Policy brief

From Protein Ambition to Delivery: Building competitive, sustainable plant-protein value chains across Europe

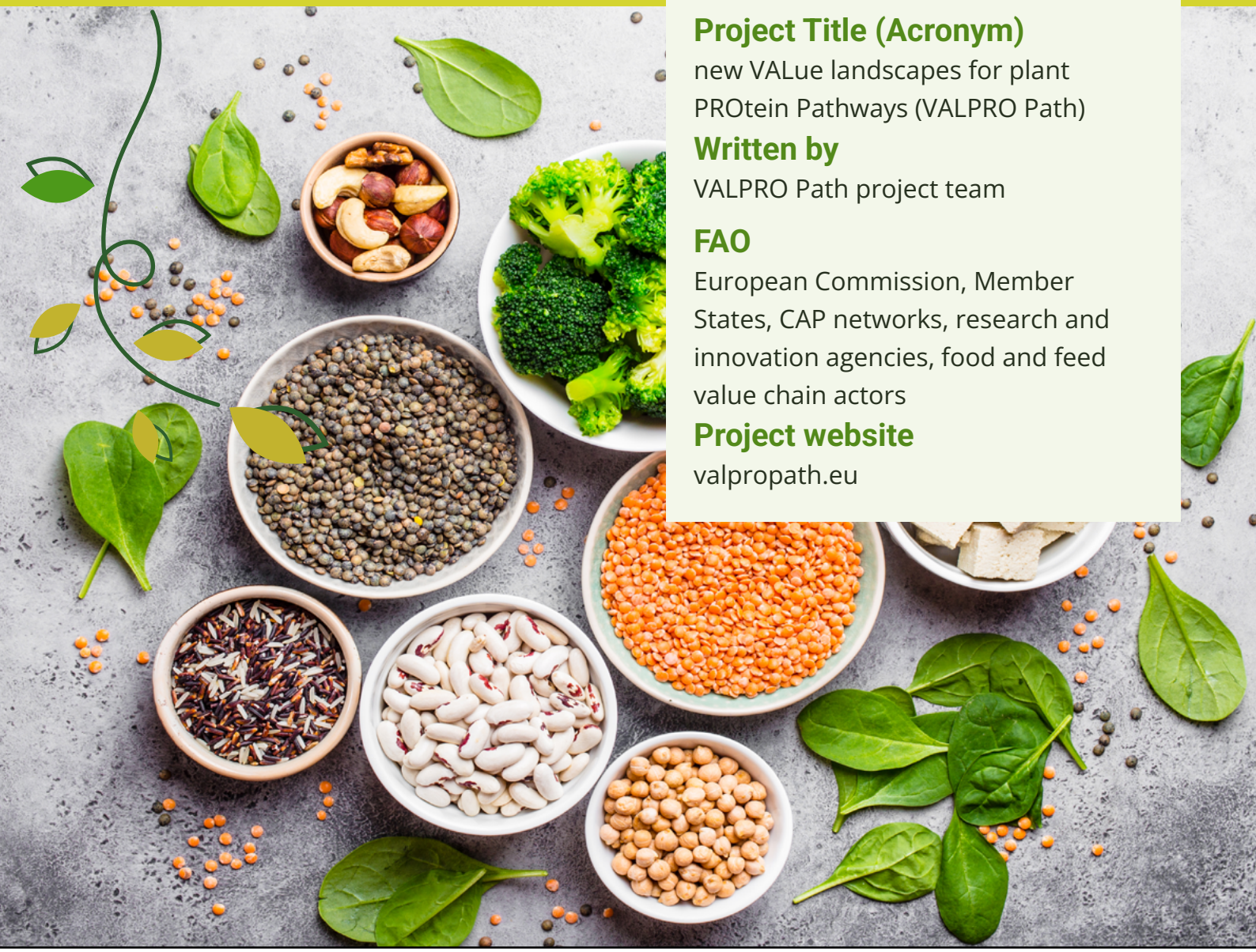
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Executive statement

