



TRansition paths to sUustainable  
legume-based systems in Europe

## Policy Briefs & Recommendations

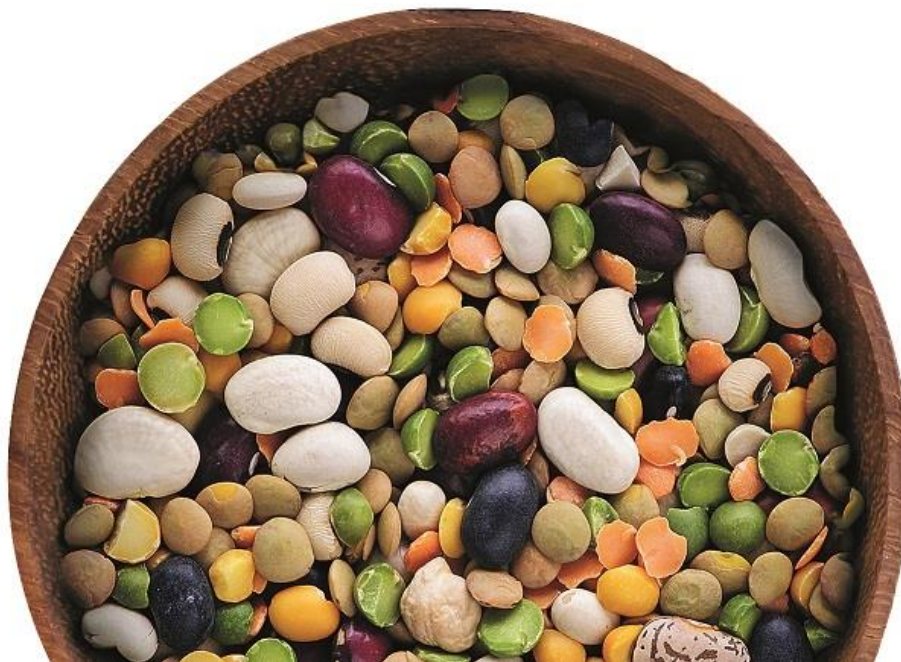
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### Deliverable Description & Contributors

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[www.true-project.eu](http://www.true-project.eu)



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## Introduction

”Despite the potential of legumes to improve the sustainability of arable cropping systems and enhance the quality of farmed animal and human diets, the production and consumption of legumes in Europe are low, whereas their demand for feed is high.” This insight, also called a ‘legume paradox’, was shared by many stakeholders (approximately 600) from the TRUE project partnership and beyond. In TRUE, we examined policies that facilitate the transition towards more legume-based food- and feed systems. Throughout this report, we refer to ‘policy’ in a broad sense, not only considering legal regulations (laws, decrees, strategies) as the policy framework, but also including public- and private-initiatives that aim to change or implement the framework conditions in subtle ways.

Our methodology built on a four-step data gathering and policy analysis framework to enable the co-creation of new governance solutions as described below.

1. **Co-design**, via the elaboration of the **research agenda**, identifying societal and scientific research needs (D7.1). We invited a range of stakeholders, beyond the project partners, to [Legume Innovation Network \(LIN\) Workshops](#) to ensure a wide variety of knowledge bases is represented. Co-design is a joint creation of targeted outputs, processes, aims, and collaboration structures with the stakeholders.
2. **Co-production of joint knowledge generation at various levels (D7.2)**. Data and information have been collected during Case Study field trips and site visits to inform real-world perspectives and decisions on sustainable solutions. Joint interpretation of the data gathered has been undertaken by different actors to identify various value systems. Such co-production enabled the analysis at regional and national levels. Policy interviews at the EU level were documented, including joint reports, publications, conferences, and socio-technical innovations.
3. **Co-creation of new governance solutions (D7.3)**. A Delphi survey (reported here) has been carried out with a broad range of stakeholders. Co-creation is an overarching concept, involving various collaboration processes between scientific and non-scientific actors to create new knowledge and practices aligned with responsible research and innovation.

