Leverage points for tackling unsustainable global value chains: market-based measures versus transformative alternatives

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Abstract

Tropical forests are rapidly disappearing due to the expansion of cash crops to meet demands from distant markets. Pressing concerns on deforestation impacts resulting from the global trade of tropical commodities have led some high-income countries' governments to consider diverse regulatory and trade levers to tackle the problem. These include proposals for new supply chain due diligence legislation concerning imports of forest-risk products and the inclusion of environmental measures in trade deals. To contribute to this debate, we conducted a comprehensive analysis of existing data on global trade and consumption patterns of tropical commodities, attribution of commodity production to deforestation, trade agreements, and progress in the implementation of crop sustainability standards. We used global data on key tropical commodities of oil palm, cocoa, and coffee. Our study shows that high-income countries have the highest per capita consumption for the three commodities evaluated and that consumption rates have dramatically increased in the last two decades. We discuss a range of measures that can potentially be required to tackle deforestation in global supply chains, which are currently being considered by policymakers, before discussing the kinds of post-growth, convivial approaches that are often excluded by the framing. Given the inherent expansionary nature of global market dynamics, we show that market-based initiatives are inadequate to tackle continuing deforestation and socio-ecological degradation. More transformative solutions amplify commoning and post-growth approaches are required to lead to some uncoupling of trade and territorializing of economic activity to fit within planetary boundaries and allow for plural values.

Keywords: consumption; planetary boundaries; post-growth; telecoupling; trade policy; tropical deforestation

1. Introduction

Tropical forests presently cover about 1.84 billion hectares and account for 45% of the tropical region (FAO 2020). These forests cover more land area than forests in other biomes (i.e., 11%, 16%, and 27% in subtropical, temperate, and boreal regions) (FAO 2020) and store the highest carbon density (Pan et al. 2013; Harris et al. 2021). They are vital in capturing carbon and serve as a natural buffer to climate change (Brinck et al. 2017; Mitchard 2018). They harbour high biological diversity and various endemic species and are important in maintaining ecosystem functions and services essential to support local livelihoods, food security, and human well-being in developing countries (Davis et al. 2020; Pillay et al. 2022). However, tropical forests have been subjected to rapid deforestation and forest degradation and escalated carbon emissions from land-use change in recent decades (Taubert et al. 2018; Brando et al. 2019; Hansen et al. 2020). About 60% of total forest losses were associated with the expansion of cropland, pasture, and industrial tree plantations (Pendrill et al. 2019). This expansion is driven by increased demand for tropical commodities such as oil palm, soybeans, cocoa, coffee, beef, and rubber from consumers in the international market (Hoang and Kanemoto 2021; Sun et al. 2022) and growing affluent populations in the commodities' producing countries (Munroe et al. 2019; Xiong et al. 2021).

High-income countries (HICs), including members of the Organisation for Economic Cooperation and Development (OECD), are recognized as among the leading international consumers of tropical deforestation embodied in trade (Pendrill et al. 2019). Between 2015 and 2017, the OECD HICs' imports of key forest-risk commodities were associated with an estimated total deforestation risk of 358,235 ha per year (equivalent to 3.08 ha per 10,000 people per year) (Pendrill et al. 2022). This is primarily due to limited production, overall high consumption rates per capita, and the presence of large food and feed industries in these countries (Bager and Lambin 2020; Fuchs et al. 2020). Besides OECD countries, Asian emerging economies such as China and India are also among the leading consumers of forest-risk commodities over the same period, although their trade-associated deforestation risk is significantly lower compared to the OECD HICs (i.e. 166,850 and 46,302 ha per year, or equivalent to 1.15 and 0.33 ha per 10,000 people per year) (Pendrill et al. 2022). Estimation of the extent of deforestation associated with crop production has so far been carried out using rudimentary data on the country or sub-national level crop production and forest cover change, raising uncertainties in their accuracy (Pendrill et al. 2019, 2022). Given the recent availability of spatiotemporally explicit data on the change in crop distribution in major producing countries, such as oil palm (Xu et al. 2020; Descals et al. 2021), soybeans (Song et al. 2021), and cocoa (Abu et al. 2021), there is room to evaluate more accurately the actual extent of deforestation attributed to the production of tropical crops.

Environmental provision has generally been lacking in trade policies (Brandi et al. 2020; Abman et al. 2021). The relationship between the environment and trade, and the legal and economic implications, have been much debated over the last thirty years, especially since the creation of the World Trade Organisation (WTO) in 1995 (Brack 2013; Bigdeli 2014). The relatively small number of WTO disputes involving policies aimed overtly at protecting the environment have been scrutinised extensively without generating consensus on any way forward (Brack 2013; WTO 2022a). However,

pressing concerns on deforestation risk embodied in tropical commodity imports, perpetuated by problems of global inequality (Sun et al. 2022), have recently led some HIC governments, including the EU and UK, to propose new legislation that mandates companies and businesses involved in forest-risk commodity imports to comply with the supply chain due diligence and reporting requirements (Environment Act 2021; European Commission 2021). These proposals marked the beginning of a formal legislative process aimed at reducing deforestation associated with trade (Brandi et al. 2020; Abman et al. 2021), although many details are yet to be addressed in the secondary regulations before they come into force by 2024.

One of the challenges in formulating secondary regulations in deforestation-free trade legislation is to devise an appropriate due diligence mechanism for each regulated crop without breaching the countries' commitment under existing international trade agreements. Sustainability standards are one of the relevant mechanisms that have long been discussed within the WTO. Sustainability standards seek to ensure that commodities are cultivated, sourced, and processed through a predefined set of sustainability threshold indicators, covering environmental and social dimensions. Private standards are not generally used in national-wide trade policy, i.e. in determining a country's levels of import or export duty, or regulatory requirements governing imports and exports. However, they have recently been used by the Switzerland authorities to verify compliance with the sustainability criteria included in the EFTA – Indonesia CEPA (European Free Trade Association – Indonesia Comprehensive Economic Partnership Agreement), thereby rendering compliant products eligible for reductions in import duty (Larrea et al. 2021; Limenta 2022).

Here we assess the potential route toward a more environmentally responsible trade of tropical crops drawing from existing data on global trade and consumption patterns of tropical commodities, attribution of commodity production to deforestation, incorporation of environmental elements in trade agreements, and progress in the implementation of crop sustainability standards. More specifically, we seek to answer four related research questions: (1) what is the current global trade of tropical commodities, and what are the commodity consumption patterns across countries with different development statuses? (2) how is the production of tropical crops associated with deforestation and how does the estimation of crop-induced deforestation vary by approach? (3) how have environmental clauses been incorporated into trade agreements and how robust are they in reflecting environmental goals? (4) what is the evidence of sustainability standards' effectiveness and impact? By addressing these questions and carrying out a comprehensive analysis of relevant data, we discuss potential leverage points pertaining to global trade which can potentially be enhanced to reduce environmental damage to the biodiverse tropical landscape and what additional measures or more transformative approaches might be required to achieve environmental goals with respect to tackling deforestation in supply chains.

2. Materials and methods

We analysed data on three key forest-risk commodities: oil palm, cocoa, and coffee. These commodities were chosen to represent various geographical foci (with differing socio-environmental conditions) and crop production models (large-scale plantations and small- and medium-scale farms). Oil palm is produced largely in tropical Asia (Indonesia and Malaysia) (Descals et al. 2021), cocoa in tropical Africa (Côte d'Ivoire and Ghana) (Abu et al. 2021), and coffee in tropical Latin America (Brazil and Colombia) (Ovalle-Rivera et al. 2015). Large-scale plantations are recognized as the primary actors in oil palm production and supply chain (Descals et al. 2021), whereas small- and medium-scale farms are prevalent in the cocoa and coffee sectors (Somarriba and López Sampson 2018; World Cocoa Foundation 2019). In the following subsections, we outline the approach and data used for analysing each of the four-pronged questions that we intend to address. Detailed methodologies are provided in the Supplementary Methods.

2.1. Global trade and consumption patterns of tropical crops

We used the UN Comtrade database (UN Statistics Division 2022) to estimate the annual quantity of imports and exports of oil palm, cocoa, and coffee for the period of 2011-2015 and 2016-2020. We focused on raw products, i.e. commodities in their raw form that undergo minimal processing. To give an estimate of the net demand for the production of a specific crop, the equivalent weight is used rather than the actual weight of the imported commodities recorded in the UN Comtrade database (see Table S1). For each crop, each country involved in the trade was classified based on their primary role as: (i) exporting country; (ii) trading country, and (iii) importing country. An exporting country is defined as a country whereby the quantities of commodity being exported far exceeds imports. A trading country is defined as a country whereby the quantities of commodities being exported account for more than 30% of the quantities being imported into the country, therefore a large proportion of the commodity undergoes limited processing and then is exported elsewhere (Jones et al. 2020; Verschuur et al. 2022) An importing country is defined as a country where the quantities of imports far exceed exports. We evaluated patterns of consumption or utilization of commodities across countries with differing economic statuses, i.e. high income (HICs), upper-middle income (UMICs), and low and lower-middle income countries (LMICs). Consumption rates per capita were estimated as the cumulative quantity of raw commodities imported and the quantity produced in that country subtracted by the quantity exported, divided by the country's population.

2.2. Deforestation risk attributed to crop production

Deforestation risks attributed to crop production were estimated using three approaches: (A) forest cover change datasets in combination with data on the spatio-temporally explicit crop expansion data; and (B) the latest spatial data on crop distribution; and (C) existing crude deforestation risks estimated from the sub-national data (Pendrill et al. 2022). The spatiotemporally explicit crop expansion data is considered to provide the most accurate direct attribution of the crop to deforestation, i.e., identification of forest

clearance that was immediately replaced by the crop (Song et al. 2021). The latest spatial data on crop distribution provides an indirect attribution of the crop to deforestation, i.e., identification of forest clearance that eventually led to crop cultivation; such data is therefore considered more accurate than the crude estimates.

For oil palm, we evaluated the deforestation risk in Indonesia and Malaysia. For cocoa we focussed on Côte d'Ivoire and Ghana, and for coffee on Brazil, Colombia, and Vietnam. Data types A, B, and C are available for oil palm; therefore, we used these three data types to generate and compare the embodied deforestation risk estimates. Data type A was unavailable for cocoa, so only data types B and C were used. For coffee, only data type C was available and therefore used in the analysis. We focused on the expansion of crops and deforestation occurring between 2011 and 2019, which reflects the period in which our different datasets overlap.

2.3. Trade agreements and the environmental sustainability elements

We collected data on trade agreements from the WTO RTA database (WTO 2022b) and focused on bilateral and multilateral (regional) trade agreements made between 1980 and 2022. For each trade agreement, we collected information on the RTA name, signatory countries, date of notification, date of entry into force, specific section(s) referencing the environment, environmental criteria relating to the traded products, and provision to withdraw trade preferences if the criteria are not met. The level of environmental commitments for each trade agreement was then assessed using an evaluative scale classified as very weak, weak, medium, and strong. These scales were generated based on four key criteria: (1) description of commitments to sustainable development and/or environmental protection; (2) specific chapter dedicated to the environment, forest-based products, and/or biodiversity; (3) review of the environmental impact of the trade agreement; and (4) measures and support to address environmental issues. The characterisation of each criterion into different scales is summarized in Table 1.

2.4. Sustainability certification schemes' implementation and evidence of impact

For each commodity, we carried out a systematic review of past empirical studies evaluating the impact of sustainability certification schemes. Impact evidence was evaluated on five dimensions: (i) deforestation, biodiversity, or wildlife; (ii) greenhouse gas (GHG) emissions or fire; (iii) management of water, soil, or waste; (iv) poverty, income, or food security; and (v) human rights, tenure security, and conflicts. For each study, we collected information on:

- the approach used to derive evidence, including: (i) case report or case-control study (either before-after or with-without), whether or not there was consideration of confounding factors, and (ii) rigorous quasi-experimental method, i.e. comparing treated and control before and after certification, and accounting for baseline conditions at the pre-treatment stage (Ferraro 2009; Sills et al. 2017);

- whether or not the study considers the spatial spillover effects of certification schemes to the broader landscapes (within and surrounding certified farms) (Heilmayr et al. 2020; Schleicher et al. 2020);
- the type of producer evaluated, including large-scale plantations, scheme smallholders (normally tied to plantations), or independent smallholders; and
- indicators of sustainability evaluated on the five, above-mentioned dimensions and summary of their impact: positive, neutral (no impact), or negative.

3. Results

3.1. What is the current global trade of tropical commodities and what are the commodity consumption patterns across countries with different development statuses?

3.1.1. Oil palm

Between 2016 and 2020, the largest exporting countries of raw oil palm were Indonesia, Malaysia, Colombia, and Guatemala (Fig. 1a). Indonesia and Malaysia exported 32.8 and 17.4 Mt per year, and Colombia and Guatemala exported 0.65 and 0.82 Mt per year, respectively. These countries are also the major producers of oil palm globally. The Netherlands was the major trading country importing 4.2 Mt per year of oil palm and 41.4% of these imports were then exported or distributed elsewhere. Middle-income Asian countries of India, China, and Pakistan, and high-income OECD countries of Germany, Spain, Italy, USA, and New Zealand were the largest importers of the commodity. Similar patterns of countries were obtained from 2011 to 2015 (Fig. S1a).

The consumption rates per capita of oil palm in each country (accounting for the country's import, export, and crop production quantities), based on the 2016-2020 datasets, systematically vary by country's economic status (Fig. 2a). HICs were the largest consumers of oil palm, with the median annual consumption rate of 4.44 kg per person. Comparatively, the median annual consumption of UMICs and LMICs were 3.54 and 2.96 kg per person, respectively. Consumption rates of New Zealand, the Netherlands, and Malaysia far exceeded other countries within the same economic status (Fig. 2a). New Zealand was estimated to consume 389 kg of oil palm per person per year, and the country's oil palm use had increased 126 times over the last two decades (Fig. S2a). New Zealand's oil palm consumption is primarily in the form of palm kernel meals to support the dairy and meat industries, which has grown rapidly in the last two decades (Stringer et al. 2016) and now accounts for 20% of the country's economy (Ballingall and Pambudi 2017). The Netherlands and Malaysia annually consume 141 and 158 kg of oil palm per person, on average, and consumption rates increased 3.6 and 1.7 times since the period of 1996-2000.

3.1.2. Cocoa

The largest exporting countries of cocoa between 2016 and 2020 were Côte d'Ivoire, Ghana, Indonesia, and Ecuador (Figs. 1b and S1b). Côte d'Ivoire exported nearly 2 Mt per year, whereas Ghana, Indonesia, and Ecuador exported 1.31, 0.97, and 0.33 Mt per year, respectively. EU countries of the Netherlands, Germany, France, and Spain, and Southeast Asian countries of Malaysia and Singapore are the major trading countries during this period. The Netherlands' imports of cocoa were 1.57 Mt per year and 47.5% of these imports were exported elsewhere. Germany's imports of cocoa were 1.33 Mt per year and 56.1% of these imports were exported elsewhere. High-income OECD countries of the USA, Belgium, UK, Italy, Canada, and Poland, and the middle-income country of Russia were the largest importers of the commodity. We obtained similar patterns from 2011 to 2015 (Fig. S1b).

The consumption rates per capita of cocoa in each country, based on the 2016-2020 data, markedly vary by country's economic status (Fig. 2b). HICs were the largest consumers of cocoa, with a median annual consumption rate of 1.06 kg per person. Comparatively, the median annual consumption of UMICs and LMICs were 0.23 and 0.02 kg per person, respectively. Cocoa consumption of high-income European countries of Belgium, the Netherlands, Switzerland, and Iceland far surpassed other countries (Fig. 2a). Belgium was estimated to consume 64 kg of cocoa per person annually, on average, and the country's cocoa consumption had increased 5.3 times since the period of 1996-2000 (Fig. S21b). The Netherlands and Switzerland annually consume 48 and 24 kg per person, and cocoa consumption increased by a factor of 27 and 3.9 since the 1996-2000 period. Belgium and Switzerland are well known for their major chocolate production, and the Netherlands is the largest trade hub of cocoa beans in Europe (Alberts and Cidell 2006; Garrone et al. 2016).

3.1.3. Coffee

Between 2016 and 2020, the largest exporting countries of coffee were Brazil, Vietnam, Colombia, Indonesia, and Honduras (Figs. 1c and S1c). Brazil and Vietnam exported nearly 1.86 and 1.47 Mt per year, whereas Colombia, Indonesia, and Honduras exported 0.71, 0.36, and 0.34 Mt per year respectively. Belgium was the largest trading country during this period, importing 0.3 Mt per year of coffee, and 62.9% of these imports were then exported elsewhere. High-income OECD countries of the USA, France, Germany, Italy, Canada, the UK, the Netherlands, Spain, Japan, and Austria were the largest importers of the commodity. Similar patterns were observed for the 2011-2015 period (Fig. S1c). Unlike oil palm and cocoa commodities whereby some countries play an important role as intermediaries or re-export hubs, coffee tends to be sourced directly from the producing countries (Figs. 1 and S1).

Data from the 2016-2020 period shows that HICs were the largest coffee consumers, with median consumption rates of 6.69 kg per person per year (Fig. 2c). The median consumption of UMICs and LMICs were significantly lower (0.97 and 0.01 kg per person per year, respectively). Coffee per capita consumption of high-income European countries of Luxembourg, Andorra, Iceland, Austria, Finland, Estonia, Norway, and France, and tropical tourist destination countries of Bermuda, Aruba, and Palau were far above other countries (Fig. 2c). Luxembourg and Andorra were estimated to annually consume 93 and 78 kg of coffee per person, on average, and the consumption rates had increased 77.5 and 3.8 times since the period of 1996-2000 (Fig. S2c). Iceland and Austria annually consume 47 and 35 kg of coffee per person, and consumption rates increased 2.5 and 5.9 times over the last two

decades. Tropical tourist countries of Bermuda and Palau annually consume 37 and 29 kg of coffee per person, and the consumption rates have increased tremendously by a factor of 184 and 294 in the last two decades.

3.2. How is the production of tropical crops associated with deforestation, and how does the estimation of crop-induced deforestation vary by approach?

For oil palm, deforestation risk attributed to the crop was estimated based on three approaches with decreasing order of accuracy: (i) direct attribution of the crop to deforestation (based on spatio-temporal distribution of the crop), (ii) indirect attribution of the crop to deforestation (based on current spatial distribution of the crop), and (iii) crude deforestation estimates (based on country level crop data; Pendrill et al. 2022). For Indonesia, deforestation risk estimates based on the direct attribution approach (330,102 ha per year) were higher than the indirect attribution (164,470 ha per year) but lower than the crude estimate (424,757 ha per year) (Fig. 3a). For Malaysia, the deforestation risk estimate based on the direct attribution approach (157,117 ha per year) was higher than the indirect attribution (79,190 ha per year) and the crude estimate (46,015 ha per year) (Fig. 3a). For cocoa, spatiotemporal explicit data are not available for the crop, deforestation risks were estimated based on indirect attribution and crude approaches. Similar to Malaysian oil palm, deforestation risks based on the indirect attribution approach for cocoa were higher than those based on the crude estimates (Fig. 3b). The deforestation risk associated with the development of cocoa in Cote d'Ivoire was 37,250 ha per year based on the indirect attribution approach, whereas the crude approach estimates deforestation of 14,541 ha per year. For Ghana, the indirect attribution approach estimated a deforestation risk of 18,837 ha per year, whereas the crude approach estimated zero deforestation. For coffee, a detailed distribution map derived from satellite images is not available, therefore deforestation risk can only be based on crude estimates. Based on this approach, the deforestation risk associated with the development of coffee in Colombia was 13,747 ha per year, and in Brazil and Vietnam, it was approximately 1,300 ha per year (Fig. 3c).

Direct attribution and indirect attribution methods generally yielded a higher deforestation risk than the crude estimation approach twofold (Fig. 3a for oil palm in Malaysia and Fig. 3b for cocoa in Côte d'Ivoire and Ghana). An exception to this is oil palm in Indonesia whereby the crude estimates were markedly higher than the direct attribution and indirect attribution methods (Fig. 3a). The underestimation of actual crop contribution to deforestation derived from the crude sub-country level datasets for Côte d'Ivoire and Ghanaian cocoa is likely due to the predominance of smallholders in the production of these crop in these countries (Somarriba and López Sampson 2018; World Cocoa Foundation 2019), which makes the attribution of the crops to deforestation difficult to be accurately captured from the sub-national administrative data. On the other hand, the overestimation of actual crop contribution to deforestation derived from the crude sub-national level datasets for Indonesian oil palm is likely due to the presence of multiple extractive industries (logging, timber plantations, and mining) in major oil palm producing areas in Indonesia (Abood et al. 2015; Gaveau et al. 2019), potentially overlooking the contribution of other sectors to deforestation in the sub-national data.

Although oil palm has the highest deforestation risk in terms of the absolute deforestation extent (in ha per year), the percentage of forest loss attributed to the crop is smaller compared to cocoa (Fig. 3d-e). Based on the indirect attribution method, oil palm is associated with 1.5% forest loss in Indonesia between 2011 and 2019 (given forest extent of 99.7 million ha in 2011) and 3.8% forest loss in Malaysia (forest extent of 18.9 million ha in 2011) (Fig. 3d). Comparatively based on the same method, cocoa is associated with 8.5% forest loss in Cote d'Ivoire (given forest extent of 4 million ha in 2011) and 2.1% forest loss in Ghana over the same period (forest extent of 8 million ha in 2011) (Fig. 3e).

3.3. How have environmental clauses been incorporated into trade agreements and how effective are they in achieving the environmental goals?

Trade agreements aim to boost investments and commercial ties between participating countries by reducing or eliminating certain barriers to trade, such as reducing tariffs on products imported to a country. Import tariffs of goods across different countries had drastically reduced from an average of 14% before 1995 to 5% prior to 2020 (World Bank 2022), allowing easy movement of materials and goods over distant places. However, sending and receiving goods from one place to another also has implications for the redistribution of environmental costs along the production chain, and these costs are often unaccounted for in trade (Meng et al. 2018; Chen et al. 2021). The RTA database shows that more regional and bilateral trade agreements are being made, especially in the last three decades (Fig. 4a). Before 1990 there were three trade agreements signed per year on average globally, but the number increased to 15 per year in the period of 1991-2022.

Of all 512 trade agreements signed between 1980 and 2022, 195 agreements contain environmental clauses or references to environmental protection and/or sustainability (Table S2). These environmental elements can be classified as: (i) **very weak**: these agreements contain only a brief reference to the environment or sustainable development; (ii) **weak**: these agreements contain more texts on a commitment to sustainable development and environment than the 'very weak' category, but still lack the detail of the reviewing processes; (iii) **medium**: these agreements include a more substantial review of the impact of the agreement on sustainability, including the role of public participation in the review; (iv) **strong**: these agreements include a set of environmental criteria for defining the sustainability of the traded goods (Table 1S3).

We classified 94 of the 195 agreements as 'very weak' in terms of environmental commitments, 79 as 'weak', 20 as 'medium', and two as 'strong'. The inclusion of environmental clauses in such agreements has become more common (Fig. 4b). After a decade since the period 2000–2009, 'weak' agreements displaced 'very weak' agreements as the most common category. 'Medium' and 'strong"' agreements increased from only 9.5% in the period of 2010-2019 to 28.9% only in the last few years. Of those agreements classified as 'medium' or 'strong' between 2000 and 2022 (a total of 22), the majority (18) featured the EU and/or the UK as a party and the remaining four included the US, EFTA (European Free Trade Association), and Nicaragua–Taiwan.

3.4. What is the evidence of sustainability standards' effectiveness and impact?

3.4.1. Geographical and certification scheme coverage of past evaluations

A total of 51 studies of sufficient quality were found that evaluate the impact of sustainability certification for oil palm (Table S3; Fig. 5a). The majority of studies were carried out on the voluntary certification scheme RSPO (Roundtable on Sustainable Oil palm) (40 studies), and the remaining were on the national certification ISPO (Indonesian Sustainable Oil palm) and MSPO (Malaysian Sustainable Oil palm). Of these 51 studies, 41 were conducted in Indonesia and Malaysia and 8 in other countries (Thailand, Colombia, Ecuador, and Ghana). There was no study on other voluntary certification schemes supposedly important for oil palm, such as ISCC+ (International Sustainability and Carbon Certification Plus) and RSB (Roundtable on Sustainable Biomaterials). This is probably because these schemes are not specific to oil palm, and they are widely applied to other commodities and biofuel production and supply chains.

A total of 25 studies were found for cocoa certification schemes, and they are mostly focused on Côte d'Ivoire and Ghana (Table S4; Fig. 5b). These studies were carried out on farms certified by Rainforest Alliance Sustainable Agriculture (RA-SA), UTZ, or Fairtrade Cocoa schemes. For coffee certification schemes, we found significantly more studies than in cocoa (47 studies) (Table S4; Fig. 5c). A total of 27 studies were from countries in Latin America, 17 from countries in Africa, and 3 from Asia. Studies were carried out on farms certified by RA-SA, UTZ, Fairtrade, or 4C (The Common Code for the Coffee Community) schemes.

3.4.2. Agriculture production models and sustainability indicators evaluated

For oil palm sustainability certification, the evaluation studies found vary by producer type, i.e., plantations (including scheme smallholders) and independent smallholders (Fig. 5a). A large proportion of studies from Indonesia and Malaysia were derived from company plantations (32 out of 51 in total) and 19 were from independent smallholders. This could reflect the fact that key oil palm players in this region are large producers (Varkkey et al. 2018; Santika et al. 2021). On the other hand, studies on cocoa and coffee certification were all carried out on independent smallholders (typically under cooperative schemes) and medium-scale farms (Fig. 5b-c). This could reflect the majority of agricultural production models for these two crops globally (Somarriba and López Sampson 2018; World Cocoa Foundation 2019).

In terms of the sustainability indicators, studies for the oil palm certification schemes evaluated a wide range of sustainability dimensions, including deforestation and biodiversity, GHG emission, water and soil management, poverty, and human rights and land tenure conflicts (Fig. 5a). Studies appraising human rights or land tenure outcomes, as well as GHG emissions or fire, are more common in oil palm compared to cocoa and coffee (Fig. 5). The absence of human rights, land tenure, and conflicts appraisal for cocoa and coffee certification may be partly because the production model of these crops is dominated by small-scale or medium-scale holders (Somarriba and López Sampson 2018; World

Cocoa Foundation 2019). This is quite different than in many oil palm production contexts whereby large-scale plantations are key actors in major oil palm producing countries, and the countries' weak land tenure systems often allow large-scale land acquisitions to occur leading to long-standing conflicts between agroindustry and local communities (Castellanos-Navarrete et al. 2021; Yang and He 2021), thus making land tenure topics especially relevant for the crop. Nonetheless, human rights issues especially regarding child labour (i.e., workloads and deprived opportunities for health and education development as defined by ILO) and trafficking are recognized as pervasive issues in oil palm (Pasaribu and Vanclay 2021), cocoa (Perkiss et al. 2021), and coffee (Bager and Lambin 2020), regardless of the crop production model. The lack of GHG emissions appraisal in cocoa and coffee is likely because cocoa and coffee are generally cultivated on mineral soil, unlike oil palm which has been extensively developed on peatland in the major producing countries of Indonesia and Malaysia (as part of government legacy in the utilisation of perceived "unproductive" land) (Dohong et al. 2017) and therefore making GHG emissions a highly relevant issue. Thus, the sustainability indicators covered by existing evaluations likely reflect specific challenges faced by each crop and the associated biophysical and socio-political contexts of the cultivated region.

