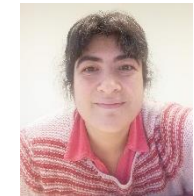


Potential for the introduction of soybean into crop rotations in the Normandy region

Ayerdi Gotor A., Bernard P-Y., Bressan M., Trinsoutrot-Gattin I., Marraccini E.



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1. Introduction

- A. Crop diversification with grain legumes
- B. Soybean as an innovative crop in Northern regions
- C. Aim of the research

2. Potential for soybean-based cropping systems (SB-CS) in Normandy region

- A. Normandy region
- B. General framework
- C. Soybean insertion in crop rotations
- D. Parcels favorable for soybean insertion
- E. Factors affecting the variability of gross margin in the new SB-CS

3. Discussion and conclusion



Introduction

- ↑ Increased demand on vegetal proteins, to substitute meat
- ↑ Willing to reduce the use of chemicals
- ↑ High cost of synthesis fertilizers
- ↑ Wish to have a more sustainable agriculture

nature communications



Article

<https://doi.org/10.1038/s41467-022-32464-0>

Global systematic review with meta-analysis reveals yield advantage of legume-based rotations and its drivers

Received: 7 February 2022

Accepted: 1 August 2022

Jie Zhao¹, Ji Chen², Damien Beillouin³, Hans Lambers⁴, Yadong Yang¹,
Pete Smith⁵, Zhaohai Zeng¹✉, Jørgen E. Olesen² & Huadong Zang¹✉

Soybean as an innovative legume crop in Northern regions

Soybean has been object of research in Northern Europe for its potential

- ↑ Highest protein content
- ↑ Well know in the food chain
- ↑ But with issues (GMO, allergies...)



in silico Plants Vol. 3, No. 1, pp. 1–13
doi:10.1093/insilicoplants/diab008
Advance Access publication 04 February 2021
Special Issue: Linking Crop/Plant Models and Genetics
Original Article

in silico
Plants
OXFORD

Evaluation of soybean (*Glycine max* L.) adaptation to northern European regions under different agro-climatic scenarios

Guénolé Boulch^{*,§}, Chloé Elmerich, Amina Djemel and Bastien Lange[§]

The potential for soybean to diversify the production of plant-based protein in the UK

Kevin Coleman^{*,§}, Andrew P. Whitmore[§], Kirsty L. Hassall[§], Ian Shield[§], Mikhail A. Semenov[§], Achim Dobermann^{§,1}, Yoann Bourhis[§], Aryena Eskandary[§], Alice E. Milne[§]



Agro-economic prospects for expanding soybean production beyond its current northerly limit in Europe

Kathleen Karges^{*,†}, Sonoko D. Bellingrath-Kimura^{*,b}, Christine A. Watson^{c,d}, Frederick L. Stoddard^e, Mosab Halwani^{*,b}, Moritz Reckling^{*,c}

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^d Department of Agricultural Science, Vilkkii Plant Science Centre and Helsinki Institute of Sustainability Science, University of Helsinki, 00014 Helsinki, Finland

Aim of the research

- ↑ Identify the potential production of soybean in a region
- ↑ Adapt the methodology proposed in Marraccini et al 2020 to another region/crops
- ↑ Identify the most suitable cropping systems for soybean introduction
- ↑ Assess the potential soybean yield



Article

An Innovative Land Suitability Method to Assess the Potential for the Introduction of a New Crop at a Regional Level

