Escenario de gestión AgroGreen-SUDOE para una mayor sostenibilidad de los sistemas agrarios en el territorio SUDOE

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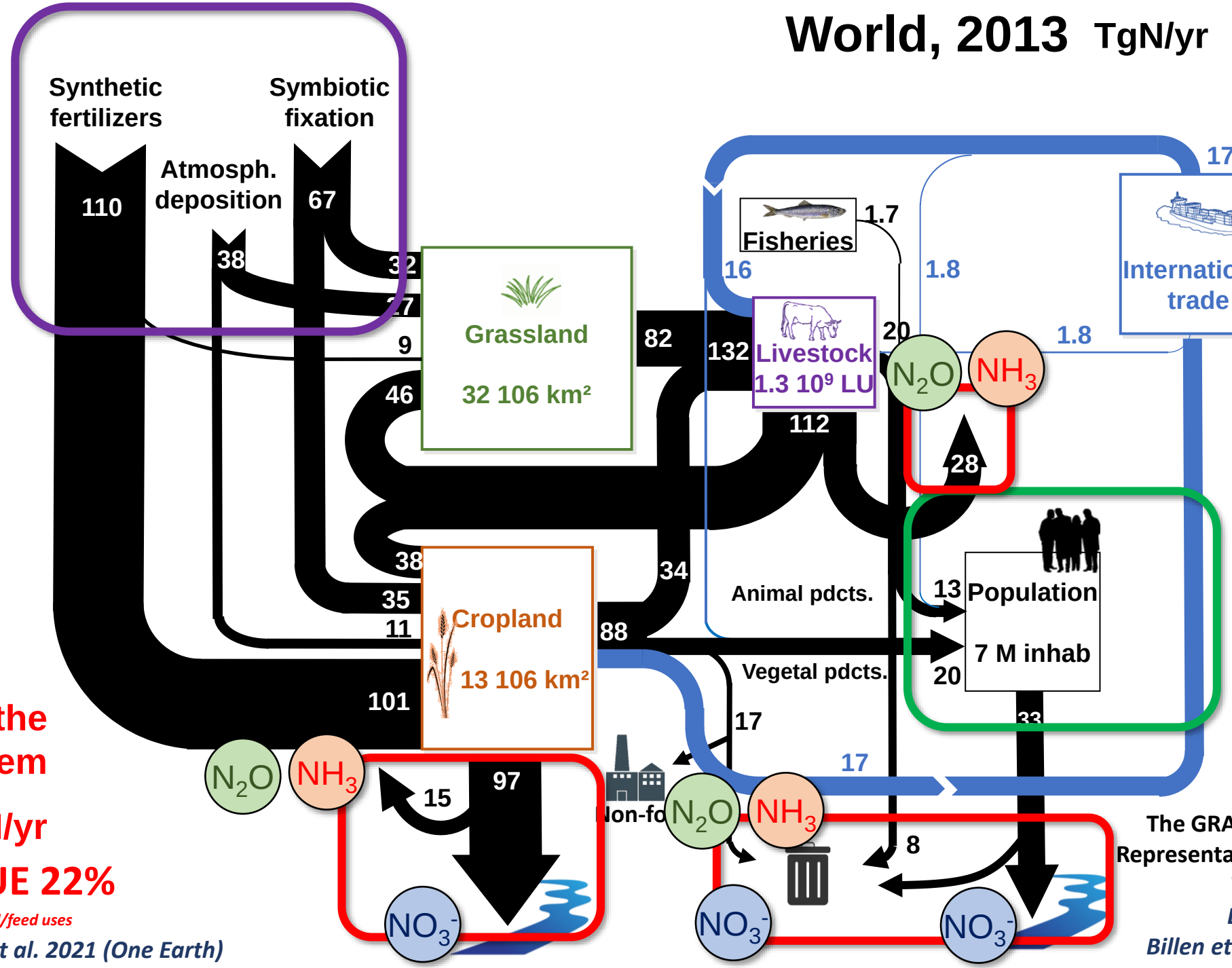
Instituto Superior de Agronomía, Lisboa

World, 2013 TgN/yr



New N Inputs into the system

196 TgN/yr

Not considering recirculated NH_3

N waste of the system

153 TgN/yr

System NUE 22%

Discounting N for non-food/feed uses

N waste: Sutton et al. 2021 (One Earth)

The GRAFS Approach: Generalized Representation of Agro-food systems

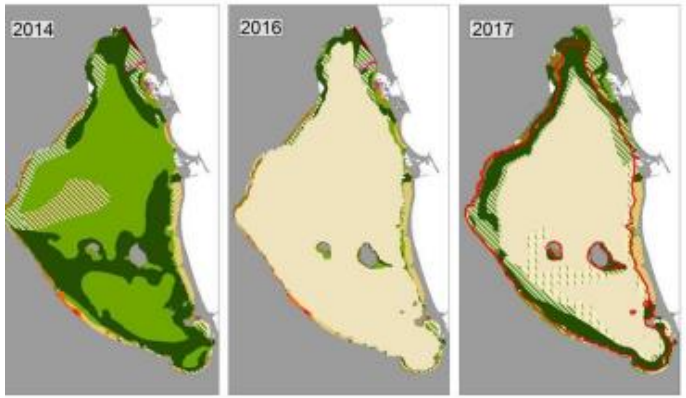
TOP-DOWN ESTIMATIONS

Lassaletta et al. 2016 (ERL)

Billen et al. 2014 (Glob. Food Sec.)

