

The Impact of Environmental Provisions in Trade Agreements on Non-Communicable Disease

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*Prevention of non-communicable disease using trade agreements

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Table of Contents

Abstract	iii
Introduction	1
International frameworks and agreements	2
Environmental Justice	4
Environmental Provisions in trade agreements	5
Data sources and resources on trade.....	5
International conventions and treaties in trade agreements	8
Climate change.....	9
UK-Australia Free Trade Agreement: concerns for environment and non- communicable disease. 10	
Air quality	13
Environmental-related traded goods	15
The circular economy.....	15
International conventions on management of hazardous products.....	15
Conclusions	19
References.....	21

Table of Figures

Figure 1: Organigram for the World Trade Organisation.....	4
Figure 2: Trend and Environment Database (2021) – Environmental provisions in preferential trade agreements 1945-2019	6
Figure 3: Major environmental provisions in trade (Source TREND)	7
Figure 4: The growth and levelling of ISDS cases under Regional Trade agreements.....	8

The Impact of Environmental Provisions in Trade Agreements on Non-Communicable Disease

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Abstract

This is a working paper describing how environmental provisions in trade agreements relate to human health, specifically to non-communicable diseases.

Environmental provisions are the most extensively used non-tariff measures applied in trade agreements between nations. The most common global environmental provisions relate to climate breakdown, environmental stewardship, and protection. Other agreements include preventing deforestation, protecting biodiversity and endangered species.

Non-communicable disease health impacts of global provisions appear to be remote, and indirect. The global health impact of an environmental provision in a trade agreement will therefore be less pressing in the agenda of the negotiators, although the impacts could be considerable.

For example, climate change increases extreme weather events, and extreme temperatures, which cause deaths of susceptible individual to heat related illness- this is most frequently coronary heart disease and stroke and some respiratory disease.

Another result of fossil fuel consumption is air pollution, which has direct effects on circulatory, respiratory, and mental health. Unregulated and uncontrolled operations of the fossil fuel and plastics industry and car manufacturers have circumvented international agreements and damaged efforts to improve health and the environment. A notable example is *Dieseltgate* (described later as a case study).

The most obvious health effects of climate change are not in relation to non-communicable diseases; they are from loss of food production, conflict and migration leading to increased starvation, destitution and violence.

Environmental provisions citing international conventions on dangerous chemicals relate more clearly and directly to recognisable non-communicable diseases in identified working populations, affected communities and individuals. For example, dangerous persistent chemicals which are known to cause cancers, metabolic and neurological diseases. Some of these are captured in international conventions and treaties but regulation and enforcement are applied to varying degrees in different parts of the world.

Health impact is rarely an express consideration in any trade agreement, and the global health community is left to pick up the pieces of unintended adverse consequences of trade deals for health. Sometimes these are seen in investor state disputes. More research is needed which should be interdisciplinary: involving economists, environmental scientists, trade experts, international lawyers, and public health community. It is important that such work fully engages communities and addresses inequalities and environmental injustices.

Introduction

The objective for this working paper is to provide an overview and analysis of how environmental provisions in trade agreements influence non-communicable diseases and their determinants. It is a first attempt to bring together trade, public health, environmental science, economic and international legal expertise to describe the wide-ranging health impacts of environmental measures in trade agreements. It has been through two rounds of peer review over 2 years but is presented for further discussion.

Non-tariff Environmental ‘Measures’, ‘Provisions’, ‘Barriers’

Generally environmental factors are included in trade agreements through non-tariff provisions. Non-tariff provisions are policy measures other than ordinary customs tariffs that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both. Industry interests, and some political commentators describe these ‘provisions’ as ‘barriers’ (WTO, 2022).

Non-tariff measures can be broadly divided into two groups. The first type is called “technical” measures and include regulations, standards, testing and certification, primarily sanitary and phytosanitary (SPS) and Technical Barriers to Trade (TBT). The second type, called “non-technical” measures, include quantitative restrictions (quotas, non-automatic import licensing), price measures, forced logistics or distribution channels, and so on. (OECD,2023)

Trade and health

Trade can have both a positive and negative influence on health. Trade can support economic growth and the development of social welfare. It can provide countries with the resources to manage their environment more effectively and can open access to beneficial technologies. On the other hand, it can result in increases in pollution and environmental degradation and adversely affect the determinants of NCDs, it can also lead to increasing inequality within and between countries (OECD, 2020). The process of trade is intended to benefit mutually the trading countries. The volume of trade may make available goods and services which contribute to better standards of living and are in themselves, health promoting. However, high volumes of traded goods and services may de-skill workforces in the recipient country and disable indigenous economies, thus undermining some of the basic health standards of a country.

There are multiple factors which influence non-communicable diseases (NCDs) in populations (Marmot, 2010). The majority of these, if not all, are susceptible to influence by trade and trade agreements. Some of the potential determinants that need consideration are climate change and sustainability, food safety and security, air quality, pollution and environmental degradation, inequality, and poverty.

Environmental provisions in trade agreements have direct and indirect impacts on health, including non-communicable diseases (NCDs). Direct impacts include, for example, the need to control dangerous chemicals which cause cancer and other non-communicable diseases. Such provisions, from international conventions, included in trade agreements, limit individual and community exposures. Indirect effects may have more considerable effects on health and cause greater inequalities. Indirect influences may impact on determinants of health such as housing, working conditions, poverty and economic inequality, environmental conditions, adequate food and nutrition, water and sanitation. Indirect effects may be less visible and less clearly understood and therefore rarely feature in a trade agreement. However, the impact of indirect effects on health is considerable.

Identifying the relative impact of environmental factors on NCDs is not straightforward. The determinants for NCDs are complex and interrelated. Environmental conditions are determinants of health, but socio-economic factors are also important determinants of population health, probably with more direct impact on NCDs.

While environmental harm will increase the level of NCDs in a population, we also need to consider the other impacts of the movement of production to other, often less developed, countries. This can provide new employment opportunities in these countries, with potentially a positive economic impact. There can also be export of cleaner technology, benefiting the environment in the manufacturing country. (Reverdy C, 2019) An increase in income can provide more opportunities for the population, including improved access to healthcare and healthier food and water. This will be dependent on local arrangements and whether the income from production is shared beyond the organisations that receive payment for the services. There is a potential that the economic benefit will only be experienced by a small section of the population. This could widen inequality, which also has a negative impact on NCDs.

