Understanding grassland response to land use intensity and climate change : **moving forward microbial trait based approach**

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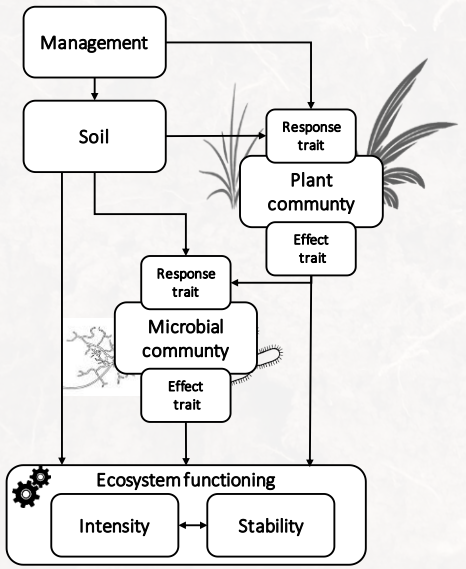

(Lavorel & Garnier 2002, Lavorel & al. 2011)

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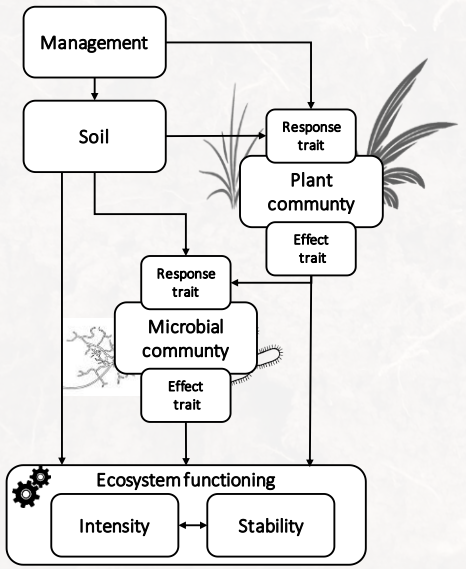
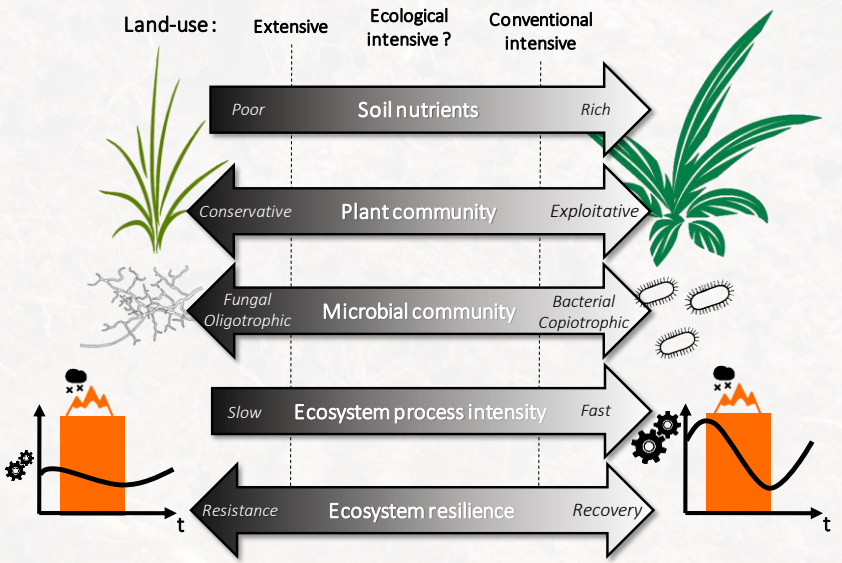


(Lavorel & Garnier 2002, Lavorel & al. 2011)

GLOBAL HYPOTHESIS

Functional trade-off and **ecosystem resilience**



(Pimm 1984, Grigulis & al. 2013, de Vries & Shade 2014)

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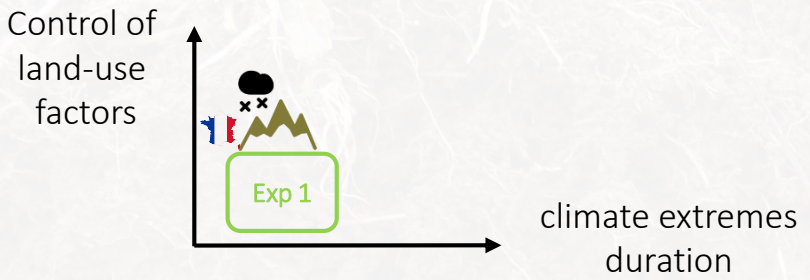
Simulation of climate extremes on **intact plant-soil cores** or **controlled plant-soil mesocosms**



