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Agro-Bio Tech

Can grazing forge the stability of farming systems?

Modelling trade-offs in ICLS

Jérôme Bindelle, Benjamin Dumont & Mathieu Delandmeter

12th of April 2026

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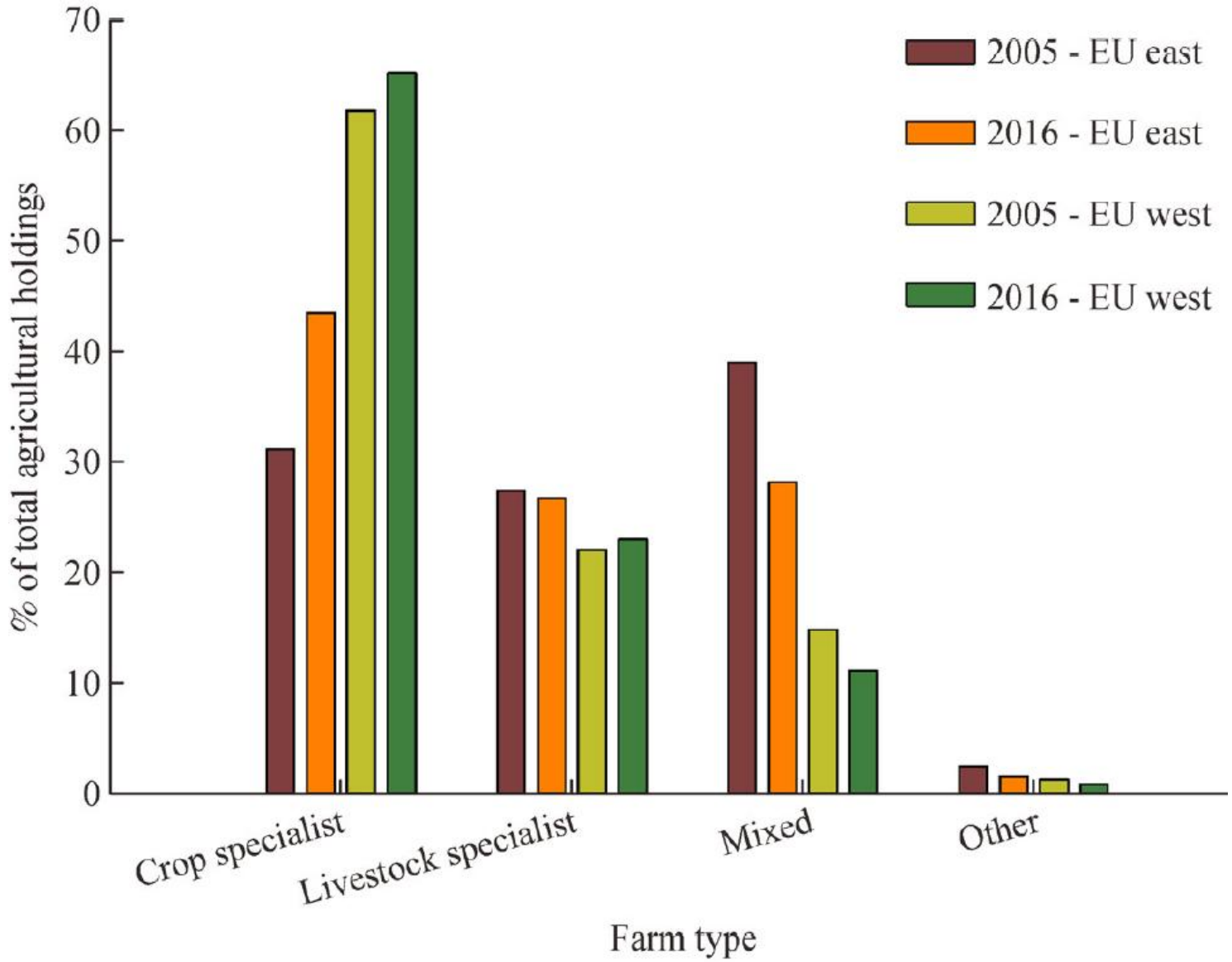
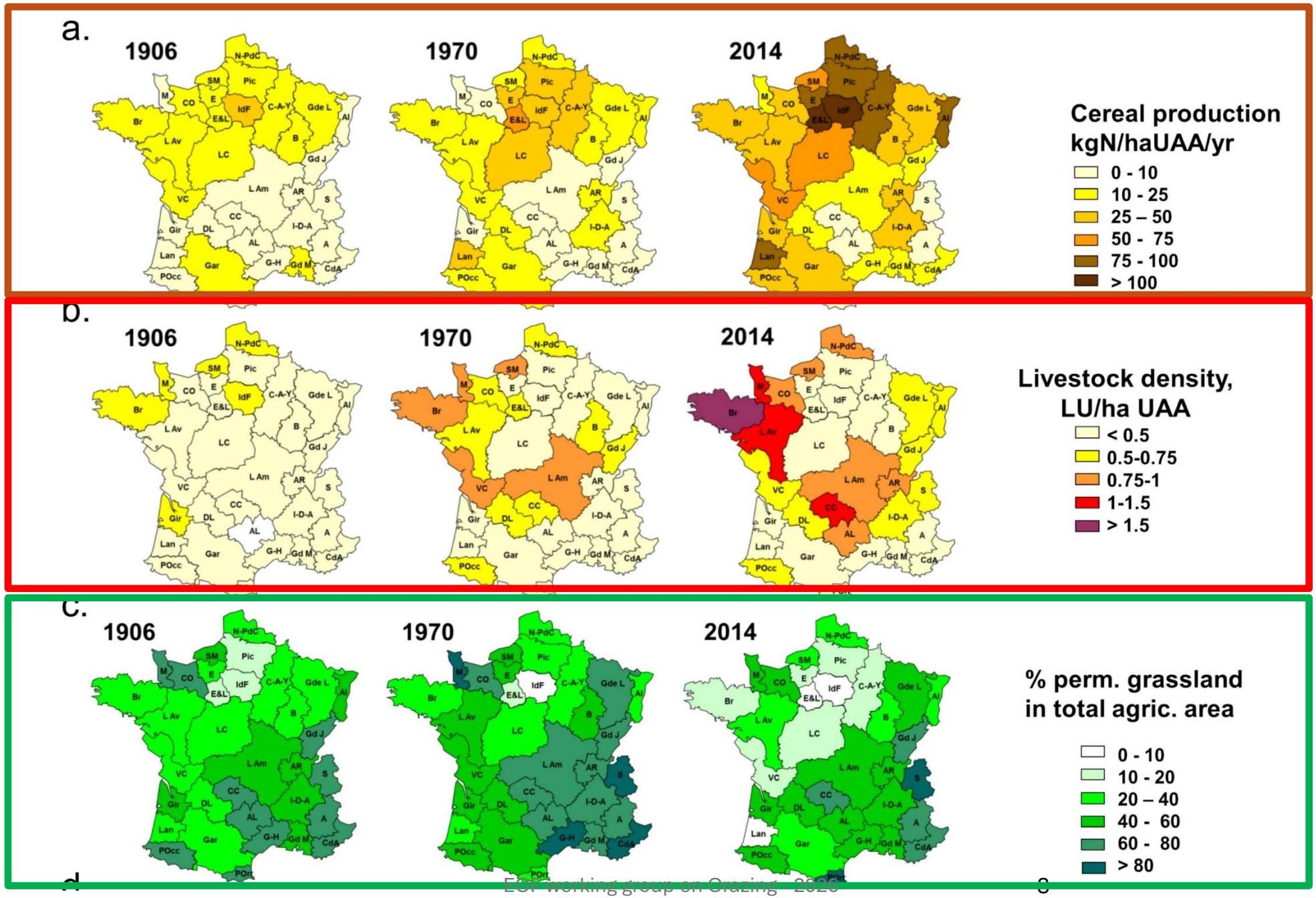
ICLS in Europe



