Legumes Translated Deliverable Report

Deliverable 6.6

Corporate social responsibility development guide

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Work package leader:	Helga Willer (FiBL)
Relevant tasks:	Long-term impact and project legacy (Task 6.9)
Relevant task leaders:	Matthias Kron (DS) and Donal Murphy-Bokern (DMB)
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Report author:	Leopold Rittler, Georg Spreitzer, Jasmin Karer (DS)
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Objectives of the tasks supporting this deliverable

The objectives of Work Package 6 are to:
1. guide the consortium with a strategic approach to communications and publication;
2. promote widespread awareness of the project in target groups;
3. implement the project's communications programme;
4. support delivery of key outputs to users; and
5. promote the long-term impact of the project

The following is a summary of the relevant plans set out in the description of action (DoA). Task 6.9 relates to Objective 2 and Objective 5 above in particular. The purpose of Task 6.9 as set out in the description of action is to inter alia support the development of corporate social responsibility in general. Based on the role of corporate social responsibility (CSR) in driving engagement with European legumes, we will investigate and develop a Practice Guide to support the development of certification for European pulses. This work will draw on the experience of AGs, the research outcomes and a range of previous studies and existing models that certify business to business transactions (e.g. Global GAP) but also business to consumer (i.e. EU organic certification; Fairtrade, Origin and regional labels). This task will particularly focus on extending the project to new key value chain actors.

Activities undertaken

This work was led by Donau Soja and supported by Donal Murphy-Bokern as set out in the DoA.

Many of the insights in this guide are based on ten years of experience of DS and its AG 'Europe Soya Value Chain Group' in developing soybean supported value chains for feed and food products in Europe. DS is in its daily business engaging with all stages of the soybean value chain in Europe and has developed a set of activities which support corporate social responsibility (CSR) programmes of companies involved in the agri-food system in Europe. CSR managers in Austria and Germany were interviewed to provide additional insights (see Annex 1). All of the interviews were transcribed.

This guide also draws on insights from a Delphi study conducted within the Legumes Translated project (Task 3.2.: Production constraints and opportunities: A Delphi study within the Legume Translated consortium[1]) to describe opportunities and constraints about developing production and use of legumes in Europe.

This report draws also on previous research conducted by DMB regarding the role of CSR programmes to mitigate greenhouse gas emissions.[2] Readers should note that the provided information will be used in further exploitation efforts by DS after the project. It is foreseen to optimise the provided content in terms of layout, structure and appearance.

[1] Murphy-Bokern, D. and Font, M. C., 2021. Production constraints and opportunities: A Delphi study within the Legumes Translated consortium. Available from www.legumestranslated.eu

[2] D. Murphy-Bokern, L. Kleemann, 2015. The role of corporate social responsibility in reducing greenhouse gas emissions from agriculture and food. Available: http://www.murphy-bokern.com/images/IFPRI_CR_Report_July_2015.pdf

Results

The work and results are reported in detail in the attached report. This will be published on the Legume Hub as a Legumes Translated practice guide. It will also be used by DS in other communications to support businesses in implementing CSR in the development of European-grown legume-supported value chains. It provides background information and guidance for those who are involved in procurement of agricultural raw materials or products and who are working at downstream stages of the value chain, e.g., in food manufacture or in retail. The addressed audience is assumed to play a relevant role in a firm's decision-making to prioritise whether European grown legumes are being used in the upstream stages, e.g., on the stage of feed production or on livestock farms. Based on the experience of DS, CSR managers as well as procurement managers in retail-chains are regarded to have such a role.

The guide introduces relevant background information on the special role of soybean in Europe's agri-food system as key protein source particularly for livestock production systems. Light is also shed on the production systems in relevant exporting countries in South America. These systems are negatively associated due on-going developments related to deforestation, land conversion and violation of human rights. The guide shows that this image has resulted in various CSR measures by companies in the European agri-food sector over the last 20 years. Frequently used measures are commodity certification or participation in round tables or also replacing 'unsustainable soy' with legumes (including soy) from Europe. The guide provides insights and practical examples of CSR opportunities arising from replacing 'unsustainable soy' with legumes grown in Europe. This is supported with a brief case study on the work of Donau Soja, which, among other relevant CSR activities, also offers a certification scheme for soybeans grown in Europe. The identified CSR opportunities derived from the case study and the analysis of sustainability statements of retail-chains are:

1) reducing the pressure on land conversion due to soybean cultivation on highly valuable ecosystems like the Amazon forest or the Cerrado in South America;
2) improved carbon footprint of animal products by avoiding high GHG emissions due to land use change activities at the stage of primary production; and
3) benefits for soil and biodiversity from increased use of legumes in European cropping rotations.

The guide provides relevant background information for all three aspects. It introduces the reader into:

1) the land use dynamics in South America and its relation to land conversion due to soybean cultivation;
2) the relevant basics of life cycle assessment (LCA) and the methods for calculating GHG emissions caused by land use changes; and
3) outlines why Europe's agri-food system relies on soybean imports and why increasing legume production in Europe is beneficial also for local ecosystems.

Conclusions

How can CSR programmes address their objectives through the use of European legumes? The purpose of this document is to address this question systematically through a practice guide for procurement and CSR managers.

Many agri-food companies in central, western and northern Europe are already addressing issues related to legumes within their CSR programmes, but more with the rationale of preventing reputation damage due to their consumption of 'unsustainable' soybean. They participate in national and international round tables, cooperate with relevant non-profit organisations and use certification schemes to assure environmental and social soundness of their products. Retail-chains across Europe have commitments regarding deforestation-free supply chains for many of their products, but there are comparatively few that aim to replace 'unsustainable' soybeans with European grown alternatives. DS already collaborates with several of them in Austria, Germany and Switzerland.

The case study of the collaboration between DS and European agri-food companies demonstrates that commodity certifications with a credible image can be beneficial for European legume production.

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Funded by the European Union

Legumes Translated

Legume Translated Practice Guide

Using corporate social responsibility to support legume production and use

Leopold Rittler, Georg Spreitzer and Jasmin Karer
Donau Soja

Ripe soybeans on field in sun. Photograph: 123rf.com

Legumes Translated

Legumes Translated (Translating knowledge for legume-based farming for feed and food systems) is an international research and development project funded by the European Union through the Horizon 2020 Programme under grant agreement number 817634. The Legumes Translated research consortium comprises 17 partners in 9 countries.

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Table of content

About this document

The purpose of this guide is to provide background information and guidance for those who are involved in procurement of agricultural raw materials or produces and who are working at downstream stages of the value chain, e.g., in food manufacture or in retail. The addressed audience is assumed to play a relevant role in a firm's decision-making to prioritise whether European grown legumes are being used in the upstream stages, e.g., on the stage of feed production or on livestock farms.

About the environmental responsibility of food production

Food production is fundamental to life on our planet. Industrialised processes in crop and livestock production as well as millions of peasant farmers around the globe are the foundation for our society and have enabled the global population growth during the 20th century. This growth was been achieved with costs for the environment. There is consensus that the way we produce and consume much of our food is creating high burden for our ecosystems as well as for our society. The website 'World in Data' brings these impacts of global food production together:[3]

- Food accounts for about a quarter of global greenhouse gas emissions[4,5];
- Half of the world's habitable (ice- and desert-free) land is used for agriculture;
- 70% of global freshwater withdrawals are used for agriculture[6];
- 78% of global ocean and freshwater eutrophication (the pollution of waterways with nutrient-rich pollutants) is caused by agriculture[4];
- 94% of mammal biomass (excluding humans) is livestock. This means livestock outweigh wild mammals by a factor of 15-to-1.[7]
- Of the 28,000 species evaluated to be threatened with extinction on the IUCN Red List, agriculture and aquaculture is listed as a threat for 24,000 of them.[8]

What limits the Earth's limits?

Planetary boundaries are scientifically based thresholds for human perturbation of the Earth system, beyond which the functioning of the Earth system may be substantially altered. This framework was proposed in 2009 by a research group based at the Stockholm Resilience Centre and the Australian National University and now receives wide acceptance in debates.

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[3] Ritchie, H. and Roser, M., 2020. Environmental Impacts of Food Production. OurWorldInData.org, https://ourworldindata.org/environmental-impacts-of-food

[4] Intergovernmental Panel on Climate Change (IPCC), 2021. https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/SPM_Updated-Jan20.pdf

[5] Poore, J., and Nemecek, T., 2018. Reducing food's environmental impacts through producers and consumers. Science, 360(6392), 987–992.

[6] FAO, 2011. The state of the world's land and water resources for food and agriculture (SOLAW) – Managing systems at risk. Food and Agriculture Organization of the United Nations, Rome and Earthscan, London.

[7] Bar-On, Y. M., Phillips, R., and Milo, R., 2018. The biomass distribution on Earth. Proceedings of the National Academy of Sciences, 115(25), 6506–6511.

[8] The number of species evaluated and threatened with extinction on the IUCN Red. In 2019, 28,338 were listed as threatened with extinction. Available: https://www.iucnredlist.org/resources/summary-statistics

The framework consists of nine global change processes. In 2009, according to Rockström and others, two boundaries were already crossed, while others were in imminent danger of being crossed.[9] Since then, this concept was widely discussed, extended and updated recently in 2021, see Figure 1.

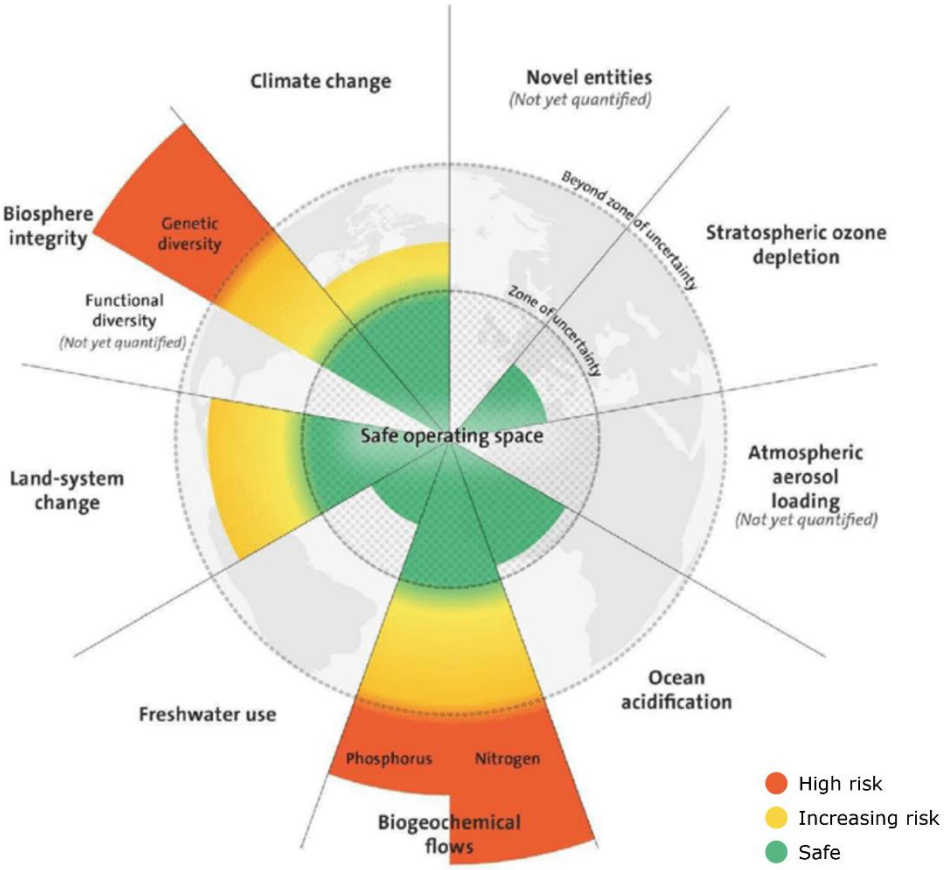

Figure 1. The nine planetary boundaries identified by the Stockholm Resilience Centre and the Australian National University. The green zone is the safe-operating space (below the boundary), yellow represents the zone of uncertainty (increasing risk), and red is the high-risk zone. In these potentially dangerous zones of increasing risk, there are likely continental and global tipping points for some of the boundaries, although not for all them. The planetary boundary itself lies at the inner heavy circle. A proposed boundary does not represent a tipping point or a threshold but is placed upstream of it, that is well before the risk of crossing a critical threshold. The intent of this buffer between the boundary and a potential threshold in the dangerous zone is to allow society time to react to early warning signs of approaching abrupt or risky change. Processes for which global-level boundaries are not quantified are represented by grey wedges.[10]

This guide focuses in particular on two boundaries, which are assumed to be most relevant to the context of using legumes as a tool within CSR approaches: biochemical flow (nitrogen) and climate change.

