

# *Fakta versus mýty v chovu skotu a jeho vlivu na klima*

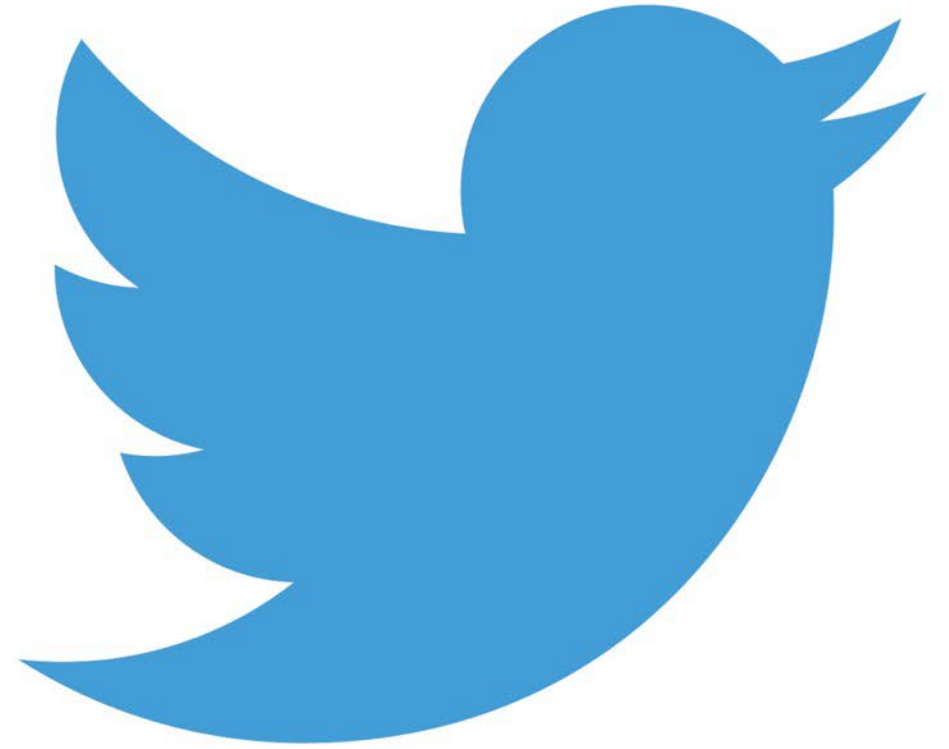
Frank Mitloehner, Professor & Air Quality Specialist, Director, CLEAR Center,  
Department of Animal Science, University of California, Davis, [fmmitloehner@ucdavis.edu](mailto:fmmitloehner@ucdavis.edu)

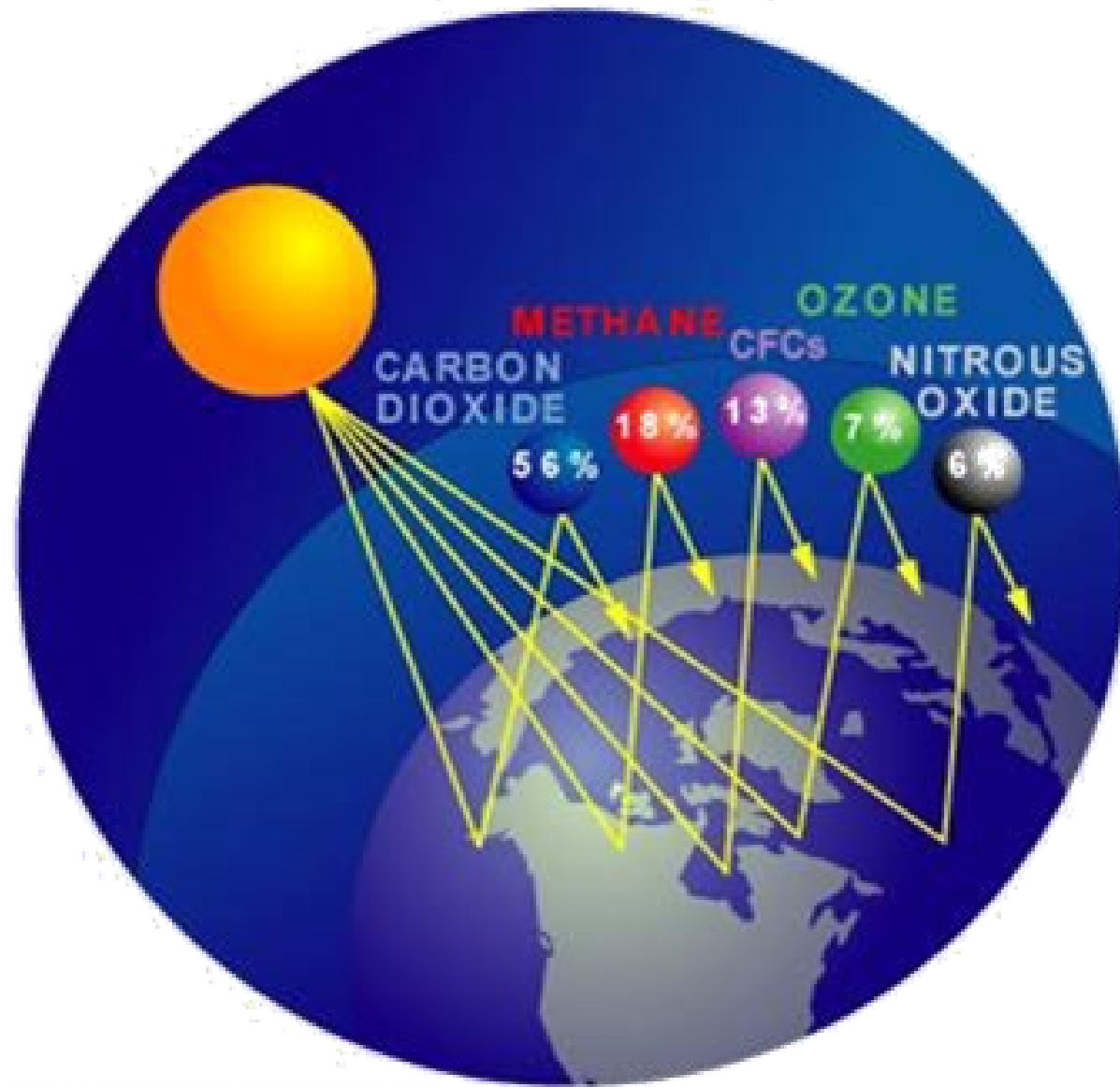


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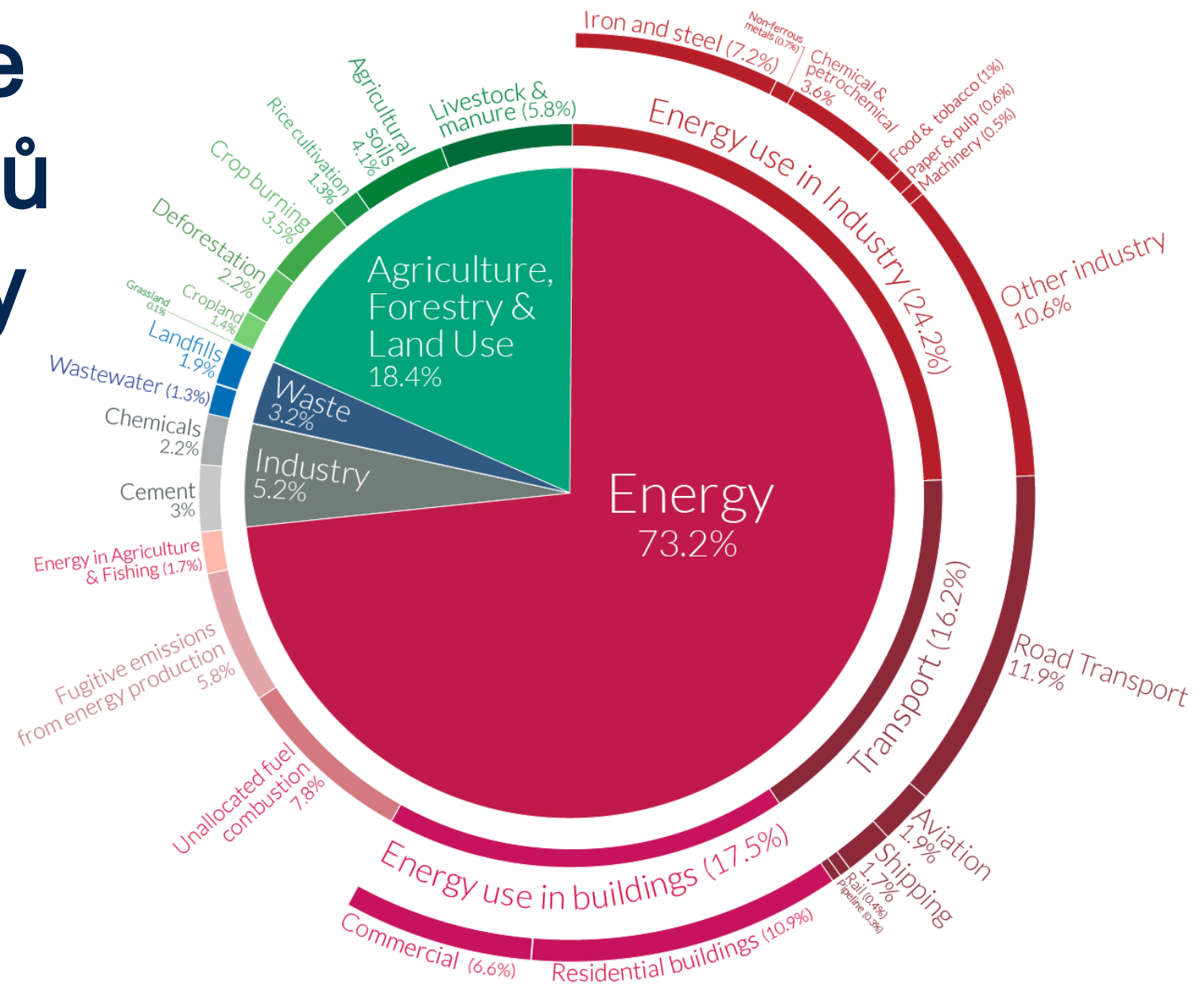
**@GHGGuru**

