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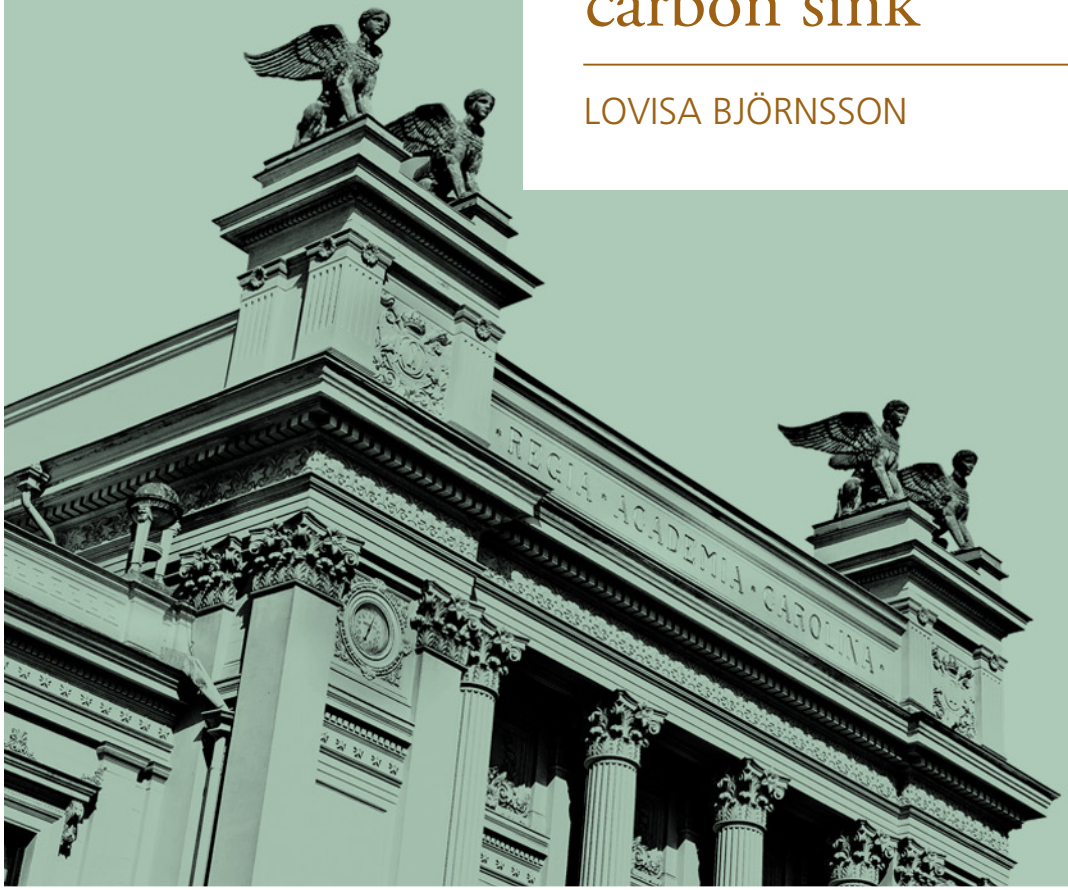
Grass to biogas turns arable land to carbon sink

LOVISA BJÖRNSSON



Project funding and reporting

Lovisa Björnsson, Thomas Prade & Mikael Lantz (2016) Grass for biogas - Arable land as carbon sink. Report 2016:280. Energiforsk, Stockholm/Malmö, Sweden.

https://energiforskmedia.blob.core.windows.net/media/20192/grass-for-biogas-energiforskrapport-2016-280.pdf

Lovisa Björnsson, Thomas Prade & Mikael Lantz (2016) Åkermark som kolsänka – en utvärdering av miljö- och kostnadseffekter av att inkludera gräsvall för biogas i spannmålsrika växtföljder. Rapport Nr 98, Miljö- och energisystem, Lunds Universitet, Lund, Sweden.

