Klimawandel und Land

Ernährungssicherheit und nachhaltige Landnutzung global und regional in der Steiermark.“

University of Natural Resources and Life Sciences, Vienna
Institute of Social Ecology

Karlheinz Erb
Institute of Social Ecology Vienna

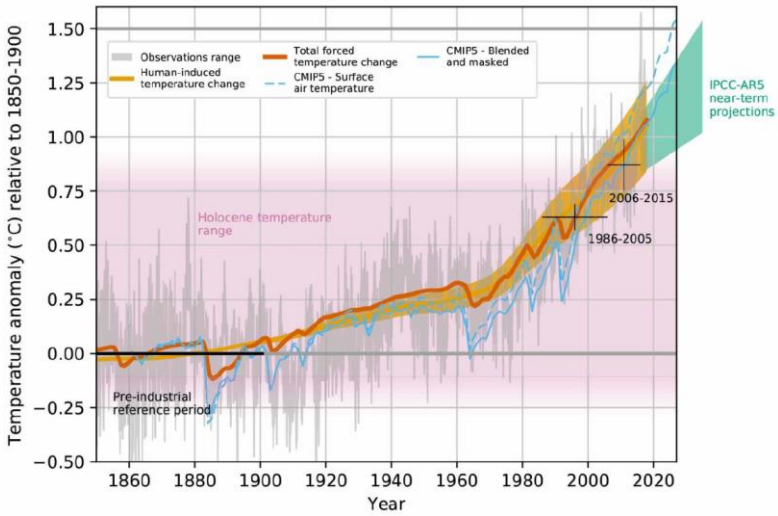
Klimaforum 2019
7. Oktober 2019
Graz

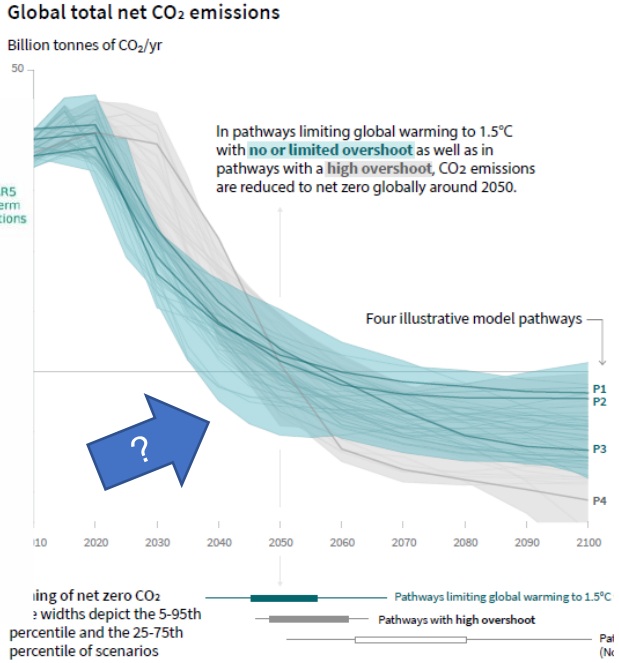
INTERGOVERNMENTAL PANEL ON climate change

Before we start

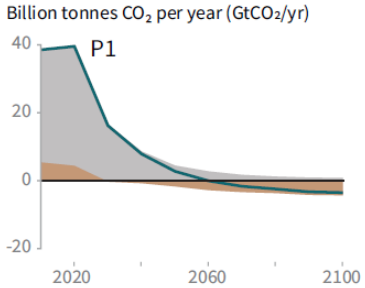
Climate change: where we are, where we are heading to…

