

Making trade work for the environment, prosperity and resilience



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Foreword

During the past few decades, trade has powered huge advances in economic development around the world. As the world economy has grown, however, so too have environmental challenges, which in turn risk undermining wellbeing, development, health and economic growth itself.

Trade that supports a healthy environment and sustainable development is critical. This report, by the World Trade Organization and UN Environment, illustrates how trade can support action by governments, companies, innovators and consumers to improve our economies and protect our environment at the same time.

The 2030 Agenda calls on all countries to put trade at the service of a more sustainable, inclusive and resilient world. To this end, we

must seize the positive momentum of countless win-win ideas and actions springing up all around the world.

In India, a start-up that repurposes waste into furniture, clothing and accessories sells these products over the internet. A young entrepreneur from the Caribbean has developed a cutting edge technology to extend the life of lithium-ion batteries for reuse around the world. Meanwhile in Madagascar, men and women in a small village have created an export-oriented business from eco-friendly seaweed farming.

“If we all come together and work together, there is no limit to what we can achieve on planet Earth.”

Erik Solheim, UN Environment Executive Director and Under-Secretary-General of the United Nations



01



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01 Erik Solheim UN
Environment Executive
Director and Under-
Secretary-General of
the United Nations

02 Roberto Azevêdo
Director-General
of the World Trade
Organization

Trade can help green business expand and flourish. It can promote environmental conservation and economic efficiency, and improve access to clean technologies at a lower cost. To make sure trade delivers these benefits and works for people and the environment, countries around the world will have to better align trade, environment and sustainable development policies.

We are committed to building on the strong foundation of cooperation between our organizations to help countries, businesses and people to meet these challenges.

In 2018, we jointly launched an initiative to broaden and deepen the dialogue among governments, the private sector and civil society on practical ways to use trade to strengthen the global economy and the environment, and to ensure a future for people whose livelihoods depend directly on natural resources.

Our aim is to shine a light on opportunities to bring trade and environment closer together, and to highlight the importance of close collaboration between governments, entrepreneurs, investors, scientists, environmental activists and civil society at large.

In this way, we hope to strengthen the contribution of our two organizations towards the sustainable, resilient and prosperous world we all want.

“By working together, we hope to provide a useful resource to explore practical ways to expand trade opportunities that are good for the economy and for the environment.”

Roberto Azevêdo, Director-General,
World Trade Organization

Erik Solheim
UN Environment Executive Director
and Under-Secretary-General of the
United Nations

Roberto Azevêdo
Director-General,
World Trade Organization

Executive summary

International trade offers unique opportunities to build a prosperous, climate resilient and environmentally sustainable world.

The world is much more interconnected than ever before. The rise of production networks across countries has transformed the trade and business landscape, influencing how and where goods and services are produced and consumed. Many developing countries are playing an increasing role in international trade, but others remain excluded due to lack of financial resources, knowledge and infrastructure.

At the same time, the world faces growing environmental pressures including air pollution, land degradation and overfishing. Climate change, in particular, has intensified the frequency and magnitude of weather-related events such as tropical cyclones, which can trigger natural disasters and widespread emergencies. Such disruptions, not least to production and transport networks, pose risks to trade and prosperity more generally.

Proactive and forward-looking trade approaches can be part of a coordinated and effective solution in tackling mounting environmental challenges while fostering economic and social prosperity. International trade is unique in that it promotes specialization, competition, economies of scale and innovation globally. These powerful forces can, if properly harnessed, help make the world economy more sustainable and resilient to environmental risks while having positive effects on prosperity, jobs and equality, in line with the United Nations' 2030 Agenda for Sustainable Development.

Trade can help bridge relative differences in resource endowments across countries, relieving resource scarcities in some regions and allowing for a more economically and environmentally efficient allocation of resources globally. With the growing impacts of climate change and resource scarcity – felt in varying magnitudes across different parts of the world – this role of trade can help foster environmental sustainability and resilience and is likely to play an even more prominent role in the coming decades.

Open, predictable and equitable trade relations among countries can accelerate the diffusion of environmental goods and services and facilitate the creation and expansion of markets for sustainable products.

International trade can accelerate the diffusion of environmental goods and services to those places where they are most needed and help stimulate productive local capacity. Environmental goods and services perform a variety of functions essential to tackling environmental challenges, regenerating the natural environment and making production and consumption more sustainable. They consist of goods and services needed to, for example, produce clean and renewable energy, improve resource and energy efficiency, and reduce waste and abolish air, water and soil pollution, among other important functions.

A larger, competitive and integrated global market gives companies, governments and consumers around the world access to better and more efficient goods and services to protect the environment. At the same time, it can drive down costs, making it easier for





countries to replace outdated, polluting technological solutions with environmentally sound ones.

In the same vein, international trade can facilitate the creation and expansion of markets for sustainable products, thereby strengthening incentives for more environmentally sustainable and socially responsible production, while boosting decent employment and green growth, particularly in agricultural markets.

Open, transparent and fair trade in sustainable agricultural products could also contribute to broader poverty alleviation efforts among smallholder farmers in developing countries, who make up the bulk of the world's rural poor. These efforts must address the many constraints that limit the capacity of smallholder farmers to participate in global markets, including access to finance, know-how and an affordable and well-functioning quality infrastructure.

The benefits of trade for environmental sustainability and prosperity are within reach.

A confluence of factors creates favourable conditions for trade to bring about prosperity, environmental resilience and sustainability.

A growing number of countries are adopting new policies – or reforming existing ones – to make their economies more resilient to environmental risks and to align them with environmental sustainability. Science has often served as a catalyst for reform. It provides the necessary knowledge base that allows governments to apply a value to the vital services provided by ecosystems, making more effective and holistic decision-making increasingly possible.

At the international level, countries have stepped up cooperation to improve the way they collectively tackle global environmental challenges while supporting economic development. These efforts have already led to important policy developments, such as the 2015 endorsement of the United Nations'

Sendai Framework for Disaster Risk Reduction, a 15-year instrument which sets targets and priorities for the substantial reduction of disaster risk. Another watershed moment was the entry into force of the Paris Agreement on climate change in November 2016.

Meanwhile, more companies are putting sustainability front and centre in their efforts to respond to a rapidly changing backdrop of risks and opportunities. From small start-ups to large multinational corporations, these "pioneer" companies are developing forward-looking business models which consider sustainability as a source of competitive advantage, a driver of efficient value chains and a gateway to tap into emerging business and trade opportunities.

Growing consumer awareness of environmental issues is another key driver of opportunities to bring the economy, trade and environmental sustainability closer together. Rapidly expanding markets for sustainable food and beverages, energy-efficient home appliances and buildings and eco-friendly holiday destinations illustrate this trend.



These shifts, along with rapid technological developments such as advanced data analytics and artificial intelligence, increased global interconnectedness and the emergence of global value chains have led to the rise of entirely new sectors of green economic activity. The renewable energy sector is a prominent example. It already employs millions of people worldwide and is expected to continue expanding rapidly as the cost of renewable energies decreases even further.

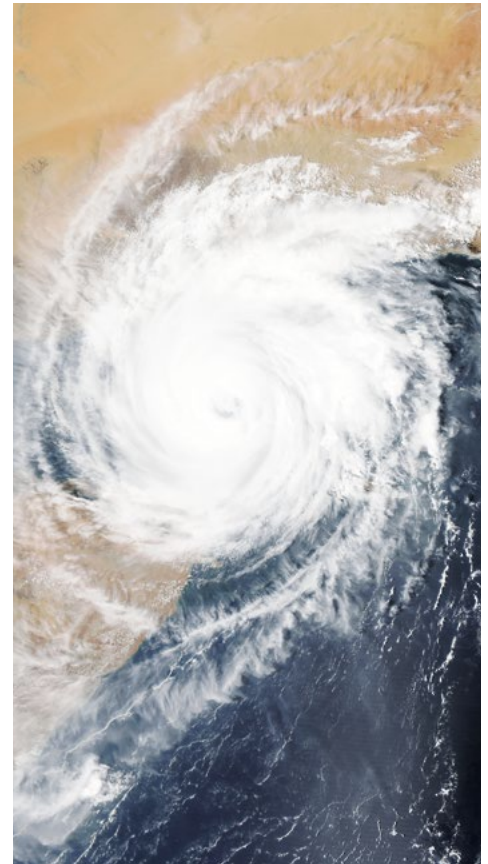
These market developments offer sizeable economic and trade opportunities, not least for small and medium-sized enterprises in less developed countries. Moreover, the drastic fall in the price of energy from renewable resources has sparked innovative business approaches to supply electricity to people who were previously deprived from it.

Despite these gains, sustainable goods and services remain niche as increases in sustainable consumption are overtaken by growing global consumption rates. This demonstrates a need to build on the existing momentum to use trade as a tool to expand and connect sustainable consumption and production.

Environmental pressures in tandem with a lack of well-functioning markets can undermine the role of trade in delivering benefits for sustainability and prosperity.

Just as trade can contribute to improving the environment, so too is a healthy, stable and resilient environment essential for well-functioning trade. If not tackled, climate change and other environmental challenges may undermine trade and may even undo much of the world's progress in reducing poverty over the past decades.

Recent extreme weather-related events, such as flooding and hurricanes, have demonstrated the vulnerability of the cross-border supply, transport and distribution chains that underpin modern-day trade. Climate change may also affect trade through its impact on countries' endowments and production more broadly. For example, increased temperatures and changes in



rainfall often lead to significant reductions in crop yields and agricultural output in many regions of the world, making agricultural production and trade particularly vulnerable to climatic changes.

Besides a healthy environment, international trade requires functioning markets, effective institutions and sound environmental and social policies to fully contribute to global prosperity, climate resilience and environmental sustainability. This calls for coordinated action that cuts across policy domains and levels of governance while considering the nuanced and complex interactions between a rapidly changing natural environment, economic growth and trade.

Despite significant progress in recent years, institutions and policies still fall short of what is required for production and consumption decisions to reflect true environmental costs, for companies to be able to take full advantage of green production opportunities, and for consumers to act upon their intentions to purchase affordable, sustainable products.

More rapid progress is also needed in avoiding and mitigating any harmful environmental impacts caused by trade, including growing carbon emissions from international transport. To be effective, action in this area must consider trade along with other, important drivers that exert pressure on the natural environment.

To ensure that trade works for sustainability and prosperity, an enabling environment allowing for coherent and fit-for-purpose policies and coordinated action that puts human wellbeing front and centre is critical.

There is no one-size-fits-all answer or single blueprint to maximize the trade opportunities to build prosperous and environmentally resilient and sustainable economies. However, all countries can benefit from approaches rooted in an understanding that protecting and enhancing the natural environment and promoting a fair, transparent and open trading system are closely intertwined and mutually supportive. Moving towards greater coherence between trade and environmental policies requires action in several areas.

First, there is a need to tackle environmental challenges, not least transboundary and global impacts resulting from, for example, international transport, by strengthening multilateral cooperation and governance. Harnessing multilateral cooperation and strengthening local, national and international environmental policies will help trade to contribute to innovative technological solutions and ensure that trade promotes a shift towards more sustainable ways of consuming and producing.

The second area involves approaches which spark virtuous circles between environmental and economic resilience. Actions to increase resilience to climate change and other natural hazards will play a major role in creating a more resilient economic system. Promoting trade facilitation and Aid for Trade in disaster-stricken countries, enhancing trade in technologies that include environmental early warning systems, diversifying production locations and trading routes, strengthening proactive and long-term planning and policy

making and providing countries with the knowledge and tools to adapt to rapid changes, illustrate a few tangible actions.

Thirdly, there is a need to encourage national policy makers to work together across environmental and trade domains and seek to identify and foster “win-win” opportunities. Environmental considerations need to feature in trade policy making, while trade needs to be considered within the development of environmental policies and compliance with environmental obligations.

One such “win-win” opportunity would be to eliminate trade barriers on environmental goods and their components. This should be complemented by efforts to tackle barriers affecting environmental services trade as well, given their key role in delivering environmental goods and ensuring that they function properly. Opening trade in environmental goods and services could bring





achieve the Sustainable Development Goals (SDGs). The SDGs call on countries to seize trade-related opportunities to promote sustainable development. This includes employing an inclusive, gender-sensitive approach in pursuing opportunities for more sustainable trade.

Finally, it will be critical to raise awareness among stakeholders on the role of trade in environmental sustainability and resilience to environmental and economic shocks. Challenges of global scale require solutions of the same calibre. Broad engagement will be needed from civil society across the globe. Raising awareness can help to shape mindsets, shift consumption patterns, influence trade flows and lead to greater international cooperation on trade and the environment.

UN Environment and the World Trade Organization are cooperating to assist countries around the world to reach mutually beneficial solutions that allow trade to work for a healthy and more resilient environment and a prosperous economy.

In responding to an array of environmental and economic changes, countries and global governance systems need to work together through innovative partnerships. SDG 17 provides a mandate for global partnerships and collaboration for sustainable development, complemented by multi-stakeholder collaboration which mobilizes and disseminates knowledge, expertise, technology and financial resources in support of the SDGs, particularly in the most vulnerable countries.

For the trade and environment communities, this means that governments, businesses, civil society and intergovernmental organizations must pull in the same direction to tap into the numerous “win-win” trade opportunities that can improve countries’ economies and the environment in tandem.

In doing so, countries can build on past work on trade and environment globally, regionally and nationally. At the global level, a major step forward was taken in 1995 when the



sizeable benefits to countries in terms of productivity, exports, jobs, innovation and a clean, healthy environment. The solar panel industry, for example, creates more than twice the number of jobs per unit of electricity generation than coal or natural gas. Another prominent “win-win” example includes the elimination of environmentally harmful subsidies, such as in fisheries.

The fourth area entails fostering public-private partnerships to facilitate market-oriented approaches that allow trade and environment to be mutually supportive. The public sector needs to establish frameworks that allow private sector opportunities to flourish. Such partnerships can highlight good practices and bring to the fore sustainable business champions, including small and medium-sized enterprises. Efforts should also be geared towards improving market access conditions for sustainable products.

The fifth area relates to the world’s poorest countries. Action is needed to strengthen their capacity to seize trade opportunities in emerging green sectors, such as renewable energy and resource efficiency. Advisory support and capacity building are also needed to ensure that countries can effectively harness trade and trade policy to implement international environmental commitments and

founders of the WTO made sustainable development an explicit guiding principle for the newly created organization. Along with other innovations in global institutional design, not least the creation of a committee dedicated to improving dialogue on trade and the environment, this decision was instrumental in paving the way for more and better cooperation among countries to ensure that trade and environment policies reinforce one another.

For its part, UN Environment has undertaken significant efforts to ensure that trade amplifies sustainable practices, greener production and consumption, investment in the environment, development of environmentally sound technologies and integration into green global value chains. UN Environment delivers its work on trade and the environment through a variety of programmes and initiatives, with the Environment and Trade Hub serving as the central vehicle for delivery. Launched on the sidelines of the 10th Ministerial Conference of the WTO, the Hub works with public and private partners to offer tailor-made capacity building and policy support around a number of key areas at the interface of trade, sustainable development and climate resilience.

Close collaboration between the Secretariats and past cooperation between UN Environment and the WTO on topics such as trade and climate change, fisheries subsidies and trade in environmental goods have created greater awareness to advance the global policy discourse on environment and trade.

Despite significant progress in global development outcomes, fundamental economic changes and technological advances, coupled with political tensions, are challenging the global trading system and its role as a force for growth, development, sustainability and environmental resilience. Overcoming these challenges requires leadership by governments and the private sector, along with greater engagement with civil society. It also requires close collaboration between the WTO and UN Environment, and among other relevant actors, to combine and leverage knowledge, expertise and convening power.

In response to this rapidly changing landscape, the Executive Director of UN Environment, Erik Solheim, and the Director-General of the WTO, Roberto Azevêdo, announced in 2018 their commitment to strengthen the cooperation between their organizations. Under the theme of “Healthier Environments through Trade”, they launched a joint initiative to promote greater dialogue and collaboration among diverse stakeholders on innovative ways of using trade to strengthen the environment while creating new opportunities for prosperity. Leading by example, the two organizations aim to inspire and support countries around the world to identify opportunities to make better use of trade as a tool for resilience, prosperity and environmental sustainability, and to explore practical ways to turn them into reality. Furthermore, they aim to support capacity building by providing a platform for discussion, facilitating public dialogue and offering technical assistance.



In the spirit of the 2030 Sustainable Development Agenda, the UN Environment-World Trade Organization initiative aims to bridge silos by identifying synergies and complementarities between the two organizations' areas of work, and to facilitate and promote the creation of new partnerships. By bringing the environment and trade communities together at all levels

– globally, regionally and nationally – along with the private sector and civil society, new and fit-for-purpose partnerships can foster interdisciplinary perspectives, give way to innovative and mutually supportive solutions, and foster enhanced partnership on trade, environment and climate resilience – a key step to achieve the 2030 Agenda.



Chapter 1

Connecting the dots: environmental sustainability, economic prosperity and resilience

Samba Lahy vividly recalls the time when, as a young man, he used to go fishing with his parents off the coast of Tampolove, one of the fishing villages dotting the southwest coast of Madagascar.¹ Every time his family returned from the sea, their long and narrow canoe would be filled to the brim with fish. But things have changed. Samba, now with a family of his own, has seen his catches dwindle. As a result, like others in Tampolove, he can no longer rely on fishing as his main source of income.

Samba's story has been repeated in scores of fishing villages around the world. Although the specifics may differ, a common thread runs through all of these stories: on the one hand, economic growth has been essential for poverty reduction and global prosperity. On the other hand, growing environmental pressures, such as increasing levels of pollution, risk compromising the prospects for future growth and well-being.

At the same time, technological progress, improved access to resources and

markets, and trade and investment policy reforms have spurred the emergence of cross-border production networks known as "global value chains". As a result, the world has become increasingly connected. Integration into these value chains offers access to networks, global markets, knowledge and technology, all of which are important for economic growth, productivity and jobs. Nevertheless, many low-income countries, lacking adequate infrastructure and resources, remain excluded.

Along with these fundamental shifts, the world faces mounting environmental challenges. Such challenges can be described as "planetary boundaries", a set of limits related to climate change, the thinning of the ozone layer, extinctions of species and the level of pollutants in the atmosphere, among other environmental issues. The group of scientists who first introduced this idea in 2009 warned that exceeding planetary boundaries may precipitate changes that are either irreversible or so abrupt as to put continued human development in peril (Rockström et al., 2009).

¹ Adapted from: "Madagascar: No more fish? We'll farm seaweed instead." Deutsche Welle. 25 July 2017. <https://p.dw.com/p/2ewb2>





In the case of the oceans, one-third of the world's fish stocks are fished at unsustainable levels, up from 10 per cent in the mid-1970s. Meanwhile, 60 per cent of stocks are being fished at their sustainable limit (FAO, 2018). But overfishing is only one of many problems affecting the oceans. Over the past 30 to 40 years, the world has lost half of its coral reefs and marine species (UN Environment, 2017a). Other problems include a rise in sea-level temperatures and in the acidity of the oceans, both caused by climate change.

There is also pollution of the oceans from both land- and sea-based activities. The "Great Pacific Garbage Patch" – an area roughly the size of Mongolia and comprising an estimated 1.8 trillion pieces of plastic debris suspended in the Pacific Ocean between the United States and Japan – has become emblematic of a larger problem that has quickly reached global proportions (Lebreton et al., 2018).

The world's oceans contain an estimated 150 million tonnes of plastic, with at least 8 million tonnes added every year (WEF et al., 2016). UN Environment projects that global plastic production will skyrocket in the next 10 to 15 years. At this rate, by the middle of this century, the sea could contain more plastic than fish by weight. The combined effect of these different problems is degrading the ocean's health and productivity and thus its ability to provide food and other resources to communities around the world.

Despite a growing awareness of environmental challenges, progress in tackling them has been slow. This is due to many factors, not least the perception that protecting the environment is costly and will therefore hinder the economy. But is it the case that a healthy environment is inherently incompatible with a prosperous economy and an open global trading system? The opening story in this publication may help to answer this question.

Samba's story is not just one of hardship caused by a rapidly deteriorating environment. Faced with dwindling catches, Samba and others in his community began experimenting with seaweed farming with help from non-governmental organizations. What started out as an experiment turned into a successful income-generating activity – so

much so that the seaweed farmed in Tampolove is now being sold in foreign markets, where it is used to produce food, personal care products, cosmetics, paints, adhesives, dyes and gels.

The interconnectedness of the world economy has fostered opportunities for rural producers, including Samba, to access foreign markets. Many women in his village have embraced the new activity and are playing a bigger role in their community's economy as a result. What is more, seaweed farming can be more environmentally friendly than other aquaculture activities (Cottier-Cook et al., 2016). Part of the reason is that seaweed and other species of algae do not need fertilisers to grow – just sunlight, carbon dioxide and water. All these factors begin to show how economic prosperity, trade and the preservation of the environment can, in fact, reinforce each other.

This publication, which considers how international trade can support efforts to protect the environment, strengthen resilience to environmental risks and build prosperity, is organized into four chapters.



1/3

Proportion of the world's fish stocks currently fished at unsustainable levels, up from 10 per cent in the mid-1970s.



Chapter 1 looks at the links between the broader economy (of which trade is an integral part) and the environment. It does so by exploring the shifts in government policies and business models that are giving rise to trade opportunities to simultaneously boost the economy and protect the environment.

Chapter 2 focuses on international trade, providing an overview of the many ways that trade interacts with the natural environment, and how trade can bolster efforts to make production and consumption more sustainable and economies more prosperous and resilient to environmental risks.

Chapter 3 discusses how the WTO and UN Environment promote cooperation among countries to help them seize trade opportunities that foster these goals.

Chapter 4 considers how UN Environment and the WTO can build on a strong foundation of existing collaboration to help countries, especially the most vulnerable ones, turn the synergies between trade and the environment into tangible benefits for their people.

Opportunities for sustainability and prosperity

There are countless opportunities to ensure that environmental protection works in unison with economic prosperity, trade and greater resilience to climate and other environmental risks. In the run-up to the UN Conference on Sustainable Development held in Rio de Janeiro, Brazil, in 2012 (also known as “Rio+20”), an influential report by UN Environment argued that investing 2 per cent of global GDP in “greening” agriculture, forestry, fisheries, energy and several other sectors could unleash the public and private capital flows needed to put the world economy on a low-carbon and resource-efficient track (UN Environment, 2011).

More sustainable use of materials and energy would add an extra US\$ 2 trillion to the global economy by 2050.