http://lup.lub.lu.se/record/c4b9d90c-c7f6-4481-b094-3e2e3fa6ad89

Göteborg Energi

Energimyndigheten

VÄSTRA GÖTALANDSREGIONEN

REGION SKÅNE

SLU

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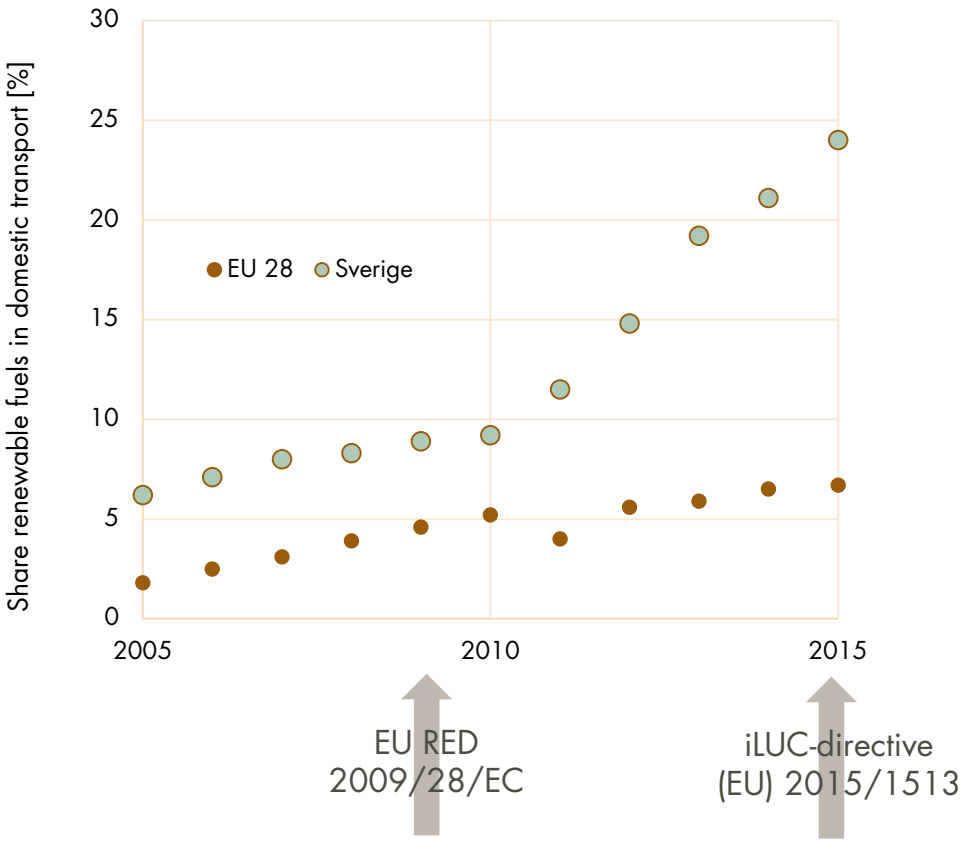
Arable land use and biofuels



Eurostat (2017) Share of renewable energy in fuel consumption of transport
"iLUC-directive" (EU) 2015/1513

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Arable land and soil carbon

Athmosphere: 750 billion t C

Above ground biomass: 550 billion t C

Soil: 1 500 billion t C

"45% of the soils in the EU have low or very low (0-2%), and declining, soil organic carbon (SOC) content"

"…soil resources in many parts of Europe are being over-exploited, degraded and irreversibly lost due to inappropriate land management practices…"

"A healthy, fertile soil is at the heart of food security"

Jones et al. (2012) The state of soil in Europe. Report EUR 25186 EN. JRC, Ispra, Italy.

Kätterer & Andrén (1998) Long-term agricultural field experiments in Northern Europe: Analysis of the influence of management on soil carbon stocks using the ICBM model. *Agriculture, Ecosystems and Environment.* 72, 165-179.

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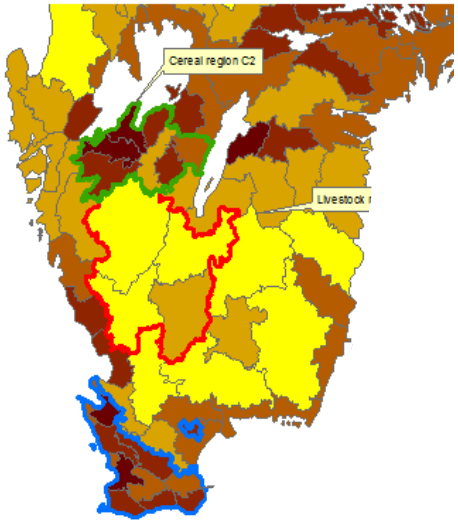
Aim

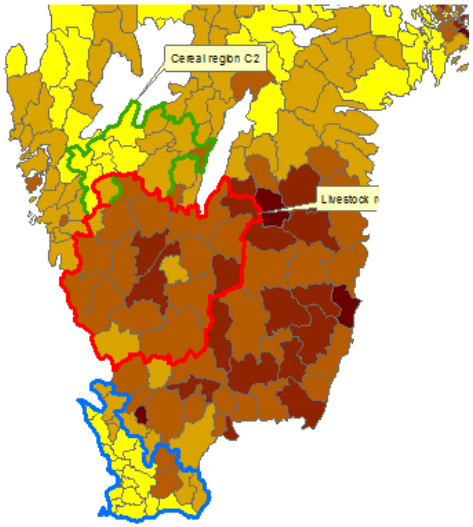
Visualize how **existing knowledge** on crop and biofuel production can be applied to create a **system with dual benefits**;