3.4.3. Evidence of impact of sustainability certifications

Available evidence on the environmental and social impact of certification was largely drawn from case-report or case-control approaches (comparing before and after, or with and without intervention, whether or not they address confounding factors). Of the total 51 studies we evaluated for oil palm, only a third (16 studies) applied a rigorous counterfactual approach (Fig. 5a), and nearly all of these were conducted on RSPO-certified plantations. For cocoa, a third of the studies (8 of 25) applied a counterfactual approach (Fig. 5b). For coffee, the proportion of studies applying a counterfactual approach was higher than in cocoa (51%) (Fig. 5c).

The impact of sustainability certification for oil palm appears to be mixed across different dimensions of sustainability (Fig. 5). The environmental impact of certification (deforestation and biodiversity, GHG emission, and water and soil management) was neutral or negligible, but the social impact (poverty, human rights, and land tenure) tends to be negative. For cocoa and coffee, the impact of certification tends to be positive on the environmental sustainability indicators. Certification impact on poverty and income appears positive for cocoa, but mixed (positive and neutral) for coffee.

4. Discussion and conclusions

A range of policy levers exist to achieve a reduction in the consumption and demand of tropical commodities. A broad distinction can be drawn between reform-oriented policy levers which work through market-based mechanisms, and more transformative pathways (Acosta 2013; Martin et al. 2020). The likely effectiveness of different reform-oriented policy levers and the shift in political will required to achieve them vary. Broad normative economic proposals relating to degrowth in wealthy nations and enhanced sharing of wealth are put forward in ecological economics (Hickel 2020; Lenzen

et al. 2022). These include practical proposals, such as cutting advertising industries to tackle consumption (Niinimäki et al. 2020; Sina et al. 2022), banning high environmental impact industries that have little value to society (e.g. private jets, large mansions) (Lynch et al. 2019), and eliminating planned obsolescence (Satyro et al. 2018; Bisschop et al. 2022). Degrowth scholars argue, however, that for poorer nations, growth is still necessary (Hickel 2021). Convivial conservation proposals call for more radical levers (Büscher et al. 2022). Below we discuss some measures that fit within the deeper end of the reform-oriented spectrum and some that potentially could be classified as transformative in nature for tackling deforestation in supply chains, and more holistic visions of future pathways toward sustainability.

4.1. Reducing consumption of tropical commodities

Extractivism and neo-extractivism have longstanding roots in colonial and post-colonial development processes, in which tropical regions have been exploited for their natural resources and labour. Reformist proposals have focused on enhanced natural resources governance through conventional economic policies, which present environmental damage largely as a given (Acosta 2013). From this point of view, problems and conflicts that arise from extractivism can be solved with “proper governance” of how natural resources are used. The ways to achieve this are orthodox economic policies, such as increasing responsibilization and participation of civil society in the oversight of extractive industry projects, more social investment in the areas where extractivism takes place to reduce social protests, and transparent information about the income obtained by the extractive enterprises, local governments, and central government. Environmental destruction is accepted as the inevitable cost of achieving development. Development paths that are inherently based on natural resource exploitation have critical implications for politics, social relations, and territorial orders, although these vary depending upon the willingness, for example, of political elites to support rent redistributions (Burchardt and Dietz 2014).

The sustainability of land and raw material use is increasingly challenged by over-exploitation, an increase in high-consumption lifestyles, and the unwillingness to target rich asset-owners with taxes and to deliver land reforms that tackle land inequalities (Burchardt and Dietz 2014). The extraction of raw materials has high environmental impacts, but their monetary value is significantly lower than processed goods (Frey et al. 2018; Givens et al. 2019). In the global system where places have unequal economic positions perpetuated by colonial histories (Ziai 2016), centres of consumption allow the exchange of values of materials through trade while undermining the productive potential of places where the raw materials are extracted. The accumulation of these value exchange activities allows centres of consumption to further extract raw materials and low-cost labour from the producing areas (Mair et al. 2016) and shift the environmental and social burden to the latter (Essandoh et al. 2020; Chen et al. 2021), consequently widening the social and economic disparities between places along the supply route (Mossay and Tabuchi 2015; Backhouse et al. 2021). It also distances economic agencies from territorial actors (Bonnedahl et al. 2022).

The relationship between centres of consumption and producing areas can reflect the interconnection between high- and low/middle-income countries at the global scale under the current

market system (Cai et al. 2018; Duan et al. 2021), as well as urban and rural areas (Sethi and Puppim de Oliveira 2015; Zhang et al. 2018), and general public and elite wealth within countries (Mirza et al. 2019; Beckert 2022). As our analysis shows, per capita consumption of forest-risk commodities for oil palm, cocoa, and coffee generally follows the country's socioeconomic status; countries with higher income are associated with higher consumption rates overall than countries with lower economic status (Fig. 2). Similar conclusions found in other studies (Pendrill et al. 2019; Sun et al. 2022). Per capita consumption rates have increased over time for all country types, but they tend to race to the level where the highest consumption can be attained in a given period, in this case by HICs (Fig. S1). The level of consumption by HICs can influence other countries by providing legitimation to emulate a similar consumption trajectory, a behaviour analogue to the debate on historical greenhouse gas emission (GHG) expenditure (Wei et al. 2012; Jakob et al. 2021). Furthermore, HICs continue to make up the largest proportion of importing and trading countries in raw oil palm, cocoa, and coffee, whereas LMICs make up the largest proportion of exporting tropical countries (Fig. 1) where most of the environmental costs are incurred (Fig. 3) (Dupas et al. 2022).

Existing patterns of ever-growing consumption, deterioration of tropical environments driven by trade, and the widening of socioeconomic inequality will continue unless appropriate measures are implemented. HICs have the largest responsibility and capabilities to reduce their per capita consumption of forest-risk commodities (Tukker et al. 2020; Hickel et al. 2022). In the short term, one potential option to reduce the consumption of forest-risk raw commodities and their derivative products is to apply consumption taxes, whether they are produced domestically or imported (Afionis et al. 2017; Rocco et al. 2020). Raising commodity prices is likely not a popular approach for consumers, especially when the products have already been subjected to other taxes, such as the sugar tax on chocolate (Shahid and Bishop 2019). However, public acceptance may be higher if the revenue collected were recycled to support smallholder farmers and programmes in crop-producing countries to reduce environmental degradation due to crop cultivation. Several studies have shown that richer nations' consumers are willing to support activities linked to sustainable food production and consumption (Tait et al. 2016; Li and Kallas 2021). Alternatively, importing countries can apply import duties to forest-risk commodities and the revenue generated can be recycled to support producing countries' sustainable agricultural programs and environmental monitoring and mitigation. Some HICs may have already been obliged to set zero or limited tariff rates for certain commodities due to bilateral or multilateral trade agreements (e.g., EU imports of cocoa from most African countries receive zero tariff), increasing import duties would place them in violation of their commitment under the WTO. However, it may be unlikely that their exporting partners would initiate a dispute if they were receiving the revenue.

More ambitious transformative shifts in the food system and dietary behaviour towards more locally adapted food consumption patterns and minimizing food waste are also required to reduce consumption rates in HICs (Green et al. 2015; Alexander et al. 2016; Hickel 2020) and urban areas in countries of emerging economies (da Costa Louzada et al. 2018; He et al. 2018). Public procurement is another key tool for incentivising more sustainable production (Martin-Ortega and Treviño-Lozano 2023). There are also movements seeking to territorialize food and agricultural production as a whole, such as those supporting small-scale agriculture, agroecology principles, and reduced use of transgenic crops

(Chaifetz and Jagger 2014). Such movements could receive more support from governments, e.g. through grant funding for food hubs or commoning institutions, such as Chambers of the Commons and Commons Assemblies, alongside land reform processes, which would represent deeper leverage points in richer nations with potential multi-dimensional benefits (Srnicek and Williams 2015).

4.2. Strengthening sustainability criteria in trade and a process of reform of environmental policy and land governance, and supporting improvement in producer country's own certification system

Meeting certain environmental criteria can be used to render a reduction in import duties described above. In general, WTO regulations, including the Technical Barriers to Trade Agreement, require criteria to be expressed based on performance rather than descriptive characteristics. Trade preference given to 'sustainable oil palm', for example, is permissible, but specifying 'sustainable oil palm' as only those products certified by RSPO, or other voluntary schemes, would not. HICs' government applying the measure would need to draw up a list of criteria for each forest-risk commodity which any supplier could potentially meet regardless of its membership in a certification scheme. These criteria can be informed by those listed in the existing voluntary standards. The use of voluntary certification schemes solely for trade preference is highly problematic due to several reasons. First, the existence and coverage of certification schemes vary widely, and some forest-risk commodities are either not covered or not to a great extent (Tayleur et al. 2017; van der Ven et al. 2018). Second, different certification schemes can cover different sets of criteria with different strengths in verification and auditing, and unintended consequences of 'standards shopping' may occur among suppliers (Schmeichel 2017). Third, past evaluations of the social and environmental impacts of voluntary certification schemes tend to show mixed results which put into question their effectiveness (Fig. 5) (Oya et al. 2018; Meemken et al. 2021) and numerous complexities exist due to a mismatch in the implementation across different sectors and institutional levels (Lambin and Thorlakson 2018; Pacheco et al. 2020; Katic et al. 2023). Fourth, certification systems are often time-consuming and costly to introduce and implement and this can be particularly challenging for smallholder farmers (Dompreh et al. 2021; Watts et al. 2021).

Some voluntary standards organisations have made efforts to address the abovementioned issues, e.g. through the development of specific smallholder standards with the provision of support for audits and streamlined processes for group certification (Latynskiy and Berger 2017; Watts et al. 2021) and jurisdictional or landscape approaches to demonstrating compliance with criteria such as zero deforestation across a wider area than individual farms (Seymour et al. 2020; Watts et al. 2021). However, there seems to be little progress in certification for providing traceability systems and verifying compliance with criteria throughout the supply chain (Pacheco et al. 2020; Meemken et al. 2021). Additionally, low/middle-income country governments have often been unenthusiastic or unreceptive to voluntary standards, as these are often perceived to be Western-dominated systems imposed on commodity supply chains without considering the development priorities of the countries that produce the commodities (Schouten and Bitzer 2015; Tyson and Meganingtyas 2022). This sentiment also partly

lies behind the development of national schemes, such as ISPO and MSPO for oil palm (Astari and Lovett 2019; Choiruzzad et al. 2021).

Although the use of environmental criteria in trade is feasible, it should not be regarded as an ideal method in isolation, especially under the broader aim of life-enhancing economies. Trade agreements are not intrinsically well suited to pursuing socio-environmental outcomes, as they focus necessarily on the mutual removal of restrictions (such as import duties, quotas, and administrative requirements) rather than incentivising different modes of production, consumption, or investment, which is generally what environmental policy seeks to do (Gammage 2018; Kolcava et al. 2019; Bastiaens and Postnikov 2020). A combination of different forms of measures, including trade restrictions (e.g. discrimination in trade between products produced sustainably or unsustainably, either legally or illegally) coupled with a process of reform of environmental policy and land governance in the producing country partner, as well as a reward system for sustainably produced products in the consumer markets, all supported by capacity-building assistance from donor countries, is likely to be more effective than the current status quo. Where low/middle-income country governments have interest and can mobilize political will to achieve ambitious environmental goals, using trade restrictions could provide a valuable reinforcement, especially where the sustainability criteria can be met by certification or similar systems that have been developed by the producer country itself, rather than those of external voluntary sustainability standards. The provision of support from high-income consumer countries would be vital and could include assistance to improve the producer country's own certification system to ensure that it can credibly verify compliance with the criteria included in the agreement. In these circumstances, the inclusion of environmental criteria in trade agreements could play a valuable role. Nevertheless, regular and robust monitoring and evaluation will be required to assess both the direct and indirect impacts of these initiatives so that timely and adequate action can be taken to minimize the unintended effects (Sellare et al. 2022; Zhunusova et al. 2022).

4.3. Enhancing monitoring of crop environmental footprints through detailed spatiotemporal data

Efforts to monitor deforestation associated with commodity production have so far focussed on industrial-scale plantations (e.g. oil palm and soybean), and this is mainly due to their social and environmental consequences (Fehlenberg et al. 2017; Phélinas and Choumert 2017; Santika et al. 2019) and the ease of capturing large-scale land cover change from satellite images. The impact of crop expansion by small-scale farmers has received less attention, although there have been growing calls for more rigorous monitoring (Ashiagbor et al. 2022; Ramírez-Mejía et al. 2022; Zhao et al. 2022). Elevated demands for tropical crops from the global market can incentivise lucrative practices and maximisation of production in the short term, and this likely has an impact on the exacerbation of agricultural expansion by both large-scale and small-scale producers following numerous mechanisms and pathways. Studies from Indonesia indicate that large-scale plantations were the primary actor in the expansion of oil palm in remote forest lands in the early stage of oil palm development, however, following the establishment of oil palm mills in the new development areas the number of smallholders

began to grow at rapid rates emulating the earlier expansion patterns of the large-scale producers, creating an extremely complex supply chain network (Prabowo et al. 2017; Heilmayr et al. 2020; Santika et al. 2021). Studies from the coffee sector in Ghana and Côte d'Ivoire show that lack of agricultural input and management due to limited capital in smallholders poses challenges to poor soil fertility and high pest and disease pressures, and this aggravates the abandonment of farms that are no longer productive on the seeking of new fertile lands and forest areas for agriculture (Ameyaw et al. 2018; Ashiagbor et al. 2022).

Our study shows that the widely used approach based on rudimentary data on crop distribution at the national or sub-national level tends to underestimate the crop deforestation risk attributed to both large-scale plantations and smallholder farms (Fig. 3). Detailed spatiotemporal change in land cover derived from satellite images that enable the detection and differentiation between large-scale plantations and small-scale farms can offer more accurate monitoring (Bey et al. 2020; Xu et al. 2020). Coupled with the trade datasets, they can be used to inform environmental policy measures. Nonetheless, while revealing the impact of deforestation on global supply chains is key for all actors, the availability of more information and traceability should not distract from the aim to catalyse change in the basic features of capitalist relations towards identifying and pursuing more transformative leverage points.

4.4. Potential transformative leverage points in achieving socio-ecological goals in supply chains

Current work on transformative change levers seeks to identify leverage points as possible entry points to a system to make far-reaching changes (Meadows 1999). In food and agricultural systems, transformations are increasingly called for in policy circles, including tackling deforestation, but the primary question is how to achieve such shifts given the power inequalities and concentrations of wealth within agrifood systems (Dupas et al. 2022; Slater et al. 2022). Neoliberal economic globalisation has given rise to multi-national corporate power, expansion of global value chains, and polycentric trade patterns, rendering communities and national governments less power than before to hold multi-national companies to account (Sikor and Lund 2009; Clegg et al. 2018). Actors who hold such power are increasingly able to influence the rules governing the global economy in their interests, leading to a thinning of democracy and a shrinking of civic space (Standing 2018). A recent intergovernmental assessment from IPBES urgently calls for a moderation of market fundamentalism, privatisation, accumulation, and extraction, and amplification of solidarity and ethics of care (IPBES 2019)

Measures such as import duties, environmental due diligence, and sustainability standards may be easier for governments to contemplate in the short to medium term, but this is fundamentally because such measures are relatively unchallenging to incumbent actors and relations in the global political economy. Evidence of the impact of sustainability standards is mixed (Oya et al. 2018; Schleifer and Sun 2020; Garrett et al. 2021) and trade agreements are rarely the best option to achieve socio-environmental goals (Rodrik 2018; Kehoe et al. 2020), and to some extent, they can be seen as a distraction from more transformative approaches (Martin et al. 2020). Given the fundamental limitations

of market-based mechanisms, it is valuable to ask what a wider range of responses might entail that can facilitate meaningful transformative change to tackle deforestation and all other supply chain sustainability challenges, given that such challenges essentially share the same root cause.

Huge distances created between local dwellers in a landscape and those with control over it, by commodity trade relations, are problematic in terms of creating accountability and an ethics of care. Values, mindsets, attitudes, and feelings of connectedness to nature fundamentally shape the goals that determine land uses, and conversely, a sense of detachment has causally contributed to the deforestation affected by actors locally and extra-territorially (Brown et al. 2019; Bonnedahl et al. 2022). Uncoupling global value chains is needed to lessen the social and environmental costs (Akizu-Gardoki et al. 2018; Lenzen et al. 2022), although some trade will still be needed for food security reasons. Some commodities consumed in the Global North, such as horticultural crops, may be grown locally (López Cifuentes and Gugerell 2021; Li et al. 2022), while for other commodities, especially those with highly negative effects, there may be potential for substitutions (Green et al. 2015; Blay-Palmer et al. 2018). Understanding the potential pathways for uncoupling requires not only detailed scientific analyses of trade-offs, but also a broader exploration of potential value shifts and pathways to greater sustainability through post-growth scenarios (Hickel 2020; Lenzen et al. 2022).

There is a need to move beyond approaches that present sustainable supply chain issues, including deforestation, as fundamentally an issue relating to production zones, and instead, focus on the root causes of the problem. Attentiveness to different classes in society is needed, addressing their relative levels of responsibility and accountability for biodiversity losses, environmental degradation, and climate change (Büscher et al. 2022; Green and Healy 2022). Some actors have greater power in the broader structures of capitalist accumulation. Conservation initiatives not only need to give local people a central role as decision-makers in planning (Friedman et al. 2020; Carmenta et al. 2023), but also focus on behavioural change efforts to create greater democracy in larger structures of power which ultimately shape the success of local scale initiatives (Büscher et al. 2022; Corson and Campell 2023). Attention has been focused on sourcing localities for far too long, and ultimately this lens depoliticizes analytic diagnoses of sustainability challenges (Brockhaus et al. 2021; Kumeh and Ramcilovic-Suominen 2023). Refocusing attention on higher-scale concentrations of power and wealth and how to disrupt and overcome these is therefore key. This could be attained through radical policy prescriptions, such as debt cancellation for poorer nations that were colonised, taxing agro-commodity companies to internalise their social and environmental impacts, increased regulation, monitoring, and accountability of corporate impacts in deforestation-risk countries, as well as support for locally designed approaches which strengthen autonomy.

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We declare that we have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Tables

Table 1. Categories of regional trade agreements (RTA) made between 1980 and 2022 in terms of environmental elements and the characteristics of the associated clauses.

RTA category (and number issued to date)	**Broad characteristics of the environmental clauses**			
	Description of commitments to sustainable development and/or environmental protection	Specific chapter dedicated to the environment, forest-based products and/or biodiversity	Review of the environmental impact of the trade agreement	Measures and support to address environmental issues
Very weak (94 RTAs)	**Minor** *Most of these agreements contain only a brief reference to the environment or sustainable development. These agreements are limited to a minimal 'do no harm' approach, with many highlighting that environmental laws remain in the realm of national policy. Many include a general commitment to sustainable development, and a statement that it is inappropriate to relax environmental protections to attract investment or trade*.	**No** *None reference existing multilateral environmental agreements, and approximately half do not have a specific chapter dedicated to the environment. None contain specific sections on forest-based products or biodiversity.*	**No** *Most agreements include no review process for evaluating the environmental impacts of the trade agreement. Most of these agreements have minimum provisions for the right of each party to impose measures, if required, to protect animal and plant life and/or the right of each party to establish its own laws regarding the environment.*	**No** *The majority do not specify a particular environmental issue which should fall under protection or cooperation efforts.*
Weak (79 RTAs)	**Yes** *These agreements contain more text than the 'very weak' agreements on their commitments to sustainable development and/or environmental protection, as well as agreeing not to relax environmental protection to attract investment or trade. In addition, the agreements often reiterate their commitment to existing multilateral environmental agreements, and all include specific sections on the environment or trade*	**No** *Only some of the agreements contain specific sections on forest-based products and/or biodiversity, including commitments to combat illegal logging, promote sustainable forest management and take into account indigenous knowledge. They often also contain references to CITES (Convention on International Trade in Endangered Species), REDD+ (Reducing Emissions from Deforestation and forest Degradation), and the role of conservation, sustainable*	**No** *Most agreements do not include review process for evaluating the environmental impacts of the trade agreement. Those that do provide little meaningful or guaranteed public or civil society participation. Most agreements have minimum provisions for the right of each party to impose measures, if required, to protect animal and plant life and/or the right of each party to establish its own laws regarding the environment.*	**No** *Only some of the agreements mention specific areas for environmental cooperation. If they do, there is an absence of detail on how this would be achieved beyond cooperation through existing forums and general mentions of capacity.*

	and sustainable development.	*management of forests and enhancement of forest carbon stocks, but without going into any detail.*		
Medium (20 RTAs)	**Yes** *These agreements contain detail commitments to sustainable development and/or environmental protection, as well as agreeing not to relax environmental protection to attract investment or trade*.	**Yes** *These agreements contain specific chapters on the environment and/or trade and sustainable development, while most have multiple sections with an environmental focus*.	**Yes** *Most of these agreements include both a government and civil society review mechanism of trade impact with the explicit aim of going beyond the more traditional tariff cuts and liberalisation of trade in goods, including new elements of environmental and labour issues.*	**No** *Although most of the agreements include environmental impact review mechanism and committees, they do not include substantially more information on environmental issues and measures to address these than the agreements classified as 'weak'*.
Strong (2 RTAs)	**Yes** *These agreements contain detail commitments to sustainable development and/or environmental protection, as well as agreeing not to relax environmental protection to attract investment or trade*.	**Yes** *These agreements contain specific chapters on the environment and/or trade and sustainable development, and multiple sections with an environmental focus*.	**Yes** *These agreements include both a government and civil society review mechanism of trade impact concerning environmental, labour, and human rights issues. These agreements contain* a *clause on biodiversity, recognising the importance of respecting and preserving traditional knowledge and the practices of indigenous communities, and promoting public participation on matters concerning biodiversity.*	***Yes*** *These agreements contain a commitment not to fail to enforce environmental laws in ways that affect trade or investment between the parties. They contain procedures for each party to request consultations with the other regarding any matter arising under the environment chapter. They ensure transparency of domestic policies and measures pertaining to the traded products. There are cooperative measures to improve and strengthen government sustainability standards and policies where applicable.*

Figures

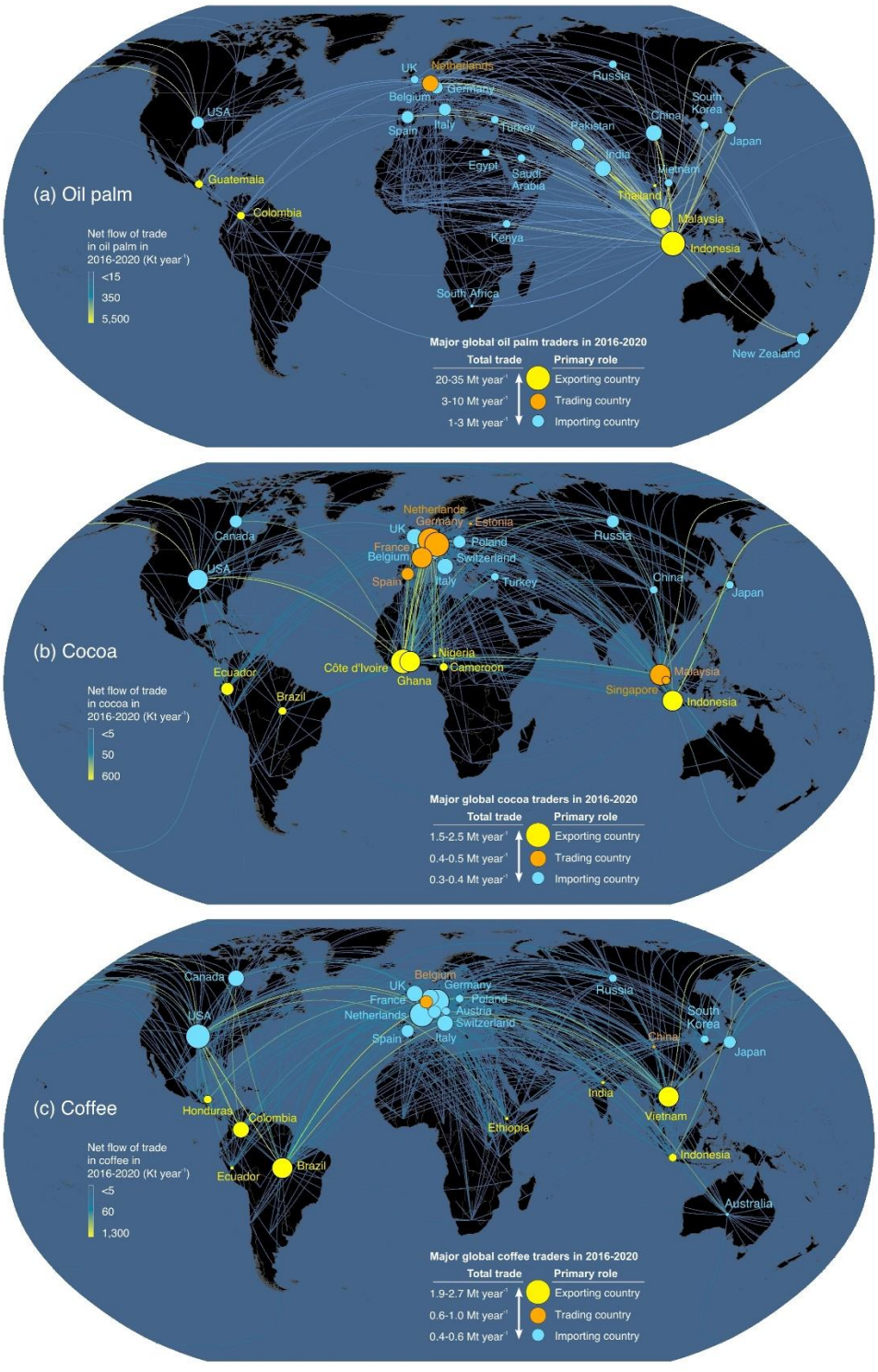

Figure 1. Global trade flow in raw oil palm (a), cocoa (b), and coffee (c) between 2016 and 2020. Raw is defined as a commodity in its raw form or with minimal processing, thus it mostly contains the commodity. An exporting country is a country whereby exports of the commodity substantially exceed imports; an importing country is a country whereby imports substantially exceed exports; and a trading country is a country whereby exports of the commodity account for more than 35% of the imports (i.e., a large proportion of the commodity is transiting through the country and distributed elsewhere).

