

International spillovers in SDG implementation

The case of soy from Argentina



SEI policy brief

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Key messages

- The soy value chain from Argentina to Europe provides a well-researched example of a complex set of positive and negative environmental and socio-economic impacts – unequally distributed along the value chain – enabling a detailed spillover study.
- Economic impacts along the soy value chain are mostly positive, social impacts have both positive and negative components, while environmental impacts are mostly negative and largely occur on the production side (Argentina). At the consumption end (Europe), negative environmental impacts are averted by externalizing production to Argentina.
- Argentina experiences the negative spillovers as obstacles to its national SDG implementation, while the EU in principle recognizes its responsibility for spillovers resulting from all of its policies, through its commitment to Policy Coherence for Development.
- Taking shared responsibility and jointly achieving sustainable consumption and production (SDG 12) will require policies and interventions that are based on integrated assessments of positive and negative impacts across sectors and regions.
- The SDGs are global in scope, and cannot be achieved by individual countries acting alone, but only through global partnerships for development (SDG 17). Entry points for Europe to meet its global responsibility include for example the Common Agricultural Policy (CAP), the EU-Mercosur trade agreement, as well as development cooperation.
- In order for countries to jointly address spillovers, they also need to be accounted for in SDG monitoring and review.

Introduction

In a globalized world, with regions interconnected through ever more complex value chains, environmental and socio-economic impacts of consumption are increasingly externalized as so-called “spillovers” to producer countries, often across large distances to other world regions (Sachs et al. 2019).

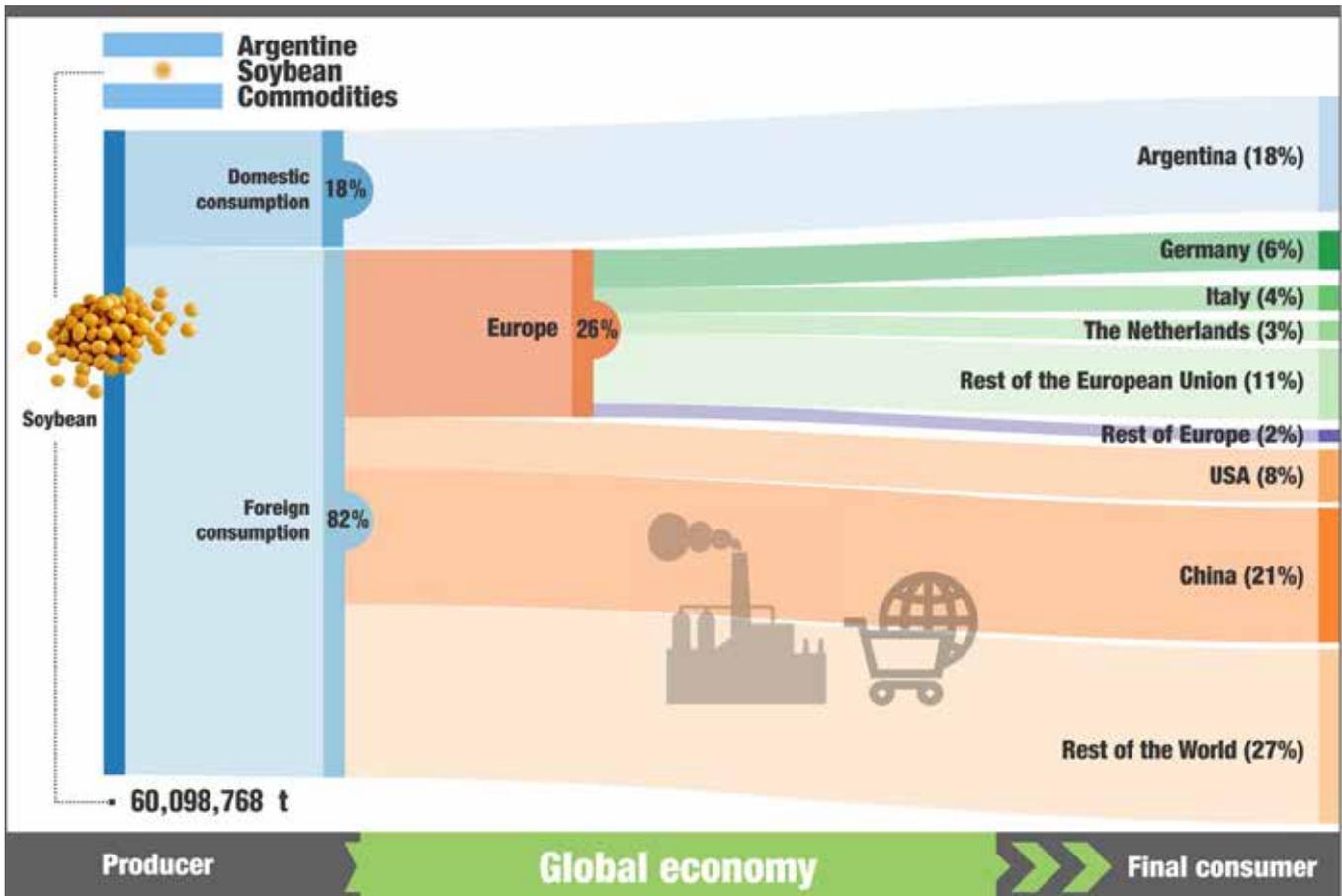
Implementation of the Sustainable Development Goals (SDGs) requires an integrated approach, both within and among countries (Hoff 2018). To achieve SDG 12 (responsible consumption and production) in particular, value chains and the full range of their associated impacts need to be better understood. For that, policymaking in both Argentina and Europe should draw on comprehensive quantitative assessments as evidence base for mitigating negative spillovers of consumption, managing trade-offs, and strengthening synergies.