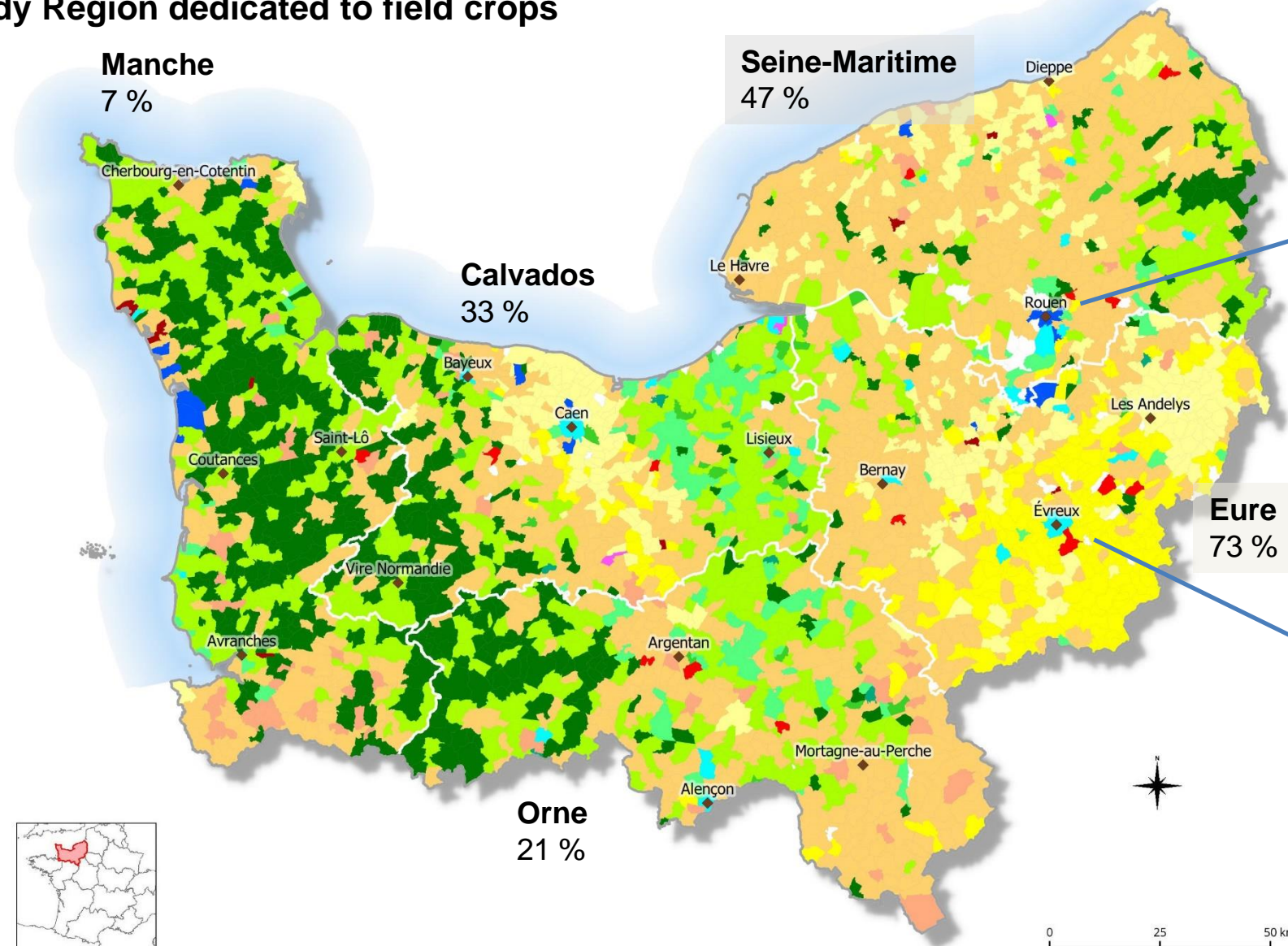
Elisa Marraccini ^{1,*}, Alicia Ayerdi Gotor ², Olivier Scheurer ³ and Christine Leclercq ¹



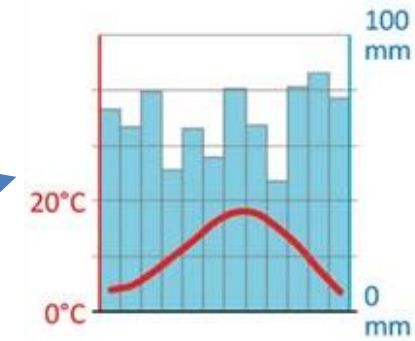
Potential for soybean-based cropping systems in Normandy

Case study Normandy region

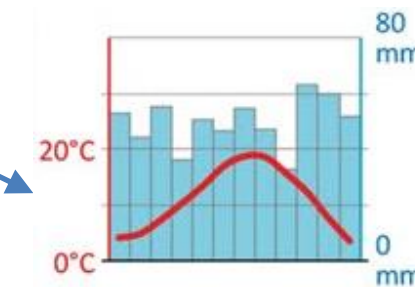
Percentage of the Usable Agricultural Area (UAA) of the departments of Normandy Region dedicated to field crops



Average annual precipitation and temperature (2011-2018)

