

Sustainable consumption and production

The role of supply chains, decent work and digitalization



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Summary

Global environmental governance of supply chains is growing in importance, both because of globalized production networks and as a consequence of the proliferation of voluntary and mandatory systems, sometimes causing conflicts and confusion.

New global frameworks are emerging for due diligence and responsible supply chains. Stronger intergovernmental action can, for example, include reliable definitions and verification, and deal with laggards through mandatory regulation. Already existing systems in some areas such as timber and palm oil have caused tensions between the rich world and the Global South. It is important to integrate development aspects into coming legislation and to replace conflict in the World Trade Organization with dialogue on sustainability. Environmental aspects in the Organisation for Economic Co-operation and Development (OECD) Due Diligence Guidelines can be strengthened, successful national initiatives as in the Netherlands can inspire others, and digital product passports can be developed.

Working conditions are another important aspect of global supply chains. Although green jobs are often at the forefront of public debate, less attention has been paid to the need to combine such a perspective with action for decent work. How workers perceive environmental policies is of great importance for societal acceptance of, for example, climate action. Labour market organizations are crucial actors for just transitions and can support ambitious environmental policies under the right conditions.

Digitalization offers both possibilities and challenges for environmental sustainability including for supply chains. It is a major factor affecting consumption and production patterns. International cooperation is needed, for example, on environmental footprint methodologies, sustainable algorithms and governance for green artificial intelligence. Following international initiatives such as the Coalition for Digital Environmental Sustainability (CODES) and the Global Partnership for Artificial Intelligence (GPAI), governments can in 2022 agree on measures for digital sustainability.

BACKGROUND PAPER

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This Background Paper supports the scientific report, *Stockholm+50: Improving Conditions for Change*.



1. Introduction

Fifty years after the 1972 UN Conference on the Human Environment, an international meeting will be held in Stockholm, with the title Stockholm+50: a healthy planet for the prosperity of all – our responsibility, our opportunity. Deliberations during the two-day meeting (2–3 June 2022) will be based on a United Nations General Assembly Resolution adopted in May 2021¹ and on an implementing resolution.²

According to the May resolution, the aim of the 2022 meeting is:

to commemorate the 50 years since the United Nations Conference on the Human Environment and its outcome documents, as a contribution to the environmental dimension of sustainable development to accelerate the implementation of commitments in the context of the decade of action and delivery for sustainable development, including a sustainable recovery from the coronavirus disease (COVID-19) pandemic.

Stockholm Environment Institute is preparing an independent scientific report for the Stockholm+50 meeting. This background note forms part of the input to the Stockholm Environment Institute report. It covers some specific issues on which the forthcoming conference might provide further impetus to global governance on environmental sustainability. The purpose of the note is to give an overview and some preliminary ideas for action, not to cover all issues at depth. It is based on existing literature, and on interviews with several experts.

Sustainable consumption and production is a broad topic, addressed in Sustainable Development Goal (SDG) 12. The UN has adopted a 10-year Framework of Programmes on Sustainable Consumption and Production Patterns³, implemented in particular through the One Planet Network⁴.

At the fourth session of the United Nations Environment Assembly (UNEA-4) the United Nations Environment Programme (UNEP) was asked to establish a task force comprising the International Resource Panel and the One Planet Network to report on pathways for sustainable consumption and production to UNEA-5. The resolution also tasked UNEP with providing an overview report and recommendations on best practices in sustainable product design and service, and on sectors such as textiles, plastics and construction. The UNEP Executive Director has recently reported on progress (UNEP, 2021).

Topics covered here are:

- global environmental governance of supply chains
- green and decent jobs
- digitalization, artificial intelligence and environmental sustainability.

The focus is on global cooperation between governments. Multilevel governance and public–private partnerships are key elements of today's global agenda. Governments remain crucial for many of the solutions.

As part of the analysis, the background note addresses some issues of particular importance to the Global South and to youth.

1. <https://www.undocs.org/en/A/75/L.88> and <https://www.un.org/press/en/2021/ga12326.doc.htm>

2. <https://documents-dds-ny.un.org/doc/UNDOC/LTD/N21/240/87/PDF/N2124087.pdf?OpenElement>

3. UN A/CONF.216/5. United Nations Environment Assembly has addressed the topic in several resolutions, including: 2/6, 2/7, 2/8, 2/9, 2/11, 3/7 and 4/1.

4. https://spaces.oneplanetnetwork.org/system/files/strategy_one_planet.pdf



2. Global environmental governance of supply chains

2.1 Background

The environmental and social footprint of supply chains has received more attention in recent years. An example is the unsustainable mining of metals for batteries and electronics, such as cobalt and tantalum. Much attention has been given to human rights issues and working conditions, but increasingly also to environmental issues such as loss of biodiversity linked to tropical wood and to hazardous substances in products.⁵

In addition, climate policies and green finance are increasingly concerned with supply chains, with both voluntary and mandatory schemes for disclosure of carbon emissions at all production stages. The debate about carbon pricing and measures such as carbon border adjustments also directs attention to the climate footprint of supply chains.

