

CrosyeN (Cropping System Experiment Network) Project

A network of experiments to design and assess cropping systems that are (more) C-neutral, climate resilient, environmentally-friendly, and productive

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And researchers involved in the 8 experimental sites



INRAE

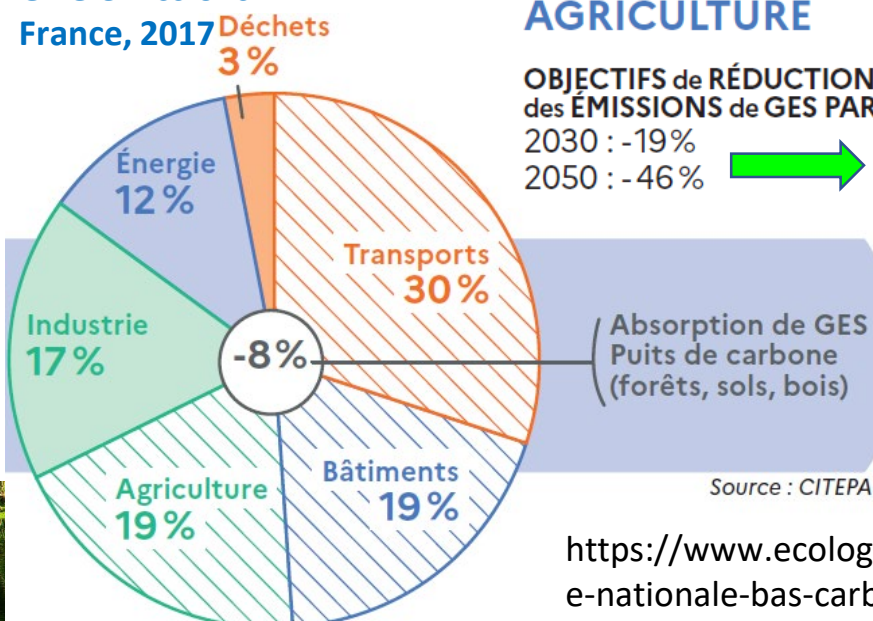


Justification => need for healthier, more sustainable cropping systems

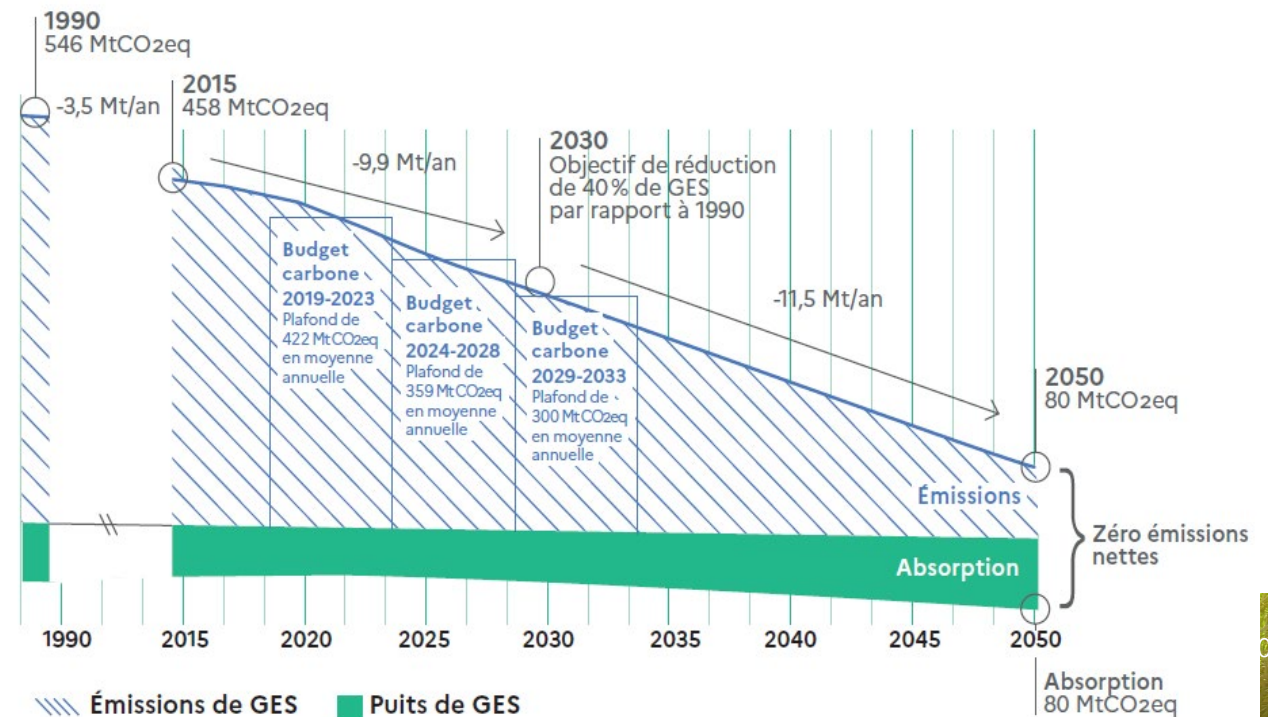
- Reducing GHG emissions from agriculture (accounting for 19% of France's total emissions and 11% globally, or 21% including LUC and forests) and enhancing carbon storage in agricultural soils are crucial to achieving the EU's carbon neutrality target by 2050 => **climate-neutral**
- Minimizing environmental impacts, such as biodiversity loss and water pollution, while also protecting human health; => **healthy and environmentally friendly**
- Tailoring agricultural practices to adapt to climate change, ensuring resilience => **climate-resilient**
- Ensuring food security => **productive**