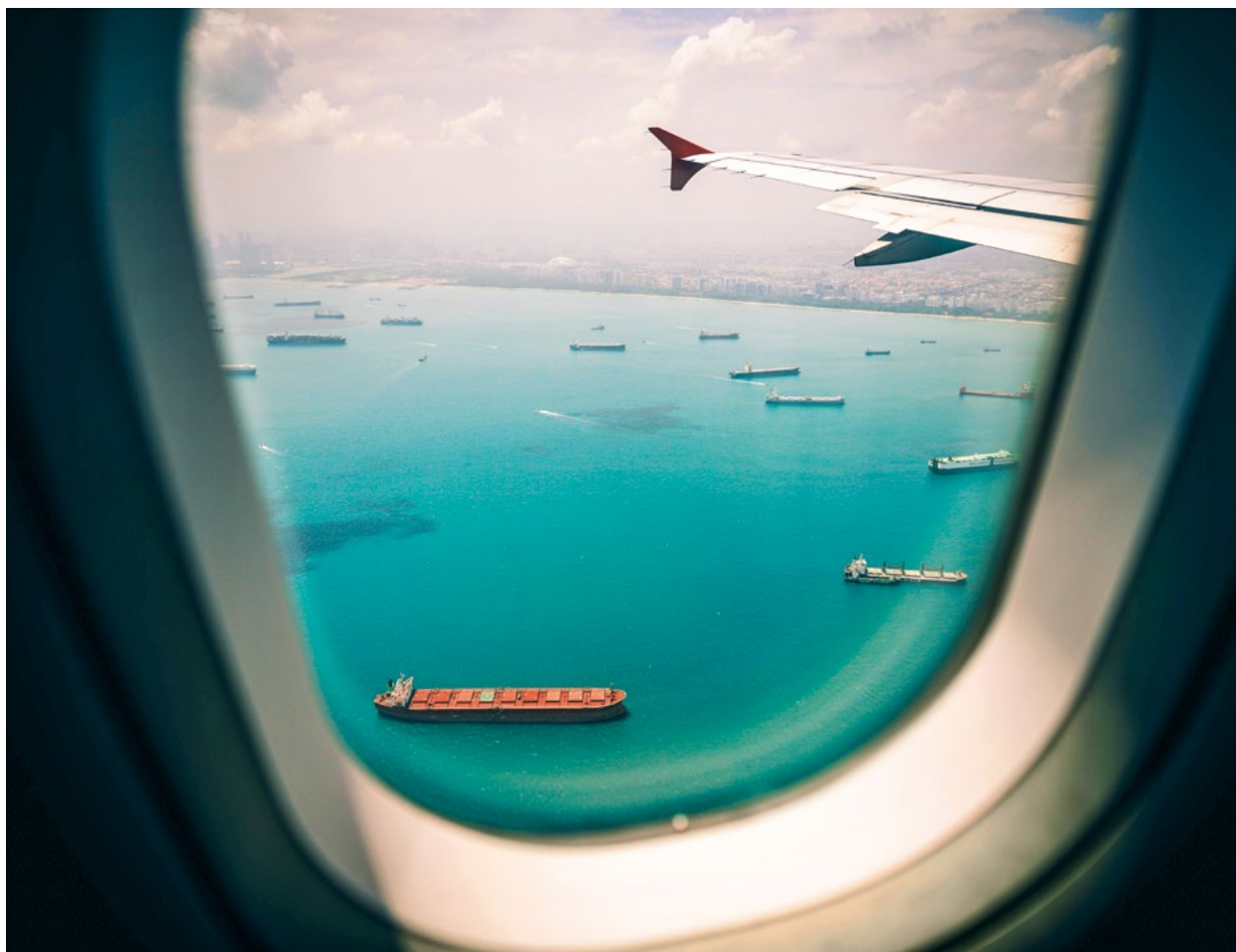


Most importantly, the analysis showed that harnessing such opportunities could catalyse economic activity of a size at least comparable to “business as usual” (a scenario where policies and other factors remain unchanged), but with a reduced risk of crises and shocks. The report also found a link between poverty eradication and better maintenance and conservation of the natural environment. Lending support to this is a recent finding that healthy ecosystems directly underpin the activities of the 1.2 billion workers involved in farming, fishing and forestry around the world (ILO, 2018).

Several other studies have identified additional opportunities to bring about a better economy and a better environment at the same time. For example, one study showed that more sustainable use of materials and energy would add an extra US\$ 2 trillion to the global economy by 2050 (UN Environment, 2017b).

According to another study, G20 countries could lift their average economic output by up to 2.8 per cent by 2050 through a combination of policies to mitigate climate change and to foster investment in low-emission, climate-proof infrastructure (OECD, 2017). This includes policies aimed at opening trade in low-carbon equipment and environment-related services (see also Chapter 2). If the economic benefits of avoiding climate change impacts such as coastal flooding or storm damage are factored into this analysis, the net increase to 2050 GDP would be nearly 5 per cent. A third study found that, on average, the benefits of restoring degraded land are ten





times higher than the costs (IPBES, 2018). A fourth study concluded that reversing the decline in fish stocks, not least by disciplining fisheries subsidies, would increase annual net benefits to global fisheries by a factor of almost 30, from US\$ 3 billion to US\$ 86 billion (World Bank, 2017).

None of this means that reaping the gains from a transition to a more sustainable economy will be easy or straightforward. Nor does it mean that sustainable action is always without cost. But the myriad of opportunities to improve the environment, and to do so in a way that advances the economy, trade and livelihoods at the same time, illustrates that a transition to a more sustainable and prosperous economy is within reach.

Underpinning the sense of possibility – and urgency – is a confluence of promising developments in science, policy-making, consumer attitudes and business practice. For example, there is a much better

understanding of the economic and social costs of environmental degradation (see Box 1.1). Well-functioning ecosystems provide multiple services that sustain human life on Earth, including air and water purification, pollination of crops, prevention of soil erosion and regulation of the Earth's climate. Science has recently provided a stream of insights into how ecosystems work, which ecosystems deliver which services and in what quantity.

As a result, it is becoming increasingly possible to apply a value to the vital services provided by ecosystems and to incorporate this information into countries' development planning. In this way, governments can make decisions that are better aligned with long-term economic and environmental sustainability. For low-income countries, natural asset valuation may have particularly large pay-offs, given that close to half of their wealth comes from their natural assets, compared with only 3 per cent for industrialised countries (Lange et al., 2018).

 Box 1.1

The cost of pollution

The Commission on Pollution and Health has assessed the health and economic costs of pollution globally and the feasibility of policy solutions. The Commission – an initiative of “The Lancet” (a leading medical journal), the Global Alliance on Health and Pollution (a partnership of governments, non-governmental and intergovernmental organizations) and the Icahn School of Medicine at Mount Sinai in the United States – comprises almost 50 leaders,

researchers and practitioners in pollution management, environmental health and sustainable development.

In a comprehensive study published in 2017, the Commission estimated the annual cost of pollution worldwide to be US\$ 4.6 trillion, or around 6 per cent of global GDP (slightly more than the GDP of Japan). According to the report, one in six people around the world die prematurely from diseases caused by contaminated air, water, soils and workplaces. This is triple the deaths from AIDS, malaria and tuberculosis combined.

Most pollution deaths – over 92 per cent – occur in low- and middle-income countries. The most fatal type of pollution is airborne, causing about 6.5 million of the 9 million annual deaths caused by pollution. Air pollution includes smog from power plants, factories and vehicles, along with household emissions from dirty indoor stoves used in many less developed countries.

The report also features examples of strategies to control pollution. It argues that developing countries can boost their economies while avoiding the health and environmental damage that affected previous industrialization episodes. To this end, they need to adopt sound anti-pollution policies and embrace clean technologies for energy, production and transport, among other measures. These messages echo UN Environment research carried out in the run-up to the 2017 UN Environment Assembly, which discussed how to move towards a “pollution-free planet”.

Sources: Landrigan et al. (2018) and UN Environment (2017c).



Countries around the world have stepped up cooperation to improve the way they collectively manage global environmental challenges while supporting economic development. A watershed moment in this regard was 2015. The year opened with the endorsement in March 2015 of the Sendai Framework for Disaster Risk Reduction, a 15-year instrument that sets targets and priorities for the reduction of disaster risk.

In September 2015, world leaders endorsed the United Nations' 2030 Agenda for Sustainable Development. This document contains the Sustainable Development Goals or SDGs, a set of 17 goals and 169 targets intended as a blueprint to turn sustainable development into practical action by governments, companies and citizens worldwide. A few months earlier, UN member states had adopted the Addis Ababa Action Agenda, a global plan to help finance the implementation of the 2030 Agenda.

Finally, in December 2015, countries agreed to a global pact, known as the Paris Agreement, to keep global warming "well below" 2°C hotter than pre-industrial levels, while pursuing efforts to limit the temperature increase to 1.5°C. Under the Paris Agreement, countries undertook to put limits on future greenhouse gas emissions in accordance with "nationally determined contributions".

Consumers are also showing more awareness of sustainability issues. Many studies confirm that consumers attach importance to sustainability (Whelan and Fink, 2016). Nonetheless, it seems that their purchasing decisions often fall short of their good intentions, especially when higher prices are involved (Vringer et al., 2015). Still, consumer demand is one of the main forces behind the rapid growth of markets and trade in sustainable products in recent years, along with the proliferation of sustainability standards and labels (see also Chapter 2).

Companies are gradually redefining their business models and applying new technologies in response to a rapidly changing mix of risks and opportunities related to sustainability. Twenty years ago, companies may have considered the environment in narrow terms of "risk" to their reputations or as a public relations drive. Nowadays a growing number of them, from small start-ups to large multinationals, are adopting more holistic approaches which consider sustainability as a source of competitive advantage, a driver of efficient value chains and a gateway to tap into emerging business and trade opportunities (see Box 1.2). Despite these gains, sustainable goods and services remain niche, as increases in sustainable consumption are overtaken by growing global consumption rates.



150 million tonnes

Amount of plastic currently estimated to be in the oceans.



 Box 1.2

New business models for sustainability



Today's business landscape involves an unprecedented and rapidly changing mix of risks and opportunities driven by population growth, global health risks, new technologies, extreme weather events and resource scarcity, among many other factors. Faced with this evolving landscape, many companies around the world are trying to keep ahead of the curve by redefining their business models or establishing entirely new ones.

Resource productivity is an area of growing attention. The global economy consumes around 90 billion tonnes of resources per year, more than three times the level in 1970. By 2050, the global population is projected to increase from today's 7.6 billion to almost 10 billion and per capita income is expected to triple, leading to a two-fold increase in global material consumption levels. Finding better approaches to manage natural resources sustainably while fulfilling the material aspirations of a growing

world population have become increasingly urgent, given their importance for poverty eradication, climate change mitigation and resilient economic growth.

A growing number of companies are looking at how they can seize the business opportunities associated with improved resource use and productivity and sustainable natural resource management. Part of this trend is the growing interest in "circular" business models. These models seek to create value by redesigning and optimizing products for multiple cycles of use. If scaled up globally, the activities underpinning circularity – eco-design, reuse and repair, refurbishment, remanufacturing and recycling – could gradually replace existing "linear" models of "take-make-dispose". This could in turn help make production and consumption more sustainable, while opening new trade opportunities.

Developing countries may have distinct opportunities for "circularity", given the prevalence of reuse, repair and recycling, and the knowledge associated with these practices among many entrepreneurs. Moreover, many circular activities in developing countries involve people employed in the informal sector. Bringing those informal activities into the formal economy as part of a broader plan to strengthen circular approaches could improve social inclusion and reduce poverty in less developed countries.

Sources: Dobbs et al. (2015), Preston and Lehne (2017) and Ellen MacArthur Foundation (2018).



Faced with a business landscape comprising unprecedented risks and opportunities, progressive companies are increasingly aware that a shift to more sustainable business models can help them improve their profitability and resilience to natural disasters and climate change. In recent years the perceived risks related to the environment have become more prominent relative to geopolitical, economic, technological and other perceived risks.

In fact, extreme weather events, natural disasters, failure to mitigate or adapt to climate change and water crises rank among the top five risks in terms of their perceived impact within the next ten years (WEF, 2018). A growing number of companies understand that proactive and forward-looking action to mitigate those risks can benefit the environment while increasing security in their supply chains, reducing operational costs related to energy and water use or otherwise helping to improve their competitiveness.

Increasingly, companies are reporting on environmental aspects, including their sustainability goals and performance or the

business case for decisions with an impact on sustainability. Of the world's 250 largest companies, 100 report on the impact of their business on the SDGs (KPMG, 2018). The World Business Council for Sustainable Development, a business organization, reviewed the reports of over 150 member companies and found that 45 per cent aligned their sustainability strategies with the SDGs (WBCSD, 2017). Multiple initiatives are underway to make sustainability reporting more comprehensive, widespread and uniform across companies.

The rapid emergence of a global renewable energy sector is one of the clearest signs yet that the environment, economic growth and global trade can be mutually supportive. Even experts have been surprised at how quickly a global renewable energy industry has emerged. The last few years have seen this industry shatter several records. In 2016, for example, renewables represented a staggering two-thirds of net new electricity generation capacity installed around the world (IEA, 2017).

It was also in 2016 that new electricity generation capacity from a single renewable



2/3

Share of renewable energy in net new electricity generation capacity installed worldwide in 2016.

technology – in this case, solar – exceeded that from coal or any other fuel for the first time (IEA, 2017). That same year, the worldwide share of electricity generated from renewable sources rose to slightly more than 11 per cent, preventing an estimated 1.7 gigatonnes of CO₂ from being released into the atmosphere and signalling the growing opportunities for companies around the world to reduce their carbon footprint (Frankfurt School-UNEP Centre and BNEF, 2017).

Much of this impressive growth in renewable energy has been accompanied by cost reductions, driven partly by trade-fuelled global competition and economies of scale (see also Chapter 2). Electricity from solar panels costs almost a quarter of what it did in 2009 and is predicted to decrease another 66 per cent by 2040 (BNEF, 2017). Meanwhile, the price of onshore wind-generated energy has dropped 30 per cent since 2009, with a further 47 per cent decrease expected by 2040 (BNEF, 2017).

In recent auctions for wind and solar projects in several developing countries, bidders have offered unexpectedly low prices to win contracts to supply electricity from renewable sources (Frankfurt School-UNEP Centre/

BNEF, 2017). These announced prices are increasingly comparable or lower than the cost of building and operating new gas and coal power plants over their lifetime. A staggering 70,000 solar panels will be installed every hour around the world during the next five years (IEA, 2017). This has implications not only for the environment, but also for trade, growth and jobs. The solar panel industry, for example, creates more than twice the number of jobs per unit of electricity generation than coal or natural gas (IRENA, 2018).

Innovation has been central to these developments. According to OECD data, the number of patented inventions in selected clean energy technologies increased at an average rate of almost 9 per cent per year between 1999 and 2014 (the latest year for which data are available), compared with slightly less than 6 per cent for all patents (OECD, 2018a). But these numbers tell only half the story, as they do not capture all forms of innovation taking place in developed and many less developed countries. In fact, innovative and low-cost business solutions sprouting up around the world are often not formally filed in patent registries (see Box 1.3).



Box 1.3

Innovative environmental solutions in clean energy

Innovative environmental solutions in clean energy can contribute to reducing pollution and accelerating the implementation of the SDGs. The drastic fall in the price of solar panels and other clean energy equipment has set off a wave of green innovations around the world. Some of those innovations could contribute to reducing “energy poverty”.

In a report issued in 2017, the Africa Progress Panel, a group of ten experts from the private and public sectors led by Kofi Annan, a former UN Secretary-General, estimated that 620 million Africans still lack access to reliable electricity (worldwide, the number is almost twice as large). Large infrastructure projects to generate more electricity and then channel it to where it is needed through the national electricity grid can be expensive, slow and difficult to implement. To expand electricity access across the continent, large-scale projects should therefore be complemented with “off-grid” and “mini-grid” solutions, which are faster and easier to put in place.

Falling costs of solar panels and innovative renewable energy solutions – both in the form of business models and new goods and services – could help make a difference. For example, recent years have seen the so-called “paygo” model spread quickly across parts of Africa. Under this model, companies provide their customers – typically low-income homes and small business owners in rural areas – with rooftop solar installations comprising a small solar panel, rechargeable battery and controller, which typically powers a few lights, a radio and a phone charger. Using

their mobile phones, customers pay a small up-front amount for the equipment and then monthly or weekly payments for the electricity they get from it. The model has attracted some US\$ 360 million in financing in East and West Africa and has helped provide power to some 700,000 people in this region.

Sources: Africa Progress Panel (2017), “The Economist” (2017) and Wakeford (2018).



However, many factors may stymie innovation opportunities in environmental sectors. For example, “knowledge spillover” effects can reduce incentives for companies to invest in innovation, and uncertainty about whether an innovation will make it to market can lower these incentives even further. Encouraging innovation through sound trade, investment and technology policies and an appropriate framework for the protection of intellectual property rights can significantly contribute to overcoming some of these challenges (see also Box 2.4 in the next chapter).

Another important factor that has often been overlooked is gender disparities, which are often as significant in sustainable as in conventional sectors of the economy (UN Women, 2014a). For example, a recent survey showed that women represent 35 per cent of the renewable energy workforce, a share greater than in the traditional energy sector, but lower than in the broader economy (IRENA, 2018).

Empowering women so that they are more involved in emerging “green” economic sectors, such as renewable energy, could deliver significant benefits for inclusiveness, growth and trade, while helping to accelerate the shift to more sustainable production and consumption. According to one study, companies with more women on their board of directors tend to invest more in renewable energy and give greater weight to environmental risks in their financial decisions (McElhaney and Mobasser, 2012).

Policy drivers

The creation and expansion of opportunities for sustainability and prosperity is partly the result of growing efforts by governments around the world to align economic, social and environmental policies so that sustainability is reflected across policy domains and in planning and decision-making processes. As part of these efforts, governments must consider trade policies and how they can be used to help shift incentives and redirect resources towards more sustainable and inclusive growth.

The role of trade and trade policy-making will be discussed further in Chapters 2 and 3. This section briefly looks at policies which are



being used to ensure that production and consumption decisions reflect environmental costs, that companies can take full advantage of green production opportunities and that consumers have a choice of sustainable products. These policies play a key role in ensuring that trade can deliver benefits for prosperity, environmental resilience and sustainability.

Policies vary widely across countries, due to differences in the institutional framework, levels of development, resource endowments, environmental problems and other country-specific circumstances (see Box 1.4). In general terms, governments rely on a combination of different types of measures to achieve environmental policy goals.

Among the different types of measures are “market-based instruments” such as taxes on waste or tradable permit schemes for air pollution, “non-market instruments” such as energy efficiency regulations for buildings or regulations on the discharge of pollutants into rivers and lakes and incentives such as feed-in tariffs for electricity generated from renewable sources (a feed-in tariff refers to a regulated minimum guaranteed price per kilowatt-hour that an electricity company must pay for renewable energy fed into the national electricity grid by a private independent producer).

Voluntary measures such as public-private partnerships and guidelines for environmental performance by companies are increasingly being used to complement government-mandated measures. Government policies also comprise measures that reach beyond those conventionally associated with the environment and that promote efficiency in resource allocation. This includes policies on innovation, competition, investment and trade.

Box 1.4

Climate change laws around the world

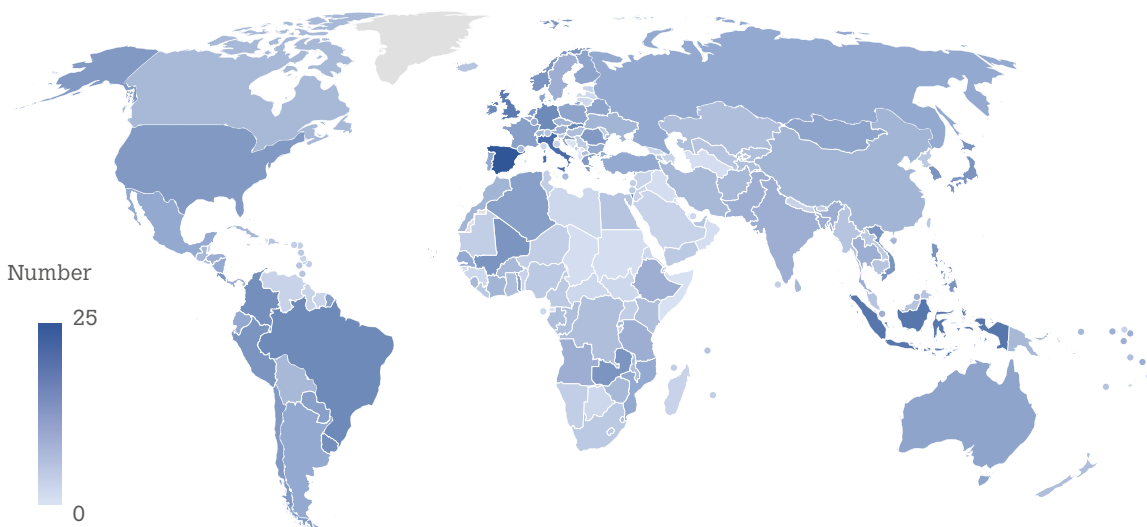
An online database of climate change laws around the world is maintained by the Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science in the United Kingdom. A recent analysis of these data found that all countries and territories which have signed or ratified the Paris Agreement on climate change have at least one law addressing climate change or the transition to a low-carbon economy (see figure below).

According to the analysis, of the more than 1,500 climate change laws and policies worldwide, 106 have been passed since the Paris Agreement

negotiations were concluded in late 2015. Examples range from “framework laws” (which typically define an overarching strategy on climate change mitigation and adaptation) to sectoral laws and regulations which set emissions standards for vehicles or define principles for the sustainable management of forests.

Sources: *Climate Change Laws of the World* database, Grantham Research Institute on Climate Change and the Environment and the Sabin Center for Climate Change Law. Available at: <http://www.lse.ac.uk/GranthamInstitute/legislation/>; and Nachmany and Setzer (2018).

Number of climate laws and policies passed worldwide (September 2018)



• Note: The circles on the map are used to display the data for small countries and territories.



70,000

Number of solar panels that will be installed every hour around the world during the next five years.



Besides putting in place new policies, some governments are also taking a fresh look at existing ones which may inadvertently run counter to sustainable and inclusive growth. One prominent example is the energy sector. Governments subsidize fossil fuels for various reasons, from promoting energy independence to reducing poverty. However, evidence is mounting that some of these measures may entail high costs for human health, national budgets and the environment, while often failing to reach those who need them most.

Support for fossil fuels among 76 economies remains sizeable at between US\$ 370 billion and US\$ 620 billion per year over the period 2010-15 (OECD, 2018b). Removing fossil fuel subsidies would raise government revenue by US\$ 2.9 trillion, while reducing global carbon emissions by more than 20 per cent and air pollution-related deaths by 55 per cent (Coady et al., 2015). Partly in recognition of this, many countries have adopted reform commitments in forums such as Asia-Pacific Economic Cooperation (APEC) and the G20.