Policy responses are rapidly developing and are finding inspiration inter alia from the debate on human rights in supply chains. In 2018, the Organisation for Economic Co-operation and Development (OECD) adopted its influential Due Diligence Guidelines for Responsible Business Conduct (Organisation for Economic Co-operation and Development, 2018), focusing mainly on human rights and working conditions. There are many other initiatives, for example through the UN Global Compact and the World Business Council for Sustainable Development. Company responsible action is facilitated through platforms such as the Global Reporting Initiative.⁶

Voluntary commitments for sustainable supply chains are significant, but ample evidence suggests that government action is also needed, including on a global level. For example, political decisions are often necessary to avoid diluted frameworks because of vested interests (Smit et al., 2020; Zamfir, 2020).

As a response, several countries are now implementing **mandatory due diligence**.⁷ The US adopted the Dodd-Frank Act in 2012, which included an obligation for companies to report on their supply chains of conflict minerals. In addition to more recent initiatives in, for example, France, Germany and the US, the European Commission put forward a proposal for an EU system in November 2021.⁸

The French law entered into force in 2018 and obliges large companies to develop a 'vigilance' plan that identifies risks in supply chains and measures to prevent severe impact on human rights, health and safety, and the environment. Companies must report on their plans and actions taken.⁹ The oil company Total has been taken to court in two cases for not taking sufficient action according to the law, regarding its business activities in Uganda and regarding its general responsibility for climate change.¹⁰

5. Stockholm Environment Institute has done extensive work in this area, including the Trase supply chain transparency programme. <https://www.sei.org/topic/supply-chains/?current-page=1#listing>

6. Home (globalreporting.org)

7. The European Commission defines due diligence as follows: 'The term "due diligence" means acting with reasonable care and investigating an issue before making a decision. In other words, it is an on-going, proactive and reactive process through which companies put in place systems and processes to make sure they are able to identify, manage and report on risks in their supply chain.' <https://ec.europa.eu/trade/policy/in-focus/conflict-minerals-regulation/regulation-explained/>

8. According to the International Trade Union Confederation (2020), the introduction of mandatory due diligence is being debated in at least 18 jurisdictions and the EU.

9. <https://www.cambridge.org/core/journals/business-and-human-rights-journal/article/abs/french-law-on-the-duty-of-vigilance-theoretical-and-practical-challenges-since-its-adoption/0398716B2E8530D9A9440EEB20DB7E07#metrics>

10. <https://www.asso-sherpa.org/first-court-decision-in-the-climate-litigation-against-total-a-promising-interpretation-of-the-french-duty-of-vigilance-law>



Since 2010 there has been a voluntary Sustainability Code in Germany for companies addressing human rights and environmental risks in supply chains. The German parliament in June 2021 decided on a law requiring large companies to report human rights and environmental abuses in their supply chains.¹¹

In 2021, the EU introduced mandatory due diligence requirements for conflict minerals (tin, tantalum, tungsten and gold)¹². The regulation requires EU companies to ensure they import these minerals and metals from responsible and conflict-free sources only. Since 2013, the EU Timber Regulation prohibits imports of illegally harvested timber and products derived from such timber, and requires EU timber traders to exercise due diligence.

In November 2021, the European Commission proposed a regulation on sustainable corporate governance that would also cover mandatory human rights and environmental due diligence.¹³ Companies are required to collect information confirming that products they place on the EU market are not linked to deforestation. The proposal covers palm oil, soy, wood, beef, cocoa and coffee. Reacting to criticism that not all products nor sensitive ecosystems such as savannah and peatlands are covered, the European Commission stated: *'the scope can be increased with time'*.¹⁴ Strong reactions are expected from producer countries such as Indonesia, Ivory Coast and Brazil.¹⁵

The proposal was preceded by intense public debate.^{16,17} The background is described in the recent EU Trade Policy Review:

Enhancing the resilience of supply chains also goes hand-in-hand with the EU's objective of making supply chains more sustainable, in particular by promoting sustainability standards across global value chains. More sustainable supply chains have generally proven to also be more resilient. Trade policy can also contribute to this objective by promoting responsible business conduct and greater transparency and traceability in supply chains. The forthcoming legislation on sustainable corporate governance as well as deforestation will be important milestones in this regard (European Commission, 2021, pp. 14–15).

On the global level, UNEP is doing work in areas such as public procurement and sustainable supply chains (United Nations Environment Programme, 2014) and on sustainable textile¹⁸ and agri-food supply chains.¹⁹ Sustainable value chains are mentioned in UNEP's work programme 2022–2023.²⁰ A life cycle approach to sustainable consumption has been addressed, for example, in a UNEA-4 resolution²¹. The UNEP Life Cycle Initiative is also relevant in this regard.²² The public procurement initiative is in particular looking at possibilities to encourage a circular economy including non-toxic material cycles.²³

11. <https://www.dw.com/en/german-bundestag-passes-new-law-on-supply-chain-ethics/a-57855174>

12. <https://ec.europa.eu/trade/policy/in-focus/conflict-minerals-regulation/regulation-explained/>

13... https://ec.europa.eu/environment/publications/proposal-regulation-deforestation-free-products_en

