculty of Arts, University of Helsinki, 00100 Helsinki, Finland
[11]Chair of Land Management, Department of Aerospace and Geodesy, Technical University of Munich, 80333 Munich, Germany
[12]Department of Geosciences and Geography, University of Helsinki, 00014 Helsinki, Finland
[13]Department of Forest & Rangeland Stewardship, Colorado State University, Fort Collins, CO 80523, USA
[14]Department of Anthropology and Geography, Colorado State University, Fort Collins, CO 80523, USA
[15]The Africa Center, Colorado State University, Fort Collins, CO 80523, USA
[16]These authors contributed equally
[17]Lead contact
*Correspondence: mar.cabeza@helsinki.fi (M.C.), n.c.stenseth@mn.uio.no (N.C.S.)

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Review

Global principles in local traditional knowledge: A review of forage plant-livestock-herder interactions

Abolfazl Sharifian [a,b,f,*], Batdelger Gantuya [b,c], Hussein T. Wario [d], Marcin Andrzej Kotowski [e], Hossein Barani [a], Pablo Manzano [f,g,h,i], Saverio Krätli [j], Dániel Babai [k], Marianna Biró [b], László Sáfián [l], Jigjidsüren Erdenetsogt [m], Qorban Mohammad Qabel [n], Zsolt Molnár [b]

¡Gracias por su atención!

+ info:

& @PabloPastos

pablo.manzano@bc3research.org

Agradecimiento a