Schut et al. 2020
https://journal.hep.com.cn/fase/EN/10.15302/J-FASE-2020373

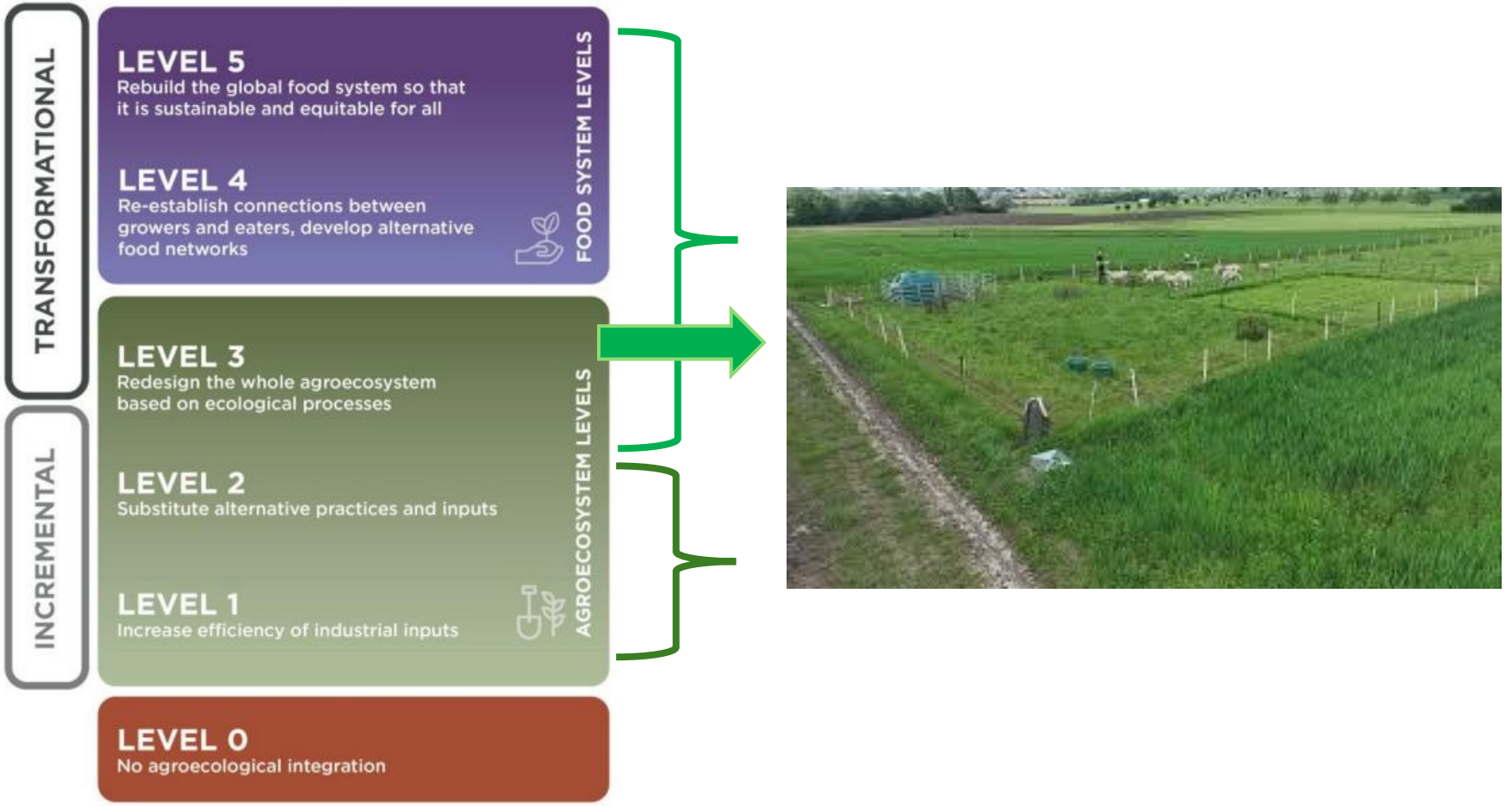


Le Noë et al, 2019 https://doi.org/10.1016/j.scitotenv.2019.01.048

The Siesta

Vincent van Gogh

Livestock used to fullfill many services



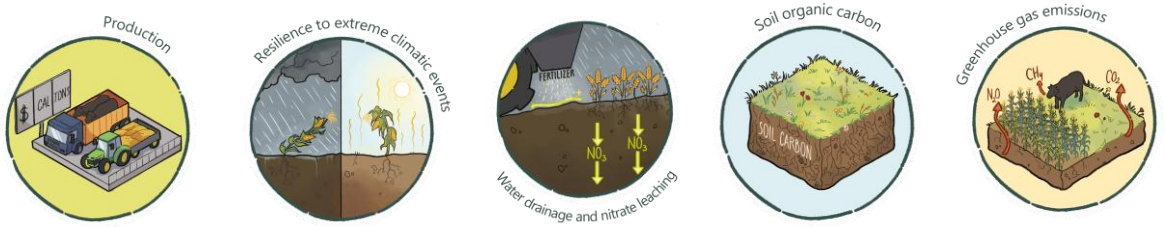
What happens if we (re)introduce a trophic level aka domestic herbivores on the fields?

