Linkages between agricultural trade, markets, investments, environmental sustainability and human well-being

A review of current understandings in science, policy and practice

MATS Deliverable 1.1

MATS
making agricultural trade sustainable

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Summary

Our current understandings in science, policy, and practice on the impacts of agricultural trade, markets and investments on sustainable development and human rights suggests that we still lack a deeper appreciation of interrelationships and impact pathways. This includes the indirect (or knock-on) effects of trade, tensions between different goals, as well as the potential contribution of novel governance arrangements, and trade practices, regimes and policies to achieving the UN SDGs.

Focus in this review and discussion paper is on trade practices, regimes and policies at national, EU, African and global levels, on the impact of agricultural trade, and on policy instruments and mechanisms for achieving sustainability transitions.

The review highlights with many examples that agricultural trade is not just a function of countries and regions, but especially of food system actors. This in turn calls for more holistic perspectives and analyses, which blend novel insights into local and on-the-ground perspectives, including those of the whole range of stakeholders (e.g., as part of case studies) with global or macro-level data and analyses. We conclude that only the combination of local and macro-perspectives is likely to provide a more convincing assessment of transboundary impacts of trade on sustainable development and human rights, and of interrelationships. Our case studies are therefore connected with a systems-dynamic modelling of global linkages and market dynamics, the latter related to trends, shocks, robustness, food system resilience, and food and nutrition security.

The key issues and questions identified in this review that ought to be pursued in further analyses are:

- How to foster the positive and reduce the negative impacts of agri-food trade on sustainable development and human rights?
- What is the role of investments, especially for supporting equitable agri-food systems and effective sustainability transitions?
- How to reduce negative transboundary impacts and foster mutually beneficial trade relations?
- How to increase the effectiveness of sustainability standards in European, EU-Africa and global agreements on agri-food trade?
- What are the responsibilities of the public and private sector when it comes to enforcement of agreed sustainability goals?

In the analyses that focus on food system governance we will need to identify who the key actors are with their roles, interests and responsibilities, and how to address risks of power inequality, participation, and public interests. Taking a human rights perspective in this analysis allows to identify roles of rightsholders and duty bearers, with science informing the political choices to be made.

Without the interplay of on-the-ground and macro-perspectives, and paying attention to food system governance, impact assessments will continue to be dominated by corporate, country, or regional perspectives, and abstract model-based analyses. More importantly, continuing with such traditional impact assessments would impede the much-needed identification of novel transition pathways toward more sustainable, resilient, and equitable agri-food and agri-food systems.

A visual overview on the broad links between agricultural trade, markets, investments, environmental sustainability, and human rights is provided in Section 7. The numbering of linkages refers to the corresponding sections in this discussion paper.

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1 Aim of this discussion paper

The EU funded MATS project aims to identify key leverage points for changes in agricultural trade policy that foster the positive and reduce the negative impacts of trade on sustainable development and human rights. Particular attention is paid to SDG1 No Poverty, SDG2 Zero Hunger and SDG3 Good Health and Well-being, as well as SDG6 Clean Water, SDG8 Decent Work and Economic Growth, SDG13 Climate Action, and SDG15 Life on Land. Focus is on improving the governance, design and implementation of trade practices, regimes and policies at national, EU, African and global levels.

In this discussion paper we present the results of a review and characterisation of the broad links between agricultural trade, markets, investments, environmental sustainability, and human well-being. Our review connects these different spheres with human rights concerns, questions of justice, risk issues related to climate change, water and land use, as well as the related question of the resilience of food systems. The aim is to illustrate, contrast and, where meaningful, combine different perspectives and insights from relevant research articles, books, and other published texts such as research reports, position papers, and news media. Closely related, we aim at identifying key issues and questions that ought to be pursued in further analyses.

The documents we reviewed cover leading institutions, research institutes, think tanks, and non-governmental and civil society organisations. Particular attention was paid to covering central notions as well as perceptions, thus going beyond academic studies. At the same time, this review of relevant research is *not* meant to be all-encompassing.

To illustrate nuances between different authors in problems and solutions framing, wherever possible, *original text* is used, retaining the opinions and value statements of these original texts. Extracts from the original publications are used. In contrast to academic article writing style, quotations are not used explicitly with full hyphenation.

To ensure that the range of perspectives, insights and conclusions that can be found in relevant written materials and discourses is covered in a balanced manner, a draft version of this document was circulated among all project teams, as well as among the members of the Project Advisory Group for review.

2 Longer term trends

2.1 Globalization and trade

Since the 1950s we have seen an unprecedented expansion of international trade. In terms of volume, world trade is nearly 57 times greater now than it was in 1950, and the share of global GDP it represents, rose from 5.5% in 1950 to 26% in 2020 (WTO 2021a). This enormous expansion in world trade has been made

possible by trade liberalisation in conjunction with technological changes and innovations, which have dramatically reduced the cost of transportation and communications, all fostered by the adoption of more open trade and investment policies (Tamiotti *et al.* 2009). The number of countries participating in international trade has significantly increased during this period: developing countries, for instance, now account for 34% of merchandise trade – about double their share in the early 1960s (Tamiotti *et al.* 2009).

Global agri-food trade has more than doubled since 1995, amounting to $1.5 trillion in 2018, with emerging and developing countries exports on the rise and accounting for over one-third of the world total. Since 2000, trade in agri-food products has grown strongly – more strongly than in the preceding decade at close to 8% in real terms annually between 2001 and 2014 compared to 2% between 1990 and 2000. Among the changes seen in agri-food markets, there has been a significant increase in trade among emerging and developing countries, which are increasing in importance, both as suppliers and markets for agri-food products (FAO 2020a; FAO 2020b).

A growing share of agri-food trade is taking place in global value chains – linking agri-food sectors and other sectors of the economy from across the world (FAO 2021a; FAO 2020c; OECD/FAO 2021a). In 2013, around 20-25 percent of world food production was traded on international markets (D'Odorico *et al.* 2014a). This proportion varies widely by commodity, however. For rice, butter and pork, it is below 10%. For soybean, vegetable oils, fish and sugar, it exceeds 30%. Maize, beef and wheat are intermediate, with 12%, 15% and 24%, respectively. These proportions are expected to remain steady for the next decade but to slightly increase by mid-century because of climate change (OECD/FAO 2021b).

In 2019, the EU exported and imported goods and services worth €3.1 trillion and €2.8 trillion, respectively, which supported 35 million jobs in the EU (D'Odorico *et al.* 2014a; Sanchez Nicholas 2021a). The EU is also the world's largest trader of agricultural and manufactured goods and services, and it ranks first in both inbound and outbound international investments .

At the same time, the EU is also a major importer, first from the EU's neighbours, and second from low-income countries, and in particular from Africa (European Commission 2021a). Low- and middle-income countries account for about one-third of global food trade (FAO 2018; HLPE 2020). The EU is also the world's largest provider of Aid for Trade.[4] This is partly unsurprising given its colonial history, as this has impacted trade relations since its conception as reflected, for example, in the Lomé conventions (Raimundo 2020; Odijie 2021).

[4] Aid for Trade aims to support developing countries in using trade as a leverage for poverty reduction. Target 8.a of the Sustainable Development Goals (SDGs) 8.a in the 2030 Agenda for Sustainable Development refers to increasing Aid for Trade, in particular to Least Developed Countries (LDCs). SDG 17 includes, inter alia, efforts to increase exports of developing countries, LDCs in particular.

2.2 Horizontal and vertical restructuring of the global agri-food sector

In the 1990s and 2000s, a spate of mega-mergers sparked unprecedented consolidation in the seed, agri-chemical, fertilizer, genetics and farm machinery industries, while creating ever-bigger players in the processing and retail sectors. Concentration kicked into higher gear since 2015 with the further consolidation of the trade in international seeds and agri-chemicals (Sandwell 2019). In the agricultural commodity trading sector, just a handful of firms dominate the bulk of the global grain trade (Oliveira and Schneider 2015; Hall 2019). In the food processing sector, a series of mergers and acquisitions in the last several years has resulted in some giant firms commanding a huge proportion of the market in their respective sectors (IPES-Food 2017; HLPE 2020).

A closely related trend is the rise of equity-related investment in the agricultural sector. Investments in agri-food firms by large asset management firms have the potential to contribute to the already concentrated market power in the agri-food system (Clapp 2019). The assessment of the state of merger and acquisition activity across the food system by IPES-Food 2017) identifies the risks arising from unprecedented consolidation at every node of agri-food chains. The main conclusion is that the dominant agri-food firms have more and more control over the agri-food system (IPES-Food 2017) (see also Section 4.2).

New data, information and communication technologies are emerging as a powerful new driver of consolidation, reinforcing the high and rapidly increasing levels of concentration in the agri-food sector. Access to and control over data means power (IPES-Food 2017; Prause *et al.* 2021).

The enormous concentration in the agri-food sector impacts food trade, agricultural investments and it has over decades led to a significant horizontal and vertical restructuring of food systems with significant socio-economic and environmental impacts (HLPE 2017a; IPES-Food 2017; HLPE 2020). Concentration across the agri-food industry has made farmers ever more reliant on few suppliers and buyers, putting pressure on farm incomes and eroding farmers ability to choose what to grow, how to grow it, and for whom (IPES-Food 2017; Fałkowski *et al.* 2017; Nes *et al.* 2021). Farmers as smaller market participants have typically less bargaining power than companies in the often highly concentrated stages of processing and food retailing (Steiner 2007; Louw *et al.* 2010; Steiner 2017). At the same time there are usually no alternative sales channels available to them, also due to the rapid perishability of many agricultural products. The disadvantageous market imbalance in the food chain for farmers tends to be aggravated by a diminishing ability of farmers for value-creation throughout value chains (Steiner 2017; BMEL 2021). The situation is slightly better in many countries of the Global South, where direct links between producers and consumers are still important and informal (local) markets are still sizable (Committee on World Food Security 2016; Kay 2016; IPES-Food 2017; FAO 2020c; FAO 2020a).

Globally, the food environment is also shaped by the expansion of supermarkets and hypermarkets (Qaim 2017). The distribution and retail models created by globalization tend to provide larger population centres with more choice (whereby it could be argued that this is pseudo-choice if it all traces back to the same big

food players), and increased food safety while marginalizing more remote areas. They have also tended to exclude small-scale producers from the supply chain, including in smaller urban centres. Although the process is highly dynamic, there is some evidence that over time this exclusion can be addressed (Reardon and Hopkins 2006; HLPE 2017a).