International frameworks and agreements

Sustainable development goals

The Sustainable Development Goals (UN, 2015) is an international framework agreement which should inform all aspects of international trade policy. All the sustainable development goals impact on trade, health and environmental objectives. For example, SDG 3 (health) SDG 7, (affordable sustainable energy); SDG 8, sustainable economic growth; 15, sustainable ecosystems are directly relevant. SDG 9 has a series of targets aiming to help less developed countries industrialise. Reducing inequalities between countries (target 10) and reducing gender inequalities (target 5) should be benchmarks against which trade agreements are tested. Sustainable Development Goal SDG 12, sustainable consumption and production is especially relevant for trade and environmental considerations. The goal contains a series of targets such as:

12.1 Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

Climate change agreements

The agreements of the international conferences of the partners (COP) on the Framework Convention for Climate Change should inform international trade agreements and enhance their environmental goals. COP 21, the Paris Agreement, is a legally binding international treaty on climate change. (UNFCCC,2015) It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. COP 26 in Glasgow has sought to build on the Paris agreement, but with limited success. There was progress in the global agreements

on trading carbon, but a failure to make real progress on reducing reliance on coal. (Parsons and Taylor, 2021)

COP 27 was held in Sharm el-Sheikh, in late 2022. The hosts of the summit promised an 'implementation COP' to move from pledges to global action. While there were successes in agreeing plans to support developing countries, the agreed implementation plan did not agree any clear plans for reducing fossil fuel use and had limited mention of cutting carbon emissions. The summit did produce important outcomes related to biodiversity and food security. Carbon Brief (2022) have produced a comprehensive analysis of the outcomes from the summit. The IPCC report (2022) set out a positive take on the progress needed to get to zero net carbon. However, the UN Secretary General (2022) described the position as a 'fast track to climate disaster'. Most recently he has heightened the present catastrophe (2023) stating that recent weather records signal that the "The era of global warming has ended; the era of global boiling has arrived".

World Trade infrastructure and regulation

The World Trade Organisation is the global body that regulates and facilitates international trade between nations. Governments use the organisation to establish, revise, and enforce the rules that govern international trade. It commenced operations on January 1995, replacing the General Agreement on Tariffs and Trade (GATT) that had been established in 1948. The WTO is the world's largest international economic organisation, with 164 member states representing over 98% of global trade and global GDP. The organigram for WTO illustrates the full range of activity for the organisation and shows where the Trade and Environment committee is located, as part of the Doha Developmental Agenda. (Figure 1) The historic DOHA accessibility of vaccines. (GNAPH and WFPHAS, 2021).

The World Trade Organisation position on environmental standards is that, if applied inappropriately, they could hinder exports and free trade. Their statement is.

"Environmental requirements can impede trade and even be used as an excuse for protectionism. The answer is not to weaken environmental standards, but to set appropriate standards and enable exporters to meet them." (WTO, 2020)

Under WTO rules, national legislation relevant to a trade agreement must be 'fair and equitable'. However, these statements on trade restriction and legislation are open to interpretation; this provides a route of influence for corporations and industries to challenge public health interventions that may affect their ability to market and promote products that may be detrimental to health. Depending on how a trade agreement is structured it may limit the options available for addressing NCDs. The requirements within the agreement may restrict a government's ability to prevent the sale of unhealthy products (e.g., restricting sugar in foods), regulate the marketing of unhealthy products, the use of tariffs and taxes to incentivise healthier diets and the introduction of food standards and labelling (Legge et al, 2013).

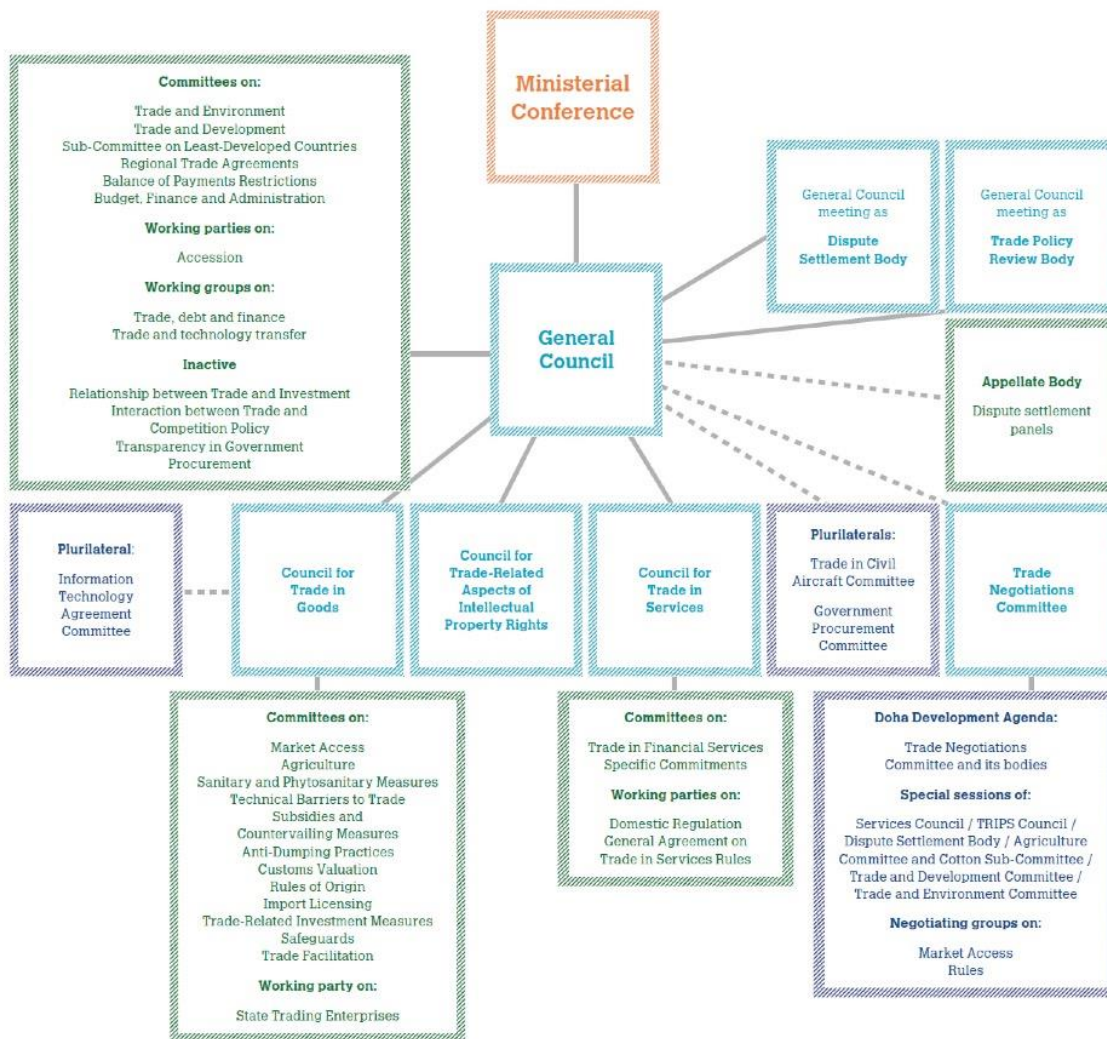


Figure 1: Organigram for the World Trade Organisation

Environmental Justice

The literature on environmental justice is also relevant to this discussion of trade, especially where production of goods and services is ‘outsourced’ to other, often less economically developed, countries. Environmental justice is defined as,

“The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation and enforcement of environmental laws, regulations, and policies (USEPA, 2022; Banzaf et al, 2019)”

Environmental justice requires that all people have the right to ethical, balanced, and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things, and for future generations. A good list of EJ issues around the world is contained in the environmental justice atlas. (Temper et al, 2015).