The need to transform the global food system in response to climate change, biodiversity loss, resource constraints, geopolitical uncertainty and growing demand for safe, nutritious food is well recognised. A transition towards greater use of plant proteins, alongside sustainable livestock production, can diversify diets, strengthen food and feed security, reduce dependence on imported inputs and deliver resilient rural economies. The EU's 2026 Protein Action Plan provides an important framework for this transition, complemented by the EU Livestock Strategy. Evidence from VALPRO Path shows that successful plant-protein value chains exist and can expand but this is dependent on regional conditions and on factors ranging from yield stability and crop rotations to processing capacity and location, market access and consumer demand. These value chains need to be underpinned by principles of circularity and cascading use. Supports for the Agricultural Knowledge and Innovation System (AKIS), targeted finance instruments and mechanisms to facilitate collaboration and coordination are also required if momentum is to be gained for the transition. EU policy must focus on enhancing connection between farmers, processors, retailers, food service, consumers and wider stakeholders, while recognising distinct but complementary objectives for human-food and animal-feed. An integrated approach can support healthier and more sustainable diets, competitive European value chains, resilient rural economies and progress towards the EU's climate, biodiversity and food security goals.

KEY WORDS

protein · plant-based food · feed · value chains · rural development · agriculture · food security · biodiversity · climate

Introduction: the issue and the context

Europe's protein system faces strategic, economic, environmental and social pressures. The EU remains substantially dependent on imported high-protein animal feed for livestock production, while domestic plant-protein production, processing capacity and value chain integration remain uneven, particularly for food production. Uncertain demand, and challenges relating to competitiveness and profitability, including inconsistent yields, constrain investment, undermining EU objectives to build more resilient, diversified food and feed systems.

The 2026 Protein Action Plan aims to increase the share of animal feed from EU-produced oilseeds and protein crops from 25.8% to 35% by 2035. While this objective is important, feed security does not constitute a sufficient protein transition. A resilient food system also requires greater production and consumption of plant protein for human food.

The VALPRO Path project examined how plant-protein value chains can develop in practice, with a focus on developing and validating added value opportunities through

food production. Its findings combine value chain, economic, policy and lifecycle analyses, results from living labs in 5 different EU member states, agronomic and food science research, supply chain modelling and business model development. Stakeholder engagement and an inbuilt multi-actor approach ensured that practitioner knowledge was integrated with scientific knowledge, ensuring practical constraints such as regional realities and processing complexity were addressed. The evidence points to a common conclusion: scaling EU plant-protein production is not simply a protein crop production challenge; policy must support developments along the whole value chain, starting from variety development and agricultural inputs at one end through to certification, labelling and public procurement at the other end, and critically, policies must be tailored to a regional context to capitalise on geographically suitable crops.

25.8% → 35%

The 2026 EU Protein Action Plan aims to increase the share of EU-produced protein from oilseeds and protein crops used in animal feed from 25.8% (2025) to 35% by 2035.

Key findings:

1. Competitiveness of food protein crops varies substantially by region, crop and end use.

Identifying the right crop, in the right place for the right market is dependent on yield stability, crop rotation benefits, market access and, in some cases, policy support to collectively underpin the margin returned to the farmer and value generated through the supply chain.

2. Access to food markets will improve added value potential for the farmer but they require reliable supply, consistent quality and efficient logistics.

Moreover, suitable localised processing infrastructure is not yet well established. Hybrid supply chain configurations, combining local pre-processing with larger-scale downstream facilities, can provide flexibility while retaining access to economies of scale. Regional pre-processing hubs, shared and modular facilities are likely to be useful in a local context. The appropriate configuration between centralised, decentralised and hybrid will depend on crop volumes, geographic distribution of production, post-harvest requirements, transport distances, processing technologies and market requirements.

3. Post-harvest processing capacity is an important component of supply chain resilience.

Variability in yield and harvest conditions can alter requirements for drying, stabilisation and storage, and can therefore affect the share of domestic production that can reach its

intended market. Flexible post-harvest infrastructure should consequently be considered together with expansion of primary production and downstream processing.

4. Circularity and wider benefits create value.

Circular bioeconomy approaches to valorise by-products and economic recognition of the benefits arising from better crop rotations, nitrogen savings, soil health and biodiversity provide other potential opportunities to generate, capture and communicate value, achieve commercial viability, enhance resource efficiency and improve sustainability.