Nitrate leaching

NO_3^- Nitrate

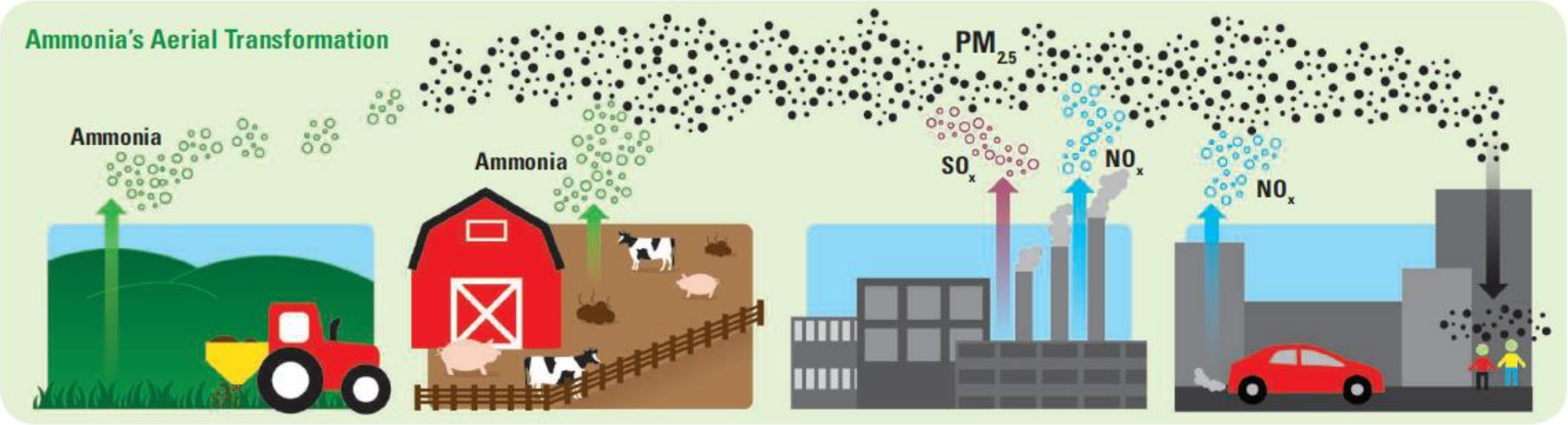


Dead zones
Pollution
Eutrophication

Air pollution: health problem & biodiversity loss

NH_3 **Ammonia**

España 10% de las emisiones de EU

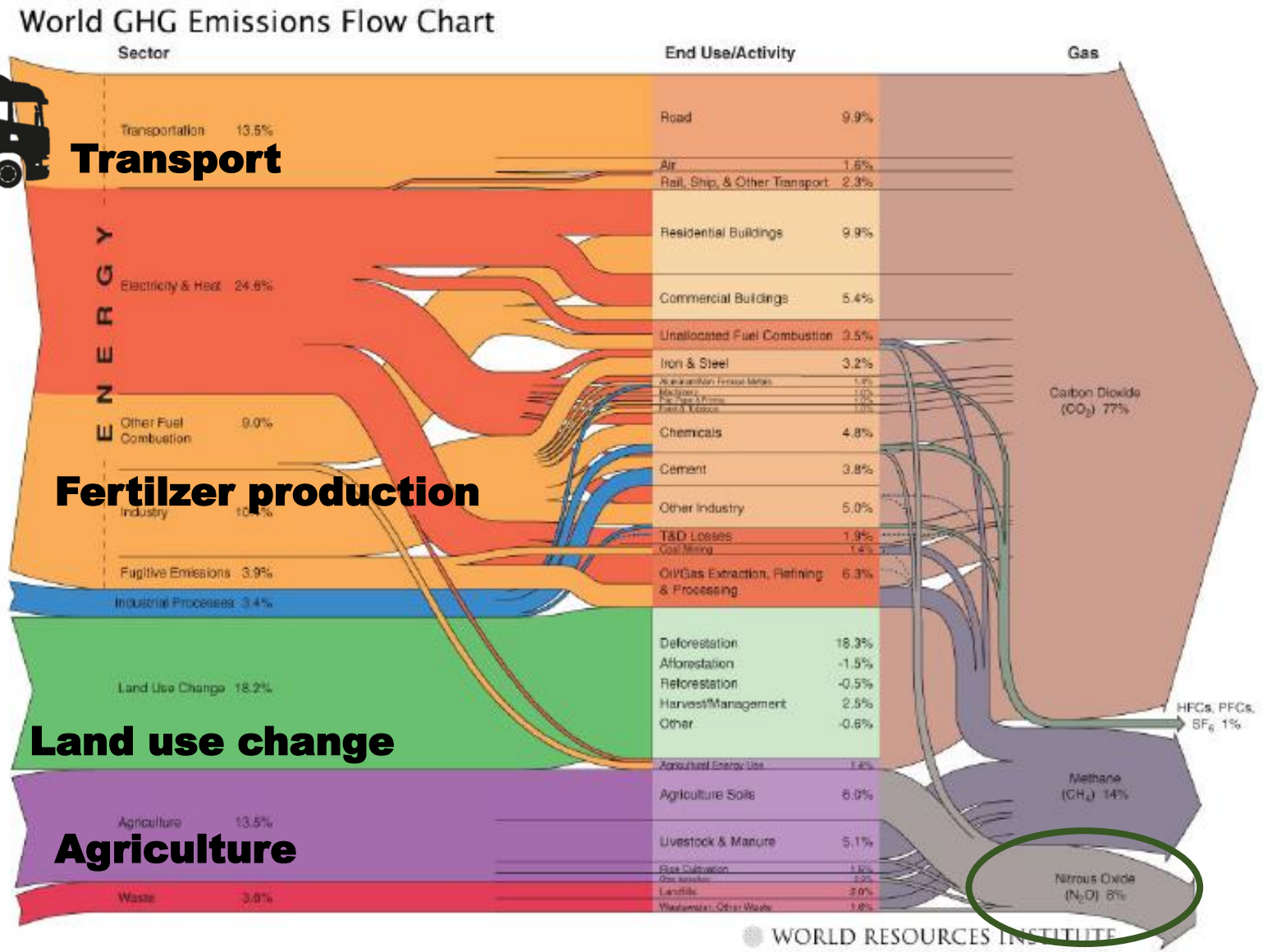


Climate change

Greenhouse gas emissions

N_2O Nitrous oxide

Transport



Fertilzer production

Land use change

Agriculture

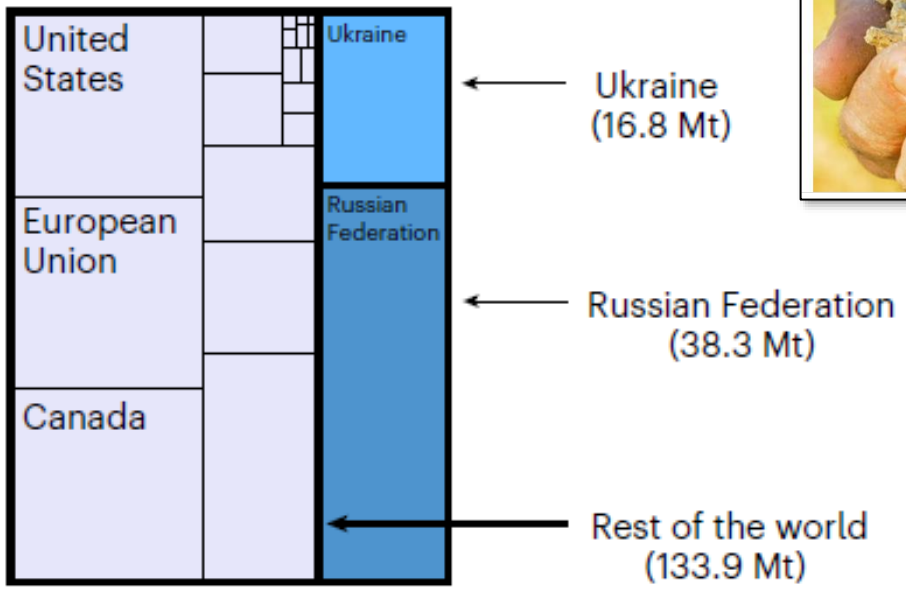
CO_2

CH_4

N_2O 8%

Waste of a very expensive resource

Russia-Ukraine
29% global exports

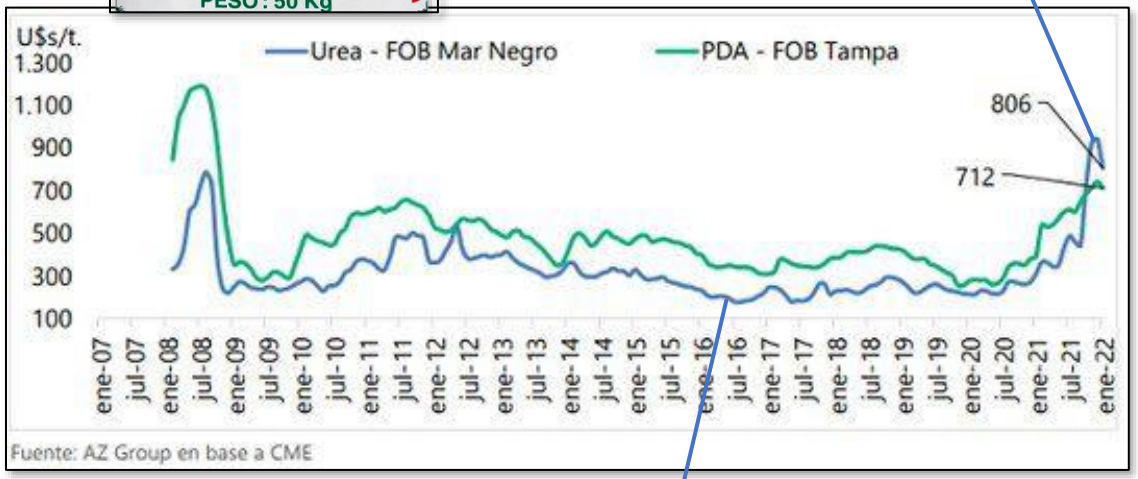


Alexander et al. 2022 (Nature food)

El precio del pienso sube un 40% de media por la guerra y los costes de las materias primas

Los fabricantes muestran tranquilidad porque ven el abastecimiento «garantizado» con la entrada de maíz o girasol de terceros países

Rise of energy prices: rise of fertilizer prices (400%)

