HOW

to support eco – innovation
in trade policy and international
trade regimes?

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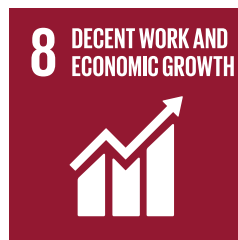This document has been published in a recycled paper

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Outlook 3

How to support eco-innovation in trade policy and in international trade regimes?

By Serdar Türkeli and René Kemp, UNU-MERIT [1]

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

17 PARTNERSHIPS FOR THE GOALS

Trade policy interacts with other policies. To design and implementa trade policy supporting eco-innovations, its vision and targets should be consistent and coherent with other policies such as environmental policy, energy policy, eco-innovation policy, industrial policy or IPR policy.

Supporting eco-innovation through trade policy in accordance with international trade regimes requires strategic intelligence relating to the identification of policy and technology options. A national governance mechanism is needed to bring forth strategic intelligence and to make use of it.

Assessing national and sub-national eco-innovation needs should be done with relevant actors from global and local value chains under a green transition of industrial policy, which monitors and evaluates the progress relating to greenness of both import and export policy, and assesses the impact of eco-innovations traded (imported/exported) in reaching the policy targets (environmental, economic, societal) with trade sustainability impact assessments.

The national governance mechanism should have a capacity-enhancing component. This involves a capacity for dealing with interests (domestically and internationally). This holds especially true for developing countries.

The UN SDGs, UNFCCC and Paris agreements offer opportunities for technology transfer (imports and exports) and for climate finance. It is proposed that trade policy takes account of those frameworks and is involved in negotiation processes on the classification of environmental goods and services and policy mechanisms.

Developing countries and least developed countries should scan existing and emerging learning networks to participate inand develop human capital, institutional capacity. Institutional capacities are crucial for the utilisation of technological capabilities through trade policies and beyond.

Developing negotiation capabilities in the scope of environmental goods and services lists in international trade regimes, whether it is World Trade Organisation (WTO), a global regime, Preferential Trade Agreements (PTAs), free trade agreements (FTAs), or regional trade agreements (RTAs) is always a supplementary option (additional to the above points).

Setting up international cooperation especially at major world regions level where contextual barriers and drivers are similar for eco-innovation and trade should complement the efforts in trying to absorb advance knowledge and technology from the North via FDI , transfer of IPRs and adaptation.

Setting up green trade missions are especially relevant for developed countries of the Global North.

1 INTRODUCTION

Adoption and diffusion of eco-innovations among countries, major world regions, and around the world is essential for reducing the ongoing detrimental dependencies on resource and energy use, and carbon emissions that continue critically endangering societal and ecological well-being. International trade barriers pose an immediate operational challenge at border customs for efficient and effective spread of eco-innovations across the globe.

These barriers are justified on the grounds of national interests, yet whether these barriers are actually derived through data and evidence-based strategic intelligence or set as blind-and-blanket trade policy measures is still questionable. Reviewing and revising the given support to eco-innovation in trade policy and in international trade regimes are relevant activities to achieve sustainable development goals, especially for the realization of much-needed sustainability transitions to help support sustainability of the development worldwide from a mission-oriented policy point of view; and this activity in itself poses a governance challenge. To this end, to **alleviate barriers** and enhance drivers for eco-innovations in trade policy and in international trade regimes, activation of a certain degree of strategic intelligence is needed. This strategic intelligence requires data, information and evidence for trade policy, as well as technology needs assessments and foresights; therefore it also requires participation of different actors into an effective governance mechanism to be able to design and implement better national trade (export/import) policies that are coherent and coordinated with other policies and engage into better negotiations of **revision proposals regarding to the scope of environmental goods and services lists used in international trade regimes. This activity forms the starting point of supporting eco-innovations in trade.**

The governance mechanism involves consultations of a range of experts, relevant international organisations, national environmental agencies, industry and NGOs. Determining and negotiating the scope of environmental goods and services list

is the key starting point activity to support eco-innovations in trade policy and in international regimes. **Environmental Goods Agreement (EGA) of the EU consists of 165 green goods and takes the Asia-Pacific Economic Cooperation (APEC) APEC-54 list as a starting point.** Yet actors provide guidance on which additional environmental products should be the international agreements' focus based on national or European and environmental interests. In the process, customs officials are also involved to ensure that the environmental products are clearly defined, and differentiated from other products in the customs nomenclature, and these participatory processes contribute into enhancing strategic intelligence.

The focus of this Policy Outlook **is how to support eco-innovation in trade policy and international trade regimes,** and the key message is the activation of strategic intelligence (data, information and evidence-based, mission-compatible policies informed with technology needs assessments and foresights etc.) within an effective governance mechanism which operates in a sustained way. The cases analysed are the **EU's EC Trade Environmental Goods Agreement, WTO's Green Economy and Trade Measures, Asia Pacific Economic Cooperation (APEC)'s Environmental Goods List in comparison, Natural Capital Netherlands Programme, Bangladesh's from waste to wealth activities, Rwanda's business and public awareness actions, EU-ASEAN COGEN Programme and activities of Full Advantage Ltd. Co, and UNEP's Trade and Environment Hub.**
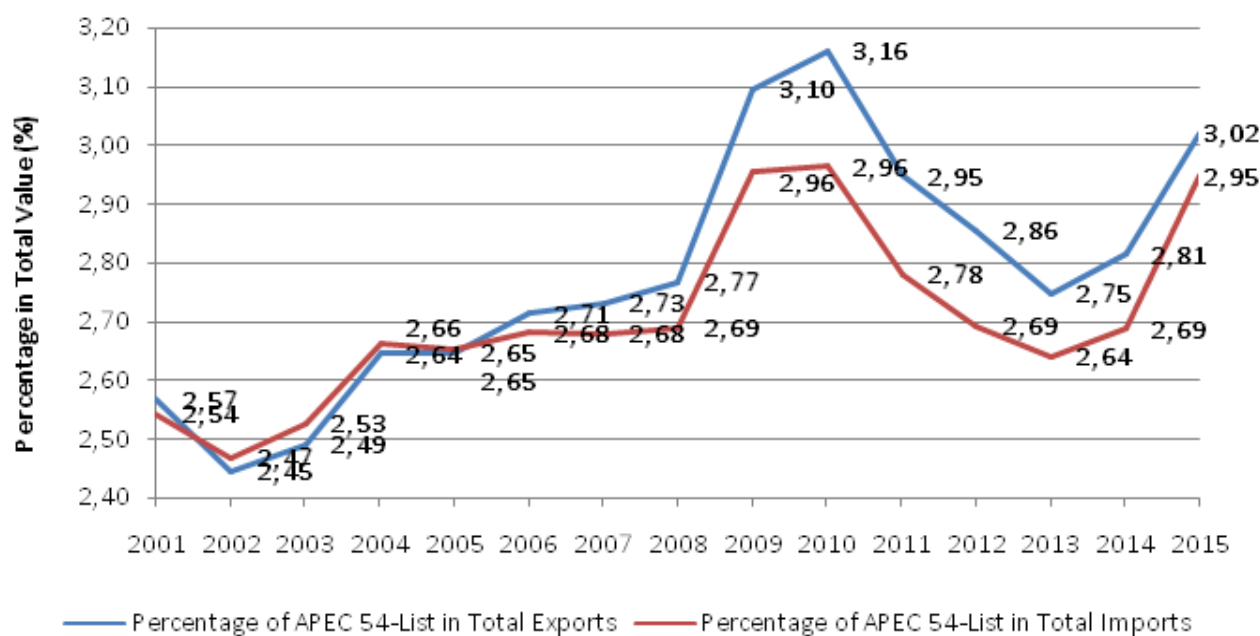
2 SUSTAINABILITY CHALLENGE

Adoption and diffusion of eco-innovations by means of international trade is key to meeting sustainability challenges. In this Policy Outlook we discuss national trade policy and international trade regimes **to foster wider adoption and dissemination of innovative sustainable technologies, environmental goods (EGs) and services (EGSs),** which may come under different names in different contexts and regions of the world, such as eco-innovations, low-carbon innovations, green innovations, clean-tech innovations, environmentally-sound innovations etc. We argue that expanding possibilities for sustainable development depends on designing and implementing better trade policies through an effective governance mechanism which builds and utilizes capabilities for policy making and policy adjustment thanks to evidence-based research on eco-innovation barriers and opportunities which is discussed with stakeholders. Trade policy should build on this process, instead of being developed independently of it.

For context, Figure 1 below demonstrates the share of EGs in total value of international trade (exports and imports), which is low. The share of export of environmental goods which could bring environmental benefits in contrast to goods with high ecological footprints, in the last 15 years, increased only from 2.57% to 3.02% of all exports value, and the share of EGs imports increased from 2.54% to 2.95% of all imports value.