In renewable energy, global employment totals some 10.3 million people.

The SDGs call on countries to rationalize inefficient fossil fuel subsidies that encourage wasteful consumption (SDG 12c) and to improve international cooperation to facilitate access to clean energy research and technology, including advanced and cleaner fossil-fuel technology (SDG 7a). In the context of the global trading system, 12 WTO members signed a declaration in the margins of the WTO's 11th Ministerial Conference held in Buenos Aires, Argentina, in December 2017 encouraging the reform and phase-out of fossil fuel subsidies.

Subsidies that may inadvertently harm the environment also exist in other sectors besides energy. For example, certain subsidies may contribute to excessive fishing capacity and put additional pressure on fish stocks, while certain subsidies applied to agricultural production may contribute to the overuse of chemical fertilizers and pesticides.

In shifting the economy towards a more sustainable path, governments have become increasingly aware of the associated job opportunities. In renewable energy, for example, global employment totals some 10.3 million people (IRENA, 2018). This includes jobs not only linked to manufacturing and assembly of components, but also to downstream services activities such as construction, installation, system integration, operations, maintenance and sales. Moreover, changes in the energy mix, the projected growth in the use of electric vehicles and increases in energy efficiency in existing and future buildings, among other developments, are estimated to result in net job creation of 18 million worldwide by 2030 (ILO, 2018).

Removing fossil fuel subsidies would raise government revenue by US\$ 2.9 trillion, while reducing global carbon emissions by more than 20 per cent and air pollution-related deaths by 55 per cent.

Besides renewable energy, other activities with potential for green jobs are sustainable agriculture, fisheries, forestry, construction, public transport and recycling and waste management. Some of these sectors tend to employ lots of people in developing countries, offering opportunities for both men and women. In the case of agriculture, for example, a sector where women play a crucial role, the transition to sustainable agriculture could create over 200 million full-time jobs across the entire food production system by 2050 (Herren et al., 2012). The transition to green jobs must be managed carefully, however, not least by putting in place adequate labour market and skill policies (Altenburg and Assmann, 2017).

A changing global environment: impacts on trade

This chapter concludes with a look at how a changing global environment affects trade, leaving the discussion of how trade affects the environment to Chapter 2. Just as the economy can be negatively affected by environmental degradation, so too can international trade. Recent extreme weather events such as flooding and hurricanes have illustrated the vulnerability of the supply, transport and distribution chains that underpin modern-day trade. Most experts agree that climate-related effects will, on

The effects of climate change and other environmental risks on the economy and trade are complex, producing financial, societal and ecological costs.

balance, have a negative effect on transport infrastructure, and that climate change will affect all forms of transport relevant for trade – air, sea and land (IPCC, 2014).

Trade in the agri-food sector is particularly vulnerable. More than half of globally traded grains pass through at least one of 14 global “chokepoints”, which include the Panama Canal, the Strait of Malacca and the Black Sea rail network (see Figure 1.1). A temporary closure or interruption of transit of any one of those chokepoints could cause serious food supply shortages and subsequent price spikes. Climate change significantly increases the likelihood of such a scenario: rising sea levels threaten port operations and coastal storage infrastructure; and extreme weather events may accelerate the degradation of paved roads and weaken bridges and other infrastructure.

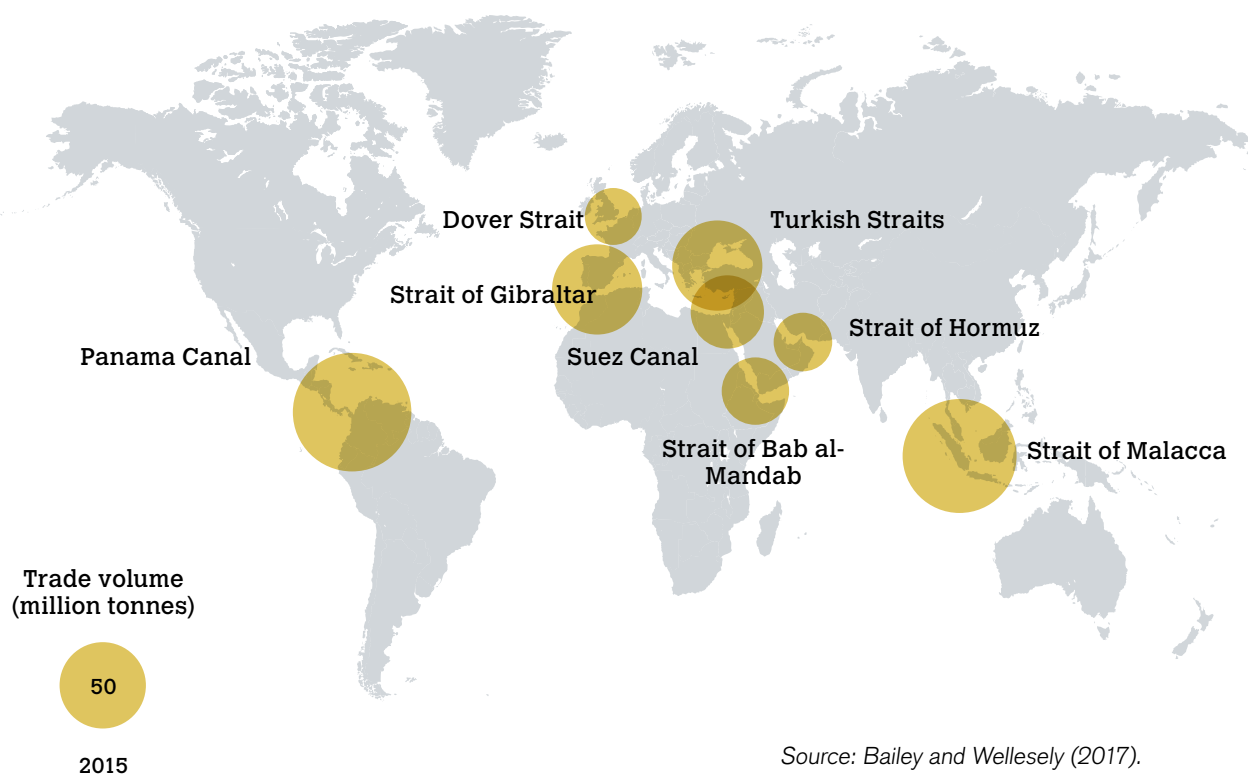


200 million

Number of jobs that could potentially be created across the entire food production system by 2050 through a transition to sustainable agriculture.



Figure 1.1: Volume of maize, wheat, rice and soybeans passing through “maritime chokepoints”, 2015



Climate change may also undermine trade through its impact on countries' endowments and production more broadly (WTO and UN Environment, 2009). For example, temperature increases, more frequent heat extremes and changes in rainfall are likely to lead to significant reductions in crop yields and output in most regions, making agricultural production and trade particularly vulnerable to climate damage.

The latter effect will not necessarily be confined to trade in goods but might extend to trade in services too. For example, many tourist destinations rely on natural assets – beaches, clear seas, tropical climate or abundant snowfall – to attract travellers. A rise in sea levels or changes in weather patterns might deprive countries of these natural assets. To the extent that these impacts may occur abruptly or that countries may be inadequately prepared, these

adjustments can prove costly. Model simulations show that climate damage will negatively affect the economies of almost all regions through reduced trade (relative to a scenario without climate change) (Dellink et al., 2017).

The effects of climate change and other environmental risks on trade and the economy are complex, producing financial, societal and ecological costs. Careful consideration of the nuanced and complex interactions between the environment, the economy and trade is therefore needed to tackle environmental challenges while building resilience to climate change and other environmental pressures. Chapter 2 will look further at these interactions, in particular the opportunities to put trade to work for a more environmentally sustainable, resilient and prosperous world.

Chapter 2

Expanding the contribution of trade to global prosperity and a healthy environment

The world economy has changed profoundly over the past 60 years. The world's population has more than doubled to 7.6 billion today, from around 3 billion in 1960, while average income has almost tripled. During this period, the world economy has become ever more integrated due to advances in communication and information technologies, along with lower barriers to global trade and investment. These developments have made it possible for companies to co-ordinate complex activities at a distance cheaply and safely.

As a result, production is increasingly organized into “global value chains” where goods are designed in one country but made from parts built in several countries and assembled in another country. The mobile phone is perhaps the archetypal “made-in-the-world” product, but countless other goods fit that description, from solar panels and computers to cars and civil aircraft.

Partly reflecting these fundamental changes, trade volumes grew at around twice the rate of global income in the two

decades that preceded the 2008 financial crisis. By boosting growth, trade contributed to the unprecedented reduction of poverty levels, which led to the early achievement of the United Nations' Millennium Development Goal to reduce poverty by half by 2015. But as trade has grown, some people have voiced concerns about its effects on the environment.

What are the environmental repercussions of greater economic integration? There is no clear-cut answer to this question. What is certain is that trade and the natural environment interact in myriad ways. The impact of trade on the environment hinges ultimately on the “structure” of economic growth – that is, the composition of inputs used (including environmental resources) and outputs produced (including pollution and waste). In turn, the structure of economic growth is a function of many factors, not least a country's institutions and policies, including those related to the environment.

Transport is one important aspect of the relationship between trade and the





environment that has received significant attention. It is estimated that 87 per cent of global freight movements (measured in tonne-kilometres) is carried by sea (this estimate includes the domestic portion of global freight, e.g. the link from ports to factories or cities, usually carried by road) (ITF, 2017). Road transport represents 8 per cent of global freight movements, rail 5 per cent and air transport 0.1 per cent. Even though its share in tonne-kilometres is small, air cargo transport handles approximately 35 per cent of global freight by value (IATA, 2018).

Moving goods or components from their place of production to their place of consumption contributes to local air pollution and the build-up of carbon dioxide in the atmosphere, among other environmental impacts. Maritime shipping generates around half of all carbon emissions from international freight transport, compared with 40 per cent for trucks, 6 per

cent for air and 2 per cent for rail. Per tonne-kilometre, carbon emissions from shipping are significantly lower than for road or air (ITF, 2017).

It is estimated that carbon emissions from international freight transport (all modes) could increase by up to 160 per cent by 2050 if no additional actions are taken, with road freight replacing maritime shipping as the largest emitter (ITF, 2017). At this rate, the share of international freight transport in total global carbon emissions from fuel combustion would be pushed well above its current level of 5 per cent.

In recognition of this, countries have recently taken important steps that build on previous work to mitigate carbon emissions from international transport. For example, in 2016, the International Civil Aviation Organization adopted a global Carbon Offsetting and Reduction Scheme for International Aviation



160 per cent

Potential increase in the amount of carbon emissions from international freight by the year 2050 if no additional actions are taken.





(CORSIA). Under CORSIA, aircraft operators will be required to purchase “offsets” for the growth in their carbon emissions above 2020 levels covered by the scheme. Offsetting consists of companies compensating for their emissions by financing a reduction in emissions elsewhere – for example, a forestry conservation or renewable energy project in a developing country.

In the case of international maritime transport, the International Maritime Organization (IMO) agreed on measures to improve fuel efficiency of ships, mainly through ship design and efficiency standards. Moreover, in April 2018 the IMO adopted an “initial strategy” to cut overall carbon emissions from shipping by at least half by 2050 compared with 2008, while pursuing full “decarbonisation” in line with the Paris Agreement on climate change.

To tackle road emissions originating from diesel trucks, which are primarily responsible for the emission of black carbon and particulate emissions, many countries are also launching green freight initiatives or switching cargo transport from road to rail. For example, the Northern Corridor Green Freight strategy launched in January 2017 seeks to reduce emissions and improve fuel efficiency of trucks travelling along the trade route that links the port of Mombasa in

Kenya to Burundi, the Democratic Republic of the Congo, Rwanda, South Sudan and Uganda.

A combination of less polluting fuels and renewable energy, innovative technologies and operational measures will be needed to lessen the environmental impact of all modes of transport. Future freight-related emissions will also significantly depend on the planning and design of major infrastructure projects today.

Transport is just one way that trade affects the environment. Production of traded goods is another. The environmental effects of production differ widely across countries due to differences in climate, soil fertility, use of technology, energy source and intensity, and laws and institutions, among countless other factors. Given this, it may be desirable to produce goods where it is most environmentally efficient to do so, and to allow trade to match global supply and demand. Or, to put it differently, what matters is not whether, in reaching the final consumer, goods and their components have crossed borders, but rather what the environmental impact of those goods is at every stage of their life cycle, from production and packaging to transport, use and disposal.



All of this makes it impossible to generalize whether consuming locally is preferable from an environmental and economic efficiency perspective to consuming goods from abroad. Some studies have shown that trade can in fact help to bridge relative differences in resource endowments across countries, thereby relieving resource scarcities in some regions and allowing for a more economically and environmentally efficient allocation of resources globally. For example, several studies have shown that trade in water-intensive products can result in global water savings in practice (Chapagain et al., 2006 and Hoekstra, 2010).

The role of trade in helping countries meet rising demand for resources that are not available or affordable domestically may become more prominent in the coming decades given that the impacts of climate change are expected not only to worsen but also to affect different geographical regions

Trade can exert its positive impact on global economic and environmental efficiency in the presence of functioning markets, effective institutions and sound social and environmental policies.

of the world in different ways (see Box 2.1). However, trade can exert pressure on the natural environment, along with other, important drivers such as population growth and increases in per capita consumption. For example, one study estimated that 30 per cent of threats to global species could be associated with the production of goods and services for foreign markets (Lenzen et al., 2012; see also Box 3.1 in the next chapter). Another study found that, of all material

 Box 2.1

Trade as a tool to adapt to climate change

Climatic changes due to global warming threaten to cause serious disruption to economic activity. In the case of food crops like maize, rice and wheat – which are the principal sources of sustenance in many parts of the world – climate change and related events and disasters are projected to affect production adversely, although the magnitude of the effects will differ across regions. International trade can help countries to adapt to these negative impacts, for example by providing a vital flow of supplies to regions that may see a sudden reduction in domestic production of food crops.

The important role of trade in helping countries to cushion the impact of climate change on the agricultural sector is backed up by academic research. Climate change could lead to a sharp rise in global crop prices due to its adverse impact on agricultural productivity. According to one study, the resulting malnutrition among households not employed in the farm sector could rise by around 45 per cent globally in a less integrated world economy, compared with a rise of less than 30 per cent in a more integrated one (Hertel and Baldos, 2016). This is because, in an integrated global economy, the most affected regions can import food from regions where climate change impacts are relatively less severe.

Moreover, agricultural welfare losses from climate change were found to be much higher in a less integrated world, roughly 0.8 per cent of projected GDP, compared with 0.3 per cent of GDP in a more integrated global economy.

Studies based on estimates of the implications of climate change on global yields of rice and wheat confirm that trade plays a part in helping countries to adapt to the adverse impact of climate change, although they come to different conclusions about the relative importance of trade (Costinot et al., 2016; Gouel and Laborde, 2017).

In the same vein, trade can serve as a tool to support recovery efforts from natural disasters. Among the expected consequences of climate change is the more frequent occurrence of extreme weather events, including stronger hurricanes and tornadoes, longer droughts and heavier rainfall and flooding. Extreme weather events can destroy infrastructure and disrupt domestic production.

Exports provide a stream of revenues that the disaster-affected country can use to assist those affected, while imports can alleviate temporary shortages that may be caused by the loss of domestic production. Trade also serves as a vehicle to support efforts to reconstruct or rebuild damaged infrastructure, since the materials, technology and skills required for such activities may need to come from abroad (Gassebner et al., 2010). In the long term, trade can support countries' efforts to build resilience to natural disasters by providing access to relevant technologies such as efficient irrigation systems or mobile technologies which allow citizens to play an active role in disaster management.

Sources: Costinot et al. (2016), Hertel and Baldos (2016), Gouel and Laborde (2017) and Gassebner et al. (2010).



resources extracted and used worldwide, about 15 per cent are traded (see Box 2.2).

Perhaps it should not be surprising that the empirical evidence on the overall effect of international trade on the natural environment is mixed. Trade can exert its positive impact on global economic and environmental efficiency in the presence of functioning markets, effective institutions and sound social and environmental policies. However, institutions and government policies often fall short of providing the necessary conditions to ensure that economic decisions fully integrate environmental and social considerations. This situation calls for increased efforts to ensure that trade, environment and other policies are fully aligned with countries' broader strategies to achieve sustainable development. The rest of this chapter identifies concrete ways of doing so.

Unlocking trade in emerging green sectors

Tackling the world's environmental challenges unquestionably requires the development and widespread dissemination of technological solutions around the world. Trade can serve as a powerful tool to help achieve this goal, as it facilitates countries' access to the best environmental goods and services available in the world market at lower cost.

Environmental goods and services perform a variety of functions essential to tackling

environmental problems, regenerating the natural environment and making production and consumption more sustainable. They comprise goods and services needed to, for example, produce clean and renewable energy, improve resource and energy efficiency, reduce pollution of air, water and soil, manage solid and hazardous waste, treat wastewater and monitor environmental quality, among other important functions.

By fostering specialization, competition, economies of scale and innovation at a global level, trade can help accelerate the development and lower the production costs of environmentally sound technological solutions, thus supporting efforts to achieve better environmental outcomes.

Value chains stretching across the globe allow producers of environmental goods to source inputs from the most competitive suppliers and to reap significant economies of scale. Global competition spurs those same producers to increase their productivity and invest in research and development. These forces, along with technological advances and supportive government policies, have likely brought about the sharp reductions seen in the cost of solar panels and other renewable energy equipment in recent years (Kirkegaard, 2010). Electric cars offer another example of how global production chains and competition may be helping to make an emerging environmentally friendly technology more affordable (see Box 2.3).

 Box 2.2

International trade in resources

In the report “International Trade in Resources – A Biophysical Assessment”, UN Environment’s International Resource Panel examines the environmental consequences of trade by estimating for the period 1980-2010 the upstream resource requirements of traded goods. This term refers to the additional materials, energy, water and land used in the extraction and production of traded goods, but left behind as wastes and emissions in the exporting country.



Of the resources extracted and used worldwide, approximately 15 per cent are being traded. This proportion increases to around 40 per cent when including resources indirectly associated with trade – that is, used in the production process, but not physically included in the traded good. According to the report, the growth in the volume of international trade relative to global resource extraction and use indicates that countries are increasingly dependent on trade. The report also reveals that upstream resource requirements of international trade have been rising in recent decades.

Overall, the report finds no conclusive evidence regarding the impact of trade on global environmental and resource efficiency. However, it shows that changing patterns of global trade had clear distributional implications, with a shift in resource-intensive processes, along with their environmental impacts, from high-income and densely populated countries that largely import raw materials, to low-income and more sparsely populated countries, mostly exporting them.

It is important to consider these impacts when assessing how trade affects natural resources. Appropriate adjustment and other government policies are needed to ensure that the environmental impacts of trade are tackled effectively. Coherence and coordination are required when designing and implementing policies to minimize the negative – and enhance the positive – impacts of trade.

Source: UN Environment (2015a).

 Box 2.3

Global value chains in green mobility

Carbon emissions from road transport represent about one-fifth of total global greenhouse gas emissions. With the global car fleet expected to triple by 2050, those emissions are expected to rise even further. Reducing transport emissions is therefore a key part of tackling climate change and the growing problem of air pollution.

The electrification of road transport is one way to achieve this goal, provided that it is accompanied by lower or zero emissions from electricity generation itself. In 2016, the number of electric vehicles sold worldwide totalled 750,000 and in 2017, global sales of electric cars crossed the threshold of 1 million units. China was the largest market, with sales of 580,000 vehicles in 2017, triple the number sold in the United States.

Some governments have put in place policies such as tax reductions and support for research and development to encourage the development and uptake of electric vehicles or have announced plans to phase out the production and sales of petrol and diesel vehicles over the next few decades. In Norway, for example, electric car owners indicate that financial incentives, such as value-added tax and vehicle registration tax exemptions, free access to toll roads and circulation tax rebates, are the most influential factors for their decision to purchase electric cars.

To scale up the electric vehicle market and reduce road transport emissions further, issues such as price, battery range and charging infrastructure must be addressed

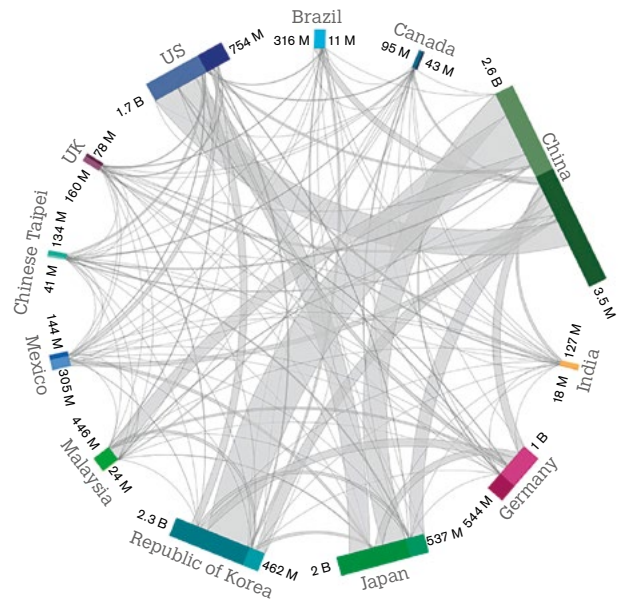
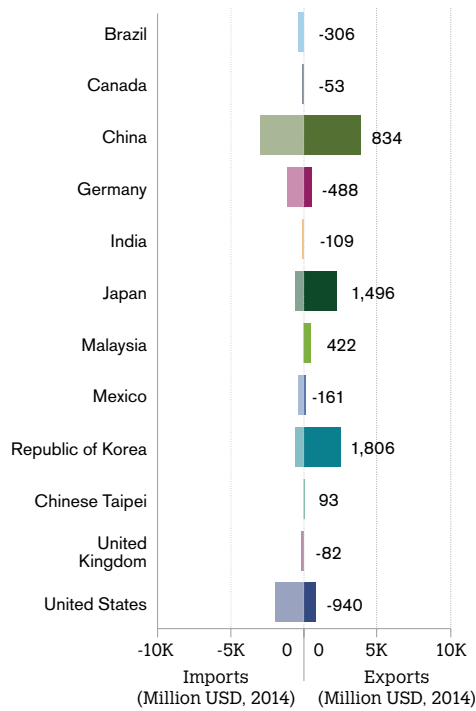
coherently. Electric vehicle prices have been falling rapidly in recent years. A big factor behind this has been the sharp decrease in the cost of batteries, which make up around one-third of the total cost of an electric vehicle. One study shows a 16 per cent annual decline in the cost of electric vehicle battery packs between 2007 and 2017 (Kapoor and MacDuffie, 2017).