Considering horizontal and vertical restructuring (see Glossary) trends and their significant impacts, it becomes even more pressing to monitor food systems globally to inform decisions and support accountability for better food system governance and the transformation processes needed (Fanzo, Haddad, *et al.* 2020; Fanzo *et al.* 2021).

3 Drivers of change in agri-food systems and trade

The nexus between international trade, food systems, food security and nutrition, and climate change is complex (Friel *et al.* 2013; Lee *et al.* 2013; Friel *et al.* 2020; FAO 2021a; GNR 2021), hence rendering the task of identifying drivers even more challenging. Nevertheless, some five main categories of drivers of food system changes have been identified by HLPE 2017a). These are: biophysical and environmental; innovation, technology and infrastructure; political and economic; socio-cultural; and demographic factors. The same authors emphasise that innovation has been a major engine for food system transformation in the past decades and will remain critical to address the needs of a rapidly growing population in a context of climate change and natural resource scarcity. It needs to be added here that innovation can take many different forms and is often highly contested, which means that a more differentiated assessment is needed (see for example (IAASTD 2008; Knickel *et al.* 2013, 2017, 2018; EU SCAR 2015; Anderson *et al.* 2020). Political leadership, as well as inclusive governance mechanisms, from global to local levels, are crucial; all anchored on the need to invest in sustainable food systems; to design and implement policies and programmes to strengthen food systems, improve diets and enhance FSN; and to overcome power imbalances (Panagariya 1999; Asafu-Adjaye and Mahadevan 2009; HLPE 2017a; Faude 2020).

Political and economic factors that influence changes in agri-food systems and trade also include foreign investment and trade; food policies, taxes and subsidies; changes in food prices; price volatility; land tenure; conflicts and humanitarian crises. Population growth and changing age distribution, urbanization, migration and forced displacement are other factors that have driven profound changes in food systems in the past decades and will remain major drivers in the future (HLPE 2017a; OECD 2020; FAO 2020a; OECD/FAO 2021b).

The increasing urbanization is expected to put additional stress on food systems but also providing an opportunity to expanding demand and market for some food types. Urban demand will increasingly dictate what foods are grown by rural producers and how these foods are processed, distributed and marketed (HLPE 2017a). This relates to longer-standing concerns around urban bias which means that the development process in the Global South is systematically biased against

the countryside and the bias that is embedded in the political structure dominated by the urban groups need to be considered (Ades and Glaeser 1995) (see also the Glossary).

We see trade also as a driver because it is directly linked with an interest in selling a product or service, and a related profit motive. The theory of comparative advantage predicts that trade is beneficial to all parties. However, in reality it shows that a more differentiated assessment of the distributional effects of trade is needed. Trade clearly is more than a (neutral) mediation process or a result of demand globalisation in combination with a lack of local competitiveness (Labonte 2004; Stiglitz and Charlton 2005; Swinen 2007).

Maggio *et al.* (2018) provide a more nuanced overview of the key drivers in 12 foresight studies on food and nutrition security. The drivers identified include resource scarcity and availability; economic growth and power; climate change; diet changes, food preferences, and values; demography; urbanization; technology, research, and innovation; trade and food prices; agri-food chain structure; globalization; social values and education; farm structure, production, and production systems; poverty; and conflicts. Another important driver identified is policy and governance which will be discussed more in Section 6.

Financial investments, or as framed by TNI 2020), the financialisation of land and territories, are a catalyst as well as a driver of change in agri-food systems and trade, often with significant impacts on resilience and nutrition (Batini 2019; Chichaibelu *et al.* 2021; Queiroz *et al.* 2021). More recently, green finance (see glossary), in particular green bonds (Maltais and Nykvist 2020), has started to have a significant impact on agri-food systems and their ability to deal with climate related risks (Batini 2019). Although the overall effectiveness of green investments continues to be debated (Larsen *et al.* 2019; Flammer 2019; Maltais and Nykvist 2020), the effectiveness of green agri-food investments regarding global nutrition (Chichaibelu *et al.* 2021), and the need for collaborative co-development of decision tools by agri-food researchers and corporate and financial actors seem uncontested (Negra *et al.* 2020).

Moreover, considering the recent developments prompted by Covid-19, several studies (Arora and Mishra 2020; Rowan and Galanakis 2020; Erten and Antonio Ocampo 2021; Amouzai and Kay 2021) have explored how Covid-19 affects trade and food insecurity, directly via its impacts on commodity prices, and indirectly through its environmental sustainability and social sustainability impacts.

4 Agricultural trade impacts

Trade plays a key role in shaping global agri-food systems (D'Odorico *et al.* 2014b; Anderson 2018; Rampa *et al.* 2020; Sanchez Nicholas 2021b), with associated significant social, economic and environmental impacts (Montalbano *et al.* 2015; IPES-Food 2017; Friel *et al.* 2020). The build-up of global value chains has had a dichotomous impact on economies and societies. On the one hand, substantial efficiency gains were created, fuelling trade-led economic growth in many parts of the world (European Commission 2021a), which has helped to lift millions of

people out of poverty (Sachs *et al.* 2020). On the other hand, these developments have sometimes had a strong disruptive effect, leading to growing inequalities and leaving whole sectors and communities behind. What were expected to be transitory adjustment costs have sometimes turned into permanent impacts in term of food inequality (D'Odorico *et al.* 2014b), living standards, employment opportunities, wages and other working conditions (HLPE 2017b; IPES-Food 2017; European Commission 2021a).

4.1 Environmental and climate impacts

The G20 countries comprise two-thirds of the world population and account for 85% of global gross domestic product and over 75% of global trade. They also generate 80% of global energy-related carbon-dioxide emissions (Sachs *et al.* 2020).

Overall, agriculture and food systems are responsible for a third of global anthropogenic GHG emissions (Crippa *et al.* 2021), yet to net out the environmental impacts of agri-food trade alone proves challenging. The reason is that the largest contribution such emissions comes from agriculture, land use and land use change (71%), with the remaining from supply chain activities: retail, transport, consumption, fuel production, waste management, industrial processes and packaging (Crippa *et al.* 2021).

Considering total CO2 emissions from global transport of all goods, international maritime shipping alone accounts for 11.8% of the transport sectors total contribution to CO2 emissions., air freight represents an 11.2% share, rail transport constitutes another 2% share, and road transport has the biggest share, at 72.6% of the total CO2 emissions from transport (Tamiotti *et al.* 2009; Koundouri *et al.* 2021; Papandreou *et al.* 2021). One conclusion is that to facilitate international trade and preserve the EU's supply chains, greater attention needs to be paid to more resilient and sustainable modes of transport (Sanchez Nicholas 2021a). While there is limited evidence on how environmental sustainability associated with agri-food trade relates to food packaging alone, it seems that its role and impact is negligible (Ferguson Aikins and Ramanathan 2020; Crippa *et al.* 2021).

Furthermore, trade has direct and indirect impacts on biodiversity. Lenzen *et al.* (2012) analysed 15,000 commodity products traded in 187 countries finding that 30% of global species threats are due to international trade. The study included supply chains related to imported coffee, tea, sugar, textiles, fish, and other manufactured items.

Direct biodiversity impacts stem from transportation (e.g. air cargo, road transport and shipping), arrival of alien pests or wildlife trafficking (EPRS - European Parliamentary Research Service 2021). Trade in pesticides is another factor directly contributing to biodiversity losses. Hard to comprehend is the fact that EU is continuing to produce and export highly hazardous chemicals that are banned internally (Gaberell and Viret 2020).

That trade also impacts global biodiversity indirectly for instance through the virtual water, land, and deforestation contained in EU imports is emphasised by Bellora *et al.* (2020).

Indirect impacts include:

- the depletion of natural capital as human demands on the biosphere increase,
- comparative advantages leading to a regional concentration extractive or pollution-intensive activity,
- the adoption of environmental technologies and goods, patents or production methods can benefit from trade liberalisation.

Direct and indirect land use change is not only a considerable driver of the environmental impacts of agri-food production (Sihvonen *et al.* 2020), but also a considerable driver of terrestrial species loss. Between 1986 and 2009, the majority of new cropland was used for exports (EPRS - European Parliamentary Research Service 2021). A major reduction in global deforestation is needed to mitigate climate change and biodiversity loss (Lambin *et al.* 2018).

The European Commission regularly analyses the impacts of trade on biodiversity in trade sustainability impact assessments and ex-post evaluations. The results of these assessments are to inform the formulation of biodiversity goals in the trade and sustainable development (TSD) provisions of agreements with partners (EPRS - European Parliamentary Research Service 2021).

Related to global deforestation, the Amsterdam Group (Amsterdam Declarations Partnership 2021) has advanced the concept of Forest Risk Products to reduce agricultural commodity-driven deforestation and helped to align political positions among EU member states on deforestation free supply chains. Forest risk products are now included in EU deforestation legislation and introduced to risk assessments looking at commodities that are globally traded goods and raw materials that originate from tropical forest ecosystems either within forests or from areas previously under forest cover (i.e., soy, palm oil, timber, rubber, sugar, beef, cocoa, coconut, and shea).

4.2 Social and economic impacts

Increased trade has been associated with rising incomes, although also with rising levels of inequality (Stiglitz and Charlton 2005). Rising incomes are important for food security; however income disparities can pose a problem if they skew the distribution system to cater to the demands of higher-income consumers at the expense of the availability of more affordable food. Any economic change, such as increased trade openness, creates winners and losers (HLPE 2017a).

Trade can create new opportunities, but also involve adjustment costs for the poor and increase inequalities. Access to international markets can deliver higher average incomes to farmers who specialize in producing export crops. But it can also bring greater competition for productive resources and reduce the demand for

workers in sectors that compete with imports (World Bank Group and World Trade Organization 2018).

Trade has made a critical contribution to poverty reduction for many, and further integration of developing countries into international markets can contribute to ending poverty (World Bank Group and World Trade Organization 2018). To realise the positive contribution, a more differentiated analysis in support of trade policy development seems needed.

Greater trade openness has coincided with unprecedented (historically speaking) levels of economic prosperity, living standards and life expectancy for most people. However, evidence also shows that not all the poor benefit from international trade. Effects depend on where people live (e.g. rural versus urban areas), their individual characteristics (e.g. skill and gender), the type of trade policy change (e.g. increased import competition or export opportunities), and where they work (e.g. type of industry, firm, and whether in the formal or informal sector) (World Bank Group and World Trade Organization 2018).