**@UCDavisCLEAR**



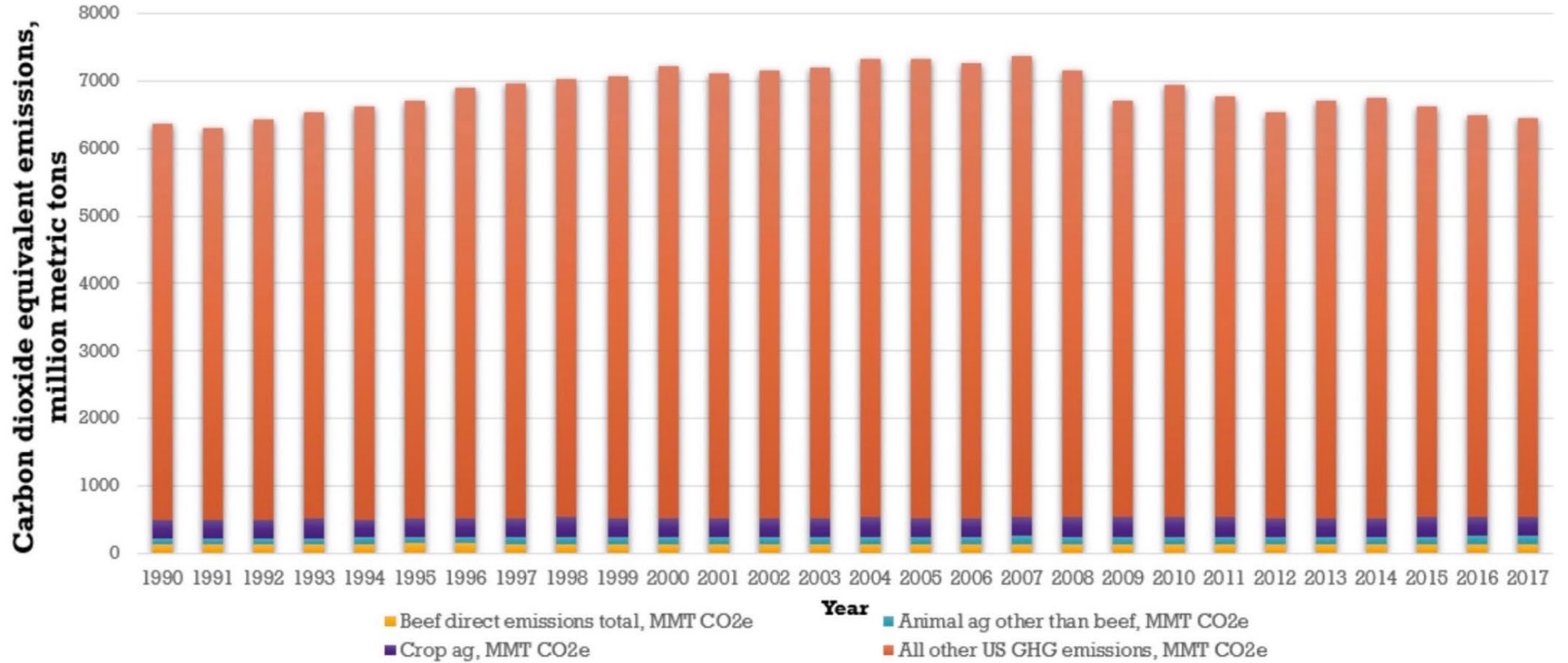


# Globální produkce skleníkových plynů dle sektorů výroby

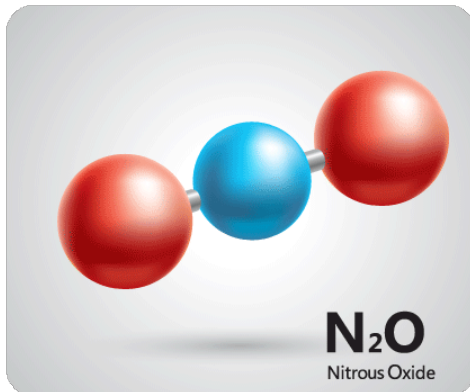
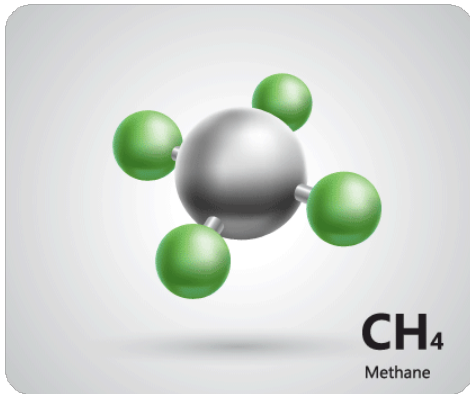
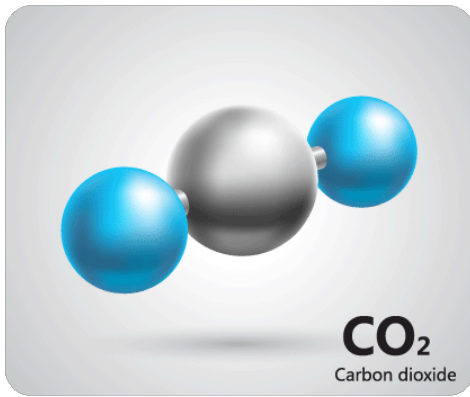


Emise za rok 2016, kdy celkové emise všech skleníkových plynů byly v součtu 49.4 GT (miliard tun) CO<sub>2</sub>eq.

**Trends in US Greenhouse Gas Emissions, 1990 - 2017 (source: EPA GHG Inventory)**



# Global Warming Potential (GWP<sub>100</sub>) (*potenciál globálního oteplování*) hlavních skleníkových plynů



Oxid uhličitý (CO<sub>2</sub>)

1

Metan (CH<sub>4</sub>)

28

Oxid dusný (N<sub>2</sub>O)

265

# GLOBAL METHANE BUDGET

## TOTAL EMISSIONS

558  
(540-568)

CH<sub>4</sub> ATMOSPHERIC  
GROWTH RATE

10  
(9.4-10.6)

## TOTAL SINKS

548  
(529-555)

105  
(77-133)

188  
(115-243)

34  
(15-53)

167  
(127-202)

64  
(21-132)

515  
(510-583)

33  
(28-38)

Fossil fuel  
production and use

Agriculture and waste

Biomass  
burning

Wetlands

Other natural  
emissions

Geological, lakes, termites,  
oceans, permafrost

Sink from  
chemical reactions  
in the atmosphere

Sink in soils

## EMISSIONS BY SOURCE

In million-tons of CH<sub>4</sub> per year ( Tg CH<sub>4</sub> / yr), average 2003-2012

Anthropogenic fluxes

Natural fluxes

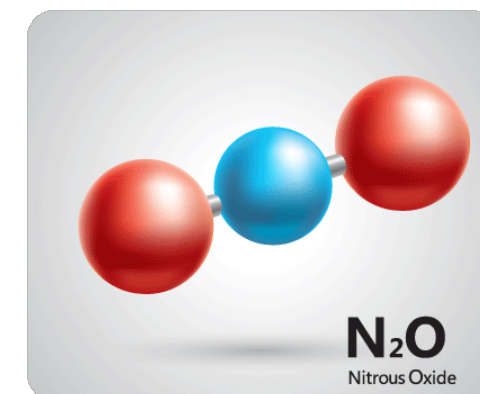
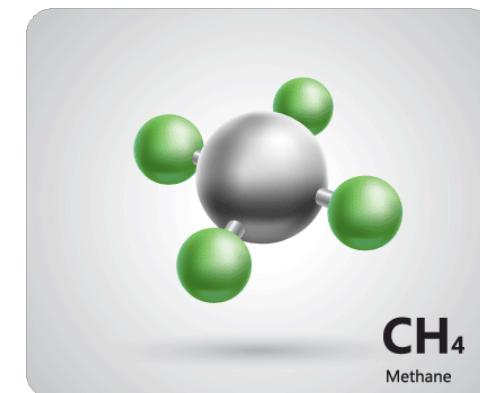
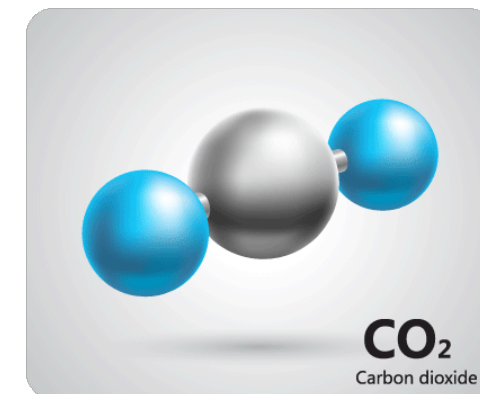
Natural and anthropogenic