3 case-studies – 3 contexts

Modelling (STICS and SALUS) as tools to explore:

➔Trade-offs

➔Possible futures



Exploring grazing intensity in simple crop-livestock systems

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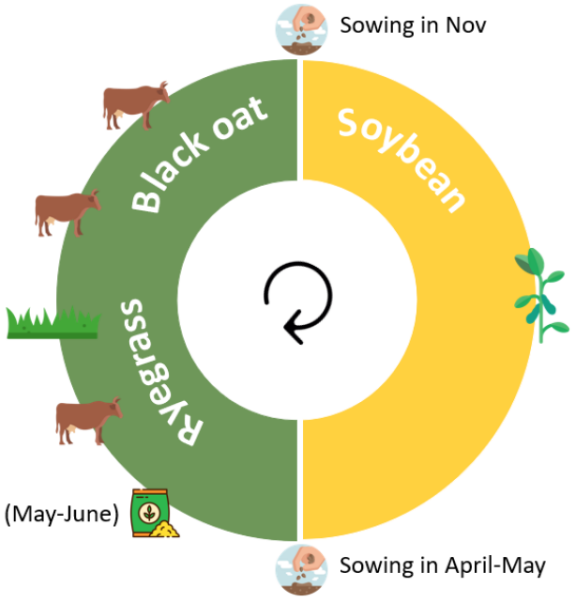
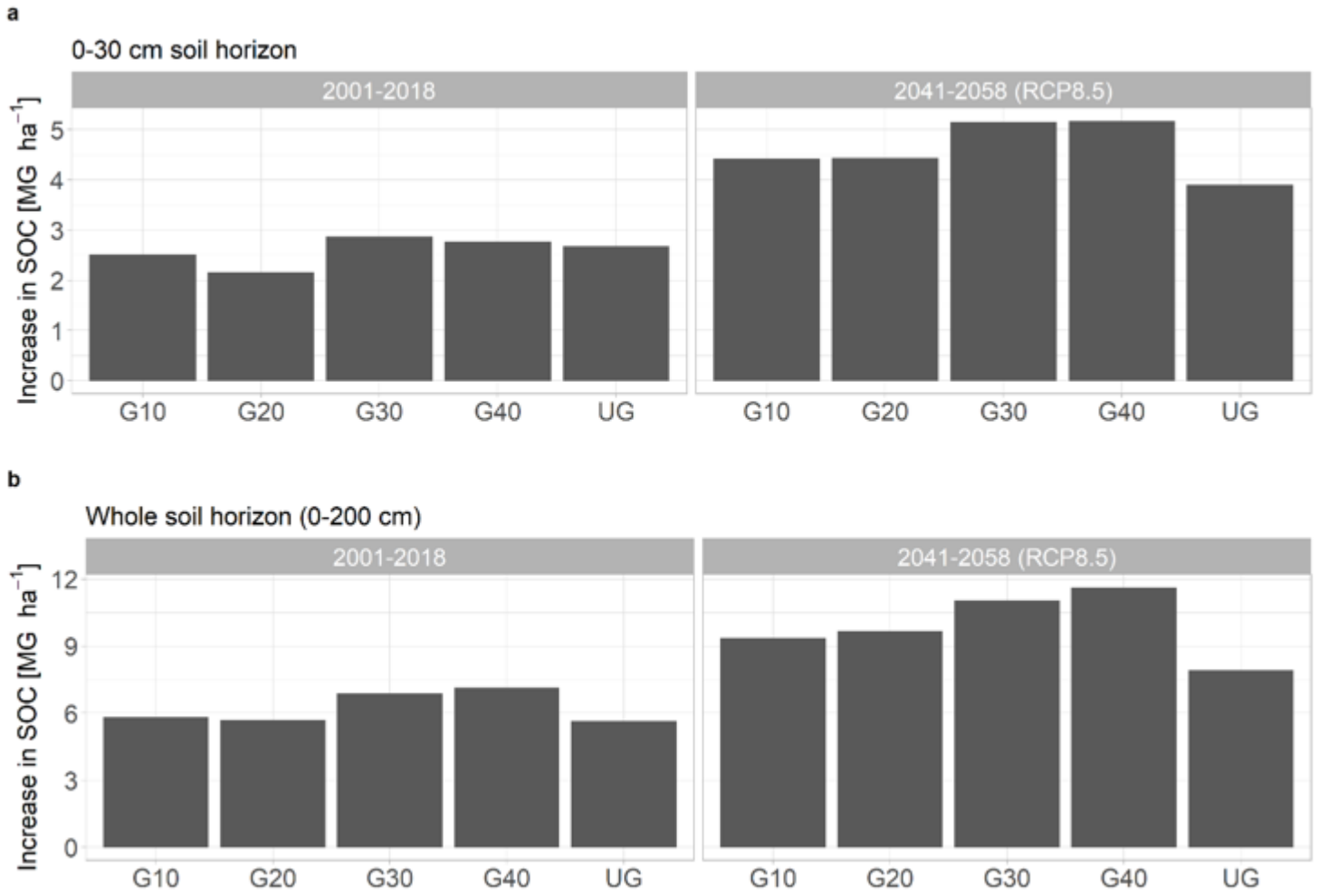