Figure 1. - The low share of EGs exports and imports in total exports and imports value (2001-2015)

Sustainability challenge

Table 1- UN SDGs, Challenges related to trade, Innovations for Sustainability

SDGs	Sustainability challenges related to existing trade patterns	Innovation for Sustainability (mission-oriented)
SDG 2 on hunger, food security, nutrition and sustainable agriculture	Inefficient and costly production or trade of agricultural commodities. Ending trade restrictions and distortions in world agricultural markets	Introducing policies and technologies to create a more open, transparent and well-functioning global agricultural market and sustainable agriculture to end hunger, achieve food security and improved nutrition.
SDG 3 on healthy lives and wellbeing	Substantially reducing the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination by 2030, and the trade of hazardous chemicals, air, water and soil polluting goods.	Monitoring and evaluating policies and introducing innovative technologies against hazardous chemicals and air, water, soil pollution and contamination.
SDG 7 on affordable and clean energy	Reliance on fossil fuels, and the increase of greenhouse gas emissions , trade of fossil fuels for energy security	Introducing policies and technologies by international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology.
SDG 8 on economic growth, employment and work	The integration of developing countries into regional and global markets	Increasing Aid for Trade support for developing countries, in particular the least-developed countries (LDCs).
SDG 10 on inequalities within and among countries	The integration of developing countries into regional and global markets	Implementing the principle of special and differential treatment for developing countries, in particular LDCs.
SDG 14 on oceans, seas, and marine resources	Problems of overcapacity and overfishing in fisheries fleets, introducing prohibition on "certain forms of fisheries subsidies that contribute to overcapacity and overfishing, and to eliminate subsidies that contribute to illegal, unreported and unregulated fishing" by 2020, and their trade	Introducing policies and technologies for conservation and sustainable use of the oceans, seas and marine resources
SDG 17 on strengthening the global partnership for sustainable development	The integration of developing countries into regional and global markets	Introducing policies and technologies to increase significantly the exports of developing countries, in particular with a view to doubling the LDC share of global exports by 2020. Realizing timely implementation of duty-free and quota-free market access on a lasting basis for all LDCs. Ensuring that preferential rules of origin applicable to imports from LDCs are transparent and simple, and contribute to facilitating market access.

Source: Authors´compilation from WTO, source: https:∕∕www.wto.org/english/thewto_e/coher_e/sdgs_e/sdgs_e.htm

Among countries or world regions, the **trade policy** comprises rules, regulations, standards and goals that pertain to trade relations. Trade policy thus has an impact on the dynamics (direction, rate and speed) of adoption and diffusion of eco-innovations. It includes national trade policy, and bilateral (between two countries) agreements, or multi-lateral agreements, such as regional trade agreements (RTAs), free and preferential trade agreements (PTAs) and participation into international trade regimes, formerly the General Agreement on Tariffs and Trade (GATT) and now the WTO[2]. The national trade policy deals with protecting the interests of a country's trade and citizens. Trade policy should be also in accord with the national foreign policies and industrial policies, both of which play a strong role in shaping national trade policy[3, 4].

International trade regimes on the other hand are defined by international economic organizations. The most prominent organizations are the World Bank, the International Monetary Fund (IMF), and the World Trade Organization (WTO)[5]. **Under their charter, these organizations support trade openness, and they are expected to reflect the interests of their member countries via negotiations with these members whether they are among high, medium or low-income countries.** These negotiations require certain degree of strategic intelligence at the members' side. Technology assessment, foresight, evaluation and benchmarking are tools or sources of strategic intelligence (Smits and Kuhlmann, 2004). We can include impact assessments into this list.

In this setting, the initial challenge is **the potential mismatch between national trade policy and the international trade regime.** International organizations in general support free trade policies and open market economy[5], yet a country's national trade policy **includes activities such as inspection regulations** (to ensure that the imported product conform to the set safety and quality standards), tariffs and duties (imposed taxes on imported and exported goods). Trade is also affected by trade policy measures such as: (ordinary) customs tariffs; non-tariff measures (NTMs) (e.g. Import licenses,

Import quotas, Export licenses, Voluntary Export Restraints, (Export) Subsidies, Local content requirements, Embargoes, Currency devaluation). All measures are known to have an economic effect on international trade of goods, changing quantities traded, prices or both.

These barriers to trade typically have an economic purpose[6], for instance, levying high tariffs on imported goods aims to protect local industries. Many of developing countries (low or middle-income countries) prefer partially shielded trade practices to protect their local industries (WTO, 1996; Milner, 2012). With high level of import taxes, these countries inflate the prices of imported goods in local markets, ensuring that local products are in a relatively advantageous position. Similarly, export schemes seek to strength the competitiveness of local producers. **However, applying tariffs or non-tariff barriers to certain goods needs to be grounded in data and evidence-based trade policy, a strategic intelligence, coherent with industrial and (eco-) innovation policies and plans, in order to secure the best interests of the country and its citizens,** by avoiding inefficient and ineffective allocation of public resources. Even in the context of least developed countries(LDCs), according to UNEP, "carefully articulated national policies and international trade rules are critical for LDCs to seize opportunities in new markets while minimizing risks of trade protectionism" (UNEP, 2011).

In short, a root cause of the problem of international trade being so dominated by non-green productsis **the lack of appropriate national governance mechanisms, preventing the creation and utilisation of strategic intelligence (data, information, knowledge, expertise etc.) about eco-innovations and trade. The absence of a solid evidence-base for policies for trade and eco-innovation, makes policy prone to failures in the form of inefficient and ineffective policies based on assumptions.** The lack of more open trade in environmental goods and services makes green solutions expensive and less accessible to producers and consumers around the world, increases the cost of attaining key environmental protection goals in both developing

and developed countries, for instance targeted trade openness can facilitate consumer access to clean technologies at lower costs whereas "LDCs appear to have relatively high tariffs on certain environmentally-friendly products such as energy efficient electric and electronic appliances" (UNEP (2011). Eliminating unfounded tariffs or non-tariff trade barriers is expected to help level the playing field for green manufacturers and workers for it helps support green jobs.

Supporting eco-innovation in trade policy and international trade regimes is **a major governance challenge requiring strategic intelligence, for all countries[7].** The central role that the trade plays in the diffusion of green goods, services and production methods among countries poses challenges to the current functioning of the multilateral trading system which must be effectively addressed by data, information, knowledge and evidence-based, mission-oriented, strategic intelligence interactions between national trade policy and bilateral trade agreements, world regional/international trade regimes. These interactions are central to **help disseminate eco-innovations, environmental goods and services, green knowledge among countries and world regions.** Therefore clearly identifying specific needs, barriers, and adapted solutions are fundamental prerequisites to fostering the development and transfer of technologies, also in LDCs (UNEP, 2011). Key way to achieve this is to institute a **systemic strategic intelligence mechanisms** with the relevant actors, which we elaborate in Section 2 (policy) and in Section 3 (stakeholders).Recent research has also revealed the systemic nature of certain eco-innovation. Systemic thinking concretely places at the heart of the reasoning inter-firm, inter-sectors and geographically related links and spillovers, compensating for the lack of internal economies of scale of eco-innovators, particularly SMEs ones (Mazzanti and Zoboli, 2009).

The challenge is to gather strategic intelligence through which a country can effectively:

▪ Assess its technology needs, thus decide on which environmental goods and services are better be imported without or with low levels of trade barriers.

▪ Conduct foresights, thus plan on which environmental goods and services could bring export competitiveness, in line with the country's industrial, eco-innovation policy.

▪ Perform evaluations, thus, participate into international cooperation where similar contextual drivers and barriers are shared (e.g. South-South cooperation).

▪ Better negotiate the scope of environmental goods and services lists from its own evidence-based perspective, and in line with its foreign policy.

▪ Exercise benchmarking, thus compare and contrast its green trade performance with other countries.

▪ Assess impacts, thus measure progress in UN SDGs-related, mission-oriented trade policy, other than applying blind and blanket tariff or non-tariff trade barriers that might not protect the interests of the country, of its institutions, organizations, firms, and its citizens, as well as its nature, natural capital (See Box 2 and Box 4).

3 ECO-INNOVATION TRADE POLICY

3.1. Policy opportunity and discussions

Expanding global market access abroad for green products or eco-innovations would require acceding to WTO, and being able to negotiate for certain environmental goods and services on the basis of strategic intelligencederived from effective governance components such as consultations, technology needs assessments, trade sustainability impact assessments and technology foresights. That capability and capacity[8] for doing this would also be beneficial for negotiating market access under regional trade agreements (RTAs) and/or bilateral free trade agreements (FTAs) with potential and actual partners, if not in a global international trade regime such as WTO.

According to UNEP (2011) international economic and environmental agreements must provide developing countries with sufficient policy space and flexibilities on sequencing and implementation of any rules or modalities that are adopted. In this outlook we argue that creating supporting services for instituting sustainability-oriented trade policies in LDCs and for international trade negotiations would be beneficial. In terms of sequencing, unilateral measures can be taken to expand the domestic markets for green products as a reciprocal measure (See Figure 2). To capture opportunities, green import and export policy require three main building blocks (See Figure 2):

▪ Negotiate and expand market access abroad for green products (Developing countries).

▪ Expand overseas demand for green products and services (relevant countries include LDCs), and

▪ Strengthen supply capabilities in global value chains, demand profiles and institutional capacities at home for green products and services (also includes LDCs).