# Poločas rozpadu hlavních skleníkových plynů v jednotce roků

Oxid uhličitý (CO<sub>2</sub>) 1000

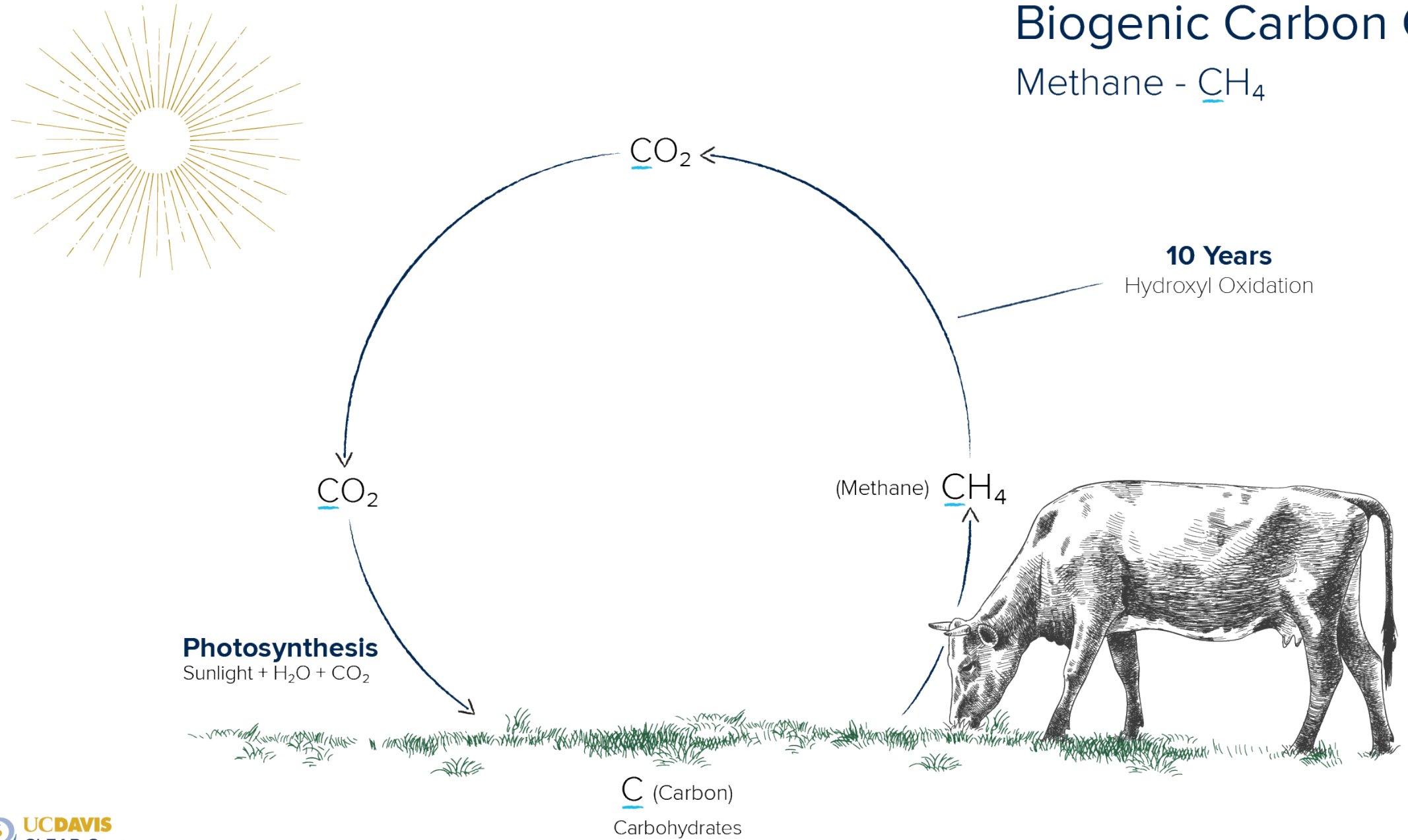
Metan (CH<sub>4</sub>) 12

Oxid dusný (N<sub>2</sub>O) 110



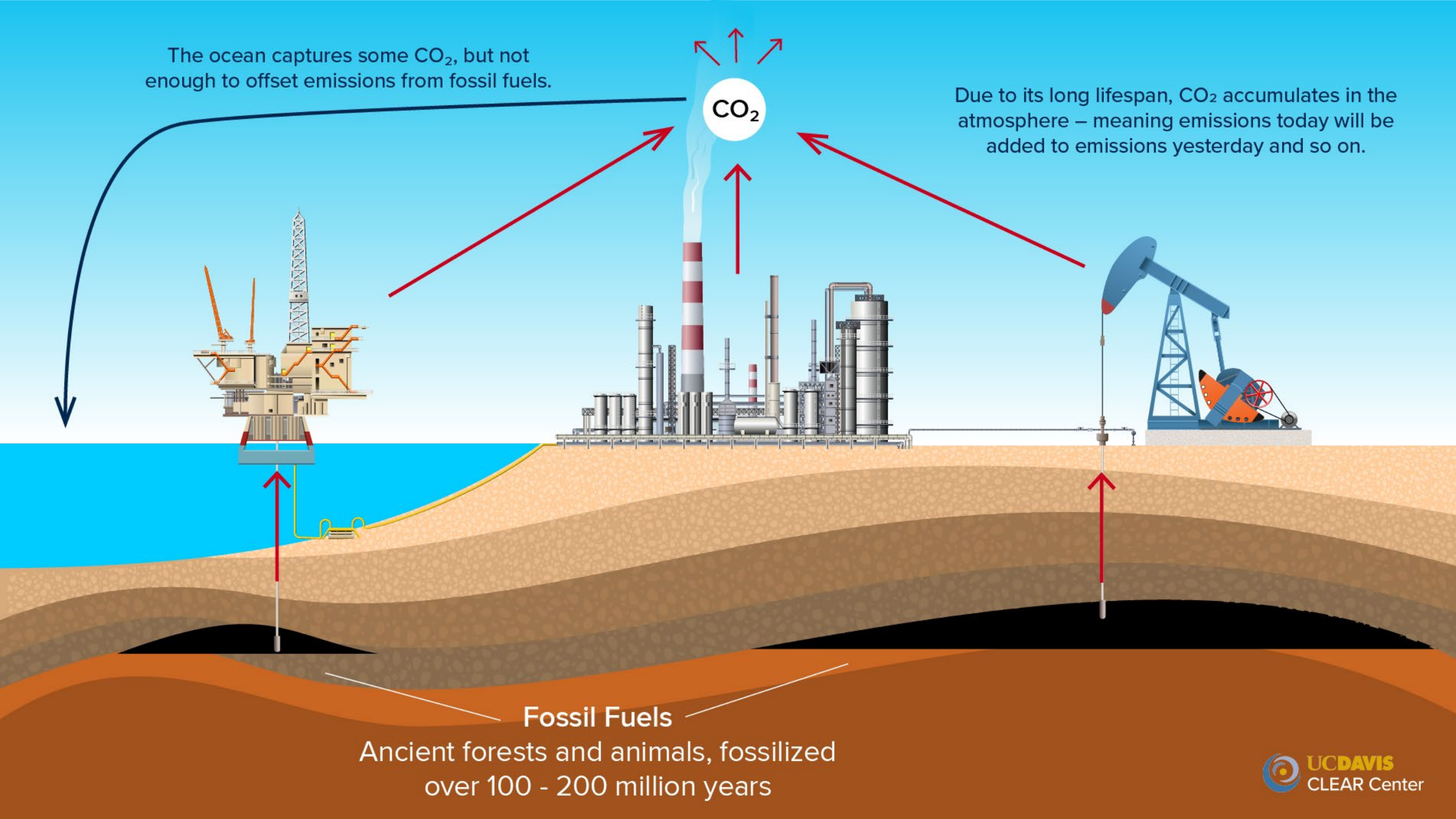
# Biogenic Carbon Cycle

Methane -  $\text{CH}_4$



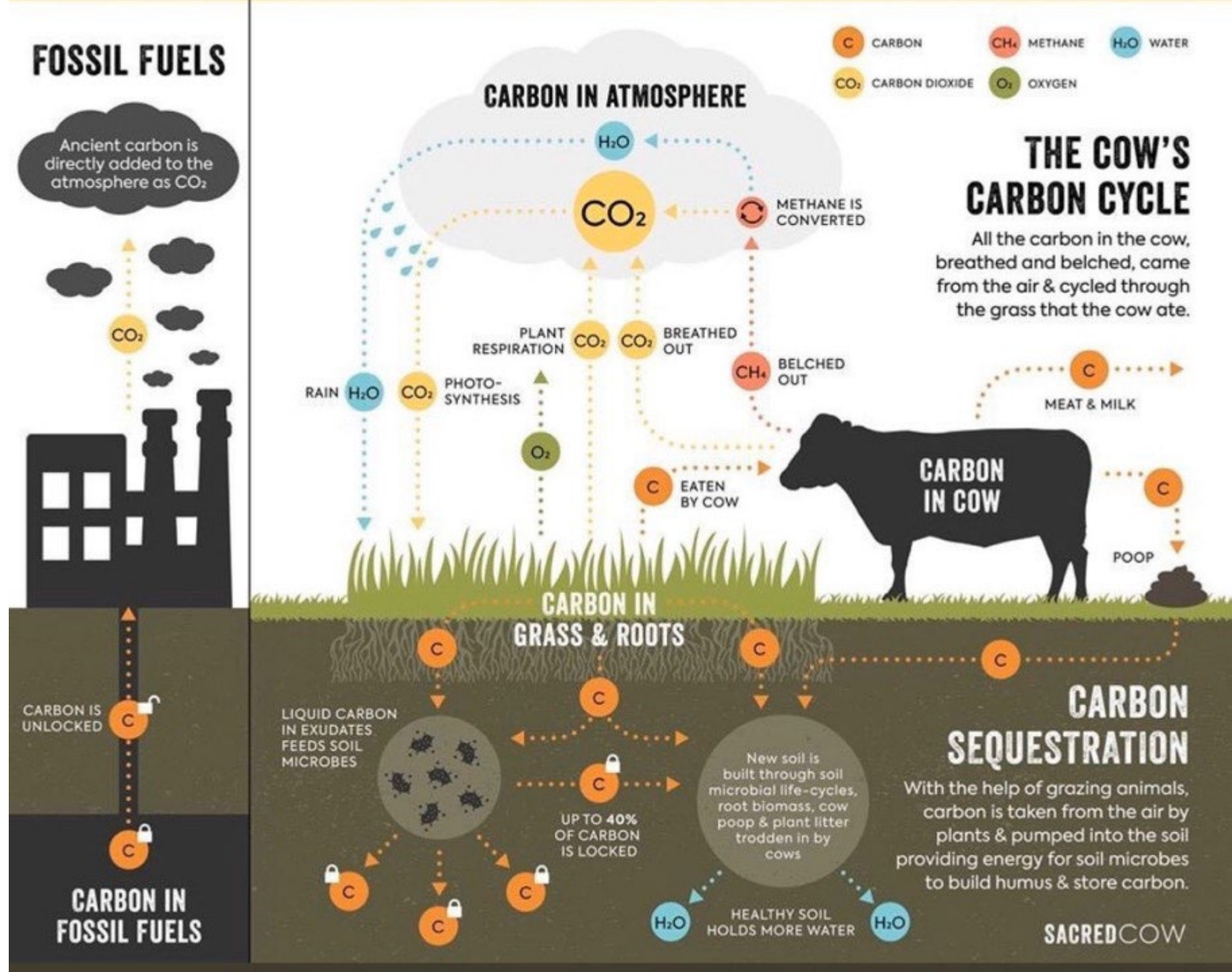
The ocean captures some CO<sub>2</sub>, but not enough to offset emissions from fossil fuels.

Due to its long lifespan, CO<sub>2</sub> accumulates in the atmosphere – meaning emissions today will be added to emissions yesterday and so on.



**Fossil Fuels**  
Ancient forests and animals, fossilized  
over 100 - 200 million years

# Fossilní vs. Biogenní cyklus uhlíku



■ = Pulse of CO<sub>2</sub>

Stock  
Gas  
Carbon dioxide  
(CO<sub>2</sub>)

Atmospheric  
Concentration

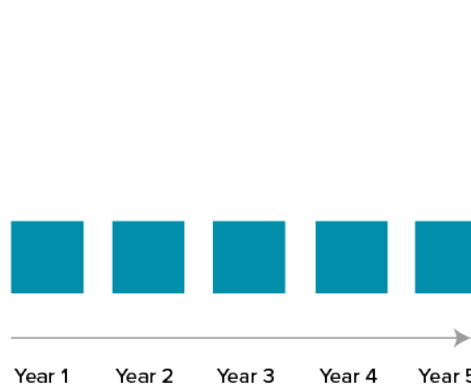


Stock gases will accumulate over time, because they stay in the environment.

■ = Pulse of CH<sub>4</sub>

Flow  
Gas  
Methane (CH<sub>4</sub>)

Atmospheric  
Concentration



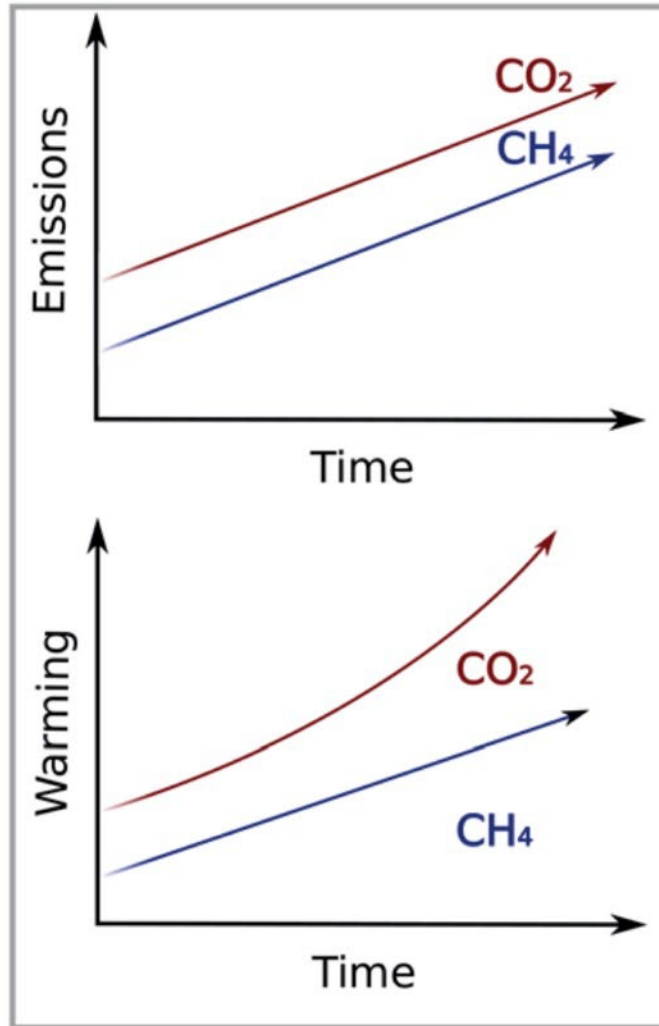
Flow gases will stay stagnant, as they are destroyed at the same rate of emission.