[9] Nature, 461 (7263): 447–448 (2009). www.nature.com/articles/461447b , doi:10.1038/461447b.

[10] Folke, C. et al., 2021. Our future in the Anthropocene biosphere. Ambio, 50. 10.1007/s13280-021-01544-8.

Biochemical flow (nitrogen) and food production

Proteins are nitrogen-based compounds and consequently, protein production and use affects the nitrogen cycle respectively the global flow of nitrogen. Due to this link, current farming and food systems are largely responsible for the human impact on the nitrogen cycle and the most exceeded planetary boundary.

What's the fuss about nitrogen

Proteins are based on nitrogen-containing amino acids and are essential for growth, body maintenance and reproduction. Hence, the supply of nitrogen is essential for all life forms, and increases in nitrogen supply have been exploited in agriculture to boost yields and provide for the growing global human population. It has been estimated that almost half of the human population at the beginning of the twenty-first century depends on fertiliser N for their food[11]. The nitrogen applied in agriculture is derived from atmospheric sources, but unlike the natural process of N fixation, most agricultural N is fixed industrially by the Haber–Bosch process[12], the remainder by nitrogen-fixing crops[13].

Knowledge of the global nitrogen cycle is incomplete, but has developed rapidly over the last two decades, with many new measurements and improved instrumentation, models and process understanding.

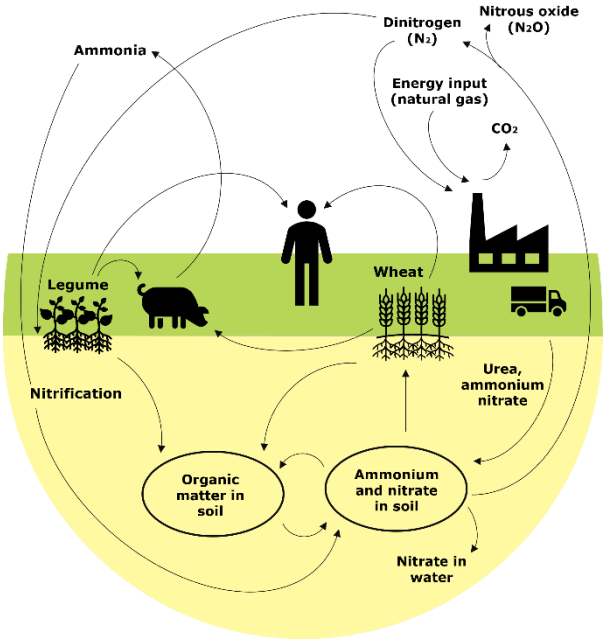

Figure 2. A simplified illustration of the nitrogen cycle that shows the difference between reactive nitrogen from biological nitrogen fixation in legumes and from synthetically-fixed nitrogen (fertilisers). Source: Murphy-Bokern, D., unpublished.

[11] Erisman, J. W., Sutton, M.A., Galloway, J., Klimont, Z., Winiwarter, W., 2008. How a century of ammonia synthesis changed the world. Nature Geoscience, 1, 636–639, doi:10.1038/ngeo325

[12] Smil, V., 2001.Enriching the earth. Fritz Haber, Carl Bosch, and the transformation of world food production. Cambridge, MA. The MIT Press.

[13] Sprent, I. J., 1987. The ecology of the nitrogen cycle. Cambridge, UK. Cambridge University Press.

Climate and food production

In its latest report, the Intergovernmental Panel on Climate Change estimates global anthropogenic greenhouse gas (GHG) emissions at around 52 Gt CO_2 eq. per year. Food supply emits annually around 10.8–19.1 Gt CO_2 eq., assumingly 25% of total human GHG emissions. This estimate covers the whole of the food system comprising five major stages: pre-farm; on-farm (agriculture); post-farm processing, manufacture and retail, and the consumption phase. There is consensus that pre-farm and on-farm emissions account for half or more of total direct supply chain emissions in developed food economies that have high levels of livestock product consumption.

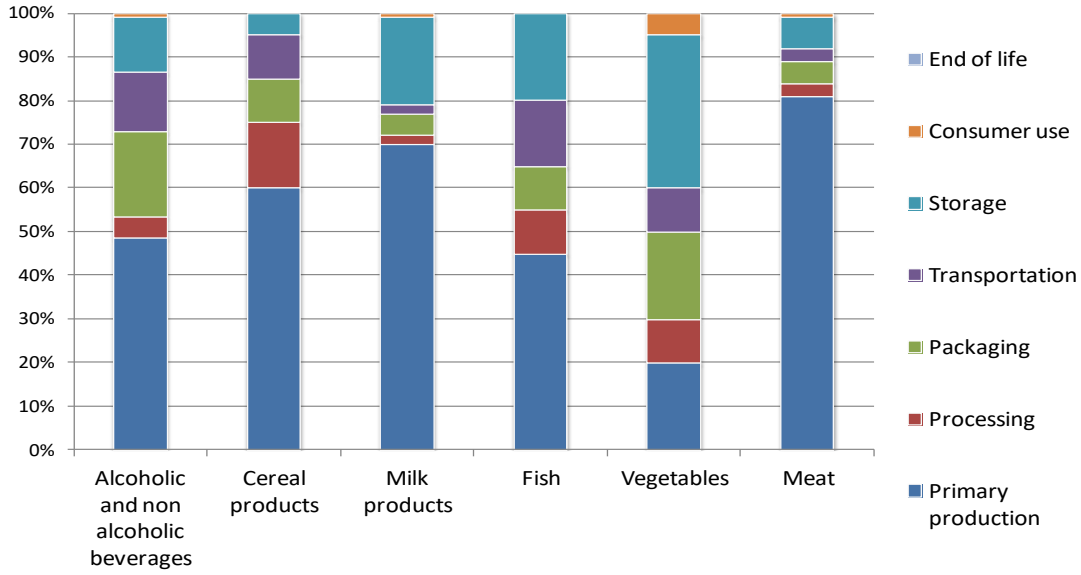

Figure 3. The allocation of life cycle stage global warming impacts for selected food groups to different stages in the production cycle. Emissions due to land use change (LUC) are not considered.[14]

Land use change and GHG emissions

Cropland almost always has a lower carbon stock in the soil than the same land in its natural state. Hence, deforestation, or any other form of clearance of natural land for agriculture, is a major source of greenhouse gas emissions, as a part of the soils carbon content is emitted into the air. This is also true when permanent grassland is converted to cropland. A more carbon rich soil is converted to a soil with lower carbon content, resulting in emission. These emissions are called land-use change (LUC) emissions.

From 1960 to 2011, almost 500 million ha of land were converted to agricultural land. This expansion was mainly driven by increasing demands for food from a growing population.[15] Between 1980 and 2000, about 80% of new agricultural land came from

[14] Sonigo, P., Bain, J., Tan, A., Mudgal, S., Murphy-Bokern, D., Shields, L., Aiking, H., Verburg, P., Erb, K. and Kastner, T., 2012. The resource use efficiency of the European food cycle. Final report, prepared for European Commission (DG ENV) in collaboration with AEA, Dr Donal Murphy-Bokern, Institute of Social Ecology Vienna and Institute for Environmental Studies. BIOIS Paris.

[15] Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, 2007. Agriculture. In Climate Change, 2007. Mitigation. Contribution of Working Group

replacing forests, especially in the tropics.[16] It is expected that this trend will continue in the future. Looking towards the year 2050, it is estimated that about 70% of the growth in agricultural output will be achieved through increasing yield on established agricultural land and the remaining 30% will come from conversion of natural land to agricultural land. This will lead to around 120 million ha of additional crop land. [17]

The IPCC estimates that between 2007-2016 land-use change accounted for about 11% of global anthropogenic GHG emissions on average [18]. About 75% of deforestation and forest degradation can be attributed to agriculture[19] and 58% of deforestation has been attributed to commercial agriculture connected to international trade. [20]

For analysing and understanding global dynamics of LUC, a differentiation between direct and indirect land use change can be made. A direct cause is the expansion in commodity production at the place where land-use change is taking place. Analyses that interconnect land-use change data and corresponding data on agricultural trade identifies three commodities that are directly associated with a large proportion of land-use change, particularly with deforestation: beef, soy and palm oil. Other commodities directly associated with land use change are coffee, tropical and citrus fruit, and maize for livestock feed and biofuels.

The indirect causes of LUC are changes that drive a general expansion in agricultural land. For example, in South America, much of the expansion of the soybean area is happening on areas which were originally cleared for cattle production. Hence, such soybean expansion is indirectly contributing to more deforestation and land-use change[21].

Link between GHG emissions and the nitrogen cycle

Nitrogen is the major 'GHG nutrient'.[22] Nitrous oxide (N_2O), a trace gas and a potent GHG, is a product of the nitrogen cycle. Rockstöm et al.[23] ranked environmental

III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[16] Gibbs, H.K., Ruesch, A.S., Achard, F. and Clayton, M. K., 2010. Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. Proceedings of the National Academy of Science (PNAS). USA doi.org/10.1073/pnas.0910275107

[17] FAO, 2006. World agriculture: towards 2015/30. Rome: Food and Agricultural Organization of the United Nations.

[18] IPCC, 2019. Summary for Policymakers. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. Available: Summary for Policymakers — Special Report on Climate Change and Land (ipcc.ch)

[19] Blaser J, Robledo C., 2007. Analysis on the mitigation potential in the forestry sector. Intercooperation, Bern.

[20]Audsley, E., Brander, M., Chatterton, J., Murphy-Bokern, D., Webster, C. and Williams, A., 2009. An assessment of greenhouse gas emissions from the UK food system and the scope for reduction by 2050. How low can we go? WWF-UK and the FCRN.

[21] Song, X. P., Hansen, M. C., Potapov, P., Adusei, B., Pickering, J., Adami, M., Lima, A., Zalles, V., Stehman, S. V., Di Bella, C. M., Conde, M. C., Copati, E. J., Fernandes, L. B., Hernandez-Serna, A., Jantz, S. M., Pickens, A. H., Turubanova, S. And Tyukavina A.,2021. Massive soybean expansion in South America since 2000 and implications for conservation. Nature Sustainability 4, 784–792.

[22] Williams, A., Audsley, E. and Sandars, D., 2006. Determining the environmental burdens and resource use in the production of agricultural and horticultural commodities. Defra project report IS0205.

processes in relation to the transgression of limits and concluded that nitrogen pollution ranks at the global scale as one of the top three threats to biodiversity.

The intensity of the nitrogen cycle is raised in agro-ecosystems directly or indirectly by the use of synthetic nitrogen fertilisers or by biological fixation in legume crops such as pea and soy. This addition of reactive nitrogen by man has increased ten-fold since 1860 to more than 150 million tonnes, with two thirds (100 million tonnes) of this due to fertiliser manufacture.[24] [25] [26] About a further 32 million tonnes is added in the cultivation of legumes.