Figure 2 - Sustainable (Green Import and Green Export) Trade policy for developing countries
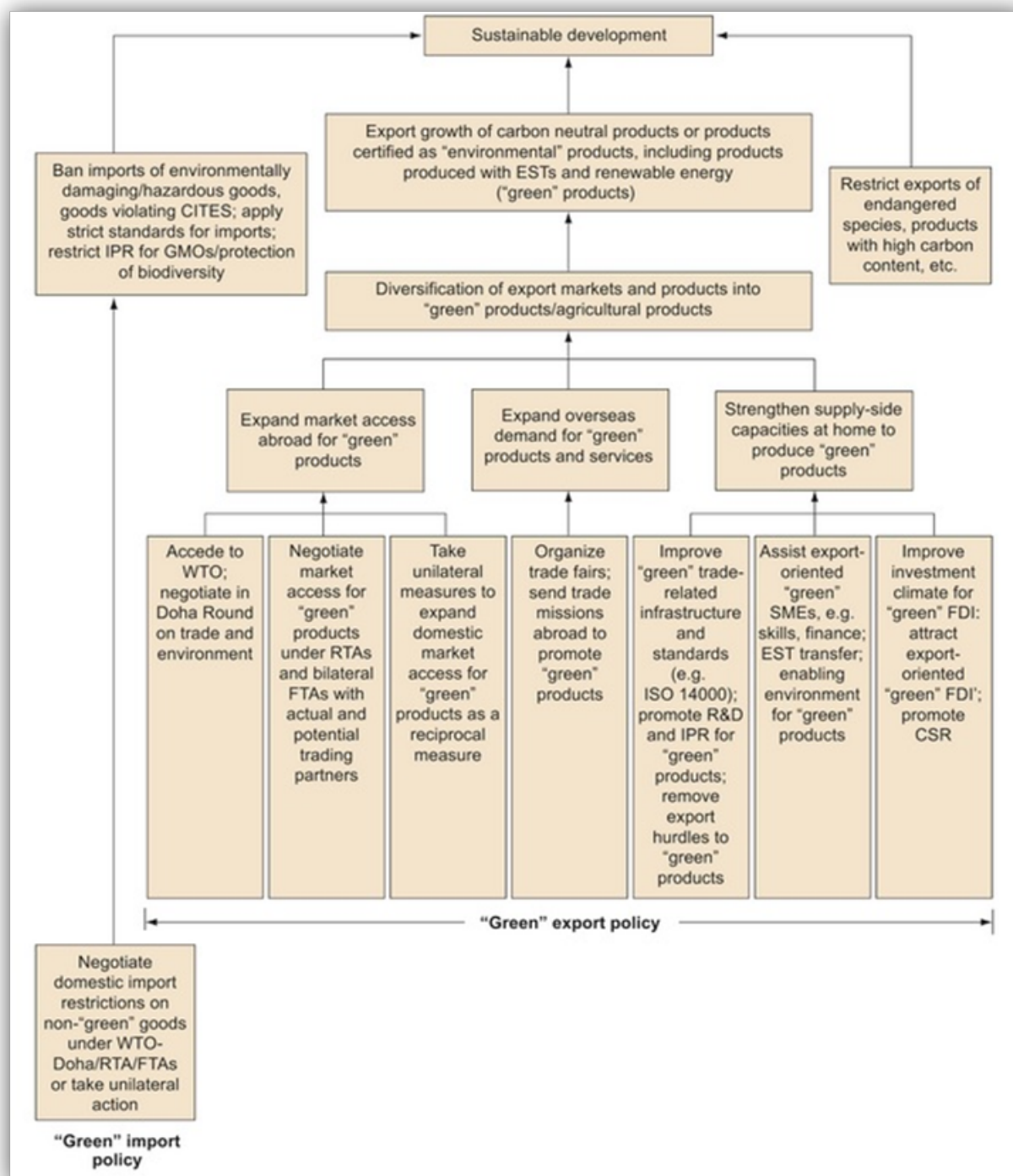
Source: UN ESCAP (2009) Asia-Pacific Trade and Investment Report 2009: Trade-led Recovery and Beyond

This is done by increasing opportunities, and diversification of export markets,green goods and services. It may lead into an export growth of low-carbon or carbon-neutral products or products certified as environmental products (standards and certification, greening global supply chains, as related opportunities) including products produced with environmentally sound technologies (ESTs), and renewable energy (Figure 2).

Box 1.1 – Internationalisation of Bangladesh's "from waste to wealth" / Policy

While Bangladesh has relatively strong environmental and natural resource management policies and regulations, according to World Bank (2016), there remains a need for integrating environmental protection and management into national planning and strengthening environmental institutions, especially to respond to the Bangladesh's rapid urbanization, industrialization, and growing pollution. Benefitting from this policy and regulation infrastructure in Bangladesh, within the infrastructure services sector, green business opportunities can be found, especially in solid waste management and recycling in urban areas. As with renewable energy, these projects draw on locally available materials and local knowledge and contribute to local job creation and income multiplying effects (UNEP, 2011). A company called Waste Concern, founded in 1995, turned environmental crisis into a green business opportunity by collecting and recycling organic waste in Dhaka, where over 6 million people live, each day producing over 3,000 tons of household waste, only half of it is collected by city, the other half remaining on roadsides, in open drains and in low-lying areas. Waste Concern utilizes the waste in a composting scheme that provides organic fertilizer to the nation's farmers while significantly reducing national greenhouse gas emissions (UNEP, 2011). The company has also attracted foreign direct investment through an agreement with a Dutch company to develop two Clean Development Mechanism (CDM) projects. Based on its success in Bangladesh, Waste Concern is now assisting 10 Asian and 10 African cities in replicating its model. A regional recycling training center was opened in Dhaka in 2010 to benefit international participants.

Sources :
World Bank (2016) retrieved from: http://www.worldbank.org/en/results/2016/10/07/bangladesh-strengthening-bangladeshs-environment-natural-resource-management

Social Entrepreneurs Brochure (2011), the Schwab Foundation for Social Entrepreneurship as cited in UNEP (2011)

Box 1.2 presents policy opportunities and the case of EU's EGA.

Box 1.2 – The case of EU's EGA / Policy opportunity

The case of the EU in policy opportunity

To capture eco-innovation and eco-innovation policy opportunities, for the case of EU, a governance mechanism for determining environmental goods and services take is created and taking place through consultation of a range of experts, relevant international organisations, national environmental agencies, industry and NGOs (please refer to the list of stakeholder involvement and negotiations' web links at the end of this Policy Outlook). A key activity of the governance process isdetermining and negotiating the scope of environmental goods and services list is the key activity to support eco-innovation in trade policy and in international regimes, in the form of guidance about which additional environmental products should be the international agreements' focus.

The most recent agreement being addressed is the Environmental Goods Agreement (EGA). In the process, customs officials are involved to ensure that the environmental products are clearly defined, and differentiated from other products in the customs nomenclature, and this involvement increases the level of strategic intelligence. Outcome of this process, some examples of the EU's nominated products in ongoing EGA negotiations can be accessed by the EC Trade link in the sources footnote. Outcomes include a Trade Sustainability Impact Assessment. EGA consists of 165 green goods and takes the APEC-54 list as a starting point.

Technologies listed as EGA products that directly contribute to reach policy goals related to environmental protection and climate change mitigation, being in line with eco-innovation opportunities:

- Helping clean the air and water, e.g. carbon dioxide scrubbers
- Helping manage waste, e.g. recycling machinery
- Contributing to energy efficiency, e.g. heat pumps, thermostats
- Controlling air pollution, e.g. measuring equipment
- Generating renewable energy such as solar, wind, or hydroelectric, e.g. wind turbines, solar panels

Green products for which he EU would like to eliminate duties:

- Generation of renewable energy,
- Control of air pollution,
- Management of solid and hazardous waste,
- Management of waste water and water treatment,
- Environmental remediation and clean up,
- Noise and vibration abatement,
- Resource and energy efficiency,
- Environmental monitoring and analysis

Sources: Consultation: http://trade.ec.europa.eu/doclib/press/index.cfm?id=1116
Environmental Goods Agreement: Promoting EU environmental objectives through trade, http://trade.ec.europa.eu/doclib/press/index.cfm?id=1438
Trade Sustainability Impact Assessment of EGA, Draft Final Report - March 2016

3.2. Eco-innovation trade policy in practice

In practice, **producing an internationally agreed list for environmental goods (EGs) as well as services has proven to be a difficult activity.** Although defining a list of environmental goods and services is a complicated technical process in itself, deciding which goods and services should be included into such a list brings politics into the process as well as WTO rules whose overriding concern is to reduce tariffs and non-tariff barriers in international trade[9]. Whilst the WTO recognises the need for green technology transfer, it does not want policies to discriminate against non-green products, as an almost impossible task.

Box 2 – The case of WTO / Practice

The case of WTO in Practice: Eco-innovation, Trade, International Trade Regime Measures

1. General Agreement on Tariffs and Trade (GATT), Article XX
The GATT is the core agreement relating to trade in goods. GATT Article XX on General Exceptions specifies a number of instances in which members' trade measures may be exempted from GATT rules that would otherwise have applied. The provision seeks, among other things, **to ensure that green economy measures are not applied arbitrarily and are not used as disguised protectionism.**

2. Agreement on Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary Measures (SPS)
Rules such as the TBT Agreement, dealing with technical regulations and product standards, and the SPS Agreement, dealing with food safety and human, animal and plant health, **provide scope for WTO members to put in place regulatory measures to protect the environment and advance a green economy, while at the same time imposing disciplines to ensure that such measures are not unnecessary restrictions on international trade.**

3. Agreement on Subsidies and Countervailing Measures (SCM)
The SCM Agreement seeks to prevent members from providing subsidies that distort international trade. **Provided certain basic disciplines are respected, the agreement leaves members with policy space for, among other things, supporting the deployment and diffusion of green technologies.**

4. Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)
The TRIPS Agreement provides a framework for applying the intellectual property system to promote access to and dissemination of green technologies, and provides policy space to promote public interest in sectors of vital importance to socio-economic and technological development, **as well as specific incentives for technology transfer and exclusions of environmentally damaging technologies from intellectual property (IP) protection.**

5. The plurilateral Agreement on Government Procurement (GPA)
The plurilateral GPA applies only to the WTO members who have ratified it. It aims at openingup procurement markets to international competition on a transparent and non-discriminatory basis. **Under the agreement, parties and their procuring entities may prepare, adopt or apply technical specifications aimed at promoting green procurement.**

Source: Adapted from WTO. (2012b). Harnessing trade for sustainable development and a green economy. World Trade Organization. Available at: http://www.wto.org/english/res_e/publications_e/brochure_rio_20_e.pdf

WTO negotiations are dominated by a "dual-pronged" approach for developing EGs lists that could help economies reap both environmental and development benefits[10]. In the technical paper of International Trade Centre (ITC) titled "Trade in Environmental Goods and Services: Opportunities and Challenges"[11], ITC indicates that:

"as a consequence of the heterogeneity of the products and the range of political interest involved in the negotiation processes, a multilateral agreement on a classification of environmental goods is still under discussion" (ITC, 2014).

