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Draft Recommendation on Enhancing Transparency and Traceability for Sustainable Value Chains in Garment and Footwear

Summary

Improving traceability and transparency has become a priority for the garment and footwear industry. Consumers, governments and civil society are demanding responsible business conduct and are calling upon the industry to identify and address actual and potential impacts in the areas of human rights violations, adverse environmental effects, and human health hazards.

The UN/CEFACT project on traceability and transparency of sustainable value chains in garment and footwear, has been developing Recommendation N°46 (ECE/TRADE/C/CEFACT/2020/INF.16) to establish a mechanism that enables governments, industry partners, consumers and all other relevant stakeholders to take risk-informed decisions, achieve accountability for sustainability claims, and anchor business models to responsible business conduct.

The "Call to Action" (ECE/TRADE/C/CEFACT/2020/6), linked to this draft "Recommendation", is currently under public review. The "Call to Action" invites all actors in the garment and footwear industry to take action for traceability and transparency to accelerate sustainability and circularity of value chain in this industry, in line with the United Nations 2030 Agenda.

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UNITED NATIONS
Centre for Trade Facilitation and Electronic Business
(UN/CEFACT)

REGULATORY AND EBUSINESS PROGRAMME DEVELOPMENT AREA
AGRICULTURE, AGRI-FOOD AND FISHERIES DOMAIN

ENHANCING TRANSPARENCY AND TRACEABILITY FOR SUSTAINABLE VALUE CHAINS IN GARMENT AND FOOTWEAR

SOURCE: Textile Project Team
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UNECE-UN/CEFACT "Enhancing Transparency and Traceability for Sustainable Value Chains in Garment and Footwear"

I. Recommendation n°46: Enhancing transparency and traceability for sustainable garment and footwear value chains

A. Introduction

1. Improving traceability and transparency has become a priority for the garment and footwear industry. Consumers, governments and civil society are demanding responsible business conduct and are calling upon the industry to identify and address actual and potential impacts in the areas of human rights violations, adverse environmental effects, and human health hazards.

2. By creating enhanced visibility in value chains, companies are better equipped to manage such impacts, and address financial, operational and reputational risks. Also, more transparent value chains allow companies to respond more effectively to unforeseen disruptions, conform with applicable laws and regulations, ensure product quality and safety, combat counterfeits, and protect cultural and industrial heritage.

3. On the other side, greater transparency empowers consumers to make better informed consumption choices, as they have more reliable information about the sustainability and circularity claims of products and processes. As a result, traceability and transparency have a strong potential to build trust among all industry actors.

4. High, low and middle-income countries as well as those with economies in transition are deeply involved in the global garment and footwear trade and all have a key role in advancing the industry's sustainable production and consumption patterns in line with the 2030 Agenda for Sustainable Development and, particularly, its Goal 12 on Responsible Consumption and Production.[1]

5. At the same time, their roles tend to be differentiated. High-income countries tend to operate more in the downstream part of the value chain where there is greater capital investment and more consumer-linked activities (design, branding and retailing, consumption, and post-consumption activities). Low-, middle-income and transition-economy countries tend to mainly intervene in the upstream part of the value chain, where there are more labour-intensive activities (farming, harvesting, ginning, spinning, dyeing, weaving, stitching, tanning, cutting and finishing).

6. Because of their nature and socioeconomic context, it is in these upstream manufacturing activities that most sustainability hotspots are concentrated, and where industry actors face most of the challenges in identifying, preventing and mitigating them. On the other hand, it is the downstream actors that often set the parameters and the financial incentives for upstream actors. Indeed, it is the design, product specifications, contract clauses related to payment terms, and withdrawal conditions that determine the margin of manoeuvre that upstream actors have for providing decent working conditions and respecting the environment.

7. As a result, effectively addressing risks to responsible business conduct depends on all the links in the value chain and requires the active and effective engagement of both upstream and downstream actors. The latter, who make the final decisions about which materials are used and which products are placed on the market, also are expected – and at times, legally required – to identify and mitigate risks that might result in harm to humans or the environment throughout their entire value chain.