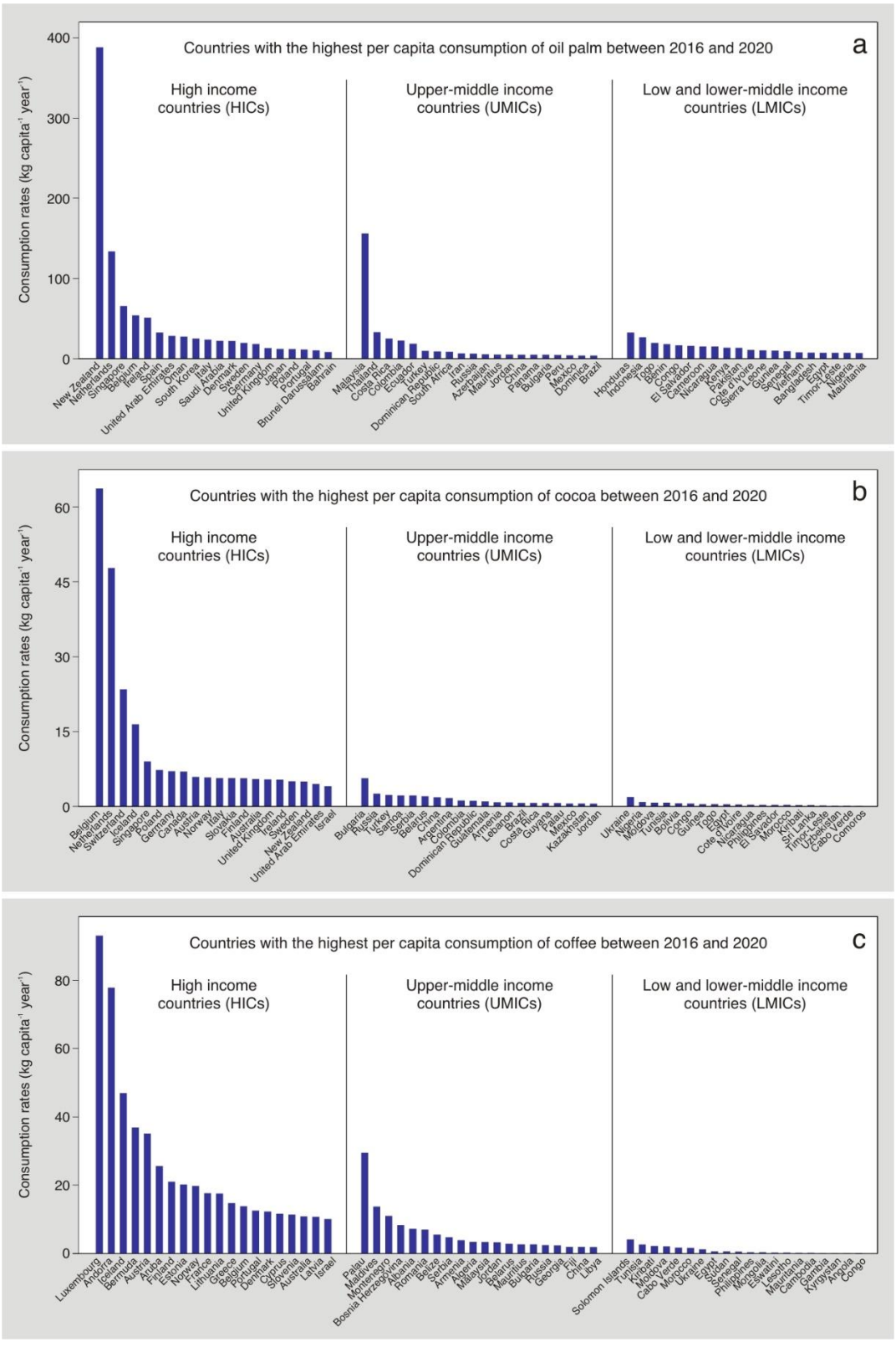

Figure 2. Country ranking in the per capita consumption of raw (a) oil palm (for food and non-food use), (b) cocoa, (c) and coffee between 2016 and 2020, by country economic status (i.e., HICs, UMICs, and LMICs). Per capita consumption in each country was estimated as the cumulative total quantity imported and total quantity produced in that country per year subtracted by the total quantity exported, divided by the country's population number.

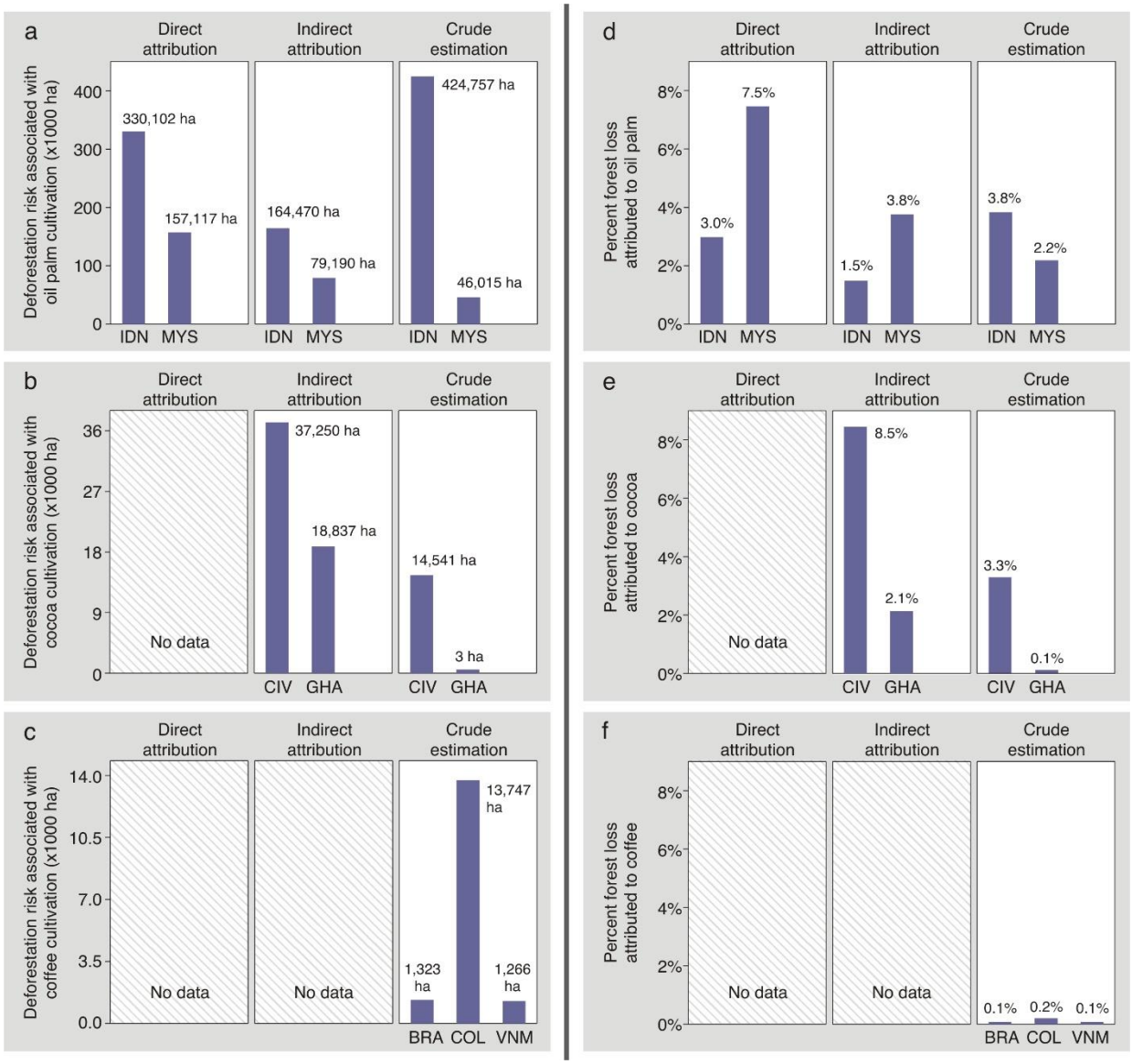

Figure 3. (a-c) Deforestation risk associated with the cultivation of oil palm, cocoa, and coffee, and (d-f) percent forest loss attributed to these commodities between 2011 and 2019 accounting for the extent of forest in 2011. Deforestation risk or percent forest loss is broken down by the approach used to derive the estimates with decreasing order of accuracy: (i) direct attribution, (ii) indirect attribution, and (iii) crude estimation approach. Major producing countries included in the assessment are Indonesia (IDN) and Malaysia (MYS) for oil palm; Côte d'Ivoire (CIV) and Ghana (GHA) for cocoa; and Brazil (BRA), Colombia (COL), and Vietnam (VNM) for coffee.

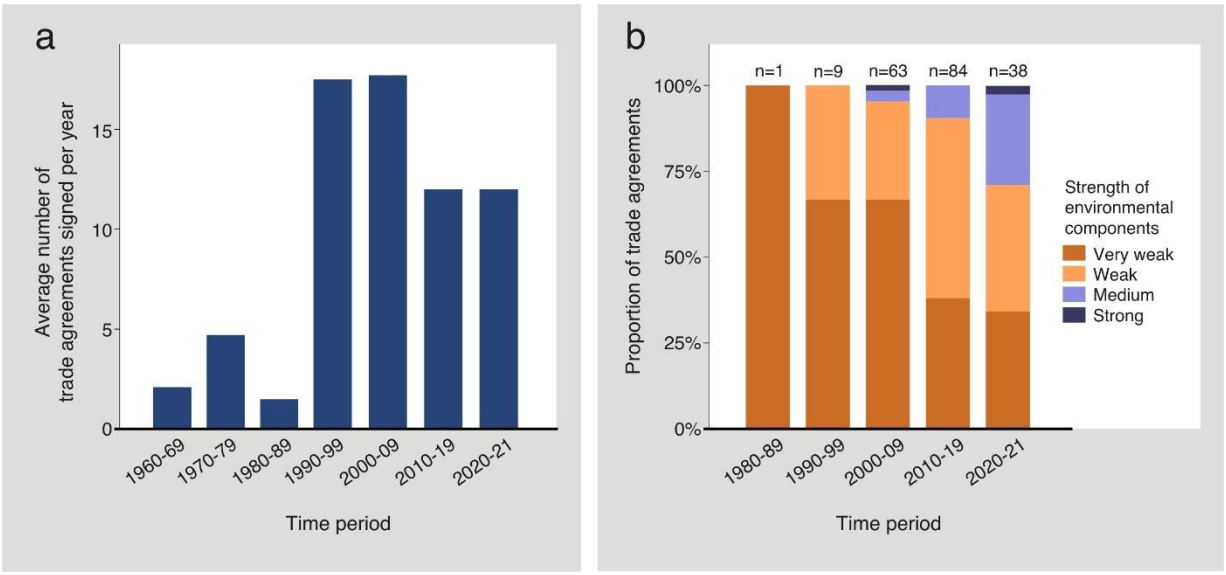

Figure 4. Trends in (a) the likelihood of trade agreements signed per year between 1960 and 2021, and (b) the strength of environmental elements in trade agreements between 1980 and 2021. See Table 1 for the definition of the strength.

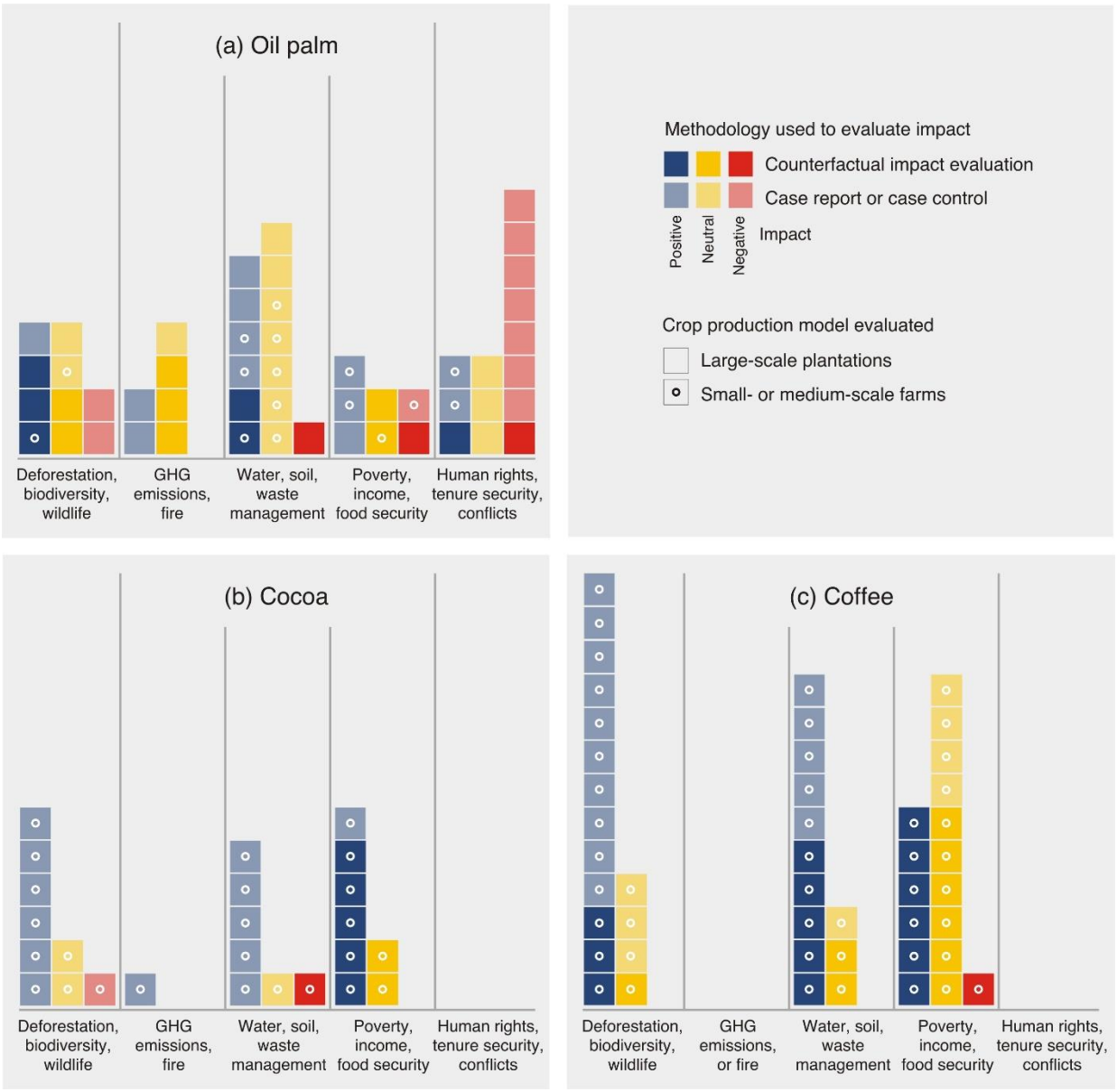

Figure 5. Environmental and social impacts of sustainability certification for (a) oil palm, (b) cocoa, and (c) coffee, estimated from past studies. Studies are categorised based on: (i) the methodology used to derive evidence of impact: rigorous counterfactual versus case report or case-control approach; and (ii) the crop production model evaluated: large-scale plantations versus independent smallholders or medium-scale farms.

Supplementary Information

Leverage points for tackling unsustainable global value chains: market-based measures versus transformative alternatives

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Supplementary Methods

A. Global trade and consumption patterns of tropical crops

We used the UN Comtrade database (UN Statistics Division 2022) to estimate the annual quantity of imports and exports of oil palm, cocoa, and coffee. We focused on recent data between 2016 and 2020 and on raw products, that is commodities in their raw form, which undergo minimal processing and contain largely the commodities. The Harmonized System (HS) codes of products associated with each crop are shown in Table S1. To give an estimate of the net demand for production of a specific crop, equivalent weight is used rather than the actual weight of the imported commodities recorded in the UN Comtrade database. The equivalent weight is defined as the actual weight tonnes of the commodity products multiplied by an equivalency factor (Table S1). The choice of HS code, equivalency factor, and methodology were adopted from past studies (Fripp et al. 2020; WWF UK and RSBP 2020).

For each crop, we classified each country involved in the trade based on their primary role as: (i) exporting country; (ii) trading country, and (iii) importing country. An exporting country is defined as a country whereby the quantities of commodity being exported far exceeds imports. This status is typically held by the crop's major producing countries. A trading country is defined as a country whereby the quantities of commodities being exported accounts for more than 30% of the quantities being imported into the country, therefore a large proportion of the commodity undergoes limited processing and then is exported elsewhere (Jones et al. 2020; Verschuur et al. 2022). This is typically a status held by countries with large shipping ports, such as the Netherlands (Rotterdam), Germany (Hamburg), Singapore, and China (Shanghai and Shenzhen). An importing country is defined as a country where the quantities of imports far exceed exports.

We evaluated the patterns of consumption or utilization of commodities across countries with differing economic statuses. The consumption rates per capita of the commodity per year in each country were estimated using recent data between 2016 and 2020. Consumption rates per capita were estimated as the cumulative quantity of raw commodities imported and the quantity produced in that country subtracted by the quantity exported, divided by the country's population. Data on commodity imports and exports were obtained from the UN Comtrade database, and data on the quantities of commodity produced in each country were obtained from the FAOSTAT database (FAO 2022). Data for countries' economic status were obtained from the World Bank's GNI (Gross National Income) per capita data (World Bank 2022), which classifies countries into high income (HICs), upper-middle income (UMICs), and low and lower-middle income countries (LMICs).

B. Deforestation risk attributed to crop production

The level of deforestation risk attributed to crop production has so far been estimated using country or sub-national (province or state) crop cultivation and forest extent datasets (Pendrill et al. 2019, 2022). Although this method provides sufficient estimates and understanding of crop-driven deforestation patterns at the global scale, it can potentially over- or underestimate the actual impacts of crop production on forest loss in a particular country. Overestimation can likely occur if multiple extractive sectors exist simultaneously at a sub-country level which equally drives deforestation. This may occur, for example, in Indonesia where tree plantations, logging, and mining operations also occur in major oil palm producing areas (Austin et al. 2019; Gaveau et al. 2019). These sectors can simultaneously drive deforestation, but their contribution can be overlooked in the deforestation estimation. On the other hand, under-estimation of crop contribution to deforestation can potentially occur if multiple production models exist within the sub-national unit, particularly when the total extent of smallholder production is greater than large-scale plantations. This is because smallholders - unlike large-scale plantations – do not normally report their activities to government

authorities (Jelsma et al. 2017), therefore their extents tend to be underreported in sub-national inventory databases (Gaveau et al. 2017; Descals et al. 2019; Oon et al. 2019). In addition, forest losses due to the expansion of smallholders are traditionally more difficult to detect and capture from satellite images due to their farm size and more heterogenous land use characteristics compared to forest loss due to the expansion of large-scale plantations (Wang et al. 2020). Both factors could lead to an underestimation of actual deforestation attributed to the crop reported by the sub-country level data.

To provide a more comprehensive understanding of deforestation risks attributed to crop production, we used the following data and approach: (A) forest cover change datasets overlaid with data on the spatio-temporally explicit crop expansion data; and (B) the latest spatial data on crop distribution; and (C) existing crude deforestation risks estimated from the sub-national data (Pendrill et al. 2022). The spatiotemporally explicit crop expansion data approach is considered to provide the most accurate direct attribution of the crop to deforestation, i.e., identification of forest clearance that was immediately replaced by the crop (Song et al. 2021). The latest spatial data on crop distribution provides an indirect attribution of the crop to deforestation, i.e., identification of forest clearance that eventually led to crop cultivation; such data is therefore considered to be more accurate than crude estimates based on sub-national data.

For oil palm, we focused on the deforestation risk in the two largest producing countries Indonesia and Malaysia. For cocoa, we focused on Côte d'Ivoire and Ghana as the largest producer of cocoa, and for coffee, we focused on Brazil, Colombia, and Vietnam. Data types A, B, and C are available for oil palm; therefore, we used these three data types to generate and compare the embodied deforestation risk estimates. Data type A was unavailable for cocoa, so only data types B and C were used. For coffee, detailed distribution of coffee is lacking, and only data type C was available and therefore used in the analysis. For all commodities, data type C was obtained from https://doi.org/10.5281/zenodo.5886600 (Pendrill et al. 2022). Additionally, data type A and B were obtained from https://doi.org/10.5281/zenodo.4473715 (Descals et al. 2021) and https://doi.org/10.5281/zenodo.3467071 ((Xu et al. 2019) for oil palm, and data type B were obtained from https://doi.org/10.1594/PANGAEA.917473 (Abu et al. 2020) for cocoa. Data on the annual change in forest cover were obtained from the Global Forest Change database (https://storage.googleapis.com/earthenginepartners-hansen/GFC-2022-v1.10/download.html) (Hansen et al. 2013). We focused on the expansion of crop and forest cover loss occurring between 2011 and 2019, which reflects the period in which our different datasets overlap.

C. Trade agreements and the environmental sustainability elements

We collected data on trade agreements from the WTO RTA database (WTO 2022) and focused on bilateral and multilateral (regional) trade agreements made between 1980 and 2022. For each trade agreement, we collected information on the RTA name, signatory countries, date of notification, date of entry into force, specific section(s) referencing the environment, environmental criteria relating to the traded products, and provision to withdraw trade preferences if the criteria are not met. The level of environmental commitments for each trade agreement was then assessed using an evaluative scale classified as very weak, weak, medium, and strong. These scales were generated based on four key criteria: (1) description of commitments to sustainable development and/or environmental protection; (2) specific chapter dedicated to the environment, forest-based products, and/or biodiversity; (3) review of the environmental impact of the trade agreement; and (4) measures and support to address environmental issues. The basis for the assignment of these scales for each criterion is outlined in Table 1.

D. Sustainability certification schemes' implementation and evidence of impact

For each commodity, we carried out a systematic review of past empirical studies evaluating the impact of sustainability certification schemes. Literature searches were conducted via Web of Science and Google Scholar in February and March 2022. Google Scholar provides access to grey literature that may have

been excluded from the Web of Science list. We used the following search terms: “*oil palm*” OR "*palm oil*" OR *cocoa* OR *coffee* AND *certification* AND *impact* OR *effect* OR *benefit* OR *cost* AND *environment* OR *biodiversity* OR *social* OR *economic* OR *poverty* OR *well-being* OP *welfare*.

Our search yielded 25,100 results, which were sorted by relevance. We skim through the first 1000 article titles, as the articles listed afterward become increasingly irrelevant to warrant further processing. For titles we identify as relevant, we read through the abstract and the main texts. We excluded studies that are purely theoretical and not based on empirical data. We also excluded meta-analyses or systematic reviews, as this could potentially duplicate reports and result in over- or under-estimation of certification impact. A total of 51 studies were finally selected for oil palm, 25 studies for cocoa, and 47 studies for coffee to be further analysed.

Impact evidence was evaluated on five dimensions: (i) deforestation, biodiversity, or wildlife; (ii) greenhouse gas (GHG) emissions or fire; (iii) management of water, soil, or waste; (iv) poverty, income, or food security; and (v) human rights, tenure security, and conflicts. For each study, we collected information on:

- the approach used to derive evidence, including: (i) case reports or case-control study (either before-after or with-without), whether or not there was consideration of confounding factors, and (ii) rigorous quasi-experimental method, i.e. comparing treated and control before and after certification, and accounting for baseline conditions at the pre-treatment stage (Ferraro 2009; Sills et al. 2017; Schleicher et al. 2020);
- whether or not the study considers the spatial spillover effects of certification schemes to the broader landscapes (within and surrounding certified farms) (Heilmayr et al. 2020; Schleicher et al. 2020);
- the type of producer evaluated, including large-scale plantations, scheme smallholders (normally tied to plantations), or independent smallholders; and
- indicators of sustainability evaluated on the five, above-mentioned dimensions and summary of their impact: positive, neutral (no impact), or negative.

The variables derived for each study for oil palm, cocoa, and coffee are summarised in Tables S3, S4, and S5, respectively.

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Supplementary Figures

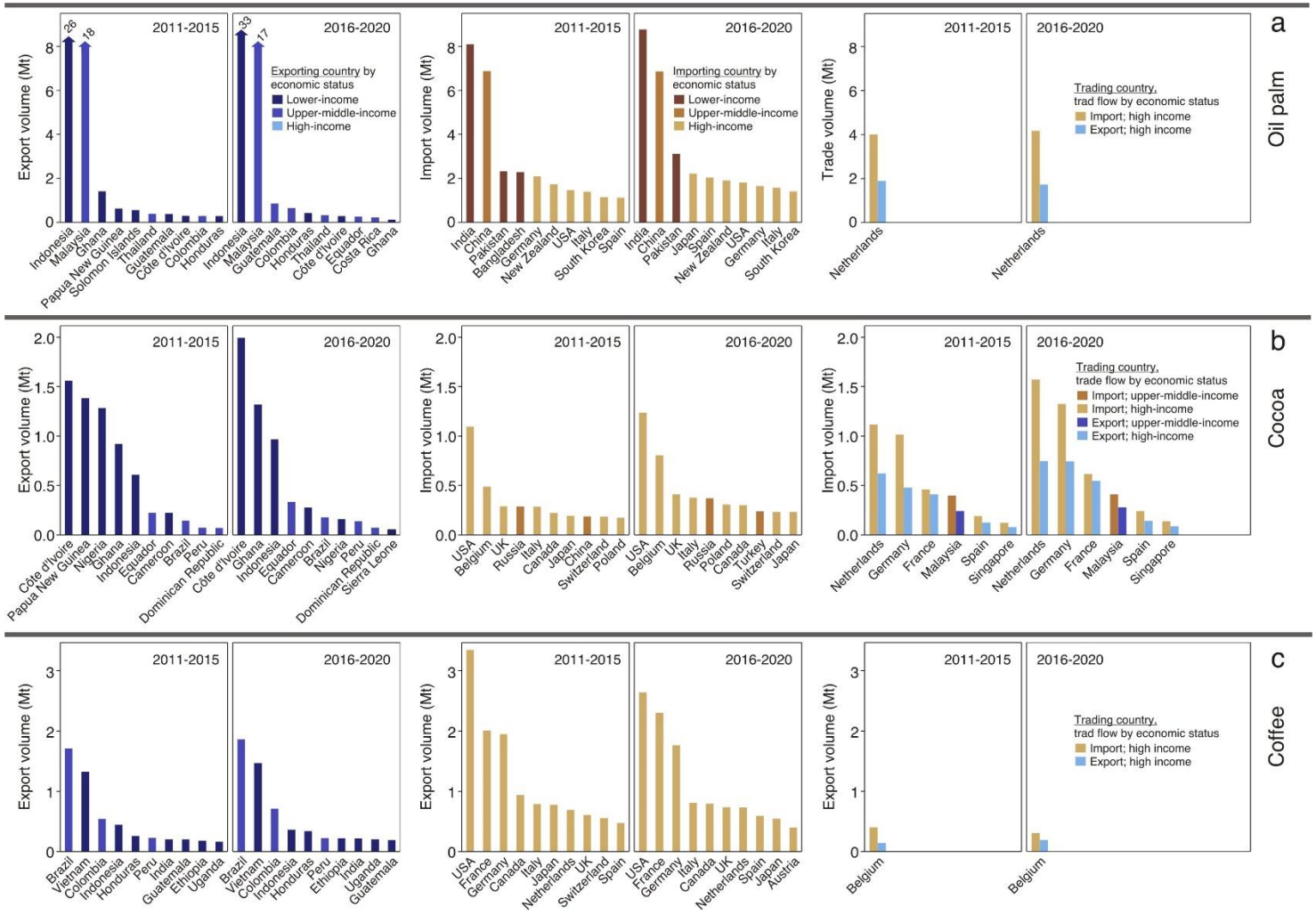

Figure S1. Top exporting countries, top importing countries, and top trading countries (more than 30% of the commodity imported were exported elsewhere), for (a) oil palm, (b) cocoa, and (c) coffee, for the period of 2011-2015 and 2016-2020.