One reason that poor people may not capture the full benefit from participation in international markets is that the goods they produce are subject to relatively high tariff and non-tariff trade barriers. Another is the capacity to develop an economy in a way that takes advantage of opportunities while leaving enough policy space for mitigating negative impacts. In the past, many countries in the Global North did this balancing through much more active state interventions in strategic sectors (in agri-food marketing boards, price controls, and different forms of protection). Only then were sectors perceived as vulnerable opened (in a limited way often still). With the WTO Agreement on Agriculture, in force since 1995, and the World Bank/IMFs Structural Adjustment Programmes (SAPs), which have been going on since 1980, these options have simply not been available to many developing countries (Winters *et al.* 2004; IATP 2021).

A study on the social footprints of international trade shows that a consumption perspective on social indicators helps to unravel trade-implicated inequality (Wiedmann and Lenzen 2018). It highlights not only international supply-chain connections between harmful production in social and environmental hotspots and consumption in affluent centres of wealth, but also that the general direction of the negative transboundary impacts of trade is from developed to developing countries (Wiedmann and Lenzen 2018). An example is based on research on EU trade arrangements with Honduras related to bananas. Findings show that trade consolidated production in the hands of few multinationals, indirectly excluding local SMEs which in turn increased inequalities and social exclusion (ARC2020, 2020).

Trade can diversify sources of food supply and contribute to economic resilience. It can also increase competition, favouring lower-cost producers. Both these changes (diversification, competition) tend to reduce food prices for consumers. Trade can enhance the diversity of national diets by increasing the availability of different types of foods and extend the number of days a year that products are available (HLPE 2017a).

4.3 Transboundary impacts or spillover effects

Transboundary impacts are expressed in and result from:

- the resources embedded in traded products;
- an increased orientation towards international markets which often means shifts in land use towards more capital and resource-intensive production systems.

Both kinds of impact are closely connected with

- the increasing geospatial separation of production and consumption;
- the question where most of the added value is made.

Spillover effects arise when one country's action produces consequences (either beneficial or negative) on another country that are not represented in market prices, and thus not internalised by the actions of both consumers and producers. Environmental and social spillovers relate to the utilisation of natural resources, pollution, and social impacts embodied in trade, while economic spillovers include international development finance, banking secrecy, unfair tax competition, corruption, and stolen assets. When negative and positive spillovers are neglected, it becomes impossible for any country to achieve the SDGs as spillovers from other nations counteract their efforts (SDSN/IEEP 2020).

SDSN/IEEP (2020) argue that the largest negative spillovers are related to trade of agricultural and forests products, such as meat and timber, and that the EU ought to halt demand for non-sustainable commodities while simultaneously avoiding negative impacts on smallholder farmers and local communities. To assist producer countries to shift towards sustainable supply chains, it is argued, coordination with other import markets, including China and the US, is needed. The analysis is in line with FFA (Forum for the Future of Agriculture 2021) that refers to the land use footprint of the global agricultural food system and its outsized impact on global sustainability.

Lenzen *et al.* (2013) analysed trade in virtual water as an important example of spillover effects. The main finding is that developed countries increasingly import water embodied in goods from the rest of the world to alleviate pressure on domestic water resources. As demand continues to increase and climate change threatens to alter hydrological cycles, water scarcity is becoming a growing problem.

The increasing geospatial separation of production and consumption, that has taken place parallel to international trade changes, has as one of its consequences an unprecedented increase in undesirable environmental and social impacts. The general direction of negative transboundary impacts is from developed to developing countries; as provided with evidence of an increase of health impacts in China from air pollution linked to export production for the United States. The relocation of production across countries counteracts national mitigation policies and may negate ostensible achievements in decoupling impacts from economic growth (Wiedmann and Lenzen 2018).

Sachs *et al.* (2020) analysed production-based as well as consumption-based emissions embodied in trade and consumption. Using tools such as multiregional input–output (MRIO) databases, combined with databases on environmental, biodiversity and social factors, transboundary impacts are estimated. Consumption-based accounting allows to incorporate the impacts generated by international transport. It also incorporates carbon leakages and attributes them to the countries that externalize CO2 emissions (or other types of impacts).

Transboundary impacts associated with global agri-food trade are especially evident in the context of deforestation. The EU consumption of commodities such as soy, palm oil, beef, rubber and cocoa causes the deforestation of some 72,900 km^2 annually (Giuntoli *et al.* 2010; Pendrill *et al.* 2019; Hoang and Kanemoto 2021). Deforestation embodied in EU27 consumption is almost entirely due to imports. An example is Côte d'Ivoire which has lost 90% of its forest since 1960, with very negative effects on climate and biodiversity and with highly fluctuating budgetary revenues (EU REDD/European Forest Institute 2020; Forum Nachhaltiger Kakao 2020).

Giuntoli *et al.* (2010), Pendrill *et al.* (2019) and Wedeux *et al.* (2021) see the expansion of agriculture in tropical regions as the biggest threat to forests and other natural ecosystems, leading to the conversion of around 5 million hectares of forests into agricultural land per year between 2005 and 2017. Because the agricultural commodities that drive tropical deforestation and ecosystem conversion are traded internationally, tackling the problem is not just the responsibility of producing countries, importing countries also need to act. The EU is the second largest importer of tropical deforestation and associated emissions. It caused more deforestation than any other country through its imports of agricultural commodities between 2005 and 2013, before being surpassed by China in 2014. Between 2005-2017, EU imports caused 3.5 million hectares of deforestation, emitting 1,807 million tonnes of CO2, which is equivalent to 40% of the EU's overall annual emissions.

Wedeux *et al.* (2021) also found that deforestation associated with the EU's imports fell steadily by around 40% between 2005 and 2017. The same authors estimate that in 2017 the EU was responsible for 16% of deforestation associated with international trade, totalling 203,000 hectares and 116 million tonnes of CO2. This puts it after China (24%) but ahead of India (9%), the USA (7%) and Japan (5%). Soy, palm oil and beef were the commodities with the largest embedded tropical deforestation imported into the EU, followed by wood products, cocoa and coffee. New deforestation was greatest for imports from Brazil, Indonesia, Argentina and Paraguay.

Finally, there is a question which tends to be often overlooked. When production shifts across boundaries, it also matters where in the new situation most of the added value is made. Already for decades the EU mainly imports bulk commodities at low costs, and exports higher-value processed foods, preparations and beverages. Examples are the conversion of cacao to chocolate, fruits to wine, or soy and oils to meat products (European Commission 2021b). It is telling too that WTO (2021b) refers to a strong resurgence of global economic activity in the first half

of 2021 that lifted merchandise trade above its pre-pandemic peak, while developing countries faced difficulties to regain market shares especially in value-added food products.

The increased orientation towards international markets, the related shifts in land use and in the distribution of value added will be some key questions in several case studies to be carried out in the current project.

4.4 Impacts of EU–Africa trade

Lenzen (2012), Alsamawi *et al.* (2014, 2017) and Wiedmann and Lenzen (2018) analyse the implications of international trade on labour in developing countries. The same authors provide footprints of those social accounts that have the highest impact on people's well-being (employment, income, working conditions, and inequality) and link data to international trade. The need for reporting on such indicators falls within the purview of corporate and national social responsibility (as part of the Triple Bottom Line reporting).

The impact of global food trade on food security is not always straightforward and is a subject of considerable debate (Clapp 2015; FAO 2018; FAO 2020a; OECD/FAO 2021b; Barrett 2021). While some see trade as enhancing opportunities for income generation (such as through the sale of cash crops) and thus increasing access to food (Lamy 2013), others critique the process of liberalization which they see as being less advantageous for smallholders in developing countries (de Schutter and Eva 2009; de Schutter 2013).

Most countries in sub-Saharan Africa have become net food importers over the last five decades (FAO 2018), raising concerns about their vulnerability arising from reliance on global markets for foodstuffs (Rakotoarisoa *et al.* 2012).

There are also debates about the impacts of trade on ecological load, with some arguing that it better distributes the ecological impacts of food production (especially for ecologically stressed food importing countries) and others expressing concern that this over-stresses ecosystems in some exporting areas (Lamy 2013; Clapp 2016; HLPE 2020; Balogh and Jámbor 2020a).

As exemplified for fish and seafood (Williams *et al.* 2014), international trade can put relatively richer consumers in different parts of the world in competition with relatively poorer consumers. The latter may find their local foods to be suddenly in demand – or that their resources are in demand for export food products instead of traditional food products. Both effects can lead to increased prices for specific foods (HLPE 2017a) and impact on local food cultures and food sovereignty.

FAO (2020b) argues that a redoubling of efforts to include smallholder farmers in modern food value chains is needed to secure rural incomes and food security in both rural and urban areas. Smallholder farmers, in particular those in the Global South, face many challenges that can undermine their attempts to farm and market their products effectively. Data from (IFAD 2013; IFAD 2016) underline that more than 80% of the world's smallholder family farmers operate in local and domestic markets which is why it is important to distinguish local, domestic and

territorial markets on the one hand and international trade on the other hand. Smallholder farmers produce feeds poor rural and urban people, especially in countries with large populations vulnerable to food insecurity and malnourishment. Larger industrial farms predominate in export markets, which is more important for trade and gross domestic product.

The same authors caution that the market mechanism cannot guarantee the provision of a range of social and environmental benefits that are central to sustainable and resilient development. In some instances, markets may fail to reconcile the interests of individuals with those of the society as a whole, but also with the needs of future generations, which are embedded in the 2030 Agenda for Sustainable Development.

Some related questions that we ought to address in our case studies relate to the framing of formal agribusiness value-chains as dominant solutions for small-holders. For example, under which conditions is market integration a suitable one-size-fits-all approach? Different types of market, product types and proximity to consumers are some of the aspects to be considered (Kay 2016).

4.5 Export-commodity-dependency of developing economies

Most low-income countries worldwide are dependent on commodity exports. UNCTAD defines a country as export-commodity-dependent when more than 60% of its total merchandise exports are composed of commodities. High export-commodity dependency, however, can negatively affect a country's economic development (UNCTAD 2019; UNCTAD 2021).

The 2019 issue of the UNCTAD report State of Commodity Dependence (UNCTAD 2019) contains statistical profiles for 189 countries comprising 30 indicators aimed at describing the extent of each country's export and import commodity dependence, as well as key structural and socioeconomic variables that are related to the commodity dependence phenomenon, such as growth of gross domestic product (GDP) and per capita GDP levels, the Human Development Index, value added by sector of the economy and institutional quality index, among others. Some key findings for 2019 are:

- 'The number of commodity-dependent countries (CDDC) has increased over the past 20 years, and commodity dependence is almost exclusively a developing-country phenomenon.
- Two out of five commodity-dependent countries are in sub-Saharan Africa, and nine out of ten sub-Saharan African countries are commodity-dependent.
- Despite higher commodity dependence, some CDDC managed to expand their manufacturing exports. Some CDDC dependent on energy and mineral exports diversified their exports by boosting agriculture (Rwanda is an example). In other CDDC dependent on energy and mineral exports, the agricultural sector contracted, and export concentration increased (Chad is an example).