This policy brief is based on results from a comprehensive, multi-model and multi-stakeholder assessment of the value chains of several Argentine soybean commodities and their environmental and socio-economic implications for national SDG implementation (Monjeau et al. 2019).

Key results

Soybean is the most important crop in Argentina. The soybean cropping area has increased from virtually zero in 1970 to 18 million hectares in 2018 – more than half of the land currently under agricultural production in Argentina. Scenarios suggest that the production of soybeans and associated exports are likely to further increase (FABLE, 2019). Soybeans produced in Argentina are transformed into different products (in particular, soybean meal for livestock feed, as well as soybean oil, and biodiesel) which are consumed and/or used as inputs in global value chains that support a wide range of other products and services consumed worldwide. As shown in Figure 1, the vast majority (82%) of current Argentinian soybean production serves foreign final consumption, with just 18% supporting domestic final consumption in Argentina itself. Top final consumers are Europe, China and the USA. Within Europe, the top three consumers are Germany, Italy, and the Netherlands – mainly due to consumption of a range of (livestock) food products.

Figure 1. Left: Average annual production of Argentine soybeans (2014–15 and 2015–16). Right: Final consumers of products that depend on or contain soybeans produced in Argentina. The flow between both ends of the graph considers all the transformations and uses of Argentine soybeans in the global economy. Source:



Source: www.unsdsn-andes.org/index.php/en/thematic3/142-spillovers



Dairy herd feeds on soya lecithin cattle feed. The bulk of soy imported to Europe from Argentina is used for animal feed. © MODFOS / 123RF

The environmental, social and economic impacts of soy production in Argentina have significant external drivers – i.e. consumption, particularly in China and Europe. From a consumption standpoint (see Figure 1) Europe is responsible for about 26% of the environmental and socio-economic impacts associated with soybean cultivation in Argentina.

However, assigning and operationalizing shared responsibilities among consumers, producers and other actors along the supply chain is not straightforward. This policy brief provides some insights towards this end.

Environmental, social and economic impacts

Environmental impacts of soy commodities take place along their entire value chains, with many of the impacts occurring on the production side (i.e. crop cultivation), such as net loss of soil fertility (e.g. from loss of carbon, nitrogen, and phosphorus), soil erosion and subsequent eutrophication, pesticide use, and impacts to ecosystems that threaten species (including almost 100 vertebrates on the Red List of the IUCN). The expansion of soybean crops contributes significantly to land use change, including by pushing the agricultural frontier, forcing other crops and cattle ranching to less suitable land, and fueling deforestation – at a rate of 300 000 ha per year in northwestern Argentina (Viglizzo et al. 2011). Greenhouse gas (GHG) emissions in Argentina from soy cultivation, plus associated land use change, amount to approximately 35 million tons of CO₂-equivalent, which accounts for more than half of Argentina's total GHG emissions from agriculture. GHG emissions and other impacts such as water and energy consumption also occur downstream in the value chain, as the soy crop is transformed into different products and transported to final markets.