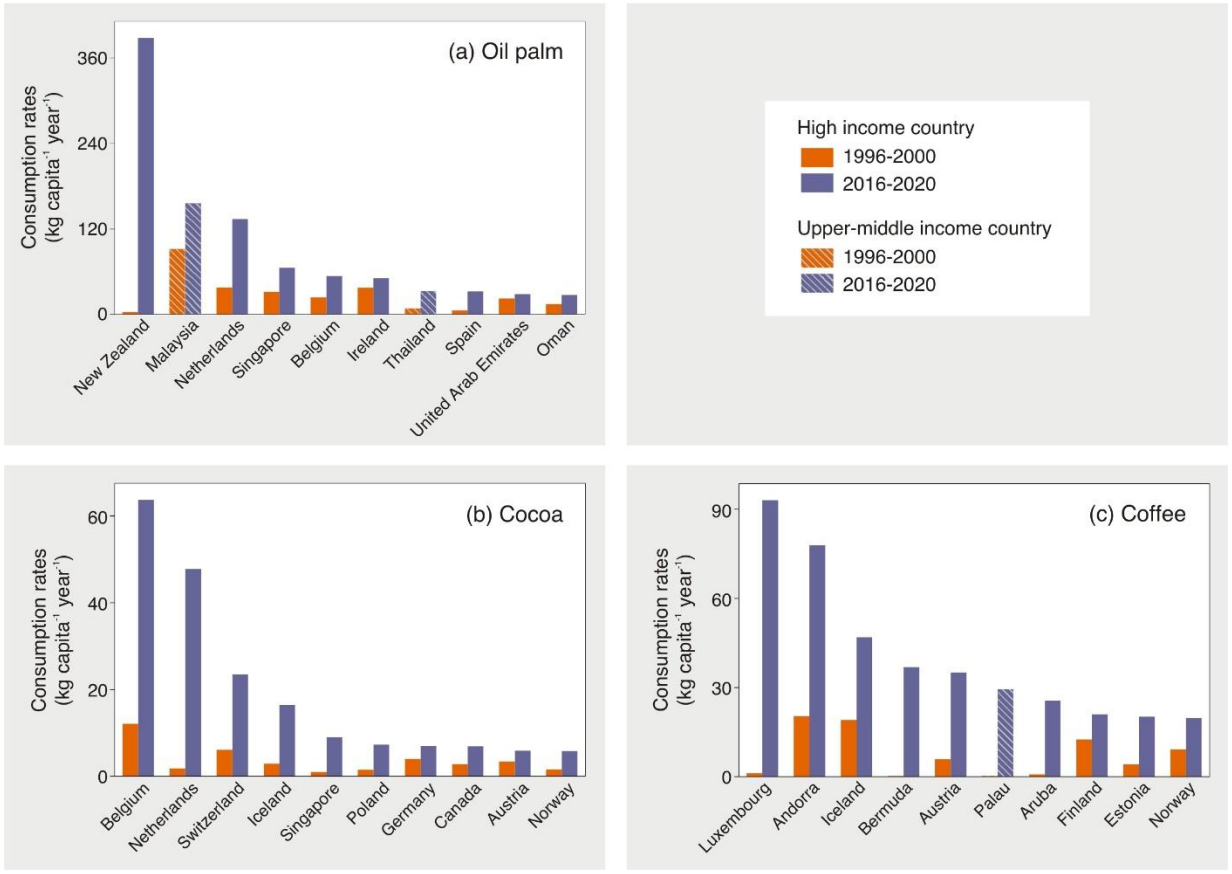

Figure S2. Changes in annual per capita consumption of (a) oil palm, (b) cocoa, and (c) coffee, between the period of 1996-2000 and 2016-2020 for the current top ten consuming countries.

Supplementary Tables

Table S1. HS codes used for raw oil palm, cocoa, and coffee, and the equivalency factors for the associated products.

Commodity	HS code	Product description	Equivalency factor
Oil palm	1511	Oil palm and its fractions, whether or not refined, but not chemically modified	1.0
	151321	Crude palm kernel	1.0
	151329	Refined palm kernel oil	1.0
	120710	Palm nuts and kernel	0.2
	230660	Palm kernel meal	1.0
Cocoa	1801	Cocoa beans	1.0
	1802	Cocoa shells	1.0
	1803	Cocoa paste, whether or not defatted	1.0
	1804	Cocoa fats	1.0
	1805	Cocoa powder	1.0
Coffee	0901	Coffee beans, husks, and skins	1.0
	210110	Coffee extracts, essences, concentrates, preparations	1.0
	210111	Coffee extracts, essence	1.0
	210112	Essences or concentrates or with a basis of coffee	1.0
	210130	Roasted chicory and other roasted coffee	1.0

Table S2. Regional Trade Agreements (RTA) made between 1980 and 2022 containing environmental clauses or references to environmental protection and/or sustainability, and summary evaluation of their environmental strength.

No	RTA name	Signatories	Date of notification	Date of entry into force	Section(s) referencing environment	Environmental criteria relating to traded products	Provision to withdraw trade preferences if criteria not met	Level of environmental strength/ commitments	Summary	Document link
1	Andean Community (CAN)	Bolivia, Colombia, Ecuador, Peru, Venezuela	01-Oct-1990	25-May-1988	N/A	No	N/A	Very weak	Parties to cooperate on environmental protection (no detail).	http://www.sice.oas.org/Trade/Junac/Carta_Ag/index.asp
2	ASEAN - Australia - New Zealand	Australia, New Zealand, Brunei Darussalam, Myanmar, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Vietnam, Thailand	08-Apr-2010	01-Jan-2010	N/A	No	N/A	Very weak	General commitment to sustainable development. Right of each party to establish own laws regarding environment.	https://asean.org/wp-content/uploads/images/archive/22260.pdf
3	ASEAN - China	China, Brunei Darussalam, Myanmar, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Vietnam, Thailand	21-Sep-2005(G) 26-Jun-2008(S)	01-Jan-2005(G) 01-Jul-2007(S)	N/A	No	N/A	Very weak	Right of each party to apply own measures to protect animal, plant life and conservation of exhaustible natural resources.	http://fta.mofcom.gov.cn/dongmeng/annex/xieyi2004en.pdf
4	ASEAN - Japan	Japan, Brunei Darussalam, Myanmar, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Vietnam, Thailand	23-Nov-2009	01-Dec-2008	N/A	No	N/A	Very weak	Right of each party to establish own laws regarding environment. Parties agree to cooperate on environment and forestry (no detail).	https://www.mofa.go.jp/policy/economy/fta/asean/agreement.pdf
5	ASEAN – South Korea	South Korea, Brunei Darussalam, Myanmar, Cambodia, Indonesia, Laos, Malaysia, Philippines,	08-Jul-2010	01-Jan-2010(G) 14-Oct-2010(S)	N/A	No	N/A	Very weak	Right of each party to establish own laws regarding environment.	https://www.enterprisesg.gov.sg/-/media/esg/files/non-financial-assistance/for-companies/free-trade-agreements/ASEAN-Korea-FTA/Legal-Text/Trade-in-Goods/Agreement-on-Trade-in-Goods-Under-the-Framework-Agreement-on-Comprehensive-6Economic-Cooperation

		Singapore, Vietnam, Thailand								
6	Australia - Chile	Australia, Chile	03-Mar-2009	06-Mar-2009	N/A	No	N/A	Very weak	General commitment to sustainable development. Right of each party to impose measures if required to protect animal, plant life.	https://www.dfat.gov.au/trade/agreements/in-force/aclfta/fta-text-implementation/table-of-contents
7	Australia - China	Australia, China	26-Jan-2016	20-Dec-2015	N/A	No	N/A	Very weak	Right of each party to impose measures if required to protect animal, plant life.	https://www.dfat.gov.au/trade/agreements/in-force/chafta/official-documents/Pages/official-documents
8	Australia - New Zealand Closer Economic Relations Trade Agreement (ANZCERTA)	Australia, New Zealand	14-Apr-1983(G) 22-Nov-1995(S)	01-Jan-1983(G) 01-Jan-1989(S)	N/A	No	N/A	Very weak	Right of each party to impose measures if required to protect animal, plant life.	https://www.dfat.gov.au/sites/default/files/anzcerta1.pdf
9	Brunei Darussalam - Japan	Brunei Darussalam, Japan	31-Jul-2008	31-Jul-2008	● Chapter 5 Investment, Article 71 Environmental Measures ● Chapter 7 Energy, Article 93 Environmental Aspects	No	N/A	Very weak	General commitment to sustainable development and environmental protection, including in energy section. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	https://www.mofa.go.jp/region/asia-paci/brunei/epa0706/agreement.pdf
10	Canada - Chile	Canada, Chile	30-Jul-1997	05-Jul-1997	● Part 3 Investment, Article G-14 Environmental Measures	No	N/A	Very weak	General commitment to sustainable development. Right of each party to impose measures if required to protect animal, plant life. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/chile-chili/fta-ale/index.aspx?lang=eng
11	Canada - Colombia	Canada, Colombia	07-Oct-2011	15-Aug-2011	● Chapter 17 Environment	No	N/A	Weak	General commitment to sustainable development and environmental protection including biodiversity and taking into account indigenous knowledge, and public participation in environmental matters. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment. Refers to separate Agreement on the Environment that is	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/colombia-colombie/fta-ale/index.aspx?lang=eng

									supportive to the trade agreement.	
12	Canada - Costa Rica	Canada, Costa Rica	13-Jan-2003	01-Nov-2002	N/A	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Right of each party to impose measures if required to protect animal, plant life.	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/costa_rica/fta-ale/index.aspx?lang=eng
13	Canada - Honduras	Canada, Honduras	05-Feb-2015	01-Oct-2014	● Chapter 18 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment. Refers to separate agreement on Environmental Cooperation between Canada and the Republic of Honduras	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/honduras/fta-ale/index.aspx?lang=eng
14	Canada - Israel	Canada, Israel	15-Jan-1997	01-Jan-1997	● Chapter 11 Trade and Environment	No	N/A	Weak	General commitment to sustainable development and environmental protection, and to existing multilateral environmental agreements. Right of each party to establish own environmental laws. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment. Parties encourage corporate social responsibility. Parties recognise voluntary, market based measures can contribute to achievement of environmental protection. General commitment to strengthen cooperation on environment. Establish a Committee on the Environment meeting a year after agreement is implemented and then upon agreement. Parties consider undertaking a review of environment chapter and endeavour to engage the	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/israel/fta-ale/text-texte/toc-tdm.aspx?lang=eng&_ga=2.56681578.1125609168.1568312262-1394131750.1568312262

									public in implementation activities.	
15	Canada - Jordan	Canada, Jordan	10-Apr-2013	01-Oct-2012	● Chapter 10 Environment	No	N/A	Weak	General commitment to sustainable development. Right of each party to establish own environmental laws. Parties have set out a separate Agreement on the Environment.	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/jordan-jordanie/fta-ale/index.aspx?lang=eng
16	Canada – South Korea	Canada, South Korea	20-Jan-2015	01-Jan-2015	● Chapter 17 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish own environmental laws. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment. General commitment to cooperate on the environment, subject to resources. Environmental Affairs Council is established, meeting as necessary.	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/korea-coree/fta-ale/index.aspx?lang=eng
17	Canada - Panama	Canada, Panama	10-Apr-2013	01-Apr-2013	● Chapter 17 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish own environmental laws. Parties have set out a separate Agreement on the Environment.	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/panama/fta-ale/index.aspx?lang=eng
18	Canada – Peru	Canada, Peru	31-Jul-2009	01-Aug-2009	● Chapter 17 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish own environmental laws. Parties have set out a separate Agreement on the Environment.	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/peru-perou/fta-ale/index.aspx?lang=eng
19	Canada - Ukraine	Canada, Ukraine	13-Sep-2017	01-Aug-2017	● Chapter 12 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish own environmental laws.	https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/ukraine/text-texte/toc-tdm.aspx?lang=eng

									Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment. Environmental impact assessments will be carried out by each party for proposed projects. Parties encourage corporate social responsibility. Parties recognise voluntary, market based measures can contribute to achievement of environmental protection. General commitment to cooperation on the environment (no detail). Committee on the Environment is established, meeting as appropriate. Parties may consider reviewing chapter and including public input.	
20	Caribbean Community and Common Market (CARICOM)	Antigua and Barbuda, Bahamas, Barbados, Belize; Dominica, Grenadas, Guyana, Haiti, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago	14-Oct-1974(G) 19-Feb-2003(S)	01-Aug-1973(G) 04-Jul-2002(S)	N/A	No	N/A	Very weak	Parties have the right to implement environmental measures to conserve natural resources or preserve the environment.	http://www.sice.oas.org/trade/ccme/protoc4a.asp
21	Chile - China	Chile, China	20-Jun-2007(G) 18-Nov-2010(S)	01-Oct-2006(G) 01-Aug-2010(S)	● Article 108 Labor, Social Security and Environmental Cooperation	No	N/A	Very weak	General commitment to sustainable development and cooperation on the environment via separate Environmental Cooperation Agreement.	http://fta.mofcom.gov.cn/chile/xieyi/freetradexieding2.pdf
22	Chile - Colombia	Chile, Colombia	14-Aug-2009	08-May-2009	● Capitulo 18 Ambiental	No	N/A	Weak	General commitment to sustainable development. Right of each party to establish own environmental laws. Parties to cooperate on development of the forest	https://www.subrei.gob.cl/acuerdos-comerciales/acuerdos-comerciales-vigentes/colombia (Spanish)

									sector and natural resources, management of water resources, green 'markets', desertification, pollution, biodiversity, instutional capacity. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	
23	Chile - Indonesia	Chile, Indonesia	01-Apr-2020	10-Aug-2019	● Article 9.5 Cooperation on the Environment	No	N/A	Weak	General commitment to sustainable development and cooperation on biodiversity, air quality, pollution, waste, chemicals, climate change, agriculture, sustainable products, sustainable forest management (no detail). Right of each party to establish own environmental laws.	https://ditjenppi.kemendag.go.id/assets/files/publikasi/doc_20190319_perjanjian-kemitraan-ekonomi-komprehensif-indonesia-chile-indonesia-chile-cepa.pdf (Indonesian) and https://www.subrei.gob.cl/acuerdos-comerciales/acuerdos-comerciales-vigentes/indonesia (Spanish)
24	Chile - Japan	Chile, Japan	24-Aug-2007	03-Sep-2007	● Article 87 Environmental Measures	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	https://www.mofa.go.jp/region/latin/chile/joint0703/agreement.pdf
25	Chile - Malaysia	Chile, Malaysia	12-Feb-2013	25-Feb-2012	● Article 9.5 Environment	No	N/A	Weak	General commitment to sustainable development. Commitment to cooperation on climate change, biodiversity, mining, water, waste management, marine pollution and conservation, chemicals, sustainable forest management. Cooperation committee is established and meets as appropriate after first year. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	https://fta.miti.gov.my/miti-fta/resources/Malaysia-Chile/MCFTA.pdf
26	Chile - Mexico	Chile, Mexico	27-Feb-2001	01-Aug-1999	● Artículo 9-15 Medidas relativas al ambiente	No	N/A	Very weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish	https://www.subrei.gob.cl/docs/default-source/acuerdos/mexico/texto-completo-

									own environmental laws. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	acuerdo.pdf?sfvrsn=d4f0536b_2 (Spanish)
27	Chile - Thailand	Chile, Thailand	12-Sep-2017	05-Nov-2015	● Article 11.5 Environmental Issues	No	N/A	Weak	General commitment to sustainable development and cooperation on climate change, biodiversity, air and water quality etc. (no detail). Right of each party to establish own environmental laws. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	http://www.sice.oas.org/Trade/CHL_THA_Final/CHL_THA_FTA_Full_Version_PDF_e.pdf
28	Chile - Vietnam	Chile, Vietnam	12-May-2015	01-Jan-2014	N/A	No	N/A	Very weak	General commitment to sustainable development and environmental protection, and cooperation on forestry (no detail).	http://www.sice.oas.org/Trade/CHL_VNM/CHL_VNM_e/1742909.PDF
29	China - Georgia	China, Georgia	05-Apr-2018	01-Jan-2018	● Chapter 9 Environment and Trade	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish own environmental laws. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment. Parties agree to review impact of environment chapter. General commitment to cooperation on the environment (no specifics).	http://fta.mofcom.gov.cn/georgia/annex/xdzw_en.pdf
30	China – Hong Kong	China, Hong Kong	27-Dec-2003	29-Jun-2003	N/A	No	N/A	Very weak	Right of each party to impose measures if required to protect animal, plant life.	https://www.tid.gov.hk/english/cepa/legaltext/files/cepa17_main.pdf and https://www.tid.gov.hk/english/cepa/legaltext/cepa_legaltext.html
31	China – South Korea	China, South Korea	01-Mar-2016	20-Dec-2015	● Chapter 16 Environment and Trade, Article 17.7 Forestry	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish own environmental laws. Parties recognise it is	http://fta.mofcom.gov.cn/korea/annex/xdzw_en.pdf

									inappropriate to weaken environmental protections to encourage trade or investment. Parties agree to review impact of environment chapter. Parties to cooperate on technology, capacity building, policy, build up of environmental industries inter alia. Parties reaffirm commitment to existing Memorandum of Understanding between the Ministry of Environmental Protection of the People's Republic of China and the Ministry of Environment of the Republic of Korea on Environmental Cooperation. Forestry section has opposite of environmental criteria, rather it notes restrictive measures should be avoided unless there is reasonable justification. Areas of cooperation are listed including on tackling illegal logging, promoting seedling industries and conservation (no detail).	
32	China - Macao	China, Macao	27-Dec-2003	17-Oct-2003	N/A	No	N/A	Very weak	Right of each party to impose measures if required to protect animal, plant life.	https://www.dsedt.gov.mo/public/docs/CEPA_CEPA_ACM/content/en/cepa_acm_en.pdf and https://www.cepa.gov.mo/front/eng/iteml_2.htm
33	China – New Zealand	China, New Zealand	21-Apr-2009	01-Oct-2008	● Chapter 14 Cooperation, Article 177 Labour and Environmental Cooperation	No	N/A	Very weak	General commitment to sustainable development. Reference to separate Environment Cooperation Agreement.	https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-in-force/nz-china-free-trade-agreement/new-zealand-china-fta-resources/
34	China - Singapore	China, Singapore	02-Mar-2009	01-Jan-2009	● Appendix 8, Chapter 17 Environment and Trade	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to establish own environmental laws. Parties recognise it is inappropriate to weaken	https://www.enterprisesg.gov.sg/non-financial-assistance/for-singapore-companies/free-trade-agreements/ftas/singapore-ftas/-/media/ESG/Files/Non-Financial-Assistance/For-

									environmental protections to encourage trade or investment. Reaffirm commitment to cooperation under the existing Memorandum of Understanding on Environmental Cooperation between the Ministry of the Environment and Water Resources of the Republic of Singapore and the Ministry of Ecology and Environment of the People's Republic of China.	Companies/Free-Trade-Agreements/CSFTA/CSFTA
35	Colombia - Mexico	Colombia, Mexico	13-Sep-2010	01-Jan-1995	● Artículo 17-13 Medidas relativas a Medio Ambiente	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Right of each party to establish own environmental laws. Parties recognise it is inappropriate to weaken environmental protections to encourage trade or investment.	https://www.tlc.gov.co/getattachment/acuerdos/vigente/tratado-de-libre-comercio-entre-los-estados-unidos/importante/texto-del-acuerdo-colombia-mexico/texto-g-3/texto-g-3.pdf.aspx (Spanish)
36	Colombia - Northern Triangle (El Salvador, Guatemala, Honduras)	Colombia, El Salvador, Guatemala, Honduras	31-Aug-2012	12-Nov-2009	● Artículo 12.16 Inversión y el Medio Ambiente	No	N/A	Very weak	General commitment to sustainable development and environmental cooperation. Right of each party to establish own environmental laws.	http://www.sice.oas.org/TPD/COL_Norte/Text/TextoCompleto.pdf (Spanish)
37	Common Market for Eastern and Southern Africa (COMESA)	Angola, Burundi, Comoros, Democratic Republic of the Congo, Ethiopia, Eritrea, Kenya, Lesotho, Malawi, Mauritius, Rwanda, Zimbabwe, Sudan, Eswatini, Uganda, Egypt, Tanzania, Zambia	04-May-1995	08-Dec-1994	● Chapter 16 Cooperation in the Development of Natural Resources, Environment and Wildlife (see whole chapter, includes section on forests).	No	N/A	Weak	General commitment to sustainable developmenet and environmental protection. Members agree to adopt a regional conservation strategy, adopt common policies for hazardous waste, adopt common regulations for the preservation of shared land, marine and forestry resources. The members also acceded to environmental agreements - the Montreal Protocol, the UNEP Convention for Eastern and Southern Africa on water and marine resources and the UNCED Agreements relating to the Conventions on climatic change and biodiversity.	https://www.comesacompetition.org/wp-content/uploads/2016/03/COMESA_Treaty.pdf

38	Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)	Australia, Brunei Darussalam, Canada; Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, Vietnam	20-Dec-2018	30-Dec-2018	● Chapter 20 Environment (whole chapter) and Article 20.2 Objectives, and Article 20.13 Trade and Biodiversity and Article 20.17 Conservation and Trade	No	N/A	Weak	General commitment to sustainable development and environmental protection, and existing multilateral environmental agreements. Parties should not weaken environmental protections to attract trade or investment. Parties have right to establish own environmental laws. Parties should not use environmental laws/measures as a 'disguised restriction' on trade or investment. Specific sections on ozone layer and marine pollution from shipping. Parties state voluntary mechanisms can be very successful in achieving environmental objectives, and encourages corporate social responsibility. Each Party shall make use of existing, or establish new, consultative mechanisms and involve public with 'relevant experience'. Environmental Committee is established, and where appropriate hold a public session at each meeting. Biodiversity section is very general, promotes sustainable use and conservation. Notes indigenous knowledge should be preserved. Conservation section references CITES.	https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-in-force/comprehensive-and-progressive-agreement-for-trans-pacific-partnership-cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership-text-and-resources/
39	Costa Rica - Colombia	Colombia, Costa Rica	31-Oct-2016	01-Aug-2016	● Artículo 12.8 Medidas Relacionadas con la salud, la seguridad el medio ambiente y derechos laborales	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Parties retain the right to impose measures required for protection of animal or plant life. Inappropriate to relax environmental measures to attract trade or investment.	https://www.tlc.gov.co/acuerdos/vigente/costa-rica/texto-del-acuerdo-espanol (Spanish)

40	Costa Rica - Peru	Costa Rica, Peru	05-Jun-2013	01-Jun-2013	● Artículo 12.8 Medidas Medioambientales	No	N/A	Very weak	Parties retain the right to impose measures required for protection of animal or plant life. Inappropriate to relax environmental measures to attract trade or investment.	http://www.acuerdoscomerciales.gob.pe/En_Vigencia/Costa_Rica/Textos_Acuerdo.html (Spanish)
41	Costa Rica - Singapore	Costa Rica, Singapore	16-Sep-2013	01-Jul-2013	● Article 14.8 Environmental Cooperation	No	N/A	Weak	General commitment to sustainable development and environmental protection, and existing multilateral environmental agreements. General commitment to cooperation on the environment, particularly on green markets, clean tech, sustainable environmental management (no detail).	https://www.enterprisesg.gov.sg/non-financial-assistance/for-singapore-companies/free-trade-agreements/ftas/singapore-ftas/-/media/ESG/Files/Non-Financial-Assistance/For-Companies/Free-Trade-Agreements/Singapore_Costa_Rica_FTA/Legal_Text/costa20rica20scrf
42	Dominican Republic - Central America	Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua	06-Jan-2012	04-Oct-2001	● Artículo 9.15 Medidas relativas al medio ambiente Artículo 13.14 Protección del ambiente	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Parties have right to establish own environmental laws/measures.	http://www.sice.oas.org/Trade/camdrep/tratadolc.pdf (Spanish)
43	Dominican Republic - Central America - United States Free Trade Agreement (CAFTA-DR)	Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, United States of America	17-Mar-2006	01-Mar-2006	● Chapter 17 Environment	No	N/A	Weak	General commitment to existing multilateral environmental agreements. An Environmental Cooperation Agreement has been negotiatied (Annex 17.9 Environmental Cooperation included). Priorities identified include strengthening environmental management systems, market based initiatives, conservation, technology transfer, capacity building (no detail.) Parties should not weaken environmental protections to attract trade or investment. Parties have right to establish own environmental laws. Parties state voluntary mechanisms can be very successful in achieving environmental objectives, and should be encouraged.	https://ustr.gov/trade-agreements/free-trade-agreements/cafta-dr-dominican-republic-central-america-fta/final-text