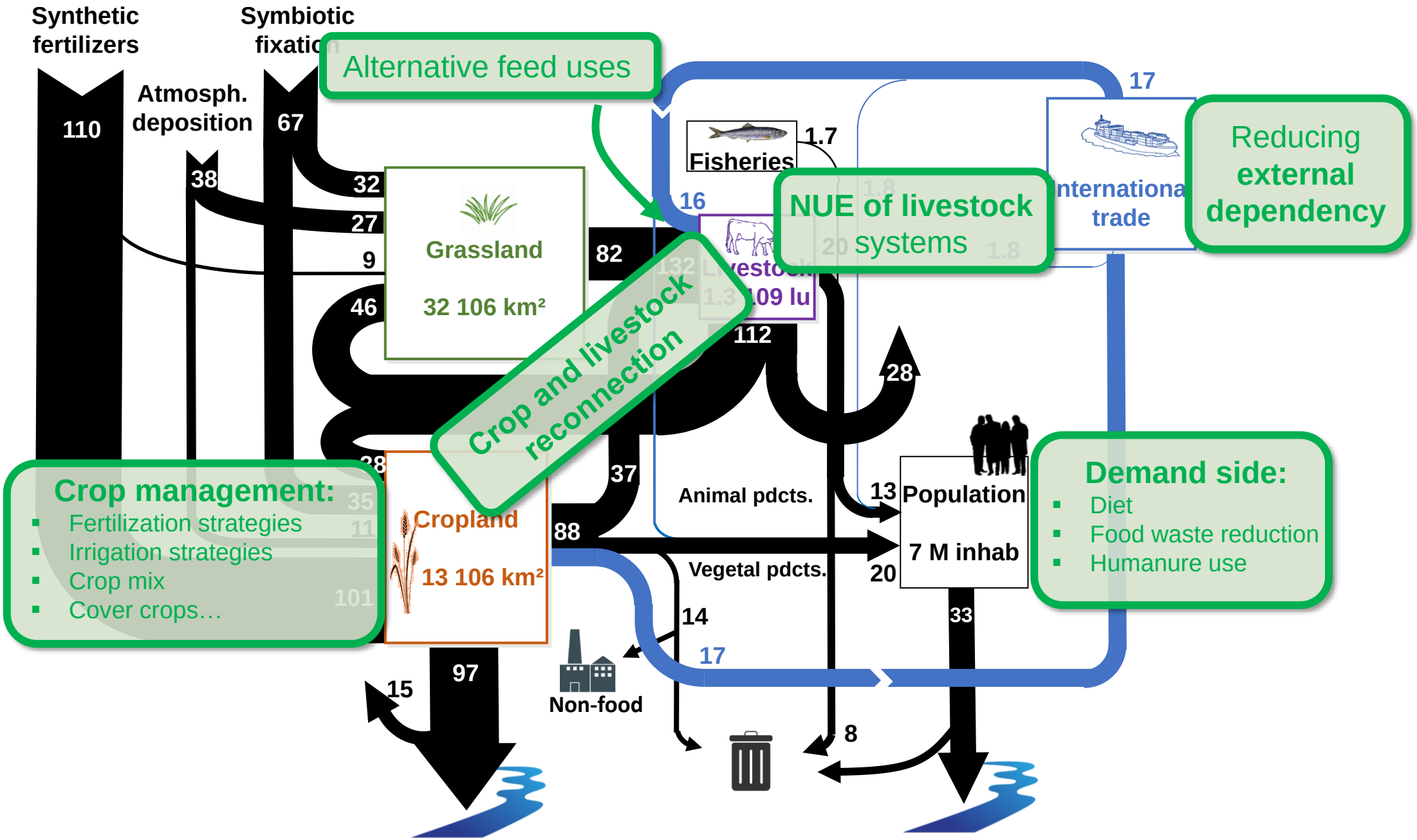


1.75 €/kg UFN

0.40 €/kg UFN

Leverages for change

World, 2013 TgN/yr



Territory AGROGREEN - SUDOE

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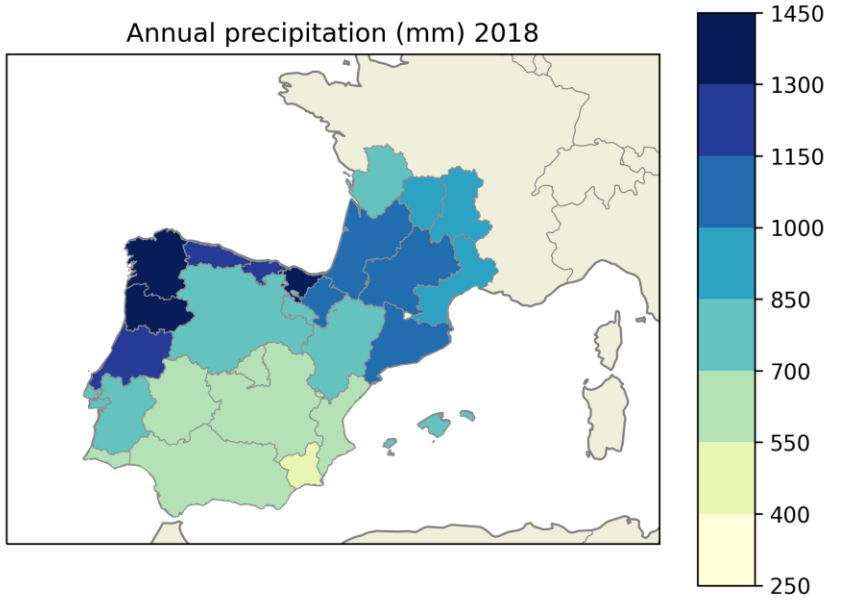