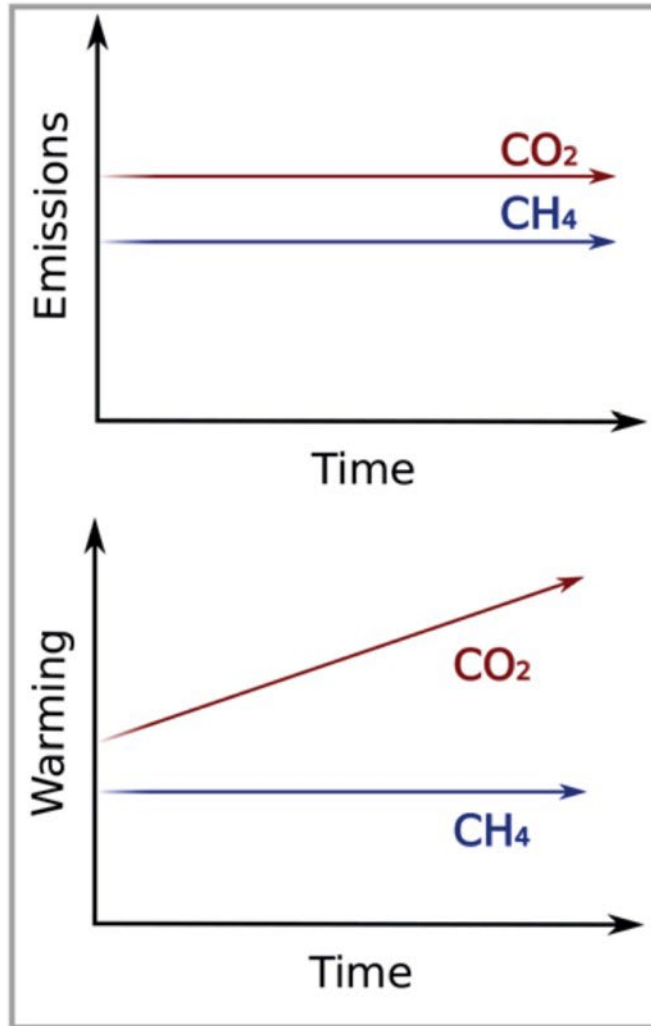
CO<sub>2</sub>

CH4

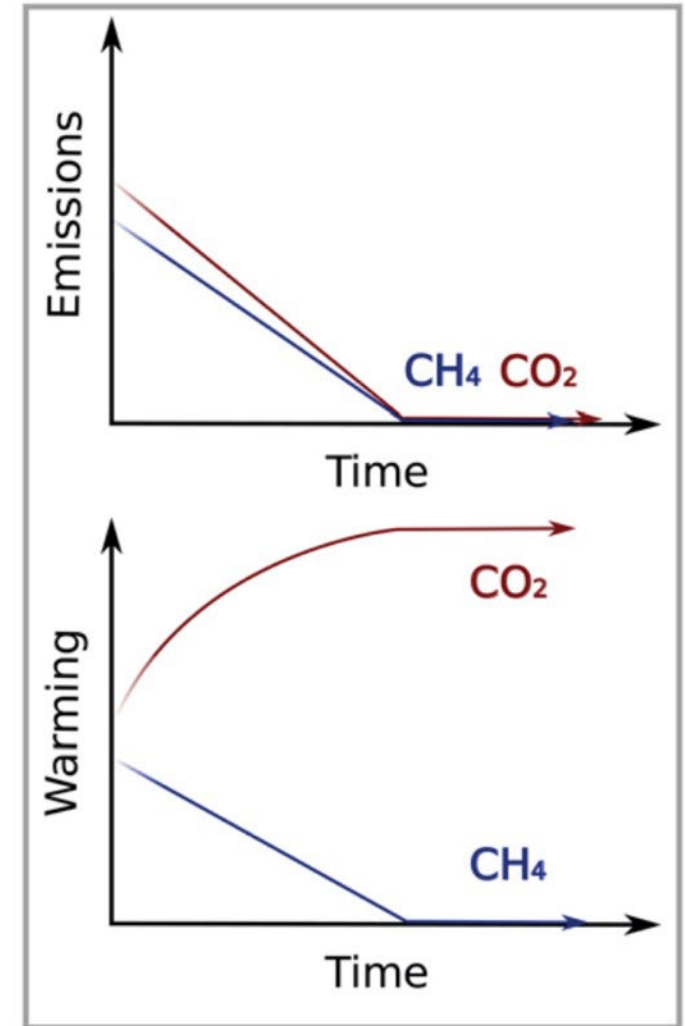
### Rising emissions



### Constant emissions



### Falling emissions



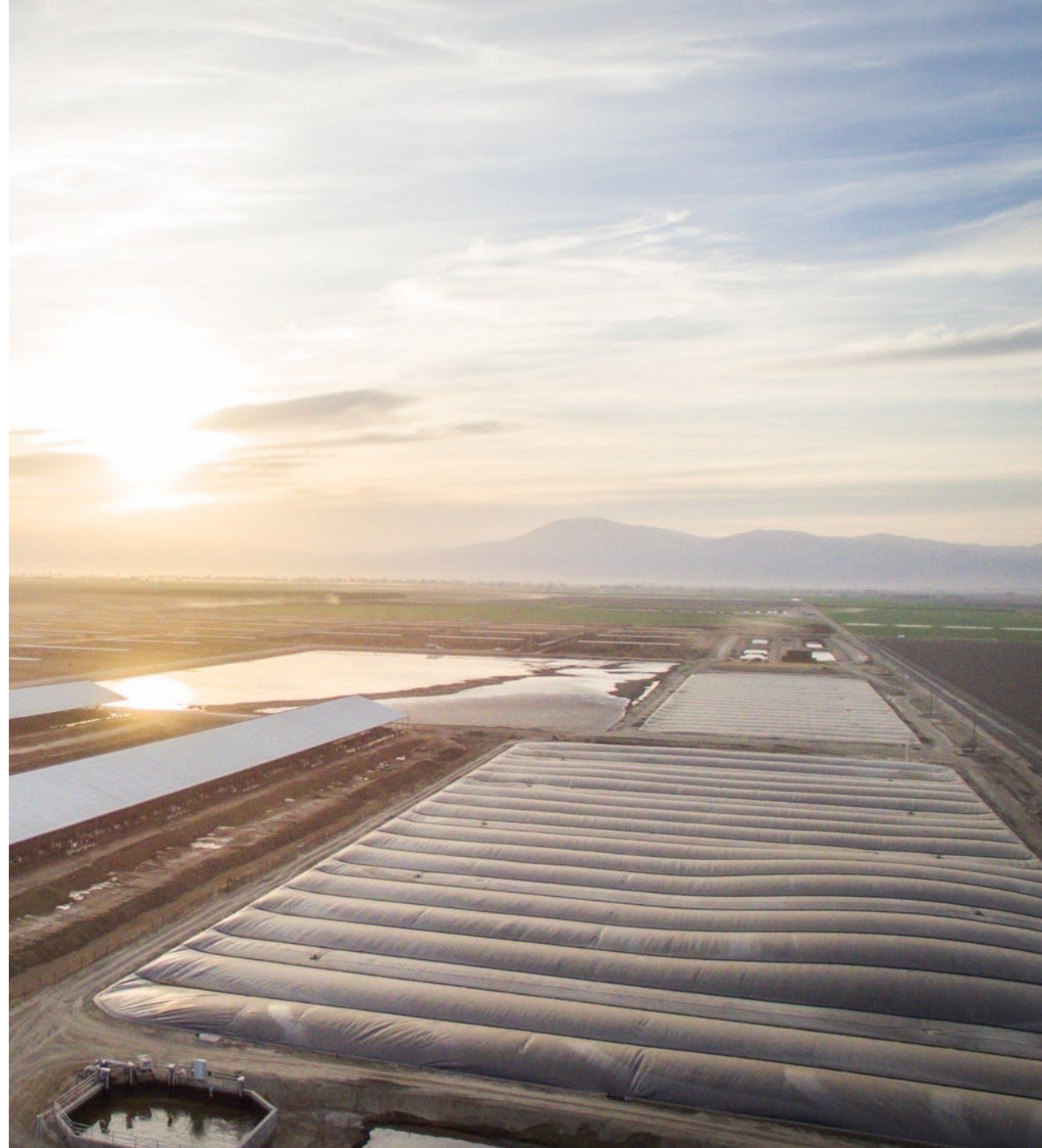
# Kalifornské mléčné farmy by měly dosáhnout úplné 40% redukce do roku 2030 = 7.2 MMT CO<sub>2</sub>e

- Poklesy stavu skotu- 2.6 to 3.3 MMT CO<sub>2</sub>e/rok
- Alternativní využití kejdy- 0.6 and 1.1 MMT CO<sub>2</sub>e/rok
- Jímače plynů nad lagunou s výkaly a močí- 4 MMT CO<sub>2</sub>e/rok
- Krmná aditiva— 250 000 MTCO<sub>2</sub>e - 2 MMT CO<sub>2</sub>e/rok

# Kalifornské trendy vývoje GHG (GHG – skleníkové plyny)

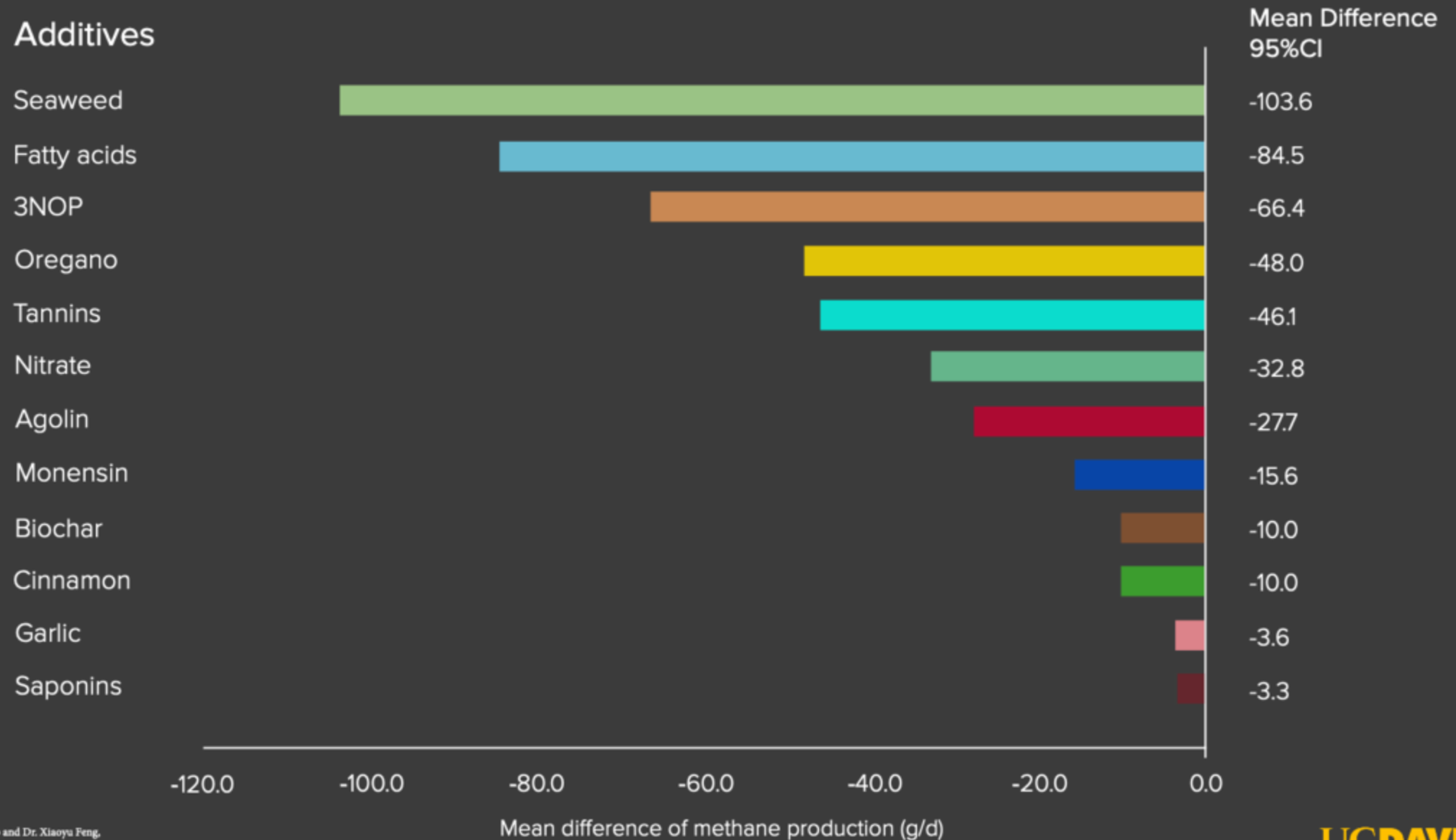
Od roku 2015 do 2024  
kalifornské farmy snížily  
produkci metanu do  
roku již o

**2.5 millionů metrických  
tun CO<sub>2</sub>e ročně.**





# Methane Reductions from Feed Additives



# Jiné možnosti redukce metanu

- Bolus pro přežvýkavce od firmy BioTech's CALM slibuje, že je schopen redukovat metan až o 70 %.
- Bolus leží v bachoru zvířat a inhibuje produkci metanu.
- Společnost z Nového Zélandu plánuje komerční využití již v roce 2025.



Review

## *Invited review:* Current enteric methane mitigation options

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Chaouki Benchaar<sup>7</sup>, Alexandre Berndt<sup>8</sup>, Rogerio M. Mauricio<sup>9</sup>,  
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<https://doi.org/10.3168/jds.2022-22091> 

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# Možnosti snižování enterického metanu?