14. <https://www.euractiv.com/section/energy-environment/news/europe-proposes-mandatory-due-diligence-to-stop-deforestation-in-supply-chains/>

15. <https://www.politico.eu/article/commission-adds-new-wrinkle-to-lifestyle-choices-deforestation/>

16 <https://euobserver.com/opinion/152433>

17. EU considering sanctions on companies liable for environmental damage abroad – EURACTIV.com

18. https://www.oneplanetnetwork.org/sites/default/files/unep_sustainability_and_circularity_in_the_textile_value_chain.pdf

19. <https://www.unep.org/ar/node/1514>

20. <https://wedocs.unep.org/bitstream/handle/20.500.11822/35061/PoW%20presentation-Fred.pdf?sequence=1&isAllowed=y>

21. Innovative Pathways to Achieve Sustainable Consumption and Production | InforMEA

22. <https://www.lifecycleinitiative.org/about/about-ICI/>

23. <https://www.unep.org/resources/report/building-circularity-our-economies-through-sustainable-procurement>

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Other global initiatives (with government funding) support companies trying to navigate the complex voluntary systems for sustainability standards and labelling. One such example is the International Trade Centre's Sustainability Map.²⁴

Disclosure of financial risks related to climate change is another area with great impact on supply chains.²⁵ The Task Force on Climate-related Financial Disclosures (TCFD) initiative²⁶ is very influential, and mandatory climate risk reporting is on the political agenda in several jurisdictions. At the G7 Summit in June 2021, leaders stated: *'We support moving towards mandatory climate-related financial disclosures that provide consistent and decision-useful information for market participants and that are based on the [TCFD] framework, in line with domestic regulatory frameworks.'*²⁷ Plans by the International Financial Reporting Standards Foundation to develop a global sustainability reporting baseline will be important to follow.²⁸ Another important development is mandatory net zero transition plans for financial institutions and listed companies, now UK Government policy.²⁹

When it comes to **resource efficiency and the circular economy**, governance of global value chains is also crucial.

Today, product and waste policies need to address global production and recycling networks spanning many jurisdictions. The recent Chinese import ban on plastic waste provides an example of the global links, with dramatic consequences for other parts of the world. To some extent, such aspects have been addressed in earlier analysis on the circular economy and resource efficiency. However, there seems to be scope for policy development on concrete actions, such as coordination on certification schemes, traceability procedures and sustainable logistics.

Similar aspects apply to several other ongoing or planned initiatives such as strategies for non-toxic circularity. How can chemical risk management be improved when consumer products are manufactured, distributed and recycled in complex global value chains, and sometimes imported directly to the individual consumer from countries in other parts of the world? Regarding plastics, there is already progress, but more can be done.

Regarding the content of products, the Strategic Approach to International Chemicals Management is engaging in better systems for information on hazardous substances.³⁰ This is important for, inter alia, circular solutions and for health and safety, not least in the Global South. **Digital product passports** can provide easy access to information about environmental impacts in the supply chains, but much methodological work remains to be done (Adisorn et al., 2021). supply chains, but much methodological work remains to be done (Adisorn et al., 2021).

24. <https://www.sustainabilitymap.org/home12>. <https://ec.europa.eu/trade/policy/in-focus/conflict-minerals-regulation/regulation-explained/>

25. <https://www.e3g.org/publications/the-political-economy-of-green-financial-regulation/>

26. <https://www.fsb-tcfid.org/>

27. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/13/carbis-bay-g7-summit-communicue/>

28. <https://asia.nikkei.com/Spotlight/Environment/Climate-Change/COP26/New-climate-disclosure-rules-to-be-set-by-global-accounting-body>

29. Greening Finance: A Roadmap to Sustainable Investing - GOV.UK (www.gov.uk)

30. <https://saicmknowledge.org/program/chemicals-products>



Recently, the EU, UNEP and United Nations Industrial Development Organization (UNIDO) launched the Global Alliance on Resource Efficiency and Circular Economy (GACERE), where sustainability of supply chains will be addressed, among other topics.³¹ An upcoming GACERE report will describe how circular economy solutions can contribute to climate mitigation. In another development, the International Organization for Standardization will soon decide on standards for measuring circular economy aspects, relevant for the governance of global value chains. For its part, the G20 is developing a Circular Economy Vision based on earlier work in this forum. OECD produced a useful background report to the July G20 Environmental Ministers' meeting (Organisation for Economic Co-operation and Development, 2021). Indonesia's G20 Presidency in 2022 will carry on this process, bringing a Global South perspective to the chair.³²

This is particularly relevant since measures for sustainable supply chains can have a large impact in the Global South.³³ Trade in palm oil, timber and cotton are some examples.

Lena Partzsch (2020, p. 79) points at 'increasing asymmetries between actors in consuming countries of the Global North and actors in producing countries in the Global South'. It is important to address issues such as the high cost for small-scale producers for certification in sustainability schemes, and for rich countries to support reform of domestic policies in exporting countries (Partzsch, 2020).