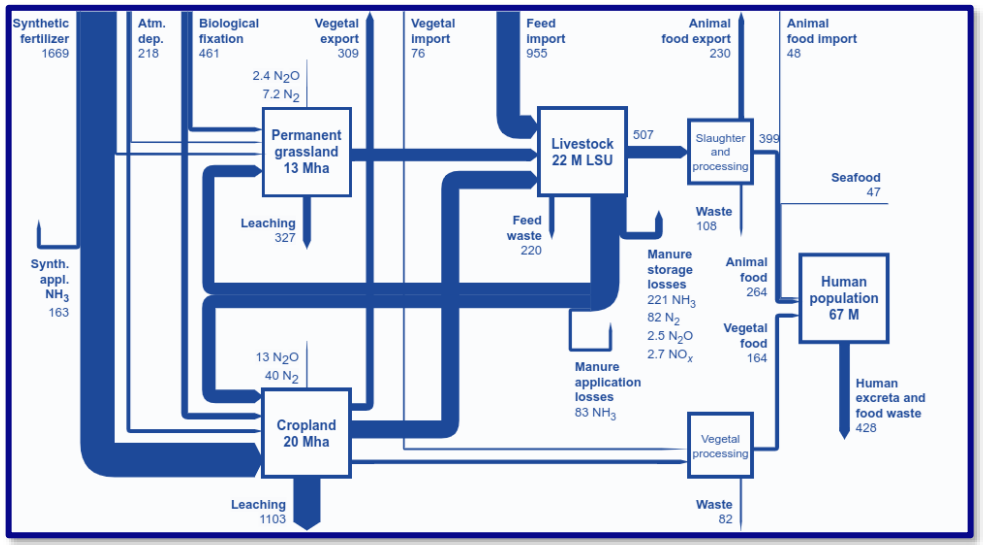
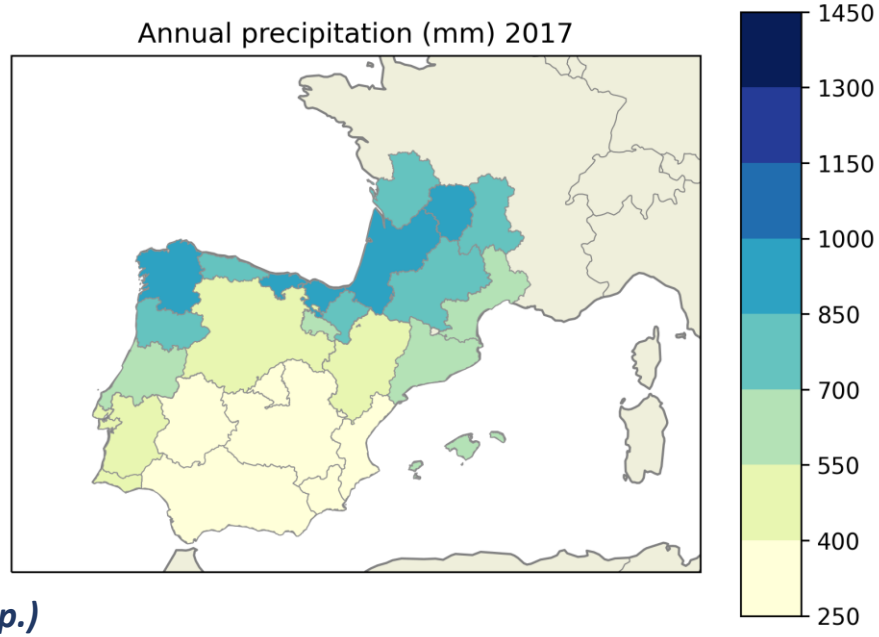
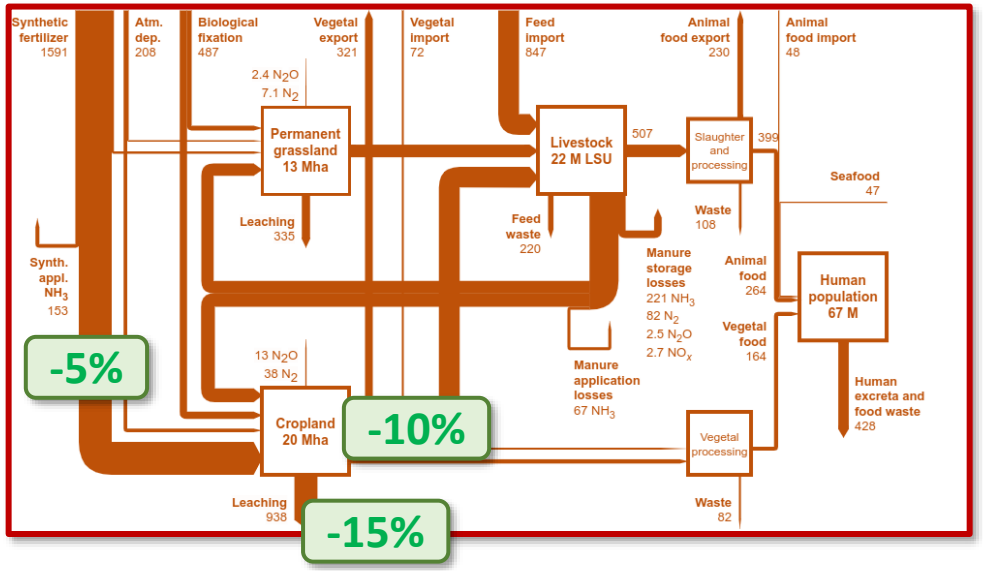
Wet year





Dry year





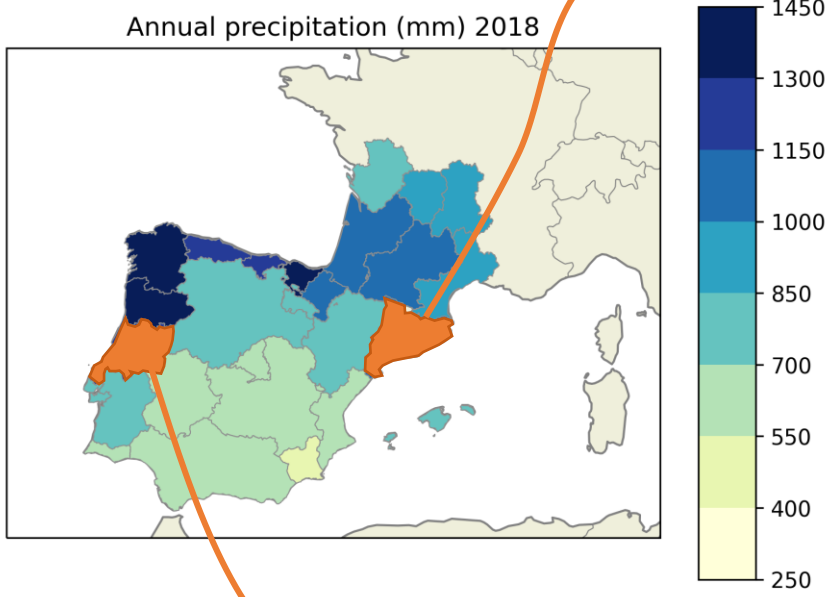
Einarsson et al. (In prep.)

