

What is meant by sustainability in the food system?

Presenter: Dr. Gloria Luzzani

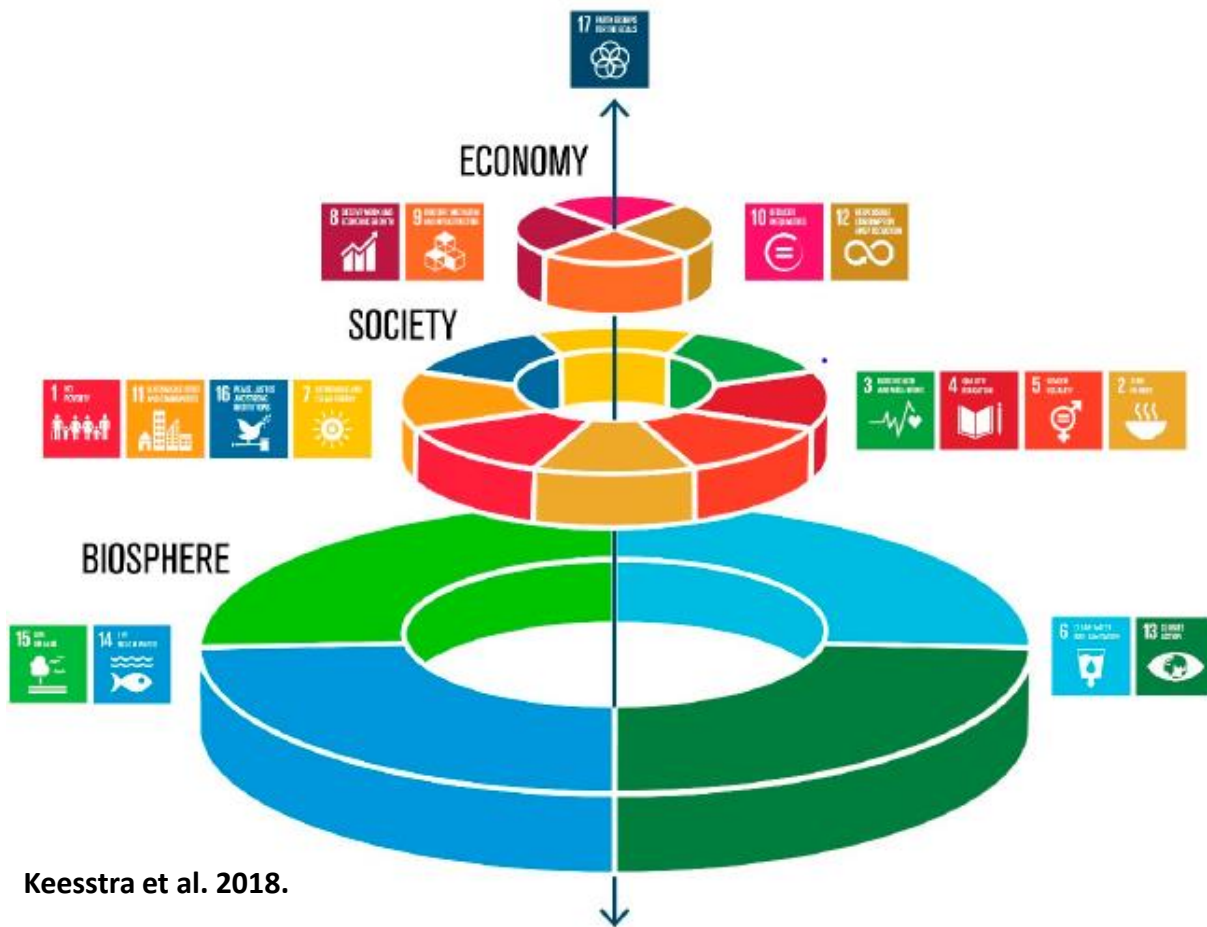
Researcher at HeFR

gloria.luzzani@hefr.ch

