Nitrogen leaching in organic and conventional systems in the Seine basin (France)

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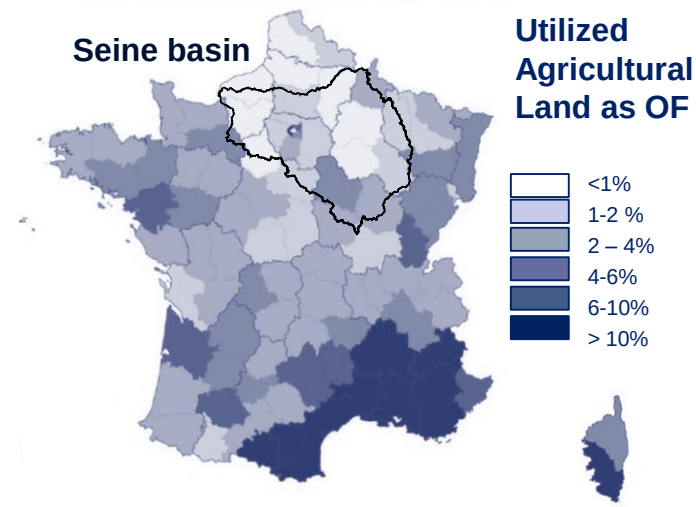
Organic farming in arable cropping

- **France**
  - 3.6% Utilized Agricultural Land (UAL)
  - 4th organic farming (OF) surface in EU
- **Seine basin**
  - lowest OF < 2 % UAL
  - 94 % arable crops ***(Agreste, 2012)***
- **Europe**
  - In literature, OF globally better for the environment

    biodiversity, biological activity, soil organic matter, water (no pesticide)
  - with controversy on N losses

    (Stolze et al. 2000; Mondelears et al. 2009)



What are the impacts of organic farming on groundwater N contamination ?

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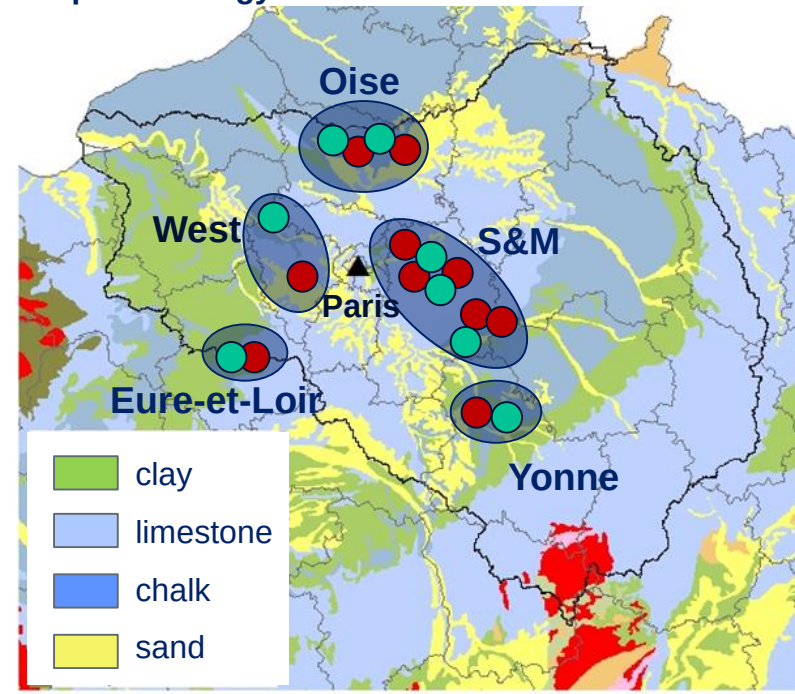
Farm network characteristics