AGROGREEN – SUDOE: NUTS2

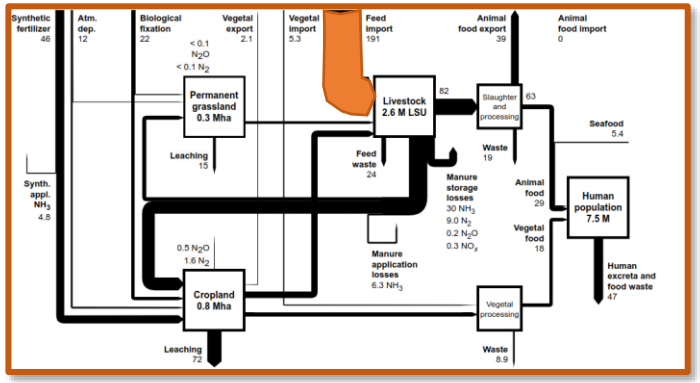
Contrasting typologies

Regions activated by net imports

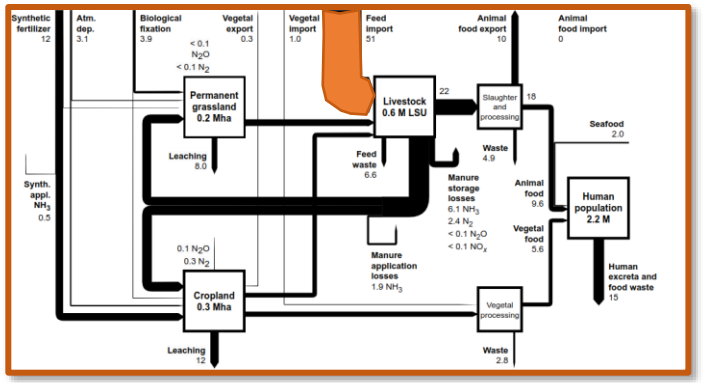
Wet year



Cataluña



Centro



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AGROGREEN – SUDOE: NUTS2

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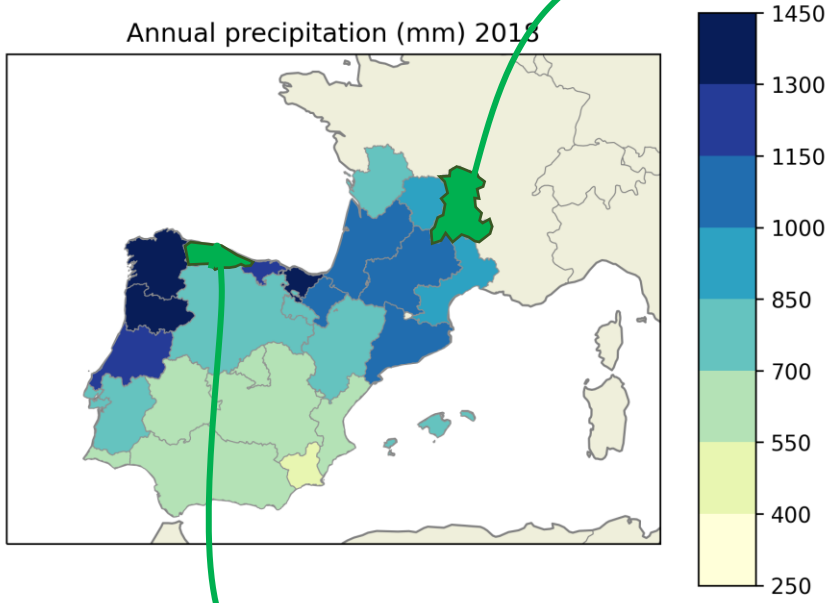
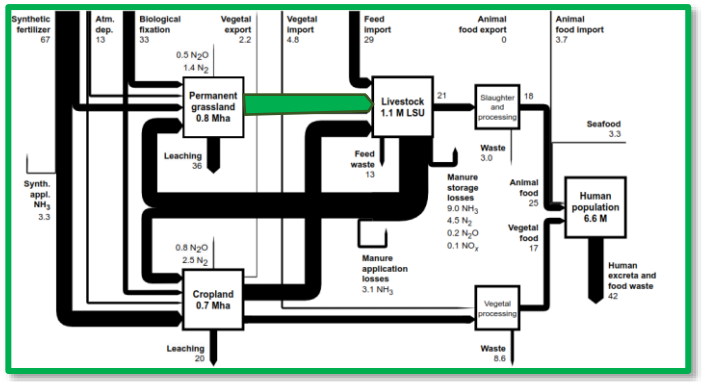
Contrasting typologies

Regions linked to grasslands

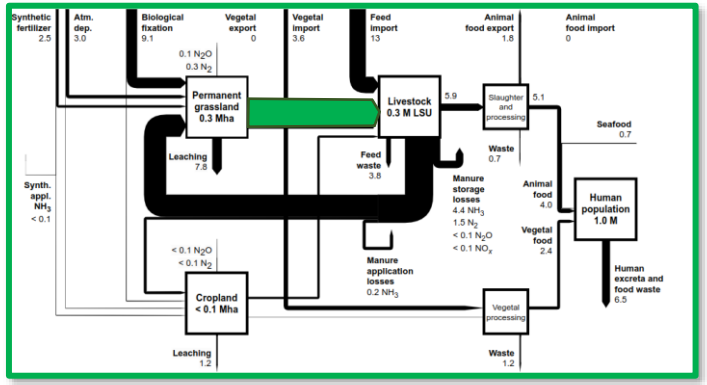
Wet year



Auvergne



Asturias



Einarsson et al. (In prep.)

AGROGREEN – SUDOE: NUTS2

Contrasting typologies

Regions activated by synthetic fertilizers

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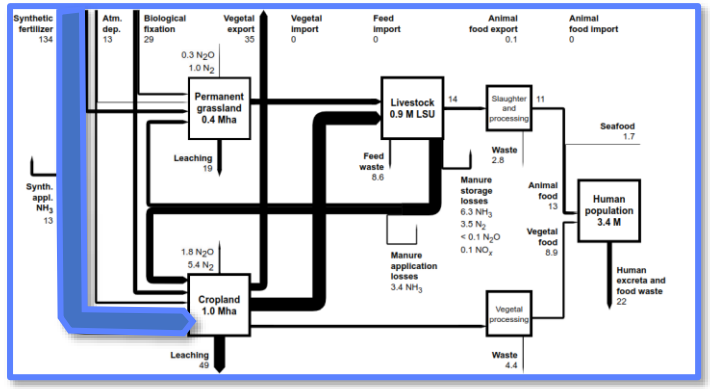
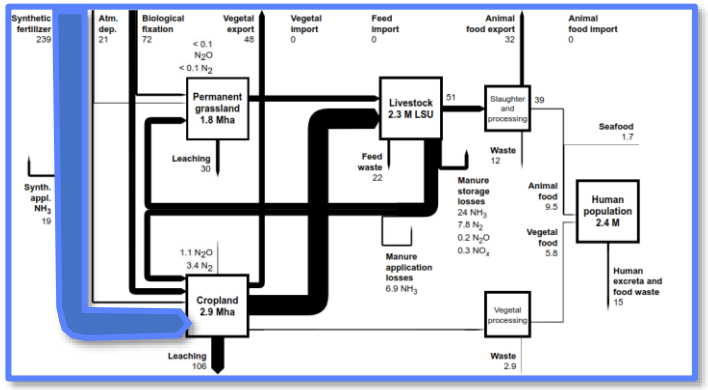
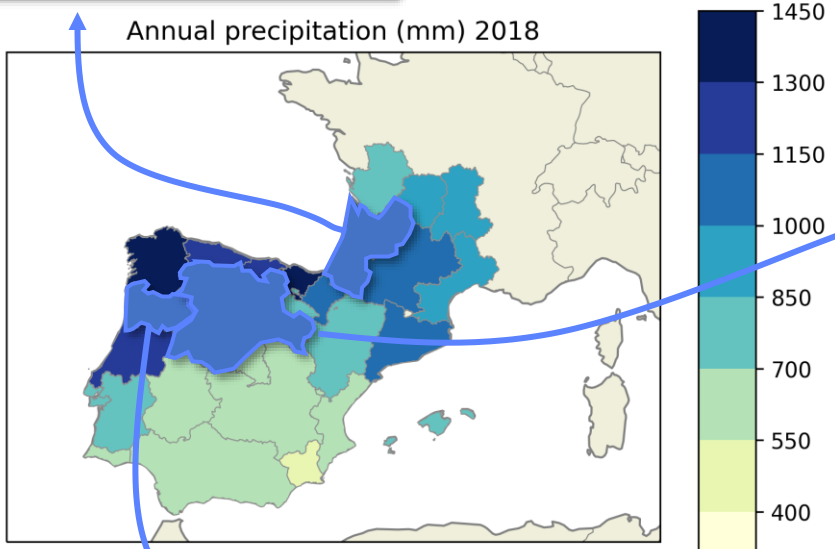
Aquitaine