A related question that should be analysed concerns the interlinkages between energy and food systems, and the impacts of this on food security and nutrition. Oil exporting countries of the MENA region where the ability to cover the food import bill is highly dependent on global oil prices are an example. The related vulnerability is one main reason why many countries in the Gulf region are moving towards offshoring their agricultural production especially in East Africa following the 2007-08 food and energy price volatility (Katkhuda 2020).

The history of commodity booms and busts seems not to bode well for being reliant on singular commodities as an engine of growth, particular tropical commodities. Whether and under which conditions a high export dependency negatively affects a country, is a question that requires a more differentiated assessment.

5 Global goals and transitions

5.1 Relevant global goals

Following on the brief review of trends, drivers and the environmental, social and economic impacts of agri-food trade, we will now turn to the question how agri-food trade contributes (or not) to achieving the global sustainable development goals. We will ask which transformation processes can already be seen in food and trade systems and identify on this basis some key institutional and policy frameworks, as well as some questions for further analysis.

The Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change (UNFCCC) call for deep transformation. Agriculture and food systems, in particular, need to become more sustainable (FAO 2014; European Commission 2020a; European Commission 2021b,c; Crippa *et al.* 2021). Various foresight reports unpack food system challenges and propose diverse pathways of change towards sustainability (Candel and Pereira 2017; Baker *et al.* 2019; Zurek *et al.* 2021). Ingram and Zurek (2018), Cooper *et al.* (2019), HLPE (2019) and others emphasise that to understand the potential role of the agri-food system transformation in contributing to global sustainability, it is necessary to first, take a food system perspective that includes all activities from farm to fork, and second, acknowledge the cross-scale interactions borne out of trade and other processes.

The connection between global warming and agricultural policies is addressed in the *Koronivia Joint Work on Agriculture (KJWA)* launched by the UNFCCC. KJWA recognises the unique potential of agriculture in tackling climate change. With FAO as the lead agency for implementation, six interrelated topics on soils, use of crop nutrients, water, livestock, methods for assessing adaptation, and the socio-economic and food security dimensions of climate change have been discussed so far (Drieux *et al.* 2019). At the UNFCCC/COP26 in Glasgow, progress on a 'road map' for scaling up implementation of best practices, innovations and technologies towards resilience and sustainable agricultural systems remained elusive (UNFCCC 2021).

Sachs *et al.* (2020) emphasise that the human health, economic, environmental and social crises call for increased international collaboration and solidarity to support the most vulnerable countries. The same authors provide an integrated and holistic framework for action that reduces the complexity, yet encompasses the 17 SDGs, their 169 Targets and the Paris Agreement. Related to this, they provide a new approach to shift from incremental to transformational change; to identify synergies using sustainable development pathways; formulate actionable roadmaps; and focus on interrelationships to uncover multiple benefits and synergies.

With a new more sustainable growth model, as defined by the European Green Deal, a reformed trade policy strategy seems needed too aligned with the goal of achieving the UN Sustainable Development Goals (European Commission 2021a,d; Forum for the Future of Agriculture/FFA 2021). It follows that the future of international trade relations will need to embody not just the potential economic gains, but also take full account of the environmental, climate, and social consequences of any agreement. The renewed talks between the U.S. Department of Agriculture and the EU Directorate General for Agriculture and Rural Development regarding a mutual commitment to sustainable and climate-smart agricultural production are in line with this new policy direction (European Commission 2021e).

5.2 Resilience of agri-food systems

In the wake of the Covid pandemic, the importance of creating resilient food systems and ensuring food security have taken on a renewed importance, but food system actors are divided over how best to achieve this (Maye and Duncan 2017; Springmann et al. 2018; Moberg et al. 2021).

A resilient agri-food system (see Glossary) can withstand and recover from disruptions in a way that ensures a sufficient supply of acceptable and accessible food for all. The current global food system is in many respects neither sustainable nor resilient (European Commission 2017; HLPE 2017a; Ashkenazy *et al.* 2018; IPES-Food 2018; HLPE 2020; Rampa *et al.* 2020; Peer *et al.* 2020; FAO 2020a; IPES-Food & ETC Group 2021).

Sustainable food systems (see Glossary) ensure food security and nutrition for all in such a way that the economic, social and environmental bases to generate the food security and nutrition of future generations are not compromised (IFAD 2021). Food system resilience goes beyond sustainability in presenting the opportunity to eradicate weaknesses and build capacities in the food system while dealing with future uncertainty (Tendall *et al.* 2015; Nyström *et al.* 2019; Folke *et al.* 2021; Szczepański 2021).

Interestingly, in the response to the Covid crisis, some actors focus mainly on the resilience aspect, leading to the operations of global value chains as the central concern, while others focus on resilience and sustainability leading to demands for food system transformation (Blay *et al.* 2020; Darnhofer 2020; Gordon 2020; Gru and Brooks 2020).

The question of the resilience of agri-food systems is rapidly becoming more important as various slow but major shifts, such as climate change, freshwater availability and allocation issues, soil degradation, pest outbreaks, economic and political crises, conflict and population growth, are putting pressure on the global food system (Tendall *et al.* 2015). The same goes for overfishing and its dramatic impact on food systems resilience, especially marine ecosystems and communities dependent on fish and fisheries for food and livelihoods (FAO 2021a). Although global aggregate agricultural production is not projected to decline before 2050, suitable production zones will shift, annual yields will become more variable (Praveen *et al.* 2019), and price volatility of agricultural commodities will increase. Climate change is also projected to affect the agricultural and the fisheries sector, altering regional crop growing conditions and pest incidence. All these changes will affect cultivation patterns, international trade and regional markets (European Environment Agency/EEA 2021).

The importance of the resilience of agri-food systems is related to the very nature of agriculture. Agriculture is one of the sectors most vulnerable to climate change, it can contribute significantly to addressing it. At the same time, agriculture represents a key sector in international trade. Supplies of cocoa beans, palm oil and exotic fruit are likely to be particularly vulnerable, as these commodities are highly vulnerable to climate-related factors and their suppliers are highly concentrated in certain countries. Other commodities - both food and cash crops - stand out because of their highly concentrated trade (e.g. soybean, soybean oilcake, maize, fish meal) or their high level of vulnerability to climate change (e.g. rice, coffee, bananas). The former are more susceptible to short-term shocks (i.e. seasonal variability and harvest failure) and the latter to incremental climate change and shifting production areas (European Environment Agency/EEA 2021).

Climate change also affects trade by disrupting transport and distribution chains, trade infrastructure and routes (e.g. port facilities, as well as buildings, roads, railways, airports and bridges (Tamiotti *et al.* 2009).

Developing countries, and particularly the poorest and most marginalized populations within these countries, will generally be both the most adversely affected by the impacts of future climate change and the most vulnerable to its effects, because they are less able to adapt than developed countries and their populations (Tamiotti *et al.* 2009; Castells-Quintana *et al.* 2018). In addition, climate change risks compound the other challenges which are already faced by these countries, including tackling poverty, improving health care, increasing food security and improving access to sources of energy (Tamiotti *et al.* 2009).

Trade and target market diversification, through either trading with more countries or diversifying the import/export portfolio, could reduce the risk of supply disruptions (European Environment Agency/EEA 2021). Trade can, in theory, also dampen price volatility by buffering demand and supply across regions (Thompson and Tallard 2010; Liapis 2013; UNCTAD 2021).

The following extracts from ongoing discussions show that a more differentiated assessment is needed:

- Public stockholding linked to public food distribution systems has traditionally been used by several states to buffer against imbalances in demand and supply and against unpredictability. FAO (2021b) provide a critical assessment of public stockholding at non-market prices when it is in support of protectionist farm income policies.
- Trade liberalisation can mean an erosion or dismantling of public stockholding. See for example the debates about the future of public stockholding in Indonesia or India.
- Public stockholding has increased, and so have WTO debates on necessary rules changes. The related issues concern the spillover on domestic and regional food insecurity, as well as the negative impact on other risk hedging tools like insurance and futures trading.
- Friel *et al.* (2013, 2020) argue that pursuing food self-sufficiency by restricting international trade may actually be an ineffective way to increase domestic price stability and reduce food loss and food price volatility.
- To the extent that international trade reduces price volatility by increasing access to food in periods of domestic shortages and truncating the upper tail of the distribution of prices, liberalized trade regimes have the potential to significantly reducing food insecurity (Smith and Glauber 2020). In practice, it is likely also the nature of the food trade network that determines its resilience (Dolfing *et al.* 2019).
- Timmer (2014) underlines that in a world of greater instability, induced by climate change, new financial arrangements, and the pressures from new political voices, food security is likely to suffer. He concludes that the central policy goal in the short run must be coping with food price volatility and the increased frequency of food price spikes. To cope with the impact of high food prices, he continues, it will be necessary to use international trade in commodities as part of the provisioning mechanism. Related to this he points out that even for countries as large as Indonesia, India, and China, where a high degree of food self-sufficiency is required simply because of the limited size of world grain markets, some interaction with world markets can lower the costs of food security.

5.3 Transition pathways

Transition pathways towards more sustainable agri-food systems have been explored from many perspectives, accounting for the embeddedness of agri-food systems in complex ecological, economic and social processes (Jurgilevich *et al.* 2016; Gliessman 2016; HLPE 2017a; Maye and Duncan 2017; Schmidt-Traub *et al.* 2019; Rudloff 2020; Friel *et al.* 2020) within debates on multifunctionality and post-productivism (Hediger and Knickel 2009; Lamine *et al.* 2019), with a focus on ethics and food assistance as well as food security (Qaim 2017; el Bilali 2019; HLPE 2020), a focus on environmental sustainability (Altieri and Nicholls 2012; HLPE 2019; IPES-Food & ETC Group 2021), as well as a focus on technology and

innovation (Klerkx *et al.* 2017; Pigford *et al.* 2018; Gaitán-cremaschi *et al.* 2019; Herrero *et al.* 2019; Fanzo, Covic, *et al.* 2020).