Environmental justice is a rights-based approach to health and to access to environmental resources. Client Earth has been very successful in pursuing court action over environmental protections, securing rights to both a safe environment and a right to health? Their work relating to climate change and to air pollution issues is particularly relevant to the trade, health, and environment agenda (Client Earth, promoting environmental justice, 2023a). Protection of natural habitats,

forests, and oceans, also contributes directly and indirectly to health and environmental improvement and reducing disadvantage and inequality. One of their current actions is a legal complaint against US-based agribusiness giant Cargill over its failure to deal with its contribution to deforestation and related human rights abuses in Brazil. (Client Earth,2023b) The production of soybeans for consumption by pigs, cattle and chickens, adds an extra dimension of unhealthy food production and consumption, increasing over-consumption of meat (Rust et al, 2020).

Environmental Provisions in trade agreements

There has been considerable movement away from Global agreements to regional agreements – in general these are thought to favour the more powerful countries.

Over the past decades the number of regional international trade agreements has grown rapidly. As an indication of this, in 2023 there are 360 Regional Trade Agreements (RTAs) in force compared to 291 in 2019. (WTO, RTA gateway, 2023) The influence and power of corporations has also increased substantially. The larger multinational companies have revenues comparable to medium sized countries and can lever political and financial influence accordingly to favour themselves in trade agreements.

WTO also describes Preferential Trade Agreements, PTAs, which may be multilateral or bilateral agreements offering reduced tariffs to the specified trading partner countries. (WTO, Preferential Trade Arrangements 2022)

One of the outcomes from this growth in international trade has been an increasing separation of place of production and consumption of goods and services, with a movement of production from developed into developing countries. This can have the effect of similarly moving environmental impact, and therefore health impact, away from the consumers to the producers of goods and services. (Yamaguchi, 2020). As an example, Zhang et al (2017) estimated that about 22 percent of air pollution deaths (762,400 deaths) were associated with goods and services produced in one region for consumption in another. Pollution related disease accounted for 1.3 to 1.9% of GDP in low-income countries but only 0.05 to 0.1% of GDP in high income countries (Landrigan et al 2017).

Similarly, this shift in local production away from the consumers also moves carbon emissions related to production away from consumers to the countries of production. This is commonly referred to as the 'outsourcing' of carbon emissions. Around 22% of global CO2 emissions stem from the production of goods that are consumed in a different country (Peters et al, 2012). Again, the countries with the resulting increased emissions are generally in developing countries with the consumers being in developed countries.

Data sources and resources on trade

The Health and Environmental Interplay Database (HEIDI)

The Health and Environment Interplay Database (HEIDI) provides a comprehensive database of environmental trade treaties (Morin and Blouin, 2019; HEIDI, 2022) This analysis of trade agreements has identified that environmentally related provisions are the most widespread form of non-tariff provision in TIAs. There is some evidence that these environmental provisions in PTAs can reduce the environmental impact of exports from developing countries. Environmental provisions can help reduce dirty exports and increase green exports from developing countries, particularly from developing countries with stringent environmental regulations (Brandi et al, 2020).

The HEIDI database provides details of the specific environmental provisions that have been included in TIAs. These include:

- Reduction of greenhouse gas (GHG) emissions.
- The strengthening and development of a carbon market mechanism.
- The development of low carbon technologies, including carbon dioxide capture mechanisms.
- An aim to increase carbon sinks in the Asia-Pacific region.
- Several treaties also refer to ‘general cooperation’ on tackling climate change and to harmonization of legislation related to climate change, specifically in relation to EU legislation.
- Renewable energy and energy conservation deals

The Trade and Environment Database (TREND)

The Trade and Environment Database (TREND) identifies nearly 300 types of environmental provisions across 730 trade agreements (Trade and environment database, 2022; Morin et al 2018). From this analysis and the associated datasets, most environmental provisions relate to the direct protection of the planet. They cover areas including climate change, environmental protection including marine and forestry, food and water security and safety, and environmental contamination and waste management. Figure 2, below, is the web page analytic for global distribution of these provisions and can be interrogated over time. There is always a classification issue when generalising information into databases. Many categories overlap and are not mutually exclusive - for example Climate change, Energy Conservation and Renewable Energy (Figure 3) all overlap which means that any analysis needs to explore in depth the text of individual agreements.

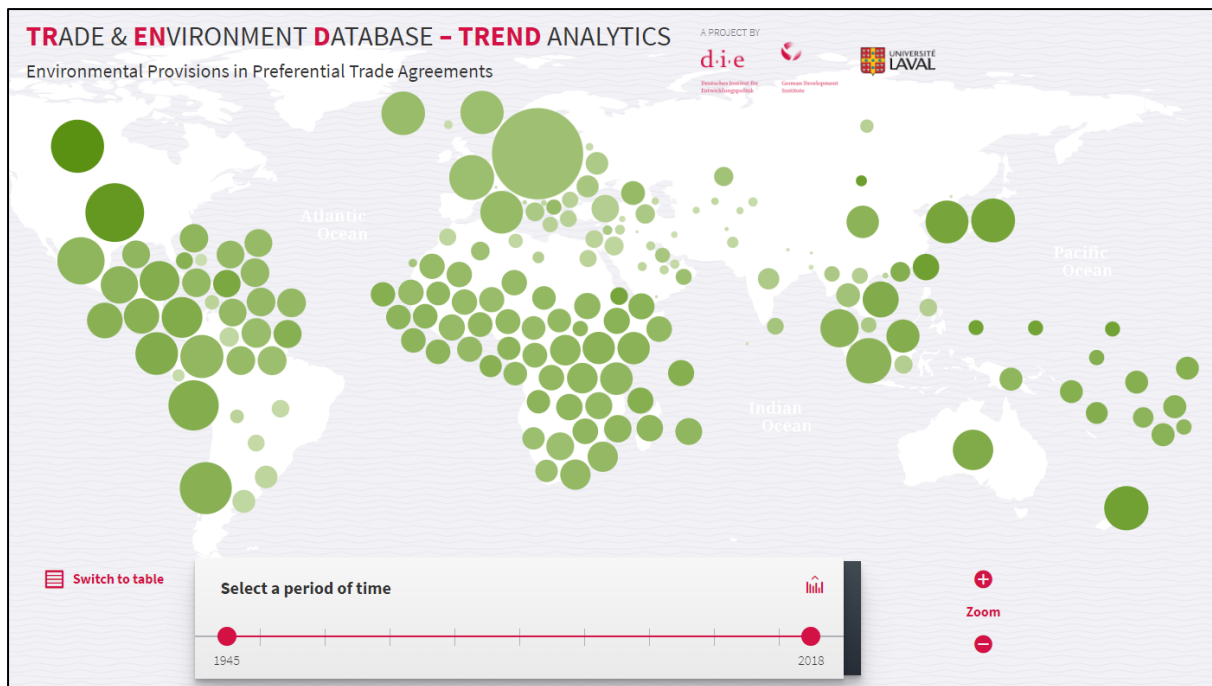


Figure 2: Trend and Environment Database (2021) – Environmental provisions in preferential trade agreements 1945-2019

Figure 3 shows TREND’s description of the major environmental provisions in trade agreements.