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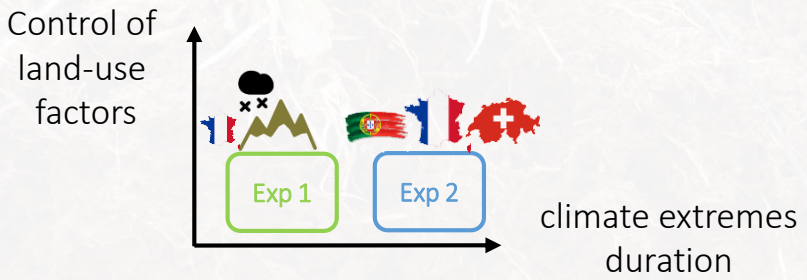

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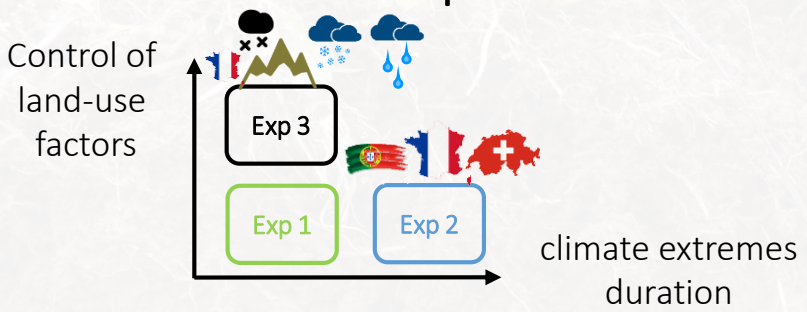

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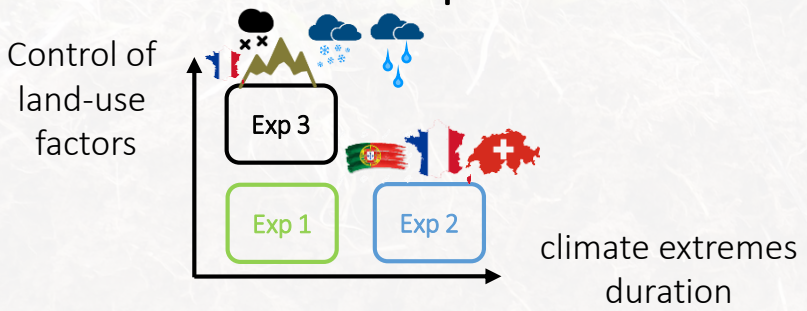
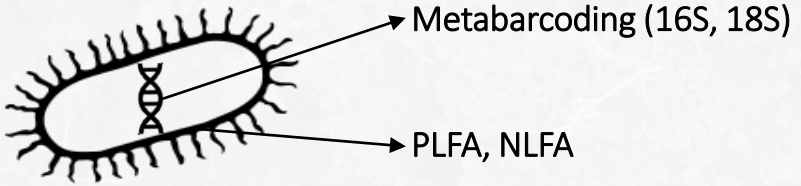


Classical microbial ecology approaches +



Microbial community composition

(Taberlet et al. 2012, Frostegard et al. 1993, Olsson et al. 1995)

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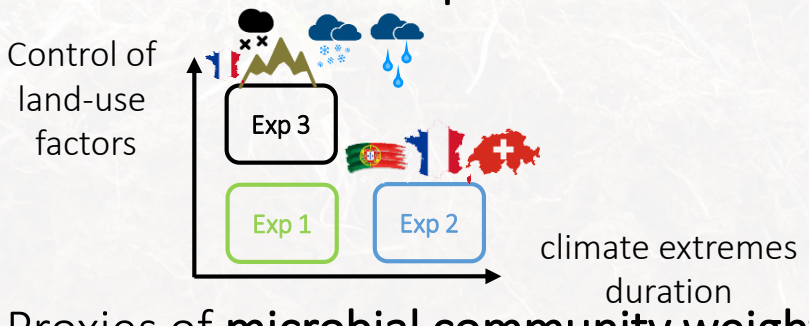