This fixation ultimately intensifies nitrogen fluxes in the environment, including the losses of nitrate, ammonia and nitrous oxide (N_20). Consequently, N_2O concentrations in the atmosphere have increased from a pre-industrial level of 270 ppb to a current level of 319 ppb. The losses and impacts of nitrogen accumulate through supply chains. Despite some recycling of manures back to the soil, more than four kg nitrogen is lost to the environment for each kg nitrogen recovered in the product. Tackling GHG emissions from agriculture involves addressing these losses at each stage of the production cycle.

Methane

Methane (CH_4) is a potent greenhouse gas (GHG), which makes it a significant contributor to climate change, especially in the near term (i.e. 10–15 years). Though methane is emitted into the atmosphere in smaller quantities than CO_2, its global warming potential (i.e., the gas' ability to trap heat in the atmosphere) is 23 times greater over the 100 years after its emission. Ruminants account for 29% of all methane emissions which is the largest single source.[27]

The importance of methane increases when the effect of timescale is considered. Conventionally, the greenhouse gas effect of methane is expressed as that in 100 years – this is the effect of an emission today over 100 years, i.e. 23 times that of CO_2. Methane degrades, and so the greenhouse gas effect of a given emission declines with time. The corresponding effect over 20 years is 72. This means that reducing methane emissions has a large effect and is particularly relevant if rapid mitigation is required, which is the case in contemporary climate policy. Methane emission reductions have a cooling effect.

[23] Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, III, F. S., Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H., Nykvist, B., De Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R. W., Fabry, V. J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P. and Foley, J., 2009. Planetary boundaries: exploring the safe operating space for humanity. Ecology and Society 14(2): 32.

[24] Enquete Commission, 1994. Protecting our green earth. Enquete Commission of the German Bundestag. Economica Verlag.

[25] Jenssen, T.K. and Kongshaug, G., 2003. Energy consumption and greenhouse gas emissions in fertiliser production, Proceedings No. 509, International Fertiliser Society, York, UK, 28 pp.

[26] Braun, E., 2007. Reactive nitrogen in the environment. UNEP.

[27] Global Methane Initiative (undated). Global methane emissions and mitigation opportunities. Global Methane Emissions and Mitigation Opportunities

What is our 'soy problem'

Europe's protein challenge

Due to suitable climate and soils, many European farmers are remarkably good at growing cereal crops such as wheat, barley and maize. This supports high levels of production of carbohydrate-rich grains used mostly to feed livestock. This productive agricultural system depends on two major inputs into European Union farms: about 11 million tonnes of synthetic nitrogen fertiliser, and the high-protein meal from about 35 million tonnes of soybean equivalents[28] to provide protein supplement for feeding animals. The increase in plant protein requirements over the last 60 years in Europe is due largely to the increased consumption and production of meat and dairy products.

After China, the European Union is now the second largest importer of soy from South America. While the European Union's agricultural system as a whole is 71% self-sufficient in tradable plant protein, 86% of the plant protein imported is soy - to cover the 29% deficit. This protein deficit is a fundamental challenge to the resilience, acceptance and performance of our agri-food systems. This is Europe's Protein Challenge.

Why does Europe have a protein deficit?

Changes in arable production in Europe

Protein-rich crops (grain legume species such as faba bean, pea, chickpea, lupin and soybean) are now grown on less than 2% of arable land in the European Union. The protein crop area as a proportion of all arable land has declined from 4.7% in 1961 to 1.8% today. Over the same period, the use of protein-rich grain in animal feed has increased dramatically. This has been enabled by increasing soybean imports[29].

Arable land is relatively scarce in Europe. Despite this, the EU is self-sufficient or nearly so in livestock products and cereals. This has been achieved by exploiting the comparative advantage of cereals which have occupied about 57% of the arable area over the last 50 years. Due to plant breeding progress combined with increased use of nitrogen fertilisers and pesticides, the yield of wheat has increased and is now about twice that of protein crops. This yield advantage for cereals is a particular feature of cropping in Europe.

Changes in consumption

The consumption and production of livestock products are closely linked in the EU. The combined production of beef, pig and poultry meat in the EU has increased from 17 to 47

[28] EU-27 imported on average about 14,2 million tonnes of soybeans and 16,8 million tonnes of soymeal between 2017 – 2021. Both figures can be aggregated on the basis of soybean equivalents (1 kg soymeal = 1.22 kg soybean equivalents). Together with soy imports of UK, total soy imports amount to about 38 to nearly 40 million tonnes of soybean equivalents. Data: Comtrade, https://comtrade.un.org/data/

[29] Bues, A., Preißel, S., Reckling, M., Zander, P., Kuhlman, T., Topp, K., Watson, C., Lindström, K., Stoddard, F. L. and Murphy-Bokern, D., 2013. The environmental role of protein crops in the new common agricultural policy. Directorate general for internal policies, European Parliament. https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/495856/IPOL-AGRI_ET(2013)495856_EN.pdf

M t from 1961 to 2019, and demand for protein-rich feed has grown accordingly. This demand has been met by a higher production of grain legumes (an increase from 3.3 to 7.7 M t and a larger share being used as animal feed) and greatly increased the net soya import (increase from 2.7 to 37 M t), see Figure 4.

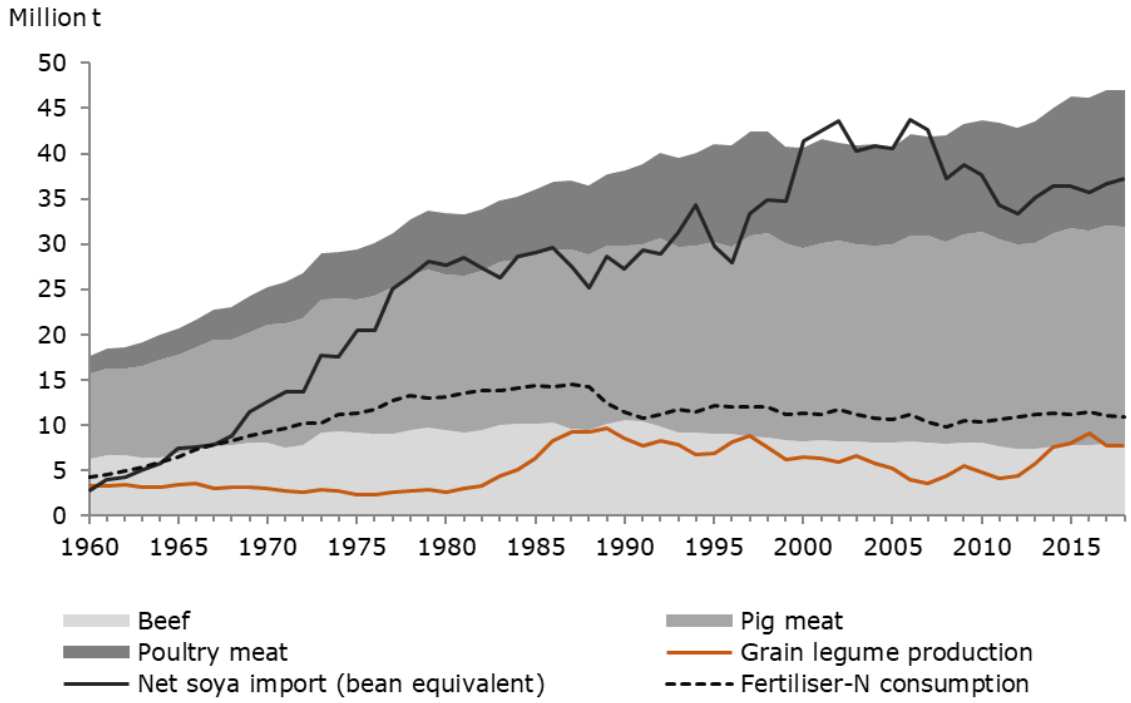

Figure 4. Production of meat, grain legumes and net soybean import in the EU (source: FAOstat).

The higher consumption of meat has been met by increased production of pig and poultry meat rather than by beef. Pig and poultry diets are cereal-based and approximately two-thirds of Europe's cereal harvest is now used to feed livestock. This scale of production based on European-grown cereals is made possible by the complementary qualities of soybean meal that provides the necessary protein enrichment for cereal-based feeds.

Soybean imports

Global soy production has doubled between 2000 and 2021, from 74 Million to 127 million hectares, with about 186 million tonnes produced in South America (global output 353 million tonnes). Soybean meal and soybeans are the main traded soya products.

In 2021, EU-27 imported 14.6 million tonnes of soybeans and 16.5 million tonnes of soymeal. Brazil accounted on average for 58% of soybeans and for 44% of soymeal, while Argentina covered 40% of meal exports. The EU imports are about 14% of the worldwide soya production. Imported soya accounts for about 10.9 million ha[30] of land outside the EU and is the largest cause of the EU net 'virtual' land import.

[30] Own calculation based on import data from Eurostat and yield values from USDA report. In the calculation, soymeal amounts were converted into soybean equivalents and import data from Brazil, Argentina and other countries were summed up, each calculated with the harvest quantity per area.

Soybean imports are a reputational threat to European food producers

As outlined before, soybean plays a fundamental role in Europe's agri-food system. The soybean is associated widely in society with major concerns about developments in the main exporting countries in South America. This section provides background information on this and how the European agri-food system has responded during the last two decades.

Deforestation and soybean

Much of global expansion of soybean production has occurred at the expense of forests and native vegetation through direct and indirect conversion. This section provides a deep insight to better understand the dynamics behind land use change and deforestation in South America.

Global demand for soybean drives land use change and deforestation directly and indirectly by displacing cattle pastures. The demand for new grazing land leads to encroachment into forests and native vegetation. In its study, the World Resources Institute found that 8.2 million hectares were deforested for soybean production from 2000–2015, with 97% of this loss occurring in South America. More than 60% of that forest loss due to soy expansion has been recorded in Brazil followed by Argentina, Bolivia, and Paraguay. [31]

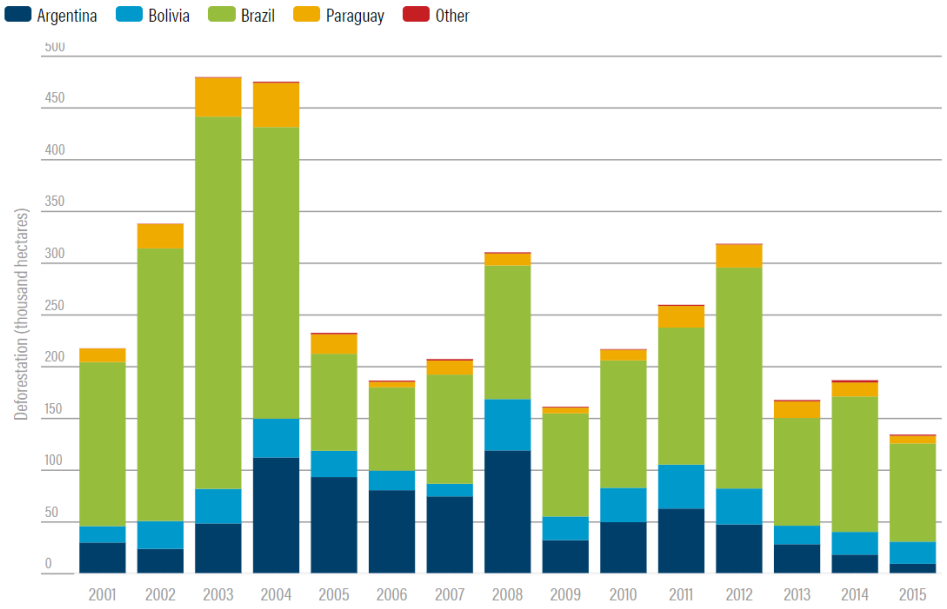

Figure 5. Forest area directly replaced by soy in South America[31]

Further investigations show that about 9% of the total deforestation in South America between 2000–2016 was related to soybean production. The researchers found that most