Yet in 2001, WTO launched the Doha Development Round, which led to Doha Ministerial Declaration initiating the negotiations on the reduction or elimination of tariff and non-tariff barriers on environmental goods and services for a triple win situation for trade, environment and development. WTO talks focused on removing tariffs on a broad list of environmental goods. The negotiators built on a list of 54 products on which the member countries of APEC (Asia-Pacific Economic Cooperation) have agreed to reduce their tariffs to 5% or less by 2015. Tariffs on environmental goods are already low in developed countries; however, other countries can charge tariffs as high as 35% on these goods. On top of that, although international trade in the 21st century is reported as facing fewer traditional tar-iffs, but has seen a proliferation of rules and regulations that affects the movement of goods and services. These non-tariff measures (NTMs) can play a significantly negative role in addressing safety and environmental issues[12]. The APEC-54 list is based on APEC (Early Voluntary Sector Liberalization) EVSL list. According to Sugathan (2004) the list

"was conceived with the end goal of policy negotiations in mind; hence the composition of goods within the list is a reflection of a political decision, rather than a conceptual exercise in identifying a comprehensive list of goods".

The list encompasses goods that reduce environmental damage (end-of-pipe pollution treatment and monitoring equipment / 17 sub-headings). Other categories are renewable energy technologies (15 sub-headings) and environmental protection including solid and hazardous waste (SHW), waste-water management (WWM) and air pollution control (APC)(21 sub-headings). is visible and relevant from eco-innovation point of view yet limited. Environmental Good and Services (EGSs) is only defined by the OECD-164 list; APEC-54 list has no services category. According to Steenblik (2005), there is only a 30% overlap between the products on the OECD-164 and APEC-54 list. There are 132 unique HS codes in the OECD-164 list, compared with 104 in the APEC-54 list.

Table 2 presents the three main official lists for environmental goods: the OECD 164-list, APEC[13] 54-list and UNCTAD 25-list. Numbers indicate the total number of sub-categories classified with respect to the Harmonized System[14, 15], at 6-digit level. Classification of international trade of goods relies on this harmonized system nomenclature. This HS nomenclature is updated in 2007, 2012 and 2017. Environmental and social concerns are given as reasons behind these updates and amendments. In total, approximately 5300 goods are listed in the HS system, of which a maximum 480 goods are proposed as environmental goods, approximately 8-9% of all goods in the system. Many technologies supported by eco-innovation policyin practice are not included. They mostly cover goods and services from the pollution control industry sector, clean production technologies, renewable energy products (such as biofuel), and certified food products (fish, timber, etc.). Electric vehicles are not part of it and neither are environmentally improved products.

	OECD - Environmental goods and services	**APEC - Environmental goods**	**UNCTAD - Environmentally preferable products**
Definition	The environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use.	Environmental goods and services is an industry sector devoted to solving, limiting or preventing environmental problems.	Products which cause significantly less environmental harm at some stage of their life cycle (production, processing, consumption, [or] waste disposal) than alternative products that serve the same purpose, or products, the production and sales of which contribute significantly to the preservation of the environment.
Number of (HS6) products	164	54	25

Source: OECD, APEC, ICTSD

The three headings of the OECD list are:

1) Pollution Management

2) Cleaner Technologies and Products

3) Resource Management (Box 4).

Many eco-innovation types named in policy outlook 1 are not included in this list. Apart from listing relevant environmental goods and services for the purposes of a greener trade policy, it should beseen as a conceptual exercise to better define the scope of the environmental industry, It thus serves a conceptual or analytical role next to a trade policy role for the environmental goods and services negotiations.

3.3 Absence of a common international methodology for eco-innovative EGSs.

Environmental goods lists cannot capture all benefits from eco-innovations since these lists do not cover manygoods that could be environmentally enhanced by resource efficiency and/or energy efficiency improvements. From technical perspective, the selection of products is made on the basis of their end use rather than production methods due to **absence of a common international methodology that would allow assessing the environmental performance of a product throughout its life cycle[16].** This gap can be filled if a common international methodology as such could be developed for eco-innovations, which would also consider rebound effects.

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Box 3 – The case of comparative EGSs Lists / Gaps

Environmental Goods and Services: Classification of Green Technologies - I

	OECD – Environmental Goods and Services	**APEC – Environmental Goods**	**UNCTAD – Environmentally Preferable Products**
Classification	**A. Pollution Management** 1. Air pollution control 2. Wastewater management 3. Solid waste management 4. Remediation and clean-up 5. Noise and vibration abatement 6. Environmental monitoring, analysis and assessment **B. Cleaner Technologies and Products** 1. Cleaner/resource efficient technologies and processes 2. Cleaner/resource efficient products **C. Resources Management Group** 1. Indoor air pollution 2. Water supply 3. Recycled materials 4. Renewable energy plant 5. Heat/energy savings and management 6. Sustainable agriculture and fisheries 7. Sustainable forestry 8. Natural risk management 9. Eco-tourism 10. Other	1. Renewable energy 2. Environmental monitoring, analysis and assessment equipment 3. Environmental protection 4. Environmentally preferable products (bamboo).[17]	1. Products which are more environmentally friendly than petroleum-based competitors 2. Products which are produced in an environment-friendly way 3. Products which contribute to the preservation of the environment.

Source: OECD, ICTSD, APEC.

Box 3 – The case of comparative EGSs Lists / Gaps

Environmental Goods and Services: Classification of Green Technologies - II

	WTO – Environmental Services	**Eurostat - Environmental Goods and Services [21]**	**OECD – Environmental Goods and Services**
Classification	1. Sewerage services 2. Refuse disposal services 3. Sanitation and similar services and 4. Other (cleaning services for exhaust gases, noise abatement services, nature and landscape protection, and other environment services not elsewhere classified).	**Environmental protection** 1. Protection of ambient air and climate 2. Wastewater management 3. Waste management 4. Protection and remediation of soil, groundwater and surface water 5. Noise and vibration abatement 6. Protection of biodiversity and landscape 7. Protection against radiation 8. Research and development 9. Other environmental protection activities **Resource management** 10. Management of waters 11. Management of forest resources 11 A. Management of forest areas 11 B. Minimisation of the intake of forest resources 12. Management of wild flora and fauna 13. Management of energy resources 13 A. Production of energy from renewable sources 13 B. Heat/energy saving and management 13 C. Minimisation of the intake of fossil resources as raw material for uses other than energy production 14. Management of minerals 15. Research and development 16. Other natural resource management activities	**A. Pollution Management** 1. Air pollution control 2. Wastewater management 3. Solid waste management 4. Remediation and clean up 5. Noise and vibration abatement 6. Environmental monitoring, analysis and assessment **B. Cleaner Technologies and Products** 1. Cleaner/resource efficient technologies and processes 2. Cleaner/resource efficient products **C. Resources Management Group** 1. Indoor air pollution 2. Water Supply 3. Recycled materials 4. Renewable Energy Plant 5. Heat/energy savings and management 6. Sustainable agriculture and fisheries 7. Sustainable forestry 8. Natural risk management 9. Eco-tourism 10. Other

Source: WTO, Eurostat, OECD.

3.4. Exclusion of non-environmental end-uses and services

Many environmental goods, which form a part of the OECD-164 list, are left out due to APEC countries' sensitivity to the issue of "dual-usage" which means environmental as well as non-environmentalend-uses, although these goods are produce more environmentally-friendly, resource and energy efficient. APEC-54 list has also no services category. According to Steenblik (2005), there is only a 30% overlap between the products on the OECD-164 and APEC-54 list.

According to EEA (2014) a number of bodies have proposed definitions of traded environmental goods, including green technologies yet these classifications have not been universally adopted (UNEP, 2013; EEA 2014 Annex 4,) (See Table 3). Using OECD and APEC lists, UNEP compiled a list of traded environmental goods and calculated that the total export value of environmental goods more than doubled between 2001 and 2007 (UNEP, 2013) with developed and developing countries showing similar levels of growth. UNEP (2013) indicates that as EU and non EU national priorities shift toward mitigating environmental damage, emerging/developing economies have become significant players in the production and trade of various clean technologies (UNEP, 2013)

Table3- Trade Policy Lists by OECD, WTO, APEC, Australia and Eco-Industry Lists by ECOTEC, Ernst & Young and ECORYS

	Trade policy lists				Eco-industry lists		
	OECD (2005)	WTO (2005)	APEC (2001)	Australian Potential EGS (2002?)	ECOTEC (2002)	Ernst & Young (2006)	ECORYS (2009)
Number of items/ products (HS codes)	158	480	109	169	26	26	24
Macro categories	3	None	None	None	None	None	None
Sub categories	18	17	9	11	8	8	8

Source: ETC/SCP. 2012.

4 BARRIERS AND DRIVERS OF ECO-INNOVATION

In Table 4, we list the main drivers (+) and barriers (-) (lack of drivers in many cases) for eco-innovation in trade policy for developed countries.

An example of a natural resource oriented approach is the Natural Capital Netherlands Programme, where the traders play an intermediary role between transporters and producers in vertically organized supply chains for goods and services from natural capital.The key message is the capital characteristic of the nature, "Nature provides all kinds of goods and services that offer economic opportunities, such as a water, food, building materials and recreation areas. However, this 'natural capital' is under pressure due to the growing world population and increased economic prosperity" (PBL, 2014). The approach connects discourses of nature conservation and sustainable production/trade/consumption for different actors in the system ranging from primary producers, traders, to consumers.