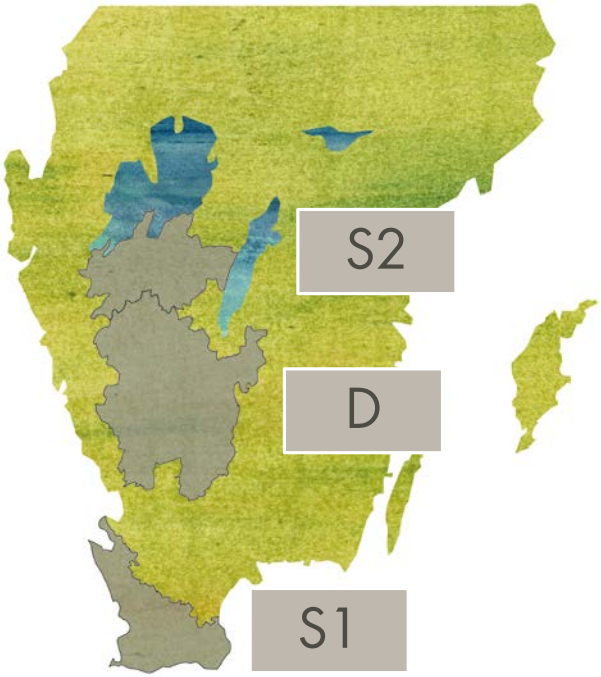
Incresing soil carbon content in combination with a **locally produced biofuel** with **low GHG emssions**

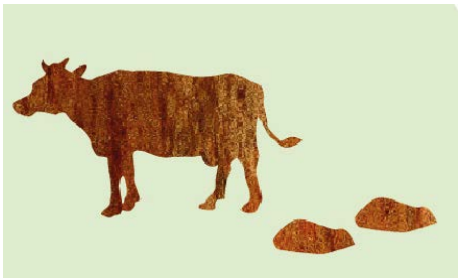
"Existing policies tend to address issues in relative isolation"

Agricultural specialization









Lovisa Björnsson, Thomas Prade & Mikael Lantz (2016) Grass for biogas - Arable land as carbon sink. Report 2016:280. Energiforsk, Stockholm/Malmö, Sweden.
Lovisa Björnsson, Thomas Prade & Mikael Lantz (2016) Åkermark som kolsänka – en utvärdering av miljö- och kostnadseffekter av att inkludera gräsvall för biogas i spannmålsrika växtföljder. Rapport Nr 98, Miljö- och energisystem, Lunds Universitet, Lund, Sweden.

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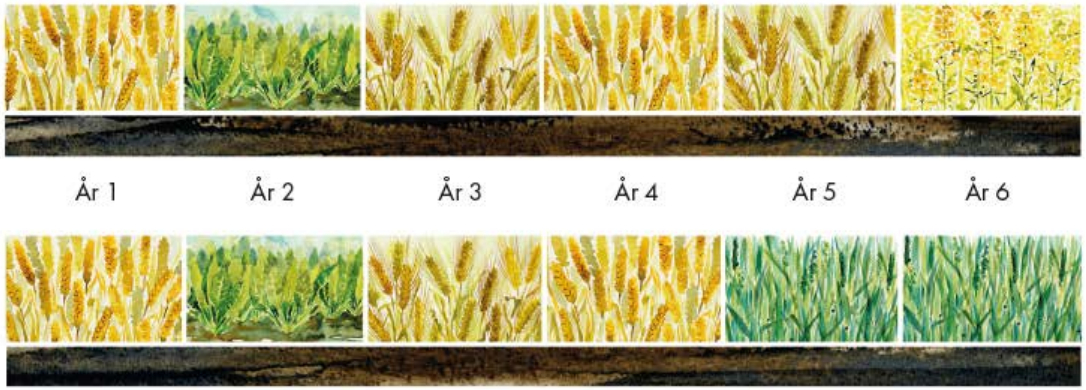
S1

NUVARANDE (ÖVRE)
MODIFIERAD (UNDRE)