Mögliche Szenarien

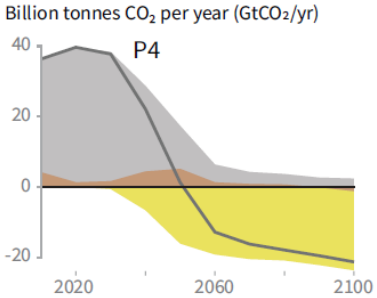




Early action



Late action

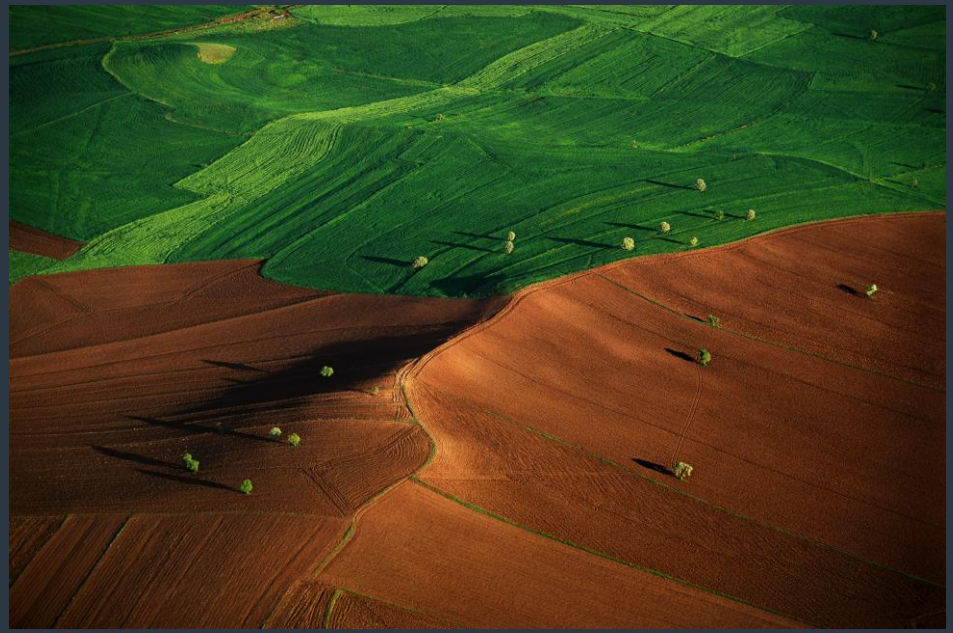


Land

Fossil fuel and industry AFOLU BECCS

Special Report on Climate Change and Land

www.ipcc.ch/report/SRCCL



Agricultural landscape between Ankara and Hattusha, Anatolia, Turkey (40°00' N – 33°35' E)
©Yann Arthus-Bertrand | **www.yannarthusbertrand.org** | **www.goodplanet.org**

Karlheinz Erb, LA Ch1

ipcc
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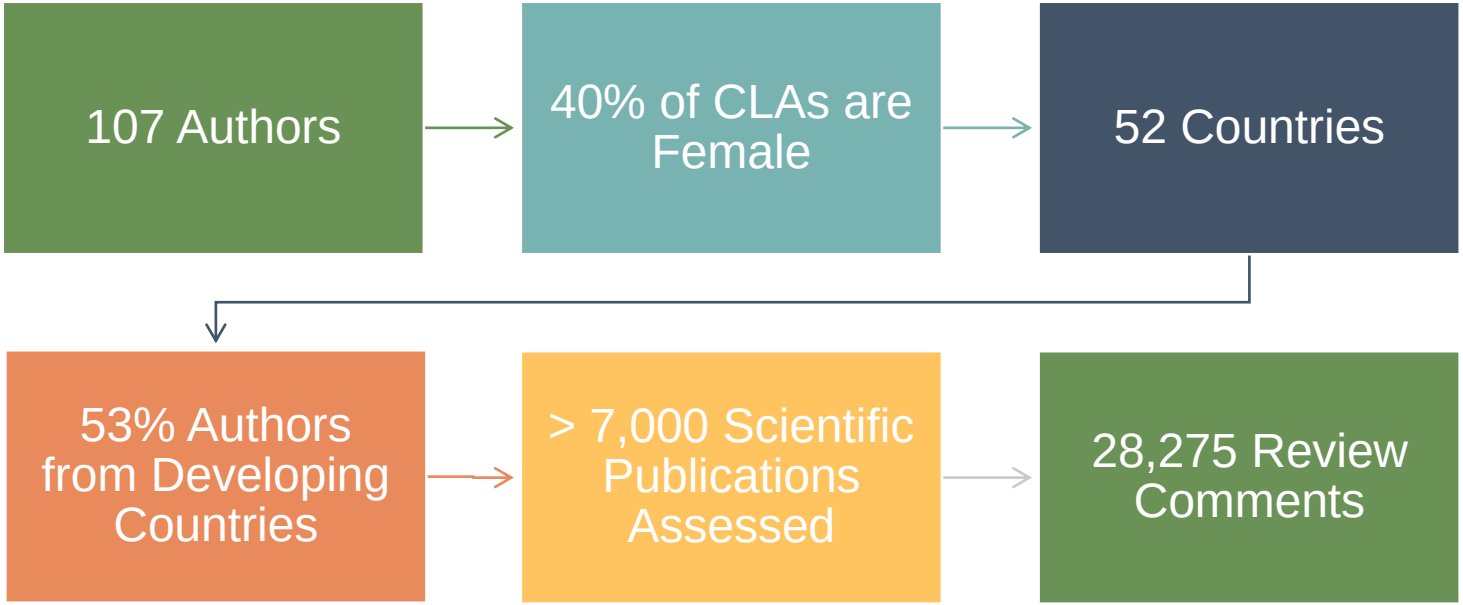
WMO UNEP

SRCCL REPORT BY THE NUMBERS



IPCC virtues:

- Calibrated language
- Policy-relevant, but not policy prescriptive
- Rigorous, transparent reviewing processes
- Country review: compromises, but enhanced legitimacy

A long title ….