[31] Goldman, E., Weisse, M., Harris, N. and Schneider, M., 2020. Estimating the role of seven commodities in agriculture-lined deforestation: oil palm, soy, cattle wood fiber, cocoa, coffee and rubber. World Resources Institute, https://doi.org/10.46830/writn.na.00001

of South America's direct conversion for soy (defined as planting soy within three years of forest clearance) occurred within the Brazilian Cerrado and the Brazilian Amazon, and that the Cerrado on its own accounts for about half of the continent's direct conversion for soy.[32] Additionally, the researchers discovered that most of the soy expansion in Brazil took place on existing farmland, while the total area of Brazilian pastureland remained largely consistent over time. This suggests that soy expansion on cleared pastureland is driving the clearing of new pasture elsewhere.[33]

Before 2006, much of the world`s deforestation for soy took place in the Brazilian Amazon. Driven by public pressure campaigns, soy traders agreed in 2006 to end deforestation for soy in the Brazilian Amazon. Within a few years, traders who joined the Amazon Soy Moratorium (ASM) had adopted effective internal monitoring protocols and measures and excluded non-compliant soy farmers from their supply chains. This led to a spectacular decrease in deforestation for soy in the Brazilian Amazon, even though the area occupied by soy in the Amazon has increased by more than 260%.[34] These private sector efforts have been reinforced by measures to protect public land in the Amazon through various policy mechanisms, combined with enforcement of the Forest Code's protection provisions, that oblige farmers to retain 80% of any private land in the Amazon as a 'legal reserve'.[35]

The ASM and government interventions were successful in reducing deforestation in the Amazon caused by soy.[36] However, deforestation for soy continued after 2006 and shifted to other ecosystems in Brazil and across the South American continent. After the introduction of ASM, about 2,200,000 hectares in the Amazon and Cerrado had been cleared for soy in Brazil by 2017, of which about 80% was in the Cerrado.[37]

While more than two-thirds of the land in the Brazilian Amazon is public and mostly protected or classified as indigenous lands, the neighbouring Cerrado landscape is dominated by private sector interests.[38] Only 7.5% of the Cerrado is under conservation; on the remaining private lands, landowners are legally allowed to clear 65–80% of each property's native vegetation.[39] In the past, this has led to widespread deforestation for

[32] Song, X. P., Hansen, M. C., Potapov, P. et al., 2021. Massive soybean expansion in South America since 2000 and implications for conservation. Nature Sustainability 4, 784–792.

[33] Trase insights "Indirect land-use change deforestation linked to soy threatens prospects for sustainable intensification in Brazil" July, 2020. https://insights.trase.earth/insights/indirect-land-use-change/

[34] Greenpeace, https://www.greenpeace.org/usa/victories/amazon-rainforest-deforestation-soy-moratorium-success

[35] Machado, F., and Anderson, K., 2016. Brazil's new Forest Code: A guide for decision-makers in supply chains and governments. WWF-Brazil. Brasília, Brazil.

[36] Gibbs, H. K., Rausch, L., Munger, J., Schelly, I., Morton, D. C., Noojipady, P., Soares-Filho, B., Barreto, P.,Micol, L. and Walker, N. F., 2015. Brazil's Soy Moratorium: Supply-chain governance is needed to avoid deforestation. Science, 347(6220), 377–378. https://www.science.org/doi/10.1126/science.aaa0181

[37] Trase. "New data on Trase shows soy trade from Brazil's Cerrado driving climate emissions." December 13, 2018. https://medium.com/trase/new-data-on-trase-shows-soy-trade-from-brazils-cerrado-driving-climate-emissions-10cc949a04c4

[38] Campos, A. and Barros, C. J., 2020. "Deforestation in the Cerrado: control by meatpackers is worse than in the Amazon." Repórter Brasil, https://reporterbrasil.org.br/2020/06/deforestation-in-the-cerrado-control-by-meatpackers-is-worse-than-in-the-amazon

[39] Strassburg, B. B. N. et al., 2017. Moment of truth for the Cerrado hotspot. Nature Ecology & Evolution, 1(4):99.

agriculture and pasture. More than half of the Cerrado has already been cleared[40]– much of it for soybean production.

Researchers found that between 2001 and 2019, 18% (1.7 million ha) of soy expansion in the Cerrado took place on deforested land; these results were consistent with other similar studies.[41] Deforestation rates for soy increase even further when considering the border of Brazilian soy expansion in the Cerrado - Matopiba (consisting of the state of Tocantins and parts of the states of Maranhão, Piauí and Bahia) – an area that contains the largest remaining contiguous areas of native vegetation in the Cerrado. [42]

While the Cerrado is currently the largest agricultural frontier for soy expansion[43], there are other smaller areas at high risk for soy expansion in Argentina, Paraguay and Bolivia. Another hotspot for deforestation is the Gran Chaco, which spans over Paraguay, Argentina and Bolivia, and lost about one fifth of its forests between 1985 and 2016.[44] Most of this loss was originally used for cattle pasture. However, as soy is planted on old cattle pastures, the pastureland is encroaching on new areas and driving deforestation.[45]

Further concerns

Various NGOs report further problematic developments and concerns linked to soybean cultivation which relate to human rights abuses, including violations of indigenous rights and labour rights as well as hazardous practises in pesticide use and land degradation.[46,47,48,49] Similar findings were also reported by the United National Special Rapporteur in September 2020 from a visit to Brazil.[50]

[40] Kennedy, L. et al., 2022. Mapping native and non-native vegetation in the Brazilian Cerrado using freely available satellite products. Scientific Reports, 12, 1588, www.nature.com/articles/s41598-022-05332-6

[41] Song, X.-P., et al, 2021. Massive soybean expansion in South America since 2000 and implications for conser- vation. Nat Sustain 4, 784–792.

[42] Agrosatélite and Abiove, 2020. Geospatial Analysis of Soy Crop in the Cerrado Biome: Expansion Dynamic. Brazil.

[43] Sax, S. and Angelo, M. "Soy made the Cerrado a breadbasket; climate change may end that." Mongabay, May 5, 2020. https://news.mongabay.com/2020/05/soy-made-the-cerrado-a-breadbasket-climate-change-may-end-that/

[44] Baumann, M., Gasparri, I., Piquer-Rodríguez, M., Gavier Pizarro, G., Griffiths, P., Hostert, P. And Kuemmerle, T., 2017. Carbon emissions from agricultural expansion and intensification in the Chaco. Glob Change Biol, 23: 1902-1916.

[45] Kimbrough, L. "Soy and cattle team up to drive deforestation in South America: Study." Mongabay, July 12, 2021https://news.mongabay.com/2021/07/study-shows-how-soy-cattle-team-up-to-drive-deforestation-in-south-america

[46] WWF and other organizations sent in March 2022 a report to the UN on deforestation in Brazil and addressed in it also land grabbing, link to website: https://wwf.panda.org/wwf_news/?5397891/WWF-and-other-organizations-send-a-report-to-the-UN-on-deforestation-in-Brazil

[47] Greenpeace International, press release on 26 October 2021, https://www.greenpeace.org/international/press-release/50164/meat-soy-deforestation-karipuna-amazon-brazil/

[48] Future in our hands and Rainforest Foundation Norway, 2018. Salmon on soybeans – Deforestation and land conflict in Brazil. https://d5i6is0eze552.cloudfront.net/documents/Publikasjoner/Andre-rapporter/Salmon-on-soy-beans-deforestation-and-land-conflict-in-Brazil.pdf?mtime=20181029093010

[49] Clean Harvest and Rainforest Foundation Norway, 2022. The State of the Soy Industry, https://www.regnskog.no/en/publications/reports

[50] Report of UN Special Rapporteur Baskut Tuncak on his visit to Brazil from 2 to 13 December 2019, accessible: https://digitallibrary.un.org/record/3956411?ln=en#record-files-collapse-header

Actions by companies in the European agri-food sector in response to the 'soybean problem'

Europe is currently importing around 35 million tonnes of soybean equivalents, an amount which translates into a virtual footprint of 10.9 million hectares. Much of these imports are considered to be associated with deforestation[51]. WWF found that that between 2005 and 2017, imports of six commodities have been accountable for 80% of the imported deforestation: soy (31%), palm oil (24%), beef (10%), wood products (8%), cocoa (6%), and coffee (5%).

Over the last two decades, soybean imports have led to intensive discussions within the industry, among political institutions on European level and on national level, and within society. Numerous industry roundtables were founded, deforestation-free commitments by companies stated, reports on forest loss were published, market mechanisms and tools were created and countless media articles published. One of the latest milestones was in fall 2021, when the EU published a draft legislation for deforesation-free supply-chains.[52]

There is barely information publicly available about consumers' awareness that soybean is linked to deforestation or that consumers express their concerns towards food producers. The probably best obtainable evidence to assess the pressure and urgency for the European agri-food sector might be the emergence and development of market initiatives, availability of certification-schemes as well as public statements by retailers (see Annex 1).

Several **international and national multi-stakeholder platforms** with broad and high-level participation of food and feed producers, retailers, NGOs and industry associations were established to address the transition towards deforestation-free soy supply-chains:

Most initiatives in Table 1 formulate jointly supported commitments that their members' products should meet in future certain sustainability criteria. This is often achieved by introducing soybean sourcing standards.

A widely recognised reference for soybean sourcing standards that meet a baseline of sustainability criteria is provided by the benchmarking programme of the European Feed Manufacturers' Federation (FEFAC). It lists 19 **soybean sourcing schemes**.[53] We are diving in the next chapter more deeply into this topic and will discuss soybean standard systems with a more systematic approach about corporate social responsibility.

[51] The concept of "embodied deforestation" is used for linking deforestation to consumption. It refers to the deforestation embodied (as an externality) in a produced, traded, or consumed product, good, commodity or service. It is the deforestation associated with the production of a good, commodity or service.

[52] European Commission, Directorate for Environment. Proposal for a regulation on deforestation-free products, https://ec.europa.eu/environment/publications/proposal-regulation-deforestation-free-products_en

[53] The International Trade Centre (ITC) provides on its website access to the FEFAC benchmarking tool: https://www.standardsmap.org/en/identify?client=FEFAC

Table 1. International and national stakeholder platforms

Initiatives by civil society, public private partnerships and others:	
Amsterdam Declaration Partnership	https://ad-partnership.org/about/
Collaborative Soy Initiative	https://thecollaborativesoyinitiative.info/
Accountability Framework Initiative	https://accountability-framework.org/
Initiatives by the feed industry	
FEFAC Soy Sourcing Guidelines	FEFAC-Soy-Sourcing-Guidelines-2021.pdf
Initiatives by traders	
Soft Commodities Forum	Soft Commodities Forum (wbcsd.org)
National soybean stakeholder platforms:[54]	
Austria	Donau Soja Association[55]
Denmark	Danish Alliance for Responsible Soy[56]
France	Alliance pour la préservation des Forêts[57]
France	Duralim Platform[58]
the Netherlands	Dutch Soy Platform[59]
Norway	Norwegian Commitments on Sustainable Soy and Forests
Sweden	The Swedish Soy Dialogue[60]
United Kingdom	UK Roundtable on Sustainable Soya[61]
Germany	Forum Nachhaltige Eiweißfuttermittel[62]
Switzerland	Swiss Soya Network[63]

How can corporate social responsibility help?