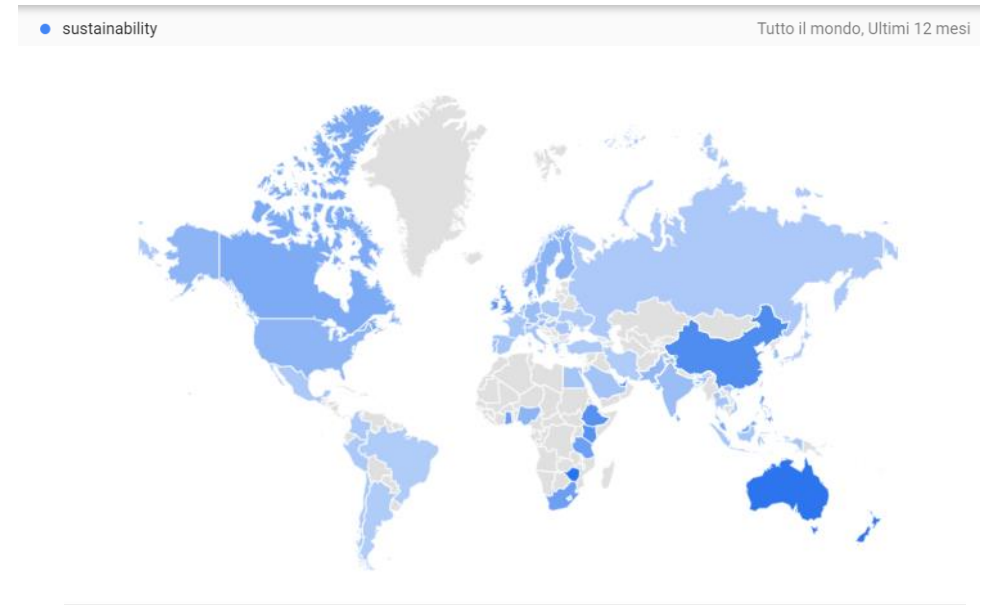
23rd May 2022

Sustainability

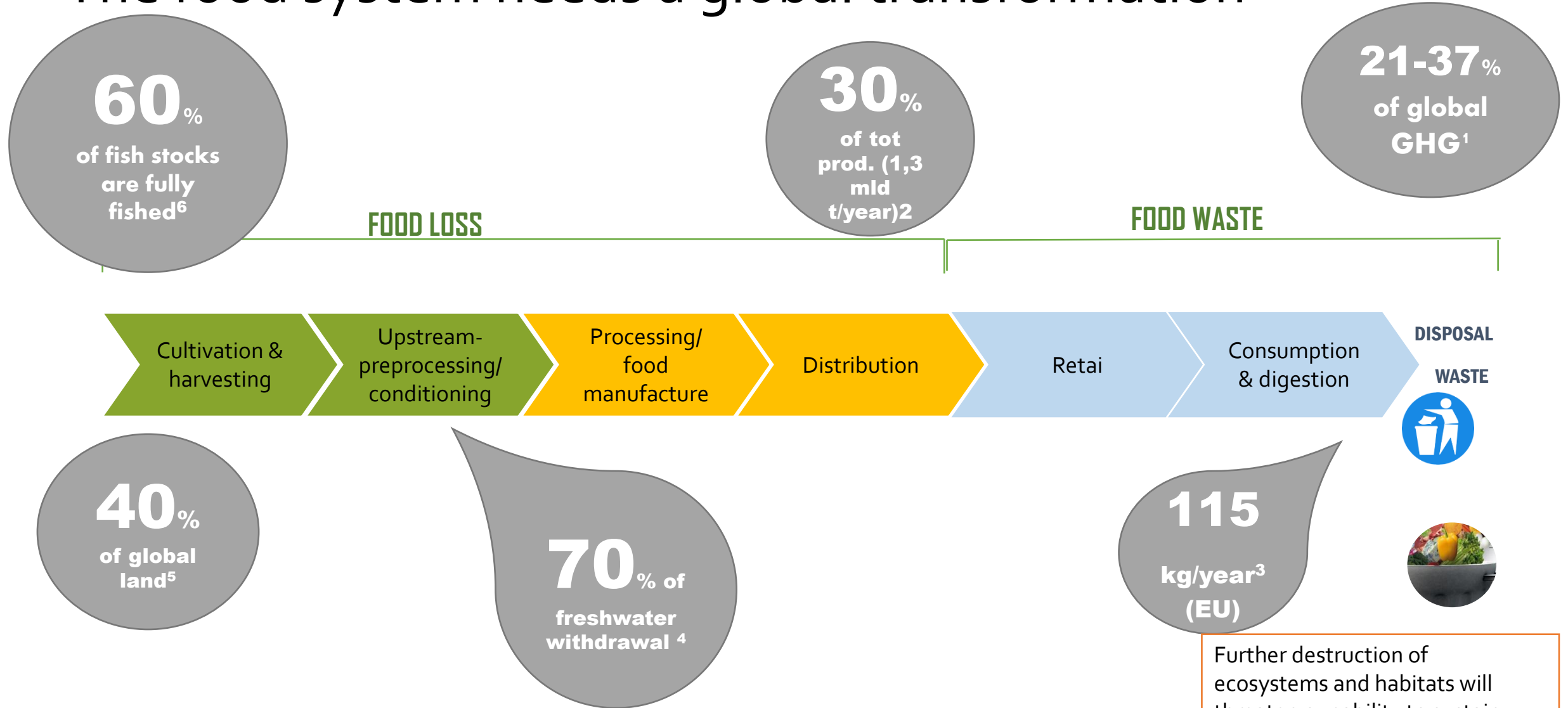
“Meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission 1987)



