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UK Research
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BestCrop

Boosting photosynthesiS
To deliver novel CROPS for
the circular bioeconomy

For Academia

www.bestcrop.eu

Introduction

BEST-CROP is an alliance of European plant breeding companies, straw processing companies and academic plant scientists aiming to utilise advances in our understanding of photosynthesis to improve barley yield and to exploit variability in barley straw quality and composition.

BEST-CROP is developing **Next Generation barley Plants (NGPs)** to replace current varieties with fully renewable alternatives.



Challenges

Society is gearing up for a **greener future** where innovation meets sustainability. The **EU** has set ambitious goals to cut greenhouse gas emissions, aiming for **climate neutrality** by 2050 and a 55% reduction in CO₂ emission by 2030. The EU introduced various initiatives, such as updating the Effort Sharing Regulation as part of the **Fit for 55 plan**.

Climate change solutions often focus on clean energy, but food production and construction also play a big role:

- **Food systems** contribute a quarter of global emissions, with 6% from animal feed¹.
- The **construction industry** accounts for about 37% of energy-related CO₂ emissions globally².

Sustainability isn't just about emissions; it also means preventing harmful substances from polluting. **Lubricating oils** with **petroleum-based additives** are widely used sources of pollution.

1 Hannah Ritchie, Pablo Rosado and Max Roser (2022) - "Environmental Impacts of Food Production" Published online at OurWorldinData.org. Retrieved from: <https://ourworldindata.org/environmental-impacts-of-food> [Online Resource]

2 United Nations Environment Programme (2020). Global Status Report for Buildings and Construction

Objectives

BEST-CROP is poised to transform barley cultivation by:

- **Optimizing Photosynthesis:** Leveraging genetic diversity and cutting-edge biotechnology, the project will enhance photosynthetic yield and optimise canopy structure. The incorporation of favourable alleles from natural diversity, mutagenized lines, and edited genes, will maximize photosynthetic efficiency by bypassing photorespiratory processes, thus elevating overall performance.
- **Tailoring Barley Straw for Industry:** Our initiative will refine barley straw's physical, chemical properties for various industrial applications, including animal feed, bio-lubricants, and bio-based construction materials.
- **Enhancing Environmental Resilience:** BEST-CROP will produce barley genotypes with increased biomass production and improved CO₂ uptake through meticulous canopy management and stomatal conductance control.