Without accounting for the asymmetric spillovers in SDG monitoring, review, and scoring, we are presented with an incomplete picture of progress toward sustainable development.

The **social impacts** are mixed, with both positive and negative effects along the value chain. At the production end, Argentine soybean cultivation has both destroyed and created jobs. Displacement of other crops has meant the destruction of jobs that were largely informal, while many of the jobs created in the soybean sector are formal, bringing improved labour conditions, including social security (33% of workers directly associated with soybean cultivation are registered employees). Because cultivation of the displaced crops tends to be more labour intensive, soybean cultivation reduces the amount of labour required per hectare, but with the expansion of production the net effect in terms of total jobs created is arguably positive. However, it is worth noting that those who have lost jobs haven't always obtained newly created formal jobs, and workers with lower qualifications, the elderly, and women have had greater difficulty in getting hired. There are also inequities among regions: some have faced a net loss of jobs, while in others there has been a net increase. Displacement of informal workers and other rural denizens has also affected the land rights of villagers and indigenous peoples. The ratio of men and women in the soy workforce is significantly skewed, with males being the overwhelming majority. Nonetheless, among formal employees, females tend to have better-paid positions. Lastly, soybean cultivation labourers are subject to fatal and non-fatal injuries.

The **economic impacts** along the soybean value chain are mostly positive. In Argentina, soybean exports contribute to a macroeconomic equilibrium, providing foreign currency and public revenues. However, the concentration on this one crop makes Argentina also more vulnerable to the volatility of the global soybean market, as well as to climate shocks.

SDG implementation in Argentina and Europe: trade-offs, synergies and opportunities for shared responsibility

If Europe were to domestically produce the amount of soybeans or alternative protein-rich crops needed to support its final annual consumption (equivalent to 16 million tons of soybeans) many related environmental "costs" would shift accordingly from Argentina to Europe, along with some of the economic benefits, like jobs and income. These effects, of course, are not perfectly transferable due to contextual factors like more efficient production systems in Argentina, higher fertilizer inputs required in Europe, and higher total GHG emissions in Argentina per unit of production. Social and employment impacts would probably be less pronounced in Europe given the greater supply of agricultural subsidies as well as the reduced need for agricultural labour (OECD Agricultural Statistics 2019).

Thus, while Europe benefits significantly from current arrangements (except for some more complex indirect impacts, e.g. on health, resulting from growing consumption of cheaply available meat) in Argentina, the picture is mixed, as Table 1 shows. Negative impacts may counteract some of Argentina's domestic goals and targets, slowing down SDG achievement. It is apparent that SDG implementation in Europe and Argentina is closely linked and there is a need for joined-up policymaking and cooperation and sharing of responsibility across borders. In the SDG Index (Sachs et al. 2019), which ranks countries on their SDG achievement, many European countries achieve top rankings, while Argentina scores much lower (45 out of 162 countries). However, without accounting for the asymmetric spillovers in SDG monitoring, review, and scoring, we are presented with an incomplete picture of progress toward sustainable development.

Table 1. Overview of impacts of the Argentina-Europe soy system on SDG achievement

