ClieNFarms
Climate Neutral Farms

ClieNFarms EIP-AGRI Practice Abstracts

Introducing grain legumes, such as pea crop, in the cropping systems to reduce net GHG

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Growing more annual harvested grain legumes is one of the promising solutions for the arable sector for targeting to both the contribution to climate mitigation and local protein production.

In 2022, mitigation studies in the French systems of "Grand Est" have shown that this solution is a **guaranteed improvement of farm carbon balance** with an increase of 15 or 20% of areas in pea, faba bean or soya. The effect is higher when it is combined with an increase in cover crops proportion (before spring type legume or in short intercrop periods).

Legumes produce their own constitutive proteins thanks to the unique ability to **fix atmospheric nitrogen** through a **symbiotic relationship** with soil bacteria. The presence of harvested grain legumes in crop successions enables to reduce the application of nitrogen fertilizers, which are **energy-intensive** to produce and contribute to **greenhouse gas emissions**. There is indeed **no application** during the grain legume campaign and the absence of **N_2O** emissions has been confirmed in field measurements in French conditions under pea crop. Moreover, the **following crop** requests a **reduced nitrogen application** and have an **increased yield**.

This practice consists in the following steps, here in the case of pea for example:

(i) Defining the **best way** to modify the initial crop succession for getting at least **15% increase** for pea area in the system.
(ii) Ensuring the **best conditions** for the pea **sowing** and **cycle**: to get the highest entry of renewable nitrogen and highest pea yield.
(iii) Defining **optimal technical** practices for the following crop.

By including peas in crop rotations, farmers can **reduce reliance on synthetic nitrogen fertilizers** and make **cost savings**, improve **soil health** and **biodiversity**, diversify their crop production for system **robustness** over years and market **opportunities**.

Figure 1: Visit on 23rd of May 2023 in one of the ClieNFarm's lead farm of the I3S-arable-North-East-France. (Terres Inovia ©)

Figure 2: Harvest of pea crops. (Terres Inovia ©)

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