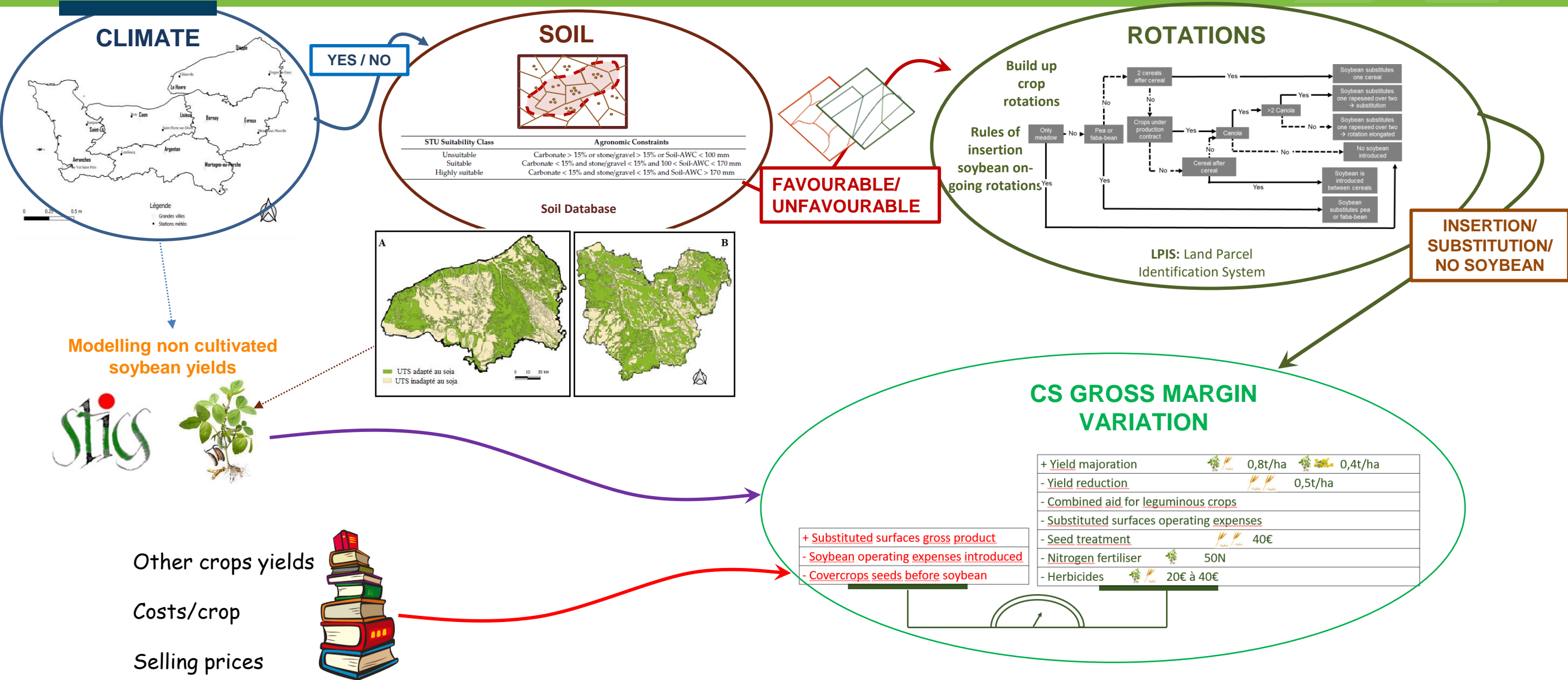


Rouen (151 m MSL)
840 mm / 10,9 °C