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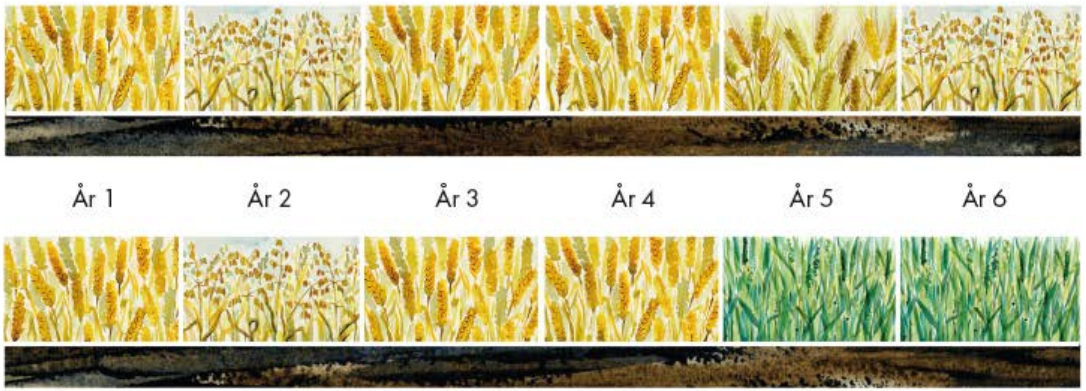
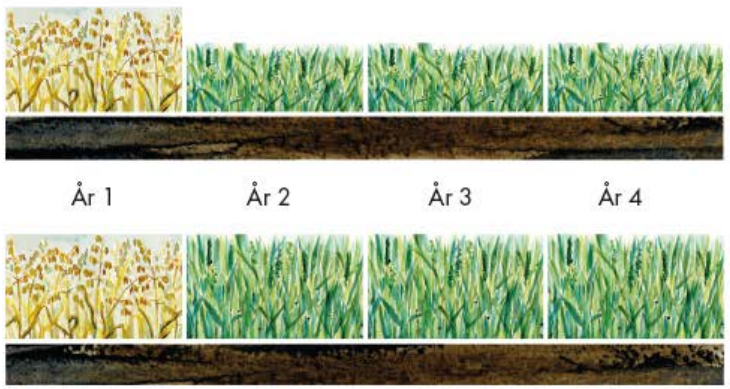


D

NUVARANDE (ÖVRE)
MODIFIERAD (UNDRE)