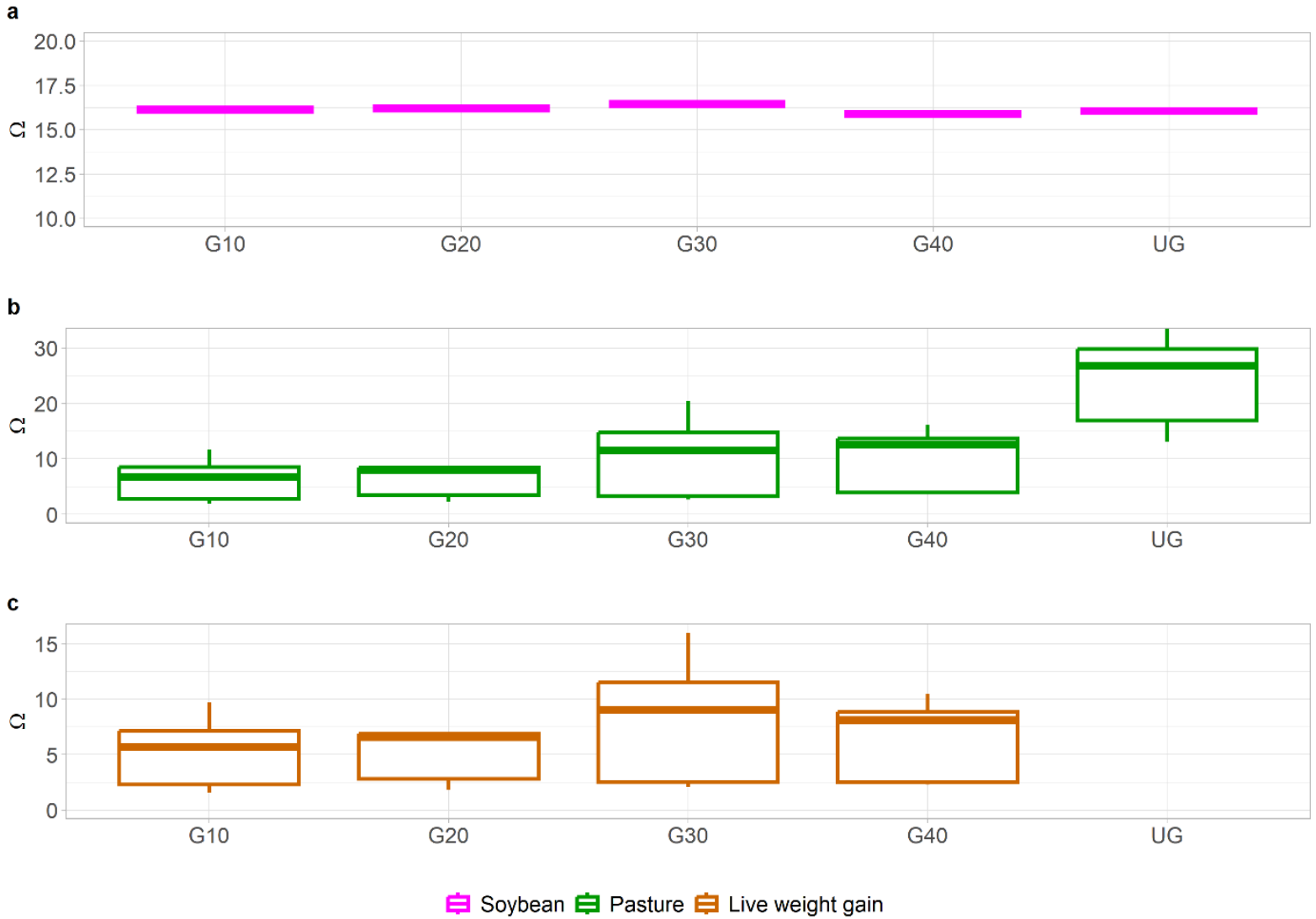
Grazing is not binary, intensity matters