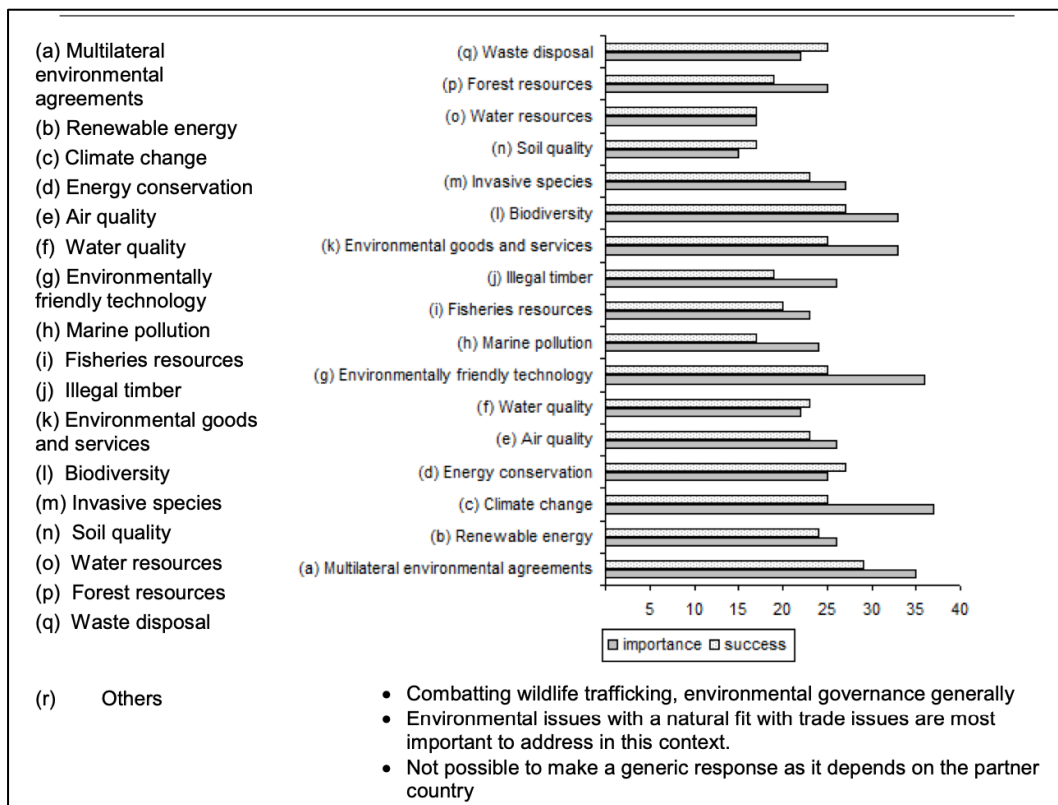
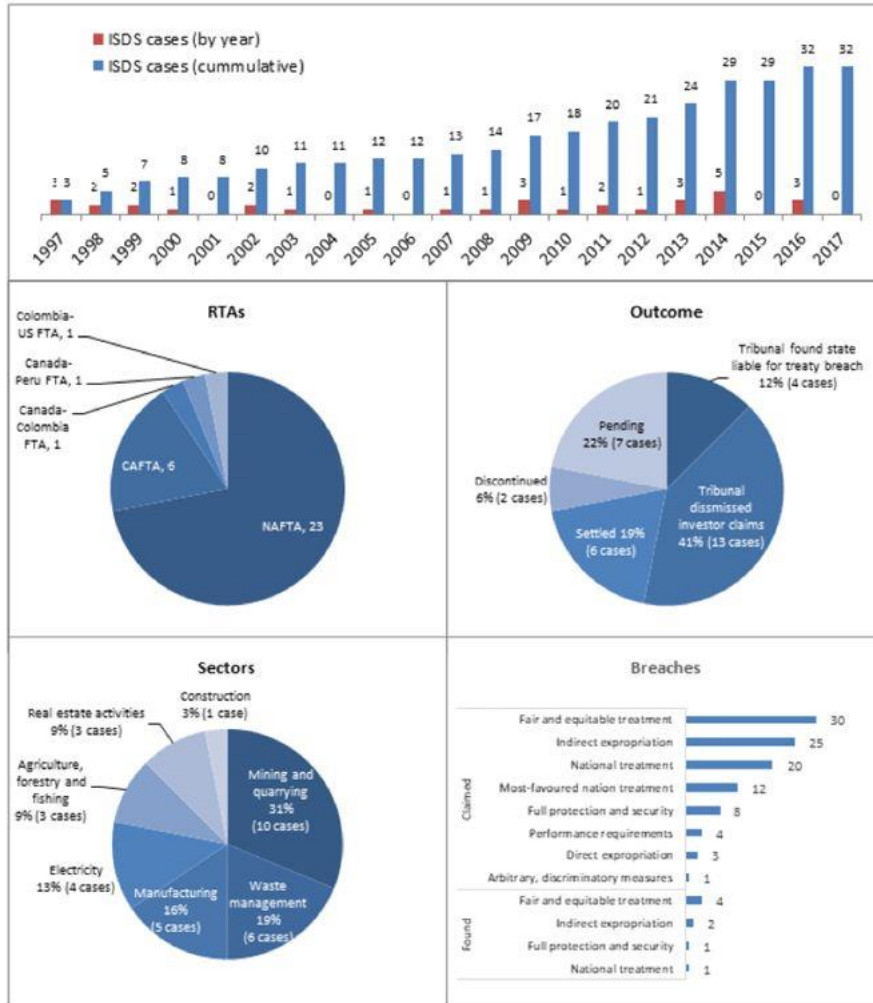


Figure 3: Major environmental provisions in trade (Source TREND)

Environmental provisions in trade agreements are the most contested. These are managed through the Investor State Dispute resolution processes (ISDS). Figure 4 shows the growth and levelling of ISDS cases under Regional Trade agreements.



Note: The year represents the year of initiation.

Source: Authors' calculations based on italaw website (www.italaw.com).

Figure 4: ISDS cases related to the environment under Regional Trade Agreements

Source: OECD (2020)

The World Trade organisation lists all disputes between countries on its website (WTO Disputes, 2023). Surprisingly perhaps, no disputes are currently listed under 'environment', or under 'health and social'. The UK Public Health Network listed health related trade disputes (UKPHN,2017) which give a flavour of some of the possible areas of contention and their potential impacts on health.