The emergence of a global battery business has greatly stimulated competition and has allowed producers to reap economies of scale, resulting in higher productivity and lower costs (see figure). Japan, the Republic of Korea and China are the leading net exporters of lithium-ion battery cells, while the United States, Germany, Brazil, Mexico, India, the United Kingdom and Canada are the biggest net importers.

Still, WTO members apply “MFN” tariff rates of close to 9 per cent on imports of lithium-ion and other batteries and their parts, with some members charging tariffs as high as 40 per cent (MFN or most-favoured-nation tariffs are the normal non-discriminatory tariffs that WTO members charge on imports, as opposed to the preferential tariffs under free trade agreements and other schemes).

Removing import tariffs on finished batteries, their components, and the capital goods used to produce them would further improve the conditions for an efficient and optimal supply chain, leading to better economies of scale in battery production and lower costs. Trade policy

Balance of trade and trade flows for lithium-ion battery cells, 2014



Notes: Darker shade indicates exports and lighter shade indicates imports. Trade figures show all end uses for lithium-ion battery cells. Source: CEMAC (2017).

could, in this way, give a boost to worldwide efforts to make mobility greener.

Besides price, the availability of charging infrastructure is another factor that is closely intertwined with the deployment of electric vehicles. Although charging infrastructure has been expanding rapidly in recent years, more needs to be done to fully meet urban demands. Related to this is the need to improve the driving range of electric cars. On average, the driving range has increased by 56 per cent over the last six years. A medium all-electric vehicle can now drive up to 180 km on a fully charged battery (Lambert, 2017).

Another important issue is the need to optimise the timing and duration of charging to deal with the increase in power demand from electric vehicles and their impact on the load distribution of the grid. Finally, a more rapid shift to renewable energy must accompany the widespread deployment of electric vehicles to ensure that the world can reap their full environmental benefits.

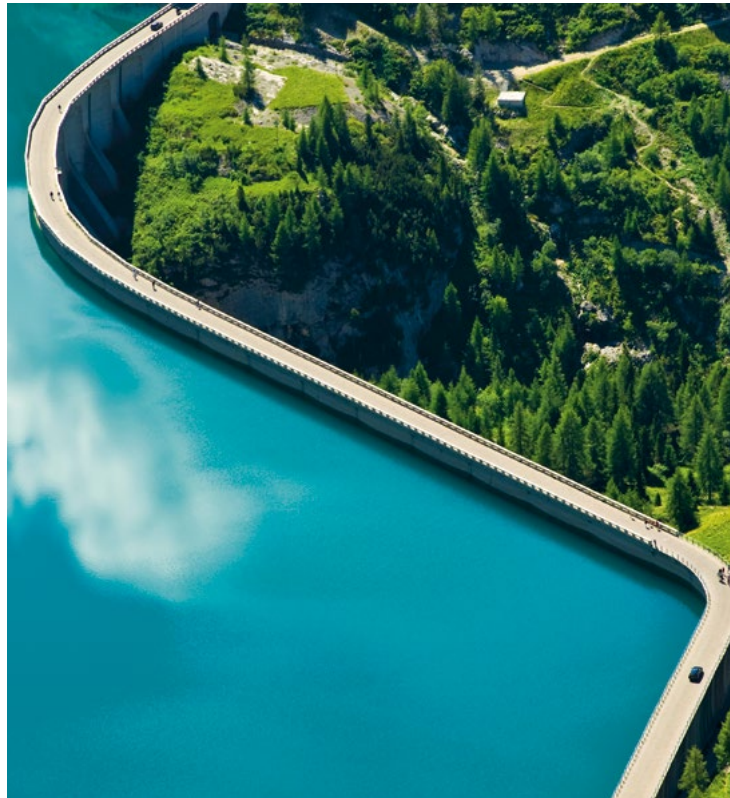
Sources: ICTSD (2017), CEMAC (2017), UN Environment (2018a), Kapoor and MacDuffie (2017) and Lambert (2017).

Without access to the world market, companies, governments and consumers in countries around the world would generally be faced with less choice and higher prices when acquiring environmental goods and services. This would slow down significantly the dissemination of environmentally sound and affordable solutions to those places where they are most needed, while making environmental protection costlier overall. The top 18 developing countries ranked by greenhouse gas emissions would be able to import 63 per cent more energy-efficient lighting, 23 per cent more wind power generation equipment, and 14 per cent more solar power generation equipment if the trade barriers they maintain on these goods were to be abolished (World Bank, 2007). In 2014, a group of WTO members launched negotiations to liberalize trade in environmental goods (see Chapter 3).

The role of trade in promoting the dissemination of environmental goods and services is closely related to its role in fostering innovation. Trade, backed by an appropriate system for the protection of intellectual property, strengthens the incentives to innovate through its effects on the size of the market, competition and cross-border flows of knowledge (see Box 2.4).

Access to a larger market for environmental goods and services, in particular, provides companies with an opportunity to reap higher profits from their innovations, thereby increasing their incentive to invest in research and development. In countries with less advanced technological know-how or less appetite for riskier “breakthrough” innovation, international trade may provide a “gateway” to developing a domestic innovation strategy based on imports of existing technologies and their adaptation to local conditions.

Open trade in environmental goods and services can be part of a broader strategy to promote exports and investment in developing and developed countries alike. In the case of developing countries, a study by UN Environment found that their share in global exports of renewable energy goods, such as solar panels, wind and hydroelectric turbines and solar water heaters, was 75 per cent in 2011, up from 32 per cent in 2004 (UN Environment, 2014). This suggests that some



developing countries have succeeded in becoming part of the regional and global supply chains that underpin the production of many environmental goods.

Moreover, investment across a wide range of clean technology sectors is expected to total US\$ 6.4 trillion in developing countries over the next decade (World Bank, 2014). Of that amount, roughly one-quarter appears to be accessible to small and medium-sized enterprises (SMEs) in sectors such as wastewater treatment, small hydro, water treatment, onshore wind power, solar panels, geothermal and bioenergy. Developing-country SMEs involved in services activities such as installation, civil works, retailing and operations and maintenance appear to be well placed to seize those opportunities.

The role of trade in promoting the dissemination of environmental goods and services is closely related to its role in fostering innovation.



1 million

Number of electric cars sold globally in 2017.

 Box 2.4

How can a balanced and effective intellectual property system support green innovation and trade?

Much innovative green technology is developed and commercialized by the private sector, ranging from niche SMEs to multinationals, and its effective implementation typically requires integrating different technological inputs from a range of partners. For instance, a major renewable energy installation may entail complex integration of a mix of technologies developed by a number of firms and research institutes.

Incentives are needed for companies and institutions to invest in research and



development in the relevant technologies, and there is a practical need to implement workable arrangements for complex technological partnerships. The intellectual property (IP) system – notably the protection of patents and technological know-how – is intended to encourage productive investment in innovative research and to provide a means of defining and structuring partnerships that enable the development, commercialization and widespread diffusion of technologies. While generally used by the private sector, the IP system is also deployed by public research institutes to maintain leverage over how their technological breakthroughs can be further developed and implemented.

From a policy perspective, the IP system aims at a mutually beneficial “balance” between legitimate private interests, specifically a rationale to invest resources into the development of new environmentally sound technologies, and the wider public interest so that beneficial technologies can be disseminated and put to work. The patent system in particular is founded on the principle that exclusive rights need to be matched by effective disclosure of new technologies so that others can learn how to put them into effect. The resulting patent information provides a valuable platform for innovators, adaptors and users of technology to track and gain access to cutting edge technologies.

Source: WTO Secretariat.



Scrapping the barriers that continue to affect trade in environmental goods and suppliers of environmental services can help to turn these opportunities into actual benefits. In the case of environmental goods, the many inputs that go into the production of the final good cross borders multiple times as they make their way through the global supply chains that underpin their production. This causes tariffs and non-tariff barriers on environmental goods to pile one upon the other before those goods reach the final consumer (see Figure 2.1).

Trade opening efforts should therefore focus on improving trading conditions for the components and capital goods necessary to produce environmental goods, not just the finished products. Such an approach could multiply the cost-reducing effects of trade opening initiatives for environmental goods.

It is equally important that trade opening efforts tackle barriers affecting the international supply of services related to the environment (Swedish National Board of Trade, 2014). Countless services are essential to deliver environmental goods and ensure that they function properly. Examples include the construction of a geothermal power plant, the repair and maintenance of

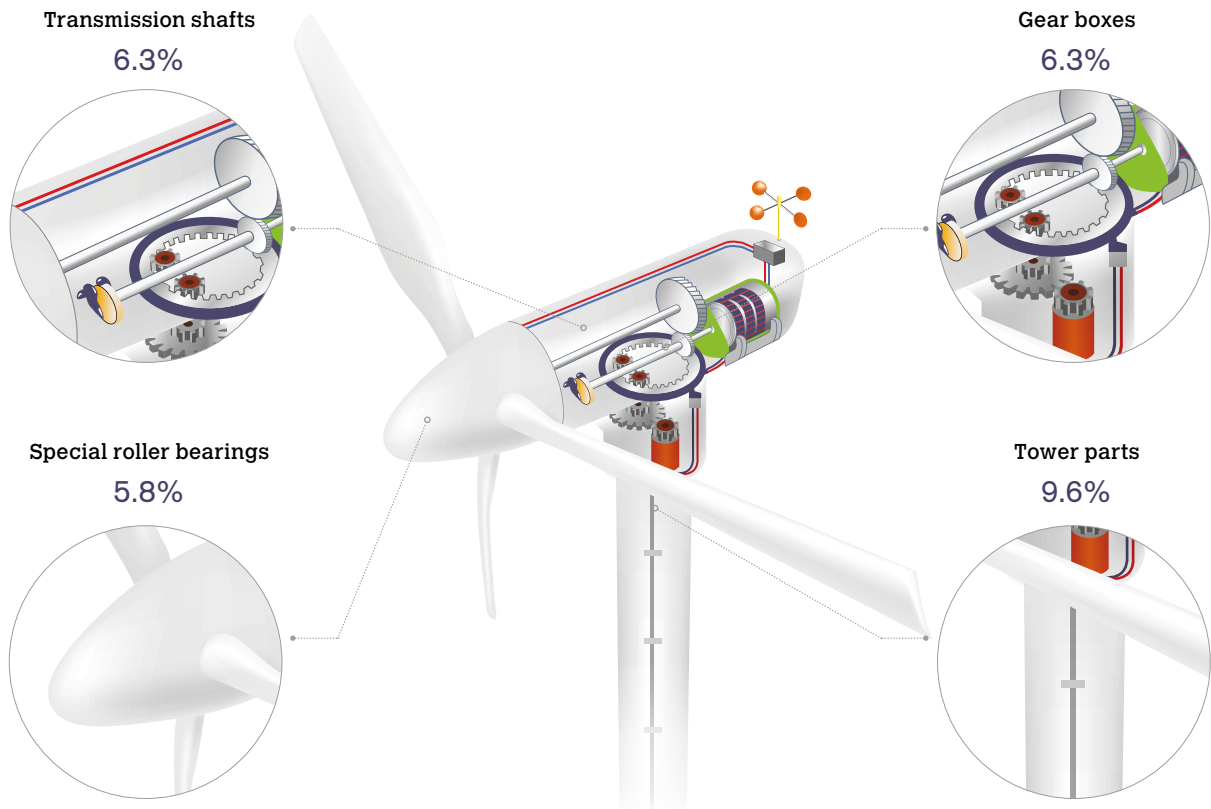
a wastewater-treatment facility, the use of advanced data analytics to improve energy efficiency of heating and cooling systems in buildings, and the testing and grading of used lithium-ion batteries for resale as second-life cells.

Tackling barriers that affect trade in environmental services may help overcome bottlenecks that impede the rapid dissemination of environmentally sound technologies around the world. Moreover, due to the strong presence of SMEs in many services sectors, eliminating services trade barriers could help SMEs in developing countries participate in regional and global value chains.

Besides its role in accelerating the worldwide dissemination of environmental goods and services, trade can also facilitate the creation and expansion of markets for sustainable products across several sectors. Trade can, in this way, strengthen the incentives to make production and consumption more environmentally sound, while boosting employment and economic growth.

The idea that trade can encourage domestic producers to become more sustainable has backing from several studies. Higher

Figure 2.1: Tariffs on selected wind turbine parts



Note: The figure shows the simple average “MFN” tariff rate applied by all WTO members on the specified goods, based on data for the most recent year available. *Source: WTO Secretariat.*

environmental standards abroad have been found to give export-oriented companies a strong incentive to upgrade their production to meet the higher (foreign) standard (Vogel, 2009). Sometimes those companies may even push their own government to adopt the higher standard domestically while they develop the capability to meet it. This phenomenon has been referred to as the “California effect”, after the role that the state has played in raising regulatory standards in the United States.

Empirical studies have shown the California effect to be plausible. One such study, based on a sample of 147 developing countries, found that greater exports of automobiles and auto parts to countries with more stringent emission standards are associated with more stringent standards in the exporting countries (Perkins and Neumayer, 2012).

The proliferation of sustainability certification and labelling schemes is a visible sign of the rapidly expanding global market for sustainable products. In recent decades, many governments, producers, retailers and non-governmental organizations around the world have promoted such schemes to strengthen the market incentives for producers to opt for more sustainable production, while cultivating consumer awareness of environmental (and social) issues (Prag et al., 2016).

A growing number of companies are also using sustainability schemes to manage environmental risks and to increase efficiency along their supply chains. Nonetheless, the proliferation of sustainability schemes in recent years has raised concerns about their effect on trade costs and market fragmentation. Costs

increase when the schemes multiply across geographic or thematic areas, fail to converge or recognize each other's equivalence, or when they do not include opportunities for collaboration in areas such as training or inspection (UNFSS, 2016).

In agriculture, the use of sustainability certification and labelling schemes has increased markedly, even though sustainable production in this sector remains niche. Typically, producers, importers or distributors work with a technical body, often in a "roundtable" multi-stakeholder format, to formulate standards on the sustainable production of the commodity in question (Andrew, 2017). Most of the time, the plantations, farms or other enterprises opting to use the standards are subject to auditing by independent third parties.

Sustainably certified production has been growing rapidly during the past few years, reflecting robust demand. At least one-quarter of the world's total area devoted to coffee production is certified as sustainable. For cocoa, palm oil and tea, between 10 and 20 per cent of the total cultivation area is certified as such. Among sustainability schemes, organic is the largest in terms of area: in 2015, slightly more than 1 per cent of the world's agricultural land was certified as organic (Lernoud et al., 2017). The share of organic farmland in total farmland exceeds 10 per cent in several countries in Europe (FiBL, 2018).

The value of the global organic food market has more than quadrupled over the past 15 years, totalling almost US\$ 82 billion in 2015 (FiBL, 2018). Trade could play an important



US\$ 82 billion

Value of the global organic food market in 2015, which is four times higher than 15 years ago.





role in strengthening this and other markets for sustainable agricultural products and in expanding related economic benefits. For trade to do so, it must be underpinned by an open, transparent, rules-based and inclusive trading system that enables producers to seize the myriad trade opportunities arising from sustainable agriculture. As part of this, it is important to ensure that sustainability requirements are transparent and based on relevant international standards, while not creating any unnecessary barriers to trade.

Promoting trade in sustainable agricultural products could contribute to broader poverty alleviation efforts among smallholder farmers in developing countries, who make up the bulk of the world's rural poor. These efforts must consider the many constraints that limit the capacity of poor smallholder farmers to participate in sustainable agricultural trade, including their access to finance and know-how.

Another common problem is lack of access to a well-functioning, affordable and reliable “quality infrastructure” which allows farmers to demonstrate compliance with relevant sustainability standards. Progress in these areas could also help women play a more important role in the economic development of rural communities, given that women comprise around 43 per cent of the agricultural labour force in developing countries (UN Women, 2014b).

Moreover, approaches should take into account the unprecedented confluence of pressures facing agriculture over the next few decades, including a growing population, intensifying competition for land, water and energy, and the threat of extreme weather events and other threats posed by climate change. All of this underscores the urgent need to strengthen the incentives to make agriculture more productive and sustainable.

A more productive and sustainable agricultural sector could deliver significant benefits not only for the environment, but also for jobs and the economy at large. According to a UN Environment study, a shift to sustainable agriculture could increase yields by up to 180 per cent and create 47 million jobs during the next four decades (UN Environment, 2011).

Policy coherence

Using trade to help protect the environment requires much more than just open markets. Efforts on the trade front must be accompanied by improved efforts to tackle environmental challenges, not least transboundary and global problems such as climate change which are beyond the control of any one country. In the absence of such action, trade cannot effectively act as a tool to allocate resources in economically and environmentally efficient ways.

Moreover, trade and environmental policies must be coherent and aligned with the overarching principle of sustainable development to avoid undermining each other. There is no one-size-fits-all answer or magic blueprint to make trade and environmental policies work in concert. However, all countries can benefit from considering trade, environment and other policies in an integrated way, in line with the principle of policy coherence espoused by the SDGs.

One concern voiced often by governments and others is that stringent environmental policy measures increase compliance costs of companies and hurt their market competitiveness. Some even fear a regulatory “race to the bottom”, where countries compete by lowering their environmental standards to limit the costs of environmental protection and to attract foreign direct investment.

There is little empirical evidence that countries are engaged in systematically weakening environmental standards to improve the competitiveness of their industries. While some studies have concluded that countries do occasionally forego opportunities to strengthen environmental standards over competitiveness concerns, others have found evidence of upward harmonization – a “race to the top”. In this scenario, international trade gives export-oriented companies a strong incentive to upgrade their production to gain access to the markets with the highest environmental standards.

Another related topic is the “pollution haven hypothesis” – the idea that trade opening will cause pollution-intensive companies to relocate from countries with stringent



environmental policies to countries with relatively lax ones. Countries will have a strong incentive to set environmental standards at a low level to attract investment, the argument goes, since the cost of complying with environmental policy measures is a major factor in a company's decision about where to locate its activities. There is limited empirical evidence in support of this line of argument.

Part of the reason is that the direct cost of pollution control is relatively minor, just a few percentage points of production costs for most industries, compared with other costs. Many other factors besides environmental policy measures affect companies' investment and trade decisions, including wages, the institutional framework and the possibility to join existing business clusters and value chains (Copeland, 2012).

In fact, more stringent environmental measures may have knock-on effects that improve companies' competitiveness

(Altenburg and Assmann, 2017). The "Porter hypothesis" holds that regulatory pressure, just like competitive pressure, encourages innovations that make production cleaner and less energy and resource demanding (Porter and van de Linde, 1995). Innovation in turn helps to offset the cost of complying with environmental measures. The empirical evidence partly supports this hypothesis (Ambec et al., 2013). The key question is therefore how to design measures that help stimulate innovation, promote a high level of environmental protection and keep the overall costs of compliance as low as possible.

Moreover, there is some recent evidence suggesting a link between sound environmental policy and higher exports of environmental goods, such as renewable energy and wastewater treatment equipment (Sauvage, 2014). In a similar vein, some studies show that countries with stringent environmental measures do not suffer from lower overall exports. Although exports of energy- and pollution-intensive goods may fall

because of more stringent environmental policy measures in the exporting country, exports of “cleaner”, less energy- or pollution-intensive industries may increase (Koźluk and Timiliotis, 2016).

This means that stringent and well-designed environmental policy can support countries’ ability to compete in the expanding global green market – for example, by boosting domestic demand for innovative green solutions. Overall, however, the effects of environmental policy measures on exports – both positive and negative – have so far been found to be small compared with other factors, such as natural endowments, market size and degree of trade openness.

All this suggests that it is possible to foster both a healthy environment and strong, prosperous and open economies. Efforts in this direction are taking place nationally, regionally and globally. Regional efforts, for example, have led to a growing number of regional trade agreements (RTAs) with numerous, and often quite elaborate, environmental provisions (see Box 2.5).

The next chapter focuses on efforts at the global level, in particular how the WTO and UN Environment can bolster multilateral cooperation towards mutually beneficial and coordinated solutions on trade, the environment and sustainable development.



 Box 2.5

Bringing environmental provisions into regional trade agreements

The last 30 years have seen a rapid proliferation of regional trade agreements (RTAs). Traditionally, RTAs have generally focused on lowering tariff and non-tariff trade barriers. More recently, an increasing number contain environmental provisions. This trend reflects the increasing recognition of trade policy as a tool for supporting environmental protection and sustainable development.

A detailed review of RTAs in force and notified to the WTO confirms that the inclusion of environmental provisions in RTAs is not a recent phenomenon. In fact, almost all RTAs include at least one environmental provision, typically in the form of a general exception clause to trade obligations for environment-related considerations or preambular language emphasizing the importance of environmental protection and sustainable development, largely mirroring the approach followed in the WTO. But the review also shows a big increase in the number, and level of detail, of environmental provisions contained in more recent RTAs.