Importance of the metrics wher comparing ICLS

SOC under historical and future climatic conditions



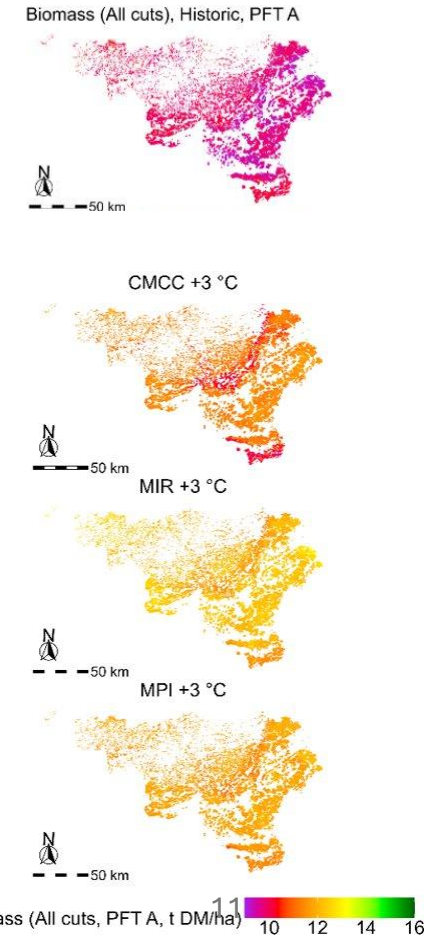
Resistance against extreme climatic events period 2041-2058 (RCP8.5)



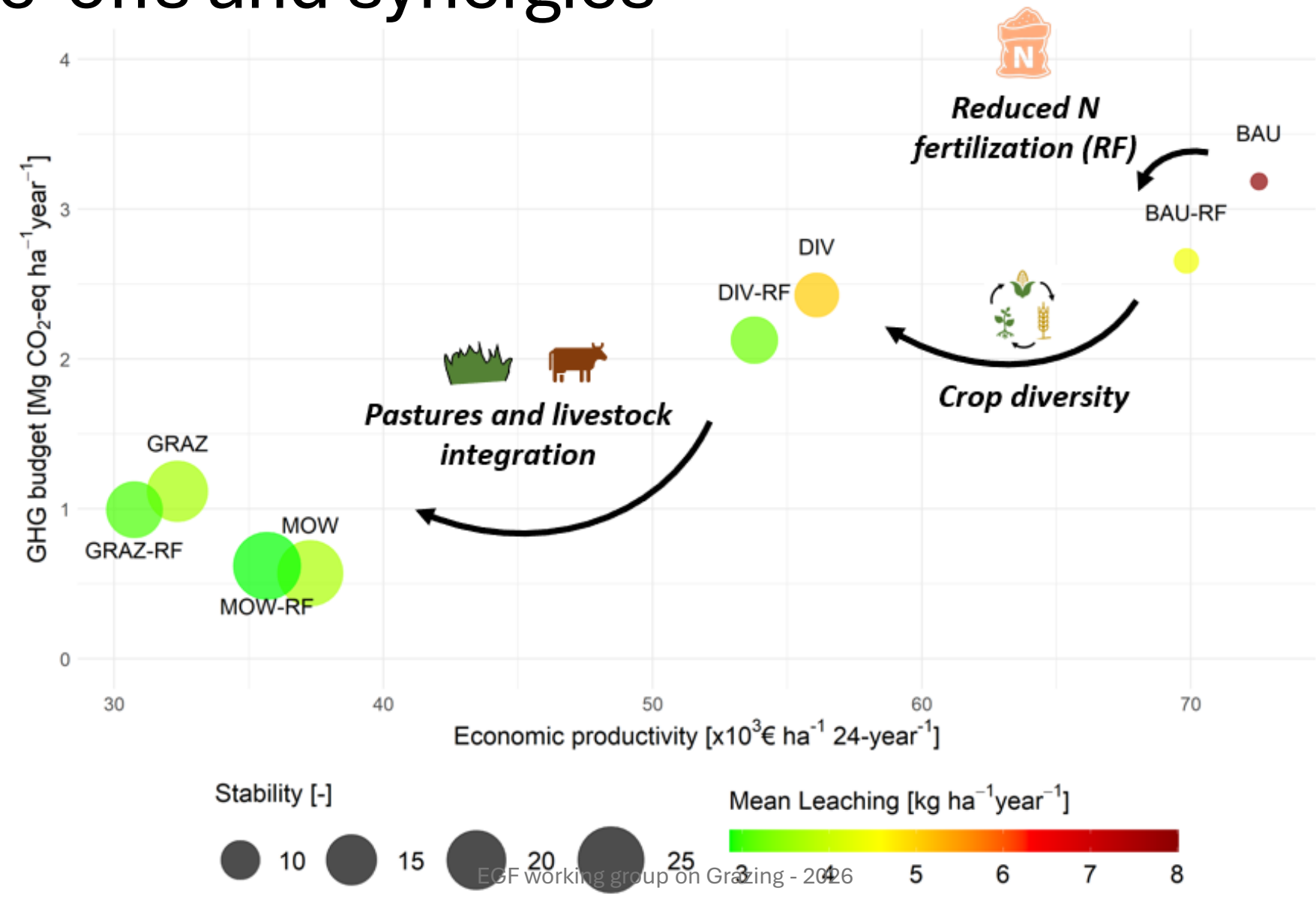
Exploring a gradient of complexity in crop sequences