“Climate Change and Land: An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems”

…mixing a variety of concepts….

“Climate Change and Land: An IPCC Special Report on climate change, **desertification, land degradation**, sustainable land management, **food security**, and greenhouse gas fluxes in terrestrial ecosystems”

…mixing a variety of concepts….

“Climate Change and Land: An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and **greenhouse gas fluxes in terrestrial ecosystems**”

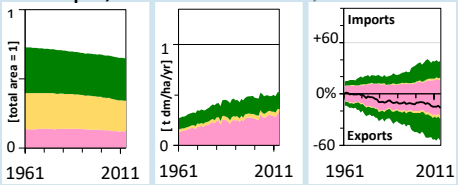
…mixing a variety of concepts….

“Climate Change and Land: An IPCC Special Report on climate change, desertification, land degradation, **sustainable land management**, food security, and greenhouse gas fluxes in terrestrial ecosystems”

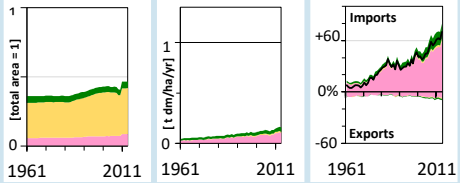
“ Land is a critical resource –
we rely on it for food, water, health and wellbeing – but it is already under growing human pressure. Climate change is adding to these pressures