International conventions and treaties in trade agreements

Regional and PTAs regularly include provisions where the partners agree to comply with existing treaties related to environmental conditions. The list of these treaties and conventions is extensive, but the main documents include:

- Convention on international trade in endangered species of wild fauna and flora (CITES, 1975)
- The Kyoto protocol on climate change, (UNFCCC,1997)
- The Paris agreement on climate change (UNFCCC,2015)
- The convention on biological diversity (UN, 1992)
- The Montreal protocol on ozone layer protection (UN, 1987)
- Stockholm convention on persistent organic pollutants (UN, 2004)

- Rotterdam convention on international trade in hazardous chemicals and pesticides (UN, 1998)
- Basel convention on hazardous waste movement and disposal (UN, 1989)

Specific chemicals: relationships and concerns regarding non-communicable diseases.

'Non-communicable diseases' tend to be considered as the long-term physical conditions such as circulatory and respiratory chronic diseases and cancers. However, the list is cast more widely in relation to chemical risks and must include neurological and metabolic disorders, adverse conditions of reproduction, genetics, growth and development, physical and learning disabilities, and mental health conditions.

The major concern with many of the proscribed chemicals is carcinogenesis. Persistent Organic Pollutants are major causes of cancer, reproductive and endocrine disruption. Endocrine disruptors make up another and overlapping major group. Endocrine disruptors can impact on endocrine systems causing diseases of the metabolic and endocrine systems, including growth disorders, renal, adrenal, pituitary, thyroid and reproductive system conditions (ECHA,2022). All these groups of chemicals feature in the Rotterdam and Basel conventions on hazardous chemicals and pesticides and hazardous waste movement.

There are specific environmental considerations and NCDs, starting with two areas where there are identifiable direct impacts on NCD, climate change and air pollution. This discussion will draw on the TREND database codebook and their analysis of environmental provisions in trade agreements (Morin and Blouin, 2019).

Climate change

Climate change, along with air pollution, is considered the greatest environmental risk to health by the World Health Organisation (WHO, 2019). WHO estimate that between 2030 and 2050 climate change will cause between 250,000 additional deaths a year from malnutrition, malaria, diarrhoea, and heat stress. Climate change has a direct impact on NCDs, particularly cardiovascular and respiratory conditions, much of this due to increased heat stress (Pruss-Ustin A, 2019). Impacts of climate change on mental health are becoming more widely recognised (Cianconi, Betrò, and Janiri (2020); Ingle and Mikulewicz, 2020).

The global increase in wildfires has been strongly attributed to climate change. People with pre-existing long-term conditions have been shown to be vulnerable to worsened air quality due to wildfires. (Lancet PH editorial, 2021) A study in 43 countries found increases of nearly 2% in cardiovascular, respiratory, and all-cause mortality per 10 µg/m³ of fire related PM_{2.5} (Gongbo Chen et al, 2021).

There are also health risks from increased levels of extreme weather events such as flooding, hurricanes, heat waves and potential secondary impacts due to climate induced changes, for example reduced food security and increased migration.

Extreme weather events

Over the past few years there has been an increase in extreme weather events across much of the world. This has included unprecedented heatwaves in Europe, North America, Asia (World Weather Attribution, 2023) and South America (Patterson, 2023). These extreme temperatures pose a significant risk to human health. Some areas, especially in the tropics, are approaching the point where the combination of temperature and humidity can reach lethal levels, as measured by the 'wet bulb' temperature (Jenix et. al, 2023). As well as direct health impacts, these conditions can

drive migration, which has the potential to increase the risk of regional conflict (Cullen et. al, 2023). These impacts are not evenly distributed. There are generational and geographical inequalities, particularly between the global north & south (Hadre et al., 2023).

Wildfires

Alongside the extreme heat events there have been widespread large-scale wildfires in many areas across the world. These have direct impacts on human health in the areas affected (Gao et al, 2023). The recent fires and resulting deaths in Hawaii demonstrated the speed and lethality of these events. The smoke and soot from these fires also cause harm for more distant populations. For example, the extensive wildfires in Canada caused severe air pollution across areas of the northern United States with a direct impact on human health in these areas, especially for people with existing respiratory conditions (NASA, 2023).

THE HEIDI database includes relevant trade related climate change indicators list above. Analysis of the relationships between trade, environmental protection and climate change has shown that there is considerable potential within existing trade arrangements, including the World Trade Organisation, to address the climate change challenges (Droge S et al,2019). However, trade is rarely considered in current policy and strategies to tackle climate change (Economist Intelligence Unit, 2019).

UK-Australia Free Trade Agreement: concerns for environment and non-communicable disease

At the end of 2021, the UK rushed through a trade deal with Australia, in the process, sacrificing previous climate change provisions and those retained in the European Union-Australia deal. Some of the implications and commentary from UK Parliamentary sources, are set out in the case study below.

Case study: UK-Australia Free Trade Agreement (FTA) Implications for environment and non-communicable disease

Environmental provisions:

The FTA includes a chapter on the environment, setting out the UK and Australia's shared commitment to mutually supportive trade and environment policies. The chapter ensures that neither country can fail to domestically enforce environmental laws to gain an unfair competitive advantage. The FTA refers to the Paris Agreement but ditched an explicit commitment to limiting global warming this century to 1.5C above pre-industrial averages. This is a retrograde step in the more general trend to including climate change provisions in TIAs. The increase in trade arising from the agreement is likely to affect the environment. The Government estimates that overall greenhouse gas emissions associated with UK-based production are likely to be largely unchanged. However, a UK Parliament Research briefing estimates indicate there would be an increase in emissions associated with the transport of goods traded with Australia. (Webb D,2023)

The House of Lords International Agreements Committee, concluded in 2022, that:

114. Given Australia's position on coal, it is regrettable that the agreement did not include any references to reducing or reviewing Australia's reliance on coal. This contrasts with the trade agreement the UK signed with New Zealand.
115. The impact assessment states that the agreement should not significantly change the greenhouse gas (GHG) emissions within UK-based production, but some areas, such as transport-related emissions, have been left out of the calculations, and the potential for increases in carbon leakage is not discussed in detail.
116. The Government's future impact assessments should cover in greater detail transport-related emissions, the potential for increases in carbon leakage, impacts on deforestation and biodiversity. Trade sustainability impact assessments produced for the European Parliament during trade negotiations are more detailed in this regard.

The House of Lords concluded more generally 'in the light of our net zero commitments, future FTAs should seek to achieve a net reduction in GHG emissions—which may be achieved by agreements on production methods and procurement. '(House of Lords, 2022)

Politically, the FTA set a poor example from the UK as we were leading the global climate change agenda, for the year following COP26. (Trade Justice Movement, 2021; BBC, 2021) The deal was seen as setting a precedent that has been part of a general back sliding on climate breakdown commitments, in 2023, at a time of global existential threat from climate catastrophe. (PolicyMogul, 2023).

The watering down of climate change commitments in the deal will add to the health impacts described in this section, directly from heat and extreme weather impacts and from air pollution related ill health.