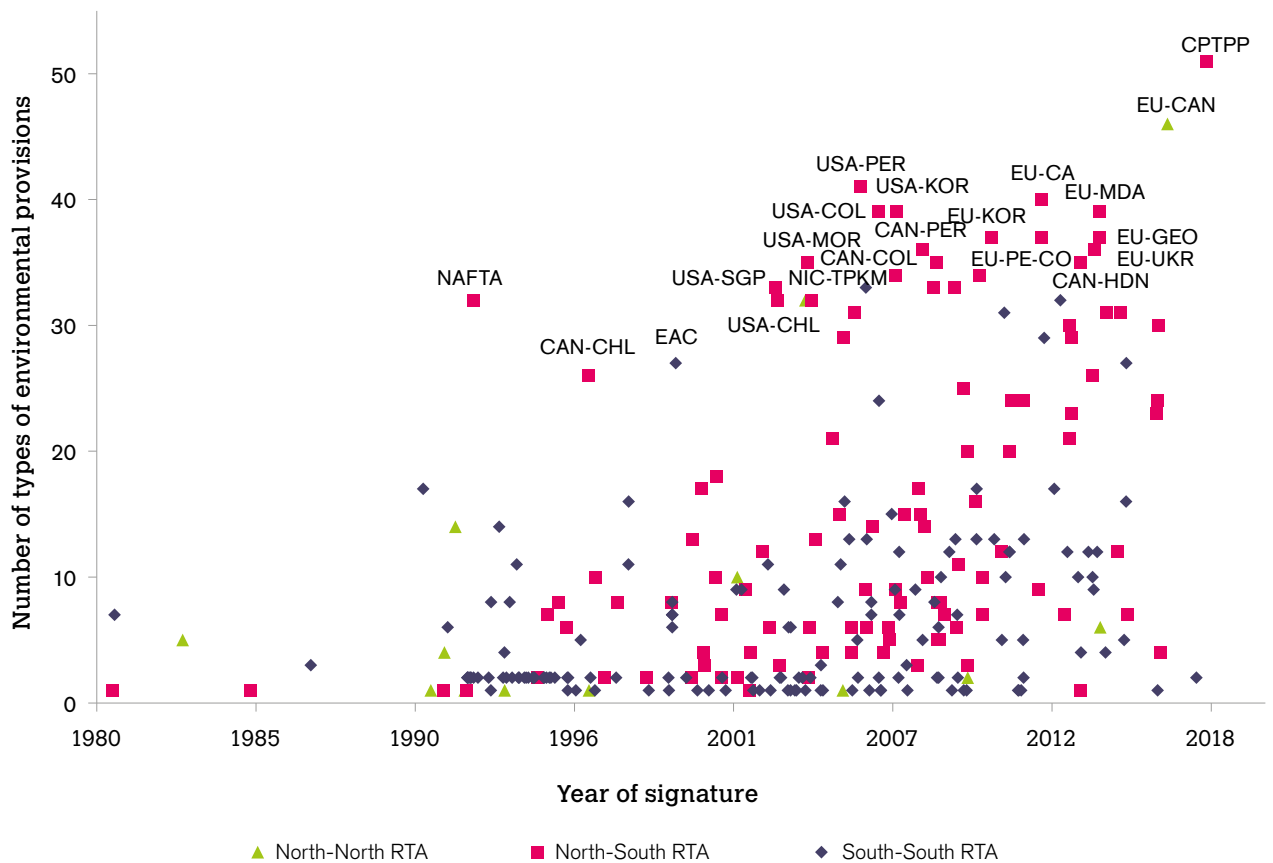
Although most environmental provisions differ in terms of language, scope and enforceability, they often tend to focus on relatively similar environmental issues, such as the level and enforcement of domestic environmental laws. Some of these provisions, most commonly found in RTAs between developed and developing countries and several RTAs between developing countries, take the form of commitments to “improve”, “adopt”, “harmonize”, “effectively apply”, “not waive” or “not relax” environmental laws.

Other environmental topics mentioned in an increasing number of RTAs include multilateral environmental agreements, environmental goods and services, biodiversity and traditional knowledge, sustainable management of forests and fisheries, trade in forest and fish products, environmentally harmful subsidies and corporate social responsibility. Public participation in policy-making processes, transparency and access to justice in environmental matters are commonly found in recent RTAs too.

RTAs often provide for cooperation, technical assistance and capacity building in support of their environmental goals and the implementation of some of their environmental provisions. Provisions on building institutional capacity to improve the enforcement of environmental laws and to maintain a high level of environmental protection are becoming more common in many RTAs. Environment-related cooperation provisions often focus on specific sectors such as water management, clean energy, energy efficiency, waste management and natural resources. Moreover, some RTAs provide avenues for the private sector and civil society to participate in the identification and implementation of environmental cooperation activities.

RTAs are sometimes viewed as a “laboratory” enabling countries to design new provisions and address new issues and challenges. The new types of environmental provisions found in so-called “mega-regional” trade agreements such as the Comprehensive and

Evolution of environmental provisions in regional trade agreements



Progressive Agreement for Trans-Pacific Partnership signed between Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore and Viet Nam show that the language and form of environmental provisions in RTAs are continuing to evolve and are becoming increasingly specific and pragmatic. Bringing the environment and sustainable development into RTAs is one way to improve policy coherence and to ensure that environmental considerations are integrated into trade

policy. To assist negotiators design, negotiate and implement environment-related provisions in RTAs, UN Environment, in collaboration with the International Institute for Sustainable Development, has developed a Sustainability Toolkit for Trade Negotiators. The toolkit features over 200 text examples of environmental provisions drawn from over 90 RTAs.

Sources: Monteiro (2016) and UN Environment and IISD (2016).

Chapter 3

Maximizing opportunities for cooperation on trade and environment

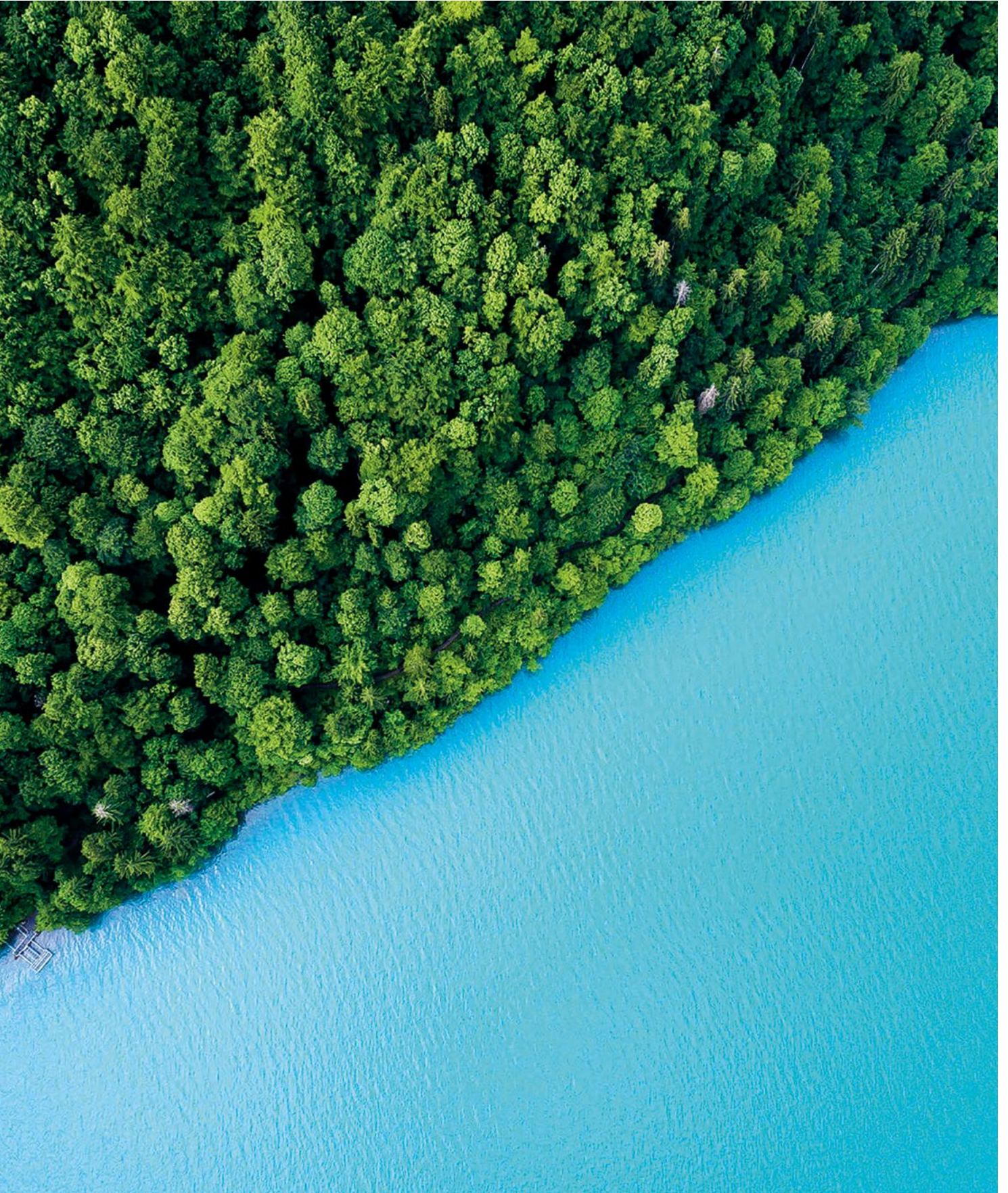
When a group of countries set about rebuilding the global trading system after World War II, they were guided by the principle of multilateral trade cooperation as an effective way to avoid mutually defeating trade policies and to help build lasting peace. A key outcome was the 1947 General Agreement on Tariffs and Trade (GATT) – the WTO's predecessor.

At the time of the GATT's inception, environmental issues typically received a low public-policy priority. It is not surprising, therefore, that the question of how trade affects the natural environment did not feature prominently in the GATT context, even though the agreement already included some exceptions to trade obligations for environment-related considerations. This changed in the 1960s and 1970s, when countries began to pay increasing attention to

the environmental effects of rising economic activity and started to put in place environmental protection measures and national and international agencies to deal with those effects.

In the lead-up to the first major global conference on the environment – the 1972 United Nations Conference on the Human Environment held in Stockholm, Sweden – the GATT Secretariat prepared a report on “industrial pollution control and international trade”. The report acknowledged the need for governments to take action to protect and improve the environment. It further recognized that the cost of complying with new environmental requirements could affect the competitiveness of some domestic industries and prompt them to seek protection from international competition. The authors cautioned governments against relying on trade measures to “compensate” affected





industries for the extra costs of complying with such requirements. Using trade measures in this way, the authors warned, could give rise to costly and mutually damaging trade frictions.

In the decades that followed, GATT “contracting parties” succeeded in avoiding trade conflicts related to the environment. They also saw new countries join their ranks and succeeded in concluding several rounds of trade negotiations.

On the environmental side, several multilateral environmental agreements or MEAs were adopted. MEAs are international environmental agreements between more than two parties aimed at addressing environmental problems, most of which have a transboundary nature and are global in scope, through international cooperation.

Examples include the Convention on International Trade in Endangered Species of Wild Fauna and Flora and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. These agreements came in response to a growing sense of urgency in the face of mounting environmental problems that transcended national boundaries. Some of the MEAs concluded during this period envisaged trade restrictions (such as bans, quotas and licences) with a view to achieving an environmental objective (see Box 3.1).

If early interactions between the global trade regime, on the one hand, and the global environment regime, on the other, were marked by tentativeness, this had changed by the late 1980s. The turning point probably came after the UN World Commission on Environment and Development introduced the idea of sustainable development.

In a report issued in 1987 (commonly known as the Brundtland Report after the name of the Commission’s chairperson, Gro Harlem Brundtland, a former Norwegian prime minister), the Commission defined sustainable development as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs”.

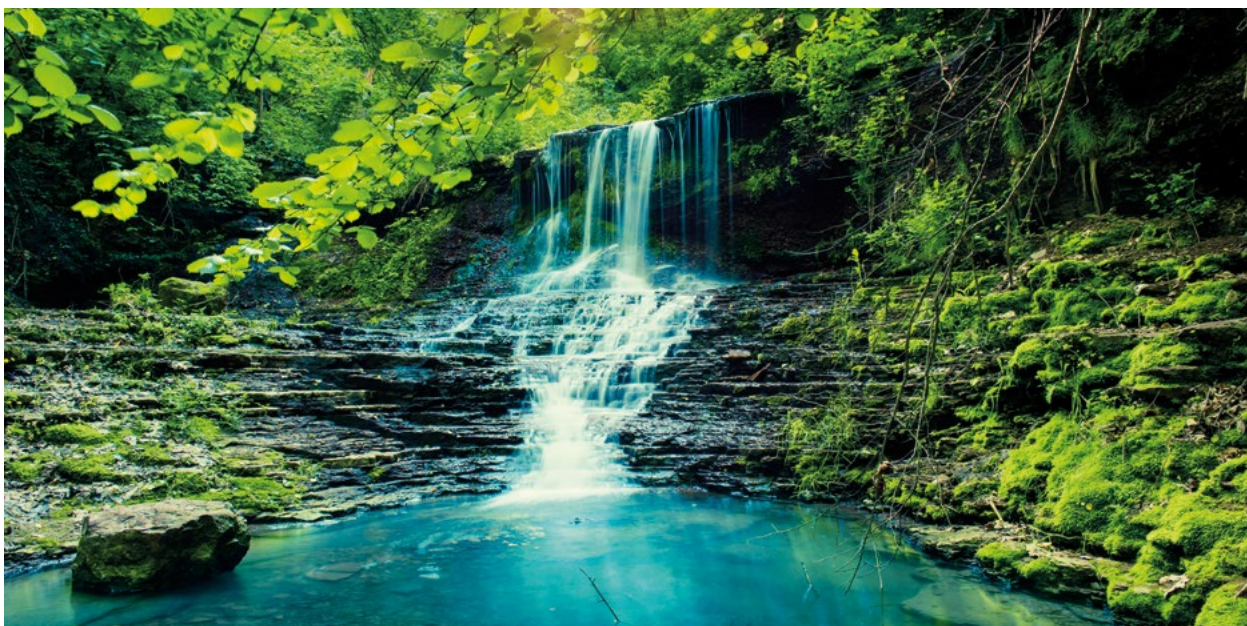
The concept of sustainable development helped clarify the relationship between the global trade and environment regimes. The Brundtland Report rejected the notion that economic development (and by implication, trade) worked against the protection of the environment. It called instead for approaches that would treat environmental sustainability as inextricably linked with lasting economic and social development.

Against this backdrop, representatives from close to 180 nations, including more than 110 heads of state and government, met in Rio de Janeiro, Brazil, for the “Rio Earth Summit” (formally, the UN Conference on



46

Number of WTO members who have embarked on an initiative to cut tariffs on environmental goods by seeking to negotiate an Environmental Goods Agreement.





Environment and Development) in June 1992. In the run-up to the event, the GATT Secretariat again prepared a report on trade and the environment.

Echoing some of the broader themes contained in the Brundtland Report, the GATT report argued that trade could support efforts to protect the environment. In the same vein, the authors showed that multilateral trade rules did not prevent countries from putting in place appropriate policies to safeguard the environment. The Rio Earth Summit emphasized the importance of international trade and of avoiding trade protectionism, while calling on governments to promote an open, non-discriminatory and equitable multilateral trading system.

Another major step forward was taken in 1995 with the establishment of the WTO – the successor to the GATT. The founders of the WTO recognized the principle of sustainable development as a guiding

principle for the newly created organization, and made sure that the founding charter of the WTO – the Marrakesh Agreement – identified trade as a tool to help countries achieve important public policy goals, including the sustainable use of the world's resources and environmental protection.

The inclusion of the sustainable development principle in the preamble to the Agreement would, in turn, have a fundamental role in informing how multilateral trade rules would be interpreted with regards to environmental policies under the reinforced dispute settlement system of the WTO (see page 59).

The SDGs put significant emphasis on the role that trade plays in promoting sustainable development.

 Box 3.1

CITES – A successful example of global cooperation to protect endangered species

People around the globe have been trading in wildlife for centuries. In the ancient world, demand for wild exotic plants used as spices, incense or perfumes led to the development of an extensive network of trade routes connecting West to East by land and by sea. Nonetheless, the scale of that trade was nothing compared with the 7.6 billion people consuming biodiversity products in today's globalized economy.

During the post-World War II economic recovery, wildlife trade increased significantly. Future trends started to look worrying in light of some instances of overexploitation, a growing human population and ever-increasing trade activity. By the seventh General Assembly of the International Union for the Protection of Nature held in Warsaw in 1960, strong apprehension about the impact of wildlife exploitation and trade on conservation was voiced for the first time (the International Union for the Protection of Nature was later known as the International Union for the Conservation of Nature or IUCN).

Based on new information about the conservation status of many species, IUCN recommended at the eighth IUCN General Assembly, held in 1963 in Nairobi, Kenya, that an international convention to regulate trade in "rare or threatened wildlife species or their skins and trophies" be drafted and submitted for the approval of governments.

Ten years later, government delegates from 80 countries participated in a conference to adopt a convention on export, import and

transit of certain species of wild animals and plants. The final convention text was signed on 3 March 1973 by 21 countries and the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) entered into force on 1 July 1975. It counted 183 parties as of April 2018.

CITES subjects international trade in specimens of selected species to certain controls, depending on the classification of the respective species on its three appendices, which include fish and timber. The appendices offer different levels of protection, primarily depending on the biological status of the species and whether it is or may be affected by trade.

Appendix I includes species that are threatened with extinction (i.e. endangered) and prohibits trade of wild-sourced specimens for primarily commercial trade. Appendix II, which makes up 97 per cent of the species listed under CITES, includes species that are not necessarily threatened with extinction, but that may become so unless trade is regulated. For these species, trade is allowed as long as it is sustainable, legal and traceable in compliance with the provisions of the Convention. Appendix III includes species listed at the request of a party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation.

While CITES predates the concepts of sustainable development and use as articulated in later global environmental

summits and international agreements, it requires trade to not cause detriment to the survival of the species concerned and for species to be maintained at a level consistent with their role in the ecosystem – key elements of sustainable development. Furthermore, these principles align with SDG 12 on sustainable consumption and production and SDG 15 on life on land, which seek, among other goals, to protect, restore and promote sustainable use of terrestrial ecosystems, to halt the loss of biodiversity and to ensure sustainable consumption and production patterns.

The Convention's requirements that traded specimens be lawfully obtained and that parties take appropriate measures to enforce the Convention also contribute to these objectives, as do efforts under the Convention to combat illegal trade in wildlife. CITES trade-related measures

serve as the core regulatory system of the Convention and include trade bans, import and export licences and science-based analysis of trade's impact on species conservation.

The Convention is an early example of a multilateral framework to tackle a global environmental problem through international cooperation. This reflects the reality that living resources do not know national boundaries, and that they may be affected by activities carried out in another state. The Convention is seen as recognition of the need for a global approach to the regulation of international wildlife trade that favours multilateral cooperation and concerted action, while also preserving the right of states to adopt stricter domestic measures.

Sources: WTO and CITES (2015).



In 2012, the United Nations Conference on Sustainable Development reaffirmed political commitment to sustainable development and emphasized the contribution of trade. Moreover, it identified an inclusive green economy as one that improves human well-being and builds social equity while significantly reducing environmental risks and ecological scarcities. As such, the green economy and trade can support each other, provided the right conditions are in place (UN Environment, 2013; and IISD and UN Environment, 2014).

With the endorsement of the 2030 Agenda for Sustainable Development in 2015, UN members consolidated their understanding of the important function of trade in helping to bring about a more prosperous, environmentally sustainable and resilient world economy. The SDGs put significant emphasis on the role that trade plays in promoting sustainable development and recognize the contribution that the WTO can make to the 2030 Agenda (WTO, 2018).

This understanding partly revolves around the idea that trade and the environment are closely intertwined. Continued economic

activity and trade depend on a healthy natural environment. At the same time, trade serves as a driver for economic growth and poverty reduction, and can help achieve better environmental outcomes. It follows from this that trade and environmental policies must be designed and implemented in mutually reinforcing ways.

Turning the relationship between trade and the environment into concrete benefits imposes new and urgent demands for effective cooperation among countries. The remainder of this chapter explains how the WTO and UN Environment help countries enhance their cooperation to achieve mutually beneficial solutions on trade and the environment.

It first looks at the work of the WTO. This work includes providing a forum for policy dialogue, creating a framework to help countries design and implement efficient, coherent and fit-for-purpose public policies and establishing partnerships to help developing countries participate more fully in global trade. It then presents an overview of the work of UN Environment in support of worldwide efforts to use trade as a driver for achieving sustainable development.





The role of the WTO

In the lead-up to the establishment of the WTO, trade ministers decided that the topic of trade and environment deserved a dedicated home in the new institution. In a decision adopted in 1994, ministers therefore directed the WTO to establish a Committee on Trade and Environment (CTE) with two specific tasks.

The first task for the CTE is to “identify the relationship between trade measures and environmental measures, in order to promote sustainable development”. The second is “to make appropriate recommendations on whether any modifications of the provisions of the multilateral trading system are required, compatible with the open, equitable and non-discriminatory nature of the system”.

In their decision to create the CTE, ministers used language that echoed the pronouncements on trade and environment made at the Rio Earth Summit a few years earlier. In doing so, they maintained the idea of “mutual supportiveness” between upholding and safeguarding an open, non-discriminatory and equitable global trading system, on the one hand, and acting

for the protection of the environment and the promotion of sustainable development on the other.

Government representatives meet regularly in the CTE to discuss how trade and environmental measures could work better together to promote sustainable development. As part of this work, participants regularly exchange views and experiences on a wide range of issues under the CTE’s broad work programme (see Box 3.2). Recent topics have included environmental taxes and labelling schemes, sustainability aspects of trade in sectors such as forestry, fisheries and energy, measures to facilitate the dissemination of environmental goods and services, the environmental footprint of products and services and the trade elements of climate action measures.

The CTE also serves as a forum where UN Environment and the secretariats of several multilateral environmental agreements (MEAs) regularly brief WTO members on their work. All this helps WTO delegates to keep abreast of the latest global initiatives on the environment and to deepen their understanding of how trade and the environment interact.

 Box 3.2

Committee on Trade and Environment in action

Twice a year, government representatives meet in the CTE to discuss a host of issues on trade and the environment. To take just one example, the CTE has held dedicated discussions on carbon footprint schemes, the practice of attaching labels to foods and other products showing the quantity of carbon emissions resulting from making and transporting the product in question. The main justification for such schemes is that disclosing a product's carbon footprint can help consumers identify products with the least negative impact on the environment, while encouraging producers to lower their emissions.

Several WTO members, such as Costa Rica, Nigeria, Chinese Taipei and Thailand, and international institutions have provided briefings in the CTE on their projects in the area of carbon footprinting. The discussions have revolved mostly around the challenges of implementing

labelling schemes, domestic and global efforts to harmonize divergent standards and measurement techniques, and concerns over the potential effects of carbon footprint schemes on market access, particularly for developing countries.

The discussions on carbon footprint schemes have helped trade officials get a better grasp of these rapidly evolving schemes around the world and to assess collectively the systemic implications of such measures for the global trading system.

As an observer, UN Environment actively engages with the CTE and its members on environment-related trade rules and on promoting the mutual supportiveness of trade and environmental policies.

Source: WTO Secretariat.