Land use dynamics of unprecedented scale

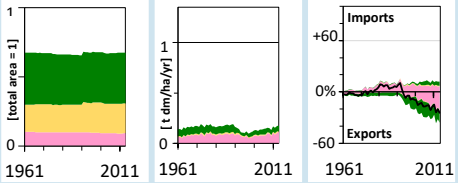
Europe, North America, Oceania



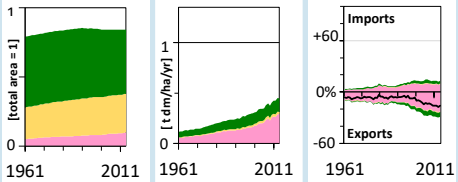
North Africa and West Asia

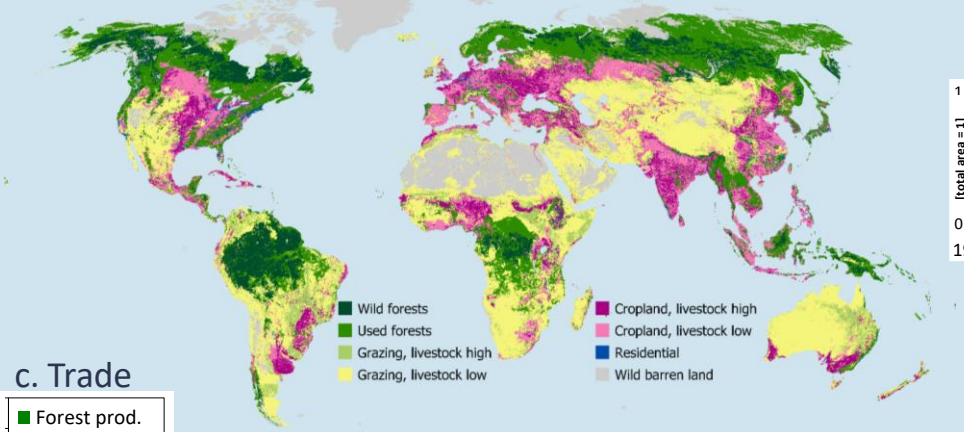


North & Central Asia

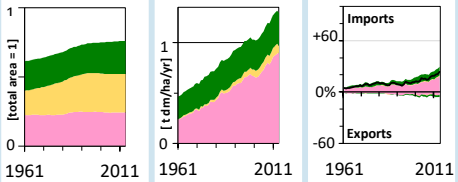


South America



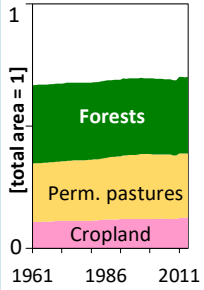


Southern Asia and Eastern Asia

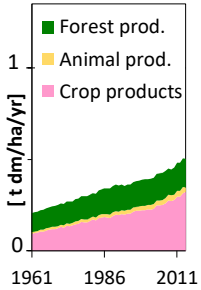


Global

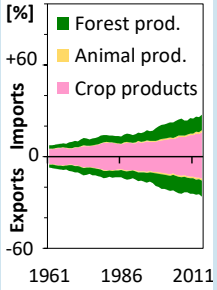
a. Area



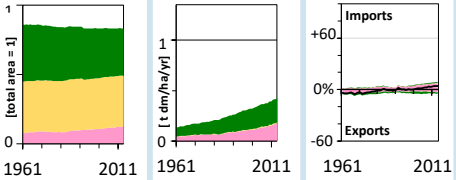
b. Production



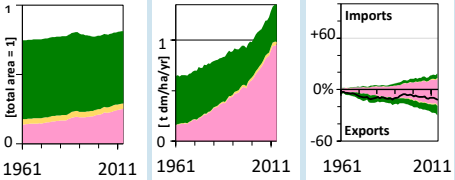
c. Trade



Sub-Saharan Africa



South-East Asia



Map based on Ellis et al., 2010, Potapov et al. 2017 and Nachtergaele et al., 2013

Erb et al., in prep

Land-use: a key contributor to global GHG emissions

2005-2015		Net anthropogenic emissions due to Agriculture, Forestry, and Other Land Use (AFOLU)			Total net anthropogenic emissions (AFOLU + non-AFOLU) by gas	AFOLU as a % of total net anthropogenic emissions, by gas
Panel 1: Contribution of AFOLU						
		FOLU	Agriculture	Total		
		A	B	C = B + A	**E = C + D**	F = (C/E)*100
CO_2[2]						
	Gt CO_2 y^{-1}	5.2 ± 2.6	--[11]	5.2 ± 2.6	**39.1 ± 3.2**	~13%
CH_4[3,8]						
	Gt CO_2e y^{-1}	0.5 ± 0.2	4.0 ± 1.2	4.5 ± 1.4	**10.1 ± 3.1**	~44%
N_2O[3,8]						
	Gt CO_2e y^{-1}	0.09 ± 0.03	2.2 ± 0.7	2.3 ± 0.7	**2.8 ± 0.7**	~82%
Total (GHG)	**Gt CO_2e y^{-1}**	**5.8 ± 2.6**	**6.2 ± 1.4**	**12.0 ± 3.0**	**52.0 ± 4.5**	~23%