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4. ***Co-dissemination and synthesis reflection workshops (D7.4).*** Co-dissemination here refers to our continuous effort to invite stakeholders to joint synthesis exercises. The aims are to facilitate the validation, application, and adoption of the results and determine how to best implement them.

This report (**D7.4**) aims to inform European and international policies that could support legume-based systems. Results from our policy analysis are formulated as recommendations and collected in **four policy briefs** available on the [TRUE website](#) to help develop positive, proactive approaches to support the realisation of more sustainable legume-based systems. The policy briefs build on our policy assessment reports (**D7.1, D7.2**), which concluded that the primary hindrance to legume-focused innovations is the inconsistencies across policies. Our Policy Delphi results (**D7.3**) have been co-produced with a panel of geographically dispersed experts and represented a common understanding of the incoherencies across sectors. Overall, based on the policy analysis, we argue that legumes require an integrative and enabling policy environment to meet current and future food and nutritional and health security challenges. We had identified several routes to leverage barriers for legume production and consumption, and these are highlighted in one of our four policy briefs. These are:

1. [Policy recommendations promoting sustainable food and feed system;](#)
2. [The Common Agriculture Policy and the transition to legume supported food systems;](#)
3. [Environmental policies;](#)
4. [Pulses on the menu \(nutrition\)](#)

TRUE WP7 also sought to engage with multiple stakeholders and decision-makers in the creation of a more favourable policy and governance context. For instance,

- TRUE jointly created a '[Crop Diversification cluster](#)', and a working group entitled "Policy recommendations to facilitate uptake of crop diversification" to deliver common messages from the cluster projects to different stakeholders.
- Several legume innovations workshops and online meetings helped to consolidate the TRUE policy recommendations. In addition, TRUE co-developed with stakeholders a science-society-policy interface platform, the 'Legume Innovation Network' (LIN), as a longer-term



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legacy aimed to connect a wide range of interested parties such as farmers, advisors, breeding businesses, non-governmental organisations interested in legume preferment and connecting value chain actors.

- The TRUE Policy Delphi involved a broad range of stakeholders in a structured policy assessment process to evaluate a set of policy scenarios to be implemented in the EU. This Policy Delphi served to identify policy interventions leveraging barriers that hinder the production and consumption of legumes in the EU.
- The TRUE Legacy Plan (D9.9) also presents some of our policy insights and approaches to help support the European Commission’s policy agenda for sustainable food systems. Originally the launch of the TRUE “Legacy-LIN” and “Policy Dialogue” event had been planned as a two-day event in Scotland House (Brussels) in late November/early December 2020. Due to the Covid-19 travel restrictions, this event went online as a [webinar series](#), which included the LIN launch event (Webinar launching the roadmap of the Legume Innovation Network on 11<sup>th</sup> May 2021). The policy dialogue event was organised as a partner event of the [EU Green Week 2021](#) (26<sup>th</sup> May 2021).

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## Results of the policy dialogue

The TRUE policy dialogue event was organised as part of the [EU Green Week 2021](#) programme. Stakeholders were invited to reorient the focus of policy on legume-based food and feed system. TRUE project researchers presented their studies and analyses based on optimal management, farmers agronomy and support needs, market trends that growers face, taste, price and convenience, and consumer claims. Participants were divided into breakout groups to discuss policy implications and recommendations of the four TRUE policy briefs.

Overall, the policy implications and recommendations related to legumes and the Common Agricultural Policy (CAP) has been evaluated as very clear (Figure 1). Additional recommendations suggested that conditionalities of the new CAP could support legumes via diverse crop rotations, that eco-schemes could include measures to support legumes and that a national protein plan is requested by the European Commission (EC). Another recommendation was to emphasise that the feed market and food market are not the same regarding the added value for the value chain, especially for farmers and that, in general, the strong focus is on legumes as feed. One participant highlighted the need to change the perspective away from farm-to-fork in favour of fork-to-farm.