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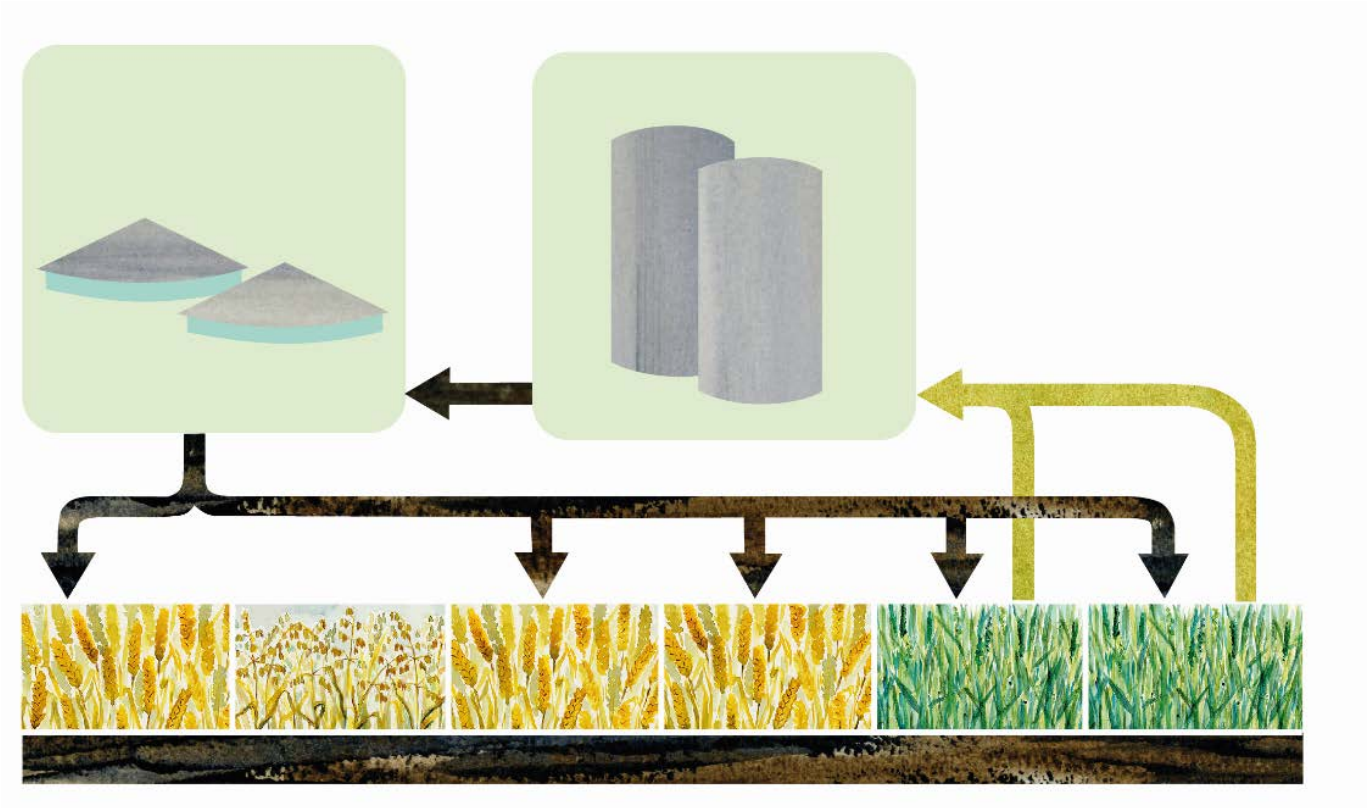
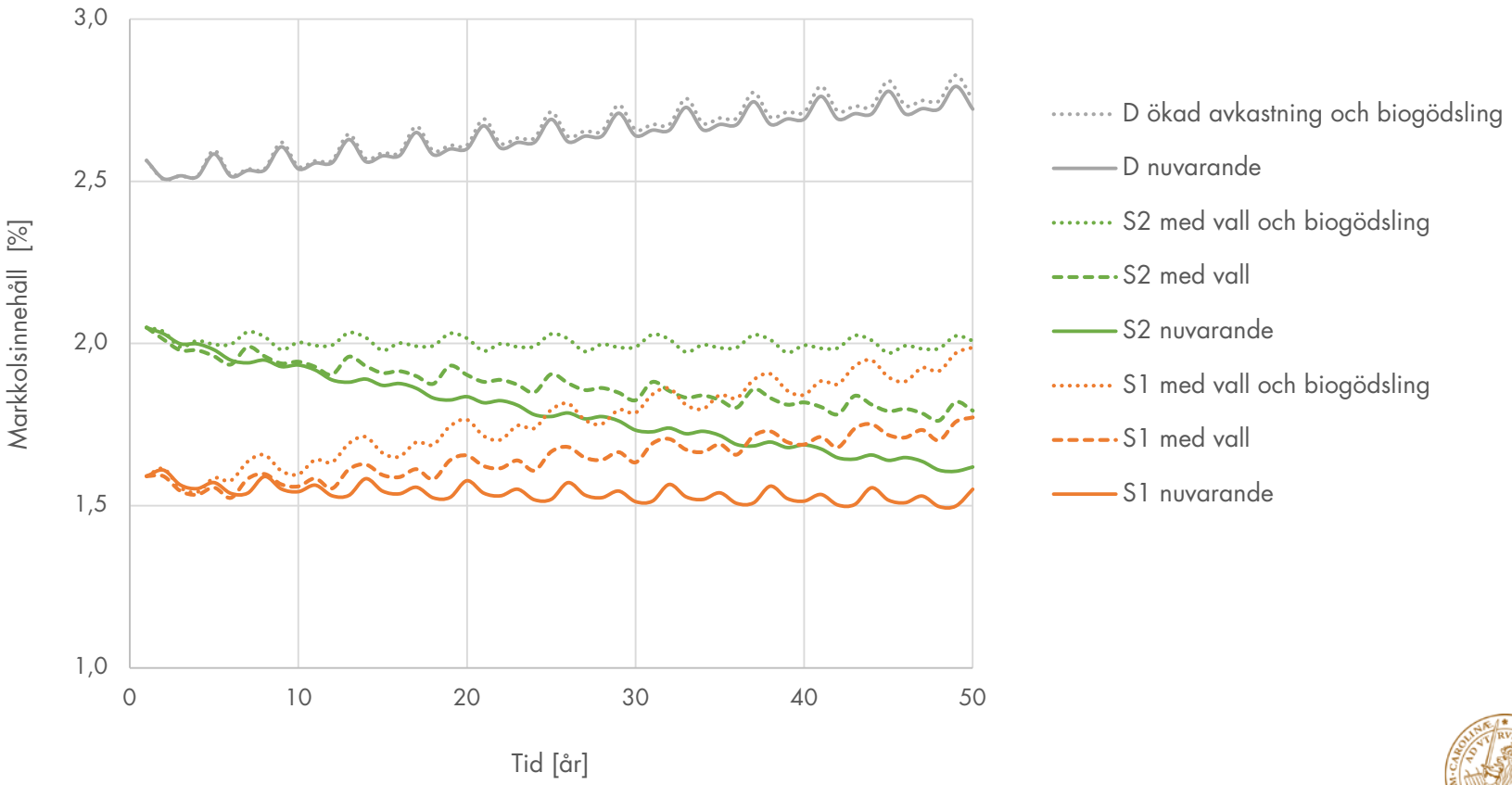
Grass as biogas feedstock