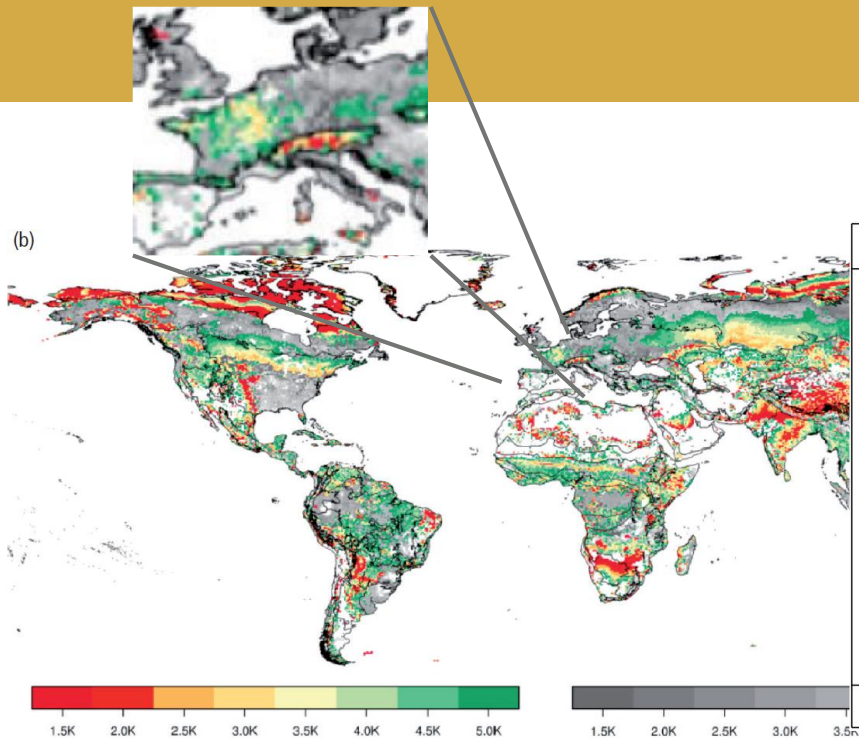
Abholzung, Habitatverlust

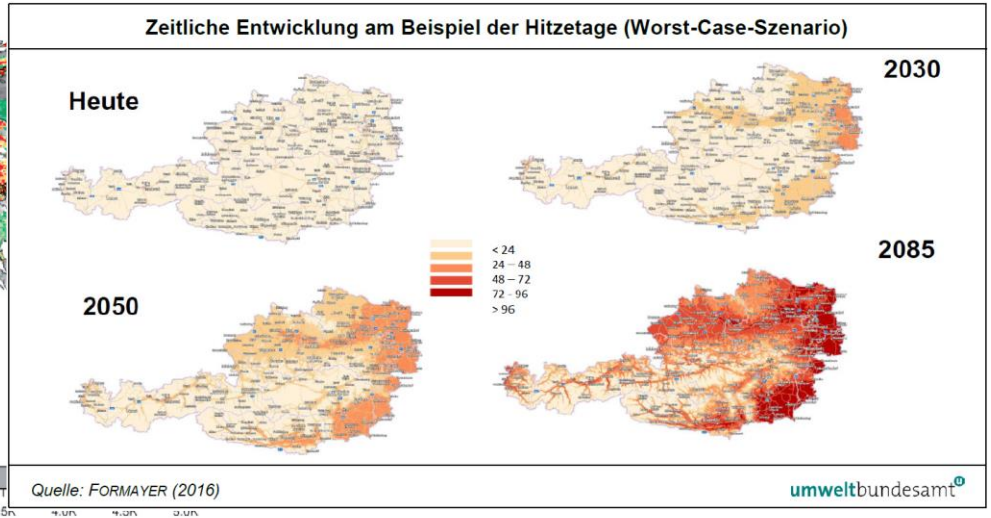
Nutztiere, Reis

Düngung

94% **100%** **related to the global food system**

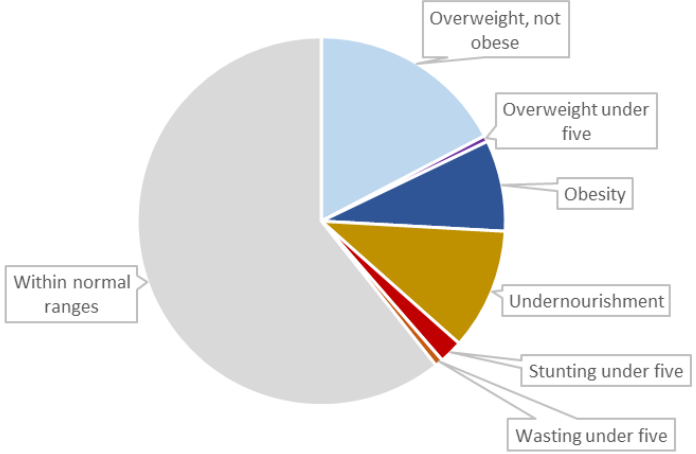
Climate Change impacts on land (use)





gravierende moderate
Ökosystemtransformation

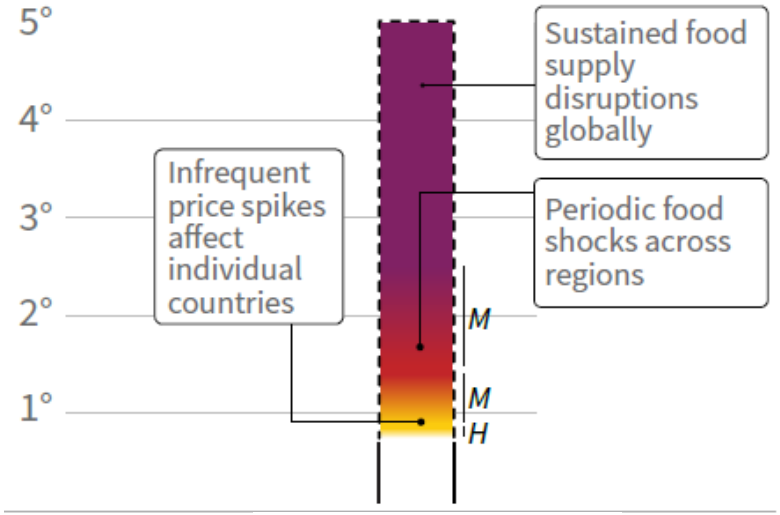
ipcc INTERGOVERNMENTAL PANEL ON climate change