The European Parliament recently emphasized the need to engage trade partners in discussions on due diligence requirements and to support capacity in the Global South, including EU programmes such as 'Aid for Trade'.³⁴

2.2 Need for stronger global action

Global environmental governance of supply chains is growing in importance, both because of globalized production networks and because of a proliferation of voluntary and mandatory systems, sometimes causing conflicts and confusion. The ecological effects of imported natural resources have also been highlighted, for example in a report by China Council³⁵ and in the EU's conclusions on resource efficiency. Given the rapid development of national and regional approaches to the environmental governance of supply chains, there seems to be scope for a higher level of global coordination.

Global policy documents have so far mainly been at the level of principles, which is useful, but not enough. A UN Resolution on SDG 12, as advocated by the European Commission, might be a step forward, but there also seems to be a need for concrete cooperation on several specific issues. For example, horizontal aspects such as traceability and verification are dealt with in different contexts, and there is a need for better coordination.

31. https://ec.europa.eu/environment/international_issues/gacere.html

32. https://www.g20.org/wp-content/uploads/2021/07/2021_07_22_ITG20_ENV_Final.pdf

33. <https://indien.ahk.de/news/news-details/human-rights-and-environmental-due-diligence-legislation-in-europe-implications-for-global-supply-chains-and-in-india-and-south-asia>

34. 'Emphasises that engagement with trade partners, in a spirit of reciprocity, is important for ensuring due diligence effects change; underlines the importance of accompanying measures and projects to facilitate the implementation of Union free trade agreements and calls for a strong link between such measures and horizontal due diligence legislation; requests therefore that financial instruments, such as "Aid for Trade", be used to promote and support the uptake of responsible business conduct in partner countries, including technical support on due diligence training, traceability mechanisms and embedding export-led reforms in partner countries; emphasises in this regard the need to promote good governance.' Texts adopted - Corporate due diligence and corporate accountability - Wednesday, 10 March 2021 (europa.eu).

35. P020161214521503400553.pdf (cciced.net)



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Experience so far suggests that progressive companies and voluntary commitments are important but inadequate. For example, car companies aiming at carbon-neutral supply chains face challenges related to standardization of carbon footprint methodologies and possible conflicts with competition law. Government action seems to be needed for reliable definitions and verification. Dealing with laggards is another case where intergovernmental action seems warranted in several areas (Smit et al., 2020).

That voluntary commitments are not enough has been echoed by major companies. *'Engineering giant Siemens said it wants to see supply chain governance rules covering "at least European or G20 states level"'*.³⁶

But the rapid development of national and EU legislation might lead to trade and development conflicts if global cooperation is not strengthened. There is thus scope for innovative proposals regarding international coordination and mutual learning on environmental governance of supply chains.

Such policy developments need to integrate concerns from the Global South. There are also links to the circular economy to be addressed in such a perspective (Hofstetter et al., 2021). Existing initiatives on supporting policy developments in developing countries, such as the Forests, Agriculture and Commodity Trade Statement,³⁷ and in particular facilitating for small-scale producers, need to be supplemented with broader analysis covering all areas of supply chain regulation, including climate disclosure and due diligence.

2.3 Key messages

- **OECD Due Diligence Recommendations** to multinational companies have had an impact, especially when it comes to human rights. There is scope to do more on **environmental aspects within this framework** since sector-specific practical guidance on such issues is to a large extent lacking. A first such step is being taken through the development of a Practical Tool on Environmental Due Diligence in Mineral Supply Chains, which is being developed in a multi-stakeholder process during 2021–2022. Many other environmental aspects could be addressed.
- In addition to the OECD track, there are calls for **new global frameworks** for due diligence and responsible supply chains. It has for example been suggested as a topic for the German G7 Presidency in 2022 (Maihold et al., 2021). Concrete proposals need to be developed to make use of this window of opportunity.
- Negotiations are ongoing on a **UN Treaty on Business and Human Rights**, after an initiative in the UN Human Rights Council by Ecuador and South Africa. The EU is participating actively. However, agreement is far away, and international business opposes such a binding instrument. If negotiations make more progress, it might be an inspiration for a similar binding instrument on the environmental footprint of supply chains including due diligence.
- It is already evident that **trade agreements** will be crucial for sustainable supply chains. Environmental sustainability needs to be better integrated in such frameworks, including megaregional agreements such as EU-Mercosur (Kettunen et al. (2020) provide concrete examples).

36. <https://www.politico.eu/article/global-supply-chain-sustainable-corporate-governance-illegal-practices/>

37. <https://www.gov.uk/government/news/over-100-leaders-make-landmark-pledge-to-end-deforestation-at-cop26>