5. Food and feed need distinct objectives.

Human food and animal feed objectives are often combined in policy documents at different levels, obscuring distinct requirements such as infrastructural and market needs. This weakens prioritisation, investment signals and accountability across EU and national policies.

6. Demand-side measures lag behind.

Public procurement and consumer measures to stimulate market growth, including further normalisation of plant-protein consumption along with building consumer awareness, understanding and capability, remain under-developed.

7. Scale-up needs coordination across the chain.

Successful scale-up requires coordinated action, investment and collaboration across the entire value chain. Digital tools can connect farm to factory data and further along the chain and, when well-designed, support interoperability and system confidence by stakeholders.



The five priority actions at a glance

1. Develop tangible and practical regional protein strategies
2. Invest in food-grade value chains and regional value-added processing
3. Reduce risks for farmers and processors through enhanced breeding, crop protection and risk-sharing
4. Create demand through public procurement and consumer measures
5. Support coordinated action across the value chain

Priority actions:

1 Develop tangible and practical regional protein strategies

Standard targets or supports are unlikely to deliver the same results across European regions. Regional protein strategies, based on factors such as pedo-climatic conditions, processing infrastructure and market demand, will enable different regions to participate according to their contexts. They should:

- Identify suitable crops, and required varieties and agronomic traits for specific locations and markets. Tailoring varieties based on both agronomic performance and nutritional profiling is key to maximising added value based in local environments.
- Include food, feed and co-product markets.
- Establish networks of demonstration farms via appropriate advisory services to support farmers but also act as a forum for farmers, merchants and processors to engage, problem solve and generate new business opportunities.
- Monitor yields, harvest conditions, prices, costs, imports, post-harvest and processing capacity, food/feed destinations and environmental outcomes to track progress at EU and Member State level. This could be supported by establishing a European protein observatory.

2 Invest in food grade value chains and regional value-added processing

The EU and Member States must prioritise aggregation, drying, storage, grading, testing, pre-processing and product development for food-grade protein crops, recognising that supply chain design should not be provided in the same way everywhere. Food markets offer higher value than feed markets, but access is constrained by insufficient supply, inconsistent quality, and limited processing capacity. Farmer participation in value capture through pre-processing on farm or upstream activity (e.g. through co-ops, contracts, equity),

and consistent policy signals, encourages crop switching, quality upgrading and investment. Through the Common Agricultural Policy and Horizon Europe, the EU should support:

- On-farm, regional, and/or centralised processing and (pre)processing capacity, including flexible hybrid configurations that combine local stabilisation or pre-processing with larger downstream facilities.
- Pilot and demonstration scale facilities to support process efficiencies and de-risk capital investment by 3rd parties.
- Cooperative and public-private investment models that can exploit outputs from pilot facilities.
- Quality and traceability infrastructure and standards to provide the supply chain with the requisite confidence needed to support investment and innovation.
- Research on sensory quality, nutritional value and functional properties to support consumer acceptance, product innovation and evidence-based EU food policy.
- Process innovation including low carbon drying, thermal processing and extraction technologies to maximise plant fractionation into protein, lipid, carbohydrate, and fibre outputs for commercialisation.
- Clear pathways for safe use of co-products in food, feed and non-food uses.

Some processing technologies can be energy intensive and have other negative environmental impacts. Hence processing support should be assessed using a lifecycle approach, considering energy use, chemical inputs and other relevant environmental impacts. This will support processors seeking to meet future Scope III targets. Blended finance vehicles and micro-grants/credit lines aimed at small producers, cooperatives, SMEs and others will enhance participation. The tracking of key indicators as part of a European protein observatory (mentioned in 1 above) will ensure an ongoing focus on the development of food value chains to complement feed value chains.

3 Reduce risks for farmers and processors through enhanced breeding, crop protection and risk reduction/sharing mechanisms

Limited variety availability for many legumes and limited legume-approved plant protection tools for managing pest, diseases and weeds means that yield variability is often a greater risk than price variability. Moreover, supply inconsistency is a major commercial risk. Programmes to address yield potential gaps, increase yield stability and provide reliable volumes, varieties and quality for processing should:

- Fund regional legume breeding and certified seed production that focus not just on yield as the primary driver but in parallel consider the nutritional profile and other quality attributes of the developed varieties.
- Measure and reward whole rotation and environmental benefits.
- Support registration of legume-appropriate plant protection tools that complement legume specific integrated pest management (IPM) strategies.