Keesstra et al. 2018.



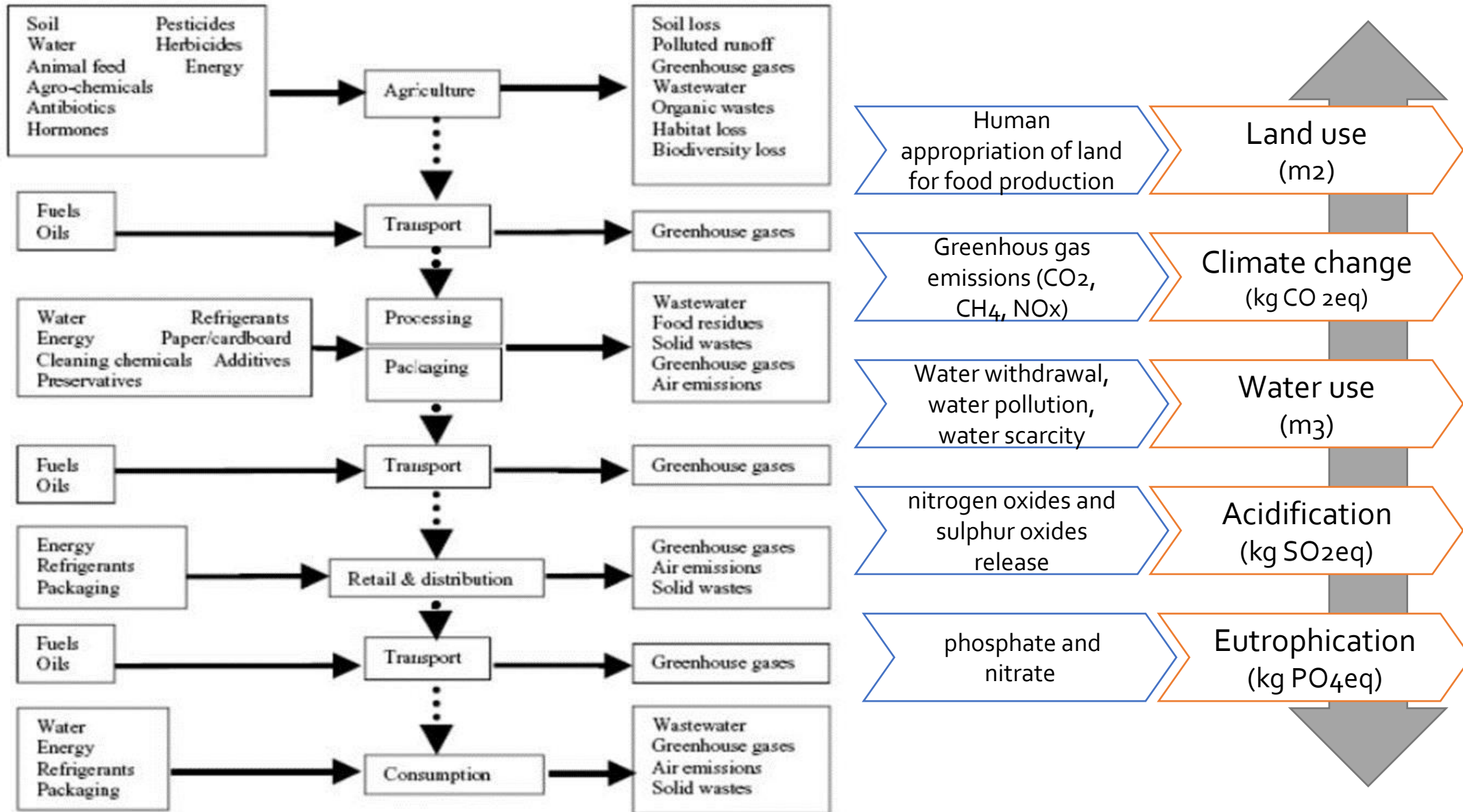
The food system needs a global transformation



