

UNIVERSITÀ
DELLA SILEZIA
DI TREVISO

COMPETERE
Policies for Sustainable Development

Sicurezza alimentare: sostenibilità e resilienza delle filiere globali

6th October 2023

TESAF
Tecnologie, Strategie
e Sistemi Agro-Forestali

La sostenibilità delle filiere alimentari nel
quadro delle nuove regole UE: zero
deforestazione, riduzione della CO2 e tutela
della biodiversità. Il ruolo degli oli vegetali.

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European
Commission

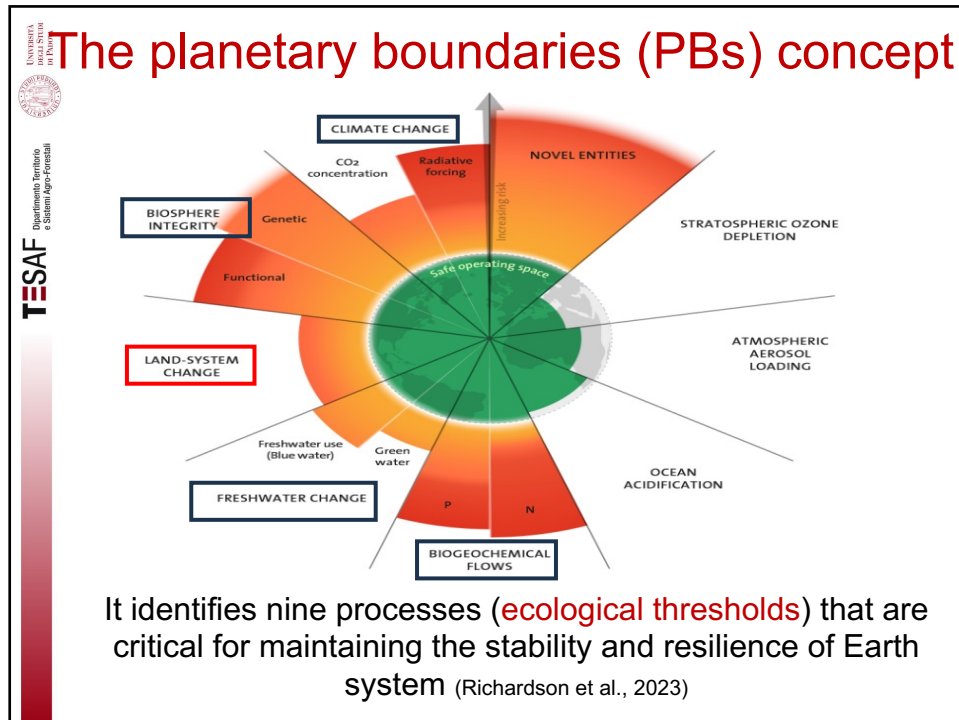
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DOCTORAL COURSE
Land Environment Resources and Health (L.E.R.H.)

Outline

- ◆ The planetary boundaries concept
- ◆ Agricultural global land-use change
- ◆ Global deforestation trends and drivers
- ◆ The EU responsibilities
- ◆ The EU regulation on deforestation free products
- ◆ The global vegetable oil sector
- ◆ Research study on vegetable oils (preliminary results)
- ◆ Concluding Remarks