- **Public procurement** is an important instrument for making supply chains more sustainable. UNEP's programme on the sustainability of supply chains and public procurement can be reinforced.³⁸
- Already existing systems in some areas such as timber and palm oil have caused tensions between the rich world and the Global South. It is important to **integrate development aspects** into coming legislation and to replace conflict in the World Trade Organization with dialogue on sustainability. The recent Forests, Agriculture and Commodity Trade initiative could inspire action in other areas.
- **Scaling up successful national examples** can be useful. For example, the Netherlands has for many years advanced policies in this area. This includes risk assessments from sectors and digital toolboxes such as the Corporate Social Responsibility (CSR) Navigator and the CSR Risk Check. The Netherlands also has a clear system for supervision of how companies follow the OECD Due Diligence Guidelines, and conformity with these recommendations is a condition for state support. Global institutions such as UNEP, UNIDO and the United Nations Development Programme (UNDP) can help diffuse the experiences from the Netherlands and other countries with ambitious policies. Voluntary initiatives with a strong participation from the Global South such as IDH – the Sustainable Trade Initiative can also be promoted.
- **Environmental footprint methodologies** could be further developed, not only for products but also on system-wide issues. The pilot phase of the EU's Product Environmental Footprint provides useful experiences and proposals to develop it further (Zampori & Pant, 2019), which are also relevant in a global context. Increased attention could be given to UNEP-led life cycle initiatives such as the Global LCA Data Access network and Global Guidance on Environmental Life Cycle Impact Assessment Indicators.³⁹ The analytical capacity of the OECD can be useful in this regard.
- Specifically on carbon footprints, there are many existing initiatives such as TCFD. However, **monitoring and verification** need to be improved, as well as methodologies for assessing climate impact in the whole supply chain. This is also most relevant for increased cooperation on carbon pricing, including the debate on carbon border adjustments. Ongoing work in the World Bank is relevant in this regard, for example using technology such as satellites and artificial intelligence for better independent verification.⁴⁰
- Extraction of **minerals and other natural resources** have large environmental impacts including carbon footprints (International Resource Panel, 2019). This issue needs more attention in global environmental governance.
- Efforts to improve **information on hazardous substances in products** need to be stepped up, with a special emphasis on the situation in the Global South. The development of digital passports for products is a promising path that needs to be further explored.
- **Stockholm+50** can be an occasion to address these questions in a global perspective, both when it comes to mutual learning and perhaps coordination, and as an arena for dialogue.

38. <https://www.unep.org/resources/publication/second-edition-uneps-sustainable-public-procurement-guidelines>

39. <https://eplca.jrc.ec.europa.eu/globalLCA.html>

40. <https://blogs.worldbank.org/climatechange/lessons-creating-mitigation-outcomes>

3. Promoting green and decent jobs

3.1 Background

Although green jobs are often at the forefront of public debate, less attention has been paid to the need to combine such a perspective with efforts to create **better working conditions**, including in a supply chains perspective. As described by the European Commission (2021, p. 3) in its recent Trade Policy Review: *'The green transition needs to go together with social equity. A serious decent work deficit persists in global supply chains in many parts of the world, from serious violations of freedom of association to poor working conditions.'*

It is true that decent work has been mentioned in the context of responses to the climate and health crises. The UN Secretary-General stated in April 2021: *'We need a new social contract, based on solidarity and investments in education, decent and green jobs, social protection, and health systems. This is the foundation for sustainable and inclusive development'*.⁴¹ G7 leaders also mentioned decent and high-quality jobs at the June 2021 summit.⁴²

However, it can be argued that the topic has not been given the attention it deserves in discussions on environmental sustainability. As noted by the International Labour Organization (ILO) in 2018, *'Efforts to promote climate action and environmental sustainability (SDG 13) can contribute to achieving SDG 8'* and *"The Paris agreement recognizes 'the imperative of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities'* (International Labour Organization, 2018a p. 11). ILO has also described the detrimental effects on productivity:

From a jobs perspective, environmental sustainability is critical. In fact, the increasing frequency and intensity of natural disasters associated with human activity have already lowered productivity. Annually, between 2000 and 2015, natural disasters caused or exacerbated by humanity resulted in a global loss of working-life years equivalent to 0.8 per cent of a year's work
(International Labour Organization, 2018b, p. 2).

How workers perceive environmental policies is of great importance for societal acceptance of, for example, climate action. Labour market organizations are crucial actors for just transitions and can support ambitious environmental policies under the right conditions.⁴³ One of the success factors behind the adoption of the European legislation on the Registration, Evaluation, Authorisation and Restriction of Chemicals was the alliance between major trade unions (represented by the European Trade Union Confederation) and environmental organizations.

41. UN chief calls for 6 measures to finance recovery from COVID-19 - Xinhua | [English.news.cn \(xinhuanet.com\)](https://www.xinhuanet.com/english/news/2021/06/13/carbis-bay-g7-summit-communiqué/)

42. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/13/carbis-bay-g7-summit-communiqué/> point 21.

43. <https://www.etui.org/publications/fair-and-effective-industrial-climate-transition>



3.2 Need for stronger global action

The Stern report to the 2021 G7 Summit addressed the need for action in this area: *'Labour market and other policies to foster a just transition to a net-zero emissions and climate resilient economy will also be crucial as rapid change will involve dislocation, in both production and consumption, requiring investment in and support for people and places'* (Stern, 2021 p.3).