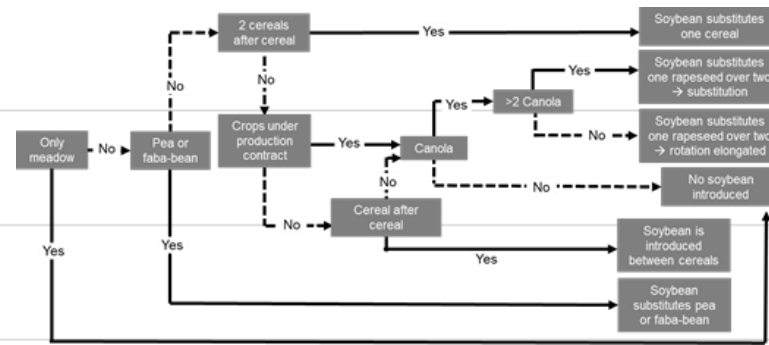
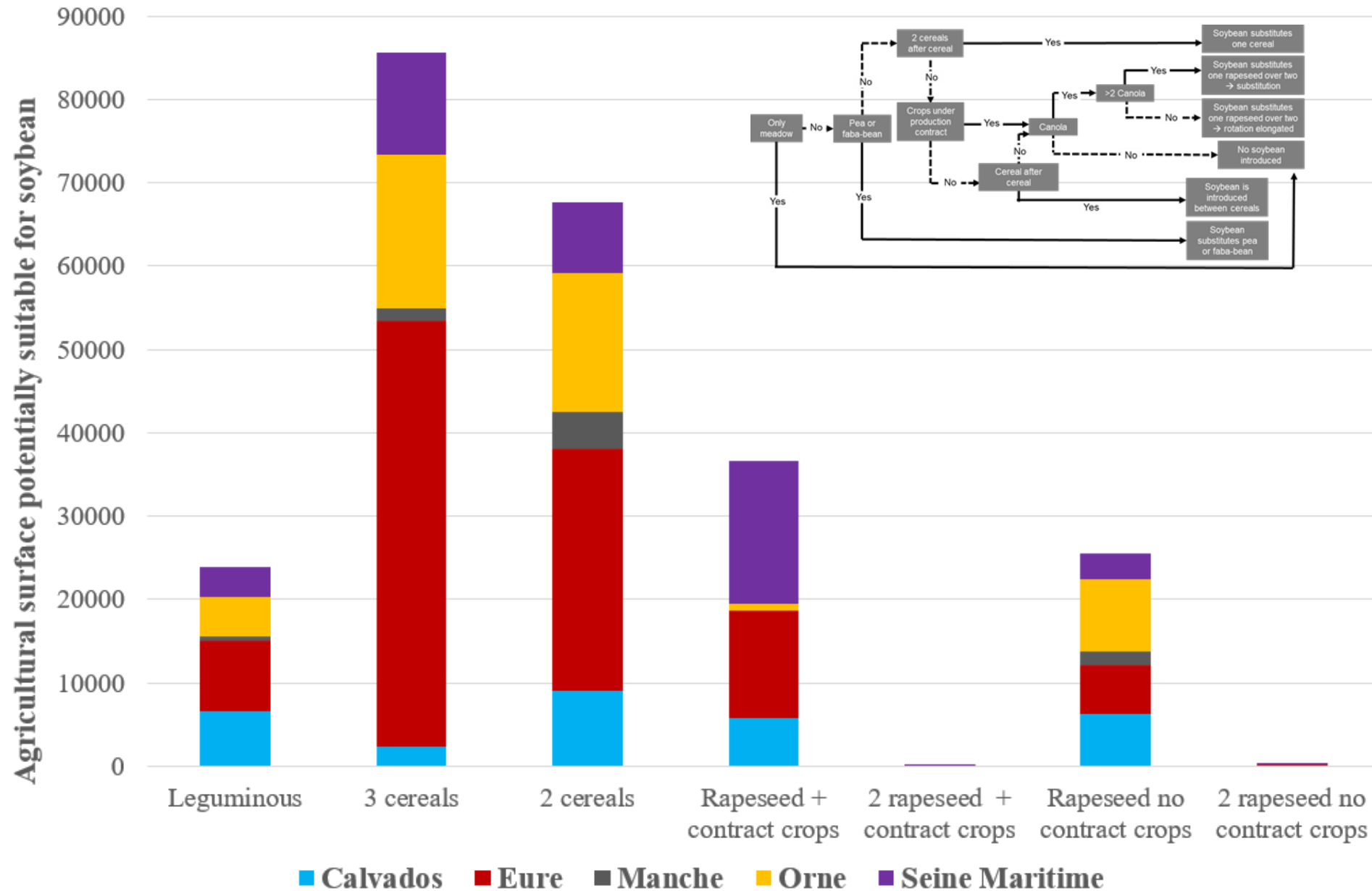


