

Policy Brief

The CropBooster Program: A contribution to a New Green Revolution to deliver improved, future-proofed crops for Europe.

This Roadmap has been developed in the CropBooster-P project (EC Grant Agreement 817690). A summary of the CropBooster Strategic Research Agenda and CropBooster-P White Paper.



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Executive summary:

Stabilising and increasing crop yields in the face of global climate change, while safeguarding biodiversity and suppling high-quality food, feed, and biomass are a priority for Europe. A second Green Revolution in crop production is needed to meet future crop biomass and yield demands. This represents a huge challenge to all agricultural value chain players. Multiple new crop technologies including molecular markers for key traits to support modern breeding are already at Technology Readiness Levels (TRLs) 3-5, although to date, efforts have been fragmented and small scale. The CropBooster Program proposes a coordinated European Research Agenda designed to accelerate the development of improved crops in line with societal expectations. These future-proofed crops will help European agriculture transition to a sustainable climate-ready model that addresses food security concerns and meets the needs of Europe's bioeconomy.

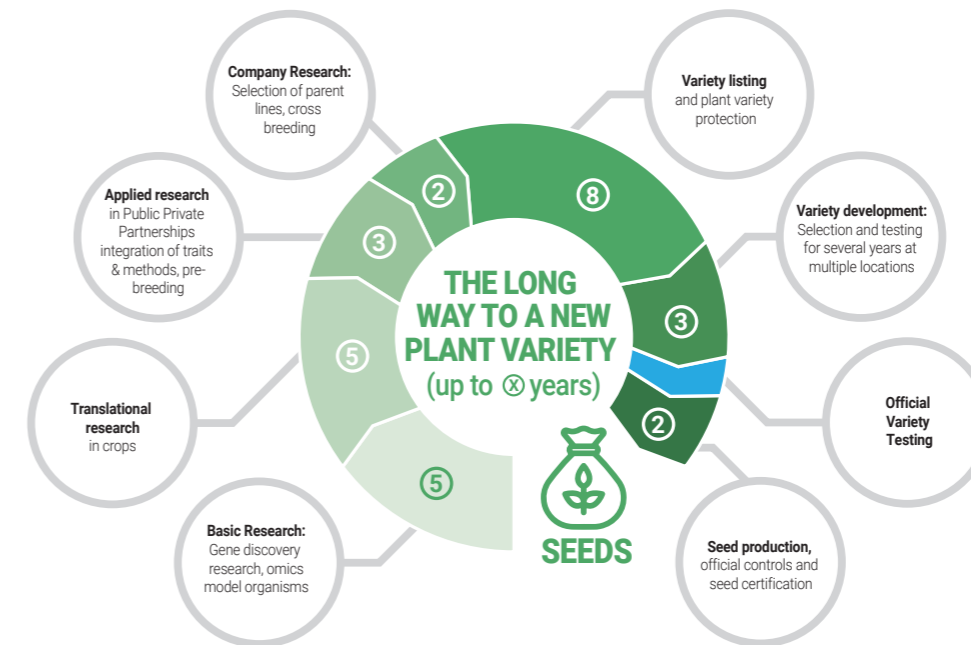
Global challenges threaten food security and the bioeconomy.

Maintaining food security, while transitioning towards more sustainable food systems, is one of the greatest challenges facing our growing global society. Climate change, a growing population and disrupted global supply chains, threaten food security and the bioeconomy. Responding to these drivers of change is increasingly urgent for European and global crop and food value chains.

The European Commission has declared sustainable yield improvement in agriculture a priority in view of global problems (food, energy, climate). To meet these challenges agriculture will need to sustainably produce food for 9.7 billion people by 2050 and contribute to the sequestration of carbon whilst meeting the demands of the bioeconomy. This will require a doubling of global crop productivity, but projections of crop yield suggest we will fall 40-70% short of demand by the 2050 target date.



Crop innovation is a critical part of the solution for climate-smart agriculture.



The Innovation cycle in plant breeding indicating estimated timescales at each stage. This differs depending on crops and approaches (source Euroseeds).

The CropBooster Program proposes a Research and Innovation Roadmap that builds on recent advances in plant science and crop research. This has the potential to transform how industry and academic plant science deliver innovations that meet the growing need for better and more resilient crops. Research excellence distributed across the European Research Area (ERA) will be combined with professional expertise from plant breeders, farmers and the bioeconomy value chains. The Program will deliver breakthrough translational research and deliver **blueprints for future-proofed crops**.

Given the long timescales for crop development from basic research to commercialisation urgent action is needed to deliver these **blueprints** for next generation of crops in the coming decade.

Alignment to EU Policies

Crop innovation will play a critical role in increasing the yield of lower input systems, such as organic farming, while reducing the need for inputs (e.g. fertiliser and pesticides) for other farming systems, in line with the Common Agricultural Policy and Farm to Fork Strategy (May 2020). The CropBooster strategic research agenda has identified multiple routes forward, building on a rich science base and engagement with stakeholders. Natural genetic resources will be exploited more effectively - aligned to DG AGRI's "A Strategic Approach to EU Agricultural Research and Innovation". New crop varieties need to be developed with improved yields and higher Resource Use Efficiencies. This reduces reliance on synthetic fertilisers whose production is energy intensive and depletes natural resources. Lowering inputs contributes to delivering the European Green Deal's (December 2019) aims to reduce Green House Gas emissions to 55 % of 1990 levels by 2030 and reach climate-neutrality by 2050.

The CropBooster Program science-based “blueprints” for improved crops will address key critical challenges including:

- **More efficient use of resources and inputs in agriculture:** in the case of CropBooster the primary resources are water and nutrients (e.g. nitrogen and phosphorus).
- **Increasing crop yields to provide sufficient food for the growing global population.** The growing global population is expected to have an increased per capita food demand, estimates suggest crop production may need to increase by up to 110%.
- **Transitioning to a more sustainable bioeconomy to meet increasing demands for biobased materials and products.** New feedstock crops and bio-factories will be better designed to meet the needs of processors and end users.
- **The adaptation of crops to improve resilience to climate change:** this will affect different regions in Europe facing diverse changes in climate and weather extremes.
- **Increasing the nutritional value and other quality parameters of future crops.**
- **Improving the mitigation of greenhouse gases,** especially carbon dioxide, fixed by photosynthesis and sequestered and stored within plant biomass or below ground (carbon farming).
- **The need to preserve space for natural ecosystems:** new crop science should increase yields and sustainability without the need to expand the area of croplands.

Part of the landscape

To future-proof our agri-food system the CropBooster Program will collaborate with farmers, agronomists, breeders and other bioeconomy and food value-chain actors, including consumers, to ensure that outputs are suitable for end-use. CropBooster will align efforts from the EU associated and interested third countries to accelerate the translation of the ERA knowledge base. The proposed structure of the CropBooster Program is a novel Partnership “Future Proofed Crops”. This public-private Partnership will fill an important strategic gap in the current Partnership strategy for food, bioeconomy, natural resources, agriculture and the Soil Health Mission. Development of the proposed Partnership will be closely coordinated with the leadership teams of other Partnerships to avoid duplication in efforts, and to build synergies.

Sources

The CropBooster Program was developed in the CropBooster-P project (EC Grant Agreement 817690) with additional contributions from academic and industry experts, the agricultural value chain, citizens and societal actors. This is a summary of the detailed Crop Booster Strategic Research Agenda (Deliverable 5.6) and the White Paper (Deliverable 5.7). Both documents can be accessed on the associated CAPITALISE project website www.capitalise.eu using the QR code.

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