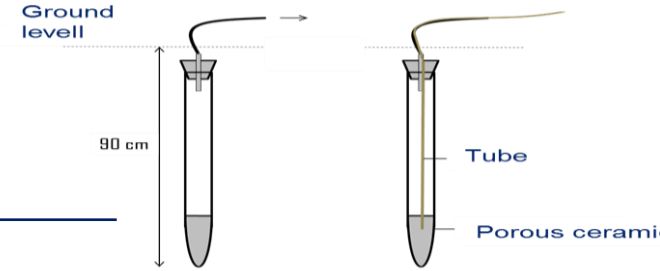
Farming	Organic	Conventional
Systems	**8**	**10**
Fields studied	49	30
Ceramic cups	*49 x 6 = 294*	*30 x 6 = 180*
Major crop succesions (= rotations)	alfalfa (2 – 3 years) wheat cereal grain legume wheat cereal cereal	rapeseed wheat spring crops wheat cereal
Fertiliser types	compost, vinasse, poultry manure	**mineral**, biogas residue, slurry, compost
Mean N inputs on fertilised fields (kg N ha^{-1} yr^{-1})	80	160
% fields fertilised	8%	100%

Map of lithology in the Seine basin



Conventional farming Organic farming

Handling in two steps for ceramic cups operation



1. Low pressure (-0.8 bar) 2. Sampling

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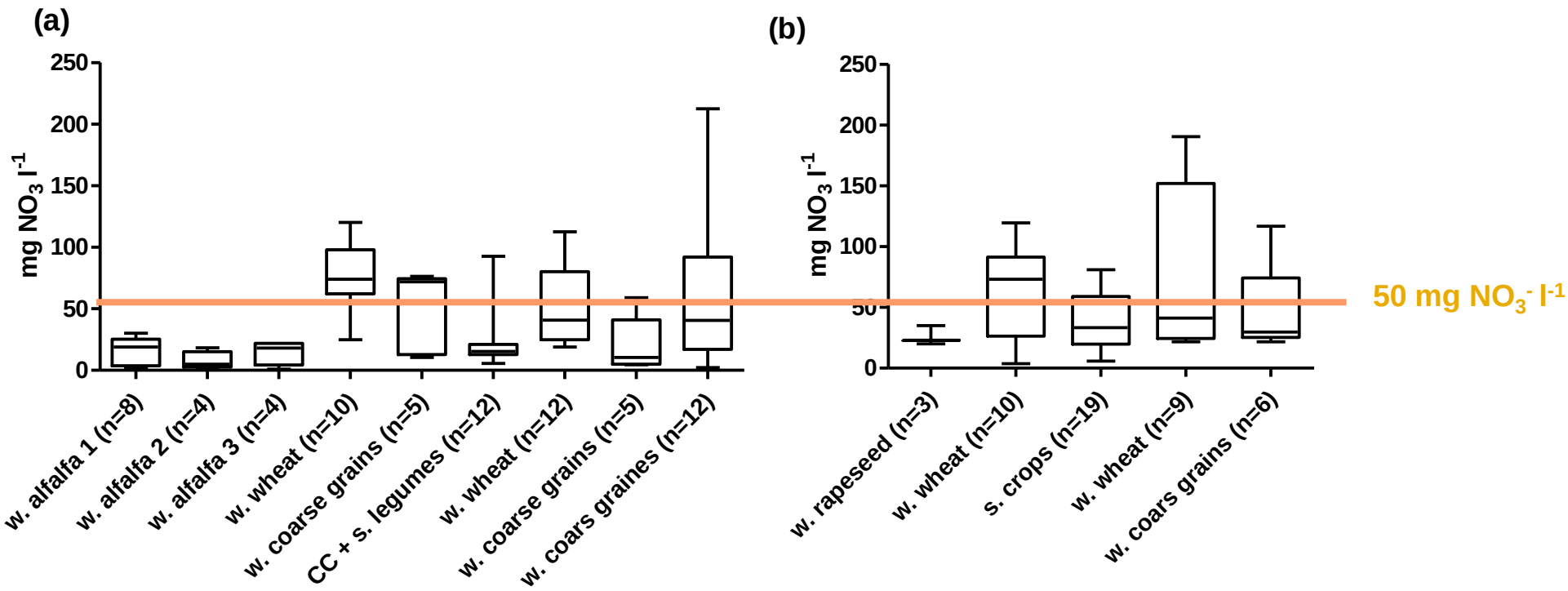
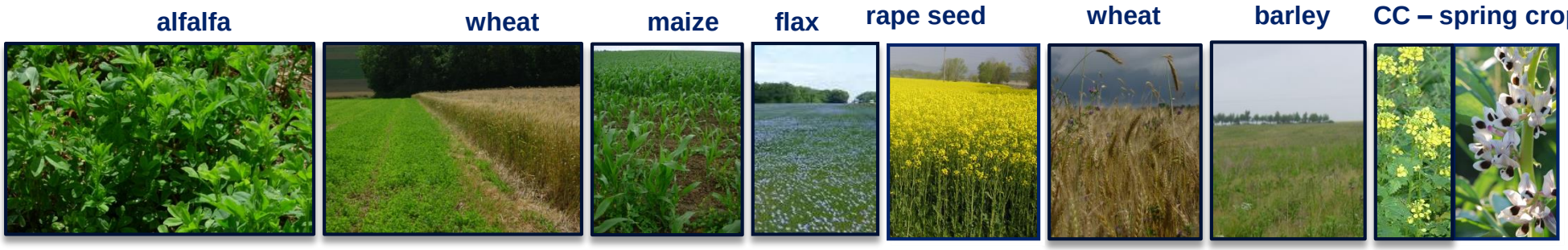
Sub-root concentrations at the rotation scale