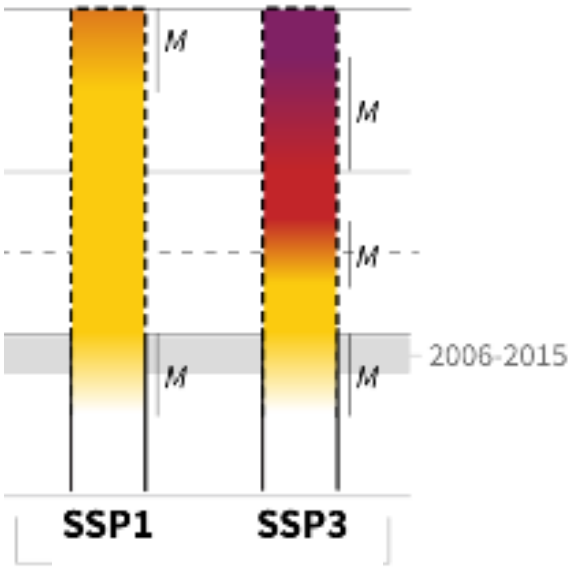
Food and Agriculture

- **821 million** people are currently **undernourished** and 2 billion adults are overweight or obese.
- The food system is **under pressure** from non-climate stressors (e.g., population and income growth, demand for animal-sourced products), and from climate change.
- Climate change is **already affecting food security** through increasing temperatures, changing precipitation patterns, and frequency of some extreme events. This will continue.
- **Distributions of pests and diseases will change**, affecting production negatively in many regions.

Climate Change and Food (in)security

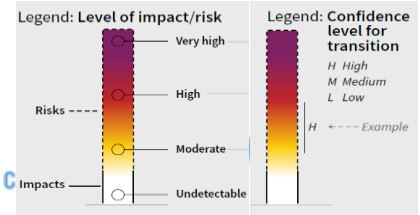


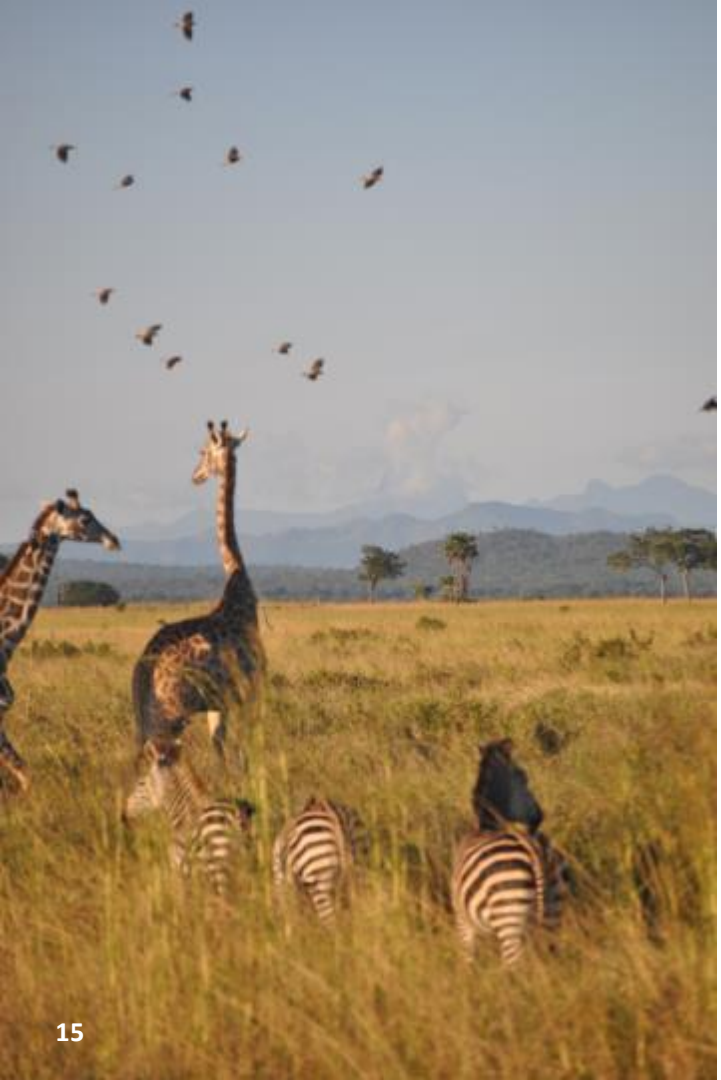
Food supply instability



Food (in)security in two scenarios

The **SSP1** pathway: low population growth, high income and reduced inequalities, effective land use regulation, high adaptive capacity, and food produced in low GHG emission systems.
The **SSP3** pathway: the opposite trends.





Climate Change Mitigation and Food Security

- A delicated balance: large scale mitigation affects negatively food security via land competition
- **Supply-side practices** can help mitigate climate change mitigation AND enhance food security
  - **Reduces crop and livestock emissions**, **decreasing emissions intensity** within sustainable production systems, and **increasing** C-absorption.
- Consumption of **balanced diets** presents major opportunities for **reducing emissions** from food systems and **improving health outcomes**.
- The **largest potential for reducing AFOLU emissions** is through
  - reduced deforestation/forest degradation
  - Increases in plant productivity (sustainable management)
  - a shift to plant-based diets
  - reduced food/agricultural waste.