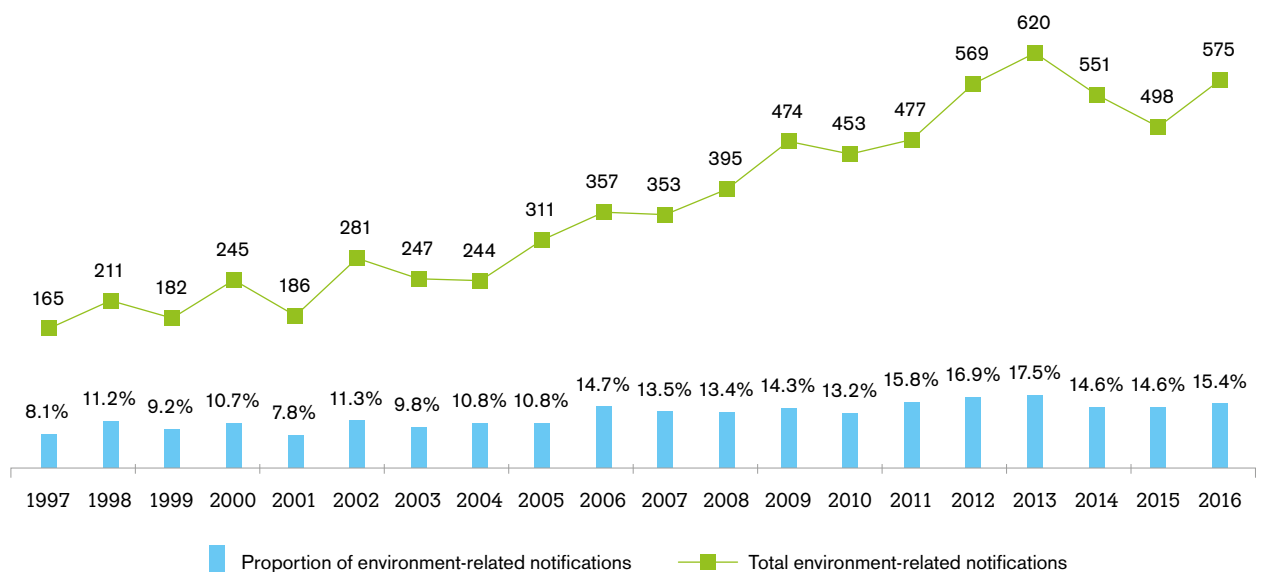
Since the environment cuts across policy domains, several other committees in the WTO, such as the Committee on Technical Barriers to Trade, also discuss trade measures adopted for environmental purposes. Under WTO rules, members are required to inform each other of trade-related measures, ranging from technical regulations and licensing procedures to subsidies and agricultural trade policies. This exchange of information is based on notifications submitted by WTO members. Notifications are essential for improving transparency and predictability in international trade. One of their main functions is to help members learn about new measures or about measures their trading partners have in the pipeline and to flag potential problems.

The WTO Secretariat conducts a survey of notifications annually to identify those that relate to the environment and makes the results available to the public in an online database. The data show a clear increase in environment-related notifications during the last decade and a half (see Figure 3.1). The share of notifications related to the environment almost doubled to 15 per cent of total notifications in 2016, up from 8 per cent in 1997. This reflects the fact that trade and the environment have become more closely

intertwined at the policy level over the years. The information exchanged through notifications often serves as a springboard for more focused “thematic” discussions among WTO members. Many of these discussions, which happen in various WTO committees, allow government representatives to look at a number of sustainability issues relating to international trade and the global rules-based trading system. Energy efficiency, invasive alien species, the relationship between the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights and the UN Convention on Biological Diversity, and sustainable public procurement practices are some examples of what has been discussed recently (see Box 3.3).

Due to their practical and technical nature, the discussions provide government officials with a wealth of information and experiences that can support their countries’ own efforts to design and implement efficient, coherent and fit-for-purpose approaches to achieve sustainability goals. In this way, the WTO’s committee work serves not only to improve the quality of trade policies around the world, but also to strengthen much-needed coherence between trade, environmental and other policies essential for sustainable development.

Figure 3.1: Environment-related notifications submitted to the WTO



Source: WTO (2018).

 Box 3.3

Sustainable public procurement in the WTO Committee on Government Procurement

Public authorities increasingly use their purchasing power actively to encourage the production and use of environmental goods and services, among other environmental goals. As government procurement accounts for a large share of economic activity – about 12 per cent of GDP on average in OECD countries and up to 30 per cent of GDP in many less developed countries – public entities that adopt green procurement policies can make an important contribution to sustainable consumption and production, innovation and sustainable development more broadly.

The main WTO rules governing government procurement are laid down in the WTO Agreement on Government Procurement (GPA). This plurilateral agreement (it applies only to parties that have accepted the Agreement, not to all WTO members) seeks to open up markets for public-sector purchases to international competition on a reciprocal, transparent and non-discriminatory basis.

A revised GPA, in force since 2014, explicitly refers to the protection of the environment as a goal of the Agreement. Following the renegotiation of the GPA, the Committee on Government Procurement adopted several work programmes, including one on sustainable procurement. The overall goal of this work programme is to identify best practices which are consistent with the principle of “best value for money” and with the international trade obligations of GPA parties.



Under the work programme, most GPA parties have provided inputs on sustainable procurement policies, goals and legislation. The WTO Secretariat has compiled all the submissions into a document, which was circulated in October 2016. In addition, the Committee held a symposium on sustainable procurement in February 2017. The symposium featured contributions from a broad range of experts on sustainability issues. Among the main takeaways from the event was that the revised GPA provides significant scope for the reflection of sustainability considerations in procurement covered by the Agreement, particularly with respect to environmental or “green” policy objectives.

Sources: WTO (2011) and WTO document GPA/W/341, 30 May 2017.

A framework for efficient, coherent and fit-for-purpose public policies

One of the main purposes of WTO rules is to provide the stability and predictability needed for international trade to play its full role for the achievement of sustainable development. Sometimes, however, measures adopted by a WTO member in pursuit of environmental or other welfare goals may, by their very nature, restrict trade and thereby impact on the WTO rights of other members. How do the rules achieve a balance between, on the one hand, safeguarding the right of countries to take measures to protect the environment and, on the other hand, ensuring that such measures are not applied arbitrarily and are not used as a back door to protectionism?

This is where GATT Article XX is important. This provision sets forth specific instances in which trade measures taken by WTO members may deviate from trade rules that would otherwise have applied. It establishes several requirements that aim to ensure that environmental measures are not applied arbitrarily and that they are not used as disguised protection. Moreover, other rules

including under the WTO Agreement on Technical Barriers to Trade (which deals with regulatory specifications), the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (dealing with food safety and animal and plant health) and the General Agreement on Trade in Services expressly recognize the right of WTO members to put in place regulatory measures to protect the environment so long as any regulatory distinction is legitimate and not more restrictive than necessary.

Many other types of environmental policy measures may also intersect with WTO rules, including support schemes for clean technologies, sustainable procurement practices, or intellectual property rights measures. Broadly speaking, WTO rules offer sufficient scope for members to adopt a wide range of environmental measures. At the same time, they seek to prevent protectionism from being introduced through the back door of legitimate policies. As demonstrated by WTO rulings, the WTO's agreements require that any detrimental treatment applied for environmental reasons be coherent, even-handed and justifiable – in essence, that WTO members do not resort to green protectionism (see Box 3.4).



 Box 3.4

Do WTO rules leave sufficient space for environmental policies?

An oft-expressed concern during the negotiations leading to the establishment of the WTO was how a reinforced dispute settlement system would impact a country's environmental policies. However, in several landmark decisions, the WTO's dispute settlement system has repeatedly highlighted that WTO rules do not encroach on the right of members to adopt ambitious environmental policies, but instead require that such policies not discriminate arbitrarily or unjustifiably against foreign producers.

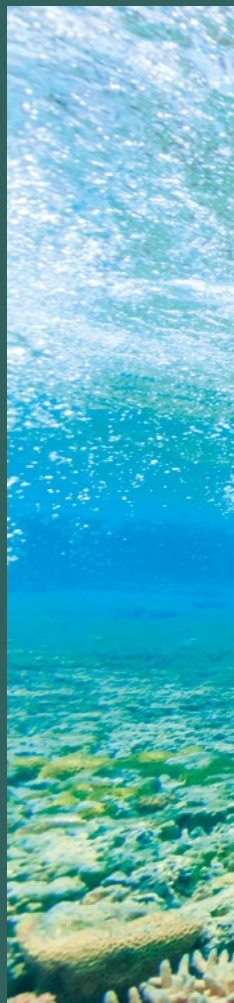
The "US – Shrimp/Turtle" dispute is a case in point. The dispute, brought to the WTO in 1996, was about a ban imposed by the United States on imports of shrimps from shrimp harvesting nations that were not certified to have a regulatory programme

on protecting turtles comparable to the US programme.

The aim of the US measure was to avoid endangered marine turtles being accidentally captured and killed during shrimp fishing activities. In practice, to be certified to export shrimp to the United States, shrimp harvesting nations with any of the five species of sea turtles within their jurisdiction had to require the fishing community to use "turtle excluder devices" (a technological solution that allows turtles to escape from fishing nets) at all times, as already required in the United States.

The Appellate Body considered that the US measure was inconsistent with WTO obligations partly because of the inflexible way by which the measure required all exporting countries to adopt essentially the same policy as that applied to US domestic shrimp trawlers. Such a requirement resulted in an arbitrary and unjustifiable discrimination contrary to WTO rules.

Conscious of the potential for its decision to be misinterpreted, and drawing from the recognition by WTO members in the Marrakesh Agreement of the importance of sustainable development and environmental protection, the Appellate Body clarified its reasoning. In the Appellate Body's own words: "We have not decided that the protection and preservation of the environment is of no significance to the Members of the WTO. Clearly, it is. We have not decided that the sovereign nations that are Members of the WTO cannot adopt effective measures to protect endangered species, such as sea turtles.



Clearly, they can and should. And we have not decided that sovereign states should not act together bilaterally, plurilaterally or multilaterally, either within the WTO or in other international fora, to protect endangered species or to otherwise protect the environment. Clearly, they should and do.”

In 1999, the United States amended its measure to allow countries to apply their own policy solutions when these were as effective in protecting turtles as the measures implemented in the United States, accounting for differences between the shrimp fishing conditions in the United

States and those of other nations. In a further round of adjudication, the Appellate Body found that the amended US measure no longer imposed an unjustifiable and arbitrary discrimination and that it complied with WTO rules.

Other landmark environmental disputes in the WTO have reaffirmed this approach. This has allayed at least some of the initial concerns, and has led to the recognition that multilateral trade rules can and do accommodate coherent policies adopted for legitimate environmental purposes.

Source: WTO Secretariat.



WTO members have also reaffirmed at the political level the fact that WTO rules do not override environmental protection. At the Doha Ministerial Conference, in 2001, WTO members recognized that under WTO rules no WTO member should be prevented from taking measures for the protection of the environment at the levels it considers appropriate as long as they are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade.

The WTO institutional framework also provides a forum for further negotiations. This essential feature of the WTO ensures that the global trading system can adapt to a changing world and play its full role in helping WTO members to achieve sustainable development. In this vein, WTO members launched the first ever multilateral negotiations on trade and the environment during the Doha Ministerial

Conference in 2001. Members agreed on three negotiating topics. The first comprised the relationship between the WTO and MEAs. The second negotiating topic related to the elimination of trade barriers on environmental goods and services. Under the third topic, WTO members aimed to clarify and improve WTO disciplines on fisheries subsidies, taking into account the importance of this sector to developing countries. Despite considerable efforts, WTO members have not yet been able to conclude the trade and environment negotiations in these three areas.

However, at the WTO's Eleventh Ministerial Conference held in Buenos Aires, Argentina, in December 2017, ministers agreed to continue to engage constructively in fisheries subsidies negotiations and to set themselves a goal for the conclusion of these negotiations by the next Ministerial Conference, which is due to be held in 2020 (see Box 3.5).



2020

At the WTO Ministerial Conference in Buenos Aires in December 2017, ministers agreed to continue to engage constructively in fisheries subsidies negotiations and to set a goal for concluding them by the next Ministerial Conference, which is due to be held in 2020.



 Box 3.5

WTO fisheries subsidies negotiations



Disciplining fisheries subsidies was identified in the early days of the WTO as having the potential to deliver a win-win-win outcome for trade, the environment and development. Curbing subsidies that supported excessive fishing capacity and overfishing could contribute significantly to ensuring sustainable fish stocks for all, the production of tradable fisheries products and support for the employment and nutrition of poor fishing populations.

Based on these considerations, since 2001 the negotiations on fisheries subsidies have

been a major component of the WTO's work in support of sustainable development. WTO members have been negotiating to strengthen WTO rules on fisheries subsidies, including by prohibiting certain subsidies that contribute to overcapacity and overfishing, while considering the particular importance of the sector for many members' development priorities, poverty reduction, and livelihood and food security concerns.

At the WTO's 11th Ministerial Conference held in Buenos Aires, Argentina, in December 2017, WTO ministers reaffirmed the centrality of sustainable development in these negotiations in a decision that incorporates the main elements of SDG 14.6, including its deadline of 2020. In particular, the decision instructs WTO members to engage constructively in the fisheries subsidies negotiations, with a view to adopting, by the WTO's next Ministerial Conference, comprehensive and effective disciplines that: (i) prohibit certain forms of fisheries subsidies that contribute to overcapacity and overfishing; and (ii) eliminate subsidies that contribute to illegal, unreported and unregulated (IUU) fishing.

The decision also recognizes that appropriate and effective special and differential treatment for developing and least-developed countries should be an integral part of the negotiations. The WTO Negotiating Group on Rules is currently engaged in an active programme of work aimed at advancing the objectives outlined by the Buenos Aires decision.

Source: WTO Secretariat.

A group of 46 WTO members have also engaged in negotiations aimed at liberalizing trade in environmental goods. Known as the Environmental Goods Agreement or EGA, the initiative seeks to build on a 2012 decision by Asia-Pacific Economic Cooperation (APEC) economies to cut tariffs to 5 per cent or less on 54 environmental goods. The APEC deal is estimated to cover around US\$ 300 billion worth of trade within the APEC region.

EGA participants account for the majority of world trade in environmental goods. Examples of such goods include energy efficient LED bulbs, solar panels, solar cook stoves, air and water filters, machines for recycling solid waste, floating barriers to contain oil spills, devices to prevent turtles and aquatic mammals such as dolphins from being trapped in fishing nets and a broad range of instruments to monitor environmental quality.

EGA participants consulted with a broad range of experts and stakeholders and conducted their own assessments to ensure

that the products contained in the EGA would benefit the environment. The resumption and successful conclusion of the negotiations, which have not been active since December 2016, could give an additional boost to trade in environmental goods. The benefits of the EGA would be extended to the entire WTO membership, meaning all WTO members would enjoy improved access to the markets of EGA participants.

Helping developing countries benefit from the global trading system

The WTO works in partnership with many other international organizations and development partners. The main aim is to improve the capacity of developing and least developed countries (LDCs) to participate more fully in international trade. The Aid for Trade initiative, the Enhanced Integrated Framework and the Standards and Trade Development Facility are examples of WTO-led partnerships that help developing





countries and LDCs use trade more effectively to achieve sustainable development. All three illustrate how the WTO is putting into practice SDG 17, which calls on the international community to revitalize global partnerships for sustainable development.

Standards and Trade Development Facility

Trade in food and agricultural products offers a way for farmers, food processors and traders in developing countries to increase their incomes and boost economic development. But limited capacity in developing countries to meet food safety and animal and plant health requirements often prevents them from turning the potential benefits into reality. The challenges are becoming bigger due to the role of climate change in compounding the problem of pests and diseases, which puts crops and animal health at risk around the world.

The Standards and Trade Development Facility (STDF), housed and managed by the WTO, brings together partners – the UN Food and Agriculture Organization, the World Bank Group, the World Health Organization, the World Organization for Animal Health and the WTO – and donors, governments, regional and international organizations and the private sector to help developing countries meet international standards for food safety and animal and plant health and to access global markets. In this way, the STDF supports efforts by developing countries to drive sustainable economic growth, tackle poverty, promote food security and support environmental protection, helping to fulfil the SDGs.

The STDF shares good practices and knowledge products on sanitary and phytosanitary (SPS) capacity building, which helps to address problems related to invasive alien species, protect biodiversity and mitigate climate change risks. By linking up organizations involved in agriculture, trade and the environment, STDF also helps to promote a more coordinated and collaborative approach to SPS capacity building, with wider benefits for the environment.

The STDF also funds projects that control the entry and spread of plant pests and animal diseases by building knowledge and skills to improve SPS border controls, to connect SPS and environmental agencies and to reduce the use and misuse of pesticides, chemicals and veterinary drugs. This has resulted in greater use of environmentally sound pesticides, more integrated pest management systems and better farming practices that reduce the burden on land (see Box 3.6).

Aid for Trade

WTO members launched the Aid for Trade initiative at the WTO's 6th Ministerial Conference in Hong Kong, China, in 2005. Aid for Trade aims to give developing countries the skills, supply capacity and trade-related infrastructure they need to benefit from WTO agreements and to expand their trade.

The WTO works on Aid for Trade in cooperation with developing countries, regional organizations, multilateral development banks, donor countries and a

Box 3.6

Spotlight on Standards and Trade Development Facility projects

Traders around the world rely extensively on wood pallets and wood packaging material. Such materials may inadvertently facilitate the movement of plant pests, especially wood-boring insects, across borders and the subsequent establishment of populations outside their native ranges. An STDF project in Botswana, Cameroon, Kenya and Mozambique evaluated the main economic, ecological and logistical consequences of adopting and implementing ISPM 15 – an international wood packaging standard.

The project identified good-practice solutions for governments on how to lower the risk of pests in wood packaging and identified options to recycle or repair wood packaging material to protect forest resources.

Other STDF-backed projects focused on agricultural value chains have helped to protect the rural environment by supporting the use of non-toxic inputs among small-holder farmers. As a result, cabbage productivity in Senegal doubled while pesticide residues dropped and producers gained market share in the region. In Bangladesh, shrimp farmers saw harvest yields and incomes rise by up to 70 per cent following the introduction of environmentally sound processes which protected the coast and livelihoods at the same time. In Southeast Asia, a project helped participants in the cocoa value chain address consumer concerns over pesticide residue and other food safety issues, helping to expand export opportunities.

Source: STDF Secretariat.





US\$ 112 billion

Amount of Aid for Trade disbursements allocated to projects with an environmental objective between 2006 and 2016.

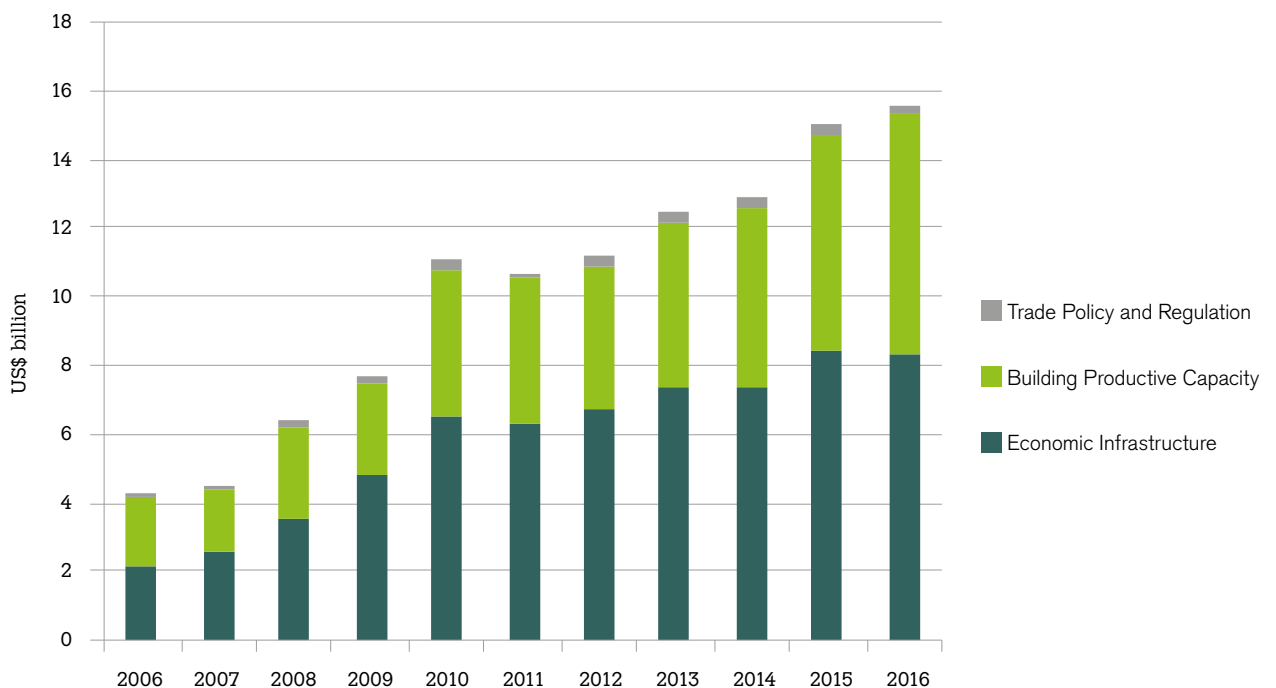
range of UN and other international organizations, including the Organisation for Economic Co-operation and Development (OECD). SDG 8a calls for an “increase in Aid for Trade support for developing countries, particularly LDCs”.

The WTO hosts a periodic “Global Review of Aid for Trade” where partners discuss the effectiveness of the initiative, along with trade and development issues. The latest review was held in Geneva in July 2017. Underpinning the review was a monitoring and evaluation exercise based on information gathered through questionnaires and case studies submitted by donors, regional economic communities, South-South partners, developing and least developed countries, as well as the private sector, academia and non-governmental organizations. Monitoring responses revealed that developing countries and bilateral and multilateral donors all recognize the important contribution that Aid for Trade can make to the SDGs.

Figures from the OECD indicate that Aid for Trade disbursements totalled around US\$ 340 billion from 2006 to 2016. Of this, around one-third (US\$ 112 billion) has been allocated to projects with an environmental objective, meaning development projects that target the goals of one of the so-called “Rio Conventions” – the UN Framework Convention on Climate Change, the Convention on Biological Diversity and the UN Convention to Combat Desertification. Japan, Germany, the European Union, the United States and France have been the largest providers of this type of Aid for Trade support. Among multilateral organizations, the International Development Association arm of the World Bank, the Asian Development Bank and the Climate Investment Funds are active donors.

For the period 2006-16, almost 60 per cent of Aid for Trade disbursements with an environmental objective went to projects related to infrastructure development, mostly energy infrastructure (see Figure 3.2).

Figure 3.2: Aid for Trade disbursements with environmental objectives



Source: OECD (2018c).

Box 3.7

EIF-funded projects aimed at supporting environmental sustainability and promoting resilience to climate change

As part of regional efforts to combat desertification by creating a “Great Green Wall of Africa”, the EIF is supporting Mali’s efforts to plant acacia trees on over 10,000 hectares of land. Some 60 per cent of Mali’s total surface area is already either desert or semi-desert. Along with environmental benefits, the project is expected to have significant economic and social benefits, given that over 350,000 people in Mali (80 per cent of them women) depend on the production of gum arabic from acacia trees used in food, pharmaceutical and cosmetic products.

The project seeks to reduce poverty by increasing the revenue of producers, collectors and exporters of gum arabic in some of the most vulnerable provinces of Mali. The US\$ 7 million project is jointly financed by the EIF and the Government of Mali.

