



TRansition paths to sUustainable
legume-based systems in Europe

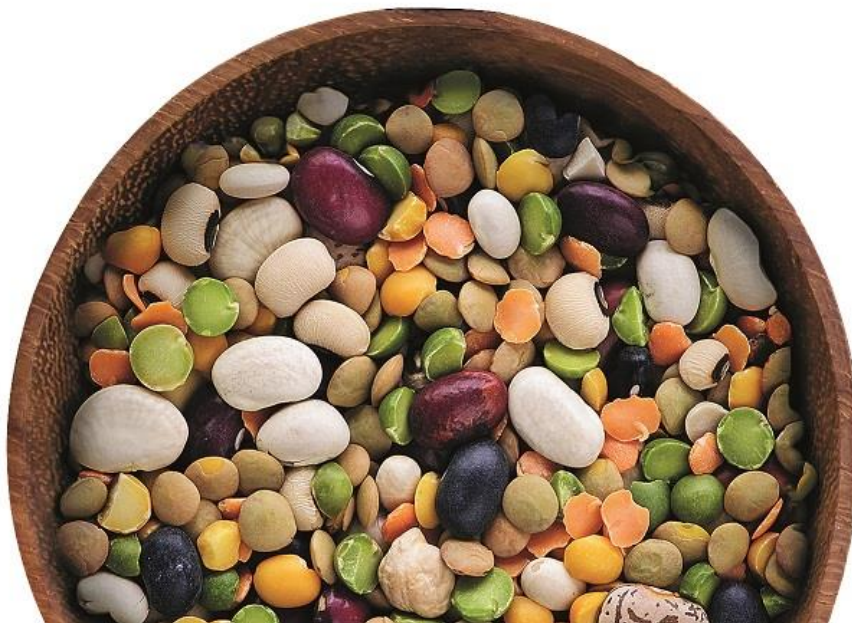
Two scientific (peer-reviewed) publications

Work Package: 3

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Deliverable Description & Contributors

- Due date: 31th July 2020
- Actual submission date: 21st July 2020
- Project start date: 1st April 2017
- Duration: 48 months
- Work Package (WP): Nutrition & Product Development (WP3)
- WP Leader: Marta W. Vasconcelos (UCP)
- Deliverable Title: TRUE-Project review: impact and legacy plan I
- Nature of Deliverable: Report
- Dissemination level: PU, Public

- **Deliverable description:** highlights two publications published in scientific journals after peer-review. They report on example novel legume-based food and beverage products, tested, and validated for optimal performance and commercial efficacy. The sensory analysis has been conducted through TRUE Legume Innovation Network workshops - to ensure a maximum range of consumer types.

- **Deliverable co-authors**
 - **TRUE-Project partners co-authors**
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 - Sabine Gruber (UHOH)
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- **Keywords**
 - Legume; Lentil; Nutrition; Food Safety; Protein; Mineral; Biomarkers; Cardiovascular; Well-being.

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Two scientific (peer-reviewed) publications

These Deliverable details (only) two Open Access articles, Ferreira et al. (2020) and Santos et al. (2020), published as an outputs of TRUE-Project partners activities carried-out via WP3. The references may be found on-line, *via* the inter-linked DOI (Digital Object Identifier) in the reference list below.

References

Ferreira, H., Vasconcelos, M.W., Gil, A.M., Pinto, E. (2020). Benefits of pulse consumption on metabolism and health: A systematic review of randomized controlled trials. *Critical Reviews in Food Science and Nutrition* 1-12. doi.org/10.1080/10408398.2020.1716680.

Santos, C.S., Silva, B., Valente, M.P.L., Gruber, S., Vasconcelos, M.W. (2020). The effect of sprouting in Lentil (*Lens culinaris L.*) nutritional and microbiological profile. *Foods* **9**, 400-411. [doi:10.3390/foods9040400](https://doi.org/10.3390/foods9040400)

Acknowledgement

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Also available online at: www.true-project.eu.