Direct concerns about Australian coal

The environmental damage from the mining, transport and burning of coal is immense. There are direct health impacts to workers in all stages of the processing of coal, especially in respiratory disease, cancer and accidents, and the indirect health impacts of climate change and air pollution. Australia is the fifth largest coal producer in the world, and the second largest exporter. Most Australian exports of coal are directed to East Asia but increasingly to the Middle East. (Australian Government, 2022) There is a very small export of Australian coal and coke to the UK. (Webb D, 2023) By definition, with the UK-Australia Free Trade Deal, there is no barrier to further Australian exports of coal and coke to the UK (however economically and environmentally ridiculous that might seem, the market may decide)

A foot in the door for Australian coal and coke exports?

Top 10 UK goods imports from Australia, 2021		
	£ millions	% total
Gold, non-monetary	763.4	27.0%
Non-ferrous metals	480.3	17.0%
Beverages	263.5	9.3%
Miscellaneous manufactured articles n.e.s.	247.0	8.7%
Postal packages not classified according to kind	114.4	4.0%
Power generating machinery & equipment	114.0	4.0%
Metalliferous ores & metal scrap	83.6	3.0%
Coal, coke & briquettes	70.7	2.5%
Electrical machinery, apparatus & appliances n.e.s.	70.4	2.5%
Oil seeds & oleaginous fruits	58.9	2.1%

Source: HMRC, [UK Trade Info](#). Note: n.e.s.: not elsewhere specified

from: Webb D, 2023

There have also been concerns on the food and environment provisions for which Australia is regarded as having less rigorous standards than the UK.

Henry Dimbleby, who wrote the independent National Food Strategy review for the UK Government, highlighted the differences in farming practices, including animal welfare standards and wider environmental impact. He has also stressed the risk that: ‘The way we do one trade deal inevitably feeds into how we do the next. Brazil – which has significantly worse environmental and welfare standards than our own, or indeed Australia’s – is also being lined up for a trade deal. If we are seen to lower our standards for the Australia deal, it will make it much harder to hold the line with Brazil – or the next potential trading partner, or the next.’

He also emphasised that there is a real risk that the Australia deal could undermine the Government’s focus on getting UK farmers to raise their environmental standards further – and that our true carbon footprint, including that from imports, would be larger than ever, as would the impact our food has on biodiversity. He therefore also recommended that, as well as maintaining the current standards that apply to imports, the Government develop a set of core standards that it can use for all future trade deals and explained how it would enforce them and thereby help to raise standards both here and abroad (Which,2021).

Air quality

Worldwide poor air quality is linked to 4.2 million deaths annually plus 10s of millions of cases of illness (WHO,2019). Poor air quality has a direct impact on non-communicable diseases, particularly cardiovascular disease, chronic respiratory disease, and lung cancer. It is estimated that 500,000 lung cancer and 1.6 million chronic respiratory disease deaths globally may be attributable to air pollution. There is also evidence that 19% of cardiovascular deaths and 21% of stroke deaths may be attributable to air pollution (Schraufnagel DE et al, 2019).

More recent evidence has also shown an association between air pollution and a range of other health conditions, including NCDs such as bladder cancer and leukaemia, osteoporosis, and renal disease. There are also possible associations with child cognitive development, low birthweight babies and eye disease. Some of these will also have indirect influences on NCDs. The recent release of new WHO air quality standards in 2021 based on the best available evidence shows that the impact of poor air quality has been greater than we have historically realised (WHO,2021).

The *Dieseltgate* scandal demonstrated how multinational car companies managed to undermine efforts for international control of air pollution and greenhouse gases, The issue, first identified with Volkswagen 'cheating software', was subsequently found to have involved virtually all multinational car manufacturers. Please see case study 2 below.

Trade provisions that impact on air quality therefore can have a direct impact on non-communicable disease. (Vardoulakis, 2020), in a PETRA position paper, discusses the additional impact on air quality from the process of moving goods between locations and a recent trend towards road freight away from shipping which can increase air pollution (UNCTAD,2016).

Compared to climate change, the HEIDI database contains far fewer references for provisions directly related to air pollution. There are references to agreed environmental standards on vehicles related to air pollution and more general statements covering,

- Combating local, regional and transboundary air and water pollution
- Air, soil and water pollution prevention management and control
- Undertake to cooperate on matters relating to environmental protection and improvement with the aim of resolving the problems caused by contamination of water, soil, and air, by erosion and by deforestation.

Case study 2: Volkswagen and other multinational car companies – ‘Dieselgate’

In 2008, Volkswagen introduced a new generation of “Clean Diesel” cars and heavily marketed them to environmentally conscious US consumers. The “cheating cars,” were touted as an environmentally conscious choice and earned awards such as “Green Car of the Year.” Later investigations, however, found the cars’ software-activated emissions controls worked only under testing conditions. On the road, these controls were disabled, and the cars generated high levels of particulate matter and gases that are known to worsen lung function, exacerbate asthma and heart disease, and create smog (Tachibana C. 2022).

The ‘clean cars’ were anything but clean, emitting pollutants up to 150 times the level of comparable petrol-fuelled cars. Alexander and Schwandt (2022) studied the rollout of these emissions-cheating diesel cars across the United States from 2008 to 2015 as a natural experiment to examine the impact of moderate levels of car pollution on infant and child health in the general population. Using the universe of vehicle registrations, they found that an additional cheating diesel car per 1,000 cars increased PM2.5, PM10, and ozone by 2, 2.2, and 1.3%, respectively, while the low-birth-weight rate and infant mortality rate increased by 1.9 and 1.7%, respectively. Similar impacts were found for acute asthma attacks in children. These health impacts occur at all pollution levels and across the socioeconomic spectrum.

An early modelling study quantified the health and economic impacts of extra NO_x emissions attributable to non-compliant vehicles in the U.S. using the EPA’s Co-Benefits Risk Assessment model (Hou et al,2016). They estimated that the total extra NO_x emitted over one year of operation would result in 5 to 50 premature deaths, 687 to 17,526 workdays with restricted activity, and economic costs of \$43,479,189 to \$423,268,502, based on various assumptions regarding emission scenarios and risks. Their study highlighted the potential impacts of VW vehicles’ lack of compliance on the health and well-being only for the U.S. population, and only for a single year of exposure.

The findings of these modelled health impacts are considered to have been important evidence to support the Biden-Harris initiatives to reduce air pollution by accelerating clean transit buses, school buses and trucks (White House, 2022). The initiative is very much a United States focussed one, referring to collaborative agreements with US based motor vehicle industry, and therefore likely to be of limited impact on trade agreements, except as an exemplar.

By 2017 clear that other European car manufacturers Fiat, Renault, Vauxhall all implicated in *dieselgate*

‘Seventy-seven percent of European diesel-powered cars produce levels of emissions that indicate the presence of an emissions-cheating device, a report by the non-profit International Council on Clean Transportation (ICCT) found’.