### The Common Agricultural Policy (CAP) and the transition to legume supported food systems

1. Policies that impact legume-based agri-food and -feed systems operate across many levels of governance shaped by international, EU, national and regional agreements.
2. There is a need for policies to operate at multiple levels concerning **awareness, education and knowledge among all value chain stakeholders of agroecological principles and legumes' potential to fulfil these**. Such shared awareness, understanding, co-innovation and cooperation is necessary to harmonise better and optimise the environmental, societal and economic functions - and so adapt to the serious existential crises facing citizens across Europe and globally.
3. Policy integration is required: a **'mixed approach' where agriculture, environmental, and health policies** are linked, and inconsistencies eliminated would foster more comprehensive support and incentives for systemic change, where legumes are fully recognised and valued for the various benefits to human and environmental functions.

**Figure 1:** Policy Implications and recommendations made in the TRUE, The Common Agriculture Policy and the ‘transition to legume supported food systems’, Policy Brief and discussed during the Policy dialogue event.

Discussion of the Policy implications and recommendations made in our ‘Promoting sustainable food and feed systems’ Policy Brief centred on recommendation 6 (Figure 2). Hence, the CAP needs to be re-oriented “. Comments from participants included:

- the Pareto Principle still dominates the CAP and small producers are excluded from benefits;
- eco-schemes need to be equally accessible for farmers; and,
- the incentives for legumes on farms should be increased.



Transition paths to sustainable legume-based systems in Europe

### Promoting sustainable food and feed systems

1. **The implementation of policies that encourage reduced use of synthetic nitrogen fertiliser use and/or increase organic N provisions** could be an important step towards increasing home-grown legume cultivation. Although, it is not clear to what extent this will impact human consumption of legumes.

2. Such policies would need to be supported by significant **investment in R&D, agricultural extension services, and knowledge transfer** to allow for a smooth transition from high use of synthetic nitrogen fertiliser in conventional agriculture to precision- and agroecological farming.

3. **Mitigation and adaptation strategies to combat climate change** can have an indirect positive effect on legume production and consumption if these policies are implemented on a large scale and effectively.

4. **Policies that tackle nutrition, health and diet** are relevant for increasing legume consumption and, indirectly, legume production. However, preferences, culinary traditions, and cultural habits are difficult to change with top-down approaches.

5. **Citizen-led initiatives that inform and educate the public** on the environmental and health benefits of legume consumption should accompany policies that tackle production and farming strategies (i.e. Greening payments, with other agroecological and rural development incentives, etc.).

6. The CAP (Common Agricultural Policy) is an important tool to support food production and the protection of the natural environment. **The farm is a key component for the creation of any positive externalities.** Hence, the CAP needs to be re-oriented.

7. **Trade agreements** are part of a complex web of interconnections between economies worldwide. Any intervention will have repercussions along the food chain in general. Therefore, this strategy **is not advocated.**

**Figure 2:** Policy Implications and recommendations made in the TRUE ‘promoting sustainable food- and feed-systems’ Policy Brief and discussed during the Policy Dialogue Event.

Discussion on the environmental-related recommendations focussed on the third recommendation, that is the technical challenges that need to be tackled through applied research, which has been evaluated as very good and important by participants (Figure 3). Comments included *‘reliable varieties are needed and if technical challenges are resolved successfully, this could also encourage other growers or stakeholders to try to incorporate legumes into their businesses and rotations.’* In relation to the second recommendation (Figure 3), the requirement for support of farmer-led and



on-farm demonstrations was mentioned as well as that the fact that yield stability is the major concern for farmers and additionally training and education, besides the policy for farmers, is needed. In summary, any policy that brings an incentive to grow more legumes would be welcome.



### Environmental Policies

1. **The implementation of policies that encourage reduced use of synthetic nitrogen fertiliser use and/or increase organic nitrogen provisions** could be an important step towards increasing home-grown legume cultivation. Although, it is not clear to what extent this will impact human consumption of legumes.

2. Such policies would need to be supported by significant **investment in R&D, agricultural extension services, and knowledge transfer** to allow for a smooth transition from high use of synthetic nitrogen fertiliser in conventional agriculture to precision- and agroecological- farming.

3. **Legume cultivation has many technical challenges which need to be tackled through applied research.** For example, developing more effective crop types such as new varieties with higher and more stable yields, better pest resistance, reduced time to harvest, and which may also minimise nitrogen loss and optimise nitrogen-cycling in-field.