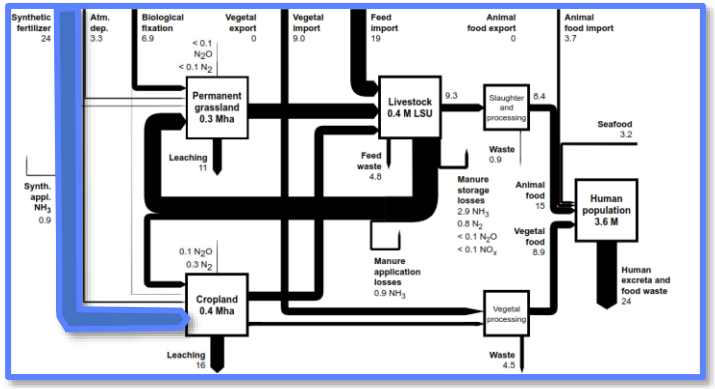
Castilla y Leon





Wet year

Norte



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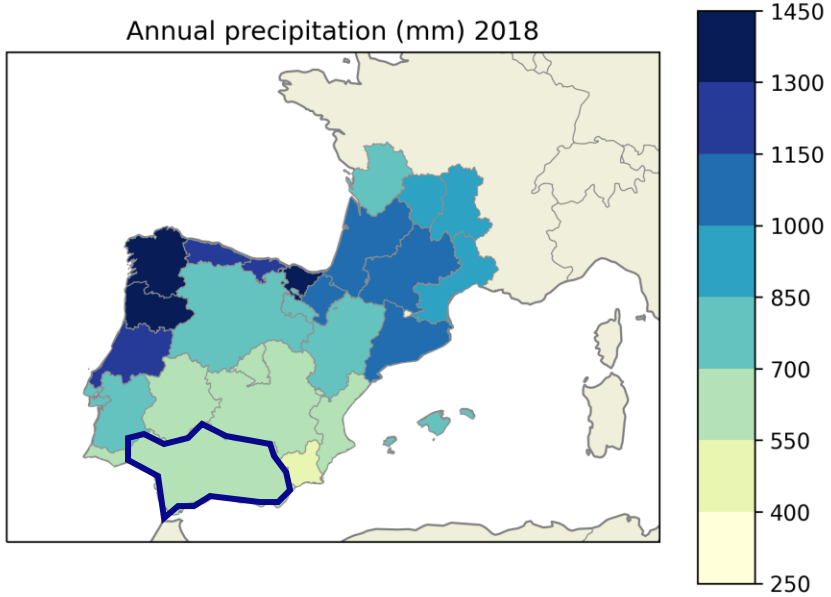
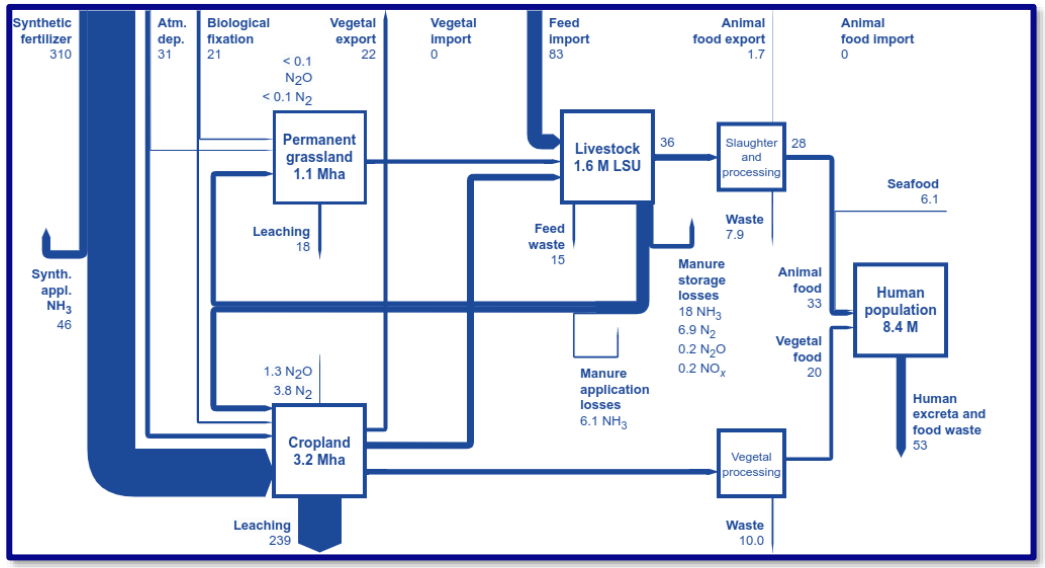
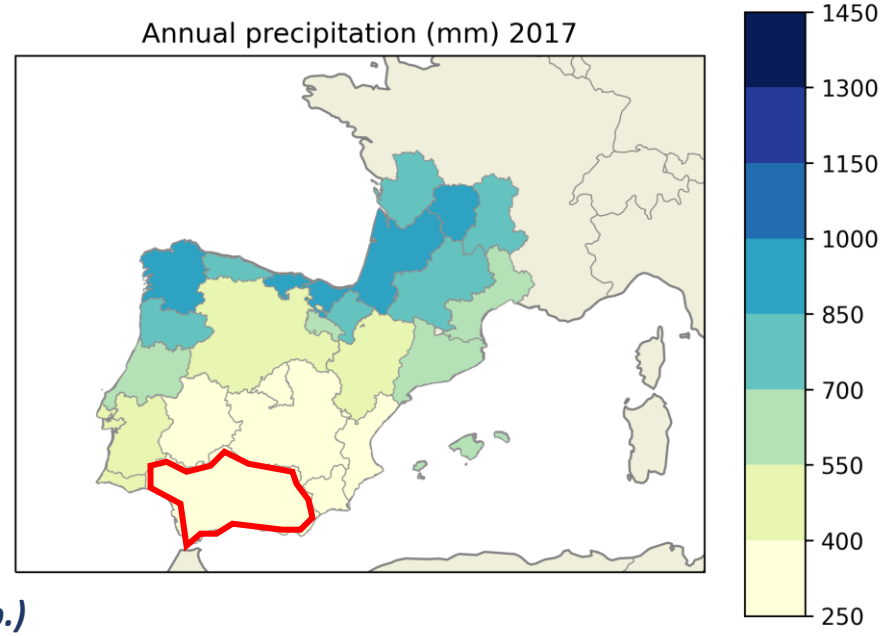
Andalucía