(Meyer m et al, 2023)

Environmental-related traded goods

The quality of the environment has a direct impact on the health of the population in that area. Trade that influences the environment within a country will therefore have an impact on health. However, the link to NCDs is likely to be indirect in many cases.

There has been a substantial increase in the trade of environmentally related goods, such trade increased by more than double between 2003 and 2016 (Garsous, 2019). The largest categories of goods in this trade were related to renewable energy, wastewater management and treatment, and solid and hazardous waste management and recycling.

Trade in refuse for recycling impacts on environment in receiving country, usually in the developing world or global south. As the wealthy world outsources carbon emissions and air pollution in manufacturing processes, so it re-outsources carbon emissions and air pollution in the processing of its waste products.

The circular economy

In recent years the concept of the Circular Economy has been widely discussed in policy circles. According to the World Health Organisation, (2018):

‘The concept of a circular economy offers an avenue to sustainable growth, good health, and decent jobs, while saving the environment and its natural resources. Further, the change from a linear economy (take, make, dispose) to a circular economy (renew, remake, share) is expected to significantly support the attainment of the Sustainable Development Goals (SDGs), particularly SDG 12 on responsible consumption and production’.

The WHO European Office say that “the transition to a circular economy provides a major opportunity to yield substantial health benefits, such as direct benefits to health care systems and indirect benefits from reducing negative environmental impacts. There are also risks of adverse and unintended health effects, however, in processes involving hazardous materials” (WHO Euro, 2018). Major concerns have been highlighted in the academic community about the rigour and practical implications of the circular economy concept, and its implications for health (Mathias Nigatu Bimir, 2020; Khan 2016).

International conventions on management of hazardous products

International conventions exist to ban, reduce, or eliminate hazardous or toxic products. In the limited situations in which these products can be transported internationally transparency and auditing of these products is built into these conventions to ensure that governments and businesses know their responsibilities so that communities are protected. Three of the most important Conventions are:

- Basel Convention – Transboundary Movement of Hazardous Waste and Disposal adopted 1989, in force from 1992.
- Rotterdam Convention – to deal with pesticides and industrial chemicals that have been banned or severely restricted adopted 1998 in force from 2004.
- Stockholm Convention – eliminate or reduce Persistent Organic Pollutants (POPs) adopted 2001, came into force 2004.

There are synergies between the Conventions and by sharing the same BRS Secretariat resources can be pooled and knowledge shared.

Managing E-waste and ‘toxic colonialism’

The Basel Convention was in response to public and NGO concern about illicit dumping of toxic waste in Africa that was called a ‘toxic colonialism’. One of the biggest global exporters of waste is the USA and yet they did not ratify the Convention despite being heavily involved in its development.

More recently there have been increasing concerns about electrical and electronic waste. E-waste is the most modern type of waste comprising largely of metals (including valuable metals such as gold, copper, silver and palladium), heavy metals such as lead, mercury and cadmium, as well as various plastics.

E-waste (electronic waste) exemplifies many of the issues in this paper – electronic and electrical items can be seen as both a product and waste. (Mathias Nigatu Bimir, 2020). Most of these items are produced in the developed world but many are disposed of in the developing world. For some developing countries this trade is seen both as a business opportunity but also a means of securing second-hand items that could be repaired or sold. E-Waste is the fastest growing segment of waste in the world due in part to how quickly digital items become obsolete (especially phones and computers). In 2020 global e-waste was estimated at 50 million tonnes and it is still growing.

A recent overview from 2020 of several African countries and how they manage e-waste found weak governance, and little actual recycling of materials due to a lack of recycling facilities in the country – landfill was the most common disposal method (Mathias Nigatu Bimir 2020). Khan (2016) also expresses scepticism that the Basel Convention is acting as it should in part due to “sometimes contradictory international regimes of liberalized trade and environmental protection.” So, whilst on paper the Basel Convention looks strong, poor data reporting, lack of enforcement as well as illegal activity means that the most vulnerable populations are still being exposed to hazardous wastes. See Case study 3: E-waste – interventions-what works?

Houessionon (2021) provide a systematic review of heavy metal contamination worldwide due to e-waste. E-waste contamination levels for soils, water and sediments are provided and in nearly all of the cases average metal levels were above the guidelines. E-waste provides several problems to the environment and human health including heavy metal contamination, leaching of toxins into groundwater or surface waters, poor incineration creating more toxins, contamination of the food chain. Effects are often greatest for those working or living near illegal or unlicensed processing sites. Over time it may well be that the development of robust circular economy models could properly re-use precious metals and other materials.

Case study on E-Waste – interventions – what works?

Evidence of the effectiveness of international treaties to manage e-waste is uncertain at best. However, other levels of intervention at the national and subnational level have also been reported on.

Heacock et al (2021) provide short summaries of exposure and interventions across many parts of the world including India, China, Philippines, Ghana and Uruguay. A range of interventions have been tried and improved with community involvement including:

- Hygiene and food classes so that the population understood the pathways and dangers involved with handling the materials
- Introduction of PPE and other protective wear
- Provision of equipment that can be used to strip cables instead of burning them,
- Indoor and outdoor remediation by removing and replacing soil,
- Education for professionals e.g., doctors in Manilla were unaware of the toxicity associated with e-waste practices
- Door to door community education programmes which built trust and understanding
- Culturally appropriate communication

In the case of Guiyu in China (one of the largest e waste locations in the world) the government shut down all informal centres in the area in 2015 creating a new industrial park for recycling including protective measures. However other countries have been reluctant or unable to take similar measures.

Of particular importance in most of these locations is the tension between the desperate short-term need for income to live (income for this work being far higher than other local occupations) and the long-term threat to health. Resolving this issue is likely to take many years involve many stakeholders and the provision of resources.

One long-term project “Solving the E-waste Problem (StEP) Initiative” www.step-initiative.org is a multi-stakeholder initiative supported by the United Nations. This provides frameworks, guidance, and toolkits for users to help develop better e-waste practices. It also produces case studies, promotes events and collaboration and lobbies for better policy.

However, two overall problems remain when dealing with e-waste. Many of these pollutants are very long lasting and will need expensive measures of remediation if these are to be addressed over the longer term. The other problem is that e-waste is still growing and is predicted to reach 74 million tonnes by 2030 (Lopes dos Santos & Jacobi 2021).

The Rotterdam convention: transport of pesticides and hazardous waste

A key component of the Rotterdam Convention is the concept of Prior Informed Consent for the transport of pesticides or hazardous waste between countries. This was specifically designed to protect the right to health.

Núñez-Rocha and Martínez-Zarzoso (2019) found that ratification of the Rotterdam Treaty led to OECD countries exporting less of these substances to non-OECD countries. This amounted to a reduction of approximately 7% of hazardous substances. However, ratification of the Stockholm Convention led to a 16% reduction of transport shipments of POPs.