**Figure 3:** Policy Implications and recommendations made in the TRUE ‘Environmental policies’ Policy Brief and discussed during the Policy Dialogue Event.

Comments on the nutrition-focussed policy included:

- subsidies for legume production but also for processing infrastructure is required;
- food innovations must support local production instead of increasing levels of pulses import;
- consumers have an active role in impacting the food systems;
- the type of legume production system impacts the environment and must be considered in terms of policy making (organic vs. conventional).



## Pulses on the menu

1. Since “ecological diets” is the most widely acknowledged policy narrative that seeks to improve the wellbeing of the environment (including non-human lifeforms) and humans in an economically beneficial manner, **it has a real potential to unify diverse stakeholders (policymakers, producers, food providers, consumers).**

2. TRUE Delphi study showed that stakeholders regard interconnected nutrition, diet and health policies and public campaigns as high potential (impact and probability) to enable a transition towards legume-based food and feed systems. For that purpose, **customer-smart policies would be desirable that promote the diversity of leguminous plants and dishes and help the take-up of innovations in food technology.**

3. Meanwhile, consumption-focused policy needs coupling with incentives for short food value chains or to benefit domestic legume producers. Changing consumer behaviour, preferences, culinary traditions, and cultural habits are tough-going, and awareness-raising has limited impacts, especially if designed in a one-way awareness campaign and top-down communication format. **Mainstreaming health and nutrition into education programs could increase youth awareness of healthy food choices.**

5. **Knowledge regarding the health and nutrition benefits of legumes may be insufficient to trigger any increase in consumption.** Existing preferences and cultural barriers may be a strong deterrent to the consumption of legumes, even if nutritional, environmental, and health benefits are high, but culturally sensitive nutrition education and marketing of novel, easy-to-cook, tasty and environmentally beneficial plant-based products may effectively increase legume consumption.

4. **Policy support and investment in value chain development for new legume-based products could further enhance biodiverse local agriculture and improve the livelihoods of legume growers.** Therefore, it is equally important to increase investment in R&D and processing technology to create a market for high-quality plant-based products. Demand-side policy tools, such as standardization, labelling, and public procurement, may make the necessary market-pull for legume-based products and ultimately lead to lower dependence on feed protein imports.

**Figure 4:** Policy Implications and recommendations made in the TRUE , Pulses on the menu (nutrition)’, Policy Brief and discussed during the Policy Dialogue Event.



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## Appendix 1 Agenda of the Policy Dialogue

10:30 **Welcome and Introduction** (*Eszter Kelemen (ESSRG), Laura Fetzer (UHOH)*)

10:35 **Presentations on TRUE outcome and policy lessons**

- Policy Delphi, *Bálint Balázs (ESSRG)*
- Novel food innovations, *Carla S. Santos (UCP)*
- New plates old beans, *Attila Králl (AK)*
- Just the tonic! *Kirsty Black (Arbikie)*
- Winning the market, *Karen Hamman (Institute for Food Studies)*
- Sustainable Food Products, *Sophie Saget (#GoEconut)*

11:30 **The TRUE policy briefs are discussed in breakout groups**

1. Legumes and the CAP
2. Legumes in the light of the TRUE policy Delphi
3. Legumes policies in view of environmental impacts
4. Legume policies related to nutrition

11.45 **Conclusion and Discussion** (*Pete Iannetta (JHI)*)

12:00 **End**

Recorded presentations from the event can be found at: <https://www.true-project.eu/news-events/policy-dialogue-event/>.