Agroecological levers

- Reduced N fertilization (RF)
- Crop diversity
- Pastures integration
- Livestock integration



Trade-offs and synergies



Variability of increasingly complex agroecological levers across large spatio-temporal scales

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No-till

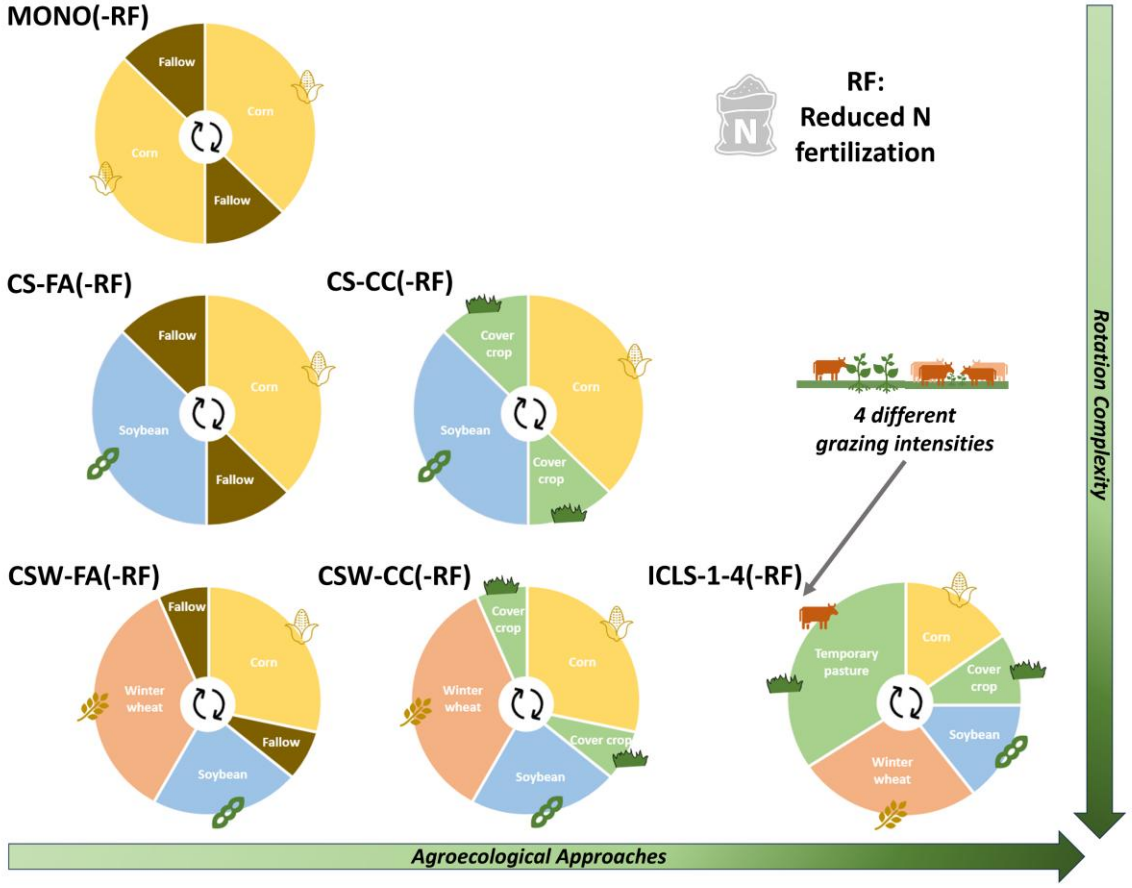
High crop diversity

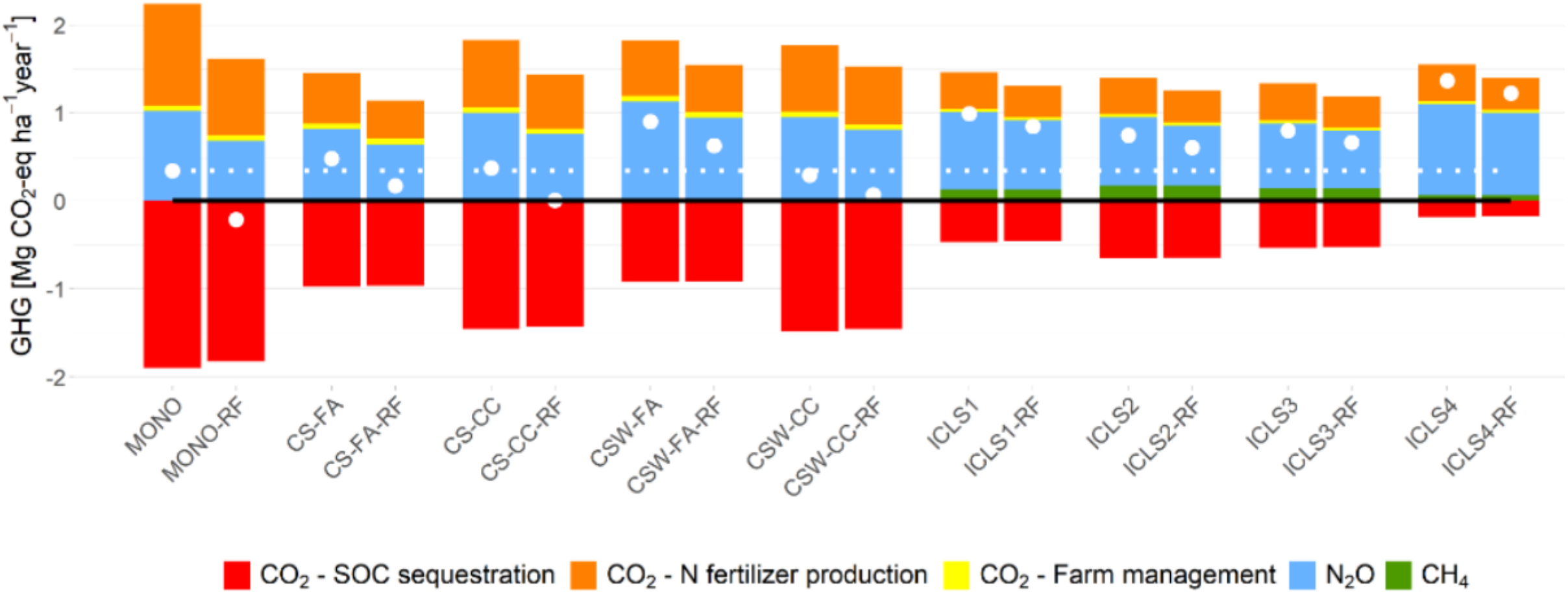
Forever green (winter crops, cover crops, perennials)