Soil carbon development



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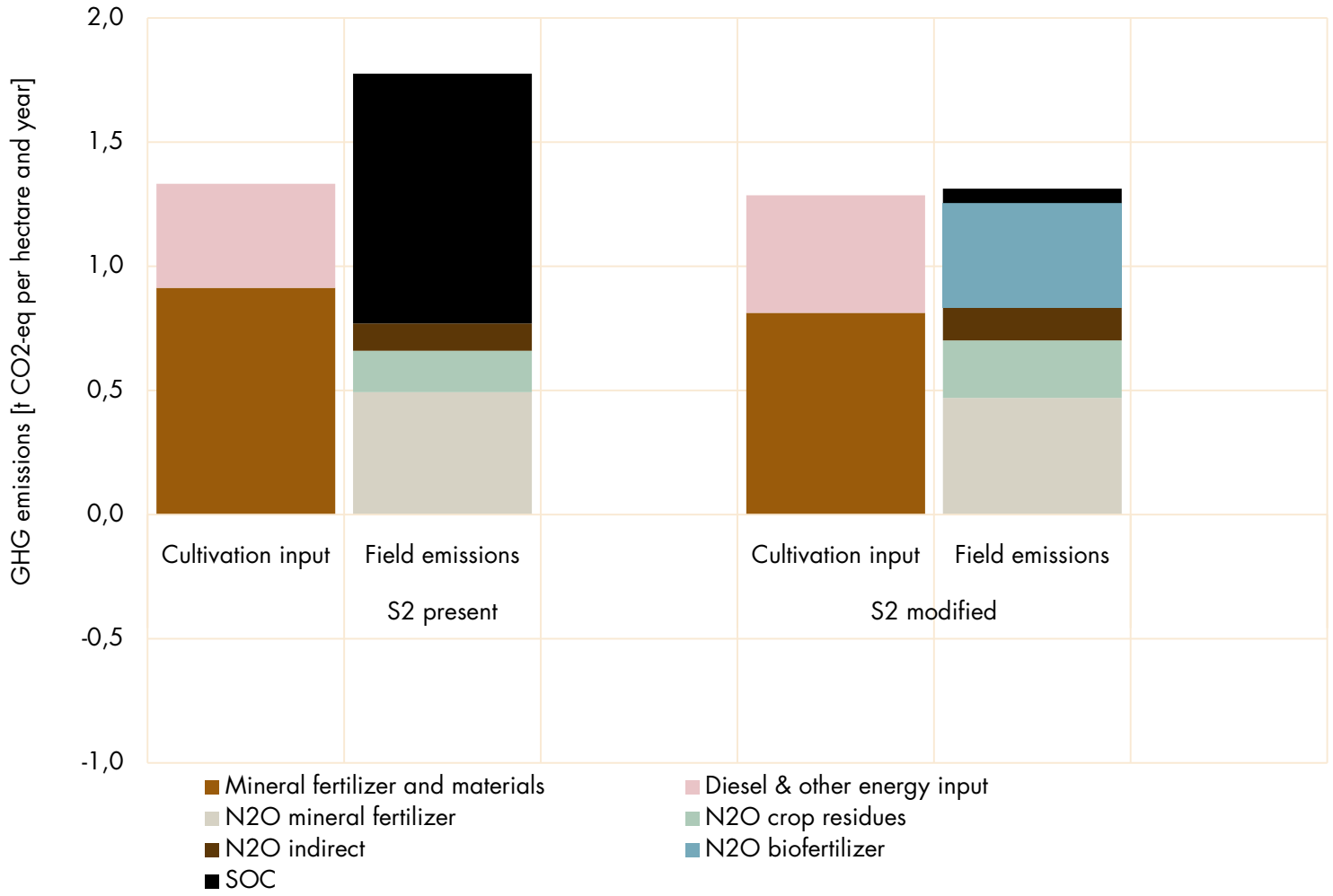
GHG emissions cultivation