Annex I: Background to the TRUE-Project

Executive Summary

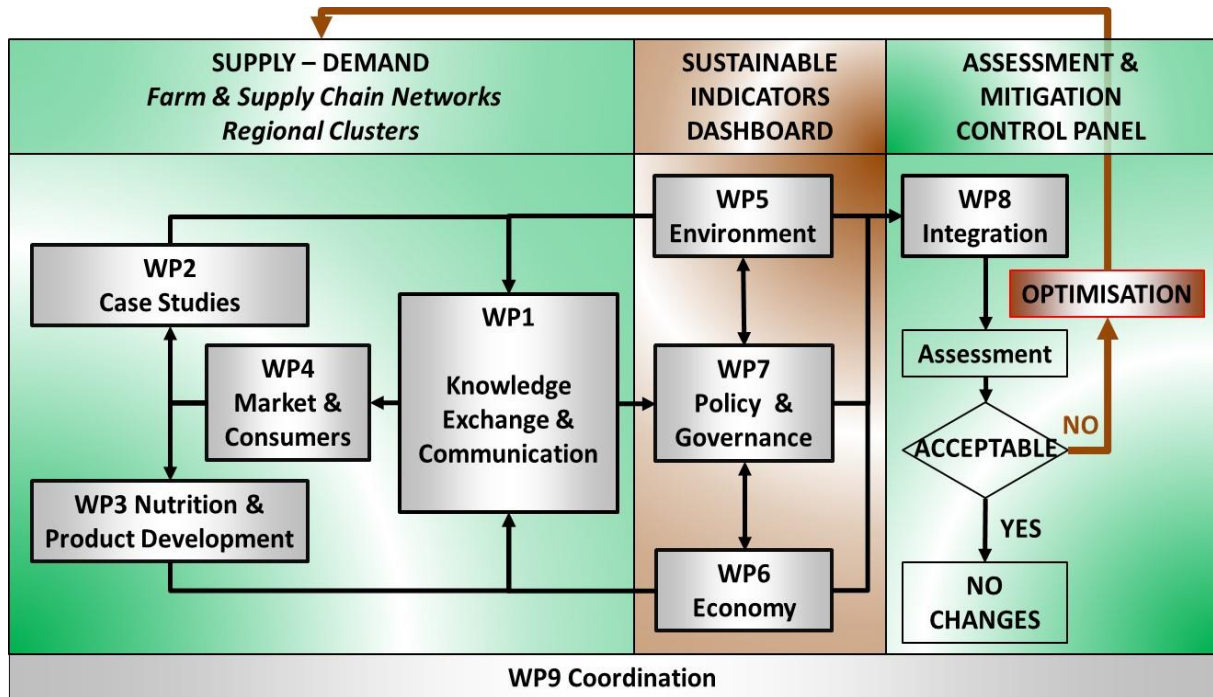
TRUE's perspective is that the scientific knowledge, capacities, and societal desire for legume supported systems exist, but that practical co-innovation to realise transition paths have yet to be achieved. TRUE presents 9 Work Packages (WPs), supported by a *Intercontinental Scientific Advisory Board*. 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 supplies 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 Life Cycle Analysis 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

Flow of information and knowledge in TRUE, from definition of the 24 case studies (left), quantification of sustainability (centre) and synthesis and decision support (right).





Project Partners

N°	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	Universitaet Hohenheim (UHOH)	Germany	University
8	Agricultural University of Athens (AUA)	Greece	University
9	IFAU APS (IFAU)	Denmark	SME
10	Regionalna Razvojna Agencija Medimurje (REDEA)	Croatia	Development Agency
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 Medimurje County (PIRED)	Croatia	Development Agency

*Coordinating institution





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 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)