									Environmental Affairs Council is established, which will include public session at meetings unless the parties otherwise agree.	
44	East African Community (EAC)	Burundi, Kenya, Rwanda, Uganda, Tanzania	09-Oct-2000(G) 01-Aug-2012(S)	07-Jul-2000(G) 01-Jul-2010(S)	● Chapter 19 Cooperation in Environment and Natural Resources Management (whole chapter) Article 114 Management of Natural Resources (Section on forests)	No	N/A	Medium	General commitment to sustainable development and cooperation on the environment. Priorities for cooperation are the sustainable utilisation of natural resources, common policies on the transport of toxic and hazardous waste, capacity building. The parties agree to develop a common environmental management strategy, develop special strategies for fragile ecosystems, take measures to control trans-boundary air, land and water pollution, disaster preparedness, integrate environmental management in all developmental activities. Forest section states the parties will adopt common regulations and practices for the conservation and management of all catchment forests, establish uniform regulations for the utilisation of forestry resources, establish Api-Agro Forestry Systems, and jointly utilise forestry training and research facilities. The Secretary General shall provide the forum for consultations between the private sector, civil society organisations, other interest groups and appropriate institutions of the Community.	https://rtais.wto.org/rtadocs/94/TOA/English/EAC%20TREATY.pdf
45	Economic and Monetary Community of Central Africa (CEMAC)	Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon	21-Jul-1999	24-Jun-1999	● Section V La protection de l'environnement	No	N/A	Weak	General commitment to environmental protection. Objectives are to combat desertification, floods and other natural disasters; preserve the quality of the environment in	https://wits.worldbank.org/GPTAD/PDF/archive/CEMAC.pdf (French)

									rural and urban areas; the protection of biological diversity; environmentally sound exploitation of forests and fishery resources; management of hazardous waste and the prohibition of the import of this waste; renewable energy.	
46	Economic Community of West African States (ECOWAS)	Cabo Verde, Benin, Gambia, Ghana, Guinea, Côte d'Ivoire, Liberia, Mali, Niger, Nigeria, Guinea-Bissau, Senegal, Sierra Leone, Togo, Burkina Faso	06-Jul-2005	23-Aug-1995	● Chapter VI Co-operation in Environment and Natural Resources	No	N/A	Weak	General commitment to environmental protection. Section on hazardous and toxic wastes outlines that parties will take measures to prohibit these imports. Parties to coordinate policies on natural resources. No forest section, but forestry is mentioned in the context of increasing productivity in this sector (no mention of sustainability).	https://www.ecowas.int/wp-content/uploads/2015/01/Revised-treaty.pdf
47	EFTA - Albania	Albania, Iceland, Liechtenstein, Norway, Switzerland	07-Feb-2011	01-Nov-2010	● Chapter 6 Trade and Sustainable Development	No	N/A	Weak	References existing multilateral environmental commitments. Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies.	https://www.efta.int/sites/default/files/documents/legal-texts/free-trade-relations/Albania/EFTA-Albania-Free-Trade-Agreement.pdf
48	EFTA - Bosnia and Herzegovina	Bosnia and Herzegovina, Iceland, Liechtenstein, Norway, Switzerland	06-Jan-2015	01-Jan-2015	● Chapter 6 Trade and Sustainable Development	No	N/A	Weak	References existing multilateral environmental commitments. Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies.	https://www.efta.int/media/documents/legal-texts/free-trade-relations/bosnia-and-herzegovina/bosnia-and-herzegovina-fta.pdf
49	EFTA - Central America (Costa Rica and Panama)	Costa Rica, Panama, Iceland, Liechtenstein, Norway, Switzerland	19-Nov-2014	19-Aug-2014	● Chapter 9 Trade and Sustainable Development (entire chapter) Article 9.3 on forest based products	No	N/A	Weak	Inappropriate to weaken environmental protection to attract investment or enhance competitive advantage. Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies. Adhere to international	https://www.efta.int/media/documents/legal-texts/free-trade-relations/central-america/EFTA-Central-America-free-trade-agreement.pdf

									environmental laws. Right of each party to establish own level of environmental protection. Encourage trade conducive to sustainable development. General exception allows enforcement of environmental measures necessary to protect animal or plant life. Specific article on forest-based products, suggests working together in relevant existing multilateral fora; mentions CITES, FLEGT, VPAs	
50	EFTA - Egypt	Egypt, Iceland, Liechtenstein, Norway, Switzerland	17-Jul-2007	01-Aug-2007	● Article 21 General Exceptions Chapter VII Technical and Financial Assistance ● Article 35 Methods and Means	No	N/A	Weak	Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies. Includes a general exception on restrictions of import/export on the grounds of animal/plant health and conservation of exhaustible natural resources. Includes article on technical and financial assistance, which encourages capacity building to support decision making on environmental considerations under the agreement	https://www.efta.int/media/documents/legal-texts/free-trade-relations/egypt/EFTA-Egypt%20Free%20Trade%20Agreement.pdf
51	EFTA - Georgia	Georgia, Iceland, Liechtenstein, Norway, Switzerland	29-Aug-2017	01-Sep-2017	● Chapter 8 Government Procurement, Article 8.3 General Exceptions ● Chapter 10 Trade and Sustainable Development (entire chapter) and Article 10.6 Trade in Forest Based Products	No	N/A	Weak	References existing multilateral environmental commitments. Inappropriate to weaken environmental protection to attract investment or enhance competitive advantage. Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies. General exception allows enforcement of environmental measures necessary to protect animal or plant life. Specific article on forest-based	https://www.efta.int/sites/default/files/documents/legal-texts/free-trade-relations/georgia/EFTA-Georgia-FTA-Main-Agreement.PDF

									products, suggests working together in relevant existing multilateral fora; mentions CITES, FLEGT, VPAs	
52	EFTA-Indonesia	Indonesia, Iceland, Liechtenstein, Norway, Switzerland		01-Nov-2021	● Chapter 8 Trade and Sustainable Development	Yes	Yes	Strong	See paper for details	https://www.efta.int/sites/default/files/documents/legal-texts/free-trade-relations/indonesia/efta-indonesia-main-agreement.pdf
53	EFTA - Hong Kong, China	Hong Kong, Iceland, Liechtenstein, Norway, Switzerland	27-Sep-2012	01-Oct-2012	● Chapter 4 Investment, Article 4.6 Right to Regulate ● Chapter 8 Trade and Environment	No	N/A	Weak	References existing multilateral environmental commitments. Inappropriate to weaken environmental protection to attract investment or enhance competitive advantage. Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies. Adhere to international environmental laws. Right of each party to establish own level of environmental protection. Encourage trade conducive to sustainable development. Right to regulate based on environmental concerns is retained.	https://www.efta.int/media/documents/legal-texts/free-trade-relations/hong-kong-china/EFTA-Hong%20Kong%20China%20Free%20Trade%20Agreement.pdf
54	EFTA – South Korea	South Korea, Iceland, Liechtenstein, Norway, Switzerland	23-Aug-2006	01-Sep-2006	N/A, Sustainable development only referenced in introduction	No	N/A	Very weak	No specific section on environment/sustainable development	https://www.efta.int/media/documents/legal-texts/free-trade-relations/republic-of-korea/EFTA-%20Republic%20of%20Korea%20Free%20Trade%20Agreement.pdf
55	EFTA - Montenegro	Montenegro, Iceland, Liechtenstein, Norway, Switzerland	24-Oct-2012	01-Sep-2012	● Chapter 6 Trade and Sustainable Development	No	N/A	Weak	References existing multilateral environmental commitments. Inappropriate to weaken environmental protection to attract investment or enhance competitive advantage. Right of each party to establish own level of environmental protection. Generic text promoting trade that encourages sustainable	https://www.efta.int/media/documents/legal-texts/free-trade-relations/montenegro/montenegro-main-agreement.pdf

									development and recognising interdependency of trade, environment and labour policies.	
56	EFTA - Peru	Peru, Iceland, Liechtenstein, Norway, Switzerland	30-Jun-2011	01-Jul-2011	● Chapter 6 Protection of Intellectual Property, Article 6.5 Measures Related to Biodiversity ● Chapter 7 Government Procurement, Article 7.2 Exceptions to this Chapter	No	N/A	Very weak	Generic text promoting sustainable development. Section on intellectual property covers rights to biodiversity and indigenous peoples. Exception under government procurement chapter allows environmental measures when necessary to protect human/animal/plant life or health.	https://www.efta.int/media/documents/legal-texts/free-trade-relations/peru/EFTA-Peru%20Free%20Trade%20Agreement%20EN.pdf
57	EFTA - Philippines	Philippines, Iceland, Liechtenstein, Norway, Switzerland	26-Oct-2018	01-Jun-2018	● Chapter 11 Trade and Sustainable Development (entire chapter) and Article 11.8 Trade in Forest-Based Products	No	N/A	Weak	References existing multilateral environmental commitments. Inappropriate to weaken environmental protection to attract investment or enhance competitive advantage. Right of each party to establish own level of environmental protection. Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies. Specific article on forest-based products, suggests working together in relevant existing multilateral fora; mentions CITES, FLEGT, VPAs	https://www.efta.int/sites/default/files/documents/legal-texts/free-trade-relations/philippines/EFTA-Philippines-Rectification-Main-Agreement.pdf
58	EFTA - SACU	Iceland, Liechtenstein, Norway, Switzerland, Botswana, Lesotho, Namibia, South Africa, Eswatini	29-Oct-2008	01-May-2008	● No specific section on environment/sustainable development. Introduction mentions sustainable development ● Chapter 3 Intellectual Property, Article	No	N/A	Very weak	No specific section on environment/sustainable development	https://www.efta.int/media/documents/legal-texts/free-trade-relations/southern-african-customs-union-SACU/EFTA-SACU%20Free%20Trade%20Agreement.pdf

					28 Investment mentions environmental standards.					
59	EFTA - Serbia	Serbia, Iceland, Liechtenstein, Norway, Switzerland	24-Nov-2010	01-Oct-2010	● Chapter 6 Trade and Sustainable Development	No	N/A	Weak	References existing multilateral environmental commitments. Inappropriate to weaken environmental protection to attract investment or enhance competitive advantage. Right of each party to establish own level of environmental protection. Generic text promoting trade that encourages sustainable development and recognising interdependency of trade, environment and labour policies.	https://www.efta.int/sites/default/files/documents/legal-texts/free-trade-relations/serbia/EFTA-Serbia-Free-Trade-Agreement.pdf
60	EFTA - Tunisia	Tunisia, Iceland, Liechtenstein, Norway, Switzerland	03-Jun-2005	01-Jun-2005	● Chapter VIII Economic Cooperation and Technical Assistance, Article 32 Methods and Means	No	N/A	Very weak	Mention of sustainable development in the introduction. Mention of taking into account environmental cooperation when implementing technical assistance.	https://www.efta.int/media/documents/legal-texts/free-trade-relations/tunisia/EFTA-Tunisia%20Free%20Trade%20Agreement%20EN.pdf
61	EFTA - Ukraine	Ukraine, Iceland, Liechtenstein, Norway, Switzerland	18-Jun-2012	01-Jun-2012	● Chapter 4 Investment, Article 4.8 Right to Regulate ● Chapter 6 Government Procurement, Article 6.11 General Exceptions	No	N/A	Very weak	Mention of sustainable development in the introduction. Right of each party to establish own level of environmental protection and regulate if needed to protect animal or plant life/health.	https://www.efta.int/sites/default/files/documents/legal-texts/free-trade-relations/ukraine/EFTA-Ukraine%20Free%20Trade%20Agreement.pdf
62	El Salvador - Ecuador	Ecuador, El Salvador	22-Mar-2018	16-Nov-2017	● Chapter 5 Cooperación en materia ambiental	No	N/A	Very weak	General commitment to sustainable development and cooperation on the environment (no detail).	http://infotrade.minec.gob.sv/ecuador/wp-content/uploads/sites/15/2017/11/26.01.2017-ACUERDO-DE-ALCANCE-PARCIAL-SALVADOR-ECUADOR-y-ANEXOS.pdf (Spanish)
63	El Salvador-Honduras - Taiwan	Taiwan, El Salvador, Honduras	06-Apr-2010	01-Mar-2008	N/A	No	N/A	Very weak	General commitment to sustainable development, environmental protection and conservation.	https://www.trade.gov.tw/english/Pages/List.aspx?nodeID=678 and https://sde.gob.hn/2017/08/17/tlc-taiwan/ (Spanish)

64	EU - Albania	Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	07-Mar-2007(G) 07-Oct-2009(S)	01-Dec-2006(G) 01-Apr-2009(S)	● Title VIII Cooperation Policies; Article 86 General provisions on cooperation policies; Article 108 Environment Protocol 5 on Land Transport, Article 2 Scope ● Title II Rail and Combined Transport, Article 7 General Provision ● Title III Road Transport	No	N/A	Weak	General mention of sustainable development. General mention of environmental needs in the transport sector, under road transport, the agreement states emissions standards need to be set	https://eur-lex.europa.eu/resource.html?uri=cellar:357b07c8-33a7-451a-9f79-a911c53a7534.0006.01/DOC_2&format=PDF
65	EU - Algeria	Algeria, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	24-Jul-2006	01-Sep-2005	● Title V Economic Cooperation, Article 52 Environment; Article 58 Agriculture and Fisheries; Article 61 Energy and Mining	No	N/A	Weak	Areas of focus for environmental protection listed under economic cooperation section, however, no detail.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22005A1010(01)&from=EN
66	EU - Bosnia and Herzegovina	Bosnia and Herzegovina, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta,	11-Jul-2008(G) 12-Jan-2016(S)	01-Jul-2008(G) 01-Jun-2015(S)	● Article 108 Environment Infrastructure ● Article 15 Environment	No	N/A	Weak	General aim of sustainable development is mentioned. Section on environment notes cooperation should be strengthened to halt environmental degradation and strengthen sustainable development; some suggested areas of cooperation are mentioned eg. waste, water pollution. Focus is placed on ratifying and implementing Kyoto Protocol. Under the transport sector, the	http://europa.ba/wp-content/uploads/2015/05/delegacijaEU_20111214050636 86eng.pdf

		Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden							agreement states standards should be put in place for emissions for heavy goods vehicles.	
67	EU - Cameroon	Cameroon, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	24-Sep-2009	04-Aug-2014	● Title V Trade Related Rules, Chapter 5 Sustainable Development, Article 60 Continuation of negotiations on sustainable development ● Title III Trade Regime for Goods, Chapter 5 Forestry governance and trade in timber and forest products	No	N/A	Medium	Agreement states parties must conclude negotiations on a set of potential conditions for sustainable development by 2009, including levels of protection, rights to regulate, and consultation and monitoring procedures. Notes parties must not encourage FDI by relaxing environmental rules. Forestry section states the parties must implement measures to increase confidence in the legal and sustainable origin of timber products, put in place an audit and surveillance system that is that is independent of the control chain. Also states that Cameroon must build and implement a regional framework to govern trade in timber and forest products originating in Central Africa. Mentions CITES and FLEGT.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22009A0228(01)&from=EN
68	EU - Canada	Canada, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak	19-Sep-2017	21-Sep-2017	● Chapter 22 Trade and Sustainable Development ● Chapter 24 Trade and Environment, Article 24.9 Trade favouring environmental protection Article 24.10 Trade in Forest Products Article 24.12 Cooperation on	No	N/A	Medium	References adherence to existing multilateral environmental agreements. Notes parties can apply own environmental protections but should not lower environmental standards to attract investement. Includes establishment of a Committee on Trade and Sustainable Development to monitor application as relevant to the FTA and commits the parties to establishing a Civil Society Forum on trade and sustainable development which	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2017:011:FULL&from=EN

		Republic, Slovenia, Spain, Sweden			environment issues ● Chapter 25 Bilateral Dialo				will convene once per year. Commitment to promote CITES, exchange information to combat illegal logging, and promote trade in sustainable forest products. Establishment of bilateral dialogue on forest products to foster and facilitate exchange of information on issues related to trade in forest products and development of laws, regulations and initiatives. General commitment to cooperate on environmental issues, referencing existing fora and international multilateral agreements.	
69	EU - CARIFORUM States	Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	16-Oct-2008	29-Dec-2008	● Part 1 Trade Partnership for Sustainable Development Article 138 Cooperation on eco-innovation and renewable energy Chapter 4 Environment (entire chapter) and Article 190 Cooperation	No	N/A	Weak	Overarching commitment to sustainable development and application to all aspects of the economic agreement. Section on fisheries states parties should comply with FAO Code of Conduct on Responsible Fisheries. Encourages sustainable tourism. Commitment to cooperation on eco-innovation and renewable energy. Right of parties to use own environmental standards, but to implement international standards where these do not exist. Parties agree to facilitate trade in timber and wood products from legal and sustainable sources. More widely, parties also agree to support private and public voluntary based market schemes including labelling and accreditation, foster public awareness, and generally support producers in meeting environmental standards.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22008A1030(01)&from=EN

70	EU - Central America	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	26-Feb-2013	01-Aug-2013	● Part II Political Dialogue, Article 20 Environment Article 63, Cooperation and Technical Assistance on Trade and Sustainable Development Article 65, Energy (Including Renewable Energy Article 66, Cooperation on Mining Article 67, Fair and Sustainable Tour	No	N/A	Medium	General commitment to sustainable development and political dialogue focussed on this to cover a range of sectors. Reaffirms commitment to multilateral agreements including Kyoto Protocol. Fisheries section also mentions sustainable development. Short section on trade in forest products, parties agree to enforce forest law and governance and promote trade in sustainable forest products, mentions CITES. Mention of biodiversity under IP section, and need to recognise indigenous knowledge. Agreement to cooperate on technical assistance to foster environmental protection. Agreement to promote sustainably sourced products including through certification of legally and sustainably produced timber. A Board on Trade and Sustainable Development is established as well as a Civil Society Dialogue Forum.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2012:346:FULL&from=EN
71	EU - Chile	Chile, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	03-Feb-2004(G) 28-Oct-2005(S)	01-Feb-2003(G) 01-Mar-2005(S)	● Part III Cooperation, Article 28 Cooperation on the Environment	No	N/A	Weak	General commitment to sustainable development. The agreement also highlights the wine industry, mining and land-use management, mentioning sustainable development in these areas.	https://eur-lex.europa.eu/resource.html?uri=cellar:f83a503c-fa20-4b3a-9535-f1074175eaf0.0004.02/DOC_2&format=PDF

72	EU - Colombia and Peru	Colombia, Ecuador, Peru, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	26-Feb-2013	01-Mar-2013	● Chapter 2 Protection of Biodiversity and Indigenous Knowledge, Article 201 Title IX Trade and Sustainable Development (whole chapter) and Article 272, Biological Diversity, and Article 273 Trade in Forest Products and Article 275 Climate Change and Artic	No	N/A	Medium	General commitment to sustainable development and adherence to existing multilateral environmental agreements. Specific section on biodiversity, including protection and respect of indigenous practices and mentioning adherence to CBD. Right of each party to apply own environmental laws. Section on trade in forest products mentions CITES and also suggests other practices such as voluntary mechanisms for forest certification. Specific section on climate change, which recognises developed countries must lead efforts, and take into account needs and vulnerabilities of developing countries. The agreement stipulates the review and monitoring of impacts of the agreement upon the environment by the signatories, via the Sub-committee on Trade and Sustainable Development, which will also convene a civil society forum once per year. Section on cooperation on trade and sustainable development also mentions REDD and UNFCC objectives, highlighting sustainable forest management.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22012A1221(01)&from=EN
73	EU - Eastern and Southern Africa States	Comoros, Madagascar, Mauritius, Seychelles, Zimbabwe, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece,	09-Feb-2012	14-May-2012	● Title IV Natural Resources and Environment, Article 51 Environment	No	N/A	Weak	General commitment to sustainable development, also highlights sustainable development of the fisheries, energy, transport and tourism industries and sustainable management of water. Parties agree to cooperate on sustainable utilisation of forestry and biodiversity as well as to integrate local	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22012A0424(01)&from=EN

		Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden							communities into the management of these resources.	
74	EU - Egypt	Egypt, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	03-Sep-2004	01-Jun-2004	● Title V Economic Cooperation, Article 44 Environment	No	N/A	Very weak	General commitment to sustainable development. Parties should cooperate on desertification, marine pollution, salination, waste management.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22004A0930(03)&from=EN
75	EU - Georgia	Georgia, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	02-Jul-2014	01-Sep-2014	● Chapter 13 Trade and Sustainable Development (entire chapter) and Article 232 Biological Diversity and Article 233 Sustainable management of forests and trade in forest products	No	N/A	Weak	General commitment to sustainable development, reference to existing multilateral agreements on the environment. Section on biodiversity which references CBD and CITES. Section on forests which references CITES, commits to exchanging information and adopting measures to improve forest governance.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2014:261:FULL&from=EN
76	EU - Israel	Israel, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia,	20-Sep-2000	01-Jun-2000	● Title VI Economic Cooperation Article 50 Environment	No	N/A	Very weak	No general commitment to sustainable development. Environment section highlights water management as the key issue.	https://eur-lex.europa.eu/resource.html?uri=cellar:411c0668-144d-44a1-a5e3-

		Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden								dd2342f7a5b5.0017.02/DOC_1&format=PDF
77	EU - Japan	Japan, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	14-Jan-2019	01-Feb-2019	● Chapter 16 Sustainable Trade and Development (entire chapter) and Article 16.6 Biological Diversity and Article 16.7 Sustainable management of forests and trade in timber and timber products	No	N/A	Weak	General commitment to sustainable development and reaffirms commitment to existing multilateral agreements. Right of each party to establish own levels of environmental protection. Inappropriate to relax environmental protection laws to encourage investment. Section on biodiversity references CITES. Section on forests references adhering only to laws of country of harvest and exchanging information.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2018:330:FULL&from=EN
78	EU - Jordan	Jordan, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	17-Dec-2002	01-May-2002	● Title V Economic Cooperation, Article 65 Environment	No	N/A	Very weak	No general commitment to sustainable development. Environment section focusses on water and waste management.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2002:129:FULL&from=EN
79	EU – South Korea	South Korea, Austria, Belgium Bulgaria, Croatia,	07-Jul-2011	01-Jul-2011	● Chapter 13 Trade and	No	N/A	Medium	General commitment to sustainable development and commitment to existing	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22011A0514(01)&from=EN

		Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden			Sustainable Development Sub Section F Article 10.40 Genetic resources, traditional knowledge and folklore				multilateral environmental agreements. Right of each party to set own environmental protections. Commitment to monitoring impact of agreement on the environment via Committee on Trade and Sustainable Development and once yearly Civil Society Forum. Biodiversity section references CBD and CITES.	
80	EU - Mexico	Mexico, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	25-Jul-2000(G) 21-Jun-2002(S)	01-Jul-2000(G) 01-Oct-2000(S)	N/A	No	N/A	Very weak	Right of each party to apply own measures to protect animal, plant life.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2001:070:FULL&from=EN
81	EU - Moldova	Moldova, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	30-Jun-2014	01-Sep-2014	● Chapter 16 Environment (entire chapter) and Article 89 ● Chapter 17 Climate Change (entire chapter) and Article 95 ● Chapter 13 Trade and Sustainable Development (entire chapter) and Article 368 Biodiversity and Article 369 Sustainable	No	N/A	Medium	General commitment to sustainable development and commitment to existing multilateral environmental agreements. Sustainable development also mentioned in relation to mining, fisheries, energy, transport. Section on the environment mentions desire to move to more sustainable production patterns. Water, waste, air quality, chemicals, biodiversity and rural and urban environments are highlighted as specific areas of attention for the	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2014:260:FULL&from=EN

					management of forests				environment. Commitment to develop a joint strategy on the environment as well as sector strategies. Commitment to joint research and development of strategies for climate change mitigation and adaptation. Section on biodiversity references CITES. Section on forests references CITES, domestic legislation of country of harvest, and potential to conclude a VPA. The Parties shall facilitate a joint forum with civil society organisations established in their territories, including members of their domestic advisory group(s) and the public at large, to conduct a dialogue on sustainable development aspects of this Agreement. The joint civil society dialogue forum shall be convened once a year unless otherwise agreed by the Parties.	
82	EU - Montenegro	Montenegro, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	16-Jan-2008(G) 18-Jun-2010(S)	01-Jan-2008(G) 01-May-2010(S)	● Title VIII Cooperation Policies Article 111 Road Transport Article 15 Environment	No	N/A	Weak	General commitment to sustainable development, emphasis on ratification of Kyoto protocol, air and water pollution and energy production, and the transport sector (where the parties are encouraged to introduce standards on particulate and gaseous emissions).	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02010A0429(01)-20150201&from=EN
83	EU - Morocco	Morocco, Austria, Belgium Bulgaria, Croatia, Cyprus,	13-Oct-2000	01-Mar-2000	● Title V Economic Cooperation	No	N/A	Very weak	General commitment to sustainable development. Cooperation on environment to	https://eur-lex.europa.eu/resource.html?uri=cellar:ecefc61a-c8d6-48ba-

		Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden			Article 48 Environment				focus on soil and water quality, waste and pollution into the sea.	8070-893cc8f5e81d.0006.02/DOC_1&format=PDF
84	EU - North Macedonia	North Macedonia, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	23-Oct-2001(G) 02-Oct-2009(S)	01-Jun-2001(G) 01-Apr-2004(S)	N/A	No	N/A	Very weak	Right of party to impose restrictions on trade if necessary to protect animal or plant life.	https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:22001A0504(01)&from=EN
85	EU - Palestine	Palestine, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	29-May-1997	01-Jul-1997	● Title III Economic Cooperation and Social Development, Article 50 Environment	No	N/A	Very weak	General commitment to sustainable development. Priority areas for the environment are water and waste management. Does not mention specific ways to tackle these issues beyond implementing environmental impact assessments.	https://eur-lex.europa.eu/resource.html?uri=cellar:76ffc73f-884a-4041-9d8b-b04b34ef7bf2.0008.02/DOC_1&format=PDF

86	EU – SADC (Southern African Development Community)	Botswana, Lesotho, Mozambique, Namibia, South Africa, Eswatini, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	03-Apr-2017	10-Oct-2016	● Part I Sustainable Development and Other Areas of Cooperation, Chapter II Trade and Sustainable Development	No	N/A	Weak	General commitment to sustainable development and to existing multilateral environmental agreements. Each party has the right to establish own environmental laws. Inappropriate to relax environmental protections to attract trade or investment. Biodiversity and forest management are highlighted as areas of cooperation for trade and sustainable development but no specific sections are dedicated to them.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2016:250:FULL&from=EN
87	EU - San Marino	San Marino, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	24-Feb-2010	01-Apr-2002	● Title II Cooperation, Article 16	No	N/A	Very weak	No general commitment to sustainable development, only one mention of the environment regarding cooperation on water, air pollution, degradation caused by deforestation and pollution in the Adriatic Sea. No further details given.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22002A0328(01)&from=EN
88	EU - Serbia	Serbia, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia,	31-May-2010(G) 20-Dec-2013(S)	01-Feb-2010(G) 01-Sep-2013(S)	● Title VIII Cooperation Policies, Article 111 Environment	No	N/A	Very weak	General commitment to sustainable development. Environment section highlights special focus on implementation of Kyoto Protocol. Development of forestry sector is highlighted as an area for	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22013A1018(01)&from=EN

		Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden							cooperation but no mention of sustainability.	
89	EU - Singapore	Singapore, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	01-Apr-2020	21-Nov-2019	● Chapter 12 Trade and Sustainable Development (whole chapter) and Article 12.7 Trade in Timber and Timber Products	No	N/A	Medium	Emphasis on moving away from fossil fuel sources of energy. Each party has right to establish own environmental laws. Reaffirms commitment to existing multilateral environmental agreements. Forest section references CITES and general promotion of sustainable timber vs. illegal logging. Parties commit to reviewing impact of agreement on sustainable development via a Board on Trade and Sustainable Development which includes a public session and consultative mechanisms.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2019:294:FULL&from=EN
90	EU - South Africa	South Africa, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	02-Nov-2000	01-Jan-2000	● Title VI Cooperation in Other Areas, Article 84 Environment	No	N/A	Weak	General commitment to sustainable development and mention of sustainability under sections on tourism, transport, energy, agriculture and fisheries. Environment section focusses on development of capacity in environmental management and cooperation in the areas of urban development, land use, waste, chemicals, biodiversity, forestry.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:1999:311:FULL&from=EN
91	EU - Tunisia	Tunisia, Austria, Belgium Bulgaria, Croatia, Cyprus,	15-Jan-1999	01-Mar-1998	● Title V Economic Cooepration	No	N/A	Very weak	General commitment to sustainable development. Parties undertake to cooperate	https://eur-lex.europa.eu/resource.html?uri=cellar:d3eef257-9b3f-4adb-

		Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden			Article 48 Environment				on soil and water quality, industrial waste and marine pollution. No detail on the mechanisms for this.	a4ed-941203546998.0008.02/DOC_4&format=PDF
92	EU - Ukraine	Ukraine, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden	01-Jul-2014	23-Apr-2014	● Chapter 13 Trade and Sustainable Development (entire chapter) and Article 294 Trade in Forest Products Sub-section 7 Article 229 Genetic resources, traditional knowledge and folklore	No	N/A	Medium	General commitment to sustainable development and to existing multilateral environmental agreements. Each party has the right to establish own environmental laws. Review of impacts of agreement on sustainable development to be undertaken, with establishment of Advisory Groups including Civil Society and Trade and Sustainable Development Sub-Committee. Section on forests is extremely short and generic, just notes parties will work together for better governance. Section on biodiversity focusses on protection of indigenous knowledge around conservation and references the CBD.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2014:161:FULL&from=EN
93	EU - Vietnam	Vietnam, Austria, Belgium Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta,	13-Jul-2020	01-Aug-2020	● Chapter 13 Trade and Sustainable Development (entire chapter) and Article 13.7 Biological Diversity and Article 13.8 Sustainable Forest Management and	No	N/A	Medium	General commitment to sustainable development and to existing multilateral environmental agreements. Each party has right to determine own sustainable development policies and levels of environmental protection. Parties will not relax environmental protections to encourage trade or investment.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2020:186:FULL&from=EN

		Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden			Trade in Forest Products				Section on biodiversity references CITES and CBD. Section on forests references VPA and FLEGT. Committee on Trade and Sustainable Development is established and reviews impact of the agreement on sustainable development with the assistance of the Advisory Groups.	
94	Eurasian Economic Union (EAEU)	Armenia, Belarus, Kazakhstan, Kyrgyz Republic, Russia	12-Dec-2014	01-Jan-2015	N/A	No	N/A	Very weak	General commitment to sustainable development. Members may impose restrictions on traded goods if such restrictions are necessary for environmental protection.	https://www.un.org/en/ga/sixth/70/docs/treaty_on_eeu.pdf
95	Eurasian Economic Union (EAEU) - Vietnam	Vietnam, Armenia, Belarus Kazakhstan, Kyrgyz Republic, Russia	04-May-2017	05-Oct-2016	● Chapter 12 Sustainable Development	No	N/A	Weak	General commitment to sustainable development. Parties should not weaken environmental protections to attract investment or trade. Parties to periodically review if sustainability objectives are being achieved (though these objectives are very general).	https://rtais.wto.org/UI/PublicSearchByCr.aspx (download)
96	Guatemala - Taiwan	Taiwan, Guatemala	11-Jul-2011	01-Jul-2006	● Section B, Investment, Article 10.15 Environmental Measures Chapter 20, Cooperation, Article 20.12 Cooperation Regarding Environment and Natural Resources	No	N/A	Very weak	Parties should not weaken environmental protections to attract investment or trade. Parties retain right to apply own environmental protections. General commitment to cooperation regarding the environment.	https://www.trade.gov.tw/english/Pages/Detail.aspx?nodeID=676&pid=321547&dl_DateRange=all&txt_SD=&txt_ED=&txt_Keyword=&Pageid=0
97	Gulf Cooperation Council (GCC)	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates	03-Oct-2006	01-Jan-2003	● Article 9 Oil, Gas, and Natural Resources ● Article 11 Environmental Protection	No	N/A	Very weak	Members shall adopt the policies and mechanisms necessary to protect the environment according to all relevant legislation and resolutions adopted within the GCC framework, as representing the minimum level for national rules and legislation.	https://rtais.wto.org/ (Download)

									Members to take into account environmental considerations when developing oil, gas and minerals industries.	
98	Hong Kong - Australia	Australia, Hong Kong	17-Jan-2020	17-Jan-2020	N/A	No	N/A	Very weak	Parties may take measures to protect animal or plant life.	https://www.dfat.gov.au/trade/agreements/in-force/a-hkfta/a-hkfta-text/Pages/default
99	Hong Kong - Chile	Chile, Hong Kong	15-Oct-2014	09-Oct-2014	● Chapter 14 Environment	No	N/A	Weak	General commitment to environmental protection and international multilateral agreements. Parties agree to establish a collaborative framework to work on environmental issues together (no detail). Parties should not weaken environmental protections to attract investment or trade.	https://www.tid.gov.hk/english/trade_relations/hkclfta/text_agreement.html
100	Hong Kong - Georgia	Georgia, Hong Kong	12-Feb-2019	13-Feb-2019	Chapter 13, Environment and Trade	No	N/A	Weak	General commitment to environmental protection and international multilateral agreements. Parties agree to periodically review impact of agreement on the environment. Parties should not weaken environmental protections to attract investment or trade.	https://www.tid.gov.hk/english/ita/fta/hkgefta/text_agreement.html
101	Hong Kong - New Zealand	Hong Kong, New Zealand	03-Jan-2011	01-Jan-2011	N/A - but refers to separate New Zealand - Hong Kong, China Environment Cooperation Agreement	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Refers to separate New Zealand - Hong Kong, China Environment Cooperation Agreement.	https://mfatgovtnz2020.cwp.govt.nz/assets/Trade-agreements/Hong-Kong-China-CEP/NZ-HK-CEP.pdf
102	Iceland - China	China, Iceland	10-Oct-2014	01-Jul-2014	● Article 96 refers to separate Memorandum of Understanding on Environmental Protection Cooperation between the State Environmental Protection Administration of the People's Republic of China and the Ministry	No	N/A	Very weak	Refers to separate MoU on environment	https://www.government.is/media/utanrikisraduneyti-media/media/fta-kina/Iceland-China.pdf

					for the Environment of Iceland.					
103	Iceland - Faroe Islands	Faeroe Islands, Iceland	10-Jul-2008	01-Nov-2006	N/A	No	N/A	Very weak	Mention of cooperation on environment (no detail).	https://d3b1dqw2kzexi.cloudfront.net/media/5351/hoyvikssattmalin-en.pdf
104	India - Japan	India, Japan	14-Sep-2011	01-Aug-2011	● Chapter 1 General Provisions, Article 8 Environmental Protection ● Chapter 8 Investment, Article 99 Environmental Measures	No	N/A	Very weak	General commitment to sustainable development. Right of each party to apply own environmental protections. Parties should not relax environmental protections to attract investment or trade.	https://www.mofa.go.jp/region/asia-paci/india/epa201102/pdfs/ijcepa_ba_e.pdf
105	India - Thailand	India, Thailand	18-Jun-2017	01-Sep-2004	N/A	No	N/A	Very weak	Mention of cooperation on environment (no detail).	https://commerce.gov.in/international-trade/trade-agreements/framework-agreement-with-thailand/
106	Japan - Indonesia	Indonesia, Japan	27-Jun-2008	01-Jul-2008	● Chapter 8 Energy and Mineral Resources, Article 102 Environmental Aspects	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract investment or trade.	https://www.mofa.go.jp/region/asia-paci/indonesia/epa0708/agreement.pdf
107	Japan - Malaysia	Japan, Malaysia	12-Jul-2006	13-Jul-2006	● Article 90 Environmental Measures	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract investment or trade.	https://www.mofa.go.jp/region/asia-paci/malaysia/epa/content.pdf
108	Japan - Mexico	Japan, Mexico	31-Mar-2005	01-Apr-2005	● Article 74 Environmental Measures ● Article 147 Cooperation in the Field of Environment	No	N/A	Very weak	General commitment to sustainable development. Commitment to cooperation on the environment. Parties should not relax environmental protections to attract investment or trade.	https://www.mofa.go.jp/region/latin/mexico/agreement/agreement.pdf
109	Japan - Mongolia	Japan, Mongolia	01-Jun-2016	07-Jun-2016	Article 10.17, Health, Safety and Environmental Measures and Labour Standards	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract investment or trade.	https://www.mofa.go.jp/files/000067716.pdf
110	Japan - Peru	Japan, Peru	24-Feb-2012	01-Mar-2012	N/A - several mentions of general commitment to environmental protection and	No	N/A	Very weak	General commitment to sustainable development and environmental protection.	https://www.mofa.go.jp/region/latin/peru/epa201105/pdfs/jpepa_ba_e.pdf

				sustainable development.					
111	Japan - Philippines	Japan, Philippines	11-Dec-2008	11-Dec-2008	● Article 102 Environmental Measures	No	N/A	Very weak	Parties should not relax environmental protections to attract investment or trade.	https://www.mofa.go.jp/region/asia-paci/philippine/epa0609/main.pdf
112	Japan - Switzerland	Japan, Switzerland	01-Sep-2009	01-Sep-2009	● Article 9, Promotion of Trade in Environmental Products and Environment-Related Services ● Article 101, Health, Safety and Environmental Measures ● Article 118 New Varieties of Plants	No	N/A	Weak	Trade in environmental products and environmental related services is encouraged. Parties should not relax environmental protections to attract investment or trade. Plant life is discussed under the section on IP. The parties also commit to providing same level of protection to new plant genera and species as under the 1991 UPOV Convention.	https://www.mofa.go.jp/region/europe/switzerland/epa0902/agreement.pdf
113	Japan - Thailand	Japan, Thailand	25-Oct-2007	01-Nov-2007	● Article 111 Environmental Measures	No	N/A	Very weak	Parties should not relax environmental protections to attract investment or trade.	https://www.mofa.go.jp/region/asia-paci/thailand/epa0704/agreement.pdf
114	Japan - Vietnam	Japan, Vietnam	01-Oct-2009	01-Oct-2009	● Article 111 Basic Principles (just a mention that the Parties will cooperate on the environment)	No	N/A	Very weak	Just a mention that the Parties will cooperate on the environment.	https://www.mofa.go.jp/region/asia-paci/vietnam/epa0812/agreement.pdf
115	South Korea - Australia	Australia; South Korea	22-Dec-2014	12-Dec-2014	● Chapter 12, Government Procurement, Article 12.8 Technical Specifications ● Chapter 16, Cooperation: Article 16.4 Innovation, Research and Development and Article 16.7 Forestry	No	N/A	Weak	General commitment to sustainable development and cooperation on environmental issues (article 16.4). Provision for government procurement to apply technical specifications for convervation or environmental protection. Forest section lists options for further cooperation between the parties including on thinning, fire management, impacts of climate change, combatting illegal logging (but without specifics).	https://www.dfat.gov.au/sites/default/files/korea-australia-free-trade-agreement.pdf
116	South Korea - Central America	Costa Rica, El Salvador, Honduras, Nicaragua,	15-Apr-2021	01-Oct-2019	● Chapter 17 Environment	No	N/A	Weak	General commitment to sustainable development and cooperation on environmental issues, including forestry and	http://www.customs.go.kr/download/ftaportalkor/_down/trty/han_ma_01_eng.pdf

		Panama, South Korea							biological diversity. Parties should not relax environmental protections to attract trade or investment. Parties have the right to apply their own environmental protections. Environmental Committee is established to set cooperation activities and review outcomes.	
117	South Korea - Chile	Chile, South Korea	08-Apr-2004	01-Apr-2004	● Article 10.18 Environmental Measures	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Parties should not relax environmental protections to attract trade or investment. Parties have the right to apply their own environmental protections.	https://www.fta.go.kr//webmodule/_PSD_FTA/cl/1/Text_of_Agreement_eng.pdf
118	South Korea - Colombia	Colombia, South Korea	05-Oct-2016	15-Jul-2016	● Chapter 16 Trade and Sustainable Development (whole chapter) and Section A Environment, Article 16.5 Biological Diversity ● Chapter 17 Cooperation, Article 17.5 Forestry Cooperation	No	N/A	Weak	General commitment to sustainable development and environmental protection. Parties should not relax environmental protections to attract trade or investment. Parties have the right to apply their own environmental protections. Biodiversity section references CBD. Council on Sustainable Development is established, to discuss relevant issues and cooperation. No civil society participation. Section on Forests encourages cooperation including in development of indicators of sustainable forest management, R&D, investment in technology.	http://www.customs.go.kr/download/ftaportalkor/_down/trty/2_kor_col_agreement_eng.pdf
119	South Korea - India	India, South Korea	01-Jul-2010	01-Jan-2010	● Article 10.16 Health, Safety and Environmental Measures Annex 1 Schedule of Korea, All Manufacturing Sectors; Sale,	No	No	Weak	General commitment to sustainable development and environmental protection. Parties should not relax environmental protections to attract trade or investment. Parties have the right to apply their own environmental	https://www.fta.go.kr//webmodule/_PSD_FTA/in/1/ALL_OF_CEPA_E.pdf

					maintenance and repair of low-emission motor vehicles Annex II Schedule of India: Forestry				protections. In the Annexes (Schedule of Korea and India), recyclers in Korea must pay levy in case of failure to meet recycling duty. India reserves the right to adopt or maintain any measure with respect to forestry, logging and related service activities	
120	South Korea - New Zealand	South Korea, New Zealand	21-Dec-2015	20-Dec-2015	N/A	No	N/A	Very weak	General commitment to sustainable development and cooperation on the environment.	http://www.customs.go.kr/download/ftaportalkor/_down/trty/han_nz_01_eng.pdf
121	South Korea - Singapore	South Korea, Singapore	21-Feb-2006	02-Mar-2006	● Chapter 18 Cooperation, Article 18.9 Environment	No	N/A	Very weak	References a separate MoU on the Environment.	https://www.fta.go.kr//webmodule/_PSD_FTA/sg/1/KSFTA.pdf
122	South Korea - Turkey	South Korea, Turkey	30-Apr-2013	01-May-2013	● Chapter 5 Trade and Sustainable Development	No	N/A	Weak	General commitment to sustainable development and encourage trade that promote this. Parties reaffirm commitment to existing multilateral environmental agreements. Parties have the right to apply their own environmental protections. Parties should not relax environmental protections to attract trade or investment. Parties identify areas of cooperation on the environment including tackling deforestation, illegal logging, sustainable fisheries and biodiversity in related to bio-fuels.	http://www.customs.go.kr/download/engportal/han_turkey_02_01.pdf
123	South Korea - United States of America	South Korea - United States of America	15-Mar-2012	15-Mar-2012	● Chapter 20 Environment (whole chapter) Article 11.10 Investment and Environment	No	N/A	Weak	General commitment to sustainable development and to existing multilateral environmental agreements. Each party has the right to establish own environmental laws. Parties should not relax environmental protections to attract trade or investment. Environmental Affairs Council established, meets once per	https://www.fta.go.kr//webmodule/_PSD_FTA/us/doc/2E_all.pdf

									year to oversee implementation of environment chapter. Public participation is applied at national level on discretion of the Parties.	
124	Latin American Integration Association (LAIA)	Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico, Paraguay, Peru, Uruguay, Venezuela	01-Jul-1982	18-Mar-1981	N/A	No	N/A	Very weak	Member states to take into account preservation of the environment.	https://rtais.wto.org/ (Download)
125	Mexico - Central America	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Mexico	20-Jan-2014	01-Sep-2012	● Artículo 11.16 Medidas Relativas al Ambiente	No	N/A	Weak	General commitment to sustainable development. Each party has the right to establish own environmental laws. Parties should not relax environmental protections to attract trade or investment.	http://www.sice.oas.org/Trade/CACM_MEX_FTA/Text_s.asp#Cap%C3%ADtuloI (Spanish)
126	Mexico - Panama	Mexico, Panama	06-Jun-2016	01-Jul-2015	● Capítulo 10, Inversión, Artículo 10.9: Medidas Medioambientales	No	N/A	Weak	Each party has the right to establish own environmental laws. Parties should not relax environmental protections to attract trade or investment.	https://www.mici.gob.pa/tratados-comerciales-vigentes/tlc
127	New Zealand - Taiwan	Taiwan, New Zealand	25-Nov-2013	01-Dec-2013	● Chapter 17 Trade and Environment	No	N/A	Weak	General commitment to sustainable development. Each party has the right to establish own environmental laws. Parties should not relax environmental protections to attract trade or investment. Parties eliminate all tariffs on environmental goods. Parties note that voluntary mechanisms and incentives are good at achieving environmental goals. Review of Trade and Environment chapter after three years.	https://www.nzcio.com/assets/NZCIO-documents/ANZTEC-Final-Text-10-July-2013-NZ.pdf
128	New Zealand - Malaysia	Malaysia, New Zealand	07-Feb-2012	01-Aug-2010	● Article 10.15 Investment and Environment	No	N/A	Weak	General commitment to sustainable development. Each party has the right to apply own environmental laws. Forestry mentioned as an area of cooperation (no detail).	https://mfatgovtnz2020.cwp.govt.nz/assets/Trade-agreements/Malaysia-NZ-FTA/mnzfta-text-of-agreement.pdf

129	Nicaragua - Taiwan	Taiwan, Nicaragua	09-Jul-2009	01-Jan-2008	● Chapter 19 Environment (whole chapter) and Article 19.08 Environmental Cooperation	No	N/A	Medium	General commitment to sustainable development and commitment to cooperation on environmental matters via an Environmental Cooperation Mechanism, which may, on discretion of each Party, also include views of the public at national consultative level. Biodiversity mentioned as an area of cooperation. Each party has the right to apply own environmental laws. Parties note that voluntary mechanisms and incentives are good at achieving environmental goals. Environmental Affairs Committee established, meets once every two years to review progress of Environment chapter. Each party shall establish a national consultative body including representatives from the public.	https://www.trade.gov.tw/english/Pages/List.aspx?nodeID=677
130	Pacific Agreement on Closer Economic Relations Plus (PACER Plus)	Australia, Solomon Islands, Cook Islands, Kiribati, Nauru, Vanuatu, New Zealand, Niue, Tonga, Tuvalu, Samoa	08-Apr-2021	13-Dec-2020	● Article 19, Investment and Environment, Helath and Other Regulatory Objectives	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract trade or investment.	https://www.dfat.gov.au/trade/agreements/in-force/pacer/documents
131	Pacific Alliance	Chile, Colombia, Mexico, Peru	03-Nov-2016	01-May-2016	N/A	No	N/A	Very weak	Parties have the right to impose environmental measures to protect animal or plant life.	http://www.acuerdoscomerciales.gob.pe/En_Vigencia/Alianza_Pacifico/Textos_Acuerdo.html
132	Panama - Taiwan	Taiwan, Panama	28-Jul-2009	01-Jan-2004	● Article 10.15 Environmental Measures	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract trade or investment.	https://rtais.wto.org/rtadocs/425/TOA/English/Panama-Chinese%20Taipei%20Agreement.pdf
133	Panama - Costa Rica (Panama - Central America)	Costa Rica, Panama	07-Apr-2009	23-Nov-2008	● Artículo 10.15 Medidas relativas al medio ambiente	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract trade or investment.	http://www.sice.oas.org/Trade/Capan/capan1.asp

134	Panama - El Salvador (Panama - Central America)	El Salvador, Panama	24-Feb-2005	11-Apr-2003	● Artículo 10.15 Medidas relativas al medio ambiente	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract trade or investment.	http://www.sice.oas.org/Trade/Capan/capan1.asp
135	Panama - Guatemala (Panama - Central America)	Guatemala, Panama	22-Apr-2013	20-Jun-2009	● Artículo 10.15 Medidas relativas al medio ambiente	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract trade or investment.	http://www.sice.oas.org/Trade/Capan/capan1.asp
136	Panama - Honduras (Panama - Central America)	Honduras, Panama	16-Dec-2009	09-Jan-2009	● Artículo 10.15 Medidas relativas al medio ambiente	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract trade or investment.	http://www.sice.oas.org/Trade/Capan/capan1.asp
137	Panama - Nicaragua (Panama - Central America)	Nicaragua, Panama	25-Feb-2013	21-Nov-2009	● Artículo 10.15 Medidas relativas al medio ambiente	No	N/A	Very weak	General commitment to sustainable development. Parties should not relax environmental protections to attract trade or investment.	http://www.sice.oas.org/Trade/Capan/capan1.asp
138	Panama - Peru	Panama, Peru	23-Apr-2012	01-May-2012	N/A	No	N/A	Very weak	Parties have the right to impose environmental measures to protect animal or plant life.	http://www.acuerdoscomerciales.gob.pe/En_Vigencia/Panama/Textos_Acuerdo.html
139	Peru - Australia	Australia, Peru	24-Jun-2020	11-Feb-2020	● Chapter 19 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Parties should not relax environmental protections to attract trade or investment.	https://www.dfat.gov.au/trade/agreements/in-force/pafta/full-text/Pages/chapter-19-environment
140	Peru - Chile	Chile, Peru	29-Nov-2011	01-Mar-2009	● Artículo 11.13 Inversión y Medioambiente	No	N/A	Very weak	Parties should not relax environmental protections to attract trade or investment.	https://www.subrei.gob.cl/acuerdos-comerciales/acuerdos-comerciales-vigentes/peru
141	Peru - China	China, Peru	03-Mar-2010	01-Mar-2010	● Article 162 Cooperation on Forestry Matters and Environmental Protection	No	N/A	Weak	General commitment to sustainable development. Forest section lists areas for possible cooperation, including increasing APACs capacity to act as a carbon sink.	http://fta.mofcom.gov.cn/topic/enperu.shtml
142	Peru - Honduras	Honduras, Peru	17-Oct-2018	01-Jan-2017	● Artículo 12.8 Medidas Medioambientales	No	N/A	Very weak	Parties should not relax environmental protections to attract trade or investment.	http://www.acuerdoscomerciales.gob.pe/En_Vigencia/Honduras/Textos_Acuerdo.html (Spanish)
143	Peru – South Korea	South Korea, Peru	09-Aug-2011	01-Aug-2011	● Article 9.9 Health, Safety, and Environmental Measures	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Parties should not relax	https://www.fta.go.kr//webmodule/_PSD_FTA/pe/1/eng.pdf

					● Chapter 19, Environment (whole chapter) and Article 19.6 Biological Diversity ● Chapter 20 Cooperation, Article 20.7 Forestry Cooperation				environmental protections to attract trade or investment. Agreement to promote trade favouring sustainable development. Each party has the right to establish own environmental laws. Biodiversity section references CBD. Parties will strive to review environmental impacts of the trade agreement (though no mechanism outlined for this). Parties will encourage and facilitate cooperation in the area of forests, including forest fire management	
144	Peru - Mexico	Mexico, Peru	22-Feb-2012	01-Feb-2012	● Artículo 11.17 Medidas relativas al medio ambiente	No		N/A	Very weak	Parties should not relax environmental protections to attract trade or investment. Parties are able to apply their own environmental protections.	http://www.acuerdoscomerciales.gob.pe/En_Vigencia/Mexico/Textos_Acuerdo.html
145	Peru - Singapore	Peru, Singapore	30-Jul-2009	01-Aug-2009	● Article 10.8 Investment and Environment	No		N/A	Very weak	Parties are able to adopt measures to ensure investment in their territory is environmentally sensitive.	https://www.enterprisesg.gov.sg/-/media/esg/files/non-financial-assistance/for-companies/free-trade-agreements/Peru_Singapore_FTA/Legal_text/PESFTA_Legal_Text.pdf
146	Singapore - Australia	Australia, Singapore	25-Sep-2003	28-Jul-2003	● Chapter 6 Government Procurement, Article 3 Exceptions ● Chapter 8 Investment, Article 20 Investment and Environmental, Health and other Regulatory Objectives	No		N/A	Very weak	Parties are able to adopt measures to protect the environment. Parties are able to adopt measures to ensure investment in their territory is environmentally sensitive.	https://www.dfat.gov.au/trade/agreements/in-force/safta/official-documents/Pages/default
147	Southern African Development Community (SADC)	Angola, Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Zimbabwe,	02-Aug-2004	01-Sep-2000	● Chapter 7 Cooperation	No		N/A	Very weak	Parties will involve private sector, civil society, NGOs in the process of cooperation on natural resources and the environment (no further detail).	https://www.sadc.int/files/5314/4559/5701/Consolidated_Text_of_the_SADC_Treaty_-_scanned_21_October_2015.pdf

		Eswatini, Tanzania, Zambia								
148	Southern Common Market (MERCOSUR)	Argentina, Brazil, Paraguay, Uruguay	17-Feb-1992(G) 05-Dec-2006(S)	29-Nov-1991(G) 07-Dec-2005(S)	N/A	No	N/A	Very weak	Mention that economic development must preserve the environment.	http://www.sice.oas.org/Trade/MRCSR/TreatyAsun_e.asp#Preamble
149	Switzerland - China	China, Switzerland	30-Jun-2014	01-Jul-2014	● Chapter 12 Environmental Issues	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Parties should not weaken environmental regulations to encourage investment or trade. Parties should make funds available to encourage sustainable trade. The chapter on environmental issues will be periodically reviewed as part of the agreement's joint committee process.	http://fta.mofcom.gov.cn/ruishi/xieyi/xieyizw_en.pdf
150	Thailand - New Zealand	New Zealand, Thailand	01-Dec-2005	01-Jul-2005	N/A	No	N/A	Very weak	General commitment to sustainable development.	https://mfatgovtnz2020.cwp.govt.nz/assets/Trade-agreements/Thailand-NZ-CEP/thainzcep-agreement.pdf
151	Trans-Pacific Strategic Economic Partnership	Brunei Darussalam, Chile, New Zealand, Singapore	18-May-2007	28-May-2006	● Chapter 16 Strategic Partnership, Article 16.8 Primary Industry	No	N/A	Very weak	General commitment to sustainable development. Parties agree to build on existing agreements in the forestry sector.	https://www.mfat.govt.nz/assets/Trade-agreements/P4/Full-text-of-P4-agreement.pdf
152	Turkey - Chile	Chile, Turkey	25-Feb-2011	01-Mar-2011	● Title IV Cooperation, Article 37 Cooperation	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Parties agree to cooperate on environmental issues such as climate change, biodiversity, water quality.	http://www.sice.oas.org/Trade/CHL_TUR_Final/Text_e.asp#Preamble
153	Turkey - Malaysia	Malaysia, Turkey	20-Feb-2017	01-Aug-2015	● Article 9.10 Cooperation in Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Parties agree to cooperate on environmental issues such as climate change, biodiversity, water quality.	https://fta.miti.gov.my/miti-fta/resources/Malaysia%20-%20Turkey/MTFTA_Main_Agreement.pdf
154	Turkey - Palestine	Palestine, Turkey	01-Sep-2005	01-Jun-2005	● Article 37 Cooperation in the Agriculture and Fisheries	No	N/A	Very weak	General commitment to sustainable development. Parties agree to cooperate on	https://trade.gov.tr/data/5b910a7013b8770becf1e696/74ea54777818f2eb514444e71b489d37.pdf

									forestry via exchange of knowledge.	
155	Ukraine - Israel	Israel, Ukraine	13-Jan-2021	01-Jan-2021	● Chapter 7 Trade and Environment	No	N/A	Weak	Encourages voluntary corporate social responsibility. Parties should not relax environmental protections to attract trade or investment. Parties are able to apply their own environmental protections. Sub-Committee on Trade and Environment is established to review implementation of this chapter within five years and shall endeavour to involve the public in the implentation of the chapter, may involve them in the review if it wishes.	https://www.gov.il/BlobFolder/policy/isr-ukraine-fta/he/sahar-hutz_agreements_israel-ukraine-fta-en.pdf
156	United Kingdom - Albania	Albania, United Kingdom	03-May-2021	03-May-2021	N/A	No	N/A	Weak	No mention of environment, however, UK agreemenet not yet in force and references original EU agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962903/CS_Albania_1.2021_UK_Albania_Partnership_Trade_and_Cooperation_Agreement.pdf
157	United Kingdom - Cameroon	Cameroon, United Kingdom	31-Dec-2020	01-Jan-2021	● Title V, Chapter 5 Sustainable development, Article 60 Continuation of negotiations on sustainable development ● Title III, Chapter 5, Forestry governance and trade in timber and forest products	No	N/A	Medium	General commitment to sustainable development and the SDGs. Commitment to continuing negotiations on areas of sustainable development including levels of environmental protection, right to regulate, application of international standards, and monitoring. Parties agree to work to promote trade of timber and forest products that come from objectively verifiable sources, to put in place an audit and surveillance system that is independent of the control chain, and implement market measures to increase confidence in the origin of forest products. Cameroon agrees to encourage work towards building a regional framework to govern timber	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/978691/MS_2.2021_UK_Cameroon_Interim_Agreement_Economic_Partnership.pdf