Evreux (138 m MSL)
597 mm / 11,1 °C

General framework



Soybean insertion in crop rotations

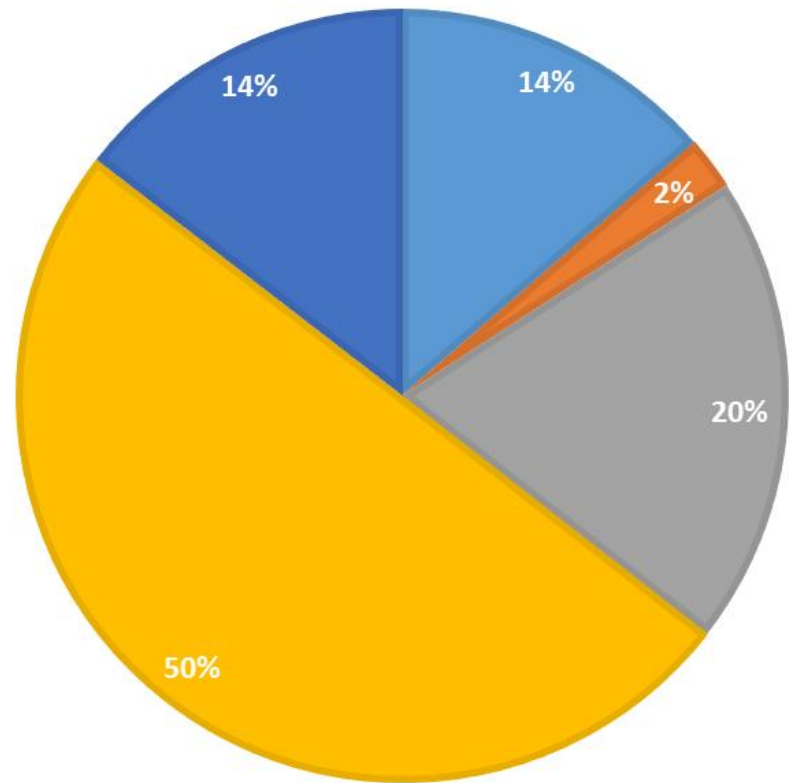


-Highest potential in less diversified or having cereals after cereals

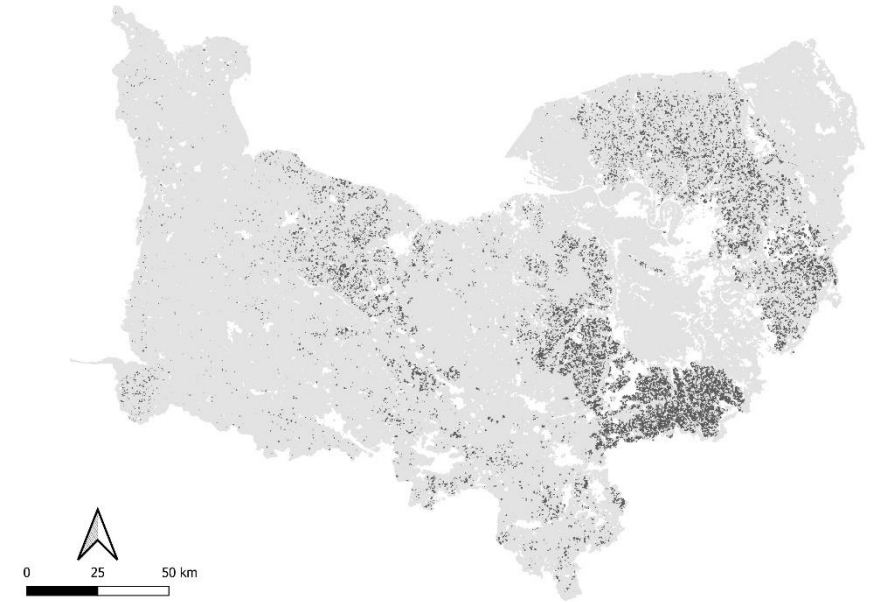
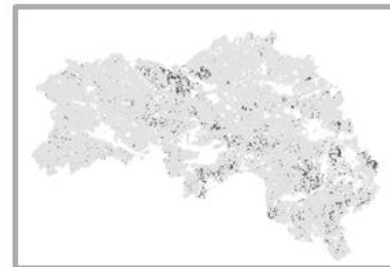
-Few surface already including grain legumes

-Eure, Seine Maritime and Orne as the regions having the highest agronomic potential

Fields favorable for soybean insertion soil & crop rotations



■ Calvados ■ Manche ■ Orne ■ Eure ■ Seine Maritime



-Eure represents 50% of the potential surface

-At the regional level, there is a potential for soybean on 220 kha

Factors affecting the variability of gross margin in the new SB-CS

R1 – 4939 ha



3,3
± 1,1 t/ha

2,2
± 1,2 t/ha

SILTY LOAM	CLAYEY
1255 € / ha	1164 € / ha
1371 € / ha	1026 € / ha

→ Continuous cereals or poorly diversified crop rotations are more favorable for soybean in soil having a lowest potential

R2 – 4290 ha



SILTY LOAM	CLAYEY
1790 € / ha	1530 € / ha
1340 € / ha	1278 € / ha

→ Poor convenience in crop rotations diversified and having contract crops

→ Impact of input prices

Discussion and conclusion

- ↗ The adaptation of the methodology is feasible in other region, attention should be paid for the soil data available.
- ↗ Seine Maritime and Eure departments are the more favorable to produce soybean in Normandy
 - First experimental sites in 2020 & 2021 are mainly in those regions
 - Yields modelled match with those harvested
- ↗ Ongoing application of the same method to other grain legumes (pea, faba bean...)

Thank you for your
attention



Martin, Philippe; Rabenandrasana, Nadège; Poméon, Thomas; Serard, Philippe, 2021, "RPG Explorer Crop successions France 2007-2014, 2007-2019, 2015-2019", <https://doi.org/10.15454/XH84QB>



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