Zurek *et al.* (2018) interrogate the framings and proposed pathways of eleven recent foresight (trend analysis, scenario planning) reports from a food system perspective. In the analysis, a food system lens is used, which recognizes drivers (social, economic, and environmental), actors and activities (i.e. the whole supply chain), and outcomes (e.g. food and nutrition security). Key drivers of food systems and their impact on food system outcomes are synthesized, trends and strategies identified, and the diversity of sustainability pathways and solution spaces discussed. One main conclusion is that there is general agreement that resource protection and adaptation balanced with significant greenhouse gas emission reductions are vital to food system transformation. At the same time, there is less consensus on the choice of change options and how to deal with potential tensions between different sustainability dimensions and address trade-offs. While focus tends to be on new technologies or consumption changes, more attention needs to be paid to overcoming blind spots like implications for equity or changes in governance mechanisms (Zurek *et al.* 2018), and, we like to add, the agency of food producers and consumers themselves (Kay 2016; Otto *et al.* 2020; Kok *et al.* 2021).

As highlighted by HLPE (2020) and Singh *et al.* (2021), transition pathways combine technical interventions, investments, and enabling policies and instruments – involving a variety of actors at different scales. Key barriers include power imbalances within the retail and input agri-food industry, as well as inappropriate market structures, which lead to unequal access to knowledge, resources and governance over the food and trade systems, and subsequent ecological, health and social impacts (IPES-Food 2016; Bernard and Lux 2016; Anderson *et al.* 2020).

Maggio *et al.* (2018) argue that international trade will be critical for ensuring food security for more than 9 billion people by 2050 (referring to scenario studies reviewed by Lattre-Gasquet and Treyer 2016). The same authors contrast scenarios for 2050 based on intensification of large-scale agro-industrial systems versus locally sourced food systems. The analysis highlights that food policies should be based on sustainable development criteria for both large-scale and small local systems. The Food and Land Use Coalition/FOLU (2019) expects that localized systems will allow for more self-sufficiency, resulting in less dependency on global trade processes and a more balanced relationship between Global South and Global North countries (Zurek *et al.* 2021). IAASTD (2008), Holt-Giménez (2012), Holt-Giménez and Altieri (2013) Glamann *et al.* (2017), Pretty (2018), Fischer *et al.* (2021) and others refer to the manifold advantages of a shift towards agro-ecological food systems (see Glossary). In particular, the IAASTD report – the outcome of a three year global consultative process involving over 400 scientists – argues that 'business as usual is not an option' and that a paradigm shift in favour of agro-ecological, multi-functional, and resilient agriculture is urgently needed to deal with the food and climate crises.

Others like Kay (2016), Blay-Palmer *et al.* (2021) and IPES-Food & ETC Group (2021) argue that regional or territorial approaches are advantageous in building

the foundational sustainability pillars of social, economic and environmental considerations into local contexts, as well as enabling inclusive participation and addressing place-based issues. Using a regional or territorial lens for food systems also considers soil and water quality, and biodiversity, allowing for a closed-loop approach to available resources.

Work on the role of interlinkages of markets and trade highlights the ambivalence of the role of trade in climate change adaptation (Tamiotti *et al.* 2009; Castells-Quintana *et al.* 2018; Sharma 2020). A changing climate will affect food availability, food access, food utilization and food security stability. If trade restrictions proliferate, double exposure to both a rapidly changing climate and volatile markets will likely jeopardise the food security of millions. Global trade can play a role in adapting to a changing climate. This potential will only be realized, however, with effective national institutions and international trade rules (Wheeler and Braun 2013; von Braun 2021).

Value chains have been identified as one important focus for analysis and policy intervention, also in terms of supporting food system transitions (Steiner 2017; Farmery *et al.* 2021; Moberg *et al.* 2021). At the same time it seems clear that changes within value chains that tend to be incremental are not sufficient as pathways. The role of value chains for example in addressing the different sustainability dimensions in a particular context needs to be reviewed. Particular attention in this review needs to be paid to diverse production and distributions systems, and the role of food chain actors and agency (HLPE 2020; Kok *et al.* 2021)

Overall, we observe a diversity of governance issues that are in the way of unlocking transition pathways toward higher levels of sustainability and food security (Galli *et al.* 2020; Conti *et al.* 2021). In particular in the case studies and in the analyses related to institutional frameworks attention needs to be paid to factors that are limiting and enabling necessary transition processes.

5.4 Private sector practices and civil society initiatives

A question that is closely related with transitions is the role of the public and private sector. Previous analyses (Lambin *et al.* 2018; Clever cities 2019; Forum for the Future of Agriculture/FFA 2021) found that many actors in the public and private sectors are seeking to go above and beyond minimum requirements set out in trade agreements and by national governments through self-regulation. Responsible supply chain management, contractually obligations for local suppliers as well as bespoke arrangements such as extra payments for environmental stewardship are becoming more and more common (Knickel and Maréchal 2018). Minkov *et al.* (2019) emphasise the necessary distinction of standards with self-regulation and publicly regulated standards (such as the PEF Product Environmental Footprint initiative of the EU).

Raising sustainability standards in European and global trade deals is a first step that needs to be accompanied with measures aimed at their enforcement, and this in turn needs to include measures against dumping and a shifting environmental and climate consequences across boundaries (Forum for the Future of Agriculture/FFA 2021).

Voluntary sustainability standards (VSSs) gained prominence after the Rio Conference in 1992 as they were viewed as a means to mobilize supply chain actors to address sustainability challenges in various commodity sectors (Voora 2021). VSS are grounded in multi-actor partnerships often made up of private sector, civil society, and non-government entities. They connect actors representing all parts of a supply chain. While VSSs are set up around common interests of the involved stakeholders, it seems logical to assume that they are not necessarily responding to public interest. Other issues relate to possible power inequalities inside multi-actor partnerships; the lack of participation of those marginalized (and therefore further marginalizing them); weak accountability and transparency mechanisms (Gereffi *et al.* 2005; Tijaja 2016; HLPE 2018).

Wedeux *et al.* (2021) found that private sector commitments are highly variable and patchy in their coverage among commodities and biomes. In 2018, 62% of EU imports of soy from South America were covered by an exporters zero-deforestation commitment or supply-side initiative, compared to just 19% of imports of South American beef in 2017. While some third-party certification schemes for palm oil, soy, cocoa, coffee and other commodities seek to prevent deforestation, market uptake is limited and uneven and results are inconclusive. In some cases, certification resulted in lower forest cover loss, but there is no evidence on whether voluntary standards have wider effects on deforestation outside the boundaries of certified areas. A narrow focus on deforestation ignores the problem of conversion in other ecosystems. The same authors contend that while tropical forests receive most attention, non-forest ecosystems such as grasslands, savannahs and wetlands too have extremely rich biodiversity and provide vital services to local people. Integrated approaches across regions and sectors are needed to prevent displacement or potential leakage into other ecosystems (Wedeux *et al.* 2021).

Fairtrade International *et al.* (2021) recognise the valuable role that national and international standards, including those in certification schemes, and other voluntary initiatives, can play in meeting sustainability goals. The same authors emphasise however that adherence to a standard by itself is not a substitute for an effective system of due diligence, which is why the position paper concludes with a call for the introduction of mandatory EU-wide due diligence legislation.

Lambin *et al.* (2018) come to similar conclusions based on the finding that recent private sector commitments aimed eliminating deforestation from a company's operations or supply chain fall short on several fronts: companies' pledges vary in the degree to which they include time-bound interventions with clear definitions and criteria to achieve verifiable outcomes. Zero-deforestation policies by companies may be insufficient to achieve broader impact on their own due to leakage, lack of transparency and traceability (including by subcontractors), selective adoption and smallholder marginalization.

The few examples presented above indicate that a more differentiated assessment is needed on the impact of VSSs in respect of the UN SDGs. The related analyses could feed into ongoing discussions on a UN treaty which seeks to increase accountability for corporations involved in human rights abuses (Binding Treaty.org 2021). Related to the above it seems also worthwhile to explore the role of innovative distribution and exchange models – such as solidarity economy initiatives

in de-consolidating mainstream supply chains (Kneafsey 2017; HLPE 2019; Anderson *et al.* 2020; Anderson 2020). A connected question is in how far 'buy local' consumer preferences and increased food safety standards shorten food supply chains and limit trade at the expense of developing country products.

6 Institutional and policy frameworks

6.1 Key political economy issues

The discussion on the interplay between public and private sector leads to the role of institutional and policy frameworks. Balancing economic gains with the possible negative externalities generated by increased economic activity remains one of the most difficult aspects of international trade. McKeon (2021) emphasises that the same applies to global food governance and the reconciliation of different interests.

Agriculture, tenure rights and land use are often at the heart of disputes. Recent examples are deforestation and wildfires in the Amazonian region, as well as current difficulties surrounding the full ratification of the EU-Mercosur trade agreement and public opposition to the deal (Forum for the Future of Agriculture/FFA 2021). The ratification of the EU-Mercosur trade agreement is facing reluctance from some EU countries, such as France and Austria, notably over concerns about the deforestation of the Amazon rainforest and the intensive agro-industrial model of Mercosur countries. Green groups warn that the implementation of this deal could lead to an increase in the EU's consumption of beef, soy, ethanol and other agricultural goods, further fuelling deforestation and human-rights violations of indigenous communities. A coalition of more than 450 CSOs call on the EU and Mercosur countries to withdraw the agreement (Hansen-Kuhn 2020; Sharma 2020; Sanchez Nicholas 2021b). Some MEPs argue the trade deal is not compatible with the Green Deal, while others warn that geopolitical competitors will engage with South American countries if the EU does not (Sanchez Nicholas 2021b).

Institutional mechanisms in place are often not delivering what is in the society's interest. Proposing that existing institutions must be stronger is not enough. Von Braun (2021) and McDermott *et al.* (2020) argue that especially at country levels, effective and more inclusive institutions to transform the food systems are needed. Von Braun (2021) highlights that at the global level the trade system lacks institutional strength, while rules and their enforcement on fairness, human rights and environmental effects in food value chains are only starting to be discussed (von Braun 2021).

IPES-Food (2017), Guttal (2021) and IPES-Food & ETC Group (2021) contend that corporate-led globalisation and the globalisation of corporate-dominated food supply chains is a major shortcoming in – and threat to – global food systems. They add that this has been accelerated together with the expansion of globalised trade, and free trade and investment agreements that benefit big corporations and wealthy countries that are home to these corporations. One aspect of this is that intellectual property rights tend to be legally protected by hard law in trade and

investment agreements, while human rights are not. The protection of human rights – despite international human rights agreements endorsed in the United Nations – has been relegated to soft law. The authors conclude that intellectual property rights usually benefit corporations, not peasants, fishers or Indigenous Peoples (see also the related discussions during CETA and TTIP negotiations).

Commitments like the 2030 Agenda of Sustainable Development are reflected in the EU's new trade policy strategy (IPES-Food 2017). The EU commits to taking measures to address deforestation, biodiversity, climate change and other environmental and human rights impacts of its consumption. Wedeux *et al.* (2021) emphasise that advances in supply chain transparency and traceability are to enable the identification of production locations, which can in turn improve our understanding of local drivers of deforestation and help design more effective responses.