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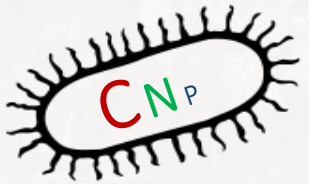

C : structural and reserves

N : enzyme machinery

P : growth machinery

Microbial biomass stoichiometry (CWM)

(Elser & al. 2003, Karpinets & al. 2006, Delgado-Baquerizo & al. 2018)

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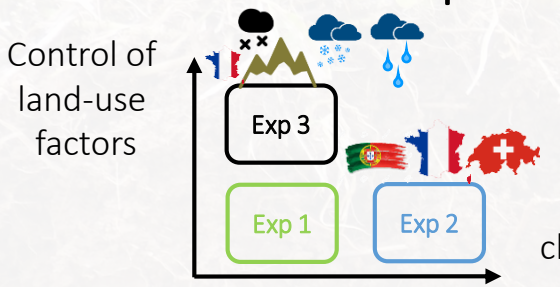

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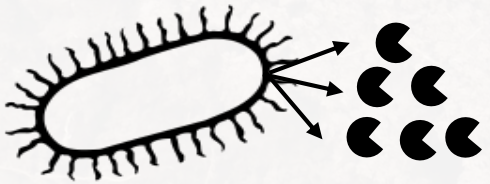

Investment in extracellular enzymes **per unit of microbial mass**

Mass specific enzyme activities (CWM)

(Fontaine et al. 2003, Kivlin et al. 2013)

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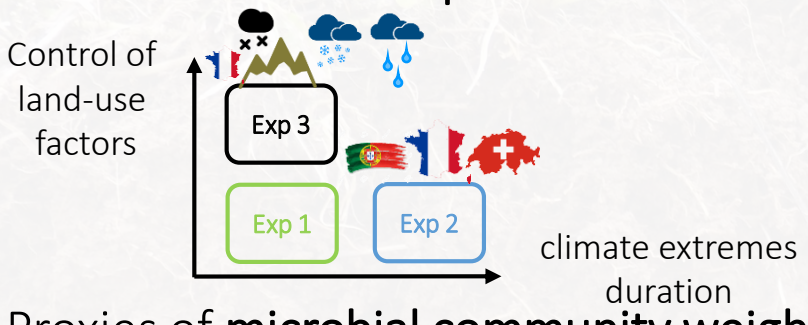

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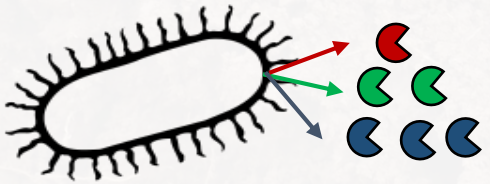

C acquisition enzymes

N acquisition enzymes

P acquisition enzymes

Ecoenzymatic Stoichiometry (CWM)

(Sinsabaugh et al 2019)

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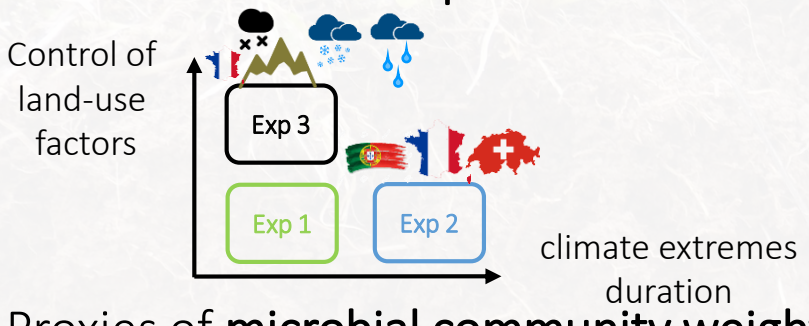

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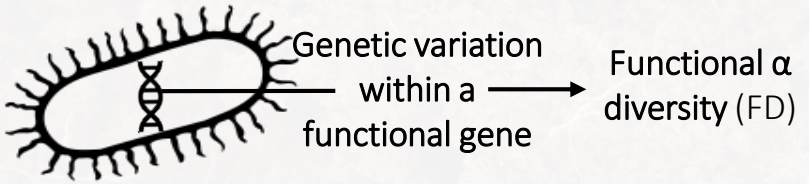

Functional genes diversity (FD)

(Bach et al. 2001, Lori et al. 2018)