8. In this context, downstream actors must increase their knowledge of where fibres, materials and all product parts and components come from, as well as how they are sourced, processed and traded. At the same time, there is clear evidence that their actual capacity to perform and manage activities in support of enhanced traceability and transparency is limited

[1] Transforming our world: the 2030 Agenda for Sustainable Development (https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E accessed on 2020-04-22).

and that their digital skills and capabilities to collect and elaborate data, need to be further developed. In order to be effective, optimize scale and create efficiencies, actions to improve traceability and transparency in garment and footwear value chains must be sector-wide and encompass globally scattered actors.

9. Moving beyond production and marketing activities, traceability and transparency are enablers that can guarantee circularity claims. As such, they can support the shift from linear economic models that take resources, make products and dispose of waste ("take-make-waste"), towards circular economic models that Reduce the new resources used, Reuse products and parts, and Recycle waste ("the 3Rs model"). The aim is to obtain the maximum value from resources, leveraging zero-waste design, product-life extension, resource efficiency, repairing and remanufacturing services.

The following definitions of key concepts are used in this Policy Recommendation:

Traceability is understood as "the ability to trace the history, application or location of an object" in a supply chain (ISO 9001:2015). In this context, it is defined as the ability to "identify and trace the history, application, location and distribution of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labour (including health and safety), the environment and anti-corruption" (United Nations Global Compact 2014);[2] and "the process by which enterprises track materials and products and the conditions in which they were produced through the supply chain" (OECD, 2018).[3]

Transparency relates directly to relevant information being made available to all elements of the value chain in a harmonized way, which allows common understanding, accessibility, clarity and comparison (European Commission, 2017).

Sustainability[4] In the context of garment and footwear value chains, means that all activities, throughout a product's life cycle, take into account their environmental, health, human rights and socio-economic impacts, and their continuous improvement (UNECE 2019).

Due diligence is understood as "the process through which enterprises can identify, prevent, mitigate and account for how they address their actual and potential adverse impacts" (OECD 2018) as an integral part of business decision-making and risk management systems (OECD, 2018).[5]

Circularity of a production process refers to the ability of such process to retain the value of products, materials and resources in the economy for as long as possible

[2] United Nations Global Compact Office (2014), 'A Guide to Traceability A Practical Approach to Advance Sustainability in Global Supply Chains'. Available at: https://d306pr3pise04h.cloudfront.net/docs/issues_doc%2Fsupply_chain%2FTraceability%2FGuide_to_Traceability.pdf

[3] OECD (2018), 'OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector', OECD Publishing, Paris. Available at: http://dx.doi.org/10.1787/9789264290587-en

[4] United Nations, 2015 (A/RES/70/1) Transforming our world: the 2030 Agenda for Sustainable Development, https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (accessed 24-06-2020), where sustainability refers to the ability of an activity to support "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This implies that the activity also takes into due account the needs of "People, Planet, Prosperity, Peace and Partnership" as outlined in the United Nations Sustainable Development Goals.

[5] OECD (2018), 'OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector', OECD Publishing, Paris (accessed on 2020-04-22). Available at: http://dx.doi.org/10.1787/9789264290587-en

and to minimise to the extent possible the generation of waste along all the steps of the value chain (European Commission, 2015).[6]

10. This Policy Recommendation responds to the increasing demand for policy and legislative action for responsible business conduct in global value chains. It seeks to support measurable sustainability efforts and targets in order to identify, prevent and mitigate adverse impacts on people and the planet entailed by corporations through their operations and third-party business relations, Thus, this Recommendation aims at reducing the imbalance between upstream and downstream actors, as well as enhancing the human dignity, quality of life and empowerment of garment and footwear workers.