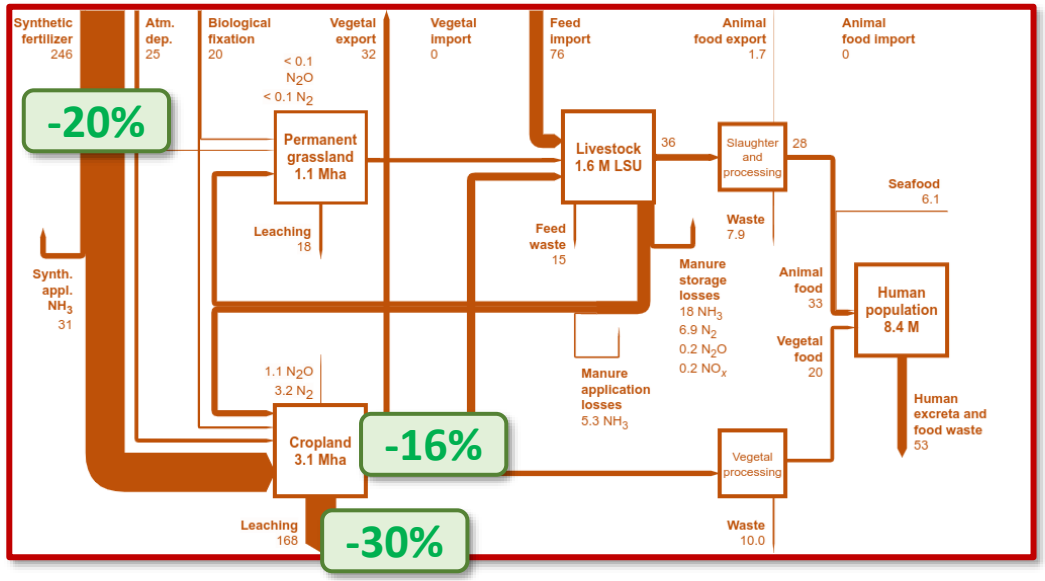
Wet year





Dry year





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Scenario AGROGREEN: Country scale (Scenarios)

Green maize replaced by alfalfa

Urea elimination. All synth. CAN

Drip irrigation

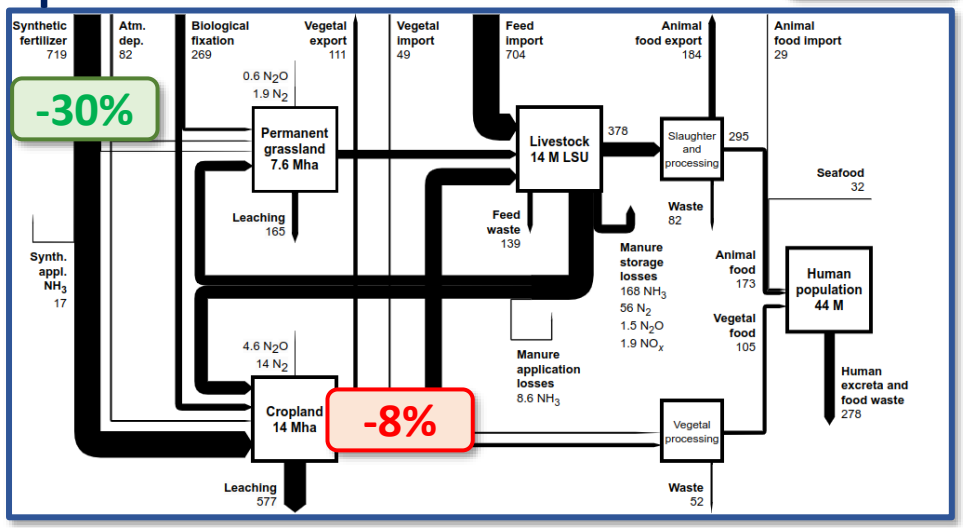
Manure incorporation

AGROGREEN – SUDOE: Country scale (Scenarios)

Inputs and economic indicators

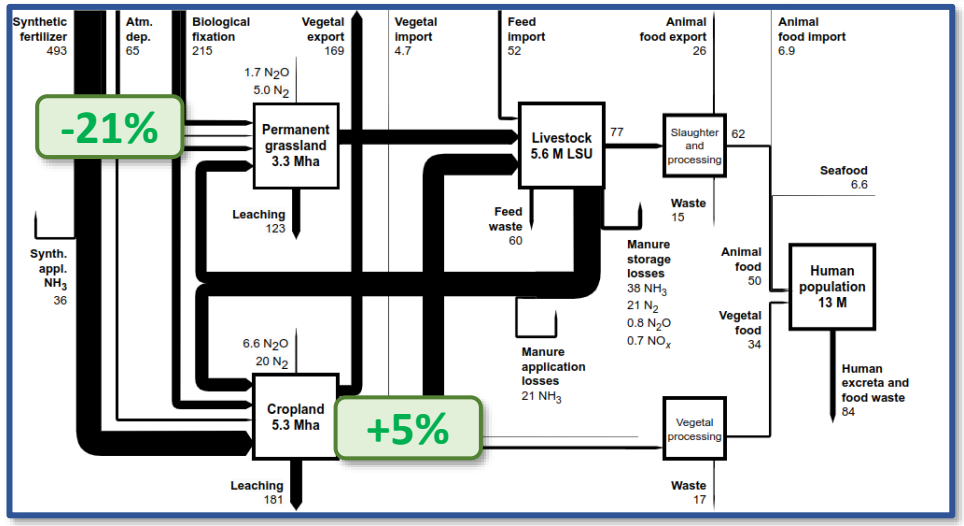
Spain

€ -6%



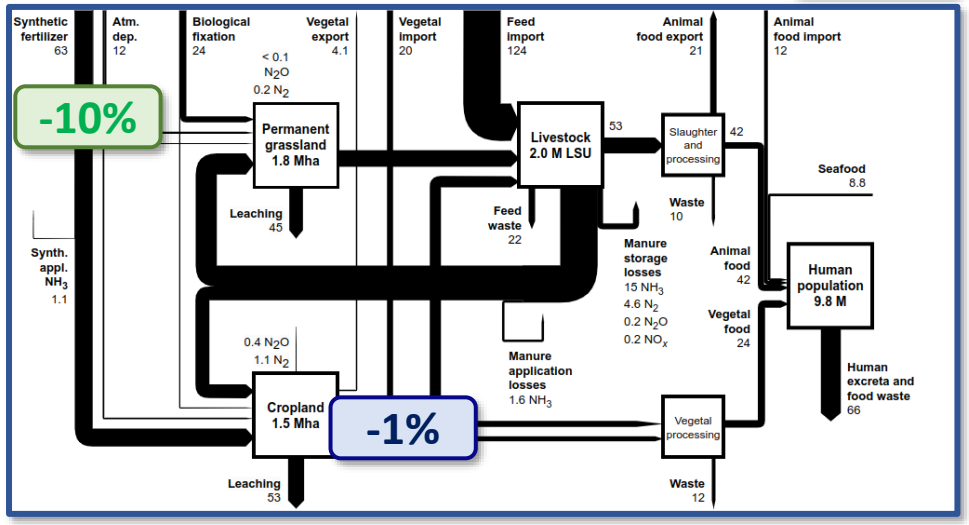
France (SUDOE)