- Use data from demonstration farms to promote the regional yield potential of legume varieties under optimized crop management, thereby improving yield forecasts, mitigating crop risks while communicating rotation and inter-cropping benefits.
- Support agronomy extension and AKIS capacity development both within and between EU regions of production, so as to promote farmer-to-farmer co-learning and on-farm innovation.
- Provide transition payments, crop insurance and risk-sharing mechanisms for farmers adopting unfamiliar crops.
- Support producer organisations, forward contracts, standardised quality protocols, transparent pricing mechanisms and crop-specific supply-chain coordination.
- Risk reduction should also address downstream supply-chain adaptability. Production uncertainty affects infrastructure utilisation, transport, storage and processing decisions. Investment and policy support should therefore encourage network configurations that have sufficient flexibility to respond to variable crop availability and quality.
- Support on-farm experimentation, weather-risk tools, cross-regional knowledge exchange and regional cooperation, particularly between strong producing and processing regions.

4 Create demand through public procurement and consumer measures

Demand side measures need to be developed alongside farm and processing supports. Public procurement not only provides early markets for European plant-protein products, it can also further normalise plant-protein consumption, build capacity in public catering and build consumer awareness and understanding. While short and regional value chains can create local value added, local sourcing is generally only beneficial from an environmental perspective where the ingredient represents a large share of the product. The EU and Member States should:

- Develop fair and transparent quality specifications and pricing mechanisms.
- Support public procurement that favours short, regional value chains where regional sourcing ensures fair remuneration to farmers and delivers economic and environmental benefits.
- Use functional units (e.g. per unit of protein) alongside product-mass comparisons in public procurement criteria to enable nutritional value to be considered.
- Support consumer education focused on taste, convenience, nutrition and affordability
- Enable clear, harmonised and proportionate rules for certification, labelling, sustainability claims and novel ingredients.
- Reward circularity and co-product valorisation in investment and sustainability schemes.

- Adapt CAP schemes, eco-schemes and investment supports to reward protein-crop production linked to viable food markets.
- Strengthen dietary guidelines, food education, professional training, consumer information and demand side policy in an integrated manner.

Procurement criteria should avoid creating unnecessary barriers for SMEs.

5 Support coordinated action across the value chain

Research on plant-based protein is relatively widespread but commercialisation, scale-up and replication, and demand articulation are weaker. VALPRO Path desk studies and pilot case examples indicate there are gaps, and thus a need for action, all along the value chain. Sustainable and resilient plant-protein value chains are more likely if such action is coordinated. While protein strategies provide a framework for this, further policy actions include

- Supporting demonstration projects, living labs, innovation partnerships, pre-commercial procurement and scale-up finance alongside conventional R&D to support the innovation to investment journey.
- Designing policy programmes around integrated value chain projects rather than isolated farm or processing interventions.
- Using supply-chain modelling and scenario analysis to test how production expansion, infrastructure location, alternative processing technologies and market developments interact under different future scenarios before major scale-up investments are made, reducing the risk of stranded assets.
- Supporting broker organisations, networking events and small collaborative grants that catalyse consortia.

KEY MESSAGE

Scaling EU plant-protein production is not simply a protein crop production challenge. Policy must support the whole value chain – from variety development and inputs to certification, labelling and public procurement – and be tailored to regional contexts to capitalise on geographically suitable crops.

VALPRO Path Case examples



Ireland: Faba bean and the value of regional fit: VALPRO Path analysis indicates that faba bean can perform relatively strongly in Ireland compared with other protein crops. Furthermore, VALPRO Path demonstrated the potential for developing innovative food products based on faba beans cultivated in Ireland, thereby enabling the production of alternative plant-based foods while creating opportunities for the development of new markets. However, competitiveness at farm level depends on yield stability, agronomy, storage, market access and the ability to move beyond feed markets. This illustrates why crops should be linked to local conditions and specific end markets.



Italy: Regional chickpea processing: A regional value chain in Italy demonstrated how locally suitable chickpeas could be milled using existing local milling capacity and incorporated into a pasta by an artisan producer. The resulting product offered a distinctive proposition through protein content, faster cooking and local production. This case supports investment in regional, modular value chains, and the argument for action along the value chain.