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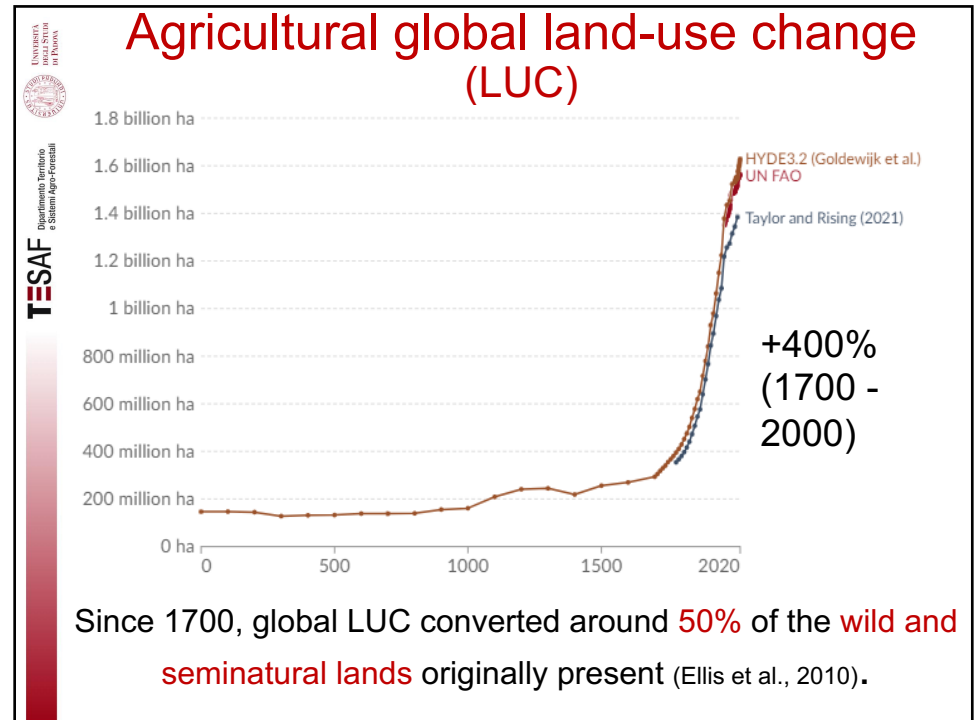
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Global deforestation trends and drivers