Further destruction of ecosystems and habitats will threaten our ability to sustain human populations

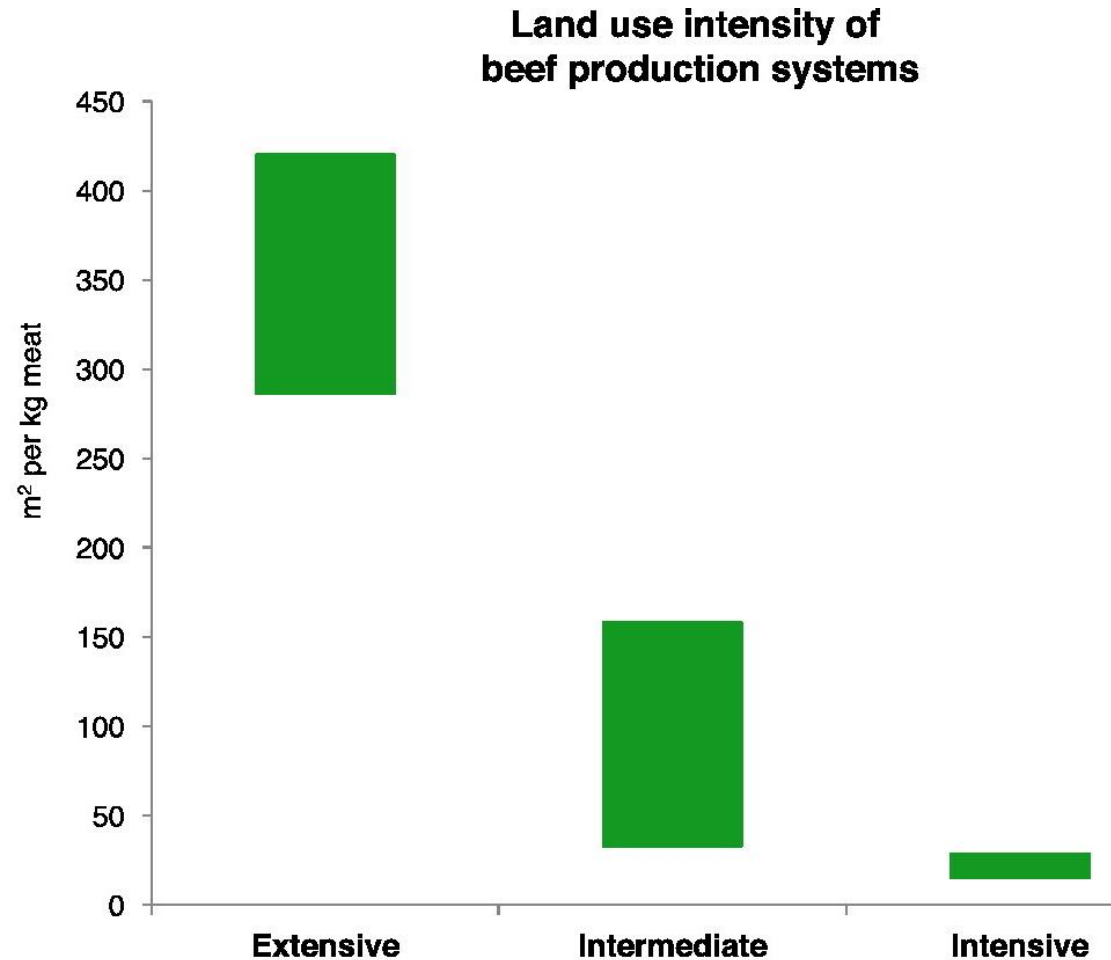
1 Rosenzweig et al. (2020); 2 FAO (2011); 3 Fusions, 2016; 4 Ceres – Food Water Risk; 5 Foley et al. 2005; 6 Tilman et al. 2017