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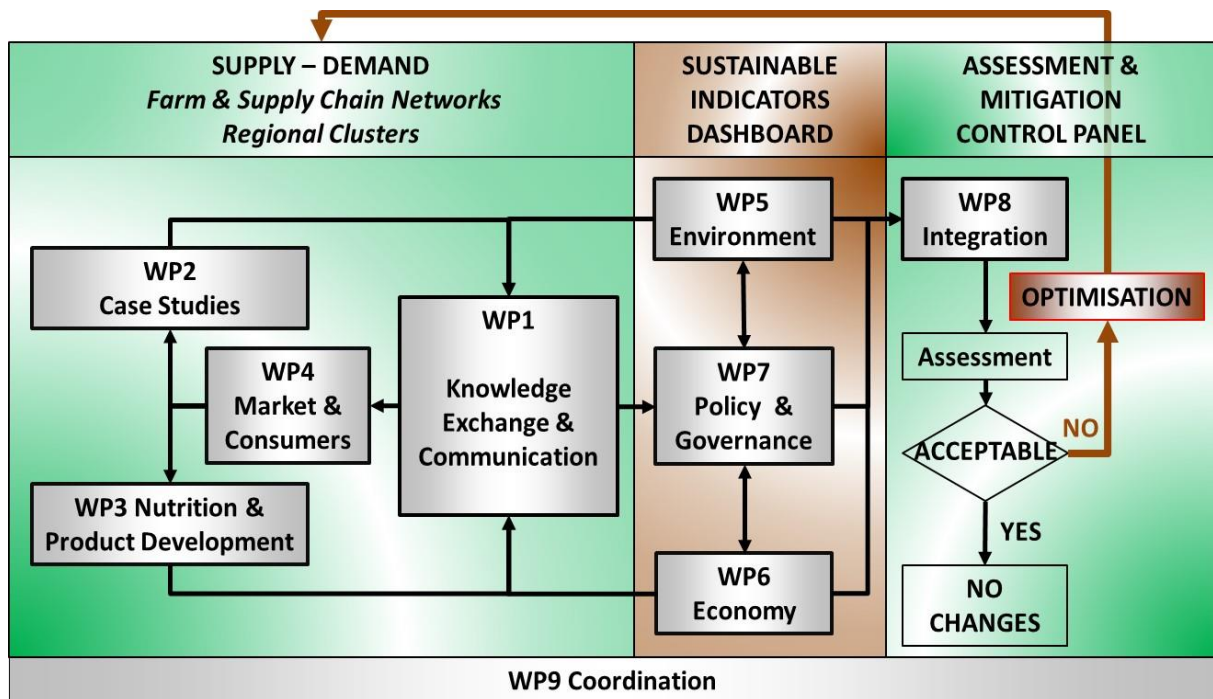
## Appendix II: Background to the TRUE-Project

### Executive Summary

TRUE's perspective is that the scientific knowledge, capacities, and societal desire for legume supported systems exist, but that practical co-innovation to realise transition paths have yet to be achieved. TRUE presents 9 Work Packages (WPs) supported by an *Intercontinental Scientific Advisory Board*. Collectively, these elements present a strategic and gender-balanced work-plan through which the role of legumes in determining '*three pillars of sustainability*' – '*environment*', '*economics*', and '*society*' - may be best resolved. TRUE realises a genuine multi-actor approach, the basis for which are three *Regional Clusters* managed by WP1 ('*Knowledge Exchange and Communication*', University of Hohenheim, Germany), that span the main pedo-climatic regions of Europe, designated here as *Continental*, *Mediterranean* and *Atlantic*, and facilitate the alignment of stakeholders' knowledge across a suite of 24 Case Studies. The Case Studies are managed by partners within WPs 2-4 comprising '*Case Studies*' (incorporating the project database and *Data Management Plan*), '*Nutrition and Product Development*', and '*Markets and Consumers*'. These are led by the Agricultural University of Athens (Greece), Universidade Catolica Portuguesa (Portugal) and the Institute for Food Studies & Agro-Industrial Development (Denmark), respectively. This combination of reflective dialogue (WP1), and novel legume-based approaches (WP2-4) will supply hitherto unparalleled datasets for the '*sustainability WPs*', WPs 5-7 for '*Environment*', '*Economics*' and '*Policy and Governance*'. These are led by greenhouse gas specialists at Trinity College Dublin (Ireland; in close partnership with LCA specialists at Bangor University, UK), Scotland's Rural College (in close partnership with University of Hohenheim), and the Environmental and Social Science Research Group (Hungary), in association with Coventry University, UK), respectively. These *Pillar WPs* use progressive statistical, mathematical and policy modelling approaches to characterise current legume supported systems and identify those management strategies which may achieve sustainable states. A *key feature* is that TRUE will identify key *Sustainable Development Indicators* (SDIs) for legume-supported systems, and thresholds (or goals) to which each SDI should aim. Data from the *foundation WPs* (1-4), to and between the *Pillar WPs* (5-7), will be resolved by WP8, '*Transition Design*', using machine-learning approaches (e.g. *Knowledge Discovery in Databases*), allied with *DEX* (*Decision Expert*) methodology to enable the mapping of existing knowledge and experiences. Co-ordination is managed by a team of highly experienced senior staff and project managers based in The Agroecology Group, a Sub-group of Ecological Sciences within The James Hutton Institute.