SDG	SDG target	Argentina – impacts	Europe – impacts
		(positive impacts in green, negative impacts in red)	
SDG 1 No poverty	1.1 Eradicate extreme poverty	Additional revenues to finance social protection programmes	
		Losses of other agricultural jobs	
SDG 2 Zero hunger	2.4 Sustainable food production and resilient agricultural practices	Productivity improvements through technology	
		Soil losses and eutrophication	
SDG 3 Good health and well-being	3.8 Achieve universal health coverage	Improved conditions for formal employees	
	3.9 Reduce illnesses and deaths from hazardous chemicals and pollution	Increased exposure to agricultural chemicals	
SDG 5 Gender equality	5.5 Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	More women in managerial positions	
SDG 6 Clean water and sanitation	6.3 Improved water quality	More agrochemicals, eutrophication	Reduced pollution due to externalization of production to Argentina
	6.4 Increased water-use efficiency, reducing water scarcity	Improved efficiency through technology More competition for scarce water	
SDG 7 Affordable and clean energy	7.2 Increase global percentage of renewable energy	Production of biodiesel from soy	
SDG 8 Decent work and economic growth	8.1 Sustainable economic growth	Economic stimulus and public revenues due to export production	Low-cost feed imports stimulate growth
	8.2 Higher economic productivity through diversification	More productive agriculture through technology Loss of economic diversification causes macroeconomic vulnerability	
	8.5 Full employment and decent work with equal pay	Additional formal jobs	
	8.8 Protect labour rights and promote safe working environments	Better labour conditions for some workers Still informal and unsafe employment	
SDG 9 Industry, innovation and infrastructure	9.2 Raised industry’s share of employment and GDP	Development of the soybean processing industry	
SDG 10 Reduced inequalities	10.1 Reduce income inequalities	Increased income for some Working poor remain, and certain groups marginalized	
		10.4 Adopt fiscal and social policies that promote equality	Fiscal revenues finance social protection programmes
SDG 12 Responsible consumption and production	12.2 Sustainable management and use of natural resources	Increased pressure on natural resources	Decreased pressure on natural resources due to externalization of production to Argentina
	12.6 Encourage companies to adopt sustainable practices and sustainability reporting	Voluntary commitments not always met	Voluntary commitments not always met
SDG 13 Climate action	13.2 Integrate climate change measures into policies and planning	Increased GHG emission in production, processing and transport	GHG emission reductions due to externalization of production to Argentina
SDG 14 Life below water	14.1 Reduce marine pollution	Eutrophication and additional agro-chemicals	Reduced pollution due to externalization of production to Argentina
SDG 15 Life on land	15.2 Halt deforestation, restore degraded forests, afforestation	Direct and indirect forest losses	
	15.5 Reduced degradation of natural habitats, halt the loss of biodiversity	Loss of habitats and biodiversity	Reduced pressure on habitats and biodiversity due to externalization of production to Argentina
SDG 17 Partnerships for the goals	17.11 Increase the exports of developing countries	Increased soy exports	

Note: The assessment and weighing of the relative importance of the various impacts is a matter for policymakers and wider society.

Opportunities and policy recommendations

To fully implement the SDGs and enable sustainability transformations, there is a need for internationally coordinated interventions and multi-level governance all along the value chain.

At the **global level**, international treaties, agreements and other governance mechanisms (including e.g. the G7 and G20) must take into account the full production-to-consumption-system of each commodity. This may include:

- developing quantitative, geographically specific, consumption-based accounting methodologies to inform policy and decision-making, including financing
- adopting a consumption-based approach, such that consumers, including individuals, companies, and countries, share responsibility with producers for minimizing negative impacts and promoting positive ones and for protecting environmental commons, including ecosystems and other natural resources, possibly through compensation mechanisms.

At the **national and regional levels**, there are opportunities for both Argentina and the EU to contribute to more sustainable soy value chains.

For **Argentina**, it is critical for policymakers to reconcile the short-term economic benefits of soy production for export with long-term environmental and social sustainability. Opportunities to do so include:

- promoting sustainable intensification practices, including agro-ecological approaches, aiming to avoid the loss of ecosystems and their services as soy production increases
- investing in soybean processing activities, in order to create additional value before export and generate new economic opportunities before export
- diversifying agricultural production and exports, so reducing dependency on a single crop or trading partner
- continuing to enforce the Forest Law of 2007, which has reduced soy-related deforestation by 50%, and explore other legislative opportunities to promote sustainable development, including agricultural and trade policies and agreements regulating and effectively supervising the use of agrochemicals.

The EU is committed to implementing the 2030 Agenda across all internal and external policies in a comprehensive approach that addresses the broader impacts of its domestic actions at international and global level (EU 2018). And individual member states, such as Sweden, with its “generational goal” (Swedish EPA 2012), have committed to solving domestic environmental problems without increasing problems in other countries. Opportunities for the EU to pursue these aims include:

- diversifying feed crops, including domestic production of soy, legumes and other adapted crops (see e.g. the European Soy Declaration)¹
- working to revise the EU Common Agricultural Policy (CAP) to promote local feed production, limit agricultural waste, and reduce fossil fuel-based fertilizers and GHG emissions.