Recently, trade unions in, for example, Germany,⁴⁴ the UK⁴⁵ and Sweden⁴⁶ have been pushing for higher climate ambitions. On the global level, frameworks such as the Global Deal have an important role.⁴⁷ But when the Just Transition Declaration was adopted at the 2021 United Nations Climate Change Conference (COP26) in Glasgow, only rich countries signed it.⁴⁸

Trade unions are arguing for more involvement in wider policies for just transition. For example, the International Trade Union Confederation (ITUC) Climate-Proof Our Work campaign puts great emphasis on social dialogue: *'Workers must have a seat at the table to discuss the policies and measures that affect their future'* (Boateng & De Wel, 2019, p. 1). ITUC has criticized international financial institutions for not recognizing the importance of strategies based on agreements and plans founded on social dialogue.⁴⁹

Climate change is increasingly affecting workers in many sectors, for example through heat stress.⁵⁰ *'It is clear that all jobs are already, or will soon be, under threat from the climate crisis in one way or another'*, according to ITUC (Boateng & De Wel, 2019, p. 1).⁵¹

Employers' associations also have important roles in just transitions, including in social dialogue and as part of collective agreements on the labour market (International Labour Organization, 2018).

There are also more direct linkages. The history of environmental protection is closely connected to health and safety at work. Chemical risk reduction is such an example. Toxic substances were regulated both because of risks to workers and to the environment. The phase-out of lead and other heavy metals illustrates this.

Still, today, there are significant co-benefits of policies that improve the environment as well as health and safety at work. For example, in the Global South, the use of hazardous pesticides creates both damage to the environment and health problems for many agricultural workers.

In many cases, problems have the same underlying reasons. Companies not managing their emissions well are also likely not to put enough focus on working conditions. In well-run firms, with ambitious environmental management systems, the risk of accidents and illness at work is also reduced. At the same time, access to nature can give important relief from stress at work.⁵²

44. Gewerkschaften: Plötzlich grün - Politik - [SZ.de \(sueddeutsche.de\)](https://www.sueddeutsche.de)

45. 'Make-or-break moment': Why business, unions, and campaigners are united in urging government to fix faltering climate strategy | BusinessGreen News Analysis

46. <https://www.dagensarena.se/opinion/klimatet-ar-en-fraga-facken/>

47. Save the date: Global Deal High-level Social Dialogue Forum 2021 - OECD ([theglobaldeal.com](https://the-global-deal.com))

48. https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_826717/lang--en/index.htm

49. Just-Transitions-A-Roadmap-to-the-Century-Ahead.pdf (parlnet.org)

50. Deadly heat: how rising temperatures threaten workers from Nicaragua to Nepal | Extreme weather | The Guardian

51. Boateng and De Wel (2019, p. 1) continue: 'We encourage every employee everywhere in the world to ask his or her boss questions like: "Is my organisation/company taking the ambitious climate measures that are urgent and necessary? Are we part of the energy transition to climate neutrality? Is my job climate proof?"'

52. <https://ieep.eu/publications/mental-health-and-the-environment-bringing-nature-back-into-people-s-lives>

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In addition to chemicals, there are clear links in many other areas between the protection of ecosystems and of workers: for example reducing air pollution and noise.

Sometimes, green transitions rely too much on supply chains with unhealthy working conditions, or even forced labour, as in the case of solar cells.⁵³ Green jobs are not necessarily good jobs, even in the rich world.⁵⁴

However, there are also positive examples, as the green jobs coordinator at ILO notes:

Certain countries have been able to improve their labor market while decoupling growth and controlling their carbon emissions. In Africa, this is the case in Ethiopia, a leader in the field of renewable energies, which is building on the diversity of the clean energy supply: wind farms, geothermal power plants, solar energy or hydropower. In Senegal, programs to restore mangrove forests make it possible to withstand soil erosion and curb advancing waters.⁵⁵

3.3 Key messages

- 'In order to ensure a just transition, efforts to promote the green economy must be accompanied by policies that facilitate the reallocation of workers, advance decent work, offer local solutions and support displaced workers' (International Labour Organization, 2018, p. 1). Such analysis should be **transformed to action**, for example in current policies for green recovery after Covid-19 and in strengthening climate action. Social dialogue has an important role to play in this regard. Special measures are needed for youth,⁵⁶ and gender dimensions need to be addressed.^{57, 58}
- ILO has also suggested that the **protection of environmental rights at work** could be strengthened in national policies and legislation (International Labour Organization, 2018). An analysis of how this can be done could be elaborated in cooperation between organizations such as ILO, UNEP, UNDP and UNIDO, highlighting existing good examples and possible ways forward.
- In addition, there are good reasons **for linking environmental sustainability more clearly to the decent work agenda**. Stockholm+50 can be an occasion to encourage this.
- **Widening the participation in global just transition initiatives** is one such possibility, including the Just Transition Declaration at COP26. Another step is to move forward with the recommended principles on human rights and the protection of workers from exposure to toxic substances.⁵⁹

52. <https://ieep.eu/publications/mental-health-and-the-environment-bringing-nature-back-into-people-s-lives>

53. <https://www.csis.org/analysis/addressing-forced-labor-concerns-polysilicon-produced-xinjiang>

54. <https://www.ft.com/content/111f9600-f440-47fb-882f-4a5e3c96fae2>

55. 'Protecting employment is the best response to climate change' (ideas4development.org)

56. https://www.ilo.org/global/topics/youth-employment/publications/WCMS_488464/lang--en/index.htm

57. <https://www.unwomen.org/en/what-we-do/economic-empowerment/sustainable-development-and-climate-change>

58. <https://www.unwomen.org/en/news/stories/2021/6/op-ed-ed-leaders-must-put-women-at-centre-of-covid-19-recovery>

59. Report of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes <https://undocs.org/en/A/HRC/42/41>



4. Sustainable digitalization and artificial intelligence

4.1 Background

The digitalization of society offers both possibilities and challenges for environmental sustainability. It is a major factor affecting consumption and production patterns.