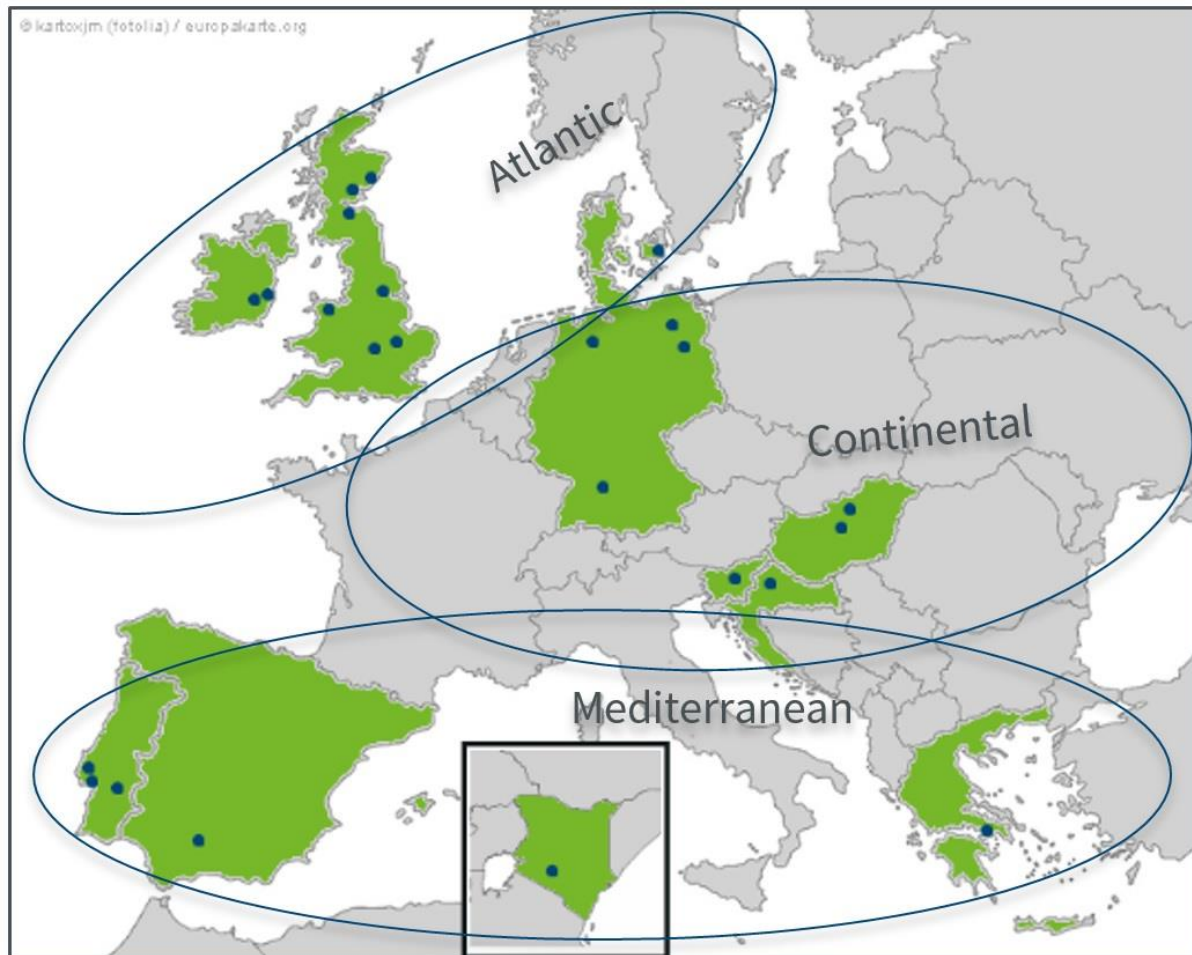
- *EU-policy linkages (on nutrition) to inform product development/uptake*

Objective 8: Develop decision support tools: growers to policy makers (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 (ELINs) and these engage multi-stakeholders in a series of focused workshops. The ELINs span three major pedoclimatic regions of Europe, illustrated above within the ellipsoids for Continental, Mediterranean and Atlantic zones.