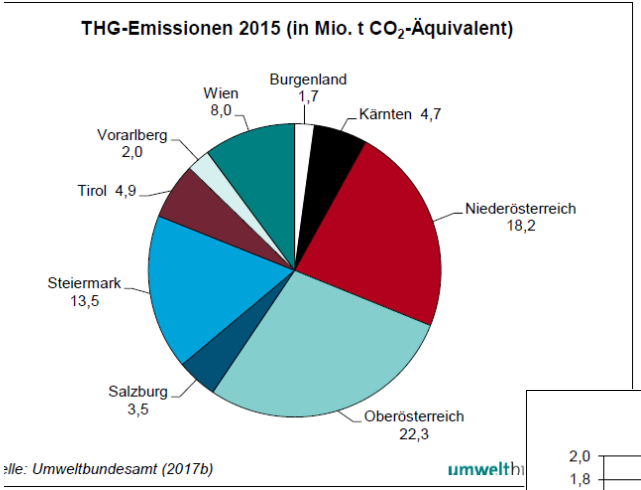
Conclusions

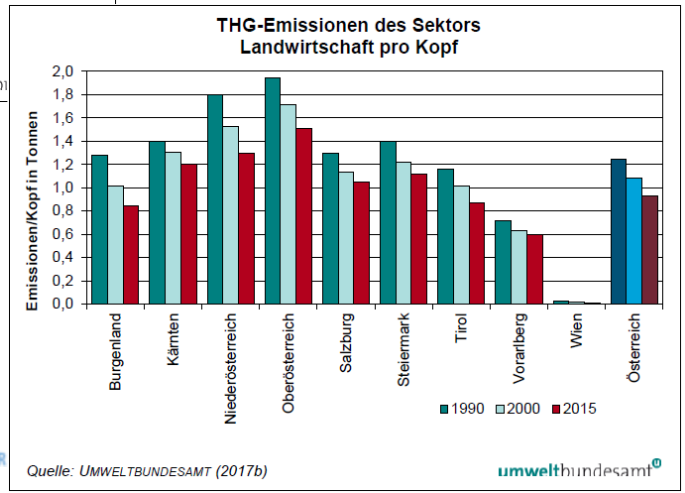
~

global

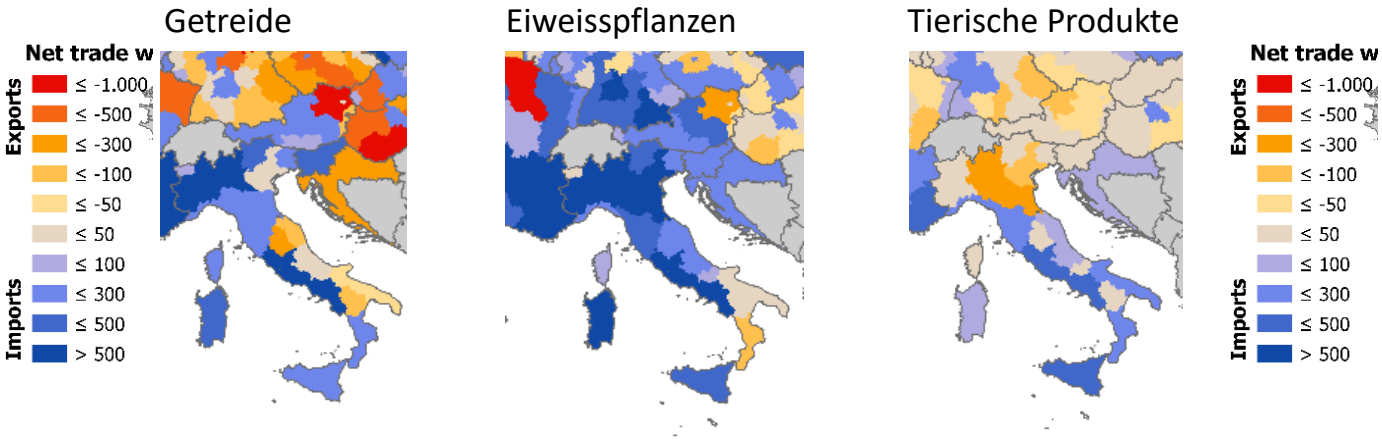
- **Land-based mitigation is** scale dependant but has a large mitigation potential – best practice needs yet to be developed
- Response options are **interlinked.** Some have co-benefits or are more **effective when paired**. Others may conflict.
- 25-30% GHG emissions are attributable to the food sector.
- **Delayed action** will mean more of a **need to respond** to land challenges **but less potential for land-based responses**
  - **Early action has challenges** related to technology, upscaling and barriers.
- **Supply-side practices** can help mitigate climate change, e.g. reducing crop and livestock emissions, absorbing carbon in soils and biomass.
- **Balanced diets present major opportunities** for reducing emissions from food.
- **Knowledge gaps** exist and formidable **social** challenges are expected

Und die Steiermark?