Energy production and use can become more efficient, and emissions be reduced. The same applies to transportation systems. Data collection and analysis improve our understanding of ecosystems and the state of the environment. Machine learning is a rapidly developing field that holds promise for better understanding of complicated systems and how to solve environmental problems.

On the other hand, much digitalization requires significant amounts of electricity and of raw materials. Processing and storage of data is a rapidly increasing area of energy use with related emissions. Manufacturing and inefficient recycling of smartphones, computers and other equipment also contribute to the environmental footprint.

Lotfi Belkhir and Ahmed Elmeligi found that, by 2040, greenhouse gas emissions from the use of information and communications technology could correspond to more than 14% of today's total emissions (Belkhir & Elmeligi, 2018). Others have taken a more optimistic view, emphasizing that efficiency improvements can to a certain extent compensate for increased service demand (International Energy Agency, 2020). However, it seems clear that the environmental footprints of digital applications need more attention. The International Energy Agency states: *'Nevertheless, strong government and industry efforts on energy efficiency, renewables procurement and R&D will be essential to curb energy demand and emissions growth over the next decade.'*⁶⁰ It is important to distinguish between the energy use in the information and communications technology industry itself, and the total effects caused by applications in all economic sectors.

Artificial intelligence poses specific challenges. Algorithms for machine learning can be both positive and negative for the environment, depending on how the system is trained and on how the risk of bias is addressed. For example, training on data sets that only include present patterns of mobility might not provide optimal solutions from an environmental point of view. Often, massive amounts of calculations are needed with high energy requirements (Thompson et al., 2020).

Policymakers have been slow to react to this development. During the last few years, however, some initiatives have been taken.

In 2019, the German Ministry for the Environment (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz [BMU]) published a policy paper, *Get the Environment into those Algorithms!* with analysis and proposals. Among the proposals were eco-labelling of cloud providers and the development of environmentally sound algorithms. The German Government has subsequently funded research in this area (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz, 2021).

60. <https://www.iea.org/reports/data-centres-and-data-transmission-networks>

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Germany put digitalization and environment on the agenda for its EU Presidency in 2020. In December 2020, the EU Environmental Council adopted conclusions on digitalization for the benefit of the environment.⁶¹ The link between digitalization and environment has also been highlighted by the European Commission, including in the flagship project Digital Europe.

Within industry, there is an increasing awareness of the need to address the negative environmental impacts of digitalization, in addition to emphasizing benefits. The financial sector is a case in point, where digitalization is progressing rapidly with a related need for more energy. Some banks are now including energy use in their sustainability reporting.

Regarding artificial intelligence, a French Government task force in 2018 published the report *For a meaningful artificial intelligence*. Named after the mathematician Cédric Villani who led the task force, the Villani report includes the following recommendations (Villani, 2018):

- Promote artificial intelligence that uses less energy (for example by eco-labelling of cloud providers, and by supporting alternatives to today's energy intense graphics processing units).
- Develop a platform for measuring the environmental impact of intelligent digital solutions.
- Establish a meeting point for ecological transition and artificial intelligence.

4.2 Need for stronger global action

As shown, digitalization is linked to rapidly increasing energy consumption and negative environmental impacts. In parallel, there is a need to make the best use of these possibilities because of urgent challenges such as climate change. Given limited progress so far on the global level, there is scope for improvement when it comes to governance.

In September 2019 the German Advisory Council on Global Change (WGBU) called for a Global Charter: 'the WGBU suggests that a UN summit on sustainability in the digital age should be convened soon. Goals would include adopting a charter and mainstreaming digitalisation issues within the UN system' (German Advisory Council on Global Change, 2019, p. 4). The 2019 Montreal Statement on Sustainability in the Digital Age⁶² has also been influential.

Although the link between digitalization and environment is missing in the SDGs (Hackmann & Messner, 2019), the UN Secretary-General's Roadmap for Digital Cooperation⁶³ in 2020 mentions links between digitalization and environment.

61. <https://www.consilium.europa.eu/en/press/press-releases/2020/12/17/digitalisation-for-the-benefit-of-the-environment-council-approves-conclusions/>

62. <https://sustainabilitydigitalage.org/montreal-statement/>

63. <https://www.un.org/en/content/digital-cooperation-roadmap/>





In 2018, Canada and France established the International Panel on Artificial Intelligence, later transformed to the Global Partnership for Artificial Intelligence (GPAI), with 25 governments as members. The GPAI brings together experts from governments, science, civil society, industry and international organizations to promote international cooperation, based on the OECD Recommendation on Artificial Intelligence. In connection with the COP 26 in Glasgow, GPAI published a report with several proposals (Global Partnership for Artificial Intelligence, 2021).