The Stockholm Convention aim is to eliminate POPs by prohibiting production as well as phasing out existing uses (28 POPs are covered by the legally binding convention). The precautionary principle is a key underlying concept of the treaty. POPs accumulate in the fatty tissue in humans and can be transferred through the placenta and breast milk. POPs also concentrate higher up the food chain (see Ren et al 2017 for an example).

Annex B of the Treaty allows for some POPs to be used where there is not an alternative – for example 17 countries are registered as using DDT. The treaty has resulted in the production of DDT being discontinued in many countries. van der Berg et al (2017) report on the effectiveness of reductions in DDT production and use but also note many countries failing to comply with reporting. DDT continues to be used in some countries under an exemption for public health especially in controlling disease. However there also exists a roadmap to help countries move away from all use of DDT and this is supported in the Stockholm Convention with financial assistance. Some countries were forced to stop/ change using DDT due to resistance building up in insects making it less effective.

Wöhrenschiimmel et al (2016) reports scepticism of the direct impact of the Convention whilst acknowledging decreases in many of the POPs that have been monitored. National and EU policy (which are likely to have been influenced by the Stockholm Convention) are suggested as the mechanisms leading to a reduction. They also identify that long term monitoring (as required by the Treaty) is weak outside of Europe and North America. They make a series of recommendations as to how to manage the long-term monitoring required see Wöhrenschiimmel et al (2016).

International differences in implementing environment and trade conventions and agreements.

The US is not a signatory to the Basel Convention and is one of the biggest exporters of waste in the world (Farge E, 2021). There are major international differences, particularly between the European Union and the USA, on the assessment of levels of risks from chemicals, not covered by the major international treaties. In 2015, US processes restricted only 11 chemicals for use in cosmetics compared with over 1,300 in the EU. Asbestos is not banned in the USA and over 750 tons were imported into the USA in 2018. (Young K, 2019). The EU and the USA have diverged in their approaches to regulating the export of hazardous waste. The EU has been a leading advocate for banning the North–South trade in hazardous waste, since 1989. However, the USA has opposed such a ban and arguing in favour of continued trade”. (Dreher and Pulver, 2008)

The REACH regulation is the European Union agreed in 2007 is designed “to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU Chemicals industry”. REACH stands for Registration, Evaluation, Authorisation, and restriction of Chemicals. The regulation puts the onus on the manufacturer to prove the safety of a chemical, and to provide the risk assessment indicating how the product can be safely used (European Chemicals Agency, 2022). Under the US Toxic Substances

Control Act, the burden of proof falls on the regulator to demonstrate proof of harm (Chemtrust, 2020).

There were strong arguments that the UK should remain aligned with EU-REACH post Brexit for the protection of human health and the environment, but also for the protection of the UK chemicals industry. The UK chemicals industry had an annual turnover of £32 billion in 2018 and was the second largest exporter to the EU after the automotive industry. It is the second biggest manufacturing industry overall (Chemtrust, 2020; Parliament UK, 2020). However, post Brexit, UK-REACH has been established as a regulation of the Environment Act 2021 (Parliament UK, 2021; HSE, 2021). It is already apparent that the processes adopted by UK REACH will fall short of the levels of public protection expected in the EU-REACH regulation (Harvey F, 2021). Divergence from the European REACH programme, the most advanced protection of the public from dangerous chemicals in the world, puts the UK public at risk, whilst at the same time disadvantaging and compromising the ability of the UK chemical industry to compete in domestic, European, and other markets. Rather than replacing the REACH requirements, UK-REACH has doubled the red tape (Parker & Foster, 2022).

Conclusions

This review has looked at the scope of environmental provisions in trade agreements and sought to relate these to the risks and protections from non-communicable disease. This is very much an overview. Environmental concerns are the single most visible non-tariff considerations in trade agreements worldwide. Many of these agreements relate to climate change and global environmental concerns. Some relate specifically to environmentally traded goods and services- renewable energy on the positive side, controlling hazardous waste and waste management and recycling on the other. There are strong reasons for pursuing environmental measures in trade agreements. There is growing awareness of the potential value in relation to climate change, as an example. Environmental provisions in trade agreements are more likely to have indirect impacts on non-communicable disease where they relate to global considerations and climate change.

The health impact assessment of environmental provisions is unexplored in the scientific literature. Brandi and colleagues listed a range of topics which could be looked at by investigating environmental provisions in PTAs: international trade and the environment; design and impacts of trade agreements; and greening the economy in developing countries. They also considered that the design of trade agreements mattered. Environmental provisions can be used as targeted policy tools to promote the green transformation and to leverage synergies between the economic and environmental effects of including environmental provisions in trade agreements. (Brandi et al, 2020) However, the study of health-related impacts remains uncovered. More fundamentally, the relevance and importance of health-related outcomes from trade agreements is largely unrecognised and un-valued.

It is also the case that the health impact of trade agreements is therefore unexplored as a political lever and under-researched in academic circles to inform political decision making and economic negotiations. The Scottish Vision for trade sets out five principles which will guide all future decisions on international trade: Inclusive Growth, Wellbeing, Sustainability, Net Zero and Good Governance. This is perhaps the first time any government has made health a specific objective for trade policy, and to then place it alongside other environmental objectives- net zero, inclusive growth and sustainability. (Scottish government, 2021)

Controlling air pollution is a major potential area where trade provisions could have an impact, but it remains generally unexplored. Vested interests of car manufacturers and fossil fuel companies are

likely to impact negatively on any efforts to develop air pollution related trade provisions (Case study: Volkswagen).

Environmental considerations in trade agreements become directly important in relation to preventing and controlling non-communicable diseases where they relate to the proscription and control of dangerous chemicals which can impact on communities and where they impact on workplaces and individuals. There is an extensive set of international agreements to control chemicals and hazardous substances and wastes. It is variably implemented and enforced around the world – “We estimate that it will take at least two decades after the entry-into-force of the Convention before monitoring data will be sufficient to tell if the efforts were adequate. “ Wöhrnschimmel et al (2016) p157.

More work is needed in researching the impacts of chemicals on non-communicable diseases, in acting to enforce new policy controls on harmful candidate chemicals such as human made “forever chemicals” PFAs (Per- and polyfluorinated alkyl substances) and whether they should still be allowed to be used in commercial production.

Specifically for the UK research and policy community, we recommend there is further research and monitoring of all new free trade deals secured by the UK since 2020 to test what environmental provisions may have changed or been omitted. There are ostensibly ambitions to explore and achieve ‘even higher standards’ of public protection through trade agreements. However, the reality suggests that in negotiations as a single nation, the UK is poorly placed to achieve anything more than the most basic and disadvantageous trading terms.

Health impact is rarely an express consideration in any trade agreement, and the global health community is left to pick up the pieces of unintended adverse consequences of trade deals for health. Sometimes these are seen in investor state disputes. More research is needed which should be interdisciplinary: involving economists, environmental scientists, trade experts, international lawyers, and public health community. It is important that such work fully engages communities and addresses inequalities and environmental injustices.

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