Defining and managing corporate social responsibility in conventional industrial sectors is relatively easy. Materials are usually traceable and their production is in the hands of a relatively small number of large commodity suppliers or manufacturers whose activities can be monitored. In the case of agriculture and food, the primary resources are land and water, and the suppliers are almost always millions of farmers competing in open commodity markets. Because of this, corporate social responsibility in farming and food

[54] Since 2020, the national soybean stakeholder initiatives are also active as "European National Soya Initiatives" platform (ENSI), except Swiss Sona Network, European-National-Soya-Initiatives-Statement_FINAL.pdf (ad-partnership.org)

[55] Donau Soja Association, www.donausoja.org

[56] Facilitator of the Danish Soy Alliance is the Danish Initiative for Ethical Trade (Dansk Initiativ for Etisk Handel) Link to statement: https://www.dieh.dk

[57] Alliance for the Preservation of Forests, https://alliance-preservation-forets.org/en/#section-2

[58] Duralim Platform, https://alliance-preservation-forets.org/en/#section-2

[59] The Dutch Soy Platform is convened by International Union for Conservation of Nature, Netherlands, https://www.iucn.nl/en/dutchsoyplatform/

[60] The Swedish Soy Dialogue Platform is facilitated by Ethical Trading Initiative Sweden, https://etisverige.se/english/

[61] The UK Roundtable on Sustainable Soya is facilitated by EFECA, https://www.efeca.com/the-uk-roundtable-on-sustainable-soya/

[62] The German platform for sustainable protein feed is facilitated by the Federal Office for Agriculture and Food (BLE), https://www.eiweissforum.de/

[63] Swiss Soybean Network, https://www.sojanetzwerk.ch/en/

extends well beyond the activities of the operating firms and also includes their suppliers. The measures used include semi-private and private certification schemes and associated standards covering large numbers of farmers and/or commodities. Corporate social responsibility strategies can encompass large parts of the complex relationships or cover a small portion such as land use or specific parts of processing.

This section briefly introduces relevant background for corporate social responsibility measures relevant to responsible soybean sourcing.

Background on CSR in agricultural value chains

Definition of CSR

The term "corporate social responsibility" (CSR) is associated with or at least related to terms such as triple-bottom line, corporate ethics, and creating shared value. The common theme of CSR and related goals is commercial firms' consideration of their impact on wider societal interests, particularly their social and environmental impacts.[64]

The Harvard Kennedy School of Government defines CSR as a firm's approach to making profit, rather than just to what they do with profits.[65] This focuses on the internal business processes that lead to profit and emphasises that efforts must go beyond philanthropy (which is a feature of US firms) and compliance with the law. The focus is on how companies manage their economic, social and environmental impacts in the workplace, the marketplace, the supply chain and the wider the community.

The European Commission defines corporate social responsibility as "the responsibility of enterprises for their impacts on society". To fully meet their social responsibility, enterprises "*should have in place a process to integrate social, environmental, ethical human rights and consumer concerns into their business operations and core strategy in close collaboration with their stakeholders*".[66] In line with the Harvard definition, the German Federal Ministry of Labour and Social Affairs emphasises the efforts beyond legal minima and says that CSR means voluntary commitments that go beyond what is required by law.[67]

Position and operation of strategies within the food system

Here we describe corporate social responsibility strategies and measures which impact or potentially impact on soybean sourcing. In the context of position in supply chains and related market drivers relevant to CSR, we identified three categories of firms:

[64] Abagail, M. and Donald, S., 2001. Corporate social responsibility: a theory of the firm's perspective. Academy of Management. The Academy of Management Review 26 (1): 117-127

[65] Harvard Kennedy School. The initiative defining Corporate Social Responsibility. http://www.hks.harvard.edu/m-rcbg/CSRI/init_define.html

[66] European Commission, 2011. A renewed EU strategy 2011–14 for Corporate Social Responsibility. Communication from the European Commission.

[67] Bundesministerium für Arbeit und Soziales, 2012. CSR Made in Germany.

1. Firms interacting with consumers in relation to specific products and supply chains, typically food product manufacturers that are known to consumers through their brands.
2. Firms interacting with consumers over a wide range of products and supply chains, such as retailers.
3. Firms not interacting directly with consumers, typically commodity traders and commodity processors.[68]

This categorisation helps examine underlying economic and market drivers relevant to corporate social responsibility, particularly brand protection and influencing consumer preferences and responses.

Firms interacting with consumers in relation to specific products and supply chains

Firms with branded products generally have a relatively high degree of control of their supply chains. These brands, which often relate to specific supply chains, are valuable. This means that additional costs arising from investment in CSR measures can be offset by an indirect economic return through strengthening of the brand. When operated down to the level of farmer suppliers, there may be further internal benefits arising from security and scheduling of supplies. In some sectors, ownership (or at least control) of the supply chain may extend down to primary production and even pre-farm activities, for example feed manufacture and the development of advanced strains of livestock. This occurs for example in the pig and poultry sectors.

Firms interacting with consumers over a wide range of products and supply chains

Large retailers and catering firms draw on a wide range of supply chains, some with their own branded products. From a CSR perspective, this strategy is similar to classical product-based approaches, but ownership is with the retailer/restaurant chain and extends across a wide range of food products. Therefore, the scope for supporting change at the food system level is greater. Retailers' brands are prominent, valuable and vulnerable to reputational damage. As for product-based strategies, enhancing the reputation of the brand provides the rationale for bearing the additional costs they may entail.

Firms not interacting directly with consumers – commodity traders and processors

A number of firms that are largely invisible to consumers influence and even control key parts of supply chains. These firms are active in commodity processing and trading. Typically, they interact intensively with farmers or local commodity traders, process and store commodity, and then transport commodities over long distances. Some of these commodities, such as soy, are inputs into other supply chains, so the link to consumer markets is particularly weak. These firms operate in a particularly competitive commodity trading environment, where the scope for branding and product differentiation is limited. There is little or no opportunity for distinguishing commodity in terms of user or process quality, except through segregation.

[68] Murphy-Bokern, D and Kleemann, L. 2014. The role of corporate social responsibility in reducing greenhouse gas emissions from agriculture and food. Draft for public consultation. A study for the International Food Policy Research Institute published by Donal Murphy-Bokern. www.murphy-bokern.com

Corporate social responsibility measures

In our experience, firms may use various CSR measures to protect their image towards consumers. An overview of the CSR measures with relevance for addressing the 'soybean problem' and the way they are used is provided in Table 2.

Table 2. Overview of corporate social responsibility measures relevant to soybean

Measures	Use in corporate social responsibility programmes
Certification	Widely in use for soy and other imported commodities like cacao, coffee, palm oil, timber etc.
Technological measures in processing	Food and feed companies are substituting soybean as ingredient with other crops or produces.
Sectoral cooperation, partnerships, platforms and roundtables	Many of these are closely related to product certification. It is possible for firms to support these without committing to the purchase of associated certified produce. Such membership has awareness-raising effects and there are benefits from shared insights and information.
Life cycle assessments	Environmental burdens and their impacts are explicitly allocated to the product or service consumed (the so-called 'functional unit'). In the agri-food sector it is often used to communicate the environmental performance to consumers.

Certification of commodities such as soya, palm oil or timber operates within specific commodity-based sectors, which entails particular challenges related to bulk-traded commodity supply chains. These schemes address sustainability issues associated with the commodity, both on the level of cultivation and/or the supply chain. Standard requirements (for example on environmental protection, or health and safety of workers and communities) reinforce or exceed legal requirements. Depending on the standards and their requirements in relation to pressing sustainability issues, specific "sustainability" claims can be made by users of the standards.

Today, dozens of certification schemes for soybeans exist. There are certification schemes developed in multi-stakeholder settings (for soy: e.g., Donau Soja/Europe Soya, ISCC, ProTerra, RTRS, etc.), as well as trader programmes or other privately-owned standards (for soy, e.g., Amaggi, Bunge, etc.). It is well-known that the various certification schemes differ in their impact and many NGOs also argue that standard systems for commodities are often too lax, tolerating loopholes and workarounds. Independent assessments are recognised within the sector as important tools to address this issue.

When commodity certifications are developed in a multi-stakeholder setting (e.g., Donau Soja/Europe Soya, ISCC, ProTerra, RTRS, etc.), they often bring various stakeholders together who relate to a specific commodity supply chain. These include environmental NGOs who often play a leading role, retailers, food processors, and commodity traders and shippers. Participating in these multi-stakeholder initiatives is a feature of many relevant CSR strategies. This membership may or may not come with a commitment to support certified production.

Technological measures in processing are based on replacing soybean with other ingredients. The applicability for a substitution depends on functional, economic and nutrition factors. Substituting soy is more common in the production of plant-based food than in the feed sector. CSR programmes often use claims such as 'soy-free'. Widely used soybean substitutes for example are oats for plant-based yoghurts and other protein-rich crops or produces like meals from rapeseed or sunflower for feed mixes.

Many roundtables, fora, platforms and partnerships bring together people from several industries involved in the same food area. Depending on the type of institution and the level of individual engagement, activities range from contributing to exchange platforms and lobbying partnerships to establishing commitments among their members.

Life cycle assessment (LCA) is a method which is defined by ISO standards 14040 and 14044 and by several further guidelines. It considers the environmental effect of processes within a production system and provides quantitative values for comparing the environmental impacts and resource use of commodities, products and processes. LCA has particular strengths in assessing impacts at the continental and global levels as it rigorously quantifies the GHG emissions and other environmental impacts. This assessment tool has due to the large environmental footprint of soybean a high relevance. We will look later more in-depth into that.

A spotlight on Austrian retail-chains in context of CSR and soybean

In preparation to this guide, Donau Soja interviewed CSR managers and purchasing agents from retail-chains in Austria and Germany and analysed websites of ten retail-chains in Austria, Germany and Switzerland to assess the importance of soybean in their CSR programmes. It was found that each of the assessed retail-chains has a broad spectrum of measures in place:

- soybean sourcing standards for feed (some explicitly distinct between certificate trade and IP-systems)
- generally higher standards in place for soy based food products than for feed
- participation to various international and national round tables and initiatives
- memberships in non-profit organisations
- use of life cycle assessments to evaluate the environmental footprint of own products

The analysis revealed that soybean sourcing is often combined with additional themes related to sustainability like 'regional' and 'non-GMO'.

About soybean standard and certification systems

The European Soy Monitor estimates for 2019 that about a quarter of the soymeal consumed in EU-28, Switzerland and Norway is certified to be deforestation-free.[69] 'Deforestation-free' is probably the best-known claim of soybean sourcing standards.

[69] The Sustainable Trade Initiative (IDH), 2021, European Soy Monitor, 2019. Available: https://www.idhsustainabletrade.com/uploaded/2021/06/2019-IDH-European-Soy-Monitor-report.pdf

Other sustainability criteria relate to 'good agricultural practise' and to 'social and labour rights'.

Certification in agriculture is however often seen as controversial. Many NGOs argue that standards relevant to sourcing sustainable soybeans are too lax, particularly regarding land use change[70]. This section briefly presents the basic elements and some important considerations related to standard systems in the context of soybeans. This should support assessing the credibility of standard and certification systems. Definitions of key elements and terms are provided in Table 3.

Table 3. Selection of definitions of soybean standard and certification systems that are relevant for assessing their credibility. Definitions are derived from the ISEAL Alliance and the Accountability Framework Initiative[71].

Element	Definition and relevance for credibility assessment
Assurance system	Demonstrable evidence that specified requirements relating to a product, process, system, person or body are fulfilled. The assurance system's rigour is important for the credibility of the standard system. The best-in-class require verifications by fully independent third-party entities. Common synonyms: certification, verification
Certificate	Generic expression used to include all means of communicating that fulfilment of specified requirements has been demonstrated. In soybean standard systems, certificates are issues for example for soybean producers, traders, processors.
Certification	The issuance of a third-party statement that fulfilment of specified conformance requirements have been demonstrated.
Chain of custody	The chain of custody system describes how to validate claims made about the product, process, business or service covered by the sustainability standard and to ultimately achieve credibility towards stakeholders and consumers. It defines a set of requirements and measures that provide the necessary controls on the movement of materials or products, and associated sustainability data, from approved or certified businesses through each stage of the supply chain. Four systems are frequently in use; ranked from high to low scrutiny: hard-IP, soft-IP, mass balance, certificate trade. See also in Annex 2.
Downstream/ upstream	A position in the supply chain. Downstream is further from raw material origin and closer to the stage of final sale and consumption. The opposite is upstream.
Due diligence	A risk management process implemented by a company to identify, prevent, mitigate and account for how it addresses environmental and social risks and impacts in its operations, supply chains, and investments.
Scheme owner	The organisation that is responsible for the standards system and accountable for the performance of its assurance system. The scheme owner can be for example an assurance provider, a governmental authority, trade association, etc. Common synonym: Standards system owner
Segregated certified material	Certified raw material or derived product that originates entirely from certified sources and is kept separate from non-certified sources throughout the supply chain.
Standard system	The collective of organisations responsible for the activities involved in the implementation of a standard, including standard setting, capacity building, assurance,

[70] Greenpeace, 2021. Destruction: Certified. Available: https://www.greenpeace.org/international/publication/46812/destruction-certified/

[71] ISEAL Alliance and the Accountability Framework Initiative, https://www.isealalliance.org/innovations-standards/innovations-projects/pledge-proof-helping-companies-achieve-sustainable

labelling and monitoring.