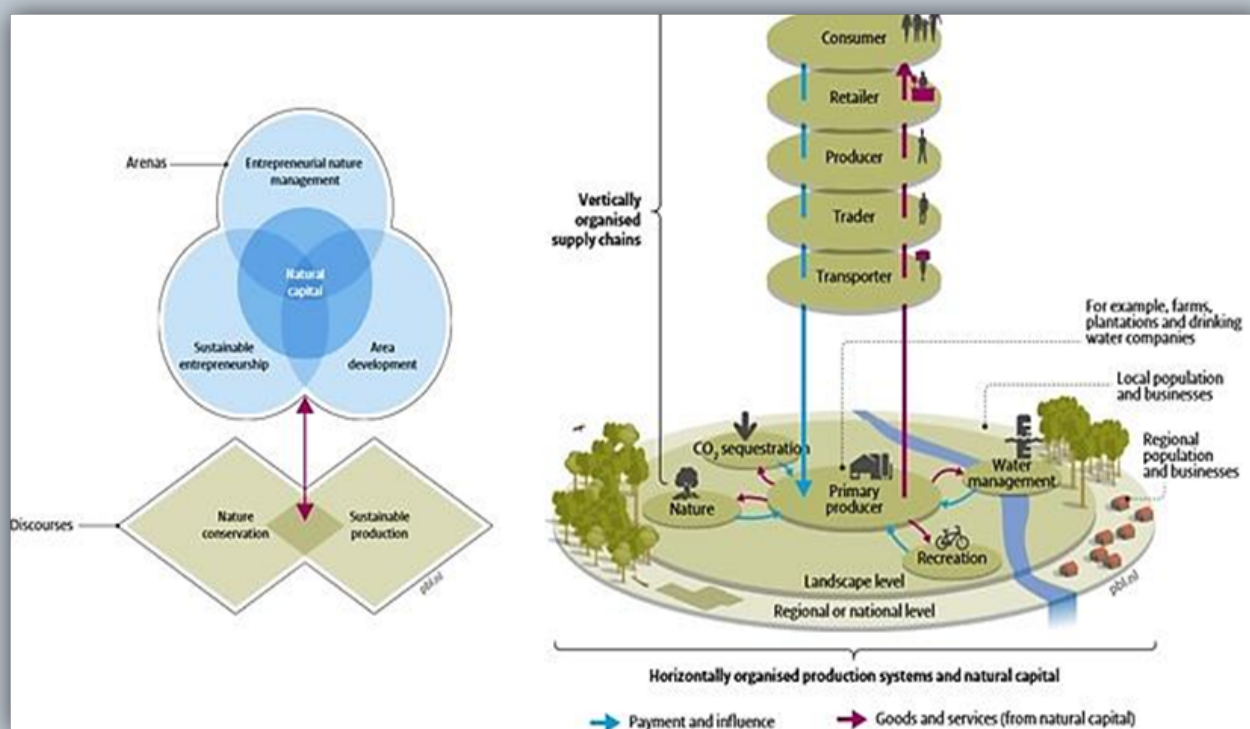Table 4 - Barriers and drivers of eco-innovation in trade policy for developing countries[*]

Technological determinants: Technical and R&D infrastructure	+ Use of Environmental Management Systems (EMS) + LCA and eco-design tools
Economic determinants: Access to R&D and innovation funding (including international donors) dedicated to eco-innovation, Eco-entrepreneurship and business creation, Local and international markets and demand, Internationalisation and competitiveness of eco-innovators	+ Reliable trade intelligence (data) on markets + In-depth knowledge of economic aspects of green supply chain management and global value chains + Solved IPR issues - Lack of standards and certification - Lack of competitive environmental goods - Low purchasing power parity - Counterfeiting risks
Collaboration facilitators: collaboration capacity (dependent on intermediary actors, human capital, culture of co-operation)	+ Knowledge and management readiness of governmental agencies, ministries, exporters/importers, eco-innovators + Presence and maturity of export/import advisers , + Collaboration between governmental agencies, ministries, export/import associations + Network of e-business export/import advisors
Ecological determinants: Access to natural resources (e.g. the lack or limited access to natural resources may be driver to innovate)	+ A natural capital mind-set other than a mere natural resources approach (See Box 3, Natural Capital Netherlands Programme (2014-2016))
Political determinants: Political support for eco-innovation; Policy instruments supporting eco-innovation	+ Presence and maturity of trade support institutions + Political and administrative social capital (use and access to resources) and cultural capital (recognition of norms and values relating to environment and ecology).
Value system: Consumption and production patterns and eco-innovation acceptance.	+ Technology needs assessment and impact assessment-guided eco-innovation import and export strategy. - The products identified in the EGs list based on country interests in liberalization. + Creating a natural capital mind-set other than a mere natural endowment approach (See Box 4, Natural Capital Netherlands Programme (2014-2016))

Box 4 – The case of Netherlands, Natural Capital Netherlands Programme

The case of Netherlands, Natural Capital Netherlands Programme: From discourses to trader

After the request of the Dutch Ministry of Economic Affairs, PBL (Planbureau voor de Leefomgeving / Netherlands Environmental Assessment Agency) in its Natural Capital Netherlands programme (2014 – 2016), conducted a number of practical studies to explore how society can keep profiting from the goods and services provided by nature, without negatively affecting natural capital.


Source: PBL.nl, Natural Capital Netherlands Programme (2014-2016) http://themasites.pbl.nl/natuurlijk-kapitaal-nederland/
wp-content/uploads/2014/pbl-2016-natural-capital-in-the-netherlands-2406-1.pdf

In the specific case of knowledge transfer practices that involve organizations in developing and emerging countries, it is said that the lack of sufficient absorptive capacity could be a serious barrier for the effective exploitation of knowledge coming from more technologically advanced sources (Barbieri et al, 2017). The problem is both a demand side problem and a supply side problem in the form of insufficient attention being given to the local context for use.

Figure 3 – Domestic absorptive capacity conditions and international green knowledge transfer
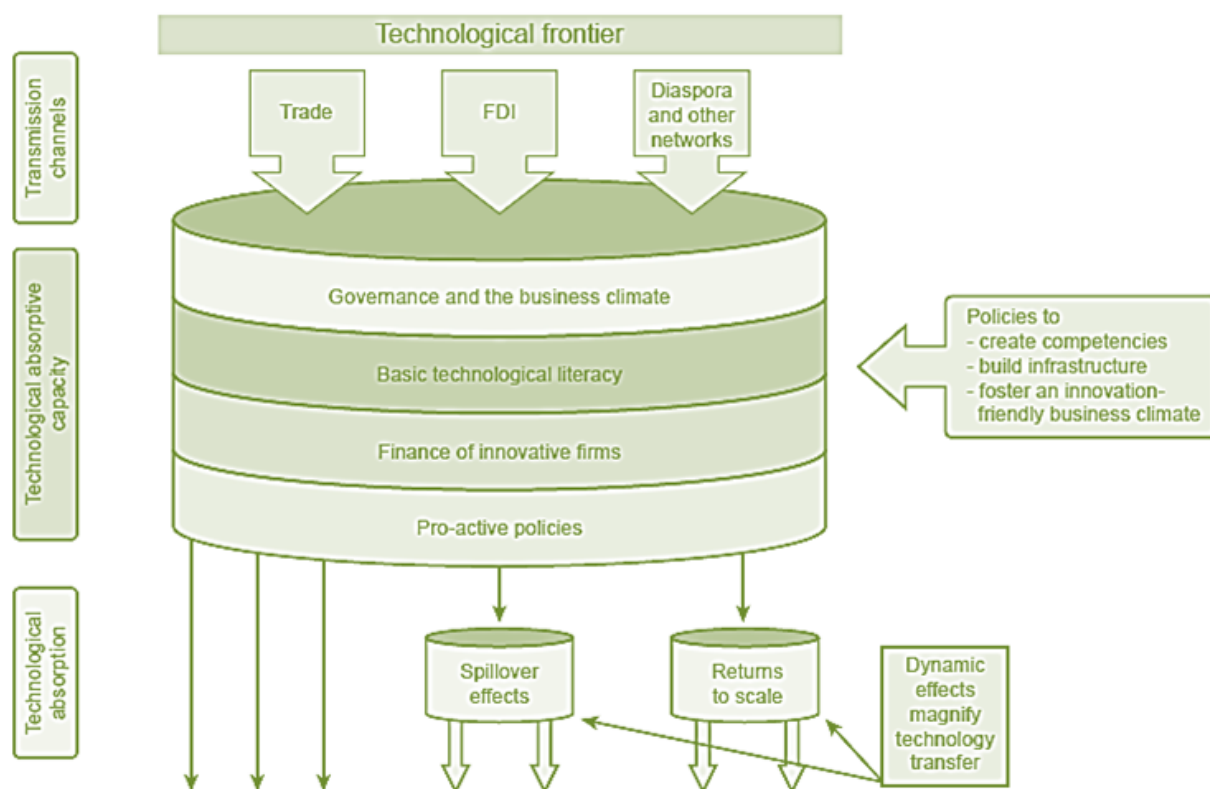
Source: Global Challenges Report Innovation and Diffusion of Green Technologies: The Role of Intellectual Property and Other Enabling Factors https://www3.wipo.int/wipogreen/docs/en/globalchallengesreport_lybecker_lohse.pdf

Figure 3 above represents international green knowledge transfer relating to domestic absorptive capacity conditions and international green knowledge transfer from technology frontier. Relating to knowledge and technology transfer for developing countries, Isabella Alcanizfromthe department of government and politics at the University of Maryland, in her article published in Environmental Science and Policy volume 55 in 2016 explains the partner selection behaviour of the developing countries in international environmental networks supported by the Global Environment Facility (GEF) in the Global South. The Global Environment Facility (GEF) is the world's largest public fund for inter-state environmental projects in the Global South[17] and the dataset she uses includes all regional and global grants awarded over the past two dec-ades. She found that the smaller the difference between countries in funding and skills, the more likely two environmental bureaus will collaborate in a cross-national GEF project, and the greater the funding disbursed by the GEF, the more likely two environmental bureaus will collaborate in a cross-national project. Three key drivers of trans-

governmental cooperation are the GEF funding, higher levels of program development, and similar levels of program development between national bureaus. By doing so, she intends to show the effect of not only the additional multilateral aid (money) but also the effect of international technology transfers (e.g. to improve the existing level of expertise in their agencies, to access new skills, know-how, and technology from foreign peers, learning by doing with a drive for skills in the path of career advancement, in short knowledge) on the establishment of transgovernmental cooperation in the protection of environment. She indicates that peer-to-peer cooperation between environmental bureaucrats from developing countries of the Global South is particularly relevant to whose states have fewer resources allocated to expert capacity building yet whose political principals can be often quite resistant to unmediated environmental aid from skill-intensive countries of the North.

