

Sustainable agri-food systems need you: the puzzle and paradox of legume-based agri-food systems in Europe

Ntatsi, G.^{1,2}, Balázs, B.³, Debeljak, M.⁴, Hamann, K.T.⁵, Howard, B.⁶, Kelemen, E.³, Kolmans, A.⁷, Maaß, H.⁷, Savvas, D.¹, Squire, G.R.⁸, Styles, D.⁹, Toma, L.¹⁰, Trajanov, A.⁴; Vasconcelos, M.W.¹¹, Vickers, R.⁶, Williams, M.¹², Iannetta, P.P.M.⁸

¹ Agricultural University of Athens, Department of Crop Science, Athens, Greece

² Institute of Plant Breeding and Genetic Resources, ELGO-DEMETER, Themi, Thessaloniki, Greece

³ Environmental Social Science Research Group (ESSRG), Budapest, Hungary

⁴ Department of Knowledge Technologies, The Jozef Stefan Institute, Ljubljana, Slovenia

⁵ Institute for Food Studies & Agroindustrial Development (IFAU), Hoersholm, Denmark

⁶ PGRO, The Research Station, Great North Road, Thornhaugh, Peterborough, England, UK

⁷ Research Centre for Global Food Security and Ecosystems (GFE), University of Hohenheim, Stuttgart, Germany

⁸ Ecological Sciences, James Hutton Institute, Dundee, Scotland, UK

⁹ SENRGy, Bangor University, Bangor, Wales, UK

¹⁰ SRUC, West Mains Road, Edinburgh, EH93JG, Scotland, UK

¹¹ Universidade Católica Portuguesa, Centro de Biotecnologia e Química Fina (CBQF) Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal

¹² Department of Botany, School of Natural Sciences, Trinity College Dublin, Ireland

Agricultural and (human) food-systems are interconnected. Despite this, policy- and governance measures tackle the challenges of each system using separate approaches. Additionally, legume crops are not yet recognised as essential components of sustainable agri-food systems. The capacity of legumes for “biological nitrogen fixation” facilitates their own nitrogen requirements, and that of other non-fixing crops in the cropping-sequence too. Legumes also provide the most nutritious of feeds and foods, and properly managed facilitate: natural nitrogen cycling; improved soil qualities; lowered greenhouse gas emissions; and, can help restore and conserve biodiversity. While these benefits are recognised, and European agri-food and feed systems are heavily legume dependant, it is paradoxical that this potential is forfeited while the dependency is satisfied (80 %) from imported grains.

The transition to home-grown legume-based agri-food systems demands buy-in and cooperation of all the actors spanning feed- and food-chains, and especially the awareness of consumers. Here we describe the early findings of the project, *TRansition paths to sUustainable legume-based systems in Europe* (TRUE, www.true-project.eu). The innovations showcased highlight a diversity of tools, from breeding and precision agriculture to European Legume Innovation Networks (ELINs), and the implementation of policies that will help place legumes in a central role to satisfy both agri-environment-, -animal- and human-health agendas.

Acknowledgements

This research is supported by: the TRUE project, funded by the EU Horizon2020 Research and Innovation Programme, Grant Agreement number 727973; and the Scottish Government’s Strategic Research Development Programme.