1700 – 2000: -21% global forest cover

Forest gain
Forest loss

1700 '20 '40 '60 '80 1800 '20 '40 '60 '80 '95

19 million ha net loss per decade

30 million ha net loss per decade

115 million ha net loss per decade

UN FAO data 1980 '20

102 million ha net loss in the 1980s

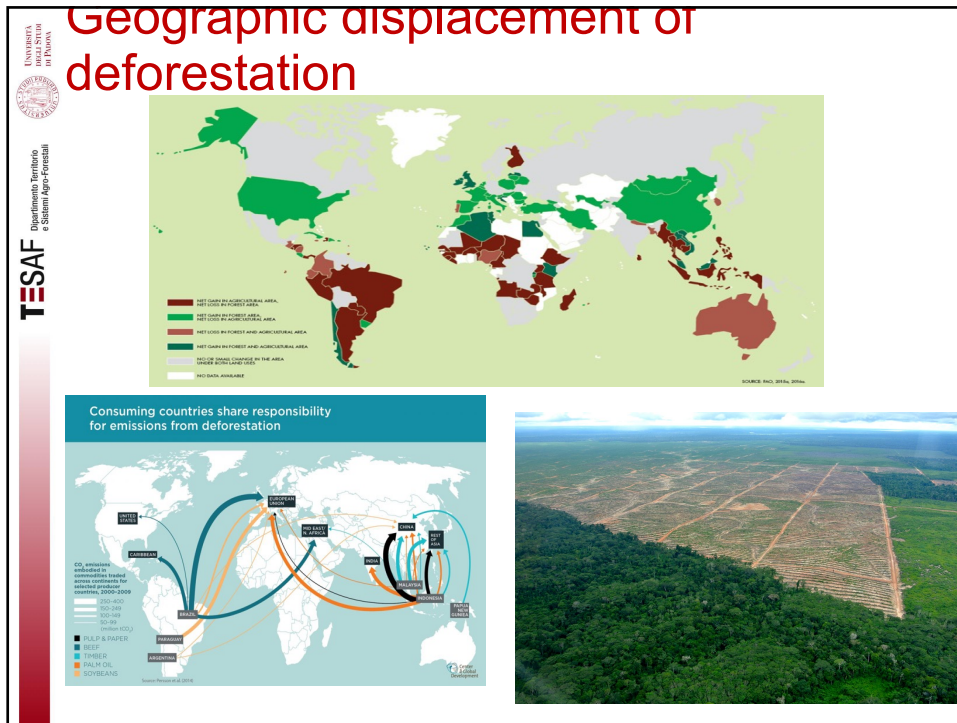
78 million ha net loss in the 1990s

47 million ha net loss in the last decade

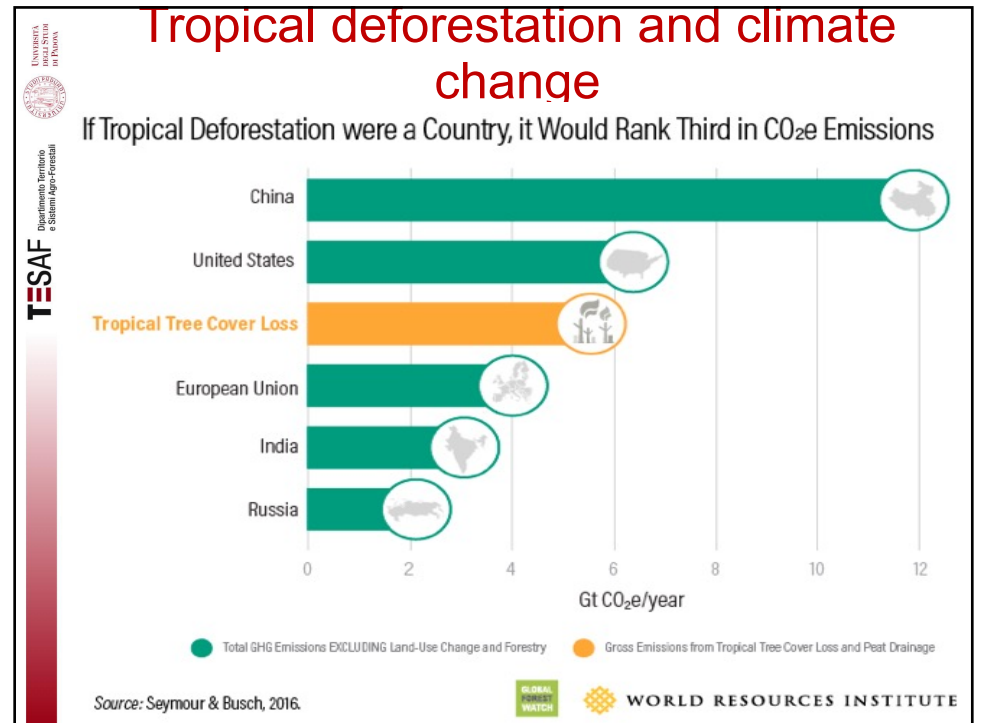
Since 2000, 5 Mha/yr

- 95% tropical regions (50% Brazil and Indonesia)
- 60% beef, soybeans, and oil palm fruits → Forest risk commodities (FRCs)
- 30-40% international trade (Embodied deforestation);

Sources: Pendrill et al., 2019, and FAO, 2020



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The EU responsibilities

- EU outsources, on average, **40%** of its agricultural consumption (food + energy) (Bruckner et al., 2019)
- **Main importer of beef, up to 30% of global imports of palm oil and soybeans** (Lawson, 2015)
- Up to **36%** of global embodied deforestation (Pendrill et al., 2019)
- Since 1990, the **largest importer of FRCs per-capita** (Heflich, 2020)
- Share of palm oil on the EU's imported deforestation: from **10%** (1990-2008) to **42%** (2017) (Cuypers, 2013; WWF, 2021)
- At least **50%** of the EU supermarket products contain palm oil derivatives (Brack et al., 2016)

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The EU regulation on deforestation free products (EUDR)