- Vyšší produktivita zvířat
- Selektce zvířat na nižší produkci metanu
- Úpravy krmné dávky
- Objemná krmiva
- Ovlivnění bachorové fermentace
- Strategie včasného zmírňování

NEW PAPER

# Meeting the Call: How California is Pioneering a Pathway to Significant Dairy Sector Methane Reduction



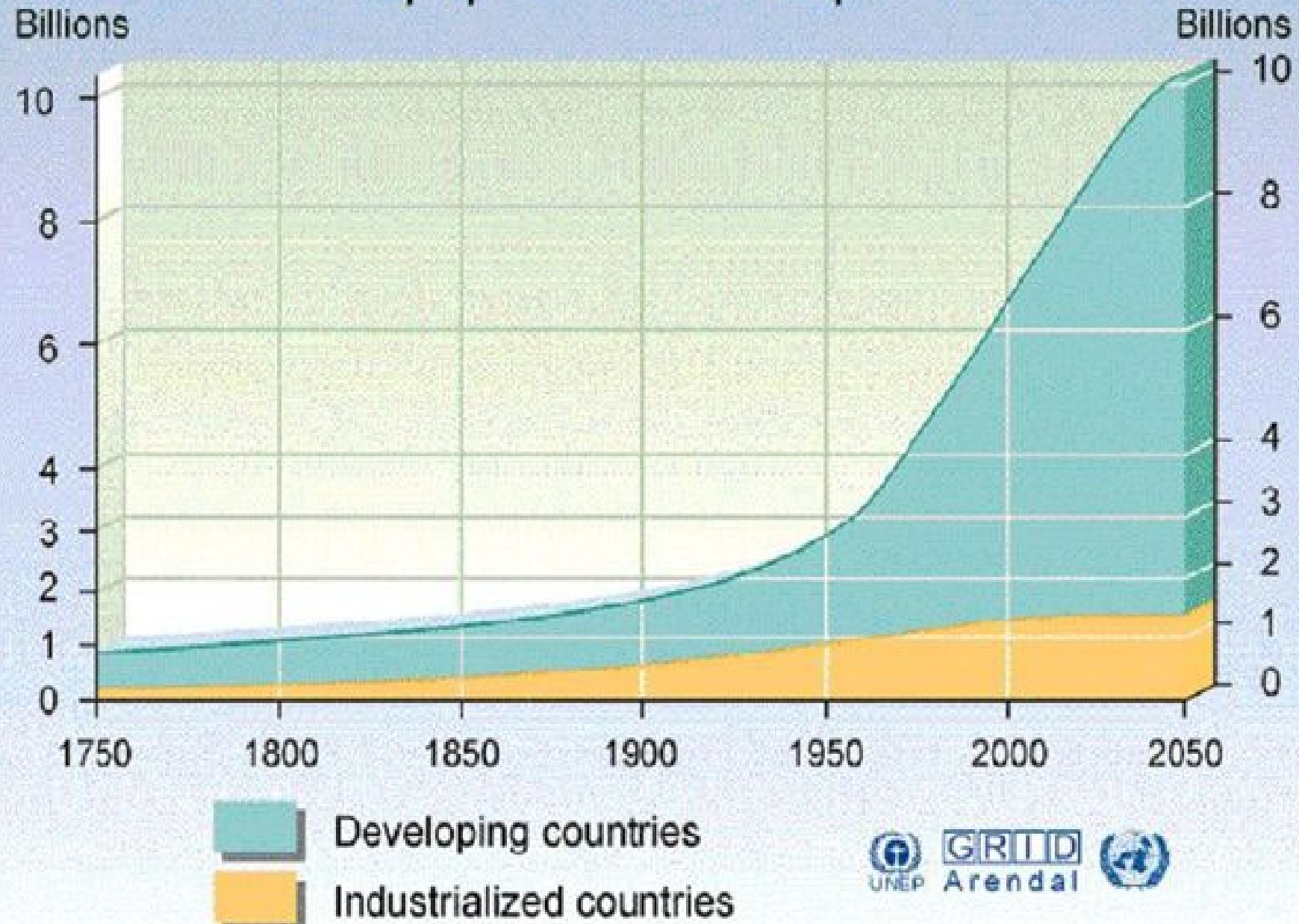
Use your cellphone camera to scan the QR code and take you to the article.

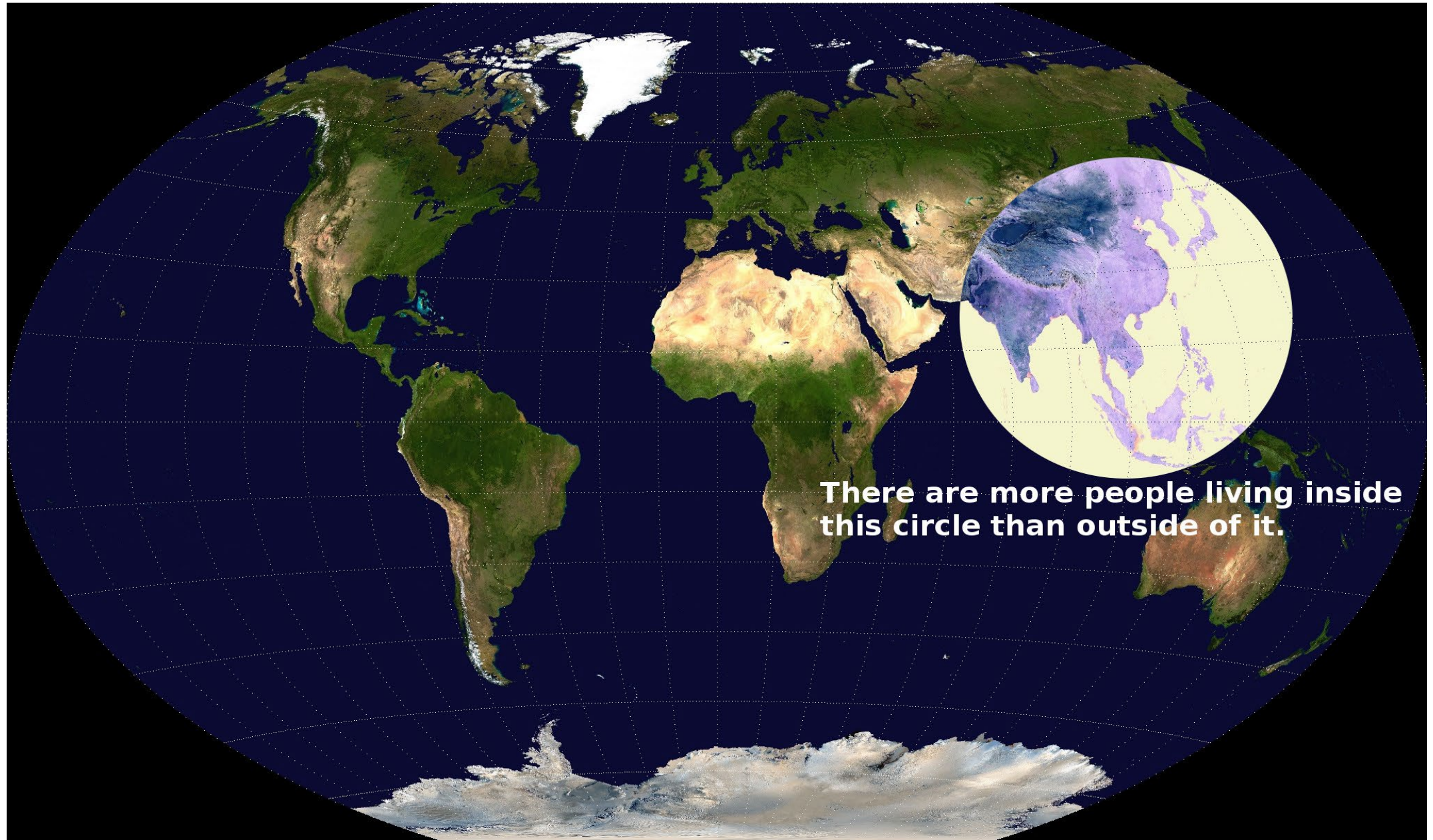
[https:// bit.ly/pathwayclear](https://bit.ly/pathwayclear)



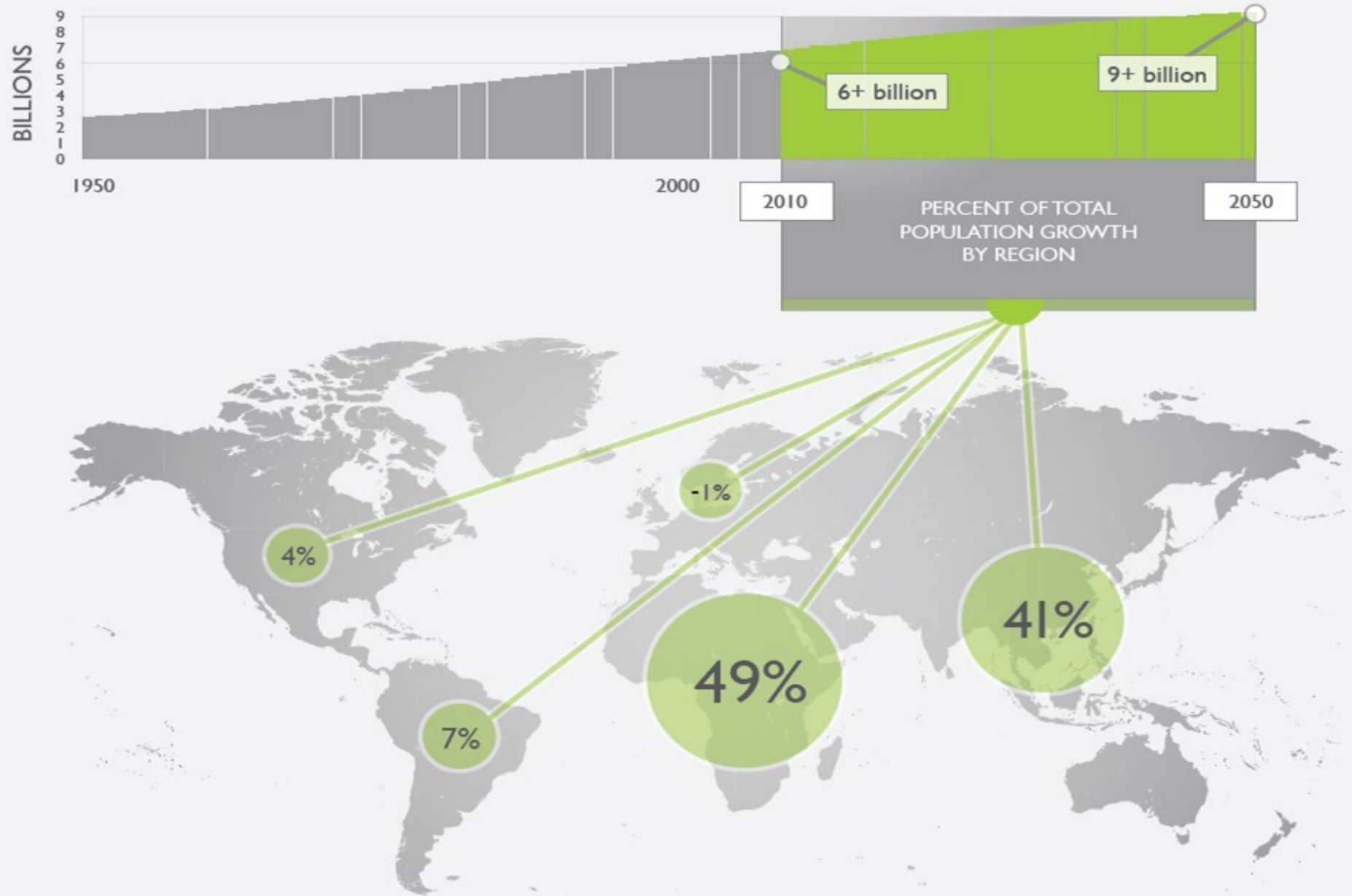
Find the summary and paper online at [le ar.ucdavis.edu](http://le ar.ucdavis.edu)