									and forest products. The parties commit to capacity building. CITES is referenced.	
158	United Kingdom - Canada	Canada, United Kingdom	31-Dec-2020(G) 29-Jun-2021(S)	01-Jan-2021(G) 01-Apr-2021(S)	● Chapter 7 Trade and Sustainable Development ● Chapter 9 Environmental Protection	No	N/A	Weak	General commitment to sustainable development. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. A civil society forum is created to review environmental provisions. The agreement notes that it includes commitments towards the sustainable management of forests and climate change however these are not outlined in the document. References continuation of rights and obligations of original EU-CETA countries agreement.	https://www.gov.uk/government/publications/ukcanada-agreement-on-trade-continuity-cs-canada-no12020
159	United Kingdom - CARIFORUM States	Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, United Kingdom	31-Dec-2020	01-Jan-2021	● Part I Trade Partnership for Sustainable Development Chapter 4 Environment	No	N/A	Weak	General commitment to sustainable development and the SDGS. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. Parties agree to monitor the operation of the Agreement via their respective participatory processes.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/803413/1._CARIFORUM_Command_Paper_Part_One.pdf
160	United Kingdom - Central America	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Medium	General commitment to sustainable development. References continuation of rights and obligations of original EU-Central America countries agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/823557/MS_32.2019_Agreement_establishing_an_association_between_the_UK_and_Central_America.pdf
161	United Kingdom - Chile	Chile, United Kingdom	31-Dec-2020	01-Jan-2021	● Article 28 Cooperation on the Environment	No	N/A	Very weak	General commitment to sustainable development and	https://eur-lex.europa.eu/resource.html?uri=cellar:1f641ed4-e709-43cc-

									cooperation on the environment.	a112-d75455ab3ecb.0016.02/DOC_1&format=PDF
162	United Kingdom - Colombia	Colombia, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-Andean countries agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/808914/MS_22.2019_Andean_Trade.pdf
163	United Kingdom - Eastern and Southern Africa States	Mauritius, Seychelles, Zimbabwe, United Kingdom	31-Dec-2020	01-Jan-2021	● Article 50 Environment	No	N/A	Weak	General commitment to sustainable development and the SDGS. Objective to cooperate on environment, including forestry, biodiversity, reducing environmental degradation, and developing new ESA industries relating to the environment (no detail). Sections on fisheries, energy, water, but not forests.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/776564/MS_4.2019_ESA_v1_pt1.pdf
164	United Kingdom - Ecuador and Peru	Colombia, Ecuador, Peru, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-Andean countries agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/808914/MS_22.2019_Andean_Trade.pdf
165	United Kingdom - Egypt	Egypt, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-Egypt countries agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943572/CS_Egypt_1.2020_Agreement_establishing_an_Association_with_Egypt.pdf
166	United Kingdom - Georgia	Georgia, United Kingdom	31-Dec-2020	01-Jan-2021	● Chapter 13 Trade and sustainable development (whole chapter) and Article 224 Biological diversity and Article 225 Sustainable management of	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. Biodiversity section references	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/844167/CS_Georgia_1.2019_UK_Georgia_Strategic_Partnership_and_Cooperation_Agreement.pdf

					forests and trade in forest products				CITES. Forest section references CITES and has general commitments towards combatting illegal logging and promoting consumption of timber from sustainably managed forests.	
167	United Kingdom - Iceland, Liechtenstein and Norway	Iceland, Liechtenstein, Norway, United Kingdom	30-Nov-2021	01-Dec-2021	● Chapter 13 Trade and Sustainable Development Section 13.4 Trade and Environment (whole chapter) and Article 13.25 Trade and Biological Diversity and Article 13.27 Sustainable Forest Management and Associated Trade	No	N/A	Medium	General commitment to sustainable development and existing multilateral environmental agreements. General commitment to cooperation on sustainable development and trade. Biodiversity section references CITES and CBD. Forest section references CITES and REDD+, general commitment to cooperate on promoting effective forest governance, sustainable management of forests, monitoring of supply chains etc. Parties establish a Sub-Committee on Trade and Sustainable Development, which will establish domestic groups including civil society to oversee implementation of the chapter.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003335/Free_trade_agreement_between_UK-Northern_Ireland_and_Liechtenstein__Iceland_and_Norway_volume_1.pdf
168	United Kingdom - Israel	Israel, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original Euro-Mediterranean countries agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781440/CS_Israel_1.2019_Trade.pdf
169	United Kingdom - Japan	Japan, United Kingdom	31-Dec-2020	01-Jan-2021	● Chapter 16 Trade and Sustainable Development (whole chapter) and Article 16.6 Biological diversity and Article 16.7	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/929181/CS_Japan_1.2020_UK_Japan_Agreement_Comprehensive_Economic_Partnership__v1.pdf

					Sustainable management of forests and trade in timber and timber products				attract trade or investment. Biodiversity section references CITES. Forest section mentions cooperating to combat illegal logging, encourage sustainable management of forests and conservation, exchange information (no detail).	
170	United Kingdom - Jordan	Jordan, United Kingdom	03-May-2021	01-May-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-Jordan Association Agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/854391/CS_Jordan_1.2019_UK_Jordan_Agreement_establishing_an_Association.pdf
171	United Kingdom - Kenya	Kenya, United Kingdom	31-Dec-2020	01-Jan-2021	● Article 92 Environment	No	N/A	Weak	General commitment to sustainable development and in the areas of fisheries, agricultural development, food security, technology, water use. Parties agree to cooperate on the environment, including on biodiversity and forestry.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945516/MS_9.2020_Economic_Partnership_Agreement_UK_Kenya_Member_of_East_Africa_Community.pdf
172	United Kingdom – South Korea	South Korea, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Medium	General commitment to sustainable development and environmental protection. Carries over EU legislation.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/831988/UK_Korea_Free_Trade_Agreement_v1.pt1.pdf
173	United Kingdom - Kosovo	United Kingdom, Kosovo	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	Agreement to increase energy efficiency, renewable energy sources and assess and reduce the environmental impact of the energy sector. References continuation of rights and obligations of original EU-Kosovo Agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/854384/CS_Kosovo_1.2019_UK_Kosovo_Partnership__Trade_and_Cooperation_Agreement.pdf
174	United Kingdom - Moldova	Moldova, United Kingdom	31-Dec-2020	01-Jan-2021	● Chapter 16 Environment ● Chapter 17 Climate Action Article 336 Sustainable management of forests and trade in forest products	No	N/A	Medium	General commitment to sustainable development and mention in context of fisheries sector, energy cooperation and transport sectors. Chemicals, air, water quality, biodiversity are highlighted as areas of environmental cooperation.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/953190/CS_Moldova_1.2021_Strategic_Partnership_Trade_and_Cooperation.pdf

					Article 335 Biological diversity				Forest section includes potential for development of a VPA and references CITES. Biodiversity section references CITES and CBD. Establishment of Trade and Sustainable Development Sub-Committee and joint civil society forum once per year.	
175	United Kingdom - Morocco	Morocco, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment. References continuation of rights and obligations of original EU-Morocco Agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/854581/CS_Morocco_2.2019_UK_Morocco_Agreement_establishing_an_Association.pdf
176	United Kingdom - North Macedonia	North Macedonia, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-North Macedonia Agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/942963/CS_N_Macedonia_1.2020_Partnership_Trade_and_Cooperation.pdf
177	United Kingdom - Palestine	Palestine, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-Palestinian Authority Interim Association Agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781389/MS_14.2019_IPTP_PLO.pdf
178	United Kingdom - SACU Southern African Customs Union) and Mozambique	Mozambique, United Kingdom, Botswana, Lesotho, Namibia, South Africa, Eswatini	08-Jan-2021	01-Jan-2021	● Chapter II Trade and Sustainable Development	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. Parties agree to cooperate on sustainable forest management, fishing practices, and biodiversity, but no detail.	https://www.sacu.int/docs/agreements/2021/SACU-Mozambique-UK-EPA-EN.pdf
179	United Kingdom - Serbia	United Kingdom, Serbia	18-May-2021	20-May-2021	● Article 111 Environment	No	N/A	Weak	General commitment to sustainable development, halting environmental degradation and Kyoto	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984929/CS_Serbia_1.2021_

									Protocol. Consideration of environment under transport section. References continuation of rights and obligations of original EU-Serbia FTA.	UK_Serbia_Partnership_Trade_and_Cooperation_Agreement.pdf https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:22013A1018(0
180	United Kingdom - Singapore	Singapore, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Medium	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-Singapore FTA.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/944339/CS_Singapore_1.2020_Free_Trade_Agreement.pdf
181	United Kingdom - Tunisia	Tunisia, United Kingdom	31-Dec-2020	01-Jan-2021	N/A	No	N/A	Very weak	No mention of sustainable development or the environment, however, UK agreement is not yet in force and references continuation of rights and obligations of original EU-Mediterranean countries agreement.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/842050/CS_Tunisia_1.2019_UK_Tunisia_Agreement_establishing_an_Association.pdf
182	United Kingdom - Ukraine	Ukraine, United Kingdom	31-Dec-2020	01-Jan-2021	● Chapter 13 Trade and Sustainable Development and Article 280 Trade in Forest Products	No	N/A	Medium	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. Parties commit to monitoring environmental impact of Agreement, each party will designate an existing or new Advisory group including civil society. Civil Society Forum meets once per year. Forest section is very weak, general commitment to promote forest governance and legal and sustainable forest products.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/934935/CS_Ukraine_1.2020_UK_Ukraine_Political_Free_Trade_Strat_Partner_Agreement.pdf
183	United Kingdom - Vietnam	Vietnam, United Kingdom	31-Dec-2020	01-Jan-2021	● Chapter 13 Trade and Sustainable Development (EU link, whole chapter) and	No	N/A	Medium	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/949053/ccs1220795270-uk-vietnam-free-trade-agreement-text.pdf

					Article 13.7 Biological Diversity and Article 13.8 Sustainable Forest Management and Trade in Forest Products				Parties must not weaken environmental protections to attract trade or investment. Committee on Sustainable Development is established and appoints domestic advisory groups including civil society to review implementation of chapter. Biodiversity section references CITES and CBD. Forest section encourages exchange of information and cooperation at regional and global levels. Transfers over provisions in EU-Vietnam FTA.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2020:186:FULL&from=EN#page=132
184	United States of America - Australia	Australia, United States of America	22-Dec-2004	01-Jan-2005	● Article 11.11 Investment and Environment Chapter 19 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to apply own environmental protections. Parties should not relax environmental protections to attract investment or trade. Parties recognise that voluntary market based measures achieve high levels of environmental protection. Parties may establish a Subcommittee on Environmental Affairs comprising of government officials, to review operation of chapter on environment. Parties must provide 'an opportunity' for the public to provide views. The Parties agree to negotiate a specific United States–Australia Joint Statement on Environmental Cooperation.	https://ustr.gov/sites/default/files/uploads/agreements/fta/australia/asset_upload_file148_5168.pdf
185	United States of America - Bahrain	Bahrain, United States of America	08-Sep-2006	01-Aug-2006	● Chapter 16 Environment	No	N/A	Weak	Right of each party to apply own environmental protections. Parties should not relax environmental protections to attract investment or trade. Parties recognise that	https://ustr.gov/trade-agreements/free-trade-agreements/bahrain-fta/final-text

									voluntary market based measures achieve high levels of environmental protection and commit to promote these. Parties may establish a Subcommittee on Environmental Affairs comprising of government officials, to review operation of chapter on environment. Parties must provide 'an opportunity' for the public to provide views. The Parties agree to negotiate a specific United States–Bahrain Joint Statement on Environmental Cooperation.	
186	United States of America - Chile	Chile, United States of America	16-Dec-2003	01-Jan-2004	● Chapter Nineteen Environment, and Annex 19.3 United States–Chile Environmental Cooperation Agreement	No	N/A	Weak	General commitment to sustainable development. Right of each party to apply own environmental protections. Parties should not relax environmental protections to attract investment or trade. Parties recognise that voluntary market based measures achieve high levels of environmental protection. Parties establish an Environmental Affairs Council comprising of cabinet level or equivalent officials, to review operation of chapter on environment. Meetings will include a public session unless the Parties disagree. A specific United States–Chile Environmental Cooperation Agreement is set out, parties agree to cooperate on developing a Pollutant Release and Transfer Register in Chile, reducing mining pollution, improving environmental enforcement and compliance assurance, sharing private sector expertise, improving agricultural practices, improving wildlife protection	https://ustr.gov/trade-agreements/free-trade-agreements/chile-fta/final-text

									and management, reducing Methyl Bromide emissions, increasing the use of cleaner fuels. Parties may sue for violation of environmental laws and may consider remedies and sanctions such as clean-up, fines, injunctions, closure of facilities.	
187	United States of America - Colombia	Colombia, United States of America	08-May-2012	15-May-2012	● Chapter Eighteen Environment (whole chapter) and Article 18.11 Biological Diversity	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to apply own environmental protections. Parties should not relax environmental protections to attract investment or trade. Parties recognise that voluntary market based measures achieve high levels of environmental protection. Parties establish an Environmental Affairs Council to review operation of chapter on environment, which should provide for public participation. Biodiversity section highlights need to listen to local indigenous knowledge and references commitment to CITES (in Annex). Parties may sue for violation of environmental laws and may consider remedies and sanctions such as clean-up, fines, injunctions, closure of facilities.	https://ustr.gov/trade-agreements/free-trade-agreements/colombia-tpa/final-text
188	United States of America - Jordan	Jordan, United States of America	15-Jan-2002	17-Dec-2001	● Article 5 Environment	No	N/A	Very weak	General commitment to sustainable development and environmental protection. Right of each party to apply own environmental protections. Parties should not relax environmental protections to attract investment or trade.	https://ustr.gov/sites/default/files/Jordan%20FTA.pdf

189	United States of America - Morocco	Morocco, United States of America	30-Dec-2005	01-Jan-2006	● Chapter 17 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. Parties highlight importance of voluntary market based measures. Parties will issue a United States-Morocco Joint Statement on Environmental Cooperation and set up a committee to monitor cooperation activities.	https://ustr.gov/trade-agreements/free-trade-agreements/morocco-fta/final-text
190	United States of America - Oman	Oman, United States of America	30-Jan-2009	01-Jan-2009	● Chapter 17 Environment	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. Parties highlight importance of voluntary market based measures. A Subcommittee on Environmental Affairs may be established by the parties, will also provide for public views.	https://ustr.gov/trade-agreements/free-trade-agreements/oman-fta/final-text
191	United States of America - Panama	Panama, United States of America	29-Oct-2012	31-Oct-2012	● Chapter 17 Environment	No	N/A	Medium	General commitment to sustainable development and existing multilateral environmental agreements. Right of each party to set their own environmental protections. Parties must not weaken environmental protections to attract trade or investment. Parties highlight importance of voluntary market based measures. An Environmental Affairs Council comprising cabinet-level	https://ustr.gov/trade-agreements/free-trade-agreements/panama-tpa/final-text

									or equivalent representatives is established, each meeting will include a public session. An environmental cooperation agreement is also established, parties to cooperate on environmental management systems, voluntary and market based measures, biodiversity conservation, technology etc. Establishes a secretariat for environmental enforcement matters under the Agreement.	
192	United States of America - Peru	Peru, United States of America	03-Feb-2009	01-Feb-2009	● Chapter 18 Environment (whole chapter) and Article 18.11 Biological Diversity and Annex 18.3.4 Annex on Forest Sector Governance	Yes	Yes	Strong	See paper for details	https://ustr.gov/trade-agreements/free-trade-agreements/peru-tpa/final-text
193	United States of America - Singapore	Singapore, United States of America	17-Dec-2003	01-Jan-2004	● Article 18.6 Environmental Cooperation	No	N/A	Weak	General commitment to sustainable development. Memorandum of Intent on Cooperation in Environmental Matters to be entered into between the Government of Singapore and the United States and in other fora. Commitment to take into account public comment and encourage citizen participation via public-private partnerships. Parties should encourage corporate social responsibility.	https://ustr.gov/sites/default/files/uploads/agreements/fta/singapore/asset_upload_file708_4036.pdf
194	United States of America – Mexico - Canada Agreement (USMCA/CUSMA/T-MEC)	Canada, Mexico, United States of America	16-Sep-2020	01-Jul-2020	● Chapter 14 Investment Article 14.17 Corporate Social Responsibility ● Chapter 24 Environment (whole chapter) and Article 24.15 Trade and Biodiversity and Article 24.22:	No	N/A	Weak	General commitment to sustainable development and existing multilateral environmental agreements. Parties should encourage corporate social responsibility. Parties recognise that voluntary market based measures achieve high levels of environmental protection. Right of each party to set their own environmental protections.	https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between

					Conservation and Trade and Article 24.23: Sustainable Forest Management and Trade				Parties must not weaken environmental protections to attract trade or investment. Parties shall provide for written receipt of questions and considerations from the public regarding environment chapter and establish an Environment Committee composed of senior government representatives which meets once every two years and provides for public input as appropriate. Includes sections on ozone layer, marine pollution, fisheries, marine species conservation, IUU fishing, air quality, biodiversity, conservation, forests. Section on biodiversity is generic, highlights public consultation is needed. Conservation section references CITES. Forest section has generic references to combatting illegal logging and promoting sustainable forest management.	
195	West African Economic and Monetary Union (WAEMU)	Benin, Côte d'Ivoire, Mali, Niger, Senegal, Togo, Burkina Faso	27-Oct-1999	01-Jan-2000	● Article 4	No	N/A	Very weak	Mention of sustainable development in the introduction. Right of each party to establish own level of environmental protection and regulate if needed to protect animal or plant life/health.	http://www.uemoa.int/fr/system/files/fichier_article/traitreviseuemoa.pdf

Table S3. Past studies evaluating the impact of oil palm certification schemes. Three assessment outcomes were identified: certification had positive (P), neutral (O), or negative impact (N).

Scheme	Sustainability dimension evaluated	References	Country or region	Producer type	Time period assessed	Evidence type	Assessment outcome
RSPO	Deforestation or biodiversity	1. Heilmayr, R., Carlson, K.M. & Benedict, J.J. (2020) Deforestation spillovers from oil palm sustainability certification. Environmental Research Letters 15, 075002.	Kalimantan	Plantations	2009-2016	Quasi-experimental and spillover effect	O
		2. Lee, J.S.H., Miteva, D.A., Carlson, K.M. et al. (2020) Does oil palm certification create trade-offs between environment and development in Indonesia? Environmental Research Letters 15, 124064.	Sumatra and Kalimantan, Indonesia	Plantations	2003-2014	Quasi-experimental	P
		3. Carlson, K.M., Heilmayr, R., Gibbs, H.K. et al. (2018) Effect of oil palm sustainability certification on deforestation and fire in Indonesia. Proceedings of the National Academy of Sciences 115, 121-126.	Indonesia	Plantations	2001-2015	Quasi-experimental	P
		4. Morgans, C.L., Meijaard, E., Santika, T. et al. (2018) Evaluating the effectiveness of palm oil certification in delivering multiple sustainability objectives. Environmental Research Letters 13, 064032.	Kalimantan	Plantations	2009-2014	Quasi-experimental	O
		5. Furumo, P.R., Rueda, X., Rodríguez, J.S. et al. (2020) Field evidence for positive certification outcomes on oil palm smallholder management practices in Colombia. Journal of Cleaner Production 245, 118891.	Magdalena, Colombia	Independent smallholders	2017	Quasi-experimental	P
		6. Gatti, R.C., Liang, J., Velichevskaya, A. et al. (2019) Sustainable palm oil may not be so sustainable. Science of the Total Environment 652, 48-51.	Indonesia and Malaysia	Plantations	2001-2016	Case-control	O
		7. Azhar, B., Saadun, N., Puan, C.L., et al. (2015) Promoting landscape heterogeneity to improve the biodiversity benefits of certified palm oil production: Evidence from Peninsular Malaysia. Global Ecology and Conservation 3, 553-561.	Peninsular Malaysia	Plantations	2014	Case-control	N
		8. Schmidt, J. & De Rosa, M. (2020) Certified palm oil reduces greenhouse gas emissions compared to non-certified. Journal of Cleaner Production 277, 124045.	Indonesia and Malaysia	Plantations	2016	Case-control	P
		9. Yahya, M.S., Syafiq, M., Ashton - Butt, A. et al. (2017) Switching from monoculture to polyculture farming benefits birds in oil palm production landscapes: Evidence from mist netting data. Ecology and Evolution 7, 6314-6325.	Peninsular Malaysia	Plantations	2017	Case-control	N
	GHG emissions or fire	10. Cattau, M.E., Marlier, M.E. & DeFries, R. (2016) Effectiveness of Roundtable on Sustainable Palm Oil (RSPO) for reducing fires on oil palm concessions in Indonesia from 2012 to 2015. Environmental Research Letters 11, 105007.	Sumatra and Kalimantan, Indonesia	Plantations	2012-2015	Quasi-experimental	O
		11. Carlson, K.M., Heilmayr, R., Gibbs, H.K. et al. (2018) Effect of oil palm sustainability certification on deforestation and fire in Indonesia. Proceedings of the National Academy of Sciences 115, 121-126.	Indonesia	Plantations	2001-2015	Quasi-experimental	O
		12. Morgans, C.L., Meijaard, E., Santika, T et al. (2018) Evaluating the effectiveness of palm oil certification in delivering multiple sustainability objectives. Environmental Research Letters 13, 064032.	Kalimantan	Plantations	1999-2015	Quasi-experimental	O

	13. Schmidt, J. & De Rosa, M. (2020) Certified palm oil reduces greenhouse gas emissions compared to non-certified. Journal of Cleaner Production 277, 124045.	Indonesia and Malaysia	Plantations	2016	Case-control	P
	14. Noojipady, P., Morton, D.C., Schroeder, W. et al. (2017) Managing fire risk during drought: The influence of certification and El Niño on fire-driven forest conversion for oil palm in Southeast Asia. Earth System Dynamics 8, 749-771.	Indonesia	Plantations	2002-2015	Case-control	P
	15. Hilmi, Y.S. & Utami, A.W. (2021) Does RSPO certification affects the amount of CO2 emission in Indonesia? IOP Conference Series: Earth and Environmental Science 637, 012051. IOP Publishing.	Indonesia	Plantations	1981-2016	Case report	O
Water and soil conservation (use of pesticide) and waste management	16. Santika, T., Wilson, K.A., Law, E.A. et al. (2021) Impact of palm oil sustainability certification on village well-being and poverty in Indonesia. Nature Sustainability 4, 109-119.	Sumatra Kalimantan & Papua, Indonesia	Plantations	2000-2018	Quasi-experimental	N
	17. Lee, J.S.H., Miteva, D.A., Carlson, K.M. et al. (2020) Does oil palm certification create trade-offs between environment and development in Indonesia? Environmental Research Letters 15, 124064.	Sumatra and Kalimantan, Indonesia	Plantations	2003-2014	Quasi-experimental	P
	18. Furumo, P.R., Rueda, X., Rodríguez, J.S. et al. (2020) Field evidence for positive certification outcomes on oil palm smallholder management practices in Colombia. Journal of Cleaner Production 245, 118891.	Magdalena, Colombia	Independent smallholders	2017	Quasi-experimental	P
	19. de Vos, R.E., Suwarno, A., Slingerland, M. et al. (2021) Independent oil palm smallholder management practices and yields. Can RSPO certification make a difference? Environmental Research Letters 16, 065015.	Central Kalimantan	Independent smallholders	2020	Case-control	P
	20. Saswattecha, K., Kroeze, C., Jawjit, W. et al. (2015) Assessing the environmental impact of palm oil produced in Thailand. Journal of Cleaner Production 100, 150-169.	Southern Thailand	Plantations	2015	Case-control	P
	21. Johari, M.A., Jaafar, N.C., Mansor, N.H. et al. (2020) Soil and water conservation practices among the independent il palm smallholders in Betong and Saratok, Sarawak, Malaysia. Journal of Oil Palm Research 32, 674-687.	Sarawak, Malaysia	Independent smallholders	2020	Case report	O
	22. Degli Innocenti, E. & Oosterveer, P. (2020) Opportunities and bottlenecks for upstream learning within RSPO certified palm oil value chains: A comparative analysis between Indonesia and Thailand. Journal of Rural Studies 78, 426-437.	Sumatra, Indonesia	Independent smallholders	2013	Case report	O
	23. Degli Innocenti, E. & Oosterveer, P. (2020) Opportunities and bottlenecks for upstream learning within RSPO certified palm oil value chains: A comparative analysis between Indonesia and Thailand. Journal of Rural Studies 78, 426-437.	Thailand	Independent smallholders	2013	Case report	P
Poverty, income, food security	24. Santika, T., Wilson, K.A., Law, E.A. et al. (2021) Impact of palm oil sustainability certification on village well-being and poverty in Indonesia. Nature Sustainability 4, 109-119.	Sumatra Kalimantan & Papua, Indonesia	Plantations	2000-2018	Quasi-experimental	N
	25. Lee, J.S.H., Miteva, D.A., Carlson, K.M. et al. (2020) Does oil palm certification create trade-offs between environment and development in Indonesia? Environmental Research Letters 15, 124064.	Sumatra and Kalimantan, Indonesia	Plantations	2003-2014	Quasi-experimental	O

