

# BELIS Objectives

The ambition of BELIS is to set up the conditions for cost-efficient legume breeding, enabling a continuous release of varieties, improved to meet farmers, consumers and industry requirements. This broad aim will be achieved by focusing in three specific objectives:

- To develop tools and methodologies for **cost-effective breeding programmes** and deliver proofs of concept, with and for breeders: phenotyping, genomic breeding tools, innovative breeding methods.
- To facilitate the **economic and regulatory environment**: variety registration, variety tests and recommendations, and new business models based on market and climate trends and integrating different financing models and value chain actors.
- To implement an efficient, ambitious and durable **transfer of innovation** through a network of breeders and actors from scientific research, extension services and seed, food and feed industries, as well as through a training portfolio.

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## PARTNERSHIP



The BELIS project brings together a consortium of **34 partners**, including plant breeders in research centres, technical institutes and seed companies, extension services, a variety registration office and an international organisation specialised in training. These are settled in 18 countries (15 EU countries, Switzerland, United Kingdom and Lebanon).

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"Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them."

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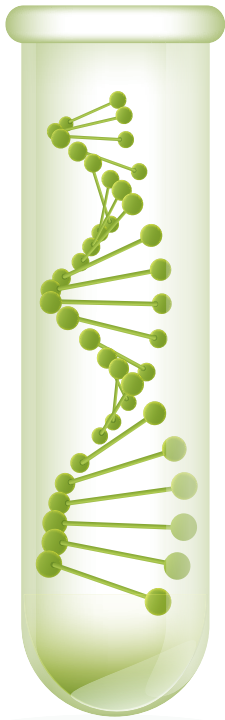
# Breeding European Legumes for Increased Sustainability



BELIS is a 5-year innovation project supported by Horizon Europe, aiming at improving genetic selection methodologies and governance structures in the legume breeding and seed industry to increase its competitiveness in the EU and Associated Countries.



# Why Breeding Legumes?



● Legumes are essential to the **sustainability of agriculture and food systems**, as a source of proteins and other nutrients for humans and animals, and because of their capacity to fix atmospheric nitrogen.

● Their **cultivation in Europe** is limited by low profitability due to low or unstable yields, agronomic constraints and pests, as well as qualities unsuited to their uses.

**Legume cropping limiting factors could be overcome through modern plant breeding technologies and a better delivery of genetic progress to the farmers and industry, making it possible to release better adapted varieties and seeds to the market.**



# Project concept and structure

**BELIS work integrates scientific, technical, and organisational aspects to propose innovations in the whole legume breeding chain. BELIS is composed of one coordination and management Work Package (WP) and six technical/scientific WPs responding to the project concept.**

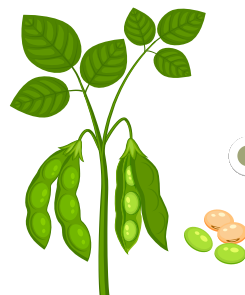
- **Technologies and protocols** for genetic resources and materials characterisation and genomic selection.
- **Better adaptation of variety assessment and recommendations** to cropping contexts.
- **Efficiency in the variety registration process.**
- **Breeding business models:** financing mechanisms involvement of all value chain actors.
- **Networking, consultation, training and knowledge dissemination,** engaging with multiple stakeholders.

## Species

**BELIS will work with 14 legume species of both grain and forage value:**

### ● Seven forage crops

Lucerne, red clover, white clover, annual clovers, sainfoin, birdsfoot trefoil and vetches.



### ● Seven grain crops

Pea, faba bean, soybean, white lupin, lentil, chickpea and common bean.

# Work Packages

**WP1**

**Coordination and project management** to ensure it reaches objectives, delivers results that will generate the expected outcomes.

**WP2**

**BELIS breeding actors platform – networking, communication, dissemination and transfer**, to bring together the community of breeders and other key actors to facilitate transfer, training and exploitation of BELIS outputs, to widely communicate and disseminate the activities, achievements and main results of BELIS and to ensure an open science approach.

**WP3**

**New phenotyping tools and protocols.** Improving and refining protocols to estimate forage biomass and seed yield, screening for resistance to major biotic and abiotic stresses, and optimizing tools for innovative quality traits measurement.

**WP4**

**Genetic effects and genotyping tools in legumes.** Efficient low-cost genotyping solutions for legumes, identify trait-marker associations and develop genomic selection models for key agronomic traits and establish a data repository for curated marker, phenotype and marker-trait association data.

**WP5**

**Legume phenotypic and molecular breeding as proofs of concept.** Validation of enhanced phenotyping techniques, Marker Trait Associations, and genomic prediction models for complex traits in breeding programs. And generating an inventory of phenotyping and genotyping protocols and tools used for all 14 target species in BELIS.

**WP6**

**Cost-efficient and accurate legume variety registration and recommendation.** Explore the use of molecular markers for DUS (Distinctness, Uniformity, Stability) tests, facilitate and increase efficiency of VCU (Value for Cultivation and Use) assessment of varieties and optimize field trials at the agrizone level, and reinforce and adapt variety recommendations in the current and future agroclimatic conditions in Europe.

**WP7**

**Co-create new business and governance models facilitating efficient legume breeding.** Analysing market trends for future legume breeding objectives, successful cases of governance and business models to identify and propose innovative models of financing mechanisms and value chain actors' involvement. Comparing public policies to identify those enabling legume breeding development.