### Work-package structure

The flow of information and knowledge in TRUE, from the definition of the 24 Case Studies (left), quantification of sustainability (centre) and synthesis and decision support (right).



## Project partners

No	Participant organisation name (and acronym)	Country	Organisation Type
1 (C*)	The James Hutton Institute (JHI)	UK	RTO
2	Coventry University (CU)	UK	University
3	Stockbridge Technology Centre (STC)	UK	SME
4	Scotland's Rural College (SRUC)	UK	HEI
5	Kenya Forestry Research Institute (KEFRI)	Kenya	RTO
6	Universidade Catolica Portuguesa (UCP)	Portugal	University
7	Universitat Hohenheim (UHOH)	Germany	University
8	Agricultural University of Athens (AUA)	Greece	University
9	IFAU APS (IFAU)	Denmark	SME
11	Bangor University (BU)	UK	University
12	Trinity College Dublin (TCD)	Ireland	University
13	Processors and Growers Research Organisation (PGRO)	UK	SME
14	Institut Jozef Stefan (JSI)	Slovenia	HEI
15	IGV Institut Fur Getreideverarbeitung GmbH (IGV)	Germany	Commercial SME
16	ESSRG Kft (ESSRG)	Hungary	SME
17	Agri Kulti Kft (AK)	Hungary	SME
18	Alfred-Wegener-Institut (AWI)	Germany	RTO
19	Slow Food Deutschland e.V. (SF)	Germany	Social Enterprise
20	Arbikie Distilling Ltd (ADL)	UK	SME
21	Agriculture and Food Development Authority (TEAG)	Ireland	RTO
22	Sociedade Agrícola do Freixo do Meio, Lda (FDM)	Portugal	SME
23	Eurest -Sociedade Europeia De Restaurantes Lda (EUR)	Portugal	Commercial Enterprise
24	Solintagro SL (SOL)	Spain	SME
25	Public Institution Development of the Međimurje County	Croatia	Development Agency

\*Coordinating institution



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## Objectives

### **Objective 1: Facilitate knowledge exchange (UHOH, WP1)**

- *Develop a blueprint for co-production of knowledge*

### **Objective 2: Identify factors that contribute to successful transitions (AUA, WP2)**

- *Relevant and meaningful Sustainable Development Indicators (SDIs)*

### **Objective 3: Develop novel food and non-food uses (UCP, WP3)**

- *Develop appropriate food and feed products for regions/cropping systems*

### **Objective 4: Investigate international markets and trade (IFAU, WP4)**

- *Publish guidelines of legume consumption for employment and economic growth*
- *EU infrastructure-map for processing and trading*