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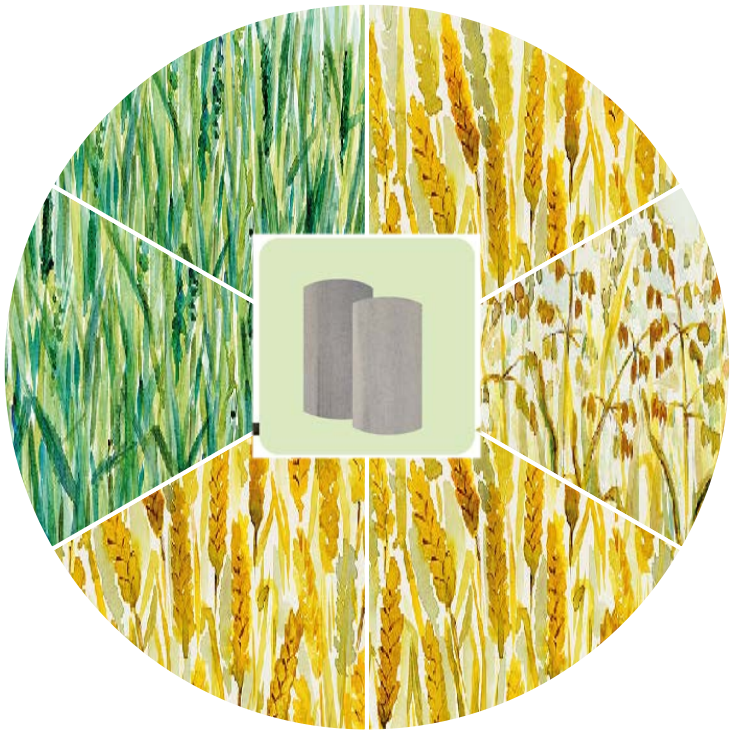
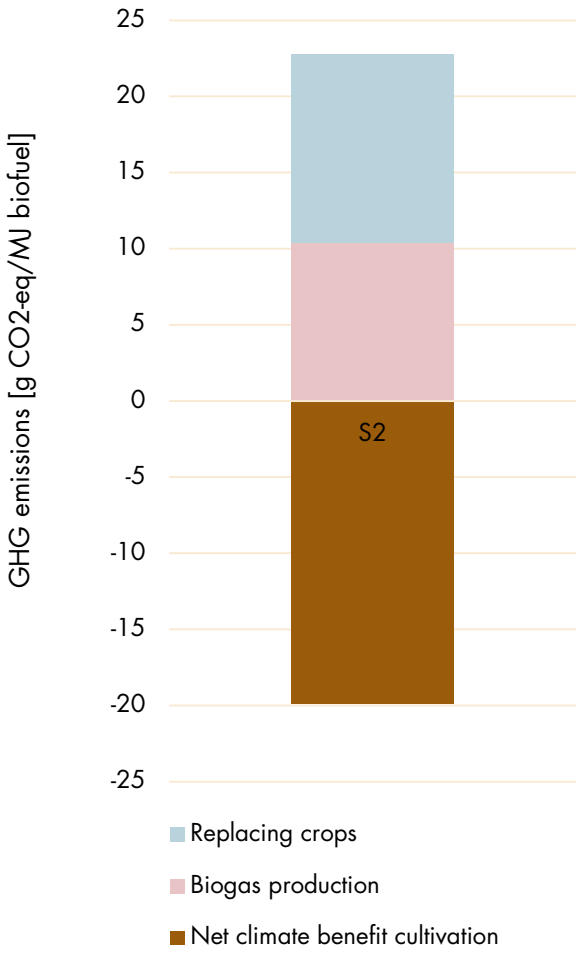
GHG emissions from a fuel perspective





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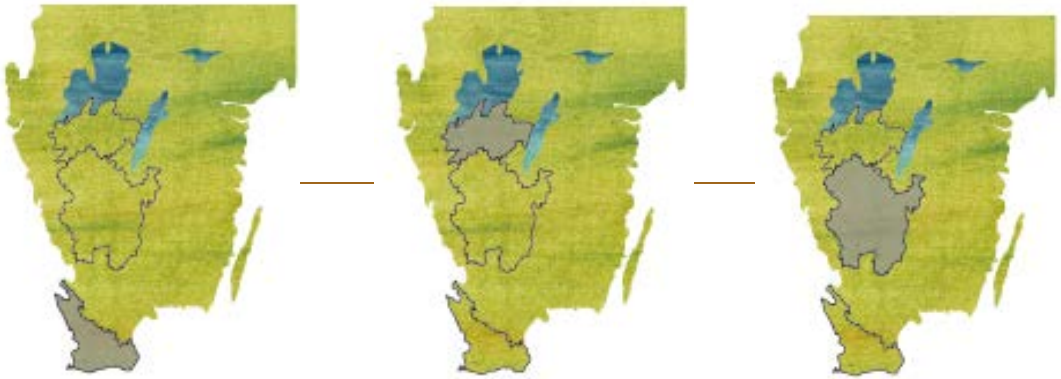