Animal integration

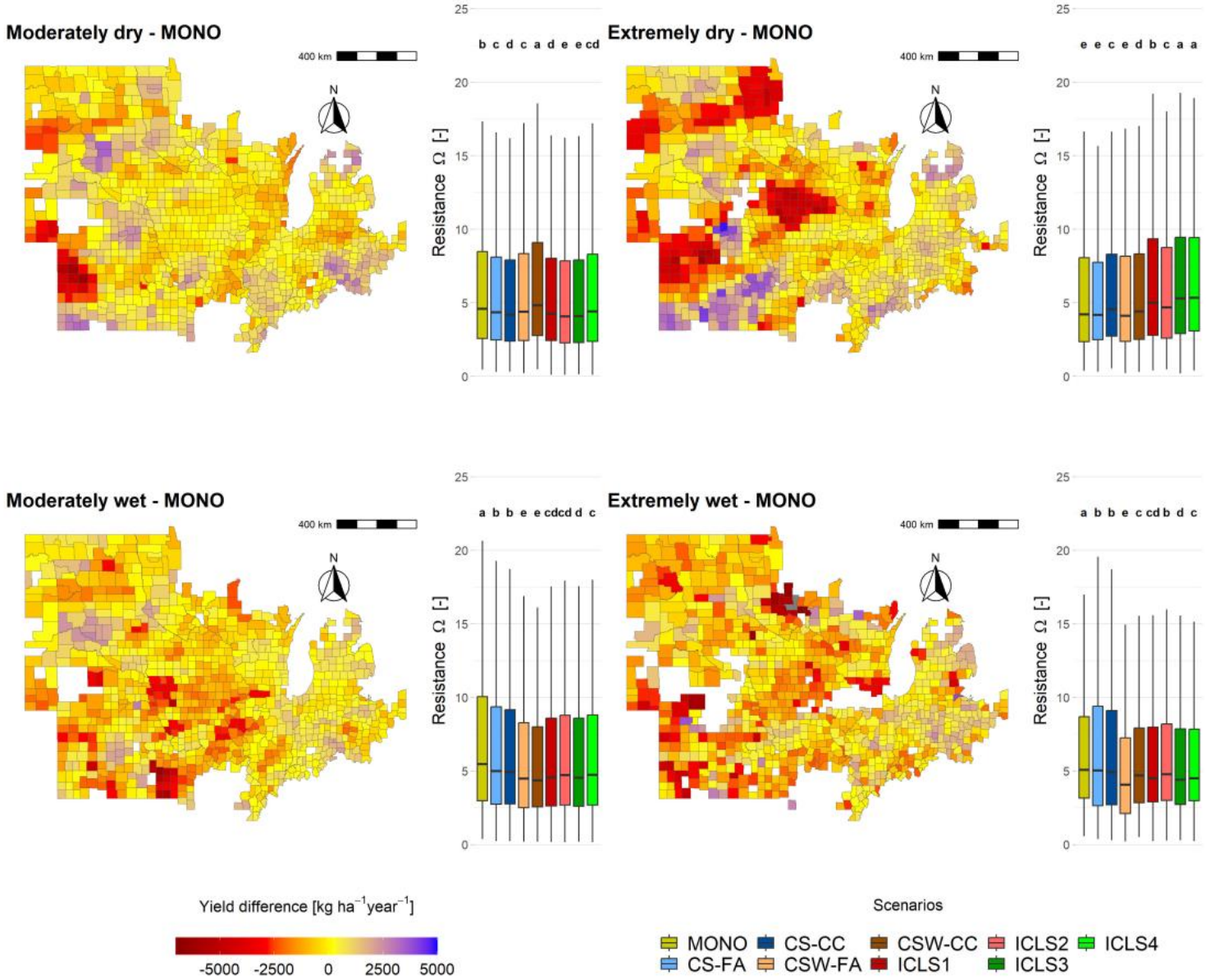
Circularity in nutrient cycles

Reduced nitrogen fertilization




GHG [Mg CO2-eq ha-1year-1]
2
1
0
-1
-2
MONO
MONO-RF
CS-FA
CS-FA-RF
CS-CC
CS-CC-RF
CSW-FA
CSW-FA-RF
CSW-CC
CSW-CC-RF
ICLS1
ICLS1-RF
ICLS2
ICLS2-RF
ICLS3
ICLS3-RF
ICLS4
ICLS4-RF
CO2 - SOC sequestration
CO2 - N fertilizer production
CO2 - Farm management
N2O
CH4

Impact of extreme events on corn yields at county scale



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Integrated crop and livestock systems increase both climate change adaptation and mitigation capacities