### **Objective 5: Inventory data on the environmental intensity of production (TCD, WP5)**

- *Life Cycle Analyses (LCA) -novel legumes rotations and diet change*

### **Objective 6: Economic performance - different cropping systems (SRUC & UHOH, WP6)**

- *Accounting yield and price risks of legume-based cropping systems*

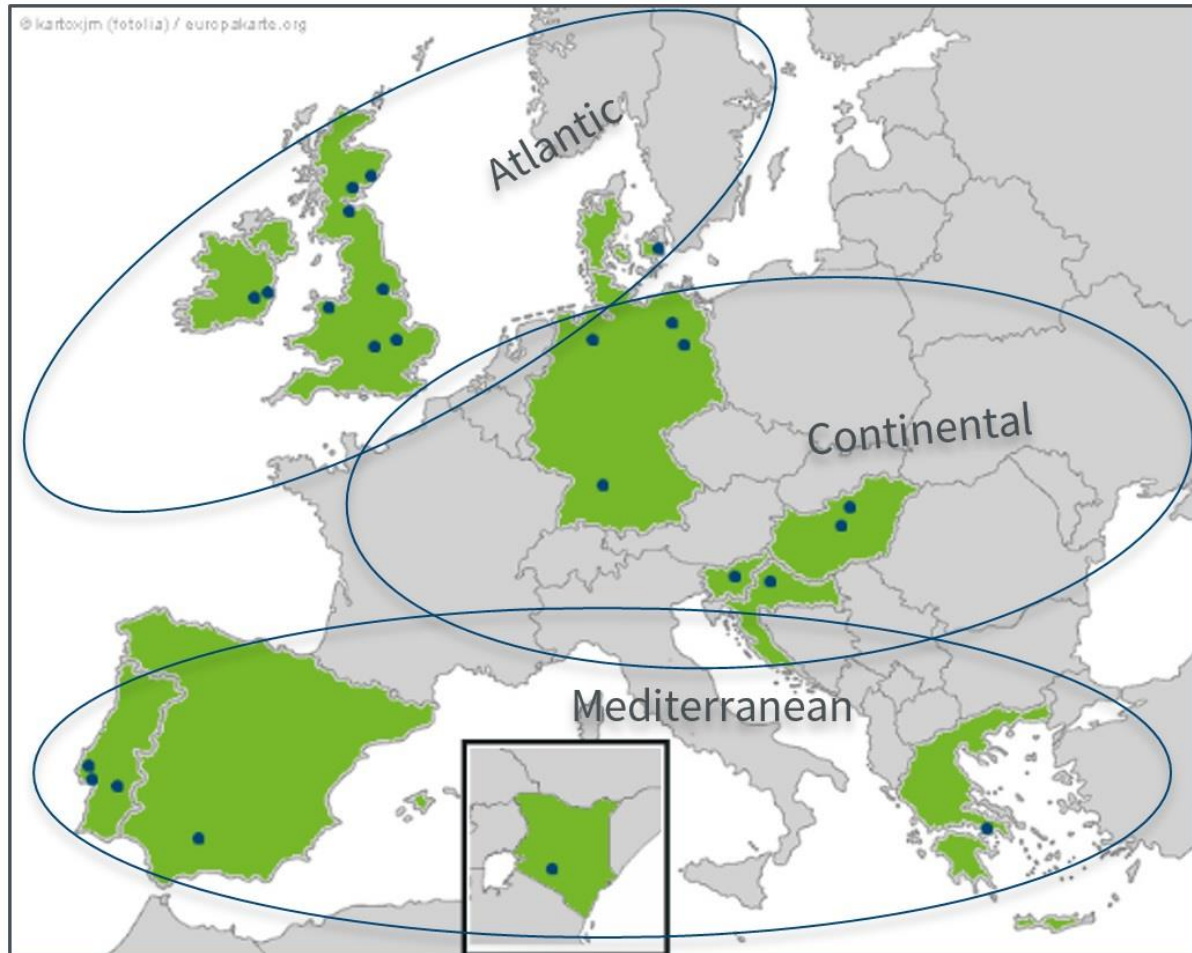
### **Objective 7: Enable policies, legislation and regulatory systems (ESSRG, WP7)**

- *EU-policy linkages (on nutrition) to inform product development/uptake*

### **Objective 8: Develop decision support tools: growers to policymakers (JSI, WP8)**

- *User-friendly decision support tools to harmonise sustainability pillars*

## Legume Innovation Networks



Knowledge Exchange and Communication (WP1) events include three TRUE European Legume Innovation Networks (E-LINs), and these engage multi-stakeholders in a series of focused workshops. The E-LINs span three major biogeographical regions of Europe illustrated above within the ellipsoids for Continental, Mediterranean and Atlantic zones.





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