Organic Farming (OF)

Conventional Farming (CF)





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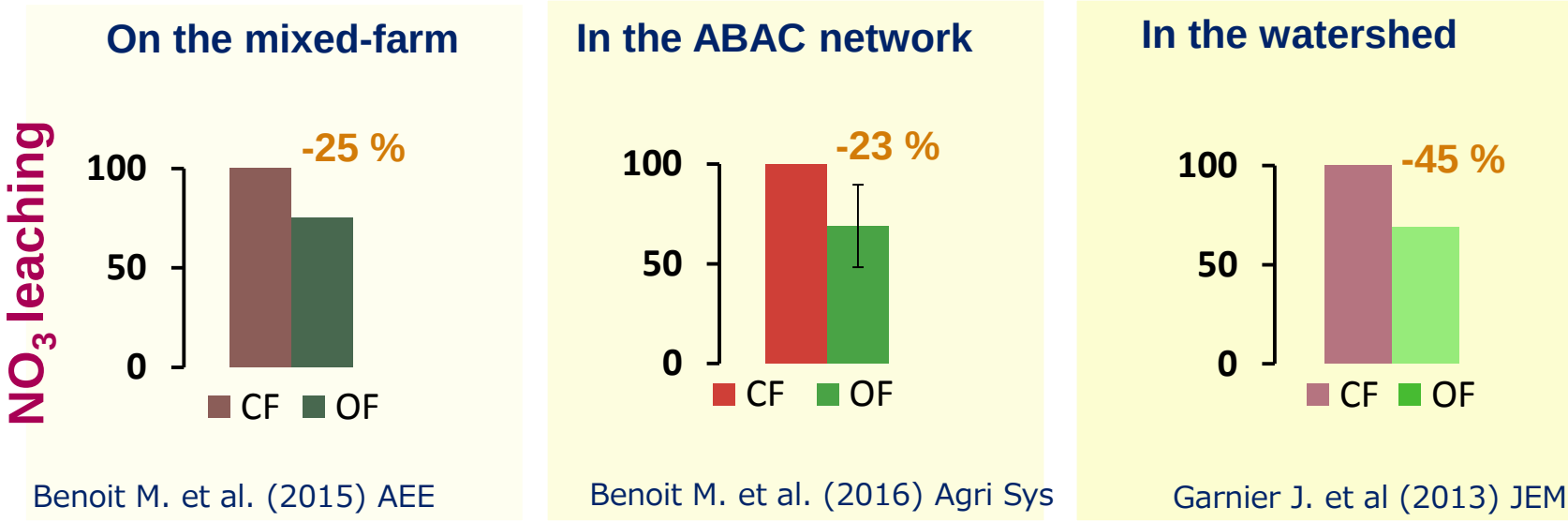
Quantify N losses in Organic farming (OF) / Conventional (CF)



On average, OF has lower N losses than CF systems, with variations due to:

- **Climate and soil conditions**
- **Crop rotations**
- **N inputs, including leguminous, mineral and organic fertilisations.**

Thank you for your attention !

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