Assessing soybean sourcing standards regarding their impact on deforestation

Studies by the Thünen-Institute and by Profundo analysed 17 certification systems with sustainability claims like no-deforestation, good agricultural practises or compliance with social criteria. Both studies found that only six standards can prevent deforestation. The determining factors for a high score were whether a strict chain-of-custody system was applied and third-party verification audits were carried out. Furthermore, it was found that many standards either use very vague definitions of forest and deforestation or do not explicitly exclude legal deforestation (see also Table 4).[72] [73] These results provided the basis for commitments by round tables as only positively approved standards were considered.

Table 4. Definitions relevant to the claim 'deforestation-free'.

Aspect	Definition and relevance for credibility assessment
Cut-off date	The date after which deforestation or conversion renders a given area or production unit non-compliant with no-deforestation or no-conversion commitments, respectively.
Deforestation	Loss of natural forest as a result of: i) conversion to agriculture or other non-forest land use; ii) conversion to a tree plantation; or iii) severe and sustained degradation. Loss of natural forest that meets this definition is considered to be deforestation regardless of whether or not it is legal.
Deforestation-free	Commodity production, sourcing, or financial investments that do not cause or contribute to deforestation (as defined by the Accountability Framework). (synonym: no-deforestation)
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or other land use. Forest includes natural forests and tree plantations. For the purpose of implementing no-deforestation supply chain commitments, the focus is on preventing the conversion of natural forests.

Good agricultural practice

Good agricultural practice (GAP) is not uniformly defined and can be interpreted in different ways. The Food and Agriculture Organisation of the United Nations (FAO) defines good agricultural practice as the application of available knowledge to ensure environmental, economic and social sustainability in both agricultural cultivation and processing. The objective is to produce healthy food and other agricultural products. Sustainable agricultural practices include for example integrated pest management, integrated nutrient management and low-resource agriculture.

[72] Hargita, Y., Hinkes, C., Bick, U. und Günter Peter, G., 2019. Entwaldungsfreie Agrarrohstoffe - Analyse relevanter Soja-Zertifizierungssysteme für Futtermittel. Thünen working paper 98. https://www.thuenen.de/media/publikationen/thuenen-workingpaper/ThuenenWorkingPaper_98.pdf

[73] Kusumaningtyas, R. and van Gelder, J. W., 2019. Setting the bar for deforestation-free soy in Europe. Profundo. https://www.profundo.nl/download/iucn1906

A main reference in the industry is the definition of GAP according to the FEFAC guidelines. There, GAP related criteria include the protection of water, soil, use of pesticides and compliance with national requirements for integrated crop production.[74]

Social criteria

Social criteria refer both to the rights and entitlements of the employees involved in agricultural production and their families, as well as to communities affected by the production. Criteria are based on the conventions of the International Labour Organization (ILO).

The CSR opportunities provided by European-grown legumes

This chapter outlines relevant background on using legumes grown in Europe as a replacement for 'unsustainable' soybeans in the context of CSR. Provided insights and references are useful for food producers, marketers and those involved in sustainable sourcing of agricultural commodities.

About protein crop and legume production and use in Europe

Legumes belong to the plant family *Fabaceae*. Most of the legumes of agricultural interest are in the subfamily *Faboideae*, characterised by papilionate (butterfly-like) flowers with an erect standard petal, two wing petals and two fused keel petals that protect the ovary. Though all food plants provide protein, the seeds of the members of the legume family are especially rich in protein. All protein crops, as the term is used in the EU, are legumes. Protein crops include bean, pea, lupin and soybean. The legumes grown for their seed are also called pulses or grain legumes. Almost all legumes perform biological nitrogen fixation (BNF) that supplies the legume plant with nitrogen and reduces the need for fertiliser nitrogen in the following crops.

Environmental role of legumes for European cropping systems

Local environmental benefits come from increased crop diversity and the impact of this on biodiversity. Protein crops support above- and below-ground biodiversity, including that of pollinating insects. Beyond the local level, benefits to the agri-food system include resource savings such as the reduction of fossil fuel use arising from the reduced demand for fertilisers in particular. Reduced fossil fuel use translates into lower emissions of greenhouse gases and acidic substances. The biologically fixed nitrogen used by the legume is nitrous oxide free, so nitrous oxide emissions from protein crops are low, although emissions can occur following the incorporation of residues. Reducing the quantity of imported soya also reduces pressure on international land-use change. Lifecycle assessments confirm that replacing imported soybean with European-grown

[74] FEFAC soy sourcing guidelines 2021, https://fefac.eu/wp-content/uploads/2021/02/FEFAC-Soy-Sourcing-Guidelines-2021.pdf

protein crops reduces the resource use and environmental impacts of livestock products.[75]

Production and use of the main grain legumes in Europe

Soybean, dry pea, faba bean and lupin are mainly grown as dry grain legumes in the EU. They have multifunctional uses, for feed that is dominating currently, and for food with an increasing trend. Biofuel is also an important market thanks to the high oil content of soybean, and its cake or extracted meal returns to animal feed. While soybeans are mainly grown in the South and East of Europe (see Table 5), the other grain legumes are mainly grown in the North of the continent (UK, Germany, Poland and Lithuania).[76]

Soybean cultivation in Europe

Soybean cultivation in Europe has doubled within the last ten years and stood in 2021 at 2.7 million hectares in the EU-27 and at 9.5 million hectares including also non-EU countries in Europe, like Serbia, Ukraine or the European part of Russia.

Table 5. Soybean production in Europe in 2012 and 2021. Source: Donau Soja, based on data from Eurostat, Ukrstat and Rosstat

Country	2012		2021	
	Hectares	Tonnes	Hectares	Tonnes
Austria	37,100	104,143	76,740	235,093
Croatia	42,000	96,720	85,000	195,000
France	37,500	104,240	155,000	455,000
Hungary	40,900	67,730	63,000	163,700
Italy	175,000	422,130	300,000	880,000
Romania	77,900	104,300	149,000	350,000
Russia (European part)	512,000	761,000	1,671,000	2,843,500
Serbia	163,000	281,000	250,000	548,839
Slovakia	21,900	41,830	64,000	174,000
Ukraine	1,412,000	2,405,000	1,390,000	3,380,000
Others	80,893	96,930	122,990	282,543
EU-27	450,308	980,063	977,630	2,670,011
Total Europe	2,600,193	4,485,023	4,326,730	9,507,675

[75] Bues, A., Preißel, S., Reckling, M., Zander, P., Kuhlman, T., Topp, K., Watson, C., Lindström, K., Stoddard, F. L. and Murphy-Bokern, D., 2013. The environmental role of protein crops in the new common agricultural policy. Directorate general for internal policies, European Parliament. https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/495856/IPOL-AGRI_ET(2013)495856_EN.pdf

[76] B., Keyeza, F., Muel, T. Smadja, W. Stauss, I., Stute, M., Simmen, M., Mergenthaler, 2020. Report on legume markets in the EU. Deliverable D3.1 of the EU-project LegValue. Publisher: Fachhochschule Südwestfalen. Available: https://www.legumehub.eu/wp-content/uploads/2021/06/d31-report-on-legume-markets-in-the-eu.pdf

A global perspective on the distribution of grain legumes in cropping system

Many European farming systems are not balanced with respect to the nitrogen cycle. Carbohydrate-rich cereal crops and oil-rich rapeseed grow very well over much of Europe and consequently many farmers specialise in growing them. World-wide, protein-rich grain legumes, which can bring agronomic and environmental benefits in crop rotations, account for about 14% of the global arable area but there is great variation in the extent of their use. Soybean is grown in intensive monocultures in the major exporting countries in South America where it commonly accounts for more than half of the cropped area. In contrast, grain legumes account for only 2 to 3% of the arable area of the European Union, mostly soybean, pea and faba bean in that order. The combination of this European cropping pattern with few grain legumes and the high consumption and production of livestock products is the basic reason why we have a protein deficit in Europe.

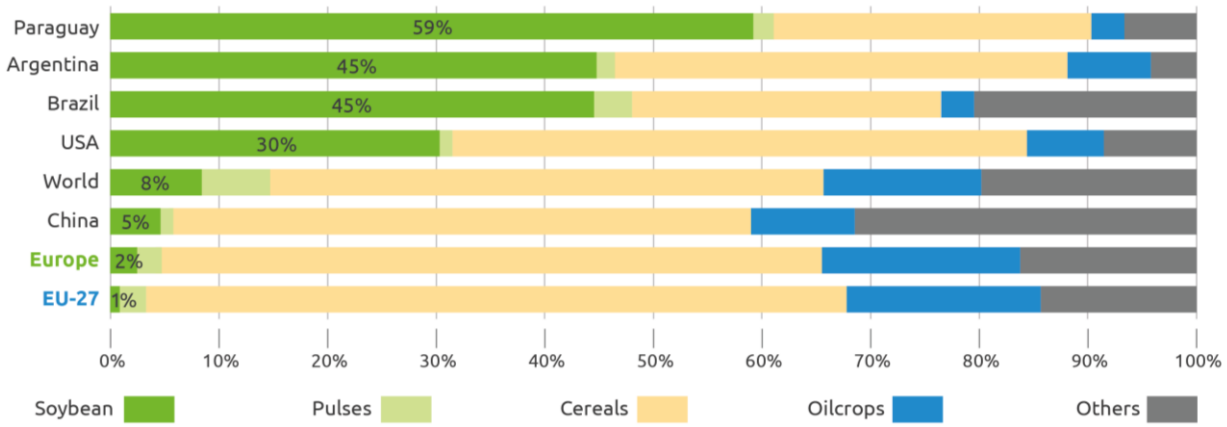

Figure 7. Harvested areas of crops. Prepared by Donau Soja. Data source: FAOstat and Rosstat. 'Europe' is based on the geographical definition of the continent and includes only the European part of Russia.

Increasing the role of European-grown legumes in agri-food value chains is assumed to be a prerequisite for a de-intensification of our agri-food systems. The current European system is enabled by the combination of specialisation in intensively fertilised carbohydrate-rich crops balanced by the import of about 35 million tonnes of plant protein into the EU each year, in particular through imports of soybeans and soymeals. Developing legumes is one component of a wider change process that will align how we consume and produce food with long-term global and European environmental goals.

Opportunities for value-chains using European legumes

A Delphi study conducted within the Legumes Translated project delivered the following results on opportunities und constraints related to the production and use of legume in Europe.

Opportunity 1: where aware, consumers are supportive of change

Consumer-related trends provide a positive framework for wider market change. The mega trend is a reduction in meat and dairy consumption with a corresponding increase

in the consumption of plant-based foods. This in itself would reduce the demand for legumes overall, increase demand for food-grade legumes, and possibly reduce livestock pressure on land resources. The more relevant consumer trend is towards sustainable consumption. Differences in feed inputs used in livestock production can be used to differentiate products. For example, non-GM dairy products, i.e., products from dairy production that do not use any GM feed ingredients, are now practically standard for the German and Austrian dairy sector.

Opportunity 2: European legume production and use protects and enhances brands

The sensitivity of European processors and manufacturers to wider societal drivers, especially those from citizens and consumers, is an opportunity. European legume production supports efforts to protect and enhance the image of food products and brands. There is broad understanding that they contribute to farming systems that are more sustainable. There is openness across the value chain to new contract arrangements, particularly where legumes are used for food products. The technologies are available to support local processing and supply chains.