Mathieu Delandmeter [a], Paulo César de Faccio Carvalho [b], Carolina Bremm [b], Carolina dos Santos Cargnelutti [b], Jérôme Bindelle [c], Benjamin Dumont [a]

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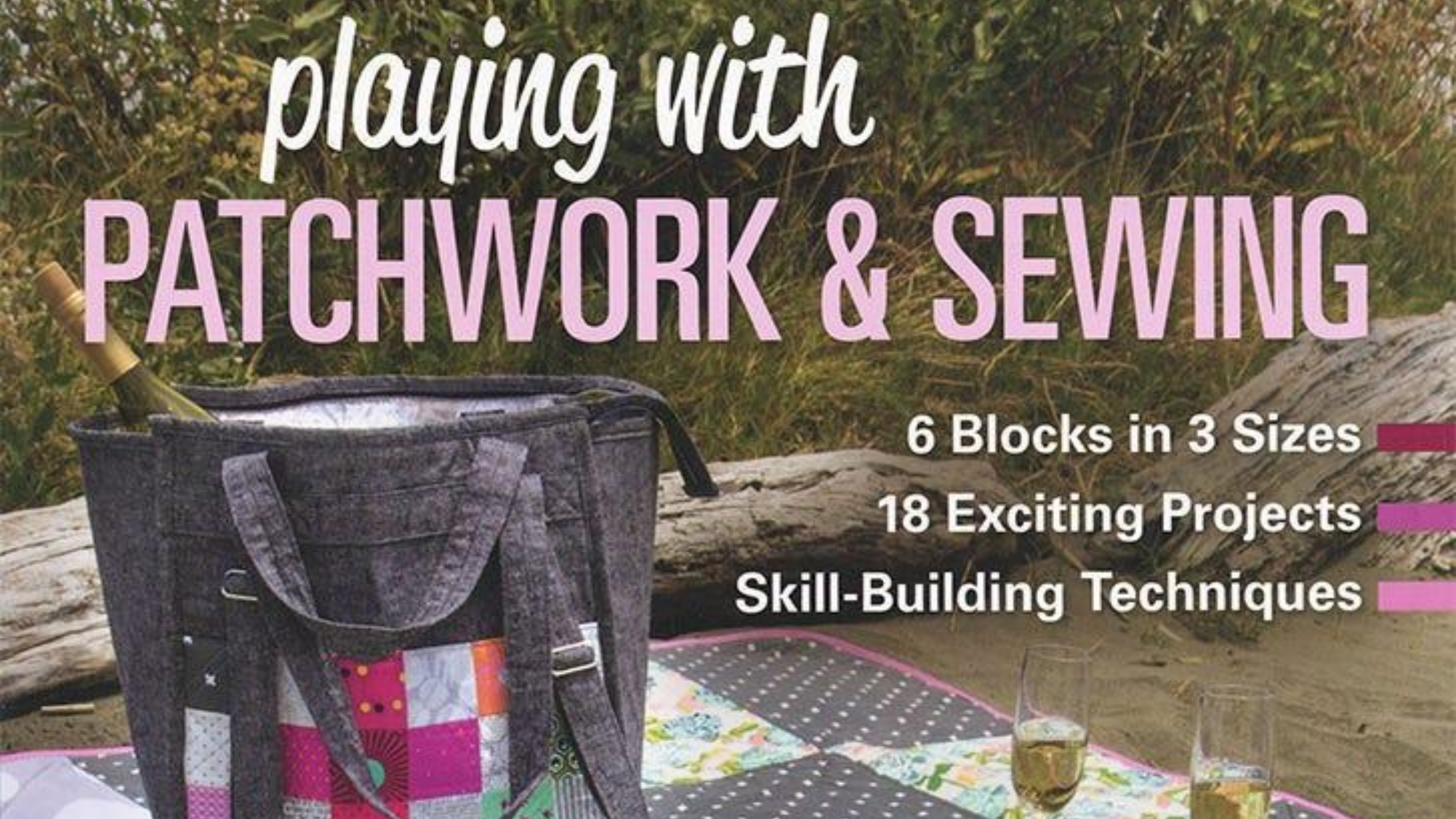
Mathieu Delandmeter, Bruno Basso, Xavier Fettweis, Christophe Lacroix, Pierre Aubry, Jérôme Bindelle, Benjamin Dumont

First published: 25 February 2026 | https://doi.org/10.1111/gcb.70765 | VIEW METRICS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