# World population development

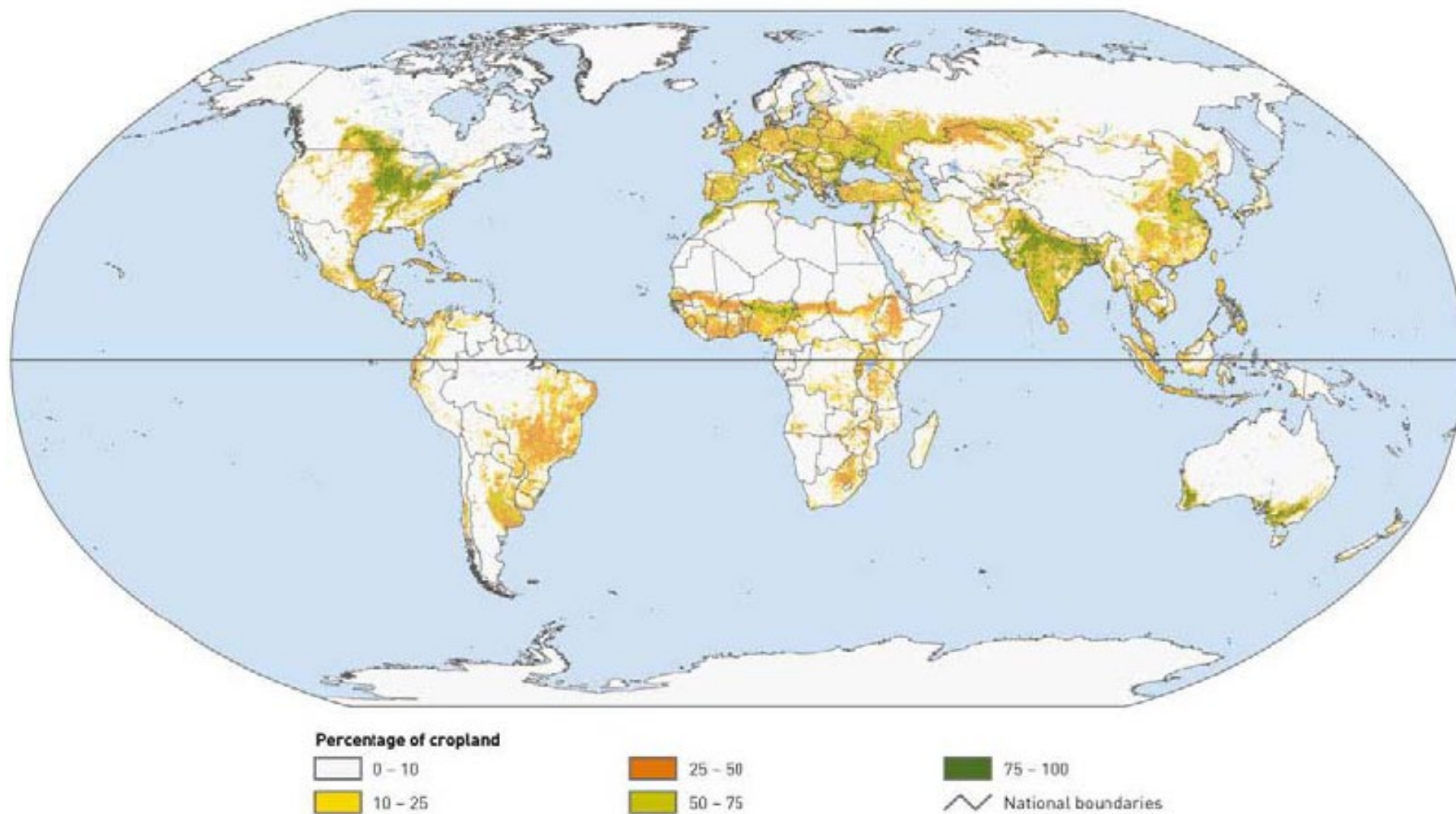


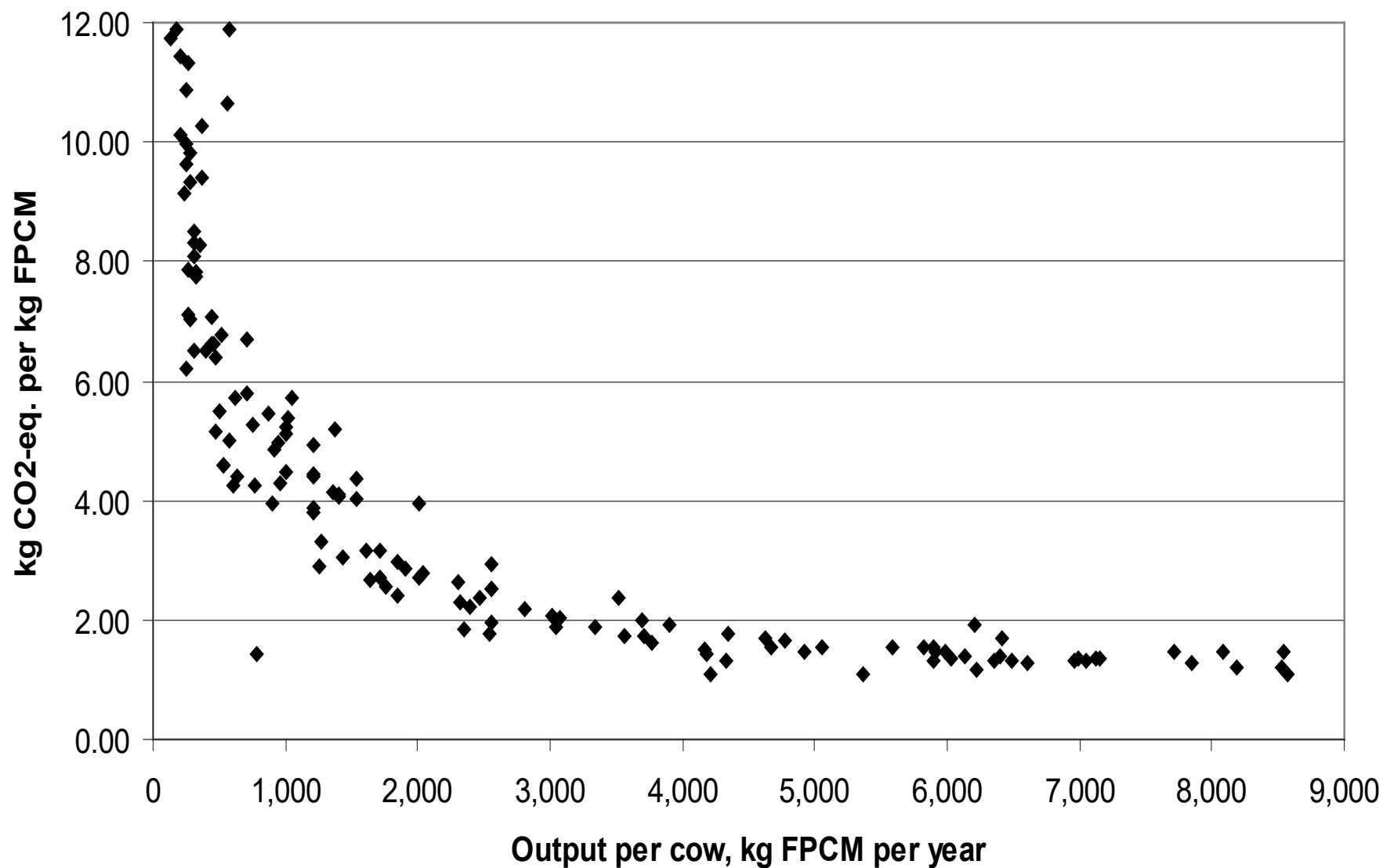


**There are more people living inside  
this circle than outside of it.**

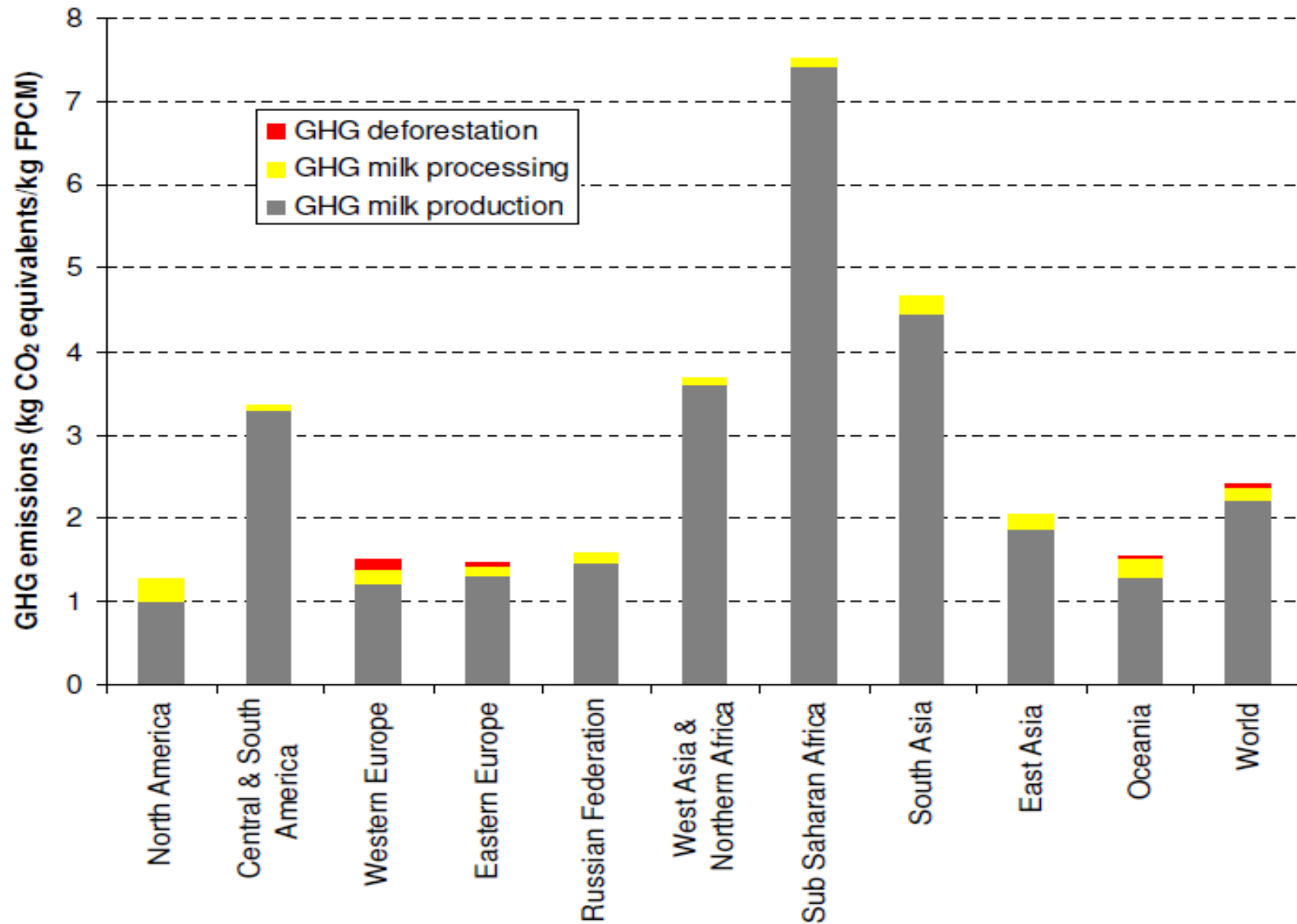


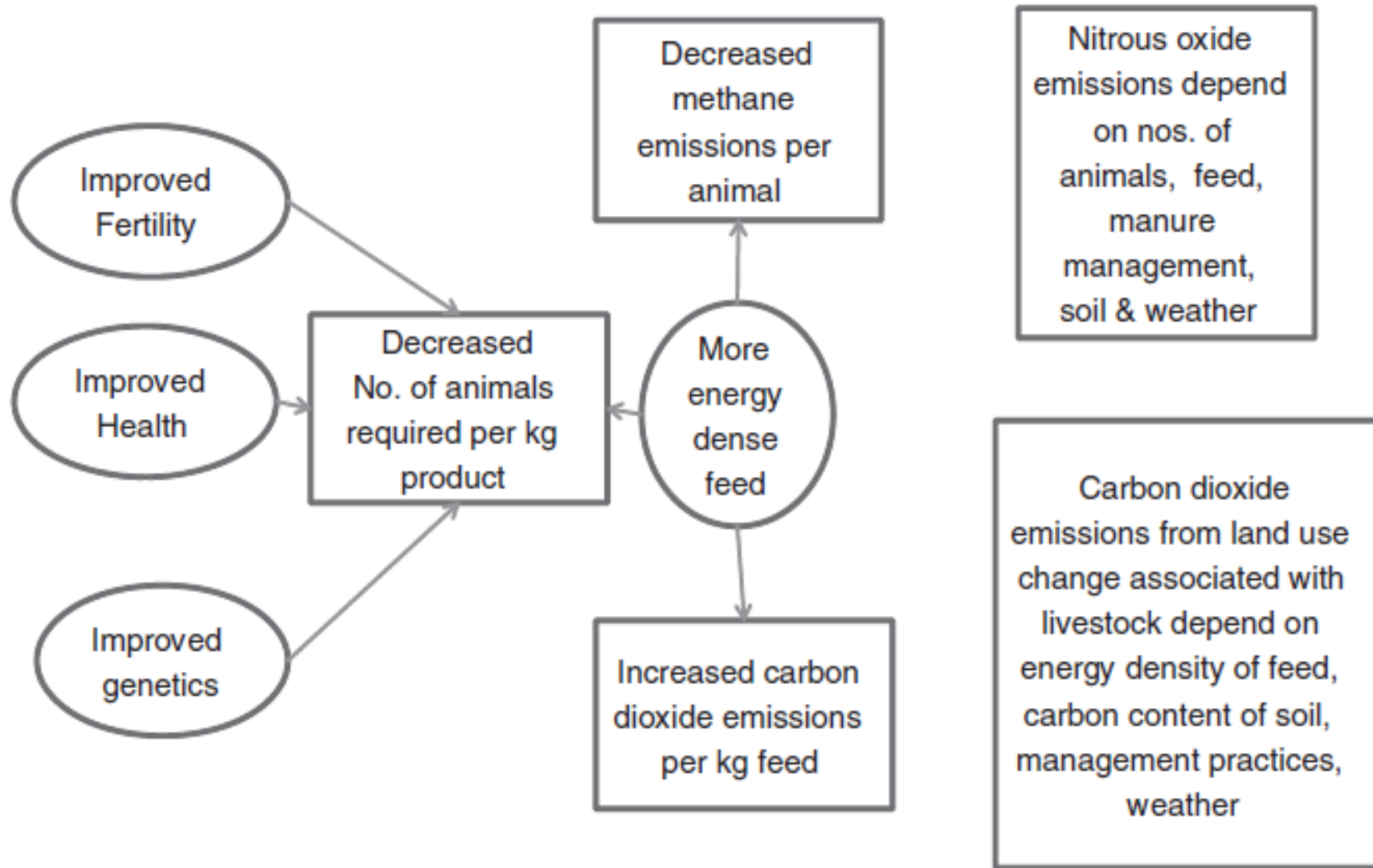
# Distribuce orné půdy na světě





Vztah mezi  
emisemi všech  
skleníkových  
plynů (GHG) a  
mléčným  
nádojem na  
krávu dle země.