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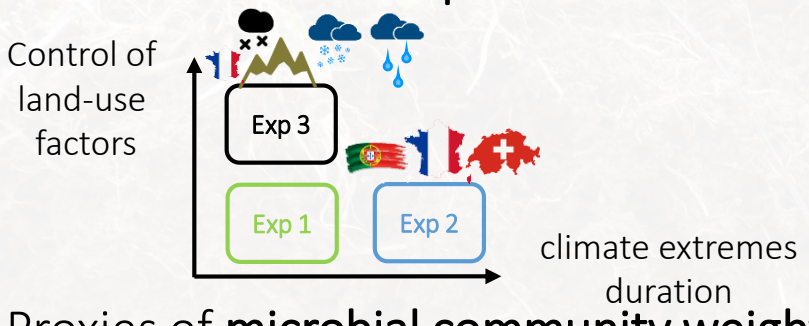

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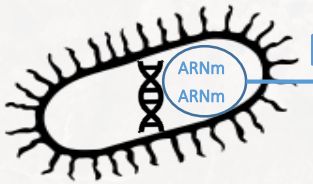

Relative abundance of functional transcripts

Meta-tanscriptomic (CWM, FD)

(Fierer et al 2014, 2017, Žifcáková et al 2016, 2017, Baldrian 2019)

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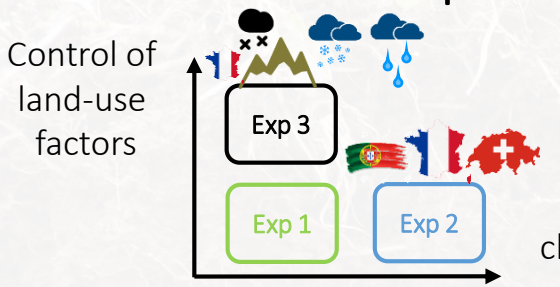

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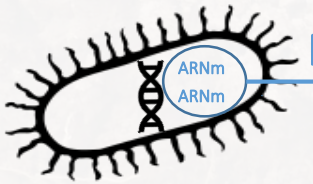

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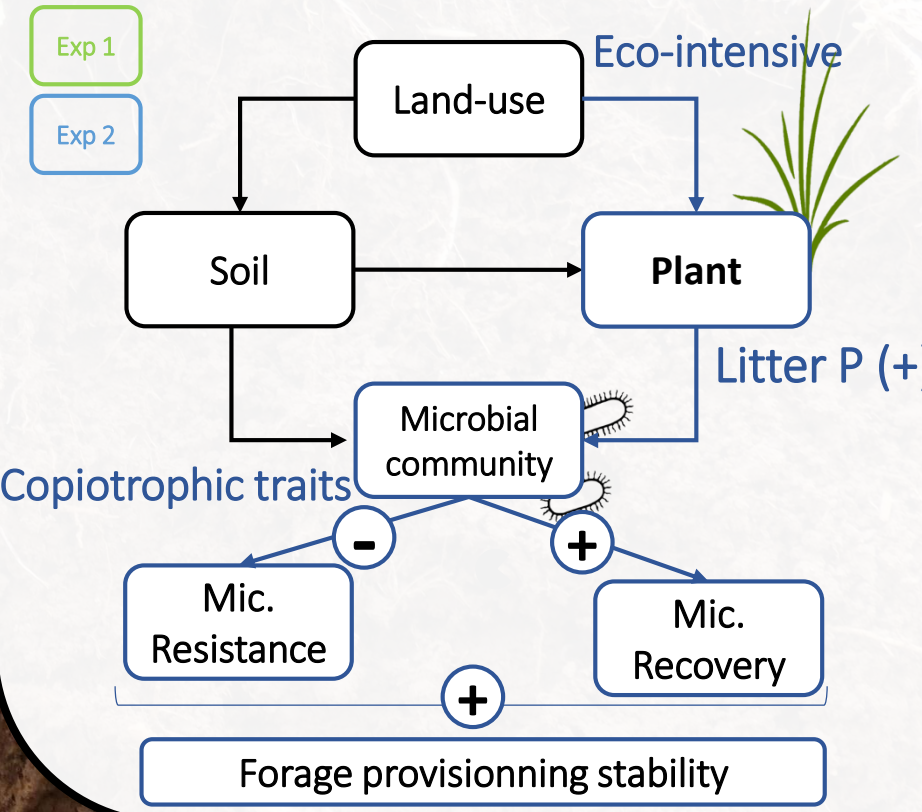