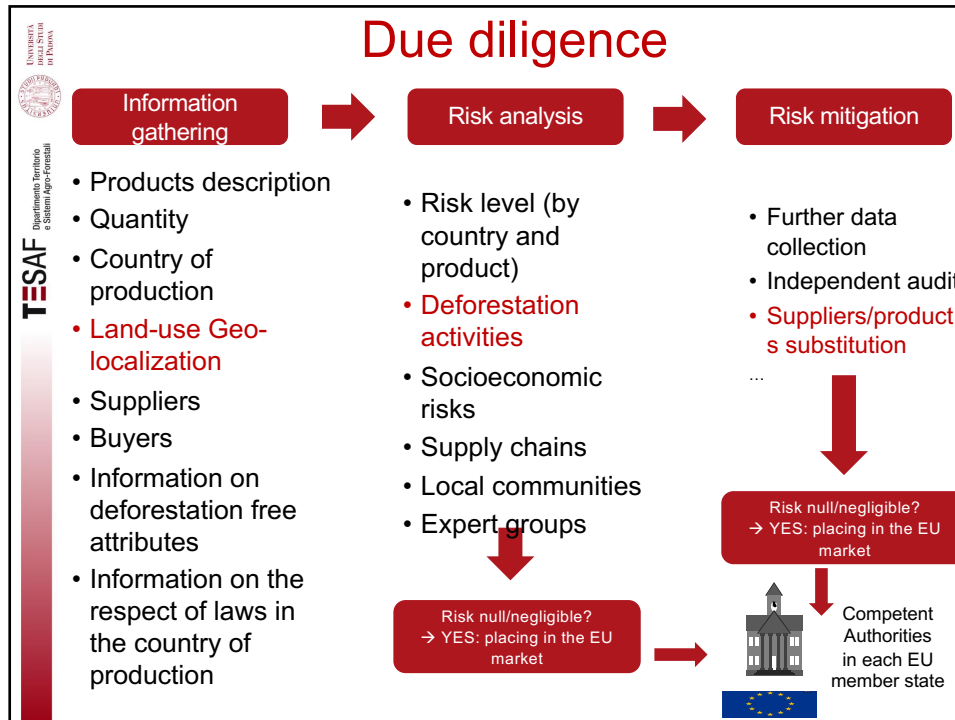
- Main objective: to minimize the EU contribution to deforestation and forest degradation embodied in trade
- How: by imposing a mandatory due diligence for all the operators placing FRCs (cattle, cocoa, coffee, oil palm, soy, rubber, and wood products) within the EU market or exporting them outside the EU borders



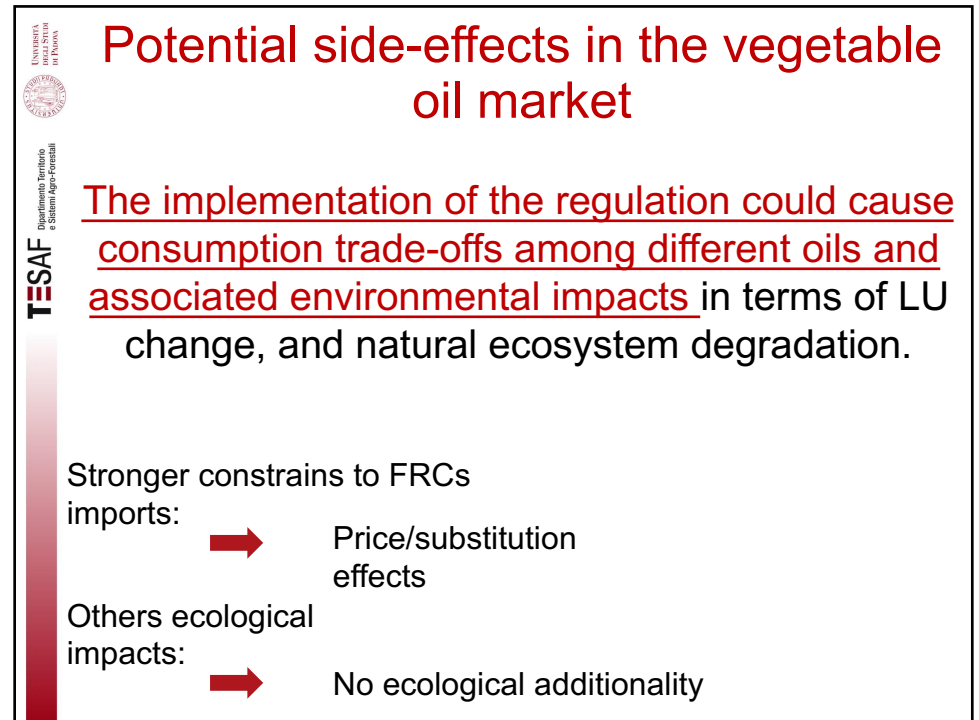
Deforestation cut-off
date: 31 - 12 - 2020