Constraint 1: commodity (spot) trading dominates

Many experts expect that commodity (spot) trading will remain the dominant market force. Even with pulse crops used for food, price setting for large-scale uses follows the price setting on commodity markets, especially commodity markets for soybean and wheat. The feed sector in particular is dominated by commodity trading and this is reinforced by the consumers' and citizens' lack of insight into how livestock are fed and the extent of reliance on internationally-traded plant protein. Policy makers are not in a positon to intervene directly to reduce the dominance of international commodity trading because this would contravene WTO rules. Arable farming in particular is seen as a producer of commodities.

The continued dominance of commodity trading challenges the view that other trading arrangements will lead to system transition. The responses of experts do not indicate that the dominant cereal-based systems will be challenged just by the growth and merger of a large number of currently niche activities. Such a challenge must be underpinned by fundamentals reflected in commodity trading, i.e., from a shift in the relative basic values of the crop outputs due to changes in relative yields and values in the constituent digestible protein, carbohydrate and oil.

Constraint 2: specialised and intensive production systems remain dominant

Farming systems (i.e., the arrangement of enterprises within a farm business) have become intensive and simple. Farmers have adopted simple systems because they reduce overall operating costs and maximise output. Farmers are focused on marginal returns from individual cropping decisions. The resulting production systems are intensive with for example many dairy herds now bred and managed to produce high milk yields using finely optimised diets that include purchased concentrate feeds. The demands on monogastric livestock are even higher. These simple systems reduce capital costs and management time per unit output. Experts do not see a strong trend towards reduced production intensity or towards mixed farming that might open up opportunities

for legume production and use. This is reinforced by difficulties in assessing real long-term economic effects of diversified cropping and reduced production intensity. There is a trade-off between short term output and long-term farm resilience if a diversification or de-intensification path is taken.

Constraint 3: integrating policy instruments are not widely used

Public policy instruments, especially regulatory instruments, are generally focused on single outcomes, for example the control of nitrate levels in water. Farming systems remain unaffected by more integrative instruments such as carbon and nitrogen balances, fertiliser taxes, carbon taxes and rewards.

Constraint 4: Post-farm processing infrastructure is weak

Processors and manufacturers value the convenience and consistency of processed commodities, especially soya-based commodities. Development of faba bean and pea in particular is constrained by a lack of infrastructure for the first processing steps that will allow harvested crops to be efficiently converted into uniform products in sufficient quantity that can be slotted into existing supply chains. There is a lack of overview of the processing requirements and opportunities in practice.

Life-cycle assessments of legume supported products

Communication about the environmental performance of products to consumers is widespread and a popular CSR measure. Avoiding emission-intensive ingredients or processes related to animal husbandry means replacing, for example, soybeans as the standard protein with alternatives. The soybean market mix often comes with high GHG emissions due to emissions from land use change in South America. Life-cycle assessment (LCA) is a suitable methodology to quantify effects from such substitutions. This section provides a brief introduction into LCA and discusses the methodology behind one main GHG driver, land use change.

Life-cycle assessment – basic principles

Life-cycle assessment (LCA) is a method which is defined by ISO standards 14040 and 14044 and by several further guidelines. It considers the environmental effect of processes within a production system and provides quantitative values for comparing the environmental impacts and resource use of commodities, products and processes. LCA has particular strengths in assessing impacts at the continental and global levels as it rigorously quantifies the GHG emissions and other environmental impacts (such as eutrophication and acidification) associated with a product throughout its life-cycle, from 'cradle to grave' or other defined system boundaries. Results are provided for impact factors, including fossil energy use, GHG emission, eutrophication, acidification, ecotoxicity.

With LCA, environmental impacts and their effects are explicitly allocated to the product or service consumed (the so-called 'functional unit'). This helps stakeholder involved in the supply chain, including consumers, to identify the effects of their decisions and

activities, for example the effect from replacing standard Brazilian soybeans in the feed ration with legumes from Europe.

The impact of LUC induced GHG emissions on the stage of primary production can be significant, particularly for crops from countries where deforestation is widespread. Emissions originate from carbon stock changes for example due to the shift from forest to an agricultural land use. Table 6 shows that more than 90% of all GHG emissions of Brazilian or Argentinian soybeans at farm stage is due to LUC induced emissions.

Table 6. Carbon footprint of soybeans at farm-stage in Brazil and European countries. Emissions cover land-use-change induced emissions and from the cultivation (mass allocation method). Source: Agri-Footprint 5.0).

	Global warming, including LUC (kg CO_2 eq / kg product)	**Global warming, excluding LUC** (kg CO_2 eq / kg product)	**Land use change induced GHG emissions (LUC)**
Argentina	4.08	0.20	3.88
Austria	0.55	0.40	0.15
Brazil	4.19	0.26	3.93
Italy	0.50	0.39	0.11
Romania	0.76	0.61	0.15
USA	0.24	0.23	0.01

The most widely accepted and used methodology for carbon footprint assessments according to the main guidelines in Europe is the PAS-2050 guideline. It is the basis for industry-led LCA databases and is also the baseline for the European Product Enviromental Footprint Guide (PEF).[77] Based on the available information on LUC, PAS-2050 defines following procedures:

1. The assessment of the impact of land use change shall include all direct land use change occurring not more than 20 years. The total GHG emissions and removals arising from direct land use change over the period shall be included in the quantification of GHG emissions of products arising from this land on the basis of equal allocation to each year of the period.

2. Where the country of production is known and the previous land use is known, the GHG emissions and removals arising from land use change shall be calculated based on information of the change in land use from the previous land use to the current land use in that country.

3. Where the country of production is known, but the former land use is not known, the GHG emissions arising from land use change shall be the estimate of average emissions from the land use change for that crop in that country

4. Where neither the country of production nor the former land use is known, the GHG emissions arising from land use change shall be the weighted average of the average land use change emissions of that commodity in the countries in which it is grown.

[77] The PEF is an EU-harmonised methodology to comprehensively measure the environmental performance of feed production across 16 impact categories; it was launched as an initiative by the European Commission under the Single Market for Green Products Communication in 2013.

5. Knowledge of the prior land use can be demonstrated using a number of sources of information, such as satellite imagery and land survey data. Where records are not available, local knowledge of prior land use can be used.

Donau Soja's support of CSR: a case study

About Donau Soja

The Donau Soja Association (DS) was founded in 2012 by Matthias Krön and is an international, non-profit organisation based in Vienna. DS supports the development of soybean along all stages of the soybean value chain: science, commercial breeding, cultivation, trade and distribution, processing to feed and food. Its goal is to promote the development of a sustainable, safe and European protein supply.

Foundation to the association and its governance is a diverse network and membership structure with recognised representatives from leading companies in the soya sector, from farming and industry associations as well as from environmental NGOs and public authorities. DS provides them a platform and supports its members and partners in addressing social, environmental and economic challenges in soya production and consumption, with the aim of increasing efficiency, fairness and sustainability in European food and feed protein value chains.

The association is established according to the Austrian association law and follows also a clear governance structure which builds on the general assembly, comprises a board and presidium, as well as technical and scientific advisory committees. In Donau Soja, each member has one vote.

CSR-related services to members and partners

Supporting its members' and partners' CSR activities is close to the core business of Donau Soja. Three key activities are provided here in more detail: DS manages several soybean standard systems with developed and widely recognised brands and labels, it provides a platform for jointly developing Europe's protein supply and it supports its members and partners in assessing the environmental footprint of their products.

Assuring the environmental and social soundness of food products

DS offers standard systems which are positively recognised by many national and international soybean initiatives. This enables companies to work credibly towards their environmental and social responsibility commitments.

Protecting and strengthening reputations

DS is trusted as a non-profit organisation within the industry, by governments and consumers. Members like retailers communicate directly with consumers and can use the membership in the Donau Soja Association as part of their CSR programme (see also

Annex 1). The use of the Donau Soja and Europe Soya labels support efforts to communicate towards consumers and the public. An additional exploitation potential to strengthen a climate-friendly image arises from carbon footprint calculations.

Sustainable soybean sourcing standards 'Donau Soja' and 'Europe Soya'

Key tools of the organisation are the Donau Soja and Europe Soya standards. The main certification requirements behind both brands are origin ('Danube region' and 'Europe'), compliance with EU plant protection regulations, compliance with labour and social standards (ILO) and non-GMO according to the guidelines of Arge Gentechnikfrei (Austria) and VLOG (Germany). For the cultivation of certified soybeans, only land that has been designated before 1 January 2008 as agricultural land may be used. Both standards are hard-IP standards with third-party assessments and verifications.

The 'Donau Soja' and 'Europe Soya' standard systems are positively assessed by the Thünen-Institute and Profundo studies.[78] [79] Both are accepted and recommended as sustainable sourcing standard by FEFAC, the Danish Alliance for Responsible Soy, the Swedish Soy Dialogue, the Swiss Soy Network, the UK Roundtable on Sustainable Soya, the Aquaculture Stewardship Council, WWF and Greenpeace.

Both standards provide also product labels which may be used on the packaging of animal and plant based end-consumer products like tofu or eggs and should strengthen thereby their image. Users of the standard respectively its label can respond effectively to consumer preferences and demands for regionality, for climate and environmental-friendly products, for 'non-GMO' and 'no-deforestation' and 'from Europe'. Users of the label are food producers and food retailers and are as of March 2022 located in Austria, Finland, Germany, Serbia, Slovakia and Switzerland.

Example users of the Donau Soja brand: the Austrian egg sector

Practically all egg producers who deliver into Austrian retail are certified according to Donau Soja standard and egg packages carry the Donau Soja label. This is the result of a transition which started in the early 2000s when first egg brands brought non-GM certified eggs onto the markets. In 2010, the whole fresh egg production in Austria was already converted to non-GM. To further strengthen the position of Austrian egg producers, an alliance between Austrian retail-chains, egg producers and the Donau Soja Association has been formed in 2012. It resulted in 2013 in the first 'Donau Soja' certified eggs, see Figure 8.

This collaboration marks a milestone for soybean producers in Austria as it created a long-lasting and reliable market uptake. Approximately 50–70 thousand tonnes of soya feed materials are used by the Austrian egg producers. DS statistics show that about 50–60% of soybeans consumed by egg producers are from Austrian fields.

[78] Hargita, Y., Hinkes, C., Bick, U. und Günter Peter, G., 2019. Entwaldungsfreie Agrarrohstoffe - Analyse relevanter Soja-Zertifizierungssysteme für Futtermittel. Thünen working paper 98. https://www.thuenen.de/media/publikationen/thuenen-workingpaper/ThuenenWorkingPaper_98.pdf

[79] Kusumaningtyas, R. and van Gelder, J. W., 2019. Setting the bar for deforestation-free soy in Europe. Profundo. https://www.profundo.nl/download/iucn1906

Figure 8. Social media posting of one Austrian retailer asking the question 'Do you know what food, did your food eat?' and referring to the use of Donau Soja certified soybeans instead of soybeans from tropical forests.

Using carbon footprint calculations as a tool within CSR

DS supports its members and partners in using life-cycle assessments for their produces. This usually includes an assessment of the impact on global warming potential if the default soybean supply is replaced by Donau Soja/Europe Soya certified produces. This usually results in a significant improvement of the carbon footprint, as the market mix of soybeans comes with high GHG emissions. Results can be effectively used in CSR programmes and can be communicated towards consumers.

Figure 7 shows a carbon footprint calculation for a specialised Austrian pork production system using Donau Soja certified soybeans feed instead of a standard market mix of soybeans.[80] The study found a GHG reduction of about 40% per kg liveweight at farm stage. The main driver of this reduction is the feed ingredient soymeal. Soymeal used to feed the Austrian pig herd in the study is produced from Donau Soja certified soybeans, that comes with a significantly smaller carbon footprint than the default soybeans. This difference is explained by LUC induced GHG emissions at the cultivation stage of soybeans in Brazil, see also Table 6.