Other examples of EIF projects with strong environmental components include an innovative project helping to promote the sustainable production of honey by small-scale farmers in Zambia while providing incentives for the conservation of forest reserves rich in biodiversity. Another project has assisted Vanuatu’s efforts to recover from the devastating impact of Cyclone Pam in 2015. It focuses on rebuilding Vanuatu’s tourism infrastructure and protecting its shoreline from further erosion. EIF support has also helped smallholder farmers obtain technologies that help them cope better

with more extreme and volatile climatic conditions, including a solar-powered irrigation system in The Gambia and greenhouse-based production in Lesotho.

Source: EIF Secretariat.





Enhanced Integrated Framework

The Enhanced Integrated Framework (EIF) brings together partners and resources to help LDCs use trade for poverty reduction, inclusive growth and sustainable development. It is underpinned by a multi-donor trust fund, which provides financial and technical support for strengthening the capacity of LDCs to participate in global trade. The EIF has its own Executive Secretariat, which is housed in the WTO and tasked with the overall coordination and implementation of the EIF's goals and programme of activities.

SDG 8a on Aid for Trade explicitly refers to the EIF. As the only global Aid for Trade programme tailored specifically to the needs of the world's poorest countries, the EIF is well placed to help them develop sustainable trade strategies. One important tool within the EIF is the "Diagnostic Trade Integration Study" or DTIS. A DTIS is a comprehensive assessment of an LDC's trade-related challenges and opportunities. It provides an analytical foundation to help the government and donors identify priority needs and actions. The EIF has financed over 40 of

these studies. Under DTIS guidelines revised in 2016, the environment is considered a cross-cutting issue that must be analysed systematically in all studies.

The EIF also finances projects that seek to strengthen productive capacity and promote inclusive trade in LDCs. These projects often have environmental components (see Box 3.7). The EIF has been working with the International Trade Centre – an agency of the WTO and the UN Conference on Trade and Development – and other partners to incorporate environmental aspects into trade-related projects in a more systematic way. Moreover, the EIF seeks to connect LDCs with financing mechanisms related to climate change in recognition of the growing links between climate adaptation programmes and trade.

The role of UN Environment

The United Nations Environment Programme (UN Environment) was established in 1972 in Stockholm, with the purpose of being the leading global environmental authority that sets the environmental agenda. As such, UN Environment has a global mandate to promote



the coherent implementation of the environmental dimension of sustainable development within the United Nations system and to serve as an authoritative advocate for the global environment. UN Environment's mission is to provide leadership and encourage partnership in protecting the environment by inspiring, informing and enabling nations and people to improve their quality of life without compromising that of future generations. In order to fulfil this mission, UN Environment believes trade and economic policy play a critical role. To this end, UN Environment's work on trade and the economy focuses on assisting countries to create environmental sustainability and to foster economic, social and environmental resilience by decarbonising, detoxifying and decoupling economic processes from environmental impacts.

The establishment of UN Environment took place in the wake of a global recognition that environmental quality is a major issue that affects well-being and underpins economic development. Equally, the 1972 Declaration of the United Nations Conference on the Human Environment (known as the Stockholm Declaration) recognized that development presents both a solution as well as a challenge for protecting the environment. Today, it has been widely understood that the environmental, social and economic

dimensions of sustainable development are intertwined and indivisible, as also articulated by the 2030 Agenda.

This, in turn, requires environmental protection to be understood as an integral part of development processes. However, decades of creating wealth have not adequately addressed environmental degradation, resource depletion and social marginalisation. In light of a growing global population, increased natural disasters and extensive environmental degradation as well as the social challenges such as widespread inequality, poverty and unemployment, the urgency to rethink the status quo is greater than ever.

While the conventional economic model based on fossil fuels is still pervasive, the world is today much better positioned to understand and measure the hidden costs. Science, technology and policy tools are now available to transition to more sustainable and equitable pathways – towards an economy and trading system that is low-carbon, efficient and clean in production and inclusive in consumption and outcomes. Such an inclusive and resilient economy provides a tool for sustainable development by improving well-being and social equity while significantly reducing environmental risks and ecological scarcities.

UN Environment has shown that achieving the transition to a more sustainable economy is a realistic and economically viable goal for all countries. Economic modelling suggests that the financing demand for this shift is only around 2 per cent of GDP and would result in enhanced long-term economic performance (see also Chapter 1).

An inclusive green economy responds to three sets of challenges facing humanity: widespread poverty, an inequitable spread of growing global prosperity and overstepped planetary boundaries (see Chapter 1). Addressing these challenges should be seen as a driver of innovative solutions.

In line with national priorities, a green economy relies on targeted public and private investments in renewable natural and clean physical capital – for example, energy-efficient buildings and machinery used in the manufacturing sector. Policies, embedded in strong public institutions, play an essential role in this process – they guide and accelerate systemic change by mobilizing finance for a new generation of assets and by reshaping patterns of consumption, investment, public spending and trade. However, such a shift relies on a strategic and integrated framework that features sound environmental, social and labour policies – but equally fiscal, industrial and trade policies that are aligned with environmental and social development objectives. Together, this provides an enabling framework for sustainable production while

shifting consumption patterns towards environmentally sound goods and services.

By way of its function of connecting green supply with green demand, trade can facilitate sustainable production and consumption. It can therefore act as a vehicle and enabler of countries' transitions to inclusive, green economies. It can offer producers of sustainable and green products access to new, global markets, which in turn can provide impetus for innovation and technological learning. By facilitating the diffusion and uptake of environmentally sound technologies, trade can substantively contribute to countries' capacity to prevent, forecast and deal with natural disasters. This can help countries to build resilience, both in environmental and economic terms.

Trade should facilitate access to, and investment in, critical environmental goods, services and technologies and should further foster eco-innovation, contribute to achieving the SDGs and climate goals as outlined in the Paris Agreement, and enable decent and inclusive job creation. By integrating environmental and development considerations, trade policy has a central role to play to enable and accentuate the contribution of trade towards equitable and environmentally sustainable economies.

A central element of UN Environment's work is to ensure that trade amplifies good practices, greener production and consumption, investment in the environment, development of green technologies and integration into green global value chains. Building policy makers' capacity to use trade and investment as tools for sustainable development is key to this end.

Governments have recognized that countries worldwide, and less developed countries in particular, continue to lack sufficient capacity to use trade as a vehicle for achieving sustainable development, including as a mechanism for resilience following conflict or natural disaster. UN Environment responds to this critical need by providing capacity building and advisory services at the interface of trade and environment. More specifically, UN Environment assists countries to integrate and align their respective policy agendas, to seize opportunities from green trade, to reduce frictions, to create synergies and to build resilience (see Box 3.8).



 Box 3.8

Examples of tools produced by the Environment and Trade Hub



Environment
and Trade Hub

The Environment and Trade Hub of UN Environment is a capacity building mechanism that supports countries and stakeholders to make trade work for the environment. The Hub delivers advisory services, acts as a convenor and provides analysis, tools and methodologies to contribute to the environmental dimension of the 2030 Agenda.

Examples of tools produced include:

- A Sustainability Toolkit for Trade Negotiators: The Toolkit helps countries to draft and negotiate provisions in regional trade and investment agreements by providing principles, examples, resources and an analysis of good practices.
- A Green Industrial Policy and Trade Toolbox: This Toolbox helps policy makers and trade negotiators navigate the complex interface between green

industrial policy and trade. It provides an overview of trade-related green industrial policy instruments and clarifies their structure and operation, while outlining their implications with regard to trade policy.

- A Handbook on Trade and Green Economy: The Handbook gives a broad overview of the legal, economic and environmental developments that are shaping the future of trade.
- A Guide for the Assessment of the Costs and Benefits of Sustainability Certification: The Guide provides guidance on how to approach an assessment of the broader costs and benefits deriving from sustainability certification.
- Online and offline training courses on trade and the green economy.

Source: UN Environment.





The Environment and Trade Hub and other trade-related initiatives

UN Environment delivers its work on trade and environment-related challenges through a variety of programmes and initiatives, with the Environment and Trade Hub serving as the central coordinating mechanism. Launched on the sidelines of the 10th Ministerial Conference of the WTO in Nairobi, Kenya, the Hub works with public and private partners to offer tailor-made policy support around a number of key areas.

First, the Hub aims to improve stakeholders' knowledge at the interface of trade, natural resources and sustainable development. Secondly, it provides advisory services to policy makers, businesses and civil society groups on sustainable trade. Thirdly, it creates, incubates and scales-up innovative policy solutions and business models that facilitate sustainable trade. Finally, it raises awareness and improves mutual

understanding and cooperation between environment and trade communities. By acting as a convener and facilitator, the Environment and Trade Hub promotes national, regional and international cooperation between the environment and trade communities and shapes the global agenda at this interface.

These services are delivered through:

- technical training supporting international, regional and national design and implementation of sustainable trade policies
- assistance in designing trade and environment related agreements
- identification and dissemination of best practices
- support to stakeholder consultations and national, regional and international dialogues on advancing the sustainable trade agenda



 Box 3.9

In the spotlight – The Hub’s work with the Partnership for Action on Green Economy

The Partnership for Action on Green Economy (PAGE) brings together five UN agencies – UN Environment, International Labour Organization, UN Development Programme, UN Industrial Development Organization and UN Institute for Training and Research – to offer integrated and holistic support to countries in fostering an inclusive green economy, ensuring coherence and avoiding duplication.

PAGE seeks to put sustainability at the heart of economic policies and practices to advance the 2030 Agenda and supports nations and regions in reframing economic policies and practices, including trade

policy, to foster economic growth, create income and jobs, reduce poverty and inequality and strengthen the ecological foundations of their economies.

Through PAGE, UN Environment and its partners deliver coordinated efforts at the national, regional and global levels. Examples of country-level work include advisory projects in Mongolia, China, South Africa, Ghana, Peru and Burkina Faso. Global-level projects include e-learning courses and resources on trade and green industrial policy.

Source: UN Environment.



- targeted stakeholder training and awareness raising activities
- identification of sector- or region-specific sustainable production and trade opportunities
- opportunity assessments and research, and country action plans.

The Hub links its work on trade with expertise within UN Environment on pollution, climate change adaptation and mitigation, conflict and disaster, energy, ecosystems, the circular economy, chemicals and waste, technology, sustainable consumption and production and environmental law, among other areas. The aim is not only to ensure that environment and trade are mutually supportive, but to promote the use of trade as a vehicle to deliver on the environmental and resilience agenda. As such, the Environment and Trade Hub works with the Partnership for Action on Green Economy (see Box 3.9), the Green Growth Knowledge Platform, the International Resource Panel, the Green Fiscal Policy Network, the One Planet network and the Green Customs Initiative, among many other initiatives.

Employing a partnership-based approach, the Environment and Trade Hub also serves as a focal point and key partner to trade-related organizations such as the WTO, the International Trade Centre and the United Nations Conference on Trade and Development. It engages regularly with the WTO's Committee on Trade and Environment and broader WTO work on behalf of UN Environment. Capacity-building work under the Environment and Trade Hub links to and complements the UN Inter-Agency Cluster on Trade and Productive Capacity (comprising 15 international organizations) and the Enhanced Integrated Framework, the Aid for Trade initiative and other programmes (see page 64).

Environment and trade-related services are delivered in four inter-linked focus areas that all contribute towards the delivery of the SDGs: enhancing trade in environmentally sound technologies; shaping governance at the trade and environment nexus; green markets and global value chains; and reducing the footprint of trade.



Enhancing trade in environmentally sound technologies

The Environment and Trade Hub's first focus area is to enhance trade in environmentally sound technologies by supporting countries in assessing opportunities and challenges, removing trade barriers, creating enabling policy frameworks and connecting to regional and global value chains.

Examples include an analysis of South-South trade in selected renewable energy products, a scoping study on intra-ASEAN value chain cooperation and trade in energy efficiency and renewable energy technologies, capacity building activities to help less developed countries to better understand implications of the WTO's Environmental Goods Agreement, an assessment of cross-border trade in renewable energy (see Box 3.10) and an ongoing project to assist the ASEAN region and East African region in benefiting from trade in environmentally sound technologies.

The United Nations Environment Assembly, the world's highest-level decision-making body on the environment, which held its fourth session in December 2017, reinforced the Environment and Trade Hub's work on environmentally sound technologies (see Box 3.11). Leaders of government and business called for joint action to unlock trade in clean technologies, remove barriers and foster partnership. This call for action was reflected in the resolution "investing in innovative environmental solutions for accelerating the implementation of the Sustainable Development Goals", which highlighted the dissemination of environmentally sound technologies as key in the sustainable use of natural capital, in minimising pollution and in reversing ecosystem degradation.

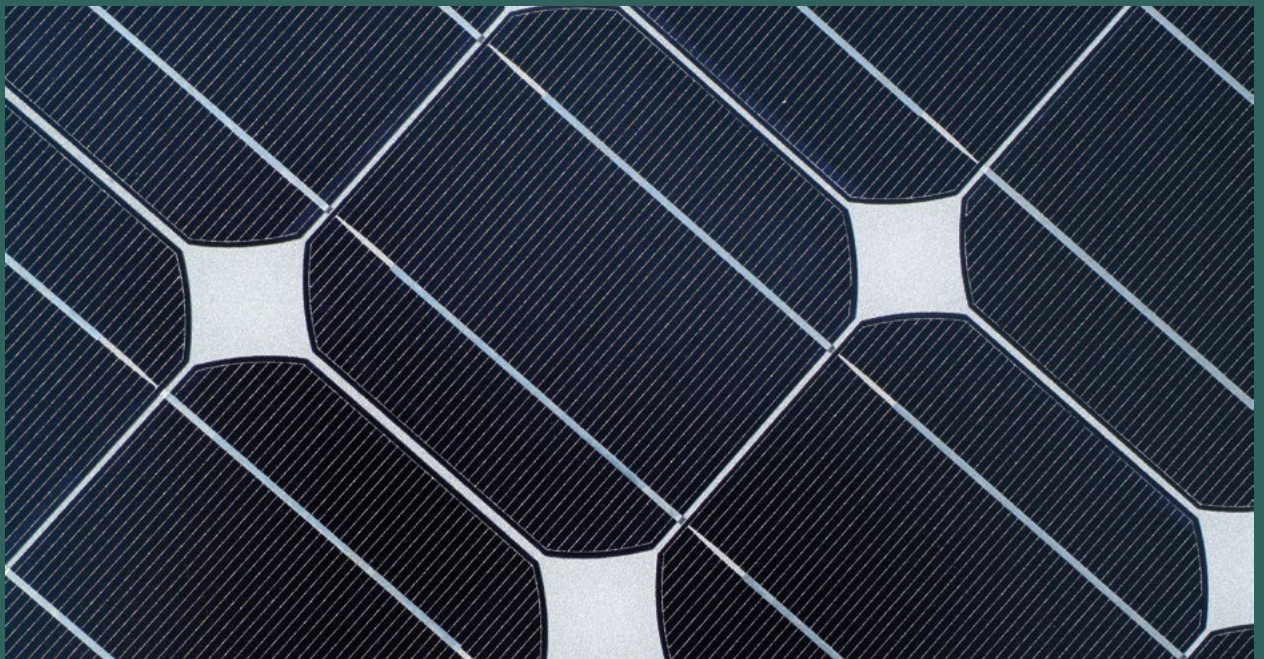
 Box 3.10

In the spotlight – Realizing Ghana’s solar-powered potential for cross-border power supply

UN Environment worked with the Energy Centre in Ghana to assess the technical and financial feasibility as well as the socioeconomic and environmental impacts of solar energy exports from Ghana. The resulting Ghana Solar Export Potential Study illustrated Ghana’s significant potential for solar-powered electricity and opportunities for pursuing electricity trade in the region. It found that a grid-connected 100 MW solar plant in Ghana could drive annual export of energy totalling US\$ 38 million, save 40,000 tonnes of CO₂ annual emissions, create 3,000 jobs and provide livelihoods for 23,000 of the poorest people.

On this basis, the Environment and Trade Hub facilitated the development of a strategy for selecting a solar-ready, cross-border grid line between Ghana and Burkina Faso, including an in-depth assessment of technical and financial requirements for installation. Expanding solar-powered energy in Ghana could provide a variety of social, economic and environmental benefits and increase the country’s resilience to the impact of climate change.

Source: UN Environment Green Economy and Trade Opportunities Project (GE-TOP).



Box 3.11

United Nations Environment Assembly – A focus on trade in environmentally sound technologies and innovation

The UN Environment Assembly, the world's highest-level decision-making body on the environment, has the universal membership of all 193 UN member states and the involvement of UN organizations, specialized agencies, inter-governmental organizations, civil society and the private sector. In bringing together these communities, the Assembly provides a platform for leadership on global environmental policy.

The third session of the UN Environment Assembly, held in Nairobi, Kenya, in December 2017, resulted in several commitments to end pollution of air, land,

waterways and oceans, and to safely manage chemicals and waste. It also featured discussions on how to confront pollution in its various forms. One of these discussions focused on the role of trade in disseminating clean technologies, including those needed to prevent, reduce, treat and control pollution.

Resolution 3/5 of the UN Environment Assembly highlights the role of trade and of technology development and transfer in innovative environmental solutions (UN Environment, 2018b). The Secretariat of the WTO participated in this discussion along with delegates from several countries.





Participants put forward several ideas on how to maximize the role of trade in scaling up clean technologies. These ideas included:

- establishing cross-ministerial committees or mechanisms on environment and trade at the national-level
- supporting emerging and developing economies with capacity building and knowledge transfer through targeted training on using trade policy instruments to support clean technology development
- improving skills development of the labour force in the clean technology value chain, including those working on testing, installation and maintenance
- cultivating new public-private partnerships to link trade policy makers with progressive companies and investors at the forefront of clean technology development
- endorsing and supporting pioneers and champions of clean technology development and pollution abatement
- leveraging private investment in clean technology development in developing economies and encouraging a long-term investment horizon at the policy level.

The fourth session of the UN Environment Assembly, which will take place from 11 to 15 March 2019 in Nairobi, will focus on “Innovative solutions for environmental challenges and sustainable consumption and production”. Innovative solutions, covering policies, financing, technologies, partnerships and multi-stakeholder processes, are key both to solving many environmental challenges as well as to accelerating sustainable development more broadly. The recognition of the need for transformative change to support Agenda 2030, highlighted in both the third and fourth sessions, directly underpins the choice by member states of the overarching theme for the fourth session of the Environment Assembly.

Source: UN Environment.

Increasing coherence between environmental and trade governance

The second focus area of the Environment and Trade Hub is to shape governance at the trade and environment nexus and create better coherence (see Box 3.12). The Hub advises and supports international rule-making to enhance environmental sustainability by improving coherence between international trade law and multilateral environmental agreements (MEAs) and promoting the design and adoption of environmental and sustainability provisions in trade agreements via targeted training and advisory services to trade and environment policy makers and negotiators. The Hub offers a plethora of resources and practical tools to improve mutual supportiveness of environment and trade policies and practices, including toolkits, handbooks and guidelines for trade and environment policy makers.

The Environment and Trade Hub liaises with and informs a variety of UN Environment-led programmes in this domain. For example, UN Environment's Regional Enforcement Network for Chemicals and Waste (REN) centres on the prevention and control of illegal transboundary movements of chemicals and wastes (see Box 3.13) and also engages in work related to four trade-relevant MEAs – the Montreal Protocol, the Basel Convention, the Rotterdam Convention and the Stockholm Convention.

REN aims to reduce illegal transboundary movement of harmful chemicals and hazardous waste by improving the capacity of frontline enforcement officials to combat illegal traffic of these substances and via enhanced cooperation at both the national and regional levels for effective enforcement of related MEAs.

An additional area of important work for UN Environment, including the Strategic



Box 3.12

Partnerships for trade in sustainable fisheries and implementing SDG 14 on healthy oceans

The Environment and Trade Hub works closely with the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Conference on Trade and Development (UNCTAD) in helping countries to reform environmentally harmful subsidies. Together, the three organizations issued a voluntary commitment at the Oceans Conference in 2017 to implement trade-related aspects of SDG 14 on

healthy oceans by 2020. This commitment includes building countries' capacity to better position themselves within relevant trade negotiations and to undertake internal policy and regulatory reform aligned with SDG 14 targets, including those related to certain forms of fisheries subsidies which contribute to overcapacity and overfishing.

Source: UN Environment.





Approach to International Chemicals Management (SAICM), is the reduction of exposure to lead, which currently causes brain damage to 600,000 children annually, for example, through exposure to leaded paints and toys in some countries. To put an end to this, UN Environment works with countries to create legislation on phasing out lead in paint.

SAICM works with the secretariats of the Basel, Rotterdam and Stockholm conventions in piloting capacity-building activities on environmentally sound management of waste lead acid batteries. Another specific initiative related to hazardous waste, the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE), was established at the eleventh meeting of the Conference of the Parties to the Basel Convention to prevent and combat illegal trade of hazardous waste.

UN Environment's OzonAction initiative strengthens the capacity of governments and industry in developing countries to elaborate and enforce the policies required to implement the Montreal Protocol – a landmark treaty designed to protect the ozone layer by phasing out nearly 100 industrial chemicals known as ozone-depleting substances – and to make informed decisions about alternative technologies. Its overall goal is to enable those countries to meet and sustain their compliance obligations under the treaty.

UN Environment has created an online information portal, InforMEA, for information on MEAs. Through this platform, stakeholders can consult treaty texts and provisions of decisions and resolutions adopted by the governing bodies of MEAs. A trade-related section in InforMEA is currently under discussion.

Box 3.13

In the spotlight – National capacity-building workshop in India on controlling illegal trade in chemicals and waste

UN Environment's Regional Enforcement Network for Chemicals and Waste (REN) leads workshops aimed at enhancing the capacity of national customs officers to control the illegal trade in chemicals and waste. For example, in India, customs officers were trained on the implementation of, and compliance with, the Basel, Rotterdam and Stockholm

conventions as well as other MEAs relating to the illegal trade in chemicals or ozone depleting substances and waste. India is considered to be a possible new destination for waste once a forthcoming Chinese import ban on certain types of waste enters into force.

Source: UN Environment.



The Green Customs Initiative forms an additional partnership of international organizations, including UN Environment, cooperating to prevent the illegal trade in environmentally sensitive commodities and substances, with an aim to facilitate legal trade. It strives to enhance the capacity of customs and other relevant border control officers to monitor and facilitate the legal trade and to detect and prevent illegal trade in environmentally sensitive commodities covered by trade-relevant MEAs and international conventions. The initiative provides opportunities for the coordinated development of tools and the delivery of training for customs and other border control officers through its umbrella partnership.

Promoting green markets

A third area of focus of the Environment and Trade Hub is promoting green markets and global value chains through trade, including via market-based tools such as sustainability standards. It helps countries to identify trade opportunities based on green policies and practices. With the “Green Economy and Trade Opportunities Project (GE-TOP)”, for example, the Hub worked on five national-level projects that identified and assessed concrete trade opportunities associated with the transition to a green economy at national

and sector-specific level in Chile, Ghana, Peru, South Africa and Viet Nam.