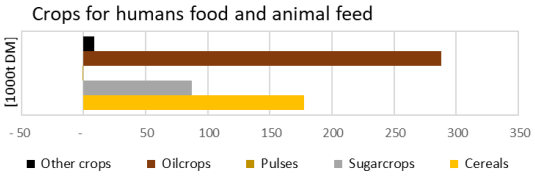


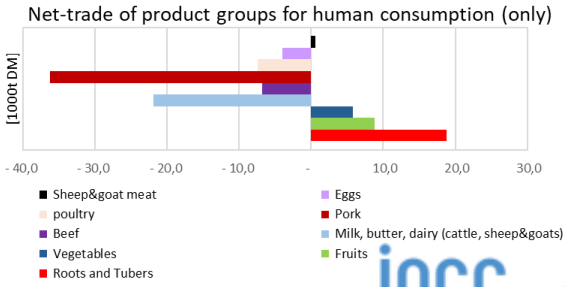


Eine systemische Perspektive…



Steiermarks Biomasse-“Aussenhandel“

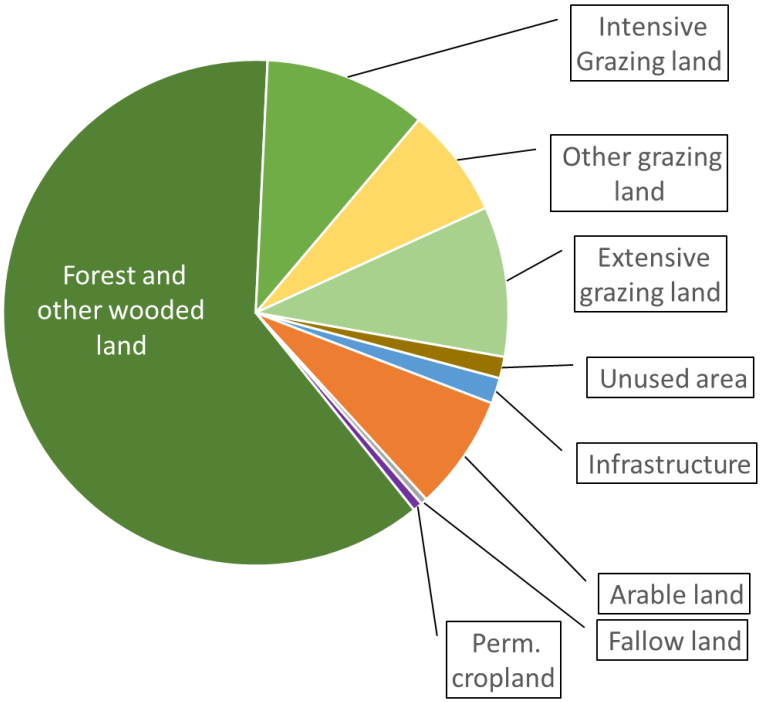




Positiv Zahlen: Importe
Negative Zahlen: Exporte

INTERGOVERNMENTAL PANEL ON climate change

Landnutzung in der Steiermark



Wald, Waldnutzung und Klimawandel

- Viel Waldfläche
- die Zeitdimension wird zentral:
  - *„overshoot“ vermeiden ist eine zentrale Prämisse des 1.5° Reports*
  - *„time-buying“ Ansätze sind wichtig – ev. sogar als wichtiger einzustufen als die lang-zeit Potenziale (besser „moderate Wirkung sofort“ als „Große Wirkung später“)*
- Besonders relevant für die Frage der Nutzung des Waldes als Bioenergiereserve
  - *Primäre Waldnutzung für Energie führt zuerst zu Emissionen (Kohlenstoff, der im Wald gespeichert wird, wir mobilisiert – auch, wenn FF ersetzt wird).*
  - *Ein Netto-substitutionseffekt wird erst nach einer „parity time“ erreicht*
  - *Das ökologische Grundprinzip: fast out, slow in*
- Vorsichtige Strategie-entwicklung notwendig, inkl. Betrachtung des Produktion-Konsum Systems (Aussenhandel!)

Thank you for your attention

Land is under growing human pressure

Land is a part of the solution

Land can’t do it all