# Zmírňování zásahy ke zlepšení produktivity

# Trendy masného skotu v USA

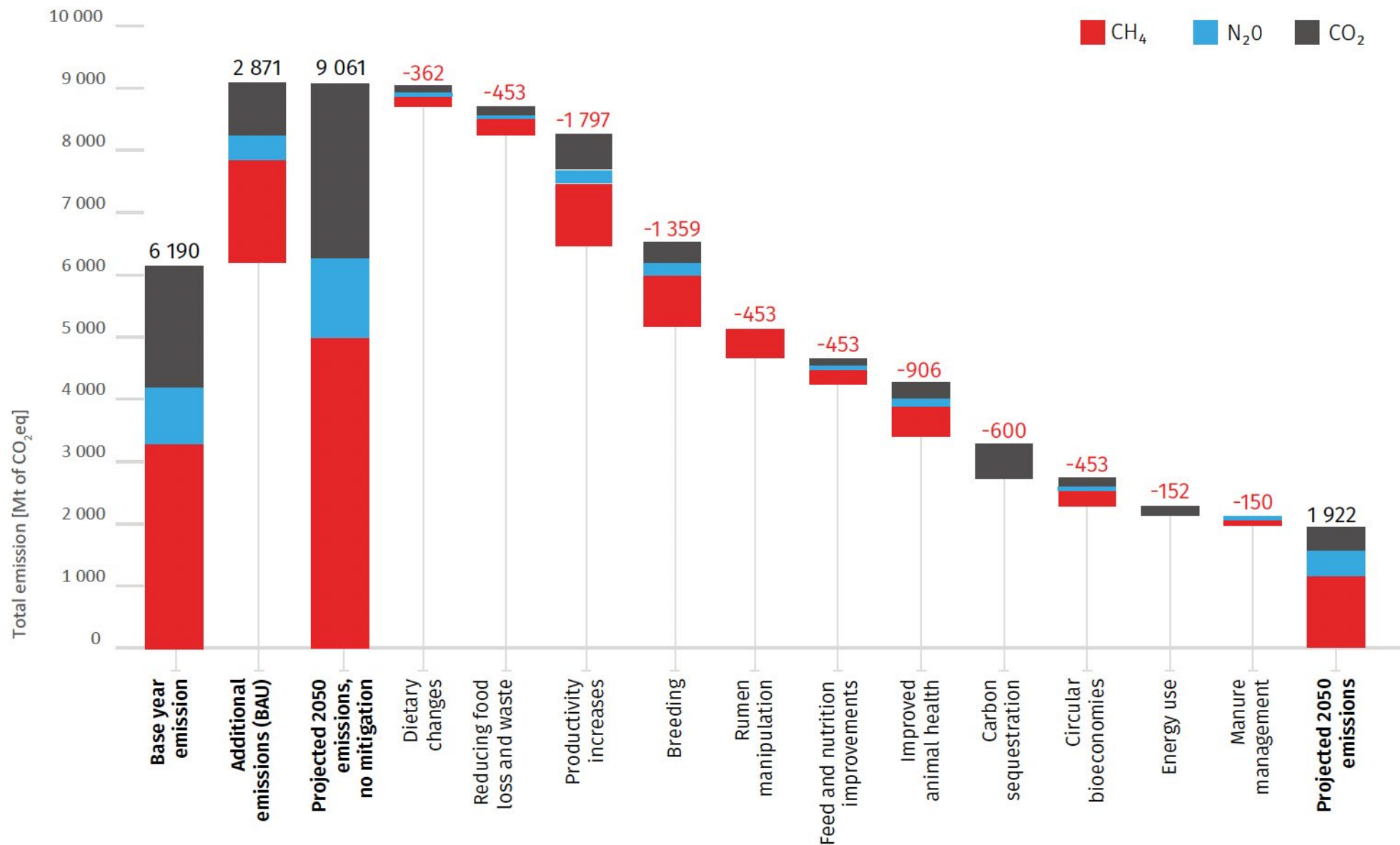
- V roce 1970 bylo v USA 140 milionů ks masného skotu
- V porovnání je dnes 90 milionů kusů
- Jak v roce 1970, tak ve 2010 jsme produkovali shodně 24 milionů tun hovězího masa.





# Trendy mléčného skotu v USA

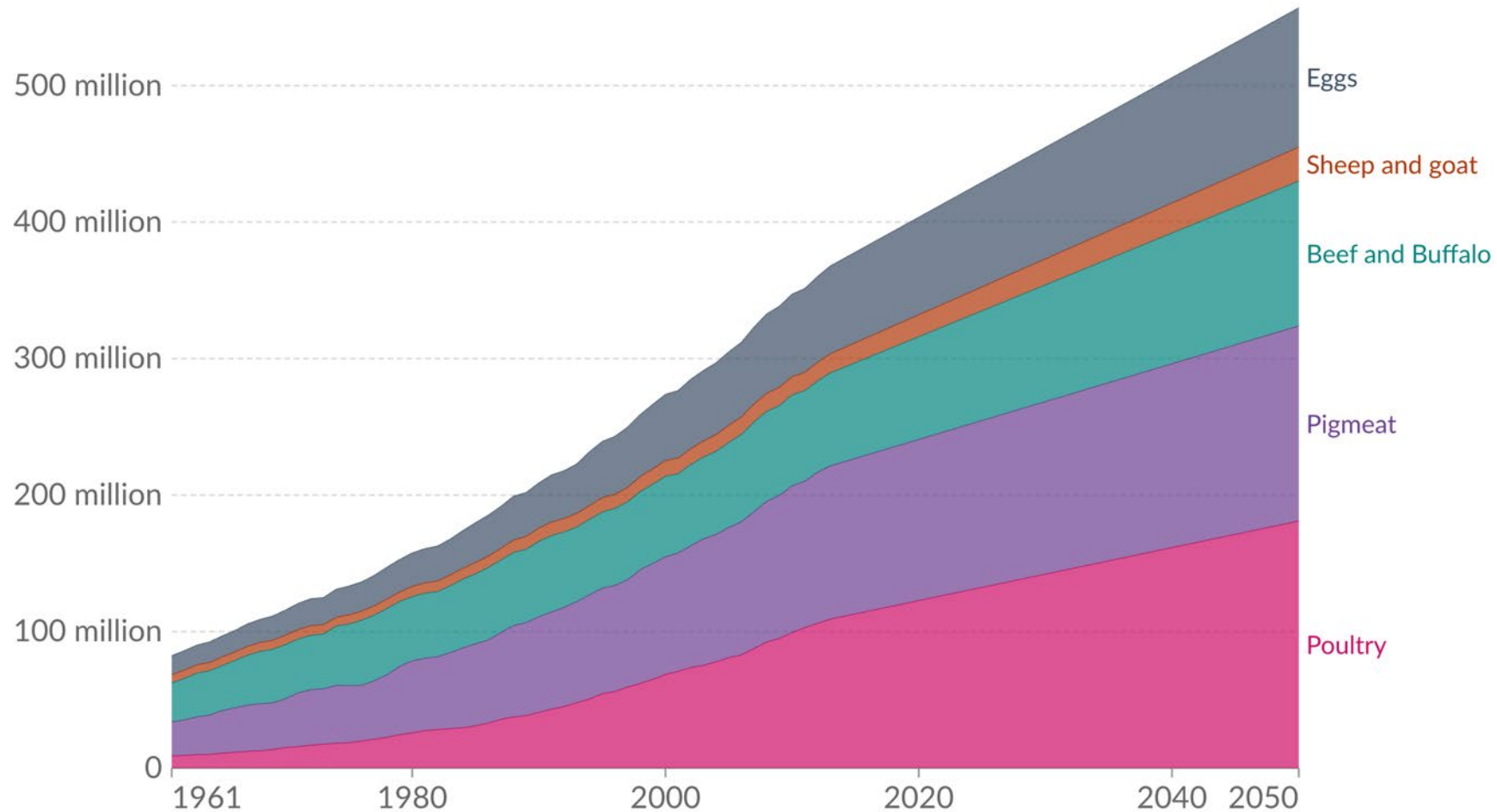
- V roce 1950 byla v USA 25 milionů mléčných krav. Dnes máme 9 milionů.
- I se stavem skotu o 16 milionů ks méně (1950 vs 2018) se mléčná produkce navýšila o 60 procent.
- Uhlíková stopa jedné sklenice mléka je dnes o 2/3 nižší, než byla před 70 lety.



Base year and projected emissions from livestock systems shown as a waterfall chart with a range of mitigation measures applied to 2050 with their technical potential. From: [Pathways towards lower emissions – A global assessment of the greenhouse gas emissions and mitigation options from livestock agrifood systems](#).

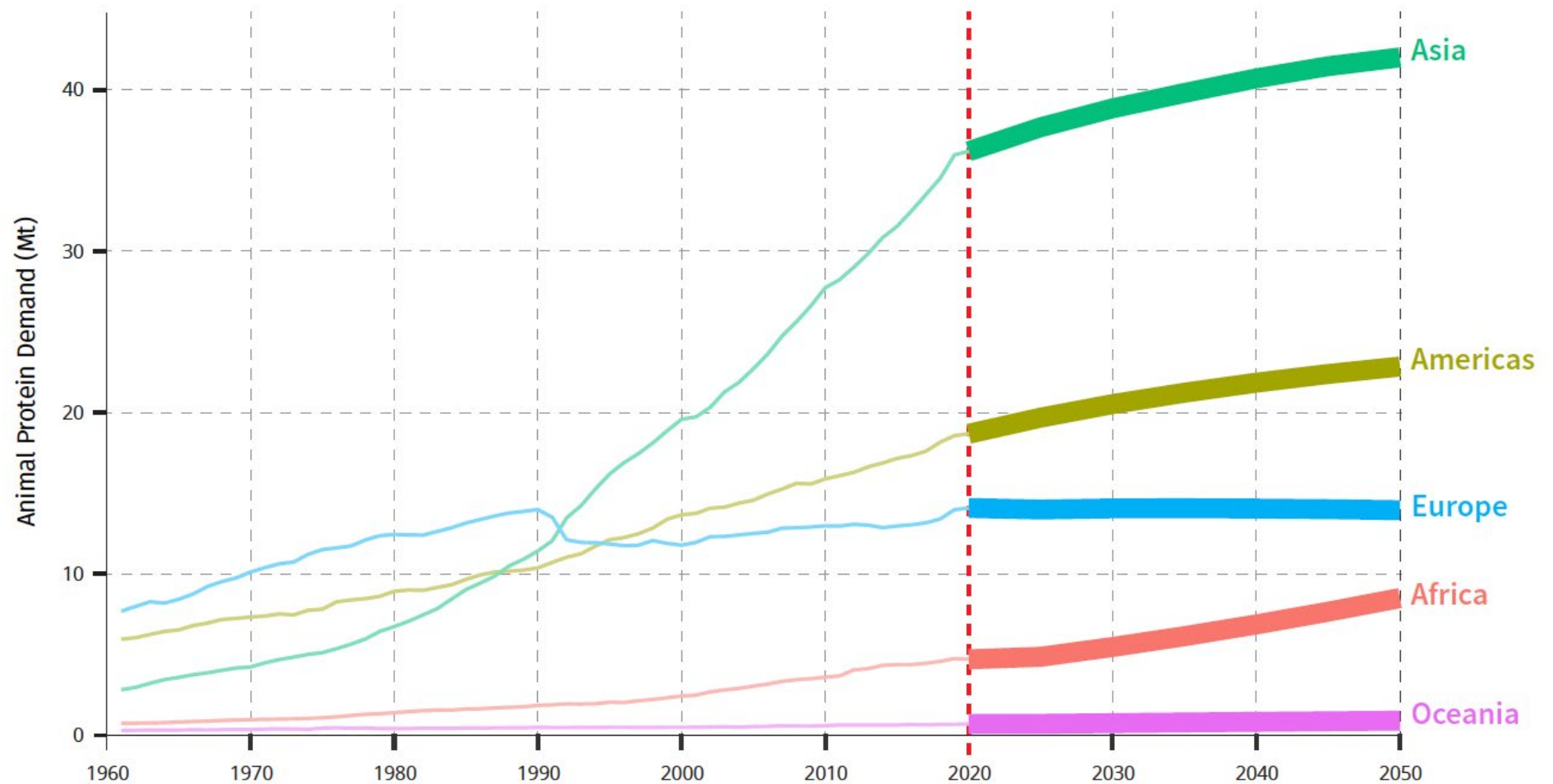
# Global meat consumption, World, 1961 to 2050