Environmental impact assessment and impact categories



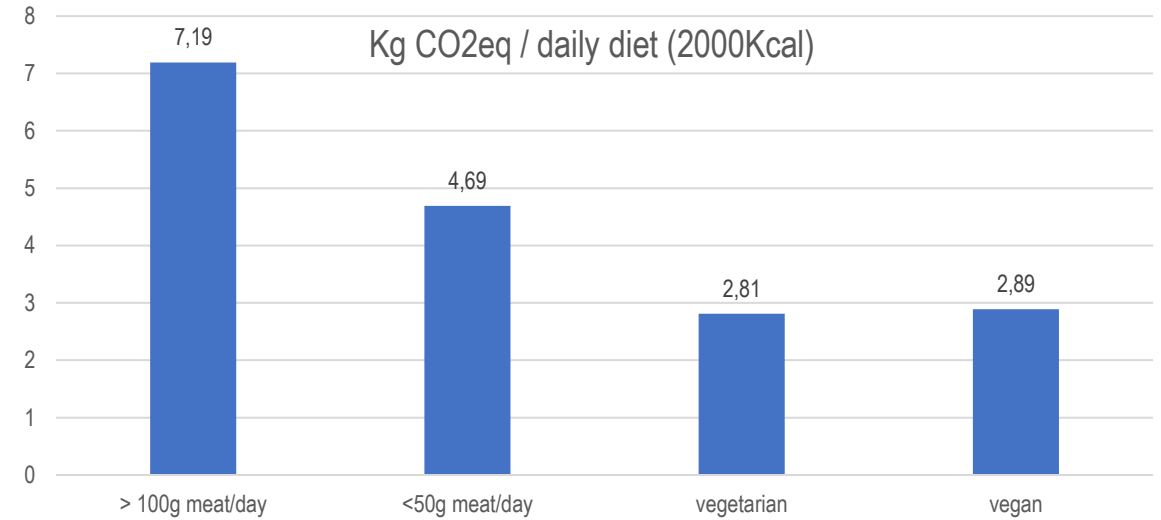
A double-ended approach

Production: changes to livestock production systems



Swain et al., 2018

Consumption: Reducing the amount of meat in global diets and waste



Scarborough et al., 2014

Env footprints of average person's daily food waste are:
124 g CO₂ eq., 58 Litre freshwater use, 0.36 m² cropland use (Chen et al., 2020)

Cooking practices (time and stoven) can offset the saving in GHGe of vegetarian and vegan diets. (Corrado et al., 2019)