¹ Launched by the German Federal Ministry for Food and Agriculture and signed by the agriculture ministers of 14 European states. See: www.bmel.de/EN/Agriculture/Plants/_Texte/Europ%C3%A4ischeSojaErkl%C3%A4rung_EN.html

While the above activities can be promoted unilaterally within Argentina and Europe respectively, several of the most powerful opportunities to share responsibility for reducing negative impacts and promoting positive ones need to be implemented **bilaterally**, such as:

- including spillovers and sustainable practices in trade agreements, such as in the EU-Mercosur free trade agreement
- creating an SDG-based certification and labelling system and implementing more sustainable sourcing patterns
- addressing spillovers in bilateral and multilateral development cooperation.

Beyond the direct role of governments, there are also opportunities for the private sector and consumers to promote a sustainable soy value chain and thus SDG implementation:

- companies should increase their voluntary commitments or pledges to sourcing sustainable soy, including by participating in sustainability rankings schemes
- consumers should demand more information about the products they purchase, including effects all along the supply chain, and use their political power to encourage decision-makers to strengthen policies in support of sustainable development. Consumers can also reconsider their consumption patterns, in particular the consumption of meat.

Achieving the SDGs globally will require strong collaboration between countries and actors, across multiple scales.

There are also opportunities for further research to support more sustainable supply chains. For example, there is a need for the following:

- hybrid tools based on existing MRIO, MFA, FABLE and LCA methods that can improve the traceability of traded commodities and their associated spillovers
- integrated quantitative geographically explicit assessments of positive and negative spillovers across SDGs, countries and regions, as well as along supply chains
- more studies like the one on which this brief is based for a broader range of commodities, value chains, and spillovers to produce a more complete picture of shared responsibility between consumers, companies, and countries.

This assessment of the soy value chain and its spillovers illustrates that achieving the SDGs globally will require strong collaboration between countries and actors, across multiple scales. It's clear that solutions and policies in one location or region may have negative spillover effects elsewhere. This means that implementing the SDGs is truly a shared responsibility, achievable only through multilateralism and global cooperation and stewardship.

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References

- EU (2017). The New European Consensus on Development: "Our World, Our Dignity, Our Future". Joint statement by the Council and the representatives of the governments of the Member States meeting within the Council, the European Parliament and the Commission (2017/C 210/01). https://ec.europa.eu/europeaid/new-european-consensus-development-our-world-our-dignity-our-future_en
- FABLE (2019). Pathways to Sustainable Land-Use and Food Systems. 2019 Report of the FABLE Consortium. International Institute for Applied Systems Analysis (IIASA) and Sustainable Development Solutions Network (SDSN). Laxenburg and Paris. www.foodandlandusecoalition.org/fableconsortium
- FAO Global database of GHG emissions related to feed crops. <http://www.fao.org/partnerships/leap/database/ghg-crops/en/>
- Hoff H. (2018). Integrated SDG implementation – How a cross-scale (vertical) and cross-regional nexus approach complement cross-sectoral (horizontal) integration. In: Hülsmann et al. (eds). *Managing Water, Soil and Waste Resources to Achieve SDGs*. Springer, Cham.
- IDH and IUCN NL (2019). European Soy Monitor. Researched by B. Kuepper and M. Riemersma of Profundo. Coordinated by N. Sleurink of IDH, The Sustainable Trade Initiative and H. van den Hombergh of IUCN National Committee of the Netherlands.
- Monjeau, A., Gómez-Paredes, J., Frank, F., Malik, A., Hoff, H. (2019). The Role of Spillovers in SDGs Implementation: An Impact Assessment of Argentine Soybean Commodities Throughout Their Global Value Chain. Technical Report to the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).
- Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G. (2019): Sustainable Development Report 2019. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN).
- SDSN Andes (2019) Sustainable production systems and consumption patterns. Available at: <http://www.unsdsn-andes.org/index.php/en/thematic3>
- Steinmann, Z. J., Schipper, A. M., Hauck, M., Giljum, S., Wernet, G., & Huijbregts, M. A. (2017). Resource footprints are good proxies of environmental damage. *Environmental science & technology*, 51(11), 6360-6366.
- Swedish EPA (2012). Sweden's Environmental Objectives: An Introduction. Swedish Environmental Protection Agency, Stockholm.
- Viglizzo, E. F., Frank, F. C., Carreño, L. V., Jobbagy, E. G., Pereyra, H., Clatt, J. and Ricard, M. F. (2011). Ecological and environmental footprint of 50 years of agricultural expansion in Argentina. *Global Change Biology*. 17(2), 959-973. <https://doi.org/10.1111/j.1365-2486.2010.02293.x>