For example, in Peru, the project demonstrated that sustainability certification resulted in better market access and sales for native biodiversity-based products. Between 2009 and 2014, biotrade exports in Peru increased from US\$ 7.6 million to US\$ 58.8 million, illustrating the potential to improve economic and social conditions in the least developed regions of the country through access to green markets. In Viet Nam, the project showed that sustainability certification for shrimp increased a farmer’s profit margin up to 15 per cent due to increased export opportunities. These cases provide strong evidence that developing countries could harvest multiple gains from green trade.

Engaging at both the global and country-levels, the Hub also works with governments to seize opportunities to drive sustainability improvements in the value chain and to increase market access for producers, for example in diverse sectors such as cotton/textiles, organic agriculture, aquaculture and non-timber forestry products. Furthermore, the Environment and Trade Hub, on behalf of UN Environment, contributes to the United Nations Forum on Sustainability Standards (see Box 3.14).



 Box 3.14

United Nations Forum on Sustainability Standards (UNFSS)

UN Environment, along with four other UN agencies (UN Conference on Trade and Development, the Food and Agriculture Organization of the UN, the International Trade Centre and the UN Industrial Development Organization), is a partner of the United Nations Forum on Sustainability Standards (UNFSS).

The UNFSS is a platform for coordinated work on voluntary sustainability standards and aims to help producers, traders, consumers, standard-setters, certification bodies, non-governmental organizations and researchers convene and share best practices on topics relating to voluntary sustainability standards. These standards may be developed by single businesses, business associations, environmental or

social non-governmental organizations or governments. The UNFSS aims to influence decision makers at the intergovernmental level by providing impartial information, analysis and discussion on voluntary sustainability standards.

To date, the UNFSS has helped several developing countries, including Brazil, China and India, to develop multi-stakeholder platforms for voluntary sustainability standards. These national initiatives, created and shared by stakeholders under each country's designated coordinating body, reflect local priorities.

Source: UN Environment.





Reducing the footprint of trade

Finally, the Environment and Trade Hub aims to reduce the footprint of trade. Trade, while offering enormous opportunities for environmental sustainability, can also contribute to environmental harm and increased greenhouse gas emissions throughout the value chain, including via extraction, transport and waste.

Transport drives economic activity and is fundamental to a country's welfare but the sector has significant impacts on the environment and health. Transport activity is increasing around the world as economies – and trade – grow, which means that the sector's emissions are also on the rise, largely because 95 per cent of the world's transport energy still comes from fossil fuels.

UN Environment strives to decouple increased mobility and increased emissions by working with governments, industry and civil society to promote cleaner fuels and vehicles. It also intends to improve air quality in coastal cities by reducing emissions from ports and maritime sources, including ships, harbour craft and cargo-handling equipment. In this regard, UN Environment ultimately aims to reduce the environmental footprint of trade-related economic growth by way of greener modes of transport and sustainable management of trade in natural resources.

UN Environment also engages in mapping trade flows of certain natural resources such as mercury. As a globally traded commodity, mercury has come under increased scrutiny due to its harmful impact on health and the environment. Under the newly concluded Minamata Convention on Mercury,

signatories are required to control trade in mercury – for example, through export restrictions. A 2017 UN Environment report mapped out global supply, trade and demand of mercury to assist the implementation of the Minamata Convention.

Additional activities within this focal area centre on trade's role in promoting a circular economy (see also Box 1.2 in chapter 1). At present, countries' economies continue to be mostly linear, which is inherently unsustainable, contributing to an ever-growing environmental footprint. Of the estimated 90 billion tonnes of resources used in 2017, more than 50 per cent was dispersed or emitted as waste and less than

10 per cent was recycled into the economy the following year. A circular economy can promote the recycling, re-use and recovery industry, for example, as seen in the use of recycled products within car manufacturing, a globally relevant industry for trade.

Many companies, countries and regions have started to adopt circular economy models. Supporting these issues is at the core of promoting a shift to a more sustainable trading system and fostering sustainable consumption and production patterns. In doing so, UN Environment aims to stimulate public-private sector engagement and to strengthen the scientific basis for policy decisions.



Chapter 4

Building partnerships for trade, environment and prosperity

The world today is more interconnected than ever before. The sheer scale and scope of global value chains have created a new landscape for business and trade, influencing how and where goods and services are produced and consumed. Countries are much more linked to one another and developing countries are playing an increasing role in international trade. In parallel, the frequency and intensity of climate change and climate-related natural disasters has intensified, at times causing disruptions to production networks.

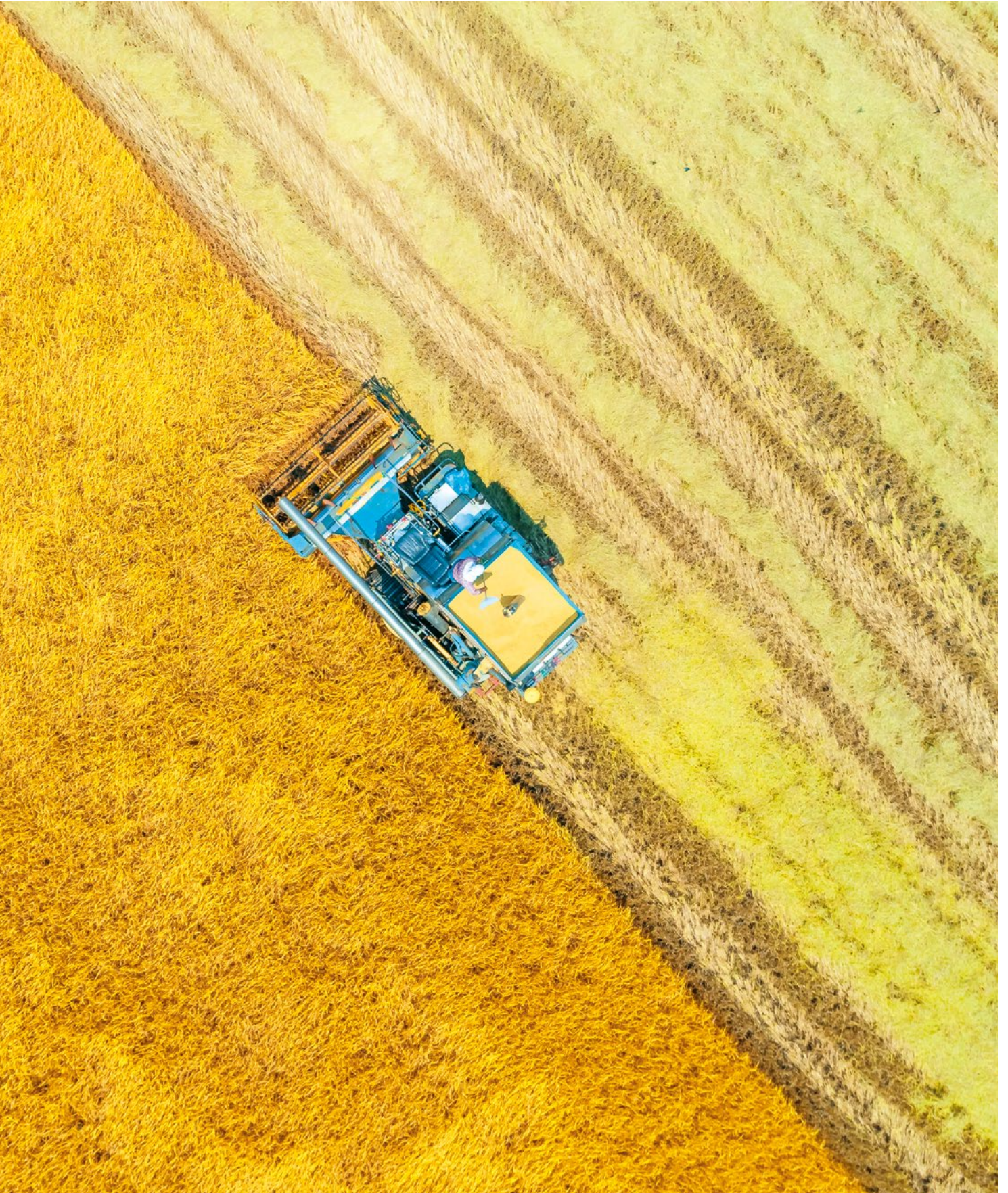
Meanwhile, the private sector is tapping into new environmental business opportunities and developing clean technologies as a source of innovation and competitiveness. Technological advances are driving the “Fourth Industrial Revolution” that is not only reshaping the world economy but also people’s daily lives. New business models, such as the sharing economy – a model that focuses on the sharing of under-utilized assets in ways that improve efficiency, sustainability and community – and e-commerce offer

new opportunities yet also pose challenges to the systems that govern them. Many of these trends and changes have important impacts on, and implications for, trade and the environment.

How could emerging technologies, such as 3-D printers, Blockchain technology, artificial intelligence and advanced data analytics affect the role of trade in helping to achieve environmental sustainability? How can new models, such as the circular or sharing economy, affect resource efficiency and trade? What kind of trading system and environmental governance is needed in response to these developments? Are current systems fit for purpose?

Such developments also pose new questions about the incentives, policy frameworks and governance mechanisms that will be needed to create a future that is resilient, sustainable and inclusive. Answering these questions will challenge all stakeholders to work across sectors and disciplines, and to forge new partnerships.





Rethinking global approaches

The changing landscape on global trade and the environment adds a new dimension to historical challenges and requires new thinking on global and national governance mechanisms. The landmark agreements on sustainable development reached in 2015 – the Paris Agreement, the 2030 Agenda for Sustainable Development, the Addis Ababa Action Agenda and the Sendai Framework for Disaster Risk Reduction – have demonstrated that open and transparent discussions involving all stakeholders can achieve ambitious global multilateral agreements. Such collaborative efforts have proven to be effective in setting out ambitious and wide-ranging global goals.

It has become clear that deeper and more effective cooperation is needed to maximize the contribution of trade in building a more sustainable, resilient and inclusive world economy. SDG 17 calls for global partnerships and cooperation for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources to support the achievement of the SDGs in all countries, particularly those less developed. This means that governments, the private sector, civil society and intergovernmental organizations must pull in the same direction to tap into the numerous trade opportunities that can improve countries' economies and environments in tandem.





Plastic pollution

Trade policies can support government incentives for the cleaner production of biodegradable materials and their global diffusion.

Meanwhile trade linkages run through nearly all the SDGs, in direct and indirect ways. If properly supported, trade can serve as a lever to address some of the world’s most pressing environmental issues – for example, building climate adaptation technology which aims to lower the risks posed by climatic changes, or fighting against marine plastics, a key UN Environment priority at the global level. Trade policy can support frameworks for governments to create incentives for cleaner production of biodegradable materials and their global diffusion, which can in turn help replace conventional plastics and reduce the scale of marine litter. At the same time, environmental policy measures, such as the ban of single-use plastics, also have an impact on trade flows.

Despite progress in some areas, significant political tensions, coupled with fundamental economic changes dominated by automation and new technologies, have challenged the global trading system and its role as a force for growth, development, sustainability and

resilience to environmental risks. It is therefore of vital importance for global governance to respond to the real drivers of change today to ensure that trade and the trading system are well positioned to advance the environmental agenda.

Innovative partnerships for the future

When accompanied by the right policies, trade can be a powerful tool for building prosperous, sustainable and resilient economies around the world. This, in turn, requires trade and environment policy makers to spearhead new approaches and to work together and in cooperation with other policy makers and all relevant stakeholders in the same spirit of cooperation that made possible recent historic achievements such as the Paris Agreement.

To maximize the contribution of trade to a better and more resilient environment, the WTO and UN Environment need to foster concerted action in the following areas:



1. **Collaborative work focusing on strengthening multilateral cooperation and governance.** This requires broader efforts to tackle environmental problems, not least transboundary and global commons problems that are beyond the control of any one country. Strengthening multilateral cooperation to achieve resource efficiency and resilience to climate change and other environmental challenges will help trade to contribute to innovative technological solutions to overcome environmental challenges. Trade's role in allocating resources efficiently will also help to create new opportunities for exports and jobs.
2. **Fostering private-public partnerships to facilitate market-oriented approaches that allow trade and environment to be mutually supportive.** The public sector needs to establish supportive policy frameworks that will allow private sector opportunities to flourish. Such partnerships can highlight good practices and bring to the fore sustainable business champions, including small and medium-sized enterprises. This will allow the public sector to better understand the needs of the private sector and will encourage businesses to replicate successful practices.
3. **Encouraging national policy makers to work together across environment and trade domains.** Environmental considerations need to feature more

prominently in trade policy making, while trade needs to be considered to a greater extent within the development of environmental policies and compliance with environmental obligations.

4. **Fostering “win-win” opportunities which provide economic and environmental benefits.** Closer cooperation is needed between environment and trade ministries in broad consultation with a variety of stakeholders, including environmental groups. Encouraging joint planning and cooperation at the national level will allow for more cohesive policy development and implementation.
5. **Supporting decision-makers from the world's poorest countries, along with vulnerable groups and under-represented communities, in preserving natural assets.** Efforts need to be made towards overcoming the obstacles that prevent less developed countries from fully using trade as a tool to achieve prosperity, sustainability and resilience to natural disasters. Realizing this goal requires improved efforts to strengthen the capacity of these countries to identify and seize trade opportunities. This can involve training on how to take advantage of new sustainable business opportunities, on implementing international commitments, and on designing and enforcing sound environmental policies.

6. Delivering inclusive, gender-sensitive, outcomes for environmental and trade policy to support broader goals within the 2030 Agenda.

Trade and environmental policies can often affect men and women differently, due to their differing economic and social roles and access to resources. Coordinated trade and environmental policy should strive to promote gender equality across global value chains and among stakeholder groups and be aligned with SDG 5 on gender equality.

7. Raising awareness among stakeholders on the role of trade in environmental sustainability and resilience to climate change.

Challenges of global scale require solutions of the same calibre. Broad engagement will be needed from civil

society across the globe. Raising awareness can help to shape mindsets, shift consumption patterns, influence trade flows and lead to greater international cooperation on trade and environment.

Leading by example: the WTO and UN Environment working in partnership

Delivering on the actions listed above will require leadership by governments and the private sector as well as close collaboration between the WTO and UN Environment to combine expertise and know-how. Such cooperation serves as a catalyst for broader and deeper forms of collaboration among diverse stakeholders, building on a solid foundation of joint activities between the two institutions (see Box 4.1).



 Box 4.1

WTO-UN Environment collaboration

UN Environment and the WTO have a rich history of cooperation, having collaborated across many areas over the past two decades, including on fisheries subsidies and climate change.

Fisheries subsidies

UN Environment has been instrumental in drawing international attention to the damaging effect of fisheries subsidies since the 1990s. It plays an important role in fostering a dialogue between trade, environment and fisheries officials around the world. Its analysis has focused on how the use of certain forms of subsidies may not only distort trade, but may also result in the unsustainable exploitation of marine resources.

UN Environment has offered concrete solutions related to topics such as special and differential treatment, artisanal fisheries and fisheries access agreements. Current work, which is conducted in close collaboration with UNCTAD and FAO, informs subsidies negotiations and discussions in the WTO.

Report on trade and climate change

The WTO and UN Environment published a joint ground-breaking study on trade and climate change in 2009, at a time when the links between trade and climate change were poorly understood. The report examined the intersection of trade and climate change from four perspectives: the science of climate change; economics; multilateral efforts to tackle climate change; and national climate change policies and their effect on trade.

The report provided evidence that more open trade, along with actions to combat climate change, can catalyse global innovation, including new products and processes that can stimulate new clean tech businesses. It

demonstrated that opening up trade and combating climate change can be mutually supportive in realizing a low carbon economy. The report concluded that there is scope under WTO rules to tackle climate change at the national level. It further highlighted that the relevance of WTO rules to climate change mitigation policies as well as the implications for trade and the environmental effectiveness of these measures largely depend on how these policies are designed and the specific conditions for implementing them.

Dialogue on healthy environments through trade

Building on earlier cooperation, and in response to a changing landscape, the Executive Director of UN Environment, Erik Solheim, and the Director-General of the WTO, Roberto Azevêdo, announced at the World Economic Forum in Davos, Switzerland, in early 2018 their commitment to intensify collaboration between the two organizations. Under the theme of "Healthier Environments through Trade", they launched a joint initiative to promote greater dialogue and cooperation among diverse stakeholders on innovative ways of using trade to simultaneously strengthen the global economy and the environment.

The aim is to provide a platform for interested stakeholders from all sectors of society to exchange ideas, highlight successful experiences and improve understanding of the interface between trade, environment and resilience to environmental risks among governments, the private sector, civil society and non-governmental and international organizations.

Sources: WTO and UN Environment (2009) and Moltke (2011).

Many of the topics discussed in this publication, including the reform of fisheries subsidies, trade opening in environmental goods and services, resilience to environmental risks and hazard events and improved coherence between trade rules and MEAs are at the heart of the collaboration between the WTO and UN Environment. The two organizations seek to work together to identify, address and promote areas where there are clear win-win opportunities.

Leading by example, UN Environment and the WTO aim to inspire and support countries around the world to identify opportunities to make better use of trade as a tool for prosperity, resilience and environmental sustainability, and to explore practical ways to turn them into reality.

As part of their collaboration, UN Environment and the WTO intend to undertake research and analysis on cross-

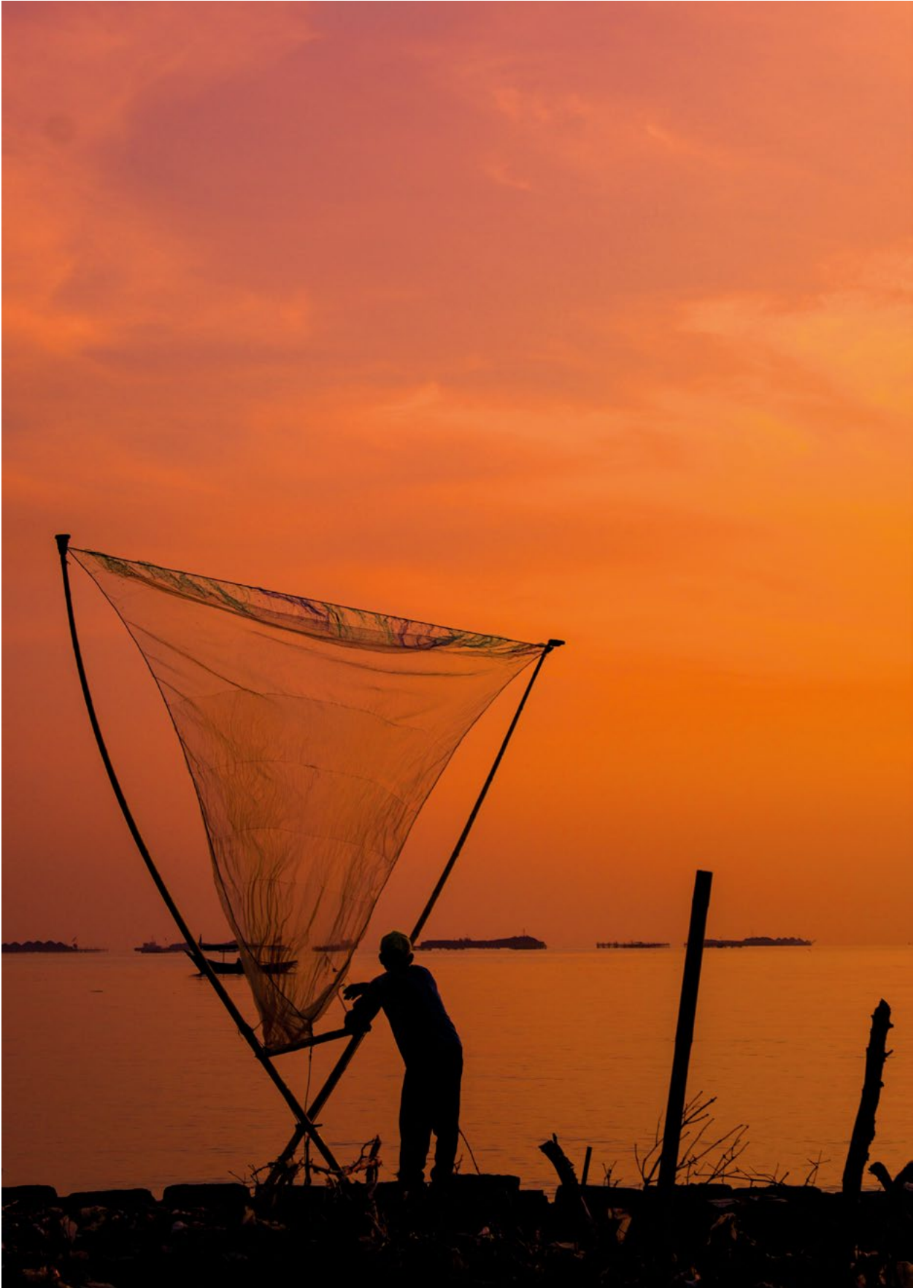
cutting issues of mutual importance. The two organizations also aim to provide technical assistance to government officials of developing countries, share expertise, host joint dialogues, participate in relevant fora and exchange information and inputs, where relevant, on each other's activities.

The UN Environment-WTO collaboration aims to bridge silos by identifying synergies and complementarities between the two organizations' areas of work and to facilitate and promote the creation of new partnerships. By bringing the environment and trade communities together at all levels – globally, regionally and nationally – along with the private sector and civil society, new and fit-for-purpose partnerships can foster interdisciplinary perspectives, lead to innovative actions and mutually supportive solutions and bring enhanced collaboration on trade and the environment – a key step towards achieving the 2030 Agenda.



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Making trade work for the environment, prosperity and resilience

International trade offers unique opportunities to help tackle mounting environmental challenges while fostering economic and social prosperity. Open, predictable and equitable trade relations among countries can accelerate the worldwide diffusion of environmentally sound technological solutions and facilitate the creation and expansion of markets for sustainable products. Moreover, with the growing impacts of climate change and resource scarcity – felt in varying magnitudes across different parts of the world – trade has an important role to play in strengthening environmental resilience.

This co-publication by the WTO and UN Environment looks at the interplay between trade and the environment and identifies ways to ensure that trade and a healthy environment reinforce each other. It highlights the need for coordinated action, along with fit-for-purpose policies and institutions, to expand the contribution of trade for a better and more resilient environment. It illustrates how the WTO and UN Environment are working together to support countries in identifying opportunities to use trade proactively to promote sustainability and prosperity, and to strengthen international co-operation to deliver benefits for all.



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