5 WHAT CAN/SHOULD POLICY MAKERS/ BUSINESS/OTHER STAKEHOLDERS DO?

5.1. Success factors

In order to support eco-innovations in trade policy and in international trade regimes, a functioning system of actors and institutions, in short, an effectively sustained governance mechanism is required to create or enhance strategic intelligence relating to policy and technology (development or transfer) options in eco-innovation and trade. Key success factors are policy coherence, policy coordination, and policy learning.

5.1.1. Policy coherence

Trade policy has many interaction points with other policies in economic, environmental, and social dimensions (See Table 4).Design and implementation of a trade policy supporting eco-innovations, its vision and targets, should be consistent with other policies in place or to be designed in accordance with environmental policy (e.g. market access barriers to hazardous goods), energy policy (e.g. reduction in ensuring energy security through trade, imports of oil, gas etc.), eco-innovation policy (e.g. promoting trade in low-carbon goods, environmental goods and services), industrial policy (e.g. lowering barriers to essential green imports, including tariffs, NTMs and trade facilitation), IPR (e.g. Trade-Related Aspects of Intellectual Property Rights (TRIPS) and environmental issues).

To give a concrete example: for fulfilling their global commitment on climate change, ASEAN Member States have been very active in promoting Energy Efficiency (EE) and Renewable Energy (RE) technologies (UNEP, 2016). For this purpose, their energy policies are coordinated through the ASEAN Energy Efficiency & Conservation (EE&C), Renewable Energy (RE) Sub-Sector Networks (SSN), which are composed of government focal points, as well as representatives from the Senior Officials Meeting on Energy (SOME), and the ASEAN Ministers on Energy Meeting (AMEM) (UNEP, 2016). However, at the ASEAN level, the development of regional trade in energy efficiency (EE) and resource efficiency (RE) technologies is negatively influenced by the nation-al regulations and policy frameworks relating to the lack of harmonization among each countries' industrial policy components, such as energy performance testing methods, minimum energy performance standards (MEPS) and labelling. Such lack of mutual recognition between trade policy and industry policy directly limits the potential for increasing intra-ASEAN trade in energy efficiency technologies, even if a consensus and a coordination mechanism is established among environmental policy and energy policy (UNEP, 2016).

Table 4 – Interaction of trade policy and other policies

Economic dimension	
Macroeconomic policies	• Fiscal policy directly affects (restricts or expands) imports • Monetary policy affects interest and exchange rates which directly affect trade and investment
Financial policies	• Access to investment capital; loans and working capital requirements for SMEs • Trade finance availability
Infrastructure policies (transport, communications, ICT)	• Strengthen physical infrastructure for trade (roads, railroads, ports, airports, communication facilities, ICT, stable electricity supply, etc.) • Use trade to strengthen infrastructure
Agriculture policies	• Ensure food security through trade (i.e. imports of food) at reasonable prices • Increase market access for agricultural exports
Industrial policies	• Protect "infant industries" • Lower barriers to essential imports, including tariffs, NTMs and trade facilitation • Promote market access for industrial exports
Investment policies	• Attract export-oriented FDI • Assist export-oriented SMEs • Remove trade-related investment measures (TRIMS) • Promote CSR
Competition policies	• Promote competition including import liberalization and promotion of FDI
Intellectual property rights	• Promote IPR as part of policies to strengthen competitiveness, competition policy and business innovation (see also environment and health policies)
Environmental dimension	
Environmental policies	• Market access barriers to hazardous goods • Promoting trade in environmental goods and services • Promoting trade in low-carbon goods • Implement "murky" protectionist measures based on environmental considerations • TRIPS and environment issues: promoting biodiversity; etc. • Issues related to CITES
Energy policies	• Ensure energy security through trade (i.e. imports of oil, gas, etc.) • Ensure stable energy supplies for export-oriented industries
Social dimension	
Education policies	• Promote vocational training and skills development for value-added export-oriented industries
Health policies	IPR and public health issues: • Promote imports of generic medicines • Issue compulsory licensing for domestic production of generic medicines • Promote exports of generic or patented medicines • Prevent production or imports of genetically engineered foods
Labour policies	• Protect labour rights in export-related industries • Restrict or promote movement of natural persons (Mode 4 GATS) • "Murky" protectionism: use labour rights as a protectionist measure against imports
Gender policies, labour	• Mainstreaming gender in trade policies
Cultural policies	• Restrict or promote trade in cultural goods and services • Policies related to IPR and traditional knowledge

Source: United States Agency for International Development, Improving Trade Policy Coordination and Dialogue in Developing Countries: A Resource Guide (Washington, D.C.) December 2003

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5.1.2. Policy coordination

Governance of coherent and consistent policies requires policy coordination at national level, which is connected to local and international levels, as well as to different sectors and policy domains and actors. In relation to trade, specialized government agencies (e.g. customs agency, investment promotion agency, export promotion agency, trade and investment support institutions, standards bureau, and intellectual property organization) form the initial layer of creating an evidence-based trade policy, strategic intelligence about eco-innovations in trade policy. This means that these agencies should collaborate in collecting, processing and interpreting evidence on trade which is relevant for eco-innovation in the country context. These agencies connect to line ministries such as ministry of trade/commerce as well as other ministries (e.g. ministry of environment, energy). Ministry of trade/commerce, if a country is a member, has a permanent mission in WTO, and delegations to trade negotiations, elsewhere. Yet strategic intelligence relating to policy and technology options is not only created by this vertical mechanism. Subnational governments and stakeholders (businesses, civil society organizations) through consultations should also connect to ministries and their subcommittees (from agriculture to services domain), which creates aninterdepartmental trade policy, supported by line officials and cabinet subcommittees for trade policy (which is headed by ministers).

Box 5 – Rwanda's coordination of public resources, private investment and public awareness

Clear strategies and policies have greater probabilities to lead to an effective allocation of public resources, to encourage private investment, and public awareness to achieve positive changes and international competitiveness in green sector. Rwanda's Vision 2020 provides such a strategic direction for the country by setting up measurable policy goals with regard to population, land and management, utilization of natural resources, and other socio-economic sectors. With Vision 2020, Rwanda integrated environmental targets into its Economic Development and Poverty Reduction Strategy and adopted an Environment and Natural Resources Sector Plan (2009 - 2013)called "Towards a Green, Clean, Healthy and Wealthy Rwanda". In April, 2015 the Rwandan government also recognized the efforts and importance of stakeholders, industries and business in greening their production with the first annual Resource Efficient and Cleaner Production (RECP) Awards in Kigali. The event aimed to incentivize and acknowledge industry leaders as well as to increase public visibility, recognition of cleaner production practices in Rwanda. Two ministries in coordination, the Ministry of Trade and Industry and Ministry of Natural Resources and Environment awarded seven industries for embracing Resource Efficient and Cleaner Production technologies as a way of preserving the environment. Francois Kanimba, Minister for Trade and Industry acknowledged that "This initiative of protecting the environment, saving energy, and keeping production clean is fundamental for a country to promote green economy and green industry. It has tremendous impact on the competitiveness of business enterprises by reducing production costs."

Source: http://www.un-page.org/may-rwanda-government-awards-green-business-and-industry

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These actors are connected to the parliament, the legislative body. This governance model above fits well for countries with quite developed administrative and institutional capacity yet for low-income or even middle income countries there are also opportunities for capacity development for policy makers. We concentrate on this key success factor in the following subsection, policy learning.

5.1.3. Policy Learning

At international level, participating into trade-related networks would support eco-innovations in trade through learning. Not only policy makers and public administrative personnel but also businesses should attend these international networks. One of the most developed networks in

the field is the Trade Promotion Organization (TPO Network)[18] of the International Trade Center (ITC). ITC has interests in boosting Fairtrade and environmental exports of developing or low-income countries, environmental exports especially in organic products, biodiversity, climate change and green technologies[19]. So far, 98 trade-and-investment support institutions around the world (from Africa, Asia and Pacific, Europe, Americas) are active in this network. While 22 countries from the EU-28 are also present, six countries are missing. These are Poland, Romania, Greece, Czech Republic, Croatia and Hungary. For policy and business networking purposes, main networking activities under ITC consist of:

▪ The Trade Promotion Network (TPO)Network: http://www.intracen.org/itc/trade-support/the-tpo-network-world-conference-and-awards/

▪ Strengthening Trade Support Institutions (TSI) Cooperation: http://www.intracen.org/itc/trade-support/strengthening-tsi-cooperation/

▪ TPO directory:
http://www.intracen.org/publication/Trade-Promotion-Organizations-Directory-2015/

▪ Importers' associations: http://www.intracen.org/itc/trade-support/importers-associations/

5.2. Steps towards transformative change

International trade, when accompanied with appropriate policies for the environment, economy and society (see Table 4 for interaction of trade policy with other policies), can be a principal driver for the transition to an inclusive green economy[20]. Developing this capacity for policy makers and stakeholders at all levels, within a sustainable governance mechanism through which a relevant strategic intelligence relating to policy and technology options can be sustained, can protect the interests of the countries and their citizens.This activity forms the key activity to support eco-innovations in trade policy and international trade regimes,

and helps develop and negotiate trade and investment-related policies, technologies and practices which contribute to the environmental dimension of sustainable development. In Box 7, we exemplify a success case of regional international cooperation for co-generation technologies titled EU-ASEAN COGEN programme. Another showcase in this field is the UNEP's Environment and Trade Hub, formally launched by former UN Environment's Executive Director Mr. Achim Steiner in 2015. This hub serves as the overarching delivery mechanism for UN Environment's work on trade (Box 8).