A recent assessment shows how EU trade policy tries to strike a balance between helping EU farmers and food producers to realise opportunities abroad, while at the same time protecting some producers from increased imports (Ferrari *et al*. 2021). This characterisation is in line with (Häberli 2015) who emphasises that EU trade agreements not only provide new export opportunities for European farm and food products, they also preserve European market shares in local consumption through the 'Préférence Communautaire'.[5]

A more encompassing assessment would also need to consider that positive impacts have coincided with the disappearance of many small farms in the EU (EU lost 1/3 of farms <10ha between 2003 and 2013), a crisis of generational renewal and an ageing farming population across Europe. This in turn reflects the fact that trade has primarily benefitted the agro-industry and few larger farms (Rampa *et al.* 2020; de Schutter 2021). Probably for the same reason, trade, and Free Trade Agreements (FTAs) in particular, have become an increasingly contentious issue over the past few years.

The role of agri-food trade in supporting sustainability has also been called into question, with proponents arguing that agri-food trade can help strengthen sustainability goals, while others are critical of trading with nations with lower sustainability and welfare standards (Friel *et al.* 2020; Balogh and Jámbor 2020b). The EU-Mercosur trade deal which, after 20 years of negotiations, provides only limited EU agricultural market openings, the failed Transatlantic Trade and Investment Partnership (TTIP) between the EU and the US, and the EU-Canada Comprehensive Economic and Trade Agreement (CETA) are examples of this debate (Fortuna and Foote 2020). It is also important to note that, unlike WTO rules, no bilateral or regional trade agreement limits domestic trade-distorting subsidies.

An analysis of 12 FTAs concluded between the EU and Australia, Canada, Chile, Indonesia, Japan, Mercosur (Argentina, Brazil, Paraguay, and Uruguay), Mexico,

[5] Community preference was one of the founding principles of the European Union. It means that all member states are encouraged by the Institutions of the EU and the Treaties of the EU to give priority preference to all goods, trade, services, agricultural products and people from fellow EU member states. Its legal basis, Article 44 of the Treaty of Rome, was repealed by the 1997 Amsterdam Treaty.

Malaysia, New Zealand, the Philippines, Thailand, and Vietnam (Ferrari *et al.* 2021) provides useful insights.[6] It includes agreements with countries where the EU has strong agricultural export interests as well as agreements with trade partners which could significantly increase their agricultural exports to the EU. The study estimates a significant increase in trade partners' share in the EU market and additional EU exports mainly to Japan, Mercosur, Thailand, and Vietnam.

IATP has produced a set of factsheets on the potential impacts of the EU-Mercosur trade agreement if it was ratified (Hansen-Kuhn 2020):

- Incentivizing socially and environmentally destructive land use change, edging the Amazon closer towards its tipping point and facilitating further destruction to sensitive and hugely important ecosystems in the Gran Chaco and the Cerrado;
- Increase in greenhouse gas emissions through expanded trade of beef and other agricultural commodities, undermining climate goals in both regions.
- Failure to ensure supply chain traceability and sustainability standards, effectively empowering agribusinesses in both regions to expand business as usual.

Parts of civil society and the agricultural sector criticise not only CETA and TTIP but also the EU-Mercosur trade agreement. Key issues are compliance with the Paris Agreement and with European sanitary and phytosanitary standards, the need to reduce deforestation, the potential lowering of food quality standards and negative impacts on the environment. Farmers, supported by agricultural unions and environmental associations, fear overproduction and dumping prices (Hansen-Kuhn 2020; IATP 2021; McKeon 2021).

Positions regarding CETA and TTIP vary significantly across EU member states (Fortuna and Foote 2020):

- Dutch farmer and dairy lobbies contested that both deals would lead to unfair competition with trade partners for their lack of the same standards in animal welfare, labour law and sustainability. Dutch farmers are particularly concerned with meat and sugar imports from South America.
- The Finnish government has a forward-thinking attitude when it comes to agri-food trade, advocating modernisation and trade deals benefiting exports. Also Italy holds a positive attitude to open trade as it is basically a commodity-importing and end products-exporting country. An Italian priority in any trade agreement under negotiation is the protection of the country's food specialties under the EU label of PDO (protected designation of origin) and PGI (protected geographical indication).
- Spain tends to be positive about trade while having concerns about specific chapters included in some trade agreements, including areas such as plant health, animal welfare, the use of phytosanitary products, and labour conditions of farmers and workers in the agri-food and agricultural sector, particularly in third countries. Many Spanish agricultural organisations and

[6] It should be noted that some of these agreements have not yet been concluded, only reached in principle (e.g. with Mercosur) or are still being negotiated (e.g. with Australia, New Zealand).

agri-food cooperatives have stressed that the Mercosur trade pact should guarantee reciprocity and fair conditions for competition between the two blocs.

- The Confederation of Portuguese Farmers (CAP) believes that trade and globalisation are fundamental, but that there must also be a robust trade policy to maximise the productive potential of the EU and providing business support. Farmers also argue that imports under trade agreements must not undermine European quality standards or represent unfair competition, adding that there needs to be a balance in terms of environmental ambition by avoiding a gap between European and non-European standards.
- A typical Greek struggle of both government and producer associations is to include PDO (Protected Designation of Origin) products in trade agreements, with an emphasis on feta cheese, Greek yoghurt, wine and spirits such as ouzo, olive oil and olives and other individual local products that have found markets for large exports.
- For Hungary the most sensitive issues in FTA negotiations, are sunflower (21.5% of EU production in 2018), corn (11.5%), poultry (4.4%), rape (4.3%), wheat, (3.5%). Hungary sees Ukraine as a serious competitor in the wheat market since the Deep and Comprehensive Free Trade Area (DCFTA) between the EU and Ukraine was signed in 2014, and always keeps an eye on its eastern neighbour. Hungary is not a fan of the Mercosur deal either. This is mostly on account of pork and poultry farmers, beekeepers, sweet corn producers, as well as ethanol and biofuel producers.
- Romania has a high workforce in agriculture and, at the same time, a significant and widening deficit from agri-food trade, reaching more than €1.2 billion in 2019. Romania is one of the largest grain exporters in the EU and one of the largest sellers of tobacco products. On the other hand, it imports large quantities of meat. Its officials refer to the need to move from cereal exports to the production of higher added-value products.

In consideration of the above, we conclude that our analyses related to food system governance will need to contribute to filling major gaps summarised well by the UN Special Rapporteur on the Right to Food (UN, 2020):

- trade policy has primarily focussed on economic frameworks and has paid insufficient attention to marginalized peoples human rights concerns;
- human rights policy has provided a powerful socio-political critique of trade but does not offer an institutional alternative to the existing regime;
- neither approach has adequately responded to climate change.

6.2 Interlinkages with the Common Agricultural Policy CAP)

An uneven landscape of national agricultural production and trade policies, such as subsidies, tariffs and quotas that can distort trade, complicates the picture. In the absence of binding good agricultural practice standards, and multilateral trade rules, states can subsidize domestic food production, while poor countries are less able to do so (HLPE 2020). A noteworthy analysis clearly showing the need for redirecting the massive supports to an unfair and unsustainable model comes from (FAO 2021c). The report highlights the distorting nature of the current support as

well as the strong influence agricultural policy has on trade and on local production practices.

Sustainable and resilient food systems that can deliver sufficient healthy foods, support livelihoods, protect environmental ecosystems, and contribute to social equity are key to deliver SDGs 1, 2, 3, 8, 12, 13 and 15. It has been argued that the EU, through it trade policies, can encourage sustainable and resilient food systems, subject to the following principles (Dekeyser *et al.* 2020):

- Policy coherence for sustainable food systems and sustainable development;
- Gradual implementation of new and innovative approaches of trade policy;
- Inclusive multi-stakeholder processes in line with the commitments of the Farm to Fork Strategy;
- Setting sustainability as an explicit goal.

The green architecture for the post-2020 Common Agricultural Policy (CAP) will include novel eco-schemes and biodiversity indicators (Buckley *et al.* 2020). Wanat and Galindo (2021) describe the most recent reform as a compromise that aims to balance the interests of farmers and national governments on one side and the green ambition of the European Commission and some members of the European Parliament on the other. To assess whether and in what ways the reformed CAP will foster more sustainable agri-food systems, and what its impact on agricultural trade and transboundary trade impacts will be, requires a more profound analysis. In view of a €270 billion budget to be spent until 2027 this analysis seems more than needed. That the EU is not alone is underlined by OECD 2020): The latest edition of the OECD's annual Agricultural Policy Monitoring and Evaluation report shows that the support policies implemented by the 54 countries studied – all OECD and EU countries, plus 12 key emerging economies – provided on average EUR 469 billion per year of direct support to farmers from 2017 to 2019. Half of this support came from policies that kept domestic prices above international levels.

6.3 Challenges related to policy coherence

Generally, governments play an important role in generating incentives and threat of sanctions for sustainable production and trade, creating and maintaining key infrastructure (for information sharing and law enforcement, for example), and in implementing measures and safeguards to avoid perverse effects on small or poor producers. Lambin *et al.* (2018) emphasise that public and private (environmental) policies need to complement and reinforce each other rather than fragment efforts.

In the Marrakesh Agreement Establishing the WTO, members highlighted the need to ensure that market opening goes hand in hand with environmental and social objectives. In the Doha Round, members went further in their pledge to pursue a sustainable development path by launching the so-called Development Round, the first multilateral trade negotiations round in which environmental issues featured

explicitly. One issue that remains unclear is the relationship between the WTO and multilateral environmental agreements (MEAs), such as the UNFCCC (Tamiotti *et al.* 2009; Breitmeier *et al.* 2020). Of equal importance is the development impact of WTO rules and disciplines, especially for agricultural trade – a topic still hotly debated 26 years after the adoption of these rules (Desta 2016; Häberli 2016).

Related to agri-food trade, there is a natural tension between, on the one hand, trade policies strengthening the EU's partnership with enlargement and with developing countries, and, on the other hand, protecting European food production through a policy of 'préférence communautaire', while ensuring European food security with sustainable domestic farming (Häberli, 2015).

Some authors such as Sharma (2020) and Follador *et al.* (2019) criticize that the EU promises next-generation Farm-to-Fork policies and stricter pesticide regulations domestically, while it at the same time supports agreements like the one with Mercosur that condone the more permissive environmental and health policies of its trading partners. The same authors argue that this double standard could further expose vulnerable populations and the environment to toxic chemicals and undermine the movement toward more sustainable agriculture in both the EU and the Mercosur countries.