[80] Based on trade statistics, the study assumed the market mix to be 50% from Brazil and 50% from USA.

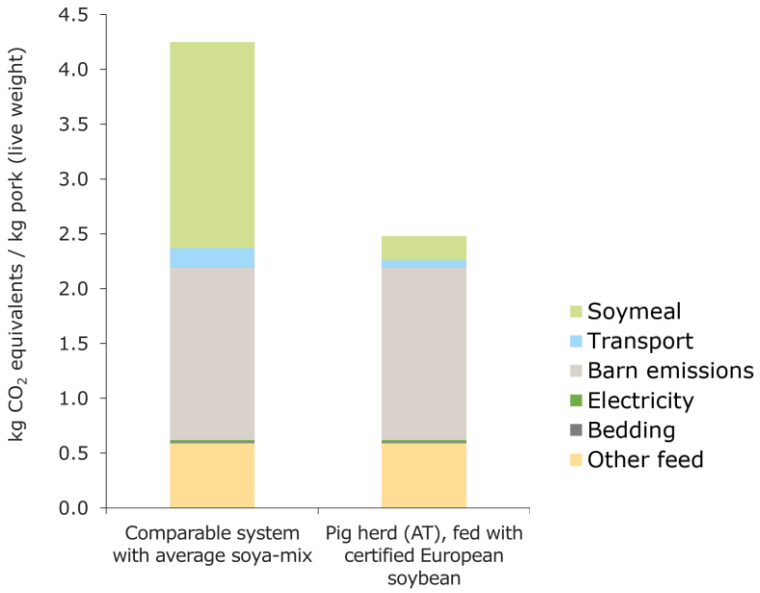

Figure 7. Effect of land use change induced emissions for soymeal for 1kg of pork. The graph shows GHG emissions of two pig feeding rations at farm level. The left is fed with an average soymeal mix (50% Brazil origin) and the right is fed with soymeal from European origin. Source: Donau Soja[81]

[81] Donau Soja carbon footprint calculation for 'Gustino' pigs in Austria: https://www.donausoja.org/projects/lifecycle-assessment-carbon-footprint-project/

Annex 1. Survey of food retailers

Method of the survey

The survey was done in summer 2021. Although one interview partner was from a German food retailer the focus of the survey was on the Austrian food retailing business. The retailers participating in the survey cover more than 90% [82] of the market shares of food retailing in Austria. Interviews were conducted with CSR-managers (n=8) and purchasing agents (n=3) as can be seen in the figure below. Nine of the interviews were done in personal meetings, two were done by email. The interviews done in personal meetings were recorded, transcribed and then analysed through qualitative content analysis. The interviews conducted by email were also analysed with the same method. The interview guide in German can be found further below in this Annex 1.

	CSR-Manager (8)	Purchsing agent (3)
Spar	x	x
Rewe	x	x
Lidl	x	
Edeka	x	
Hofer	x	
Metro	x	
Top-Team / Transgourmet	x	x

Overview of Interview partners

Aims and hypothesis of the survey

First of all the purpose of the interview was to survey the state of knowledge regarding the CSR relevant connections with soybean. E.g. On what information/knowledge base do the persons in charge rely on? What are the in-house processes for coming to guidelines? How is the company-environment related to them? (Suppliers, customers, politics,…)

The hypothesis of the survey was that CSR managers have a lack of soy-specific expertise. It was derived that this leads to a difficulty when it comes to the links between CSR-targets and the selection or promotion of products containing soybean, especially regarding the knowledge transfer towards their colleagues (marketing, store managers,…) and furthermore towards the customers.
The aim was to find out, where to best start with a report about CSR and food products, which should help CSR managers to better communicate the topic of CSR and food, especially concerning the intersections of CSR and soybean.

[82] Lebensmittel- und Drogeriefachhandel, 2021. GS1 Austria, https://www.gs1.at/sites/default/files/2021-06/Poster-KEYaccount-Handelstabelle-Lebensmittel-und-Drogeriefachhandel-2021.pdf

Interview guide

This is the interview guide used for the survey amongst CSR managers and purchasing agents of food retailers.

	CSR-Manager	**Verantwortliche in Einkauf**
1	Gibt es Zielvorgaben im Unternehmen bezüglich SDGs?	Welche Rolle spielt Nachhaltigkeit in Ihrer Position?
2	Was erwarten Sie von Ihren Lieferanten bezüglich Nachhaltigkeit?	Was sind bei Ihnen Kaufkriterien für nachhaltige Produkte?
3	Wie präsent ist das Thema Soja in Ihrem Bereich?	Welcher Reihenfolge bei der Kaufentscheidung eines Produktes folgen Sie (Preis-Verfügbarkeit-Service-Bekanntheit-Nachhaltigkeit etc.)?
4	Wie umfangreich ist Ihr Wissen zum Thema Soja & Nachhaltigkeit? Welche Themen fallen Ihnen dazu ein?	Welche Nachhaltigkeitskriterien sind Ihnen besonders wichtig?
5	Können Sie mir zum Thema Land-use change etwas sagen?	Was sind die Grundvoraussetzungen eines Unternehmens für einen persönlichen Termin mit dem Einkauf?
6	Wie wird auf Anfragen vom POS bezügl. Nachhaltigkeit im Unternehmen reagiert?	Was sind für die CSR-Abteilung Voraussetzungen für Co-Branding/Zertifizierung?
7	Werden MitarbeiterInnen in Ihrem Unternehmen über Nachhaltigkeitsthemen (bezügl. Soja und allgemein) informiert/regelmäßig geschult? In welcher Form? In welchen zeitlichen Abständen?	
8	Wie schätzen Sie den Wissensstand zu Soja & Nachhaltigkeit bei den MitarbeiterInnen am POS ein? (Unterschiede an Feinkost und an Regal/Kassa bzw. im Einzel- und Großhandel?)	
9	Erhalten Sie regelmäßig KonsumentInnen-Feedback vom POS?	
10	Gibt es bestimmte Informationen zum Thema Soja & Nachhaltigkeit, die Sie sich für eine Broschüre zum Thema Soja & Nachhaltigkeit wünschen bzw. benötigen?	

Conclusions from interviews with CSR managers

The survey showed that understanding among CSR and procurement managers for impacts from global interconnections. Many conveyed in their interview knowledge about European soybean production versus the import of soybean produced overseas, which come with higher emissions because of e.g. transport or even more if forest had been previously converted to arable land. Many interviewees addressed the need to break global connections down to pieces which can be facilitated in their daily work too. This

became obvious when interview partners 1) either directly addressed this need or 2) made reference to it e.g. through the importance of quality labels which help to make decisions.

Websites of retail-chains for the role of soybean in their CSR programmes

Company	Country	CSR measures related to soy
Aldi Süd	Germany	https://www.aldi-sued.de/de/nachhaltigkeit/klima-und-umwelt/waldschutz/soja.html
Coop	Switzerland	https://www.taten-statt-worte.ch/de/nachhaltigkeitsthemen/landwirtschaft-und-verarbeitung/rohstoffe/soja.html
Edeka	Germany	www.edeka.de/nachhaltigkeit/unsere-wwf-partnerschaft/soja/index.jsp
Hofer	Austria	www.hofer.at/de/heute-fuer-morgen/schwerpunkte/kunden/gentechnikfreiheit.html
Kaufland	Germany	https://unternehmen.kaufland.de/content/dam/kaufland/website/corporate/de_DE/download/document/20-mmdu/lieferketten/kaufland-lieferketten-positionspapier-nachhaltiges-soja-als-futtermittel.pdf
Lidl	Austria	https://www.lidl.at/content/download/59248/847693
Lidl	Germany	https://unternehmen.lidl.de/verantwortung/handlungsfeld-sortiment/food-sortiment/rohstoffe-soja
Migros	Switzerland	https://corporate.migros.ch/de/nachhaltigkeit/nachhaltige-produkte/unsere-fortschritte/getreide-huelsenfruechte/soja.html
Rewe Group	International	https://rewe-group-nachhaltigkeitsbericht.de/2020/lieferkette/soja.html
Spar	Austria	www.spar.at/nachhaltigkeit/produkte/tierische-produkte/futtersoja

The interviews with CSR managers were accompanied by an analysis of the websites of retail-chains and which CSR measures there are implemented.

Annex 2. Chain of custody (CoC)

The chain of custody (CoC) system is a key element of agri-food certifications. The objective of the CoC System is to validate claims made about the product, process, business or service covered by the sustainability standard and to ultimately achieve credibility towards stakeholders and consumer. It defines a set of requirements and measures that provide the necessary controls on the movement of material or products, and associated sustainability data, from approved or certified businesses through each stage of the supply chain. Many standard systems set a CoC standard for this purpose, in addition to their production or management standard. CoC systems include CoC models.

Following CoC models are derived from guidance documents by ISEAL Alliance and are provided to help appreciate the range of approaches used.[83]

Chain of custody models describe the approach taken to demonstrate the link (physical or administrative) between the verified unit of production and the claim about the final product. Standards systems may choose to include one or several CoC models as the means to verify compliance with their CoC standard, and this will affect the claims permitted:

1. Identity Preservation (IP), also 'hard IP'. An IP model ensures that certified product from a certified site is kept separate from other sources. If used through the whole supply chain, it allows certified products to be uniquely traced through the production process from a production site and batch (sustainability certificate holder) to the last point of transformation orlabelling of a product (or use of a claim). In this model, the certified material cannot be physically mixed with other certified or non-certified material of the same commodity or ingredient.
2. Segregation (SG), also 'bulk commodity' or 'soft IP'. This model ensures that certified product is kept separate from non-certified sources through each stage of the supply chain, allowing assurance that the ingredients within a particular product originate from certified sources, though it may not be possible to identify which molecule came from which certified source. Physical mixing of certified material coming from two or more different certified sources is allowed and must be documented accordingly.
3. Mass balance. In the mass balance model the volume of certified product entering the operation is controlled and an equivalent volume of product leaving the operations can be sold as certified. The physical mixing of certified and non-certified product is allowed, but not required (i.e. does not define the model to have physical blending) at any stage in the production process provided that the quantities are controlled in documentation. Mass balances are usually further defined by the extent segregation is maintained. Different mass-balance forms are for example: batch-level, site-level or group-level.
4. Certificate trading. In this model certified material is completely decoupled from sustainability data. Certified and non-certified product flows freely through the supply chain. Sustainability certificates or credits are issued at the beginning of the supply

[83] ISEAL Alliance, 2016. Chain of custody models and definitions. www.isealalliance.org/sites/default/files/resource/2017-11/ISEAL_Chain_of_Custody_Models_Guidance_September_2016.pdf

chain by an independent issuing body and can be bought by market participants, usually via a certificate or credit trading platform. It is important to acknowledge the certificate trading model as it is widely used by many manufacturers to meet their sustainable sourcing targets, especially when sourcing the required volumes of CoC certified product directly is not possible. However, it should be noted that certificate trading is not strictly a CoC model: the end product contains no known certified product, or an equivalent volume that has been controlled under the CoC system, and there is no physical traceability through the supply chain.

Recommended for further reading

Retail Soy Group, October 2021: Achieving deforestation- and conversion-free soy value chains. Principles of successful strategies for downstream sellers of livestock products. https://www.3keel.com/retail-soy-group-deforestation-conversion-free-roadmap/

European Compound Feed Manufacturers' Federation, FEFAC. Soybean Sourcing Guidelines 2021. https://fefac.eu/wp-content/uploads/2021/02/FEFAC-Soy-Sourcing-Guidelines-2021.pdf

FEFAC Step-wise management plan for feed manufacturers on environmental footprinting, https://fefac.eu/wp-content/uploads/2021/10/SR_Step-wise-engagement-plan-for-feed-manufacturers-on-environmental-footprinting.pdf