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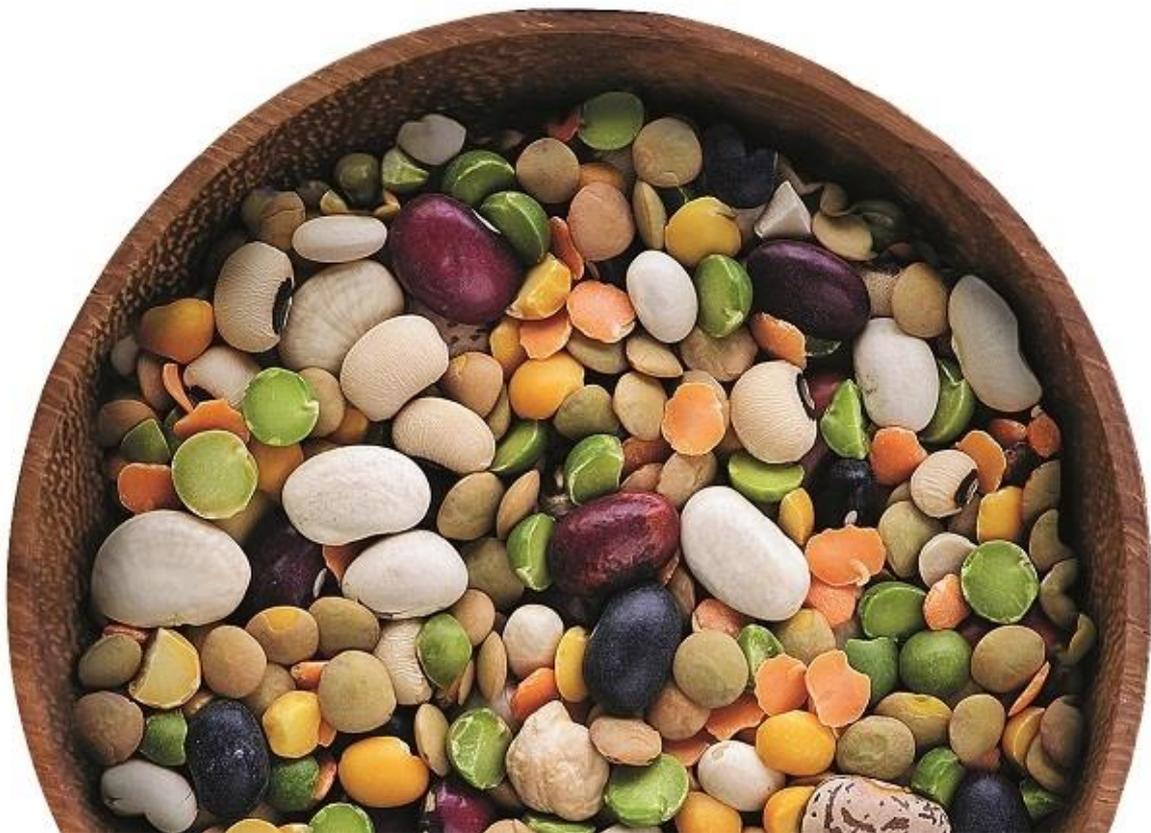
# TRUE-project 1<sup>st</sup> (18-month) Periodic Report

## Publishable Summary

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## Report description

The text below provides a brief plain-English summary of the TRUE-project 1st Periodic Report.

The summary was first published in Nov. 2018 and provides details on the progress and impact which the TRUE-project has achieved over the period from the project start-date, April 1<sup>st</sup> 2017, and until Sept. 30<sup>th</sup> 2018 (18 months).

The full Technical- and Financial- Reports were formally submitted to the European Commission (EC) in Nov. 2018 and reviewed by EC officials and two independent expert scientific evaluators over the period Dec. 2018 to March 2019. This review process included a 1-day face-to-face meeting with the evaluators at EC offices in Brussels (Belgium) in early Dec. 2018, and iterative interaction thereafter.

The full Periodic Report, and the Publishable Summary provided here, was ratified by the EC in March 2019.

The aim, objectives and publicly-available outputs of the TRUE-project are provided on the project website, which can be viewed *via* this link: [www.true-project.eu](http://www.true-project.eu).



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## Publishable Summary

Agriculture accounts for 25% of total (global) greenhouse gas (GHG) emissions. The production of animals for meat and the application of synthetic nitrogen fertiliser are the largest contributors to agriculture's GHGs budget. Fortunately, legume crops such as beans and clover, are a sustainable source of highly nutritious food and feed and may also be used as a natural nitrogen fertiliser, thanks to their capacity for "*biological nitrogen fixation*", that converts atmospheric nitrogen (N<sub>2</sub>) to biologically useful nitrogen. Thus, legumes do not require the application of synthetic nitrogen fertiliser. Legumes can also help enable nutrition security by countering undernutrition and unbalanced nutrition, which impose financial health-care cost burden, through the effective implementation of sustainable legume-based diets. Ironically, there are very high levels of legume grains use throughout Europe, but the majority (70 %) of the EUs protein (legume) demand is imported and mainly as soybean for use as animal feed, and often GM sourced from ex-rainforest regions. Thus, the reality is that legumes occupy only a very small percentage of European farmed land, and in the region of 1 to 4% depending on the country. Therefore, more diverse agri-food systems supported by home-grown legumes are required to help safeguard nutritional security and environmentally wellbeing. This transition demands greater cooperation among all agri-food system actors.