	26. Dompreh, E.B., Asare, R. & Gasparatos, A. (2021) Sustainable but hungry? Food security outcomes of certification for cocoa and oil palm smallholders in Ghana. Environmental Research Letters 16, 055001.	Southern Ghana	Independent smallholders	2019	Quasi-experimental	O
	27. Hidayat, N.K, Offermans, A. & Glasbergen, P. (2016) On the profitability of sustainability certification: an analysis among Indonesian palm oil smallholders. Journal of Economics and Sustainable Development 7, 45-62.	Indonesia	Independent smallholders	2015	Case-control (with-wtthout)	P
	28. Oosterveer, P., Adjei, B.E., Vellema, S. et al. (2014) Global sustainability standards and food security: Exploring unintended effects of voluntary certification in palm oil. Global Food Security 3, 220-226.	Indonesia and Ghana	Independent smallholders	2014	Case report	N
	29. Chalil, D. & Barus, R. (2021) The impact of sustainable palm oil management on sustainable landscape. IOP Conference Series: Earth and Environmental Science 653, 012118. IOP Publishing.	North Sumatra, Indonesia	Independent smallholders	2020	Case-control	P
Human rights, tenure security, conflicts	30. Santika, T., Wilson, K.A., Law, E.A. et al. (2021) Impact of palm oil sustainability certification on village well-being and poverty in Indonesia. Nature Sustainability 4, 109-119.	Sumatra Kalimantan & Papua, Indonesia	Plantations	2000-2018	Quasi-experimental	N
	31. Chalil, D. & Barus, R. (2021) The impact of sustainable palm oil management on sustainable landscape. IOP Conference Series: Earth and Environmental Science 653, 012118. IOP Publishing.	North Sumatra, Indonesia	Independent smallholders	2020	Case-control	P
	32. Pasaribu, S.I. & Vanclay, F. (2021) Children's Rights in the Indonesian Oil Palm Industry: Improving Company Respect for the Rights of the Child. Land 10, 500.	North Sumatra	Plantations	2016-2020	Case report	O
	33. Kadarusman, Y.B. & Herabadi, A.G. (2018) Improving sustainable development within Indonesian palm oil: the importance of the reward system. Sustainable Development 26, 422-434.	Indonesia	Plantations	2016-2017	Case report	N
	34. Wielga, M. & Harrison, J. (2021) Assessing the effectiveness of non-state-based grievance mechanisms in providing access to remedy for rightsholders: A case study of the Roundtable on Sustainable Palm Oil. Business and Human Rights Journal 6, 67-92.	Indonesia and Malaysia	Plantations	2020	Case report	N
	35. Johnson, A. (2022) The Roundtable on Sustainable Palm Oil (RSPO) and transnational hybrid governance in Ecuador's palm oil industry. World Development 149, 105710.	Ecuador	Plantations	2011-2014	Case report	N
	36. Marin-Burgos, V., Clancy, J.S. & Lovett, J.C. (2015) Contesting legitimacy of voluntary sustainability certification schemes: Valuation languages and power asymmetries in the Roundtable on Sustainable Palm Oil in Colombia. Ecological Economics 117, 303-313.	Colombia	Plantations	2015	Case report	N
	37. Genoud, C. (2021) Access to land and the Round Table on Sustainable Palm Oil in Colombia. Globalizations 18, 372-389.	Colombia	Plantations	2017	Case report	N
	38. Köhne, M. (2014) Multi-stakeholder initiative governance as assemblage: Roundtable on Sustainable Palm Oil as a political resource in land conflicts related to oil palm plantations. Agriculture and Human Values 31, 469-480.	Sumatra, Indonesia	Plantations	2011-2012	Case report	N
	39. Prinanda, D. & Dugis, V. (2017) Winning public trust in multi-actor bargaining: A case study of PT SMART strategy in facing allegation of environmental destruction through RSPO.	Indonesia	Plantations	2017	Case report	N

		40. Clerc, J. (2013) Oil palm plantations and negotiations for access to land in Indonesia: reflexions based on a case study in Kapuas Hulu (West Kalimantan). Cahiers Agricultures 22, 53-60.	West Kalimantan, Indonesia	Plantations	2013	Case report	N
MSPO	Deforestation or biodiversity	1. Senawi, R., Rahman, N.K., Mansor, N. et al. (2019) Transformation of oil palm independent smallholders through Malaysian sustainable palm oil. Journal of Oil Palm Research 31, 496-507.	Malaysia	Independent smallholders	2019	Case report	O
	GHG emissions or fire	NA					
	Water and soil conservation (use of pesticide) and waste management	2. Senawi, R., Rahman, N.K., Mansor, N. et al. (2019) Transformation of oil palm independent smallholders through Malaysian sustainable palm oil. Journal of Oil Palm Research 31, 496-507.	Malaysia	Independent smallholders	2019	Case report	O
		3. Johari, M.A., Jaafar, N.C., Mansor, N.H. et al. (2020) Soil and water conservation practices among the independent il palm smallholders in Betong and Saratok, Sarawak, Malaysia. Journal of Oil Palm Research 32, 674-687.	Sarawak, Malaysia	Independent smallholders	2020	Case report	O
	Poverty, income, food security	NA					
	Human rights, tenure security, conflicts	4. Wahab, A. (2020) The state of human rights disclosure among sustainably certified palm oil companies in Malaysia. The International Journal of Human Rights 24, 1451-1474.	Malaysia	Plantations	2019	Case report	O
ISPO	Deforestation or biodiversity	NA					
	GHG emissions or fire	NA					
	Water and soil conservation (use of pesticide) and waste management	1. Aisyah, D.D. & Mulyo, J.H. (2021) Understanding the palm oil smallholders' characteristics and their compliance towards the Indonesian Sustainable Palm Oil (ISPO): A case study in North Sumatera, Indonesia. IOP Conference Series: Earth and Environmental Science 637, 012041. IOP Publishing.	North Sumatra, Indonesia	Scheme smallholders	2020	Case report	P
		2. Aisyah, D.D. & Mulyo, J.H. (2021) Understanding the palm oil smallholders' characteristics and their compliance towards the Indonesian Sustainable Palm Oil (ISPO): A case study in North Sumatera, Indonesia. IOP Conference Series: Earth and Environmental Science 637, 012041. IOP Publishing.	North Sumatra, Indonesia	Independent smallholders	2020	Case report	O
		3. Ulma, R. & Aziz, M. (2021) Study of sustainability status of the implementation of ISPO (Indonesian Sustainable Palm Oil) in plasma farmers oil palm plantation. IOP Conference Series: Earth and Environmental Science 716, 012114. IOP Publishing.	Jambi, Indonesia	Plantations	2020	Case report	O
	Poverty, income, food security	4. Chalil, D. & Barus, R. (2021) The impact of sustainable palm oil management on sustainable landscape. IOP Conference Series: Earth and Environmental Science 653, 012118. IOP Publishing.	North Sumatra, Indonesia	Independent smallholders	2020	Case-control	P
	Human rights, tenure security, conflicts	5. Kunene, N. & Chung, Y.C. (2020) Sustainable production policy Impact on palm oil firms' performance: Empirical analysis from Indonesia. Sustainability 12, 8750.	Indonesia	Plantations	2010-2015	Quasi-experimental	P

6.	Chalil, D. & Barus, R. (2021) The impact of sustainable palm oil management on sustainable landscape. IOP Conference Series: Earth and Environmental Science 653, 012118. IOP Publishing.	North Sumatra, Indonesia	Independent smallholders	2020	Case-control	P
7.	Ulma, R. & Aziz, M. (2021) Study of sustainability status of the implementation of ISPO (Indonesian Sustainable Palm Oil) in plasma farmers oil palm plantation. IOP Conference Series: Earth and Environmental Science 716, 012114. IOP Publishing.	Jambi, Indonesia	Plantations	2020	Case report	O

Table S4. Past studies evaluating the impact of cocoa certification schemes Three assessment outcomes were identified: certification had positive (P), neutral (O), or negative impact (N).

Scheme	Sustainability dimension evaluated	References	Country or region	Producer type	Time period assessed	Evidence type	Assessment outcome
Rainforest Alliance, UTZ, and Fairtrade	Deforestation or biodiversity	1. Smith Dumont, E., Gnahoua, G.M., Ohouo, L. et al. (2014) Farmers in Côte d'Ivoire value integrating tree diversity in cocoa for the provision of ecosystem services. Agroforestry Systems 88, 1047-1066.	Côte d'Ivoire	Smallholders	2012	Case-control (with-without)	O
		2. Ingram, V., Van Rijn, F., Waarts, Y. et al. (2018) The impacts of cocoa sustainability initiatives in West Africa. Sustainability 10, 4249.	Côte d'Ivoire	Smallholders	2012-2017	Case-control (with-without)	P
		3. Ingram, V., Van Rijn, F., Waarts, Y. et al. (2018) The impacts of cocoa sustainability initiatives in West Africa. Sustainability 10, 4249.	Ghana	Smallholders	2012-2017	Case-control (with-without)	O
		4. Addae-Boadu, S. & Safian, S.A.A.A. (2014) The Cocoa Certification Program and Its Effect on Sustainable Cocoa Production in Ghana: A Study in Upper Denkyira West District.	Ghana	Smallholders	2016	Case-control (with-without)	P
		5. Bandanaa, J., Asante, I.K., Egyir, I.S. et al. (2021) Sustainability performance of organic and conventional cocoa farming systems in Atwima Mponua District of Ghana. Environmental and Sustainability Indicators 11, 100121.	Ghana	Smallholders	2011-2017	Case-control (with-without)	P
		6. Asigbaase, M., Dawoe, E., Lomax, B.H. et al. (2021) Biomass and carbon stocks of organic and conventional cocoa agroforests, Ghana. Agriculture, Ecosystems & Environment 306, 107192.	Suhum, Ghana	Smallholders	2019	Case-control (with-without)	P
		7. Asigbaase, M., Sjogersten, S., Lomax, B.H. et al. (2019) Tree diversity and its ecological importance value in organic and conventional cocoa agroforests in Ghana. PLoS ONE 14, e0210557.	Eastern Ghana	Smallholders	2018	Case-control (with-without)	P
		8. Newsom, D., Milder, J.C. & Bare, M. (2021) Toward a sustainable cocoa sector: Effects of SAN/Rainforest Alliance certification on farmer livelihoods and the environment. Rainforest Alliance.	Côte d'Ivoire	Smallholders	2010-2016	Case-control (before-after)	N
		9. Newsom, D., Milder, J.C. & Bare, M. (2021) Toward a sustainable cocoa sector: Effects of SAN/Rainforest Alliance certification on farmer livelihoods and the environment. Rainforest Alliance.	Ghana	Smallholders	2010-2016	Case-control (before-after)	P
	GHG emissions or fire	10. Bandanaa, J., Asante, I.K., Egyir, I.S. et al. (2021) Sustainability performance of organic and conventional cocoa farming systems in Atwima Mponua District of Ghana. Environmental and Sustainability Indicators 11, 100121.	Ghana	Smallholders	2011-2017	Case-control (with-without)	P
	Water and soil conservation (use of pesticide) and waste management	11. Sellare, J., Meemken, E.M. & Qaim, M. (2020) Fairtrade, agrochemical input use, and effects on human health and the environment. Ecological Economics 176, 106718.	Southeastern Côte d'Ivoire	Smallholders	2018	Quasi-experimental	N
		12. Ingram, V., van Rijn, F., Waarts, Y. et al. (2018) Towards sustainable cocoa in Côte d'Ivoire: The impacts and contribution of UTZ certification combined with services provided by companies (No. 2018-041). Wageningen Economic Research.	Côte d'Ivoire	Smallholders	2013-2017	Case-control (with-without)	P

		13. Addae-Boadu, S. & Safian, S.A.A.A. (2014) The Cocoa Certification Program and Its Effect on Sustainable Cocoa Production in Ghana: A Study in Upper Denkyira West District.	Ghana	Smallholders	2016	Case-control (with-without)	P
		14. Bandanaa, J., Asante, I.K., Egyir, I.S. et al. (2021) Sustainability performance of organic and conventional cocoa farming systems in Atwima Mponua District of Ghana. Environmental and Sustainability Indicators 11, 100121.	Ghana	Smallholders	2011-2017	Case-control (with-without)	P
		15. Asigbaase, M., Dawoe, E., Lomax, B.H. et al. (2021) Biomass and carbon stocks of organic and conventional cocoa agroforests, Ghana. Agriculture, Ecosystems & Environment 306, 107192.	Suhum, Ghana	Smallholders	2019	Case-control (before-after)	P
		16. Newsom, D., Milder, J.C.& Bare, M. (2021) Toward a sustainable cocoa sector: Effects of SAN/Rainforest Alliance certification on farmer livelihoods and the environment. Rainforest Alliance.	Côte d'Ivoire	Smallholders	2010-2016	Case-control (before-after)	P
		17. Newsom, D., Milder, J.C. & Bare, M. (2021) Toward a sustainable cocoa sector: Effects of SAN/Rainforest Alliance certification on farmer livelihoods and the environment. Rainforest Alliance.	Ghana	Smallholders	2010-2016	Case-control (before-after)	O
	Poverty, income, food security	18. Knößlsdorfer, I., Sellare, J., Qaim, M. (2021) Effects of Fairtrade on farm household food security and living standards: Insights from Côte d'Ivoire. Global Food Security 29, 100535.	Southeastern Côte d'Ivoire	Smallholders	2018	Quasi-experimental	P
		19. Iddrisu, M., Aidoo, R., Wongnaa, C.A. (2020) Participation in UTZ-RA voluntary cocoa certification scheme and it impact on smallholder welfare: Evidence from Ghana. World Development Perspectives 20, 100244	Ashanti, Southern Ghana	Smallholders	2018	Quasi-experimental	P
		20. Dompreh, E.B., Asare, R., Gasparatos, A. (2021) Sustainable but hungry? Food security outcomes of certification for cocoa and oil palm smallholders in Ghana. Environmental Research Letters 16, 055001.	Southern Ghana	Smallholders	2018	Quasi-experimental	O
		21. Sellare, J., Meemken, E., Kouamé, C. et al. (2020) Do sustainability standards benefit smallholder farmers also when accounting for cooperative effects? Evidence from Côte d'Ivoire. American Journal or Agricultural Economics 102(2), 681-695.	Southeastern Côte d'Ivoire	Smallholders	2018	Quasi-experimental	P
		22. René, N., Luc, N.N., Bergaly, K.C. et al. (2022) Economic performance of certified cocoa-based agroforestry systems in Cameroon. Environment, Development and Sustainability. In Press.	Center and Southwestern Cameroon	Smallholders	2018	Quasi-experimental	P
		23. Meemken, E., Sellare, J., Kouame, C.N. et al. (2019) Effects of Fairtrade on the livelihoods of poor rural workers. Nature Sustainability 2, 635-642.	Southeastern Côte d'Ivoire	Small-farm workers	2018	Quasi-experimental	O
		24. Dompreh, E.B., Asare, R., Gasparatos, A. (2020) Do voluntary certification standards improve yields and wellbeing? Evidence from oil palm and cocoa smallholders in Ghana. International Journal of Agricultural Sustainability 19, 16-39.	Southern Ghana	Smallholders	2018	Quasi-experimental	P
		25. Fenger, N.A., Bosselmann, A.S., Asare, R. et al. (2017) The impact of certification on the natural and financial capitals of Ghanaian cocoa farmers. Agroecology and Sustainable Food Systems 41(2), 143-166.	Southern Ghana	Smallholders	2007-2008 and 2012-2013	Case-control (with-without)	P
	Human rights, tenure security, conflicts	NA					

Table S5. Past studies evaluating the impact of coffee certification schemes. Three assessment outcomes were identified: certification had positive (P), neutral (O), or negative impact (N).

Scheme	Sustainability dimension evaluated	References	Country or region	Producer type	Time period assessed	Evidence type	Assessment outcome
Fairtrade, Organic, Rainforest Alliance, UTZ, and Common Code for the Coffee Community (4C)	Deforestation or biodiversity	1. Rueda, X., Thomas, N.E. & Lambin, E.F. (2015) Eco-certification and coffee cultivation enhance tree cover and forest connectivity in the Colombian coffee landscapes. Regional Environmental Change 15, 25-33.	Colombia	Smallholders	2003-2009	Quasi-experimental	P
		2. Takahashi, R. & Todo, Y. (2013) The impact of a shade coffee certification program on forest conservation: A case study from a wild coffee forest in Ethiopia. Journal of Environmental Management 130, 48-54.	Belete-Gera, Ethiopia	Smallholders	2005-2010	Quasi-experimental	P
		3. Takahashi, R. & Todo, Y. (2017) Coffee certification and forest quality: evidence from a wild coffee forest in Ethiopia. World Development 92, 158-166.	Belete-Gera Ethiopea	Smallholders	2005-2010	Quasi-experimental	P
		4. Haggar, J., Soto, G., Casanoves, F. et al. (2017) Environmental-economic benefits and trade-offs on sustainably certified coffee farms. Ecological Indicators 79, 330-337.	Central-Northern Nicaragua	Smallholders	2008	Quasi-experimental	O
		5. Philpott, S.M., Bichier, P., Rice, R. et al. (2007) Field-testing ecological and economic benefits of coffee certification programs. Conservation Biology 21, 975-985.	Chiapas, Mexico	Smallholders	2004-2005	Case-control (with-without)	O
		6. Giovannucci, D., Potts, J., Killian, B. et al. (2008) Seeking sustainability: COSA preliminary analysis of sustainability initiatives in the coffee sector. Committee on Sustainability Assessment. Winnipeg, Canada.	Nicaragua, Peru, Kenya, Costa Rica, Honduras	Smallholders	2004-2007	Case-control (with-without)	O
		7. Elder, S.D., Zerriffi, H. & Le Billon, P. (2013) Is Fairtrade certification greening agricultural practices? An analysis of Fairtrade environmental standards in Rwanda. Journal of Rural Studies 32, 264-274.	Rwanda	Smallholders	2009	Case-control (with-without) with confounding	P
		8. Jaffee, D. (2008) Better, but not great": the social and environmental benefits and limitations of Fair Trade for indigenous coffee producers in Oaxaca, Mexico. The Impact of Fair Trade. Wageningen: Wageningen Academic Publishers, pp.195-222.	Oaxaca, Mexico	Smallholders	2001-2004	Case-control (with-without)	P
		9. Hardt, E., Borgomeo, E., dos Santos, R.F. et al. (2015) Does certification improve biodiversity conservation in Brazilian coffee farms? Forest Ecology and Management 357, 181-194.	Minas Gerais, Brazil	Smallholders	1995-2011	Case-control (with-without)	P
		10. Bose, A., Vira, B. & Garcia, C. (2016) Does environmental certification in coffee promote "business as usual"? A case study from the Western Ghats, India. Ambio 45, 946-955.	Karnataka, India	Smallholders	2011-2014	Case-control (with-without)	O
		11. Ho, T.Q., Hoang, V.N., Wilson, C. et al. (2018) Eco-efficiency analysis of sustainability-certified coffee production in Vietnam. Journal of Cleaner Production 183, 251-260.	Central Highlands, Vietnam	Smallholders	2012-2015	Case-control (with-without) with confounding	P

	12. Haggar, J., Jerez, R., Cuadra, L. et al. (2012) Environmental and economic costs and benefits from sustainable certification of coffee in Nicaragua. Food Chain 2, 24-41.	Penas Blancas, Nicaragua	Smallholders majority	2006-2010	Case-control (with-without)	P
	13. Ssebunya, B.R., Schader, C., Baumgart, L. et al. (2019) Sustainability performance of certified and non-certified smallholder coffee farms in Uganda. Ecological Economics 156, 35-47.	Western Uganda	Smallholders	2015	Case-control (with-without)	P
	14. Kraus, E. (2015) The impact of sustainable certifications on coffee farming practices: a case study from Tarrazú region, Costa Rica. Doctoral Dissertation, University of Copenhagen.	Tarrazú, Costa Rica	Smallholders	2011	Case-control (before-after) with confounding	P
	15. Takahashi, R.& Todo, Y. (2014) The impact of a shade coffee certification program on forest conservation using remote sensing and household data. Environmental Impact Assessment Review 44, 76-81.	Oromiya Region, Ethiopea	Smallholders	2005-2010	Case-control (before-after) with confounding	P
	16. Solano, A.L., Pons, D., Tucker, C. et al. (2017) Biodiversity, sustainable certifications and climate change adaptation: lessons from shade coffee systems in Mesoamerica. The Lima Declaration on Biodiversity and Climate Change: Contributions from Science to Policy for Sustainable Development, p.133.	Mexico, Guatemala, Honduras and Costa Rica	Smallholders	2015	Case-control (with-without)	P
	17. Haggar, J., Asigbaase, M., Bonilla, G. et al. (2015) Tree diversity on sustainably certified and conventional coffee farms in Central America. Biodiversity and Conservation 24, 1175-1194.	Costa Rica, Guatemala and Nicaragua	Smallholders	2013	Case-control (with-without)	P
GHG emissions or fire	18. NA					
Water and soil conservation (use of pesticide) and waste management	19. Blackman, A. & Naranjo, M.A. (2012) Does eco-certification have environmental benefits? Organic coffee in Costa Rica. Ecological Economics 83, 58-66.	Costa Rica	Smallholders	2003-2004	Quasi-experimental	P
	20. Giuliani, E., Ciravegna, L., Vezzulli, A. et al. (2017) Decoupling standards from practice: The impact of in-house certifications on coffee farms' environmental and social conduct. World Development 96, 294-314.	Brazil, Colombia, Costa Rica, Guatemala, and Mexico	Smallholders	2008-2010	Quasi-experimental	O
	21. Bolwig, S., Gibbon, P. & Jones, S. (2009) The economics of smallholder organic contract farming in tropical Africa. World Development 37, 1094-1104.	Uganda	Smallholders	2000-2001	Quasi-experimental	P
	22. Ibanez, M. & Blackman, A. (2016) Is eco-certification a win–win for developing country agriculture? Organic coffee certification in Colombia. World Development 82, 14-27.	Cauca, Colombia	Smallholders	1997-2007	Quasi-experimental	P
	23. Haggar, J., Soto, G., Casanoves, F. et al. (2017) Environmental-economic benefits and trade-offs on sustainably certified coffee farms. Ecological Indicators 79, 330-337.	Central-Northern Nicaragua	Smallholders	2008	Quasi-experimental	P
	24. Ruben, R. & Fort, R. (2012) The impact of fair trade certification for coffee farmers in Peru. World Development 40, 570-582.	Peru	Smallholders	2010	Quasi-experimental	P
	25. Ho, T.Q., Hoang, V.N. & Wilson, C. (2022) Sustainability certification and water efficiency in coffee farming: The role of irrigation technologies. Resources, Conservation and Recycling 180, 106175.	Central Highlands, Vietnam	Smallholders	2012-2015	Quasi-experimental	O

	26. Giovannucci, D., Potts, J., Killian, B. et al. (2008) Seeking sustainability: COSA preliminary analysis of sustainability initiatives in the coffee sector. Committee on Sustainability Assessment. Winnipeg, Canada.	Nicaragua, Peru, Kenya, Costa Rica, Honduras	Smallholders	2004-2007	Case-control (with-without)	P
	27. Soto, G., Haggar, J., Le Coq, J.F. et al. (2011) Environmental and socioeconomic impact of organic coffee certification in Central America as compared with other certification seals. Proceedings of the Third Scientific Conference of ISOFAR. 28 Sep – 1 Oct. Namyanglu, South Korea.	Nicaragua and Costa Rica	Smallholders	2008-2009	Case-control (with-without)	P
	28. Arnould, E.J., Plastina, A.& Ball, D. (2007) Market disintermediation and producer value capture: the case of fair trade coffee in Nicaragua, Peru, and Guatemala. In Product and Market Development for Subsistence Marketplaces. Emerald Group Publishing Limited.	Nicaragua, Peru and Guatemala	Smallholders	2005	Case-control (with-without)	P
	29. Elder, S.D., Zerriffi, H.& Le Billon, P. (2013) Is Fairtrade certification greening agricultural practices? An analysis of Fairtrade environmental standards in Rwanda. Journal of Rural Studies 32, 264-274.	Rwanda	Smallholders	2009	Case-control (with-without) with confounding	O
	30. Maguire-Rajpaul, V.A., Rajpaul, V.M. et al. (2020) Coffee certification in Brazil: compliance with social standards and its implications for social equity. Environment, Development and Sustainability 22, 2015-2044.	Brazil	Smallholders	2006-2014	Case-control (with-without) with confounding	P
	31. Haggar, J., Jerez, R., Cuadra, L. et al. (2012) Environmental and economic costs and benefits from sustainable certification of coffee in Nicaragua. Food Chain 2, 24-41.	Penas Blancas, Nicaragua	Smallholders majority	2006-2010	Case-control (with-without)	P
Poverty, income, food security	32. Van Rijsbergen, B., Elbers, W., Ruben, R. et al. (2016) The ambivalent impact of coffee certification on farmers' welfare: A matched panel approach for cooperatives in Central Kenya. World Development 77, 277-292.	Central Kenya	Smallholders	2009 and 2013	Quasi-experimental	P
	33. Jena, P.R., Stellmacher, T. & Grote, U. (2017) Can coffee certification schemes increase incomes of smallholder farmers? Evidence from Jinotega, Nicaragua. Environment, Development and Sustainability 19, 45-66.	Northern Nicaragua	Smallholders	2010	Quasi-experimental	O
	34. Chiputwa, B., Spielman, D.J., Qaim, M. (2015) Food standards, certification, and poverty among coffee farmers in Uganda. World Development 66, 400-412.	Uganda	Smallholders	2012	Quasi-experimental	P
	35. Mitiku, F., de Mey, Y., Nyssen, J. et al. (2017) Do private sustainability standards contribute to income growth and poverty alleviation? A comparison of different coffee certification schemes in Ethiopia. Sustainability 9, 1-21.	Ethiopia	Smallholders	2014	Quasi-experimental	O
	36. Jena, P.R., Chichaibelu, B.B., Stellmacher, T. et al. (2012) The impact of coffee certification on small-scale producers' livelihoods: a case study from the Jimma Zone, Ethiopia. Agricultural Economics 43, 429-440.	Southwestern Ethiopia	Smallholders	2009	Quasi-experimental	O
	37. Vanderhaegen, K., Akoyi, K.T., Dekoninck, W. et al. (2018) Do private coffee standards 'walk the talk' in improving socio-economic and environmental sustainability? Global Environmental Change 51, 1-9.	Eastern Uganda	Smallholders	2014	Quasi-experimental	O
	38. Jena, P.R. & Grote, U. (2022) Do certification schemes enhance coffee yields and household income? Lessons learned across continents. Food Systems 5, 716904.	Ethiopia	Smallholders	2021	Quasi-experimental	N

		39. Jena, P.R. & Grote, U. (2022) Do certification schemes enhance coffee yields and household income? Lessons learned across continents. Food Systems 5, 716904.	India and Nicaragua	Smallholders	2021	Quasi-experimental	P
		40. Akoyi, K.T., Mitiku, F., Maertens, M. (2020) Private sustainability standards and child schooling in the African coffee sector. Journal of Cleaner Production 264, 121713.	Ethiopia and Uganda	Smallholders	2014	Quasi-experimental	O
		41. Meemken, E., Spielman, D.J. & Qaim, M. (2017) Trading off nutrition and education? A panel data analysis of the dissimilar welfare effects of Organic and Fairtrade standards. Food Policy 71, 74-85.	Uganda	Smallholders	2012 and 2015	Quasi-experimental	P
		42. Chiputwa, B. & Qaim, M. (2016) Sustainability standards, gender, and nutrition among smallholder farmers in Uganda. The Journal of Development Studies 52, 1241-1257.	Uganda	Smallholders	2012	Quasi-experimental	P
		43. Meemken, E. & Qaim, M. (2018) Can private food standards promote gender equality in the small farm sector? Journal of Rural Studies 58, 39-51.	Uganda	Smallholders	2015	Quasi-experimental	P
		44. Akoyi, K.T. & Maertens, M. (2018) Walk the Talk: Private sustainability standards in the Ugandan coffee sector. The Journal of Development Studies 54, 1792-1818.	Uganda	Smallholders	2014	Quasi-experimental	O
		45. Beuchelt, T.D. & Zeller, M. (2011) Profits and poverty: Certification's troubled link for Nicaragua's organic and fairtrade coffee producers. Ecological Economics 70, 1316-1324.	Nicaragua	Smallholders	2007	Case-control (with-without) with confounding	O
		46. Valkila, J. (2009) Fair Trade organic coffee production in Nicaragua – Sustainable development or a poverty trap? Ecological Economics 68, 3018-3025.	Nicaragua	Smallholders	2005-2008	Case-control (with-without)	O
		47. Vellema, W., Buritica Casanova, A., Gonzalez, C. et al. (2015) The effect of speciality coffee certification on household livelihood strategies and specialisation. Food Policy 57, 13-25.	Colombia	Smallholders	2012	Case-control (with-without) with confounding	O
	Human rights, tenure security, conflicts	NA					