In March 2021, seven organizations launched the Coalition for Digital Environmental Sustainability (CODES).⁶⁴ This open stakeholder coalition includes UNEP, UNDP, the German Environment Agency and the Kenyan Ministry of Environment and Forestry. The aim is described as follows:

Through co-design and implementation of a common vision rooted in shared values, the initiative will work to accelerate a digital planet for sustainability that values thriving natural ecosystems, human wellbeing and community resilience. The co-champions will organize meetings, shape discussions, issue flagship reports and help forge collaborations towards an Acceleration Plan for Digitalizing Environmental Sustainability.⁶⁵

CODES published a draft report for consultations.⁶⁶ Comments on the consultation report included views on digitalization, sustainability and the Global South. Although the draft highlighted the global digital divide and obstacles such as the lack of universal internet access, some commentators noted that issues such as participatory governance need to be addressed from a Global South perspective, where democracy is often weak. On the other hand, new technologies such as low Earth orbit satellites combined with digitalization might bring opportunities for both environmental sustainability and democratization, according to other commentators.

After two roundtable discussions and extensive other consultations, CODES presented its draft action plan at a side event to the UN Environment Assembly meeting 2 March 2022 (Coalition for Digital Environmental Sustainability, 2022). The ambition is now to launch the action plan at the Stockholm + 50 meeting.⁶⁷

4.3 Key messages

- It is important to **provide impetus for strengthened international governance**, including follow-up of the CODES report and relevant proposals by GPAI. Stockholm+50 is well-timed for a further step in this process.
- **More parts of the world should be engaged**, not only the EU, US and Canada where much of the discussion so far has taken place: for example, China, Japan and Republic of Korea.
- **Cooperation on environmental footprint methodologies** are required. Measuring carbon footprint is not simple. There is for example no consensus on how emissions from electricity production related to energy use for digitalization should be accounted for. It is even more challenging to assess the environmental impact of different machine learning methods and blockchain algorithms.

64. Coalition for Digital Environmental Sustainability (CODES): Launch Event | Office of the Secretary-General's Envoy on Technology

65. <https://www.umweltbundesamt.de/en/press/pressinformation/german-environment-agency-co-champions-global>

66. <https://www.umweltbundesamt.de/en/service/dates/open-consultation-codes-a-digital-planet-for>

67. <https://www.sparkblue.org/CODESActionPlanFeedback>



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- Existing policy proposals will require more **standardized measurement and accounting**, especially if implemented on a global level. This is relevant for example when it comes to eco-labelling of software and machine learning methods. Companies will also be required to report carbon dioxide emissions related to digitalization correctly, for example in accordance with the TCFD framework and the revised EU directive on non-financial reporting.
- There is an urgent need for more knowledge on how to use machine learning in ways that **do not automatically reinforce current non-sustainable consumption and production patterns**.
- The slow response to negative environmental impacts of new digital technologies (with cryptocurrencies such as bitcoins as one of many examples) illustrates a lack of technological foresight in environmental policies. Stronger global governance is needed for **technology foresight and environmental sustainability** including early action, expanding UN Secretary-General António Guterres' initiatives on technology.

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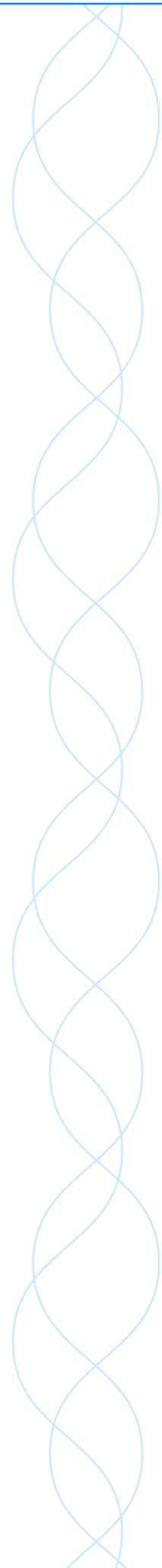
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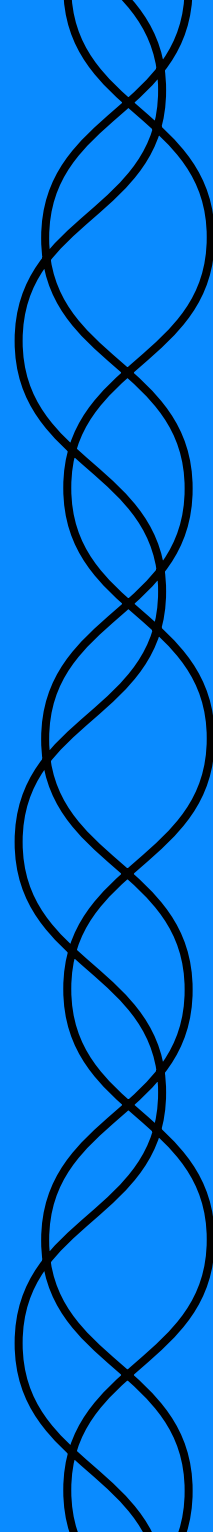
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