The EUDR full text is available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1115&qid=1687867231461>

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The global vegetable oil sector

Global vegetable oil production (1961 - 2020)

- ◆ Production (2020): **palm oil (37.4%)**, **soybean oil (28.8%)**, rapeseed oil (12.4%), and sunflower oil (10.1%) (Faostat, 2023)
- ◆ Projections: **+12%** by 2032 (i.e., **+ 7Mha**) (OECD&FAO, 2023)
- ◆ **Foodstuff (60-65%)**, **bioenergy (10-15%)**, oleochemicals, animal feed (i.e., oil cakes) (OECD&FAO, 2023)

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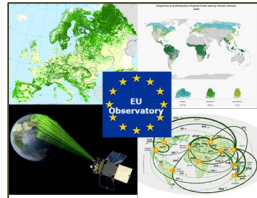
Università degli Studi di Padova
TESAF
Dipartimento Territorio e Sistemi Agro-Forestali

PhD program:
Land, Environment, Resources and Health (LERH) - 36th Cycle -
University of Padua


Comparative assessment of the land footprint and regulating ecosystem services embodied in the EU consumption of vegetable oils: an environmental trade-off analysis among substitute goods

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Research project financially supported by the Joint Research Centre (JRC) of the European Commission (EC)



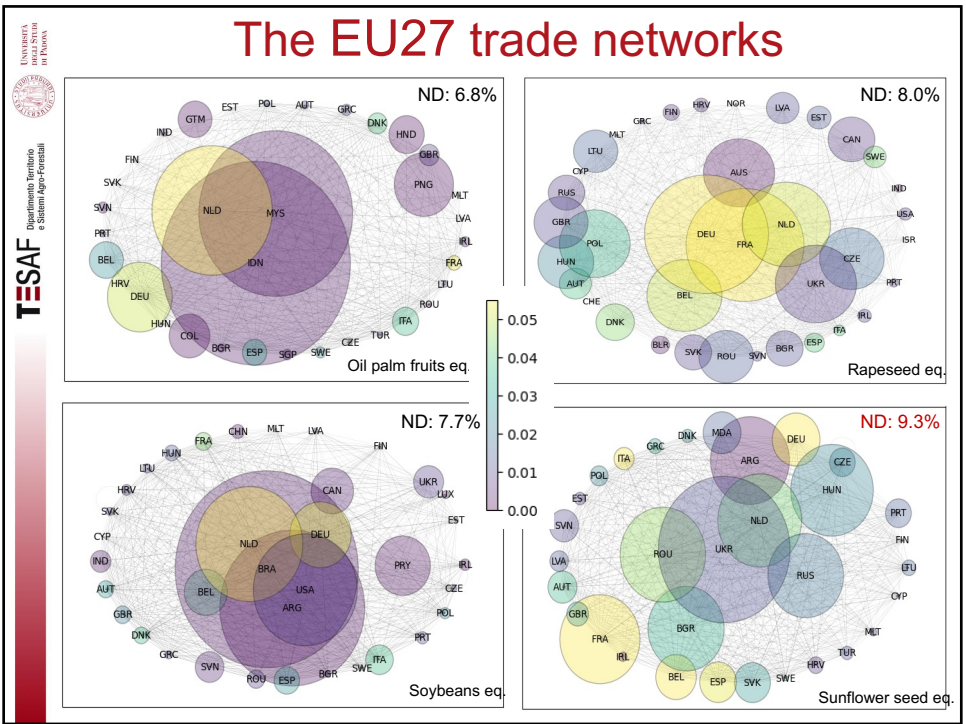
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Research objectives (ROs)


RO1: To analyse the EU27 **trade network** of the top four vegetable oils (i.e., palm, soy, rapeseed and sunflower oil);

RO2: To quantify the EU27 impact in terms of **land footprint** (i.e., agricultural lands) associated with the consumption of the four commodity groups differentiated by producing countries;

RO3: To assess the **trade-offs** between **oil yields per hectare (food-security)** and **ecological impacts** associated with the production of the four vegetable oils consumed in the EU27



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The EU27 and Italian primary crops top suppliers

Table 2: Producing countries sourcing at least 1% of EU27 apparent consumption for soybeans, sunflower seed, rapeseed, oil palm fruits (% on total apparent consumption) between 2000 and 2020.

Soybeans	Sunflower seeds	Rapeseeds	Oil palm fruits
BRA (44.9%)	UKR (24.6%)	FRA (17.3%)	IDN (46.5%)
ARG (32.0%)	ROM (11.9%)	DEU (16.7%)	MYS (31.0%)
USA (9.9%)	SPA (10.8%)	POL (10.4%)	PNG (7.2%)
PRY (4.9%)	FRA (9.5%)	AUS (10.4%)	GTM (3.8%)
IND (1.5%)	ARG (8.6%)	UKR (8.0%)	HND (3.8%)
CAN (1.4%)	HUN (8.2%)	CZE (5.0%)	COL (3.1%)
UKR (1.3%)	BGR (7.8%)	CAN (4.6%)	THA (1.0%)
	RUS (7.3%)	ROM (3.9%)	ECU (1.0%)
MDA (2.2%)	RUS (3.4%)		
	ITA (1.8%)	HUN (3.0%)	
	SVK (1.2%)	GBR (2.3%)	
		LTU (1.8%)	
		SVK (1.7%)	
		DEN (1.6%)	
		BGR (1.5%)	
		SWE (1%)	

Primary crop eq.	LF (Mha)	% on Total
Soybeans	140.8	41.6%
Rapeseed	91.3	26.3%
Sunflower seed	84.2	24.9%
Oil palm fruits	24.5	7.1%
Total	340.8	100.0%

Primary crop eq.	LF (Mha)	% LF on Total
Soybeans	21,3	49.2%
Rapeseed	3,7	8.5%
Sunflower seed	12,4	28.5%
Oil palm fruits	6,0	13.8%
Total	43,4	100.0%

Countries names follow Alpha-3 codes ISO 3166-1


42 countries supplied >=99% of the EU27 consumption

Italy covered 12.7% of the EU27 apparent consumption

Top 5 Italian suppliers:

- Soybeans: ARG (52.4%), BRA (21.8%), PRY (7.9%), ITA (6.3%), USA (5.1%);
- Sunflower seed: UKR (34.5%), RUS (19.3%), ITA (14.9%), HUN (8.4%), ROM (6.8%);
- Rapeseed: CAN (19.4%), FRA (16.6%), RUS (12.2%), DEU (10.3%), UKR (5.7%);
- Oil palm fruits: IND (64.2%), MYS (23.5%), PNG (5.7%), GTM (1.7%), THA (1.4%);

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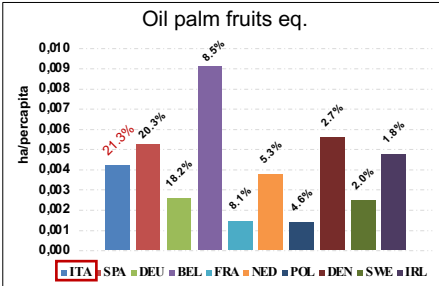


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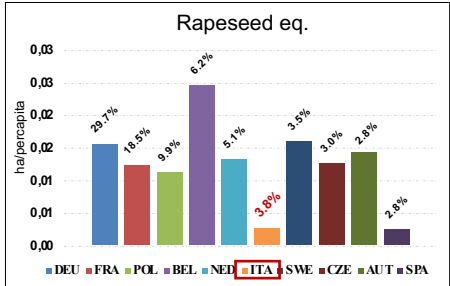
Top ten EU27 consumers (%) and per-capita land footprint (ha)

Oil palm fruits eq.