The EU-H2020 funded project TRUE (*TRansition paths to sUustainable legume-based systems in Europe*) was designed from the perspective that the scientific knowledge and societal desire for more-sustainable legume-supported agri-food systems does exist, but that co-innovation among supply chain actors to identify, realise and prioritise transition paths remains to be achieved. TRUE is therefore aimed at working with the full-range of stakeholders across the supply chain, including civil society bodies, to identify and enable routes (*transition paths*) to help realise more-sustainable legume-supported agri-food systems. TRUE comprises an equal balance of 24 academic and non-academic partners, who span the agri-food system to deliver a diverse suite of research- and innovation-strategies in parallel and in a transdisciplinary context.



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TRUE has built a strong foundation of communication activities (Work Package (WP)1: Knowledge Exchange and Communication) with a dynamic social media presence as highlighted on the project website that features all public outputs including a blog, Deliverable- and workshop-reports. TRUE's annual transdisciplinary Legume Innovation and Network (ELIN) workshops held across Europe encouraged agri-food systems stakeholders (or multi-actors) to identify factors to enable legume-supported agri-food systems. TRUE's Data Resource Centre (WP2: Case Studies) stores methods and data from historical and new experimental work carried out through our Innovative Case Studies, which include the development of novel cropping systems and agronomy encompassing production of prototype precision agriculture tools, biofertilisers and novel processing methods that deliver novel legume-based foods (for humans) and feeds (for animals, fish and shell-fish) (WP3: Nutrition and Product Development). Research characterising public and private food procurement highlighted that wholesalers are the key 'bottle-neck' for the movement of legumes into the food service markets (WP4: Markets and Consumers). Also, early (Life Cycle Analysis) data to help inform 'consumption transitions' confirm the high nutritional provision and low environmental impact of legume-based foods and feeds (WP5: Environment). An economic assessment of sustainable and profitable legume production and consumption in Europe in a farm-to-fork approach is currently being carried out (WP6: Economics) an analysis of: a) the economic performance of legumes at the farm and regional level; b) the behavioural intentions of the farmers to incorporate legumes into their cropping system; and, c) the consumer's willingness to purchase and consume legume-based products. The insight gained is being used to help inform a critical analysis, and potential solutions, of existing policies and governance solutions for legume-supported systems (WP7: Policy and Governance). The flow of data from the 'Foundation WPs' (1-4), to and between the 'Pillar WPs' (5-7), will be resolved by WP8 (Transition Pathways), which has carried out preliminary work in the design of a conceptual models for evaluation of sustainable systems.

TRUE has begun formalising the factors that enable the uptake of legume-supported cropping and processing systems, shifts in consumption patterns and development of policies for sustainable food systems. For instance, TRUE has delivered insight into improved production mechanisms of a diversity of legumes destined for different food chains such as intercropping, use of elite rhizobia and tools for organic vegetable production. In addition, examples of processing chains transitions include the generation of novel legume-based feeds for aquaculture and poultry businesses. There



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is also the inclusion of novel legume-based meals in catering units to improve human health and well-being too. TRUE enhanced innovation capacity via the LCA and economics-based approaches is providing indicators of the environmental-, human-health and economic potential of legume-based agri-food systems and in comparison, to non-legume alternatives. Collectively, the TRUE approaches open avenues to increase the scale and commercial competitiveness of legumes.

TRUE's preliminary decision support system (DSS) has been conceived to test sustainable systems using legume-supported food systems as a model. The approach uses key sustainable development indicators of economic-, societal- and environmental-wellbeing. The DSS identify the impact of various scenarios, such as the implementation of policies which: increase protein self-sufficiency across the EU28; improve uptake of legumes across the food-chain; reduce synthetic fertiliser use; enhance natural chemical cycling and soil qualities; and, which enable technologies for more profitable, processing and marketing of 'European grown' legumes. The TRUE project's experts have already provided critical scientific support for relevant EU Directorate Generals, such as the ECs 'Plant Protein Plan' and are informing strategic national policies in their countries. This advice aims to achieve multiple objectives to help ensure greater synergy between Common Agricultural Policy and those targeted to benefit public- and environmental-health initiatives.

The creation of TRUE's ELINs has engaged a wide diversity of actors from across the entire agri-food system to extend the projects scope across science, policy, the farming sector and wider society at large. The ELINs have been a major platform and success of the TRUE project. A main conclusion drawn from the year one workshops is the urgent need for much more education of actors throughout society. The educational provisions must be tailored to ensure that all consumers are fully aware of legumes and provisioned to realise their values. The diversity of educational approaches will establish the necessary foundation to enable more-rapid realisation of agri-food systems which are based on European grown legumes.



## Disclaimer

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## Citation

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