€ +7%



Portugal

€ -1%



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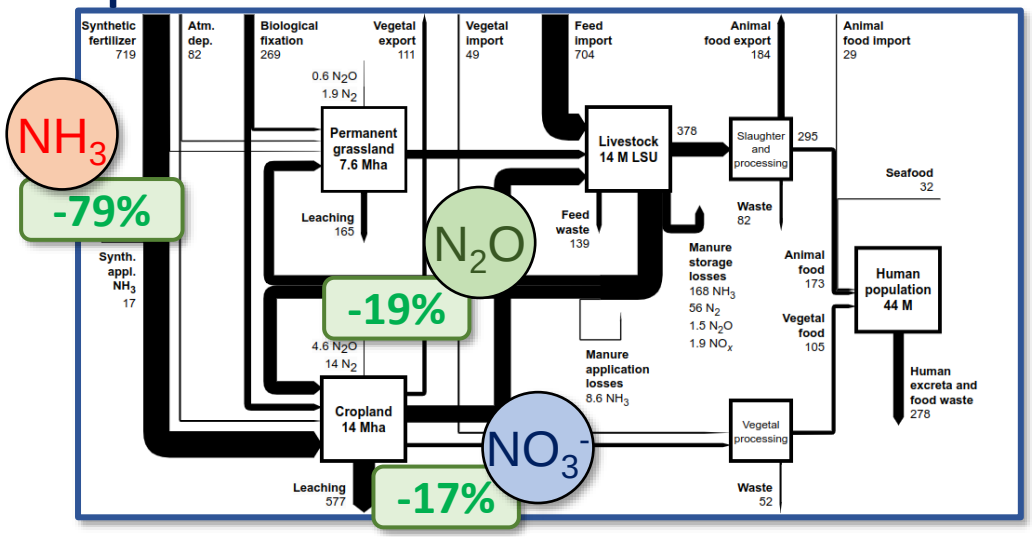
AGROGREEN – SUDOE: Country scale (Scenarios)

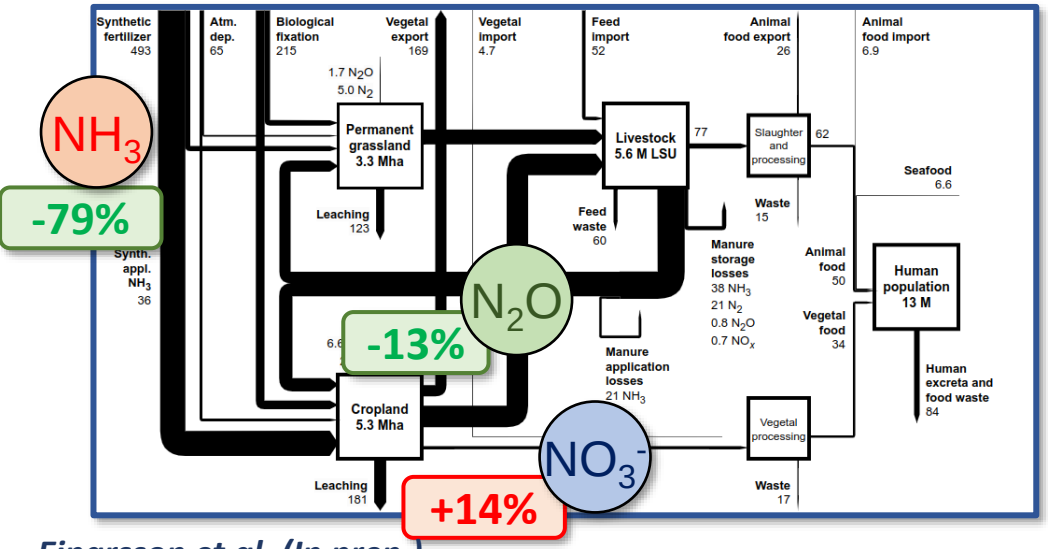
Pollution

NO_3^- NH_3 N_2O

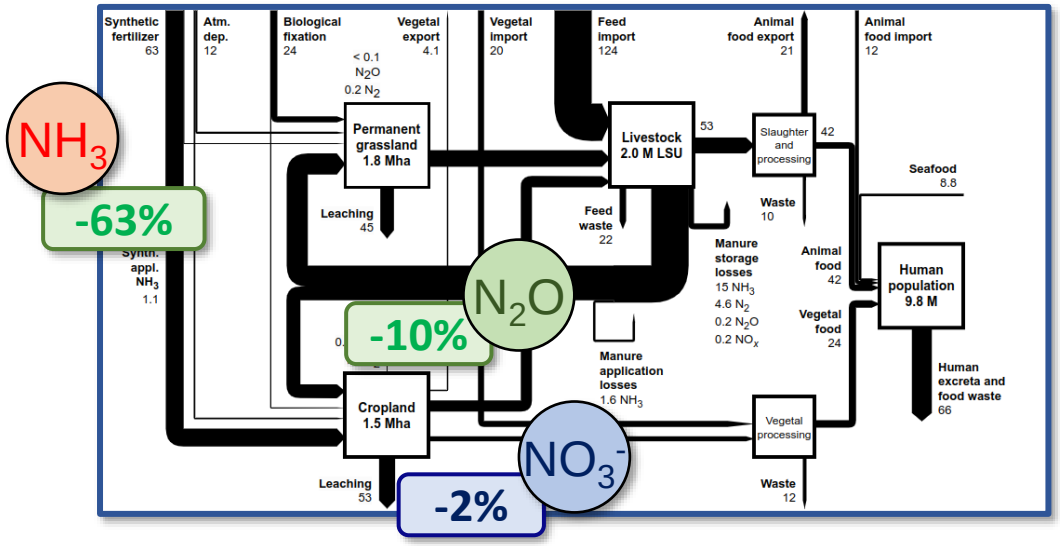
Spain



France (SUDOE)



Portugal



Einarsson et al. (In prep.)

Conclusions

A **good management of nitrogen** is essential from an **agronomic, economic and environmental perspective**

Sustainable agro-food systems **producing enough quality food with low pollution** need to comprise integrated approaches across the nested **system scales** (**from crop to the agro-food system scale**) and across the **spatial scales** (**from field to national**)

A combination of strategies embracing top-down and bottom-up perspectives is paramount to ensuring food security, profitability and environmental quality

Thank you!

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@AGRISOST_CM

Agradecimiento

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