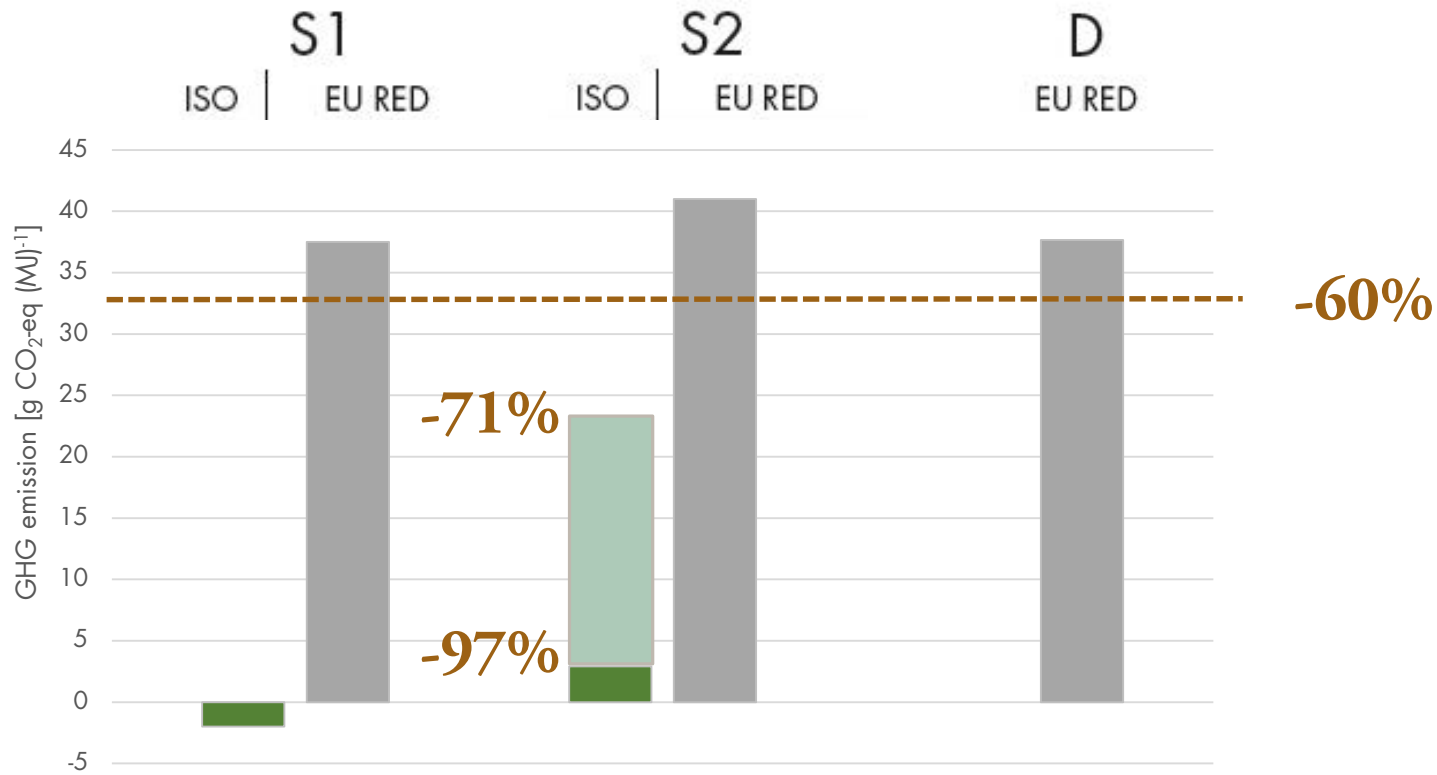

Valin et al. (2015) The land use change impact of biofuels consumed in the EU - Quantification of area and greenhouse gas impacts. ECOFYS, Utrecht, The Netherlands-

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To conclude

- Too narrow perspectives makes us miss systems with dual benefits

- It is important to consider potential conflicts between sustainable food supply and an increasing demand of biomass in other sectors

BUT also consider the fact that current agriculture on our most high yielding soils is not sustainable from a long term perspective – and drastic measures will be needed to change this development

- To introduce integrated cereal and energy grass production is one way to turn the present soil carbon losses

BUT grass based biogas production is not sustainable according to the EU RED calculation method for biofuels

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