The International Panel of Experts on Sustainable Food Systems (IPES-Food) and others demand an EU Common Food Policy that would strengthen EU food policy coherence. Wunder (2021) finds there still is a lack of food policies that integrate perspectives from all relevant policy fields (increasing synergies and reducing trade-offs), and that linkages between production and consumption as well as interconnections along the value chain. The author criticizes that present food policies dominate which follow a siloed approach between health, agriculture, environment and climate protection, trade, development, education and rural development. That the inclusion of different perspectives through multi-actor, cross-sectoral and multi-level governance mechanisms can create a coherent policy framework is underlined by Candel and Pereira (2017), and Biesbroek and Candel (2020). Wunder (2021) demands to phase out harmful subsidies and to redirect subsidies and incentives towards healthy and sustainable food systems, as well as making trade policies coherent with overarching food system objectives.

6.4 Relevant mechanisms and instruments

Governments, civil society, scientific research, and business are the key actors in agri-food system transformation (Maddox 2019). HLPE (2020) identifies 'agency' as an important additional dimension in their global narrative report.

Regulatory coherence and private standards for operators along the food value chain can support the transition to a more sustainable, climate-friendly agriculture (Larrea et al 2021).

Sustainable production and consumption can also be encouraged through bilateral trade agreements for example by:

- Including the promotion of sustainable food systems as an explicit goal of the EU FTAs;
- strengthening the participation of stakeholders in negotiations to better ensure that the sustainably concerns of different stakeholders are addressed;
- providing adequate support for FTA implementation, including building capacity for smallholder farmers and SMEs to achieve sustainability standards (Dekeyser *et al.* 2020).

Hepburn (2021) requests governments to take a forward-looking approach to policy making and trade rules. The same author criticises that existing trade policy frameworks do relatively little to reign in measures that harm producers and consumers in other countries. Shortcomings in three critical areas have been identified: food export restrictions, high tariffs for key farm goods, and harmful agricultural subsidies. In addition, a special safeguard mechanism should be established that helps producers in low-income countries cope with sudden price depressions.

The European Commission (2021a,d) cautions that measures that restrict trade could cut developing countries off from global value chains. It demands a trade policy that provides a stable, rules-based trading framework, opening new markets to diversify sources of supply, and developing cooperative frameworks for fair and equitable access to critical supplies. In this context, the EU pursues with partners a trade and health initiative in the WTO. Enhancing the resilience of supply chains also goes together with the EU's objective of making supply chains more sustainable, in particular by promoting sustainability standards across global value chains.

Tamiotti *et al.* (2009) suggest that the reduction of tariffs in climate-friendly goods and technologies could be very effective. First, reduction or elimination of import tariffs and non-tariff barriers in these types of products should reduce their price and therefore facilitate their deployment. Second, liberalization of trade in climate-friendly goods could provide incentives and domestic expertise for producers to expand the production and export of these goods (Tamiotti *et al.*2009; Jensen, 2020). A concrete step toward such liberalization and harmonization efforts are the EU's PEF initiative (EC, 2020) and carbon border tax adjustments. Jensen (2020) explores (i) how a shift to low carbon transportation may affect LDC exports given their remote location from main markets; (ii) how LDCs exports will be influenced by their own domestic climate measures; (iii) whether mitigation instruments introduced by other governments that result in carbon border tax adjustments will significantly affect LDC exports; (iv) the importance of the nature of liberalization of trade in green goods; (v) how government sustainability standards in overseas market may affect trade, and finally (vi) the potential impact of private measures used by businesses for carbon management.

IPES-Food (2017) calls for the building of a new anti-trust environment that is accompanied by measures to fundamentally address the root causes of consolida-

tion. The same authors suggest that a collaborative assessment of agri-food consolidation and a UN Treaty on Competition are required to deliver transnational oversight of mega-mergers.

Wiedmann and Lenzen (2018) argue that a comprehensive implementation of the UN SDGs requires the inclusion of footprint indicators to avoid loopholes in national sustainability assessments. Initiated by the Sustainable Consumption and Production Action Plan, the EU Commission is following suit with the forthcoming harmonization and regulation of the PEF (Product Environmental Footprint), which promises to put footprint indicators into labelling practice, thereby potentially affecting agricultural trade flows.

Sachs *et al.* (2020) argue that, in addition to a production-based accounting that emphasizes the principle of product liability (which makes producers responsible for the quality and safety of their products), a consumption-based accounting is needed that emphasizes the responsibility of consumers. The same authors argue that a fair rules-based international trade system with preferential treatment for the least developed countries (LDCs) would support economic development in rich and poor countries alike.

6.5 EU trade policy

The 2019 Lancet Commission identified trade as an important consideration in improving nutrition and the sustainability of food systems (Willett *et al.* 2019; Thow and Nisbett 2019). To ensure coherence with development objectives, the EU must avoid undermining efforts to promote domestic food production in developing countries (Thow and Nisbett 2019).

The new EU Trade Policy (European Commission 2021a) focusses on six areas that are seen as critical to achieving the EU's objectives for an open, sustainable and assertive trade policy (Figure 1).

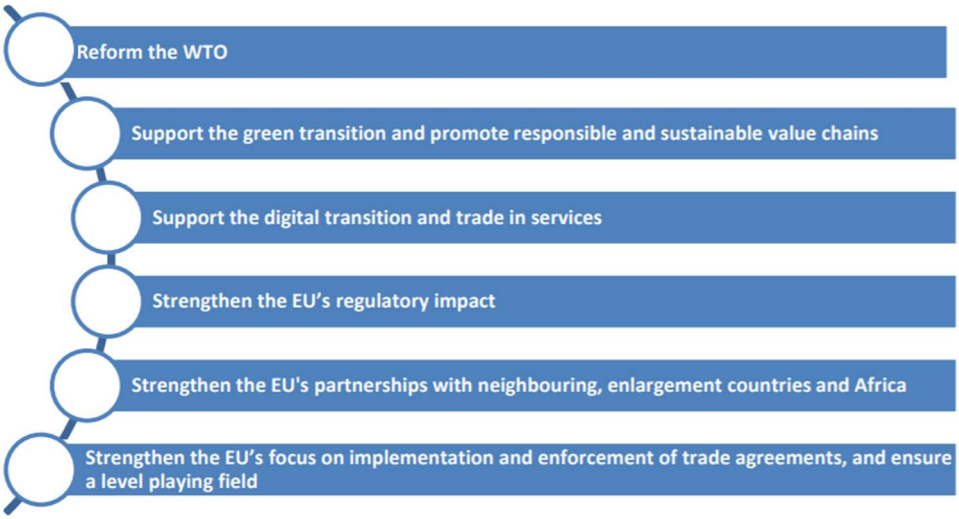


Figure 1: Six areas that are critical to achieving the EU's objectives (Source: European Commission, 2021a)

Closely related, the EU wants to push for a strong environmental agenda at the WTO, with initiatives that include the liberalisation of trade in selected green goods and services, the greening of aid-for-trade, or agreements to reduce fossil fuel subsidies. Other initiatives are making due diligence rules mandatory to tackle forced labour and environmental harm in the value chains of EU companies, as well as rules to avoid distortions of competition due to state intervention (Sánchez Nicolás, 2021b).

Fair Trade Advocacy Office/FTAO (2021) welcomes the EU's commitment to promote value chains that are circular, responsible and sustainable. The same authors applaud the respect of the Paris Agreement becoming an essential element in all future trade agreements and the reference to the Sustainable Corporate Governance Initiative.

Key deficits seen are the lack of concrete proposals to make this happen, and, more specifically the following (Fair Trade Advocacy Office/FTAO 2021):

- The strategy includes no single specific measure to ensure that trade works for small farmers and business models that put people and planet before short-term gains.
- It does not build on innovations introduced by the Trade for All Strategy of 2015, such as the Fair and Ethical Trade City Award.

Fair Trade Advocacy Office/FTAO (2021) further argues that the upcoming Commission legislative proposal should be shaped to ensure that it will eventually result in improved purchasing practices and prices that enable living incomes and wages for small farmers, artisans and workers in value chains. The 15-point Action plan on the effective implementation and enforcement of Trade and Sustainable Development Chapters in Trade Agreements plays a particularly important role in this respect.

As a part of its Green Deal, the EU Commission has proposed Carbon Border Adjustment Measures (CBAM) to avoid its own CO2 taxes being undermined by carbon leakage (Gros and Egenhofer 2011; Sakai and Barret 2016; European Commission 2021f). As pointed out by Matthews (2019), in sectors where climate policies include domestic emission taxation, some emissions-producing production is likely to shift to third countries with the laxer climate policy. It is expected that this instrument would allow the EU to protect Europe's economy against carbon-emitting competitors from outside the bloc. Current efforts are focussed on ensuring that a carbon border tax is compatible with the WTO rules and engaging with partners (Sanchez Nicholas 2021a). However, not only does sector-specific emissions reporting pose a challenge to many developing countries in implementing an EU carbon border tax (Eicke *et al.* 2021), leakage in terms of land use change and thus another displacement effect is likely to arise from such a tax if it is associated with production (Dumortier and Elobeid 2021). Dumortier and Elobeid (2021) project that changes in trade patterns because of a US carbon tax on agricultural production also result in a re-allocation of land-use in the rest of the world leading to a slight increase in global GHG emissions from land use change. Hence, the design of an EU carbon border tax needs to consider possible global tax adjustments (Matthews 2019).