Portugal: Peanut production and location-specific competitiveness: The Portuguese peanut case shows that crop competitiveness depends on local agronomy, water availability, processing scale and market conditions. Additionally, the Portuguese peanut case indicates that European cultivated peanuts exhibit significant potential in terms of environmental sustainability, presenting an advantage over peanuts from other regions. It reinforces the need for regional strategies rather than uniform support mechanisms.



EU: Hermetic bagging systems to enable cross-regional applications for plant proteins: Hermetic bagging systems can help small and regional producers preserve identity, quality and traceability while reducing dependence on costly centralised storage silos. This shows that support for modular equipment, rental/service models, along with interoperable digital traceability and crop-specific validation can enable farmers and smaller processors to participate in plant-protein value chains without prohibitive costs.



EU: Pulse flours and product quality: Pulse flours can increase confectionery's protein and fibre content while supporting demand for locally grown European crops. VALPRO Path demonstrated their potential without compromising sensory and functional characteristics, while identifying varietal characteristics suitable for flour production and confectionery applications. The case highlights the importance of industrial trials and close value chain collaboration to ensure products meet consumer expectations before large-scale deployment.

Limitations and further research

Innovations developed in VALPRO Path have been validated but they still require commercial scale-up. The provision of demonstration, scale-up and commercialisation funding beyond conventional research grants would support this. Once innovations are technically validated, the main barriers to scale-up are usually commercial rather than technical: reaching minimum efficient volumes, securing offtake agreements with processors, retailers and food services, and financing equipment before revenues are proven. Existing instruments such as the EIC Accelerator, the Circular Bio-based Europe Joint Undertaking, InvestEU and CAP investment interventions could be better aligned to this stage, for example through calls dedicated to agri-food value chain demonstration, blended finance combining grants with loans or equity, and support for shared or modular processing facilities that farmers, cooperatives and SMEs can use without carrying the full investment alone. Clear IPR and exploitation arrangements agreed early between research partners, farmers and industry also make it easier to attract follow-on investment.

The European peanut business case demonstrates how long-term commercial sustainability can be strengthened through appropriate IP protection and exploitation strategies, including the application of plant variety protection (PVP) measures for regionally adapted peanut varieties. Similarly, partners in VALPRO Path have taken steps during the project to protect their digital innovations, including the Digital Traceability Tool for Protein Crop Supply Chains and the Automated Carbon Footprint Assessment Tool, paving the way for commercial exploitation through licensing and subscription-based services. Industry partners also benefited from guidance on EU and national funding opportunities, including tailored financing options identified for project partners to support the further development, scale-up and market uptake of plant-based burgers. These examples highlight the need for policy instruments that bridge the gap between innovation validation and commercial deployment by combining effective IP protection, accessible scale-up financing and targeted business development support.

Practice in the VALPRO Path project shows the value of embedding tacit knowledge capture in project design (e.g. co-creation workshops). This is particularly important when practical constraints and regional realities matter. Hence projects to address research gaps to support scale-up should be funded, or required, to undertake tacit-knowledge capture within the project.

There is an opportunity to build on the outcomes of the VALPRO Path project by applying the developed models to additional case studies within the EU to design and test alternative plant-based supply chain networks for different crops and uncertainties, across countries and transnational contexts to strengthen EU self-sufficiency in plant-based proteins.

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For more information, the following public VALPRO Path deliverables are available:

D1.1 - Story map, profiling regions for their current and potential future state re crop derived protein landscape
D2.1 - Database of varietal robustness for future proofing
D2.2 - Storyboards of three innovative circular processing business approaches
D2.4 - Composition of new co-products and ingredients
D3.1 - Report on full IPS implementation 1
D4.1 - Report on Cost and Benefit Assessment
D4.2 - Life Cycle Sustainability Assessments
D5.3 - Exploitation, IPR and Business Models Catalogue I
D5.4 - Exploitation, IPR and Business Models Catalogue II
D5.5 - Practice Abstracts, Batch 1
D5.6 - Practice Abstracts, Batch 2

Furthermore, project scientific publications are available on the **VALPRO Path website.**

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