GHG emissions

France, 2017

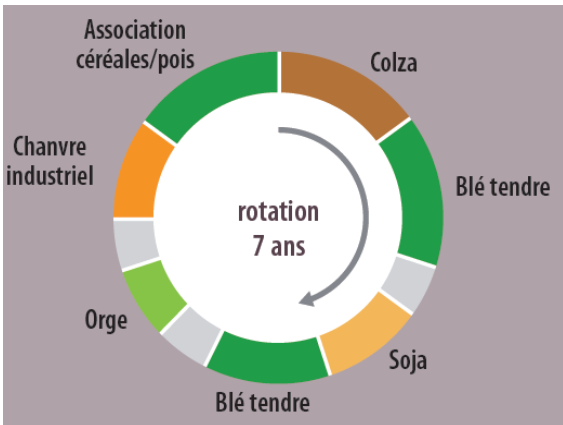


<https://www.ecologie.gouv.fr/strategie-nationale-bas-carbone-snbc>



=> 8 experiments (4 in France, and 4 in tropical countries) in which innovative cropping systems are designed by integrating diverse agronomic practices, e.g. practices that increase spatial and temporal plant species diversification, reduce soil disturbance, maximize soil cover, increase residues retention, or incorporate legumes

=> Long-term monitoring to assess and compare the cropping systems



Fictitious example
of a long and
diversified rotation



CA-SYS (Dijon-Epoisses)



Cambodia



DIAMS (Mauguio)



Estrées-Mons



Toulouse-Auzeville



Objectives

- To consolidate this network of experiments that design and evaluate innovative, multifunctional agroecological cropping systems => **strengthen instrumentation, standardize data collection and data management;**
- To carry out transversal assessments, comparing cropping systems with different levels of biodiversification and agroecological practices => perform **multisite, multicriteria analysis of the performance of the tested systems**, evaluating their effectiveness across various dimensions.



Notable facts

- The inclusion of individual experiments in a network appears to **increase their visibility**, which may facilitate the obtention of new fundings (e.g. projet BIAFINA for DIAMS experiment), further strengthening experimental sites.
- Increased visibility can also **attract scientists with complementary expertise** who take advantage of experimental sites to **develop their own research** (e.g. Florine Degruene assessed the effect of cropping systems on microbial diversity through microbial DNA analysis on two experimental sites, and shared its methodology with the PI of another experimental site) => **platform for sharing new methodologies and ideas**
- Data retrieving (old and new data) from individual sites helps to secure them (on a unique dataset) and facilitate their access. It also leads the P.I.s of some individual sites to re-explore some old datasets (e.g. Bac Giang site in Vietnam => new findings and publication).
- Inventories of soil samples stored in the labs of the different experimental sites will allow us to perform identical soil analyses across experimental sites (NIRS, MIRS, fractionation of OM)
- Although it is too early to perform multisite/multicriteria analyses, first results from older experimental sites suggest that crop species diversification, reduced soil disturbance, increased soil cover and residue retention, increased soil C stocks with low influence of crop residue retention on N₂O emissions (Leng et al., 2024; Shumba et al., 2024; Leonard, pers. Comm.)

Battambang, Cambodia



Thanks for your attention

Auzeville, Intermediate crops (green
manure), March 2024



Zimbabwe, cropping systems with corn
and cowpea in monoculture or mixtures



13/12/2024

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