Box 6 – The case of EU-ASEAN COGEN Programme / Change - World-Regional

EU-ASEAN COGENis an economic cooperation programme between the European Commission (EU) & the Association of South East Asian Nations (ASEAN). It is funded by the EC and has three phases: Phase I (1991-1994) Initiation, Phase II (1995-1998) Consolidation,and Phase III (2002-2005) Large Scale Implementation. The Coordination Team is based at the Asian Institute of Technology (AIT), Thailand. Official objectives are 1) to promote the use of Cogeneration in ASEAN, 2) to promote proven, clean and efficient European Cogeneration technologies and 3) to create business opportunities for cogeneration using biomass, coal and gas as fuels. The stakeholder structure of COGEN is given below.
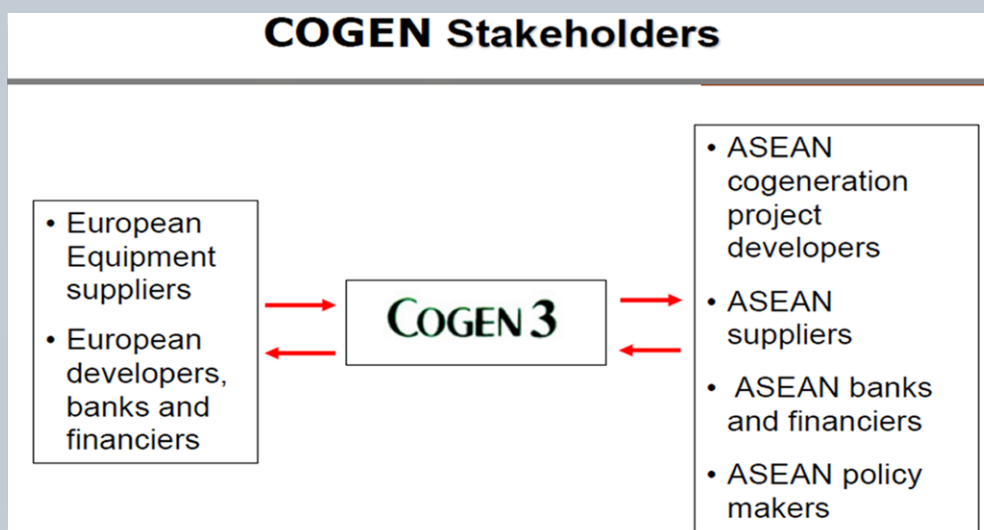
Activities include demonstration of the technical reliability and economic viability of proven European cogeneration technology to ASEAN end-users, ▪ 24 Full-scale demonstrations projects (FSDP) candidates selected, Total Amount of EC support: 8.6 mill. EURO , Total Investment: 209 mill. EURO. Very high bang for the buck. Cases of application are rice mills, palm oil mills, sugar mills, bio-energy, bagasse-fired cogeneration plants.

Source: Dr.Ludovic Lacrosse, Executive Chairman, Full Advantage Co., Ltd. http://www.full-advantage.com

Box 7 – The case of UNEP's Environment and Trade Hub / Change - Global

As a demand-driven mechanism, the Environment and Trade Hub offers capacity building and related policy advice on sustainable trade and investment that are tailored to local needs and circumstances

Environment and Trade: Four Focus Areas

AREA 1. Enhancing trade and investment in environmentally sound technologies (EST):	AREA 2 Shaping governance at the trade, investment and environment nexus:
Provide advice, impact analysis, and capacity building for countries to engage in the local production, deployment, and trade of EST and environmental services, while enhancing the use of global value chains and green export strategies.	Build capacity for countries to pursue environmental management and sustainable development through trade and investment agreements and global economic and environmental governance mechanisms.
AREA 3 Green Markets and Global Value Chains:	AREA 4 Reducing the footprint of trade and greening the brown:
Enhance the design and uptake of sustainability standards and facilitate market access for sustainably produced and certified products in order to green global production and consumption.	Support countries to make trade and investment activities more sustainable by assessing adverse environmental, social, and health impacts related to trade practices, and developing alternative solutions.

Source: http://web.unep.org/greeneconomy/what-we-do/environment-and-trade-hub

The initiation phase starts with a stakeholder request, in case of UNEP, a country. This stakeholder can be a business or industry association, or a network. Approval is granted if the request fits with one of the four areas of action. After identifying other relevant stakeholders and policymakers, a process of consultations and dialogues starts. Implementation requires several capabilities in monitoring and feedback, closure, evaluation, and assessing project replicabilities.

Environment and Trade Hub Invention Cycle

Source: http://web.unep.org/greeneconomy/what-we-do/environment-and-trade-hub
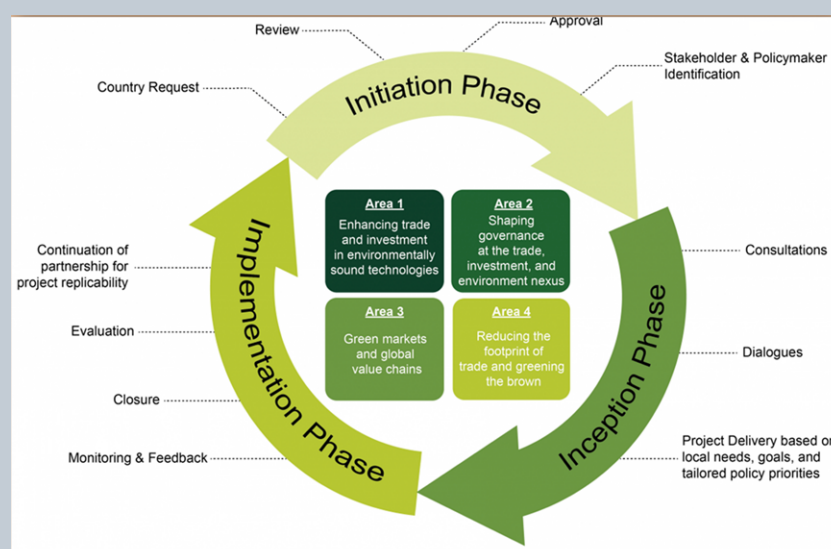
Within the Green Economy and Trade Opportunities Project, the Environment and Trade Hub works at the country-level to develop a global framework about the mutually beneficial relationship between trade and green economy, followed by identifying concrete trade opportunities at sector-specific level. In terms of concrete achievements the Environment and Trade Hub found and promoted opportunities pertaining to sustainability standards and ecolabels in the agricultural sector in Chile; solar energy exports in Ghana; value chains in the biotrade sector in Peru; organic agriculture in South Africa, and sustainably certified aquaculture in Vietnam.

At the national level, policy officials can reiterate UNEP's Environment and Trade Hub approach with businesses, research laboratories, consultancies, NGOs to help them engage in local production, deployment, and international trade of eco-innovations, environmentally-sound technologies (ESTs), environmental services, and in greening global value chains by designing and supporting the uptake of sustainability standards, certifications, and IT-based environmental management systems.

Final conclusions

In this outlook we have argued that trade policy can be used to support and exports and imports of environmental goods and services. To this end nations should build strategic intelligence about technological needs and technological possibilities for meeting those needs and cooperate with technology suppliers, trade experts and nations to reduce barriers to exports and imports for those technologies.

Strategic intelligence and a national governance mechanism are mutually dependent on each other: a national governance mechanism is needed to bring forth strategic intelligence and to make use of it.

[1] We thank Roberto Zoboli for offering comments on an earlier version.

[2] Staiger R.W (2004). Report on the International Trade Regime for the International Task Force on Global Public Goods, The University of Wisconsin and NBER.

[3] C. (2015)., An integrated EU trade and foreign policy, Commissioner for Trade Brussels Annual of the European Council on Foreign Relations, 11 June 2015.

[4] Cooper R.N. (1972). Trade Policy Is Foreign Policy, Foreign Policy No. 9 (Winter, 1972-1973), pp. 18-36 and

[5] Krueger A.O. (2000). International Economic Organizations, Developing Country Reforms, and Trade

[6] Borrás, S. (2012). Three tensions in the governance of science and technology. The Oxford handbook of governance, 429-440.

[7] Technology (needs) assessment, foresight, evaluation and benchmarking are tools or sources of strategic intelligence (Smits and Kuhlmann, 2004). We can include impact assessments into this list. According to UNEP (2011), a review of the Technology Needs Assessments (TNAs) conducted in 24 LDCs by UNFCCC give an indication of specific technologies that LDCs will require to respond to the challenges of climate change through a low-carbon path of development in LDCs. Main technology needs are in agriculture, land use, livestock and forestry sector, energy, waste management, transport and industry (UNEP , 2011).

[8] Capability is related to being able to perform the activities listed, skills in general; capacity is related to the scale, depth and width of performing capability-based activities, e.g. being able to handle various types of interactions with other actors, processes, infrastructure, means in general.

[9] Reducing tariffs and other non-tariff barriers to trade in environmental goods and services is expected to bring down the costs of sustainable energy technologies and enable scaling-up innovations and/or production and deployment of such technologies, thus trade policy is an important instrument in this regard.