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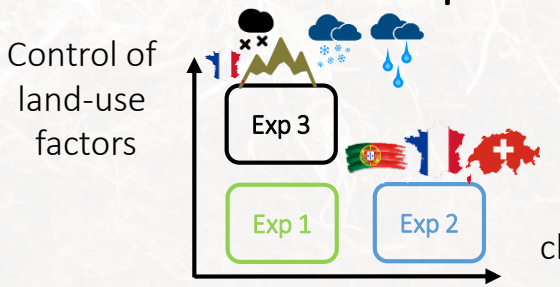

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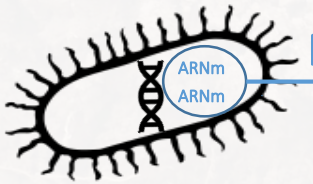

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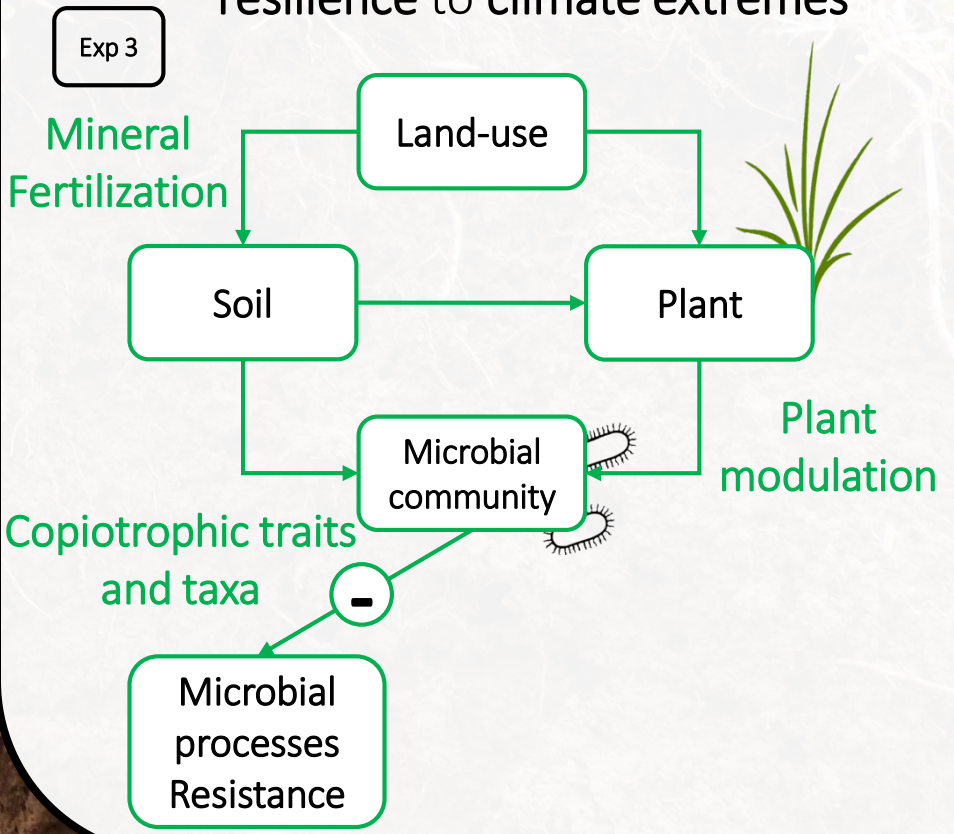

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CONCLUSION and OUTLOOKS

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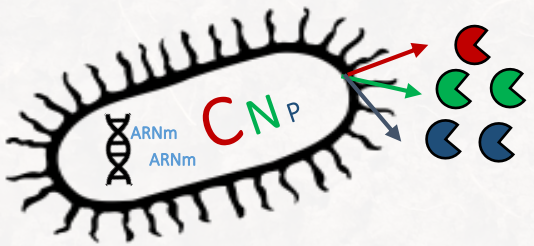

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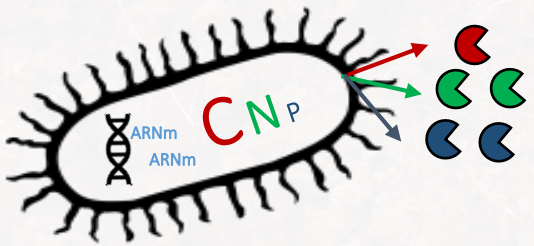

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