Expressed in tonnes of meat. Data from 1961-2013 is based on published FAO estimates; from 2013-2050 based on FAO projections. Projections are based on future population projections and the expected impacts of regional and national economic growth trends on meat consumption.



Data source: Food and Agriculture Organization of the United Nations

[OurWorldInData.org/meat-production](https://OurWorldInData.org/meat-production) | CC BY

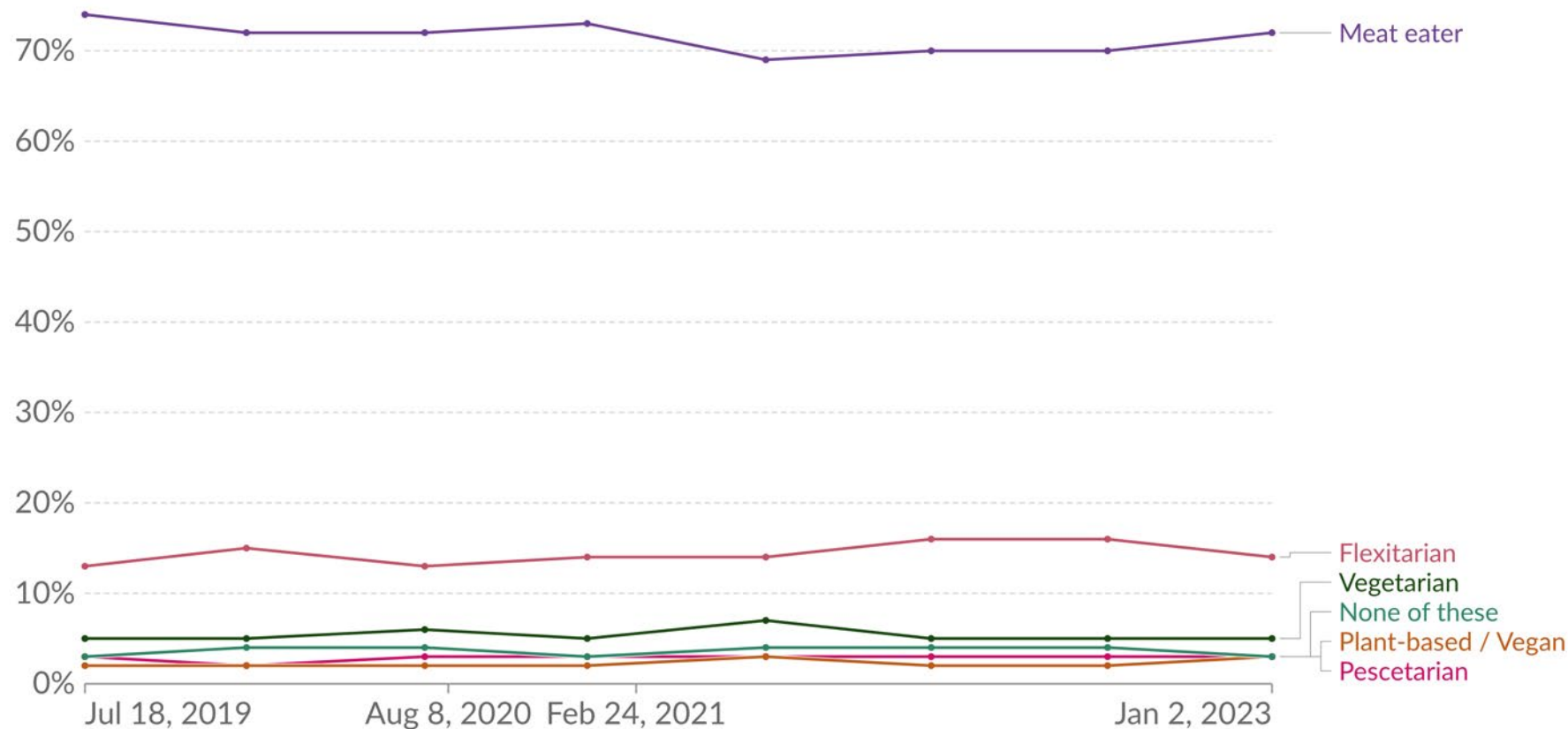


Historical and projected demand for animal products. Source: Based on FAOSTAT food balance sheets and the projected demand from FAO. 2018b. The future of food and agriculture: Alternative pathways to 2050. Rome. [https://www.fao.org/global-perspectivesstudies/resources/detail/en/c/1157074/Pathways towards lower emissions – A global assessment of the greenhouse gas emissions and mitigation options from livestock agrifood systems](https://www.fao.org/global-perspectivesstudies/resources/detail/en/c/1157074/Pathways%20towards%20lower%20emissions%20-%20A%20global%20assessment%20of%20the%20greenhouse%20gas%20emissions%20and%20mitigation%20options%20from%20livestock%20agrifood%20systems) .

## Vegans, vegetarians and meat-eaters: self-reported dietary choices, United Kingdom, All adults, Jul 18, 2019 to Jan 2, 2023

Our World  
in Data

- Flexitarian: mainly vegetarian, but occasionally eat meat or fish.
- Pescetarian: eat fish but do not eat meat or poultry.
- Vegetarian: do not eat any meat, poultry, game, fish, or shellfish.
- Plant-based / Vegan: do not eat dairy products, eggs, or any other animal product.



Diet choices  
in the UK

Data source: YouGov (2023).

[OurWorldInData.org/meat-production](https://ourworldindata.org/meat-production) | CC BY

Note: Based on biannual survey data of adults aged 18 years and older. Around 2000 adults are included per survey.

Edouard Mathieu and Hannah Ritchie (2022) - "What share of people say they are vegetarian, vegan, or flexitarian?" Published online at [OurWorldInData.org](https://ourworldindata.org/vegetarian-vegan). Retrieved from: 'https://ourworldindata.org/vegetarian-vegan' [Online Resource]

# Můžeme se „projít“ skrze klimatickou krizi ?

- Všežravec proti veganovi (ročně) = 0.8 tun CO<sub>2</sub>e méně (Wynes & Nicholas, 2017)
- Jeden trans-atlantický let (na 1 pasažéra) = 1.6 tun CO<sub>2</sub>e (Wynes & Nicholas, 2017)
- Tzv. „bezmasé pondělky“ (celé USA) = 0.3 % redukce GHG (Hall & White, 2017)



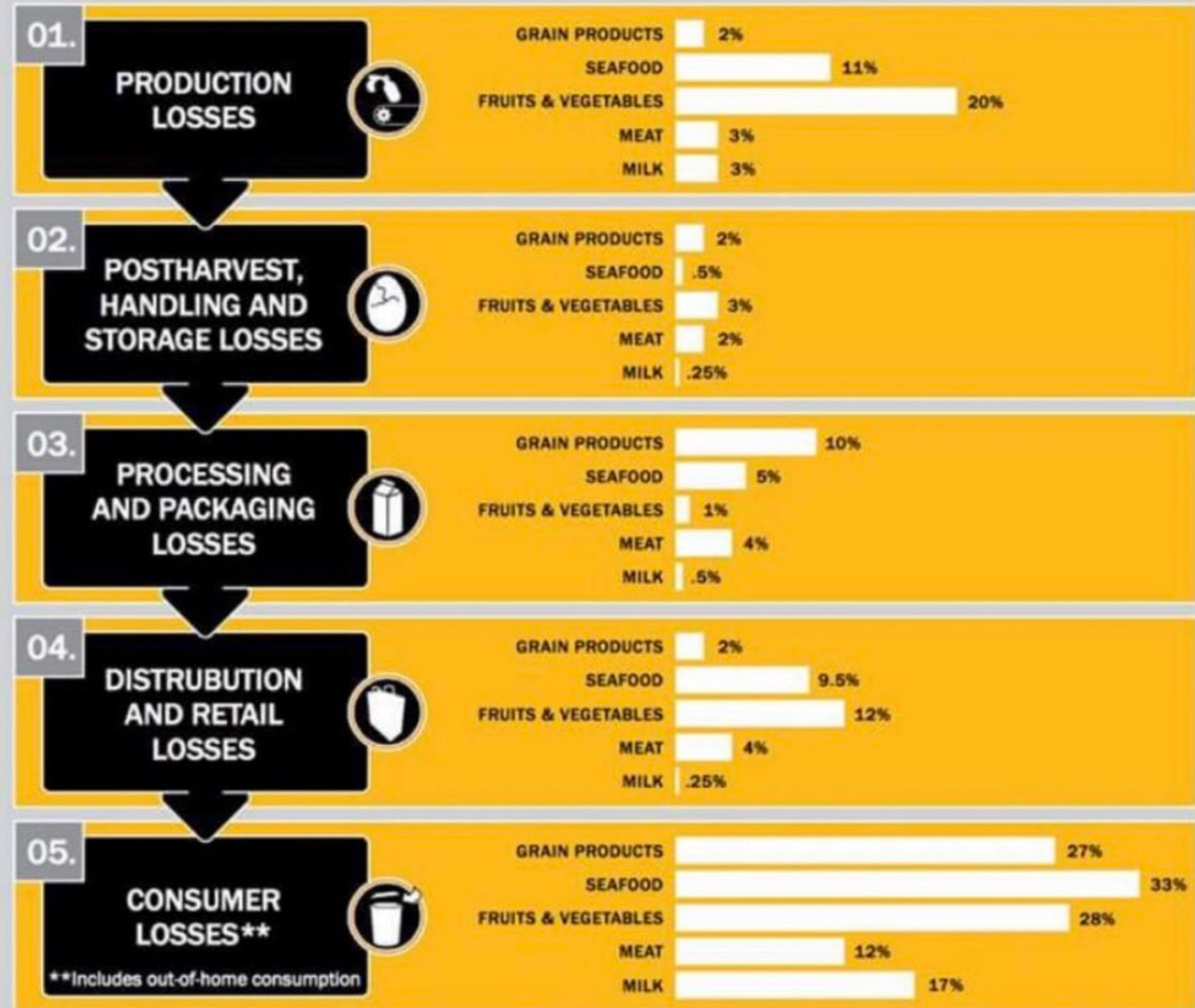


**Ztráty  
potravin:  
1 ze 3 kalorií  
  
40 % všech  
potravin v  
USA  
vyhozeny**

PHOTOGRAPH BY ROBERT CLARK,  
NATIONAL GEOGRAPHIC

## NORTH AMERICAN\* FOOD LOSSES AT EACH STEP IN THE SUPPLY CHAIN

\*Percentages calculated collectively for USA, Canada, Australia, and New Zealand.



Source: Food and Agriculture Organization 2011.

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