[10] Source: http://www19.iadb.org/intal/intalcdi/PE/2013/13532.pdf

[11] Source: ITC (2014) http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/AssetPDF/EGS%20Ecosystems%20Brief%20040914%20-%20low%20res.pdf

[12] Source: http://trade.ec.europa.eu/doclib/docs/2016/december/tradoc_155191.pdf

[13] APEC Countries: Asia-Pacific Economic Cooperation (APEC) alliance: 21 countries: Australia, Japan, Philippines, Brunei Darussalam, Korea, Russia, , Canada, Malaysia, Singapore , Chile, Mexico, Chinese Taipei China, New Zealand, Thailand , Hong Kong, China, Papua New Guinea, United States , Indonesia, Peru, Viet Nam

[14] World Custom Organisation (WCO) Harmonized System (HS) Nomenclature. The World Customs Organization has been pursuing correct and uniform application of the Harmonized System Convention (Harmonized System or HS), since its introduction on 1 January 1988. According to WCO, correct and uniform application of the HS in an efficient manner facilitates international trade and investment and promotes compliance with fiscal and trade rules or laws.

[15] The United Nations (UN) is using HS subheadings as building blocks for its economic classifications. The data used for statistical systems e.g. The Standard International Trade Classification (SITC), the International Standard Industrial Classification of all economic activities (ISIC) and the Central Products Classification (CPC), is based on HS classification.

[16] Source: http://trade.ec.europa.eu/doclib/press/index.cfm?id=1438

[17] Source: https://www.thegef.org/gef/whatisgef: The GEF's 18 implementing partners are: Asian Development Bank (ADB), African Development Bank (AFDB), Development Bank of Latin America (CAF), Conservation International (CI), Development Bank of Southern Africa (DBSA), European Bank for Reconstruction and Development (EBRD), Foreign Economic Cooperation Office - Ministry of Environmental Protection of China (FECO), Food and Agriculture Organization of the United Nations (FAO), Fundo Brasileiro para a Biodiversidade (FUNBIO), Inter-American Development Bank (IDB), International Fund for Agricultural Development (IFAD), International Union for Conservation of Nature (IUCN), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), West African Development Bank (BOAD), World Bank Group (WBG), World Wildlife Fund U.S. (WWF).

[18] Source: http://www.intracen.org/itc/events/tpo-network-world-conference-and-awards/

[19] Source: http://www.intracen.org/itc/sectors/environmental-exports/

[20] Source: http://web.unep.org/greeneconomy/what-we-do/environment-and-trade-hub

Scientific Research Articles

- Bilman, A. S., & Turkeli, S. (2014). Interaction between international trade and economic growth: evidence from qualitative comparative analysis. International Economics Letters, 2(4), 5-18.
- EEA (2014). Resource-efficient green economy and EU policies, Report No 2/2014, ISSN1725-9177Accessed:https://www.eea.europa.eu/publications/resourceefficient-green-economy-and-eu
- ITC (2014). Trade in Environmental Goods and Services: Opportunities and Challenges, Accessed: http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/AssetPDF/EGS%20Ecosystems%20Brief%20040914%20-%20low%20res.pdf
- Kemp, R. (2011). Ten themes for eco-innovation policies in Europe. SAPI EN. S. Surveys and Perspectives Integrating Environment and Society, (4.2).
- Kemp R. & B. Never (2017). Green transition, industrial policy, and economic development, Oxford Review of Economy Policy (2017) 33 (1): 66-84. DOI: https://doi.org/10.1093/oxrep/grw037
- Mazzanti, M. and Zoboli, R., 2009. Embedding environmental innovations in local productionsystems: SME strategies, networking and industrial relations. Inter national Review of AppliedEconomics 23 (2), 169–195.
- Milner C. (2012) Declining Protection in Developing Countries: Fact or Fiction?The World Economy Asia Annual Lecture University of Nottingham Malaysia February, 2012 Accessed: https://www.nottingham.ac.uk/.../2012/worldeconomyasiachrismilner(feb2012).pptx
- Barbieri, N., Ghisetti, C., Marzucchi, A., Mazzanti, M.&
- Zoboli, R.(2017). Green-oriented Knowledge Transfers in global markets: technologies, capabilities, institutions, Deliverable 4.1 Green.eu Inno4SD.net , 2017
- Smits, R. & S. Kuhlmann (2004). The rise of systemic instruments in innovation policy. International Journal of Foresight and Innovation Policy 1(1/2): 4-32.
- Steenblik, R. (2005). Environmental Goods: A Comparison of the APEC and OECD List. OECD Trade and Environment Working Paper, No. 2005-04, 11.
- Sugathan, M. (2004). Environmental Goods and Services Negotiations: Challenges and Opportunities, WTO workshop on Environmental Goods: Para 31 (iii) of the DDA. OECD Environmental Goods Classifications
- UNFCCC (2010). Handbook for conducting technology needs assessment for climate change. UNFCCC, November 2010
- WTO (1996), Participation of developing countries in World Trade: Overview of major trends and underlying factors, Accessed: https://www.wto.org/english/tratop_e/devel_e/w15.htm

Web links and documents

- **Environmental Goods Agreement (relevant for general audience):**

  - Joint EU-US declaration following the WTO Ministerial, 4 December 2016
  - Report of the 16th round of negotiations , October 2016
  - Report from the 15th round of negotiations , August 2016
  - G20 Trade Ministers Meeting Statement , Shanghai, July 2016
  - Report from the 14th round of negotiations , July 2016
  - Report from the 13th round of negotiations , May 2016
  - Chair's statement on state of play of Environmental Goods Agreement negotiations, 14 December 2015, Nairobi (10th WTO Ministerial Conference)

- **Stakeholder processes (relevant for policy and business stakeholders):**

  - Stakeholder seminar "Environmental Goods Agreement – contribution of trade to climate action ", 7 December 2015, Paris (UNFCCC)
  - Stakeholder roundtable: The Environmental Goods Agreement - Promoting EU environmental objectives through trade, 3 June 2015, Brussels
  - Workshop on Services for the Delivery of Environmental Goods What Implications for Trade Negotiations? 13 November 2014, Brussels
  - Public consultation on trade in environmental goods ("Green Goods Initiative") launched by the Commission on 5 June 2014 (deadline 31 July 2014).
  - The global industry support letter on the green goods initiative Southeast Asia Regional Workshop Report, Sep 2015
  - Latin America Regional Workshop Report, Sep 2015

- **Civil Society Dialogues (relevant for civil society, media, businesses):**

  - Minutes, civil society dialogue March 2015
  - Minutes, civil society dialogue February 2016

- **List of Environmental Goods Lists**

  "Friends of Environmental Goods" List: this list is the most comprehensive submission (comprising diverse sectors with a total of 153 HS-codes) submitted so far in the context of the Doha negotiations. The 'Friends of Environmental Goods' group comprising Canada, the European Union, Japan, Korea, New-Zealand, Norway, Chinese Taipei, Switzerland and the United States. This list was the result of the downsizing of a previous list earlier submitted by the Friends, which exceeded 400 products (precisely 480). The World Bank's 43 Climate-friendly goods list is a subset of this FoEG-153 list.

Links to main Environmental Goods (EGs) lists:

- OECD-164: http://www.oecd.org/trade/envtrade/35837840.pdf
  APEC-54:http://apec.org/Home/Meeting-Papers/Leaders-Declarations/2012/2012_
      aelm/2012_aelm_annexC.aspx
- UNCTAD-25: https://www.oecd.org/tad/envtrade/35841725.pdf (Annex 2)
- WB-43: http://www.iisd.org/pdf/2009/bali_2_copenhagen_egs.pdf (Annex 1)
- FoEG-153: http://www.egatradesia.com/sites/all/docs/final/Annex_II-Friends_of_
      Environmental_Goods_List-a.pdf (Annex II)
- EGA-165 list: http://www.egatradesia.com/sites/all/docs/Final_Report/EGA_Trade_
      SIA_Final_Report.pdf
- Extensive Synthesis List-480 http://www.jmcti.org/2000round/com/doha/tn/te/
      tn_te_w_063.pdf
- Trade lists , Eco-Industry lists (Annex 4)
      https://www.eea.europa.eu/publications/resourceefficient-green-
      economy-and-eu

ABOUT

The Inno4SD Policy Outlooks series focuses on the horizontal policy issues or transversal topics relevant for public policy supporting innovation for sustainable development. The selected topics are based on questions and issues raised by policy makers and stakeholders active in the Innovation for Sustainable Development (Inno4SD) network.

1. Why should public policy support transformative eco-innovation?

2. How can policies supporting innovation deliver on the sustainable development goals (SDGs)?

3. How to support eco-innovation in trade policy and international trade regimes?

4. Can environmental process standards enable eco-innovation?

5. Can eco-innovation respond to NEXUS challenges?

6. Can public procurement in cities support circular economy?

7. How to measure eco-innovation and assess its impacts?

8. How to build effective policy mixes for eco-innovation?

9. How to ensure the level playing field for eco-innovation, taking into account adverse effects of existing policy measures?

10. How to design and implement science, technology and innovation (STI) roadmaps to foster eco-innovation for sustainable development?

11. How to account for macro-economic framework conditions in designing eco-innovation policy?

12. Can environmental product standards enable eco-innovation?

The content of each document has been peer- reviewed by experts and by the editorial team of the inno4sd network. The views expressed in each Outlook are those of the authors and not necessarily reflect the views of inno4sd or its strategic partners.

Expressions of interest to contribute to the series are welcomed; please send us your proposals at the email/ contact details indicated at in the back cover of this document.

Advancing the state-of-the-art in innovation for global sustainability

The Innovation for Sustainable Development Network (inno4sd.net®) brings together networks dedicated to innovation for sustainable development with the aim of reducing fragmentation and supporting collaboration, whilst engaging policy-makers, research & development, and businesses to achieve the sustainable development goals.

The H2020 Green.eu project and inno4sd® network was coordinated by the Netherlands Organisation for applied Scientific research TNO in the period March 2015-January 2019. As of February 2019 the inno4sd Steering Board oversees the activities and management of the network.

Innovation for Sustainable Development Network - inno4sd

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