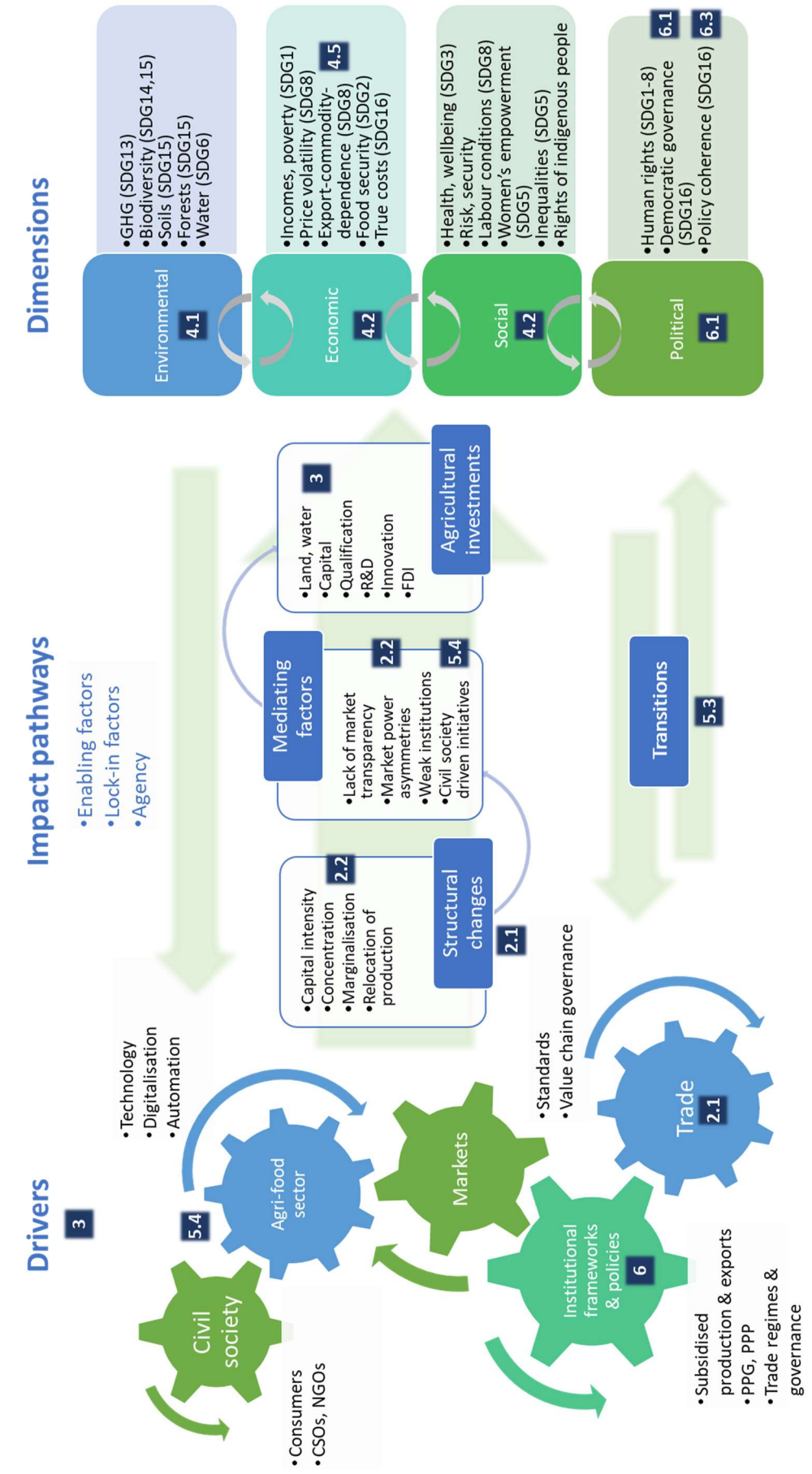
The example shows that EU trade policy cannot be seen in isolation. The competing visions between the EU (Green Deal) and US on global food security and the role of trade also point to this conclusion (Wax and Anderson 2021). The different views threaten to undercut the more fundamental aspiration to reverse global warming through cooperation on food systems, which are responsible for more than a third of greenhouse gas emissions. During its EU presidency in the first half of 2022, France will seek to legislate on restrictions on imports coming from countries that the EU sees as having inferior standards, including in relation to the use of agri-chemicals. Influential American farm lobbies also fear Farm to Fork could hurt their bottom lines by erecting new hurdles for their goods to enter the EU market, where they already face difficulties selling goods like meat across the Atlantic due to differing standards (Wax and Anderson 2021).

The European Commission (2021a) also wants the trade policy to promote responsible business conduct and greater transparency and traceability in supply chains. The forthcoming legislation on sustainable corporate governance as well as deforestation will be important milestones in this regard.

Particularly relevant for our analyses is the attention that future EU policy is to pay to trade relations with African countries (European Commission 2020b). As a long-term prospect reference is made to a continent-to-continent trade agreement based on the successful implementation of the African Continental Free Trade Area (AfCFTA) and building on Africa's regional economic communities and the economic partnership agreements with the EU.

7 A visual overview of interrelationships

The following figure provides a summary overview on the broad links between agricultural trade, markets, investments, environmental sustainability, and human rights. The numbers in the dark blue boxes refer to the corresponding sections in this discussion paper.


Drivers
3
Civil society
•Consumers
•CSOs, NGOs
Agri-food sector
5.4
•Technology
•Digitalisation
•Automation
Markets
Institutional frameworks & policies
6
•Subsidised production & exports
•PPG, PPP
•Trade regimes & governance
Trade
2.1
•Standards
•Value chain governance
Impact pathways
•Enabling factors
•Lock-in factors
•Agency
Structural changes
2.1
•Capital intensity
•Concentration
•Marginalisation
•Relocation of production
2.2
Mediating factors
•Lack of market transparency
•Market power asymmetries
•Weak institutions
2.2
•Civil society driven initiatives
5.4
Agricultural investments
•Land, water
•Capital
•Qualification
•R&D
•Innovation
•FDI
3
Transitions
5.3
Dimensions
Environmental
4.1
•GHG (SDG13)
•Biodiversity (SDG14,15)
•Soils (SDG15)
•Forests (SDG15)
•Water (SDG6)
Economic
4.2
•Incomes, poverty (SDG1)
•Price volatility (SDG8)
•Export-commodity-dependence (SDG8)
•Food security (SDG2)
•True costs (SDG16)
4.5
Social
4.2
•Health, wellbeing (SDG3)
•Risk, security
•Labour conditions (SDG8)
•Women's empowerment (SDG5)
•Inequalities (SDG5)
•Rights of indigenous people
Political
6.1
•Human rights (SDG1-8)
•Democratic governance (SDG16)
•Policy coherence (SDG16)
6.1
6.3

8 Glossary

Food system: Food systems are multifaceted and complex, incorporating a range of sociocultural, economic and environmental aspects (de Sousa, 2015). A food system includes all the aspects of feeding and nourishing people: growing, harvesting, packaging, processing, transporting, marketing and consuming food. It encompasses all the interactions between people and the natural world – land, water, the climate, etc. – and the natural world's effects on human health and nutrition. It also includes the inputs, institutions, infrastructure and services that support the functioning of all these aspects, as well as the role of diets and cultural practices in shaping outcomes (HLPE 2017a; Zurek *et al.* 2021). A food system can be described too based on how food moves, starting with soil, seeds and other production inputs through processing, distribution to markets onto people's plates and, finally, to recycling and waste. In more globalised food systems, these movements are regularly linear food chains with few connections between processes. In more localised regional or territorial agroecological systems, this movement of food and materials is more circular, and is often referred to as food flows (Blay-Palmer *et al.* 2021). FAO (2020d) defines 10 agroecological elements that are vital to sustainably transform the agriculture sector so it can be more climate-resilient and (HLPE 2019) gives 13 principles of agroecological systems.

Food chain: The food chain encompasses all activities that move food from production to consumption, including production, storage, distribution, processing, packaging, retailing and marketing. The decisions made by the many actors at any stage of this chain have implications for other stages. They influence the types of food available and accessible, as well as the way they are produced and consumed. Supply chains impact how foods are processed, distributed and marketed. They also impact diets and nutrition positively and negatively by creating entry and exit points for nutrition, affecting the nutritional value of the food produced (Beretta 2019). In the context of sustainability, often a distinction is made between supply chains (focus on flows of information and resources and risk management issues) and value chains (cradle to cradle perspective) (Steiner 2017; Beretta 2019). In this text, and for simplification, food supply and food value chain are used interchangeably.

Green finance: For the UN, green financing plays an important role in delivering several of its SDGs. Green finance is any structured financial activity – a product or service – that is being created to ensure a better environmental outcome. It includes an array of loans, debt mechanisms and investments that are used to encourage the development of green projects or minimize the impact on the climate of more regular projects, or a combination of both. One common green finance instrument is the green bond. The Green Bond market aims to enable and develop the key role that debt markets can play in funding projects that contribute to environmental sustainability. The Green Bond Principles (GBP) promote integrity in the Green Bond market through guidelines that recommend transparency, disclosure and reporting.

Green goods and services: Trade in green (or environmental) services is closely linked with trade in goods, since the provision of those services often relies on the use of related goods. For instance, wastewater management includes the removal, treatment and disposal of household, commercial and industrial sewage and other wastewater. The common feature of green goods and services is that they benefit the environment or conserve natural resources. The aim of eliminating trade barriers on environmental goods and services is to create a triple win for trade, the environment and development (Sinclair *et al.* 2017; WTO, 2021).

Resilient food system: Resilience is the ability to prepare for, withstand, and recover from a crisis or disruption (Nyström *et al*. 2019). Disruptions are either natural or man-made, and in the latter case they could often have been prevented or mitigated with sustainable practices. Resilience can in this sense be seen as a key marker of sustainability. A resilient food system can withstand and recover from disruptions in a way that ensures a sufficient supply of acceptable and accessible food for all. Resilience occurs at the multiple levels of the food system, from individuals to national food systems to global value chains (Tendall *et al.* 2015).

Sustainable food system: Food systems that ensure food security and nutrition for all in such a way that the economic, social and environmental bases to generate the food security and nutrition of future generations are not compromised. Sustainable food systems embody the following qualities: productive and prosperous; equitable and inclusive; respectful and empowering; resilient; support the six dimensions of food security (HLPE 8, 2014). In sustainable food systems, food protects ecosystems and biodiversity, respects human rights, ensures food security, and supports fair livelihoods, different cultures and traditional knowledge. In conventional, global food systems, economic considerations tend to have priority over social and environmental concerns, with an emphasis on efficiency, profit, processing, extraction and technology. Designing and planning for sustainable food systems happens best when processes are participatory and empowering for all citizens (Blay-Palmer *et al.* 2021).

Urban bias: The related theory posits that the development process in the Global South is systematically biased against the countryside and the bias is embedded in the political structure dominated by the urban groups (Ades and Glaeser 1995). Pugh (2016) contends that the idea of urban bias has had continuing relevance in macroeconomic and trade policies (especially in many developing countries) since the 1960s.

Vertical restructuring (or vertical integration): The incorporation of agricultural production in vertical food chains. Swinen (2007) refers to the combination of a demand for products of high quality and safety standards and the problems which farms face in supplying such products to processors and traders has led to the growth of vertical coordination in supply chains. Burch and Geoffrey (2007) emphasise that these chains tend to be controlled by transnational corporations and refer to the transformation from producer-driven to buyer-driven food chains. Typically more upstream players in the food system are exerting increasingly more control over the downstream (more production oriented) sectors. Closely related

is the buying up of farmland to hedge against price volatility while buying up farmland has become a more attractive investment opportunity in and of itself.

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