Diet optimization



Diet scenario	Tech scenario	Loss and waste scenario	GHG emissions			Cropland use			Bluewater use			Nitrogen application			Phosphorus application		
			SSP2	SSP1	SSP3	SSP2	SSP1	SSP3	SSP2	SSP1	SSP3	SSP2	SSP1	SSP3	SSP2	SSP1	SSP3
Baseline	Baseline	Baseline	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4
		Waste/2	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4
		Waste/4	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4
	Tech	Baseline	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4
		Waste/2	4	4	4	3	3	3	2	2	2	4	4	4	4	4	4
		Waste/4	4	4	4	2	2	2	2	2	2	4	4	4	4	4	4
	Tech+	Baseline	4	4	4	3	3	3	3	3	3	3	3	3	2	2	2
		Waste/2	4	4	4	2	2	2	2	2	2	3	3	3	2	2	2
		Waste/4	4	4	4	1	1	1	2	2	2	3	3	3	2	2	2
Guidelines	Baseline	Baseline	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4
		Waste/2	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4
		Waste/4	4	4	4	4	3	4	3	3	3	3	3	3	4	4	4
	Tech	Baseline	4	4	4	3	3	3	3	2	3	4	4	4	4	4	4
		Waste/2	4	4	4	2	2	2	2	2	2	4	3	4	4	4	4
		Waste/4	4	4	4	2	1	2	2	2	2	3	3	3	4	3	4
	Tech+	Baseline	4	4	4	2	2	2	3	2	3	3	3	3	2	2	2
		Waste/2	4	4	4	1	1	1	2	2	2	3	3	3	2	2	2
		Waste/4	4	3	4	1	1	1	2	2	2	3	3	3	2	2	2
Flexitarian	Baseline	Baseline	3	2	3	4	4	4	3	3	3	4	4	4	4	4	4
		Waste/2	1	1	2	4	4	4	3	3	3	3	3	3	4	4	4
		Waste/4	1	1	1	4	3	4	3	2	3	3	3	3	3	3	3
	Tech	Baseline	2	1	2	3	3	3	2	2	3	4	4	4	4	4	4
		Waste/2	1	1	1	2	2	2	2	2	2	3	3	3	4	4	4
		Waste/4	1	1	1	1	1	2	2	2	2	3	3	3	3	2	3
	Tech+	Baseline	1	1	2	2	2	2	2	2	3	3	3	3	2	2	2
		Waste/2	1	1	1	1	1	1	2	2	2	3	2	3	2	2	2
		Waste/4	1	1	1	1	1	1	2	2	2	2	2	2	2	1	2

Socio-economic dimension



Relationship with residents, complaints management, valorization of the territory as heritage



Compliance with CCNL contracts of subjects hired by third parties, recruitment practices, monitoring contractual conditions.



Accident monitoring and risk reduction



Employees learning & development programs



Consumer safety, transparent communication.



Implementation and verification of working protocols



Contribution to the development of the local community and circular economic promotion



Monitoring of stabilized and non stabilized employee quotas, welfare



Selection of suppliers (sustainability aspects) and stability of contracts

Preservation of cultural identity, food identity and tradition

Smallholders livelihood

Food affordability

Some approaches

Optimal use of low-opportunity-cost feedstuff to promote optimal conversion of feed into food protein (Hal et al., 2018):

- supply of 27g pork (EU), 610 g dairy, 33 g beef, 1g egg / per cap/ per day
- compared with a vegan diet, consumption of a small amount of ASF reduced land use per person when livestock were mainly fed with co-products (Van Kernebeek *et al.* 2015).
- A vegan diet produce 129kg co-products/person

Land use perspective (Van Zanten et al., 2015):

- Grass-based ruminant systems on marginal land produce human digestible protein more efficiently than food crops (Van Zanten et al, 2015)
- If we use marginal land for production of animal source food, we can produce daily about 3 g of protein/person (with 1.9 billion ha marginal land)

TAKE HOME MESSAGE

- Livestock systems should shift the attention from increasing productivity per animal **to increasing protein production for humans per hectare**, which means making optimal use of leftovers, low-opportunity-cost feedstuff and marginal lands (Van Zanten et al., 2015) .

**Thank you for your
attention**

Dr. Gloria Luzzani

gloria.luzzani@hefr.ch