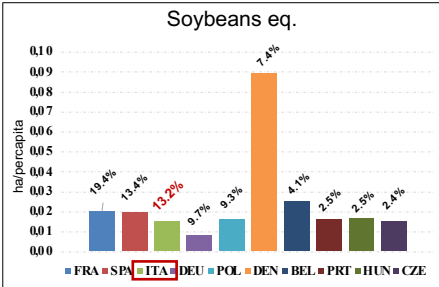
Legend: ITA, SPA, DEU, BEL, FRA, NED, POL, DEN, SWE, IRL

Rapeseed eq.



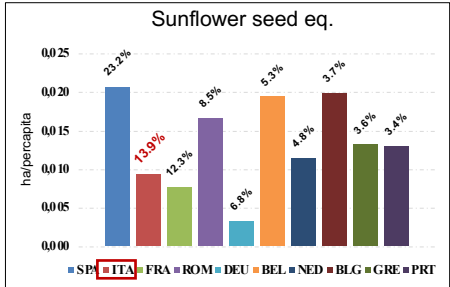
Legend: DEU, FRA, POL, BEL, NED, ITA, SWE, CZE, AUT, SPA

Soybeans eq.

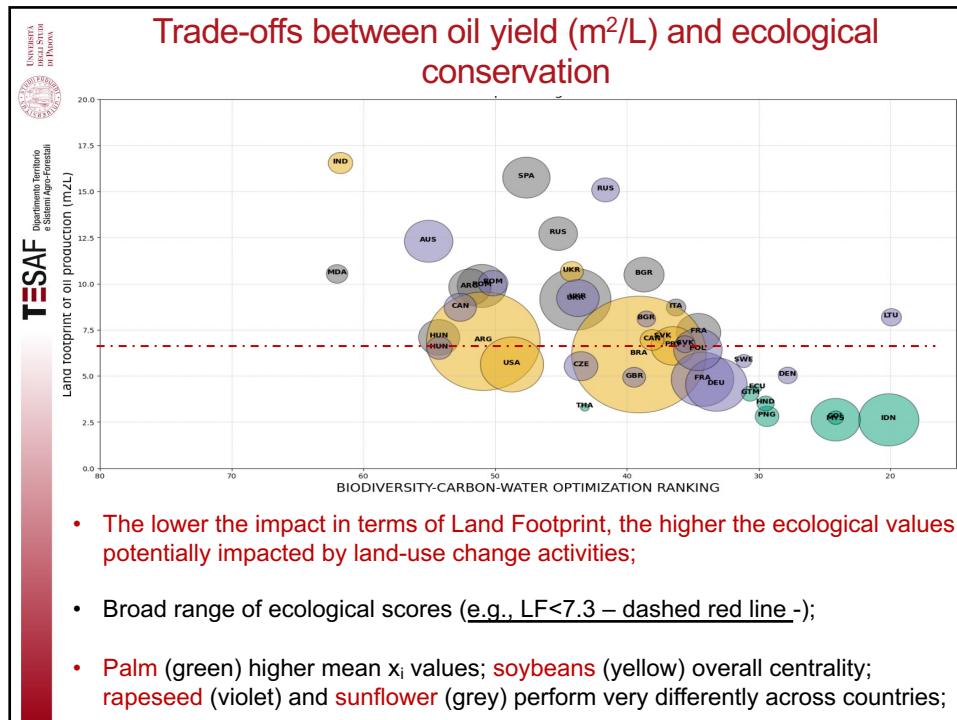


Legend: FRA, SPA, ITA, DEU, POL, DEN, BEL, PRT, HUN, CZE

Sunflower seed eq.



Legend: SPA, ITA, FRA, ROM, DEU, BEL, NED, BLG, GRE, PRT



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Concluding remarks

- Agricultural-driven global LUC → **trade-offs between food-energy security and ecological impacts** (e.g., biodiversity conservation, climate and water regulation)
- Producing countries perform differently both in terms of land footprint (LF) per unit of product, and embodied ecological impacts
- **Among vegetable oils: Palm oil performs better in terms of LF but may be worse in terms of potential ecological impacts**
- **Substitution of palm oil with other vegetable oils may have a greater impact in terms of global LF and uncertainty regarding the overall ecological impacts**
- EU policies should shape the EU market, by **assessing future LUC activities across consumption alternatives in relation with specific conservation targets at subnational level**

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