11. The measures and approaches recommended here are aligned with: the relevant Sustainable Development Goals (SDGs) of the United Nations Agenda for Sustainable Development 2030; the United Nations Guiding Principles on Business and Human Rights;[7] the International Labour Organization's (ILO) Declaration on Fundamental Principles and Rights at Work, relevant ILO Conventions and Recommendations, and the ILO Tripartite Declaration on Principles concerning Multinational Enterprises and Social Policy; the Paris Agreement on Climate Change; the Convention on Illegal Trade of Endangered Species (CITES); the Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises,[8] and the OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector.[9]

B. Scope

12. This Policy Recommendation is relevant for all countries and companies participating in global value chains for garment and footwear, from raw materials production and processing, through manufacturing to finished product branding and retailing, consumption and post-consumption activities.

13. Areas where action to advance the traceability and transparency of value chains is needed include:

- Awareness of the indispensable role that traceability and transparency play in the identification, prevention, mitigation and remediation of potential and actual adverse environmental, social and ethical risks to responsible business conduct by companies and their global business partners throughout the entire value chain. This also applies to suppliers that are more at risk of remaining hidden like subcontracted, informal and small producers.
- Development, implementation and enforcement of supporting government policy, legislation and practices, including the integration of traceability and transparency information into public purchasing practices in order to better inform the work of buying and compliance offices.
- Incorporation of traceability and transparency into the analysis supporting risk-based management of value chains, and into the reporting on efforts to address sustainability risks based upon relevant norms and standards.

[6] European Commission (2015), European Circular Economy Package of the European Commission, Communication 'Closing the loop – An EU action plan for the Circular Economy', COM(2015) 614 final.

[7] UNHR ,UN Guiding Principles on Business and Human Rights (https://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf accessed on 2020-04-22)

[8] OECD Guidelines for Multinational Enterprises (www.oecd.org/daf/inv/mne/48004323.pdf accessed on 2020-04-22)

[9] ILO Tripartite Declaration on Principles concerning Multinational Enterprises and Social Policy https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---multi/documents/publication/wcms_094386.pdf

- Engagement of enterprises in long-term relationships based on their mutual adherence to the United Nations Sustainable Development Goals, and adoption of a more proactive vision by value-chain leaders for the implementation of incentives to encourage continuous improvement in traceability and transparency for sustainability in sector activities.
- Promotion of sustainable consumption, encouraging consumers to better understand their role and take action, based on product information that comes from traceability and transparency activities. This should apply during the purchase, re/use and disposal of products in order to reduce potential negative impacts and effects on society, human health and the environment, and to support the circular economy.
- Development and promotion of a common supporting framework across the entire sector and of guidance on the implementation of traceability and transparency for all industry stakeholders.

14. The last of the above needs to support the design of traceability and transparency systems for rapid and effective information exchange that allow value-chain actors to take targeted actions based on their goals for supporting sustainable development and related, risk-based priorities.

15. At the same time, such systems need to be underpinned by a set of common, agreed rules which take into account their implementation costs and the capacities of all actors involved as well as building the trust needed for sharing data. They also need to be practical and allow for the use of appropriate implementation technologies by facilities of varying sizes and technological capabilities, including farmers and small businesses.

C. Target audience

16. This Recommendation offers a basis for action by both public-sector policymakers and private-sector decision makers who wish to advance due diligence, sustainability, and circularity approaches.

17. The Recommendation can also serve as a reference for other industry stakeholders in their efforts to support the uptake and implementation of the recommended measures, including:

- Business and industry associations
- Consumers and consumer associations
- Intergovernmental Organizations
- Investors/shareholders
- Local authorities
- Non-governmental organizations (NGOs)
- Scientific and technological community
- Workers and trade unions

D. Purpose and Benefits

18. This Recommendation responds to the call from industry stakeholders for government action in support of:

- Greater awareness by government, industry and the public of the benefits provided by traceability and transparency for due diligence, sustainability and circularity.
- A level playing field where industry actors will benefit from a competitive advantage when they invest and take action to enhance traceability and transparency in their value chains in support of due diligence and sustainability.

- More efficient ways for workers and consumers to access remedies for human rights violations and value chain disruptions.
- A globally recognized and harmonized approach for collecting, exchanging and validating information for traceability and transparency in the sector's value chains.
- The use of standard data definitions and codes to facilitate the exchange of information (semantic interoperability) between IT systems that support traceability and transparency in the sector's value chains.
- The fight against product counterfeiting, fraud and illegal trade in protected species through the identification of origin – which means provenance and location of all products, parts, components, processes and factories – and local content.

19. The final objective of this Recommendation is to establish a mechanism that enables governments, industry partners, consumers and all other relevant stakeholders to take risk-informed decisions, overcome information asymmetry, communicate and achieve accountability for sustainability claims that go beyond regulatory compliance, and anchor business models to responsible business conduct.

20. It does so by providing industry and other relevant stakeholders with a set of internationally agreed practices for the harmonized collection and transmission of data for tracking and tracing materials, products and processes across an entire value chain including all involved facilities and intermediaries as well as related information about the sustainability performance of these value-chain participants. This will help to ensure the reliability of sustainability claims in the areas of human rights, fair labour practices, the environment, consumer interests and anti-corruption, while also allowing simplification, cost-efficiency and improved organizational processes, especially for SMEs and industry actors in less-advanced economies.

21. The Recommendation includes implementation Guidelines which assist policy and decision makers in better understanding tracking and tracing while also providing a framework for implementation by all stakeholders in garment and footwear value chains. The annexed Call to Action provides a mechanism to monitor and keep track of implementation of the recommended measures, and to facilitate the exchange of good practices and lessons learned.

E. Challenges

22. Tracking and tracing in garment and footwear value chains is a multifaceted effort and a challenging task due to the organizational and technological complexities of the business networks in this industry, which often make it difficult for companies to track a product's history and attributes back to its origins.

23. The maintenance of data privacy and security is a critical aspect, and is of particular concern for brands, traders, and companies in the high-value segment of the market who often consider information about specialized providers to be an important competitiveness factor. In addition, there are challenges around ensuring that data systems are secure for all users.

24. The reliability and authenticity of data shared as well as the strength of the controls validating materials, products and production processes, and of the proofs showing compliance with sustainability requirements, are also important issues. In the context of traceability, models with less stringent controls, for example around the handling of certified and non-certified materials, are often less complex and, thus, less expensive.

25. In addition, the implementation of traceability and transparency requires substantial investments in systems and technologies aimed at performing various levels of verification of processes, products, parts and components at all stages of the value chain and related data entry and product labelling. In this connection, technological barriers are also a concern. Technological advances such as blockchain and distributed ledger technologies, bar codes and RFID tags offer an opportunity, but mastering these technologies may be difficult, due to geographical and language barriers as well as costs and available infrastructure. In

addition, coordination between different supply chain actors requires time and willingness on all sides. These costs are a concern for many actors pursuing traceability, and especially for non-vertically integrated companies, brands and SMEs.

26. Alignment around tools, as proposed in this Recommendation and its accompanying Guidelines, helps to reduce costs for individual actors. When leadership is there and collaboration is widespread, there is greater incentive for actors to work together, which improves results, lowers costs overall – and thus helps to address the above challenges.

F. Recommendation

27. The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) of the United Nations Economic Commission for Europe (UNECE), at its twenty seventh session, agreed to recommend that Governments act in the following action areas:

Policy Actions, Norms and Standards

(a)Establish harmonized policies and regulations that support the implementation of traceability and transparency, in order to achieve higher environmental and social standards, economic viability and circularity in garment and footwear value chains by:

(i) Encouraging responsible business conduct, which addresses actual and potential adverse impacts resulting from companies' decisions

(ii) Ensuring the reliability of non-financial reporting and sustainability claims about materials, products, processes and facilities

(iii) Contributing to international policy coherence, thus addressing the challenges, for both producers and consumers, that are created by a proliferation of similar, but different, policies and regulations, as well as establishing a more level playing field for companies operating in this industry.

(b) Define minimum levels of traceability across garment and footwear value chains, from raw materials sourcing to consumption and post-consumption activities, and the minimum data that needs to be collected in order to show due diligence and transparency in support of claims regarding the origin, quality and other characteristics, including sustainability performance of products, processes and facilities.

(c)Encourage companies' efforts to embrace higher transparency in value-chain operations, for example by disclosing the names and addresses of suppliers' factories and sharing relevant information on their sustainability performance with stakeholders who are impacted, or potentially impacted, by enterprise decisions. This should be done in a timely, culturally sensitive and accessible manner, in line with international data protection norms and standards.

(d) Reduce the implementation burden on business and support SMEs by promoting the use of international standards, such as the UN/CEFACT standard for traceability and transparency of sustainable value chains in garment and footwear or the equivalent, and by encouraging the use of existing data. For example, requiring the use of these standards for any mandatory reporting requirements linked to traceability results such as showing that materials were legally sourced or no forced labour was used.

Incentives

(e)Provide economic and fiscal incentives (positive and negative) for establishing and implementing value-chain traceability and transparency systems, especially in support of SMEs, small farmers and producers, and other vulnerable groups such as women, young workers, home-based workers and migrant workers

(f) Provide non-financial incentives, including measures to facilitate access to markets, fast-track processes, public procurement criteria that are green and socially responsible,

specialized managerial and workforce training, public visibility, peer-learning and non-financial reporting requirements.

Research & Development

(g) Support research and development, and identify and scale-up innovative solutions for:

(i) Tracing and verifying products' authenticity and provenance

(ii) Advancing the sustainability and circularity of production and consumption processes

(iii) Increasing the lifespan of products

(iv) Creating more sustainable materials and

(v) Recycling garments and textiles.

Awareness & education

(h) Provide education in order to:

(i) Allow consumers to make informed choices

(ii) Create an awareness of the shared responsibility of all stakeholders including both business and consumers in preserving our planet, and

(iii) Increase the demand for materials, products and processes that are more responsible and sustainable.

Multi-stakeholder collaborative initiatives

(i) Stimulate and support multi-stakeholder, collaborative initiatives that seek to achieve industry-wide change and create shared value for all industry actors. These should be inclusive, benefitting especially SMEs and vulnerable groups in developing and transition countries while, at the same time, addressing garment and footwear value chains' sustainability risks and impacts. Such initiatives could include:

(i) A global, open-source knowledge platform to make guidance available and ensure that industry actors receive appropriate training and information

(ii) Multi-stakeholder policy dialogues for the sharing of good practices and lessons learned at international, regional and national levels

(iii) Pilot projects to experiment with innovative approaches and advanced technologies in traceability, including blockchain, artificial intelligence (AI), Internet of things (IoT), and biotechnology markers to ensure an effective connection between digital and physical assets.

28. When deciding upon specific public policy actions to be taken, multi-stakeholder consultations are recommended in order to strike a balance between the different interests at stake, and to identify targeted implementation support for vulnerable groups. Special attention needs to be given to SMEs, smallholders and farmers, and other groups affected by unfair practices in this sector, including, as appropriate, women, young workers, home-based workers and migrant workers.

29. In order to monitor and keep track of the implementation of this Policy Recommendation, Governments are requested to report on commitments to the recommended measures starting from 2022, and thereafter, every two years. Such pledges are to be expressed in accordance with the annexed Call to Action, which is open to all industry stakeholders and actors embracing transformational change for a responsible and sustainable garment and footwear industry of the future.

II. Guidelines for Recommendation n°46 on enhancing transparency and traceability for sustainable garment and footwear value chains

A. Introduction

30. These Guidelines aim to assist policy and decision makers who wish to put in place or encourage recommended approaches for enhancing the traceability and transparency of sustainable and circular value chains in the garment and footwear industry.

31. *Traceability* is an essential requirement for creating transparency. It allows to identify where "assets" are as they move through a value chain. Then, when you have a final product, it can allow you to identify all of the "assets" that were used to make that product, their origin and characteristics, and the way they have been processed and transformed

32. *Transparency* requires companies to know what is happening upstream in the value chain, and to communicate this knowledge to both internal and external stakeholders. This knowledge includes where, by whom, how and when the product is made. Indeed, more and more consumers are insisting upon value-chain transparency for the products they buy, and they also tend to be willing to pay more for brands that provide this information.[10]

33. The surrounding ecosystem includes supporting policies, norms and standards, incentives, promotion, capacity building, and collaborative initiatives.

34. A *traceability system* together with its surrounding ecosystem forms a *traceability framework*.

35. The Recommendation and its Guidelines look at the planning and design of *traceability frameworks* across the entire value chain – from the production and processing of raw materials, through manufacturing to finished product branding and retailing, consumption and post-consumption activities. It covers

(a) The *guiding principles* for effective and efficient traceability in garment and footwear value chains.

(b) The *key components* of a *traceability system*, encompassing all the practical processes, procedures and technology that make up a functional system.

(c) *Cost allocation and incentive systems* as well as *creating inclusiveness* because the success of a system depends upon having the participation of all value-chain partners

(d) *The supporting role of advanced technologies* because they can improve the cost structure, operational effectiveness, and inclusiveness of traceability frameworks.

36. In annex to the Recommendation and these Guidelines, is a complementary *Roadmap* which presents a step-by-step approach for developing and implementing, from a practical standpoint, a traceability framework in support of sustainability, from both the industry and government perspectives.

37. Also in annex, a *Glossary* establishes a common understanding of the terms used across all of these documents.

B. Traceability principles

38. To develop and implement an efficient and effective traceability framework in the garment and footwear industry, a number of guiding principles should be taken into consideration:

[10] Harvard Business Review, What Supply Chain Transparency Really Means, by Alexis Bateman and Leonardo Bonanni, 20 August 2019 https://hbr.org/2019/08/what-supply-chain-transparency-really-means (accessed on 16-05-2020).

(a) **Awareness**: Key stakeholders and industry actors need to be aware of the benefits of traceability systems in terms of enhanced regulatory compliance and corporate value.

(b) **Knowledge**: A clear understanding of the purpose of a traceability system, its scope, and the information needed in order to promote sustainability and circularity in production and consumption processes. This includes the information which should be collected and exchanged about the traceable asset ("what"), and how it has been transformed, moved or stored: i.e. by which actors ("by whom"), at which locations ("where"), in which processes ("why"), and at which time ("when").

(c) **Risk-based analysis:** In order to maximise impact and make the best use of limited resources, traceability systems should be focussed on where there are risks of non-sustainable practices. These risk areas differ between products, value chains and geographic areas, so an in-depth risk analysis is needed at the start of the planning and implementation processes.

(d) **Commitment**: Policy and decision makers need to commit to traceability in the entire industry value chain – from the production and processing of raw materials, through manufacturing to finished product branding and retailing, to consumption and post-consumption activities, and such commitment must be embedded into policy and legal frameworks as well as corporate strategies for sustainability and circularity.

(e) **Engagement**: Traceability in the industry value chain requires a consensus approach and, therefore, engagement, buy-in and cooperation from a wide range of actors. To this end, the identification of their roles and the establishment of effective cooperation and collaboration mechanisms are essential. Due consideration should also be given to measures for supporting the participation of small actors, especially in emerging economies.

(f) **Structured implementation**: The implementation of traceability systems requires a high level of organization in the value chain, in order for assets or a groups of assets, to be identified (tagged), traced, and related information made available, preferably in an electronic format.

(g) **Norms and standards**: Traceability systems are of greatest value if they are implemented using relevant norms and standards, including for the data to be collected and exchanged. Therefore, implementation should be based on available, recognised norms and standards for data, implementation and certification of traceability in order to favour the harmonisation of concepts, approaches and terminology, as well as the interoperability of systems.

(h) **Appropriate technology**: Tools and infrastructure to support effective traceability are a key enabling factor. Digital technologies should be interoperable and support for their use must come from all actors along the value chain and, when required, support must also be given to actors so that all value-chain participants have access to the required technologies.

(i) **Inclusiveness:** Traceability systems need to be inclusive, in order to integrate all stakeholders including small- and medium-sized companies, disadvantaged groups (such as minorities and women) as well as low and middle-income economies. Acceptance and support for a traceability system depends on its capability to integrate these stakeholders.

C. Key traceability system concepts

39. *Traceability system* refers to all of the practical processes, procedures and technology needed to create a functional system.

40. Value-chain actors in the garment and footwear industry need to perform due diligence and exercise responsible business conduct in order to ensure that their products are made in a way that does not harm the environment or result in unacceptable social conditions

including human rights violations. Traceability systems are an effective way to monitor and report on the sustainability of garment and footwear products throughout the value chain.[11]

41. Traceability systems can support sustainability **claims** about the characteristics of a product, a process or an organization by collecting data to validate these claims based upon defined **verification criteria**.

42. To do this, a system needs to:

- Identify the sustainability **claim(s)** and the related **verification criteria** which will define the traceability information to be collected, exchanged and verified
- Identify the **traceable assets** for supporting the claim – which could range from raw materials through to final products
- Select the most appropriate **traceability models** for organizing the value-chain's processes
- Track/identify traceable assets when they are transported in **logistics units**
- Consider the needs of post-consumption processes when identifying **verification criteria**
- Mark/tag each traceable asset and logistics unit with a unique **identifier (ID)**
- Record and link these IDs to **sustainability information** that will support the verification criteria as the traceable assets move between the **entry and exit points** for traceability in the value chain
- **Have a verification process,** carried out by auditors, which verifies that the data collected is accurate, aligned with the verification criteria and supports the claims

Table 2.1
Summary of key traceability system concepts

C1. Claim *Why traceability? What is its objective?*	A claim is a high-level statement about **a characteristic of a product, or about a process or an organization associated with that** product (traceable asset). In order to show that the characteristic is true**, it is necessary to trace the asset as it moves through the value chain**.[12]
C2. Traceable asset *What is being traced?*	The claim should be linked to a traceable asset, which is the material or product to be traced. It can be defined at different levels: • Individually (for example a single garment) • In batches from raw material production or manufacturing processes (for example a bale of cotton or one machine load of dyed fabric or all of the products produced by one machine during a specified period such as a work shift or a day) • In trade units, which are quantities used for buying and selling (for example a package of shirts or a container-load of thread). A traceable asset can be transformed or aggregated/disaggregated (into trade or logistic units) along its path. **Unique IDs** are therefore vital in order to trace an asset back and forward along its path in the value chain. Which traceable assets to use will depend upon the objective(s) of a traceability system and the selected traceability model, as well as the processes in the value chain and the capabilities of value-chain partners.

[11] UNECE, Traceability for Sustainable Trade, A Framework to Design Traceability Systems for Cross Border Trade, ECE/Trade/429, http://www.unece.org/index.php?id=43763 (accessed 17-05-2020).
[12] UNECE, Traceability for Sustainable Trade, A Framework to Design Traceability Systems for Cross Border Trade, ECE/Trade/429, http://www.unece.org/index.php?id=43763 (accessed 17-05-2020).

C3. Logistics unit *Which package(s), pallet(s), container(s) are my traceable assets being transported in?*	Logistics units contain traceable assets for transport and/or storage. Most often they contain aggregated traceable assets (for example, multiple fabric rolls in a container), but logistic units may also contain disaggregated traceable assets (for example, one batch of thread spindles that is packaged onto multiple pallets). Logistics units are given IDs in order to follow the traceable assets they contain. This is done by recording the IDs of the traceable asset(s) and linking them to the ID of their logistics unit. As a result, if a logistics unit is lost, the sender or receiver will be able to immediately identify the traceable assets it contained. Sometimes this chain of IDs can also be used for detecting fraud (for example if 6 fabric rolls from a weaver are loaded onto a container and 7, or 5, are unloaded). In addition, because logistics providers track only logistics units (and not what they contain), if there is a need to calculate CO2 emissions, then the information from the logistics provider about transportation routes and modes for a logistics unit needs to be linked to the traceable assets contained in the logistics units.
C4. Identifiers (IDs) *How do you know what happens to what is being traced?*	The path of a traceable asset (e.g. material, product, product batch) consists of a collection of information linked directly or indirectly to the traceable asset. To follow this path, the traceable asset must have a unique Identifier (ID). IDs are also required for all of the entities (i.e. enterprises, locations, logistics units, etc.) and processes that information is collected about. Whenever possible, IDs should be based on open non-proprietary standards in order to support interoperability (for example, ISO/IEC 15459). Many IDs are attached directly to individual traceable assets (products, batches or trade units) or a logistics unit. This is best practice, but is not always possible, especially during transformation processes. For transformations, the IDs and quantities of inputs are recorded, the quantity of output is measured (to be sure it matches the input quantities) and a new ID is given to the output which is linked to its input IDs. How these and other practices result in a “Chain of IDs”, going from the start of traceability through to its end, is explained in more detail below.
C5 Traceability models *How should I organize processes to be sure that traceability is preserved?*	There are three basic models for organizing the flow of traceable assets within a value chain in order to support a claim: • Product segregation • Mass balance • Book and claim. These are applicable across a value chain from the raw materials stage through to finished products and are explained in more detail below
C6. Entry and exit points *When does traceability take place?*	Entry and exit points are **the events (activities)** at the start and the end of the traceability process within the value chain. At each of these points the traceable asset needs to meet specified criteria. For example, if the entry point is “harvesting cotton,” the entry point criteria could be, “that the cotton must have been raised according to an organic standard”.
C7. Verification criteria *Why should anyone believe the claim?*	Verification criteria define the **information to be collected** about the traceable asset, and the **scope of the verification process**. Verification criteria should be objective. These criteria are set by the verification

What is the information that needs to be collected in order to verify the claim?	requestor. The following description is in line with the ISO definition.[13] Criteria should include: • A definition of the claim to be verified including tolerances (for example, 50 per cent organic cotton with a tolerance of 5 per cent) • The applicable process for verification (for example, which data need to be collected, which control methods should be used etc.) • The standards and normative documents against which the claim is verified (e.g. ISO or industry standards/guidelines)
C8. Verification process *How do you prove that your traceability process is working? Who is checking to be sure that the data is accurate and, also that no one is cheating?*	Verification is "confirmation of a claim, through the provision of objective evidence, that specified requirements have been fulfilled".[14] In the context of traceability, the verification process is carried out by a verification (audit) body that analyses traceability events and validates the information about them against the verification criteria and any other transparency system rules. Based upon risk analysis, independent verification may only be needed for selected stages of the value chain. An independent verification agency could be from: (i) The public sector, such as a ministry; (ii) The private sector, such as an inspection service or industry association, or (iii) A public private sector partnership (PPP), such as an inspection agency appointed by the government. The role of the verification process is to: • Request from stakeholders selected traceability data from the relevant Entry/Exit Points and from business processes between the Entry and Exit Points (i.e. traceability events) • Ensure that the data recorded for traceability purposes reflects what is actually happening in the supply chain (for example through field inspections) • Monitor and safeguard traceability by ensuring that assets meet entry/exit conditions and verification criteria (rules) are applied correctly.[15]

1. Sustainability claims

43. *"A claim is a high-level statement about a characteristic of a product, or about a process or an organization associated with that product (traceable asset)."*

44. Sustainability claims to support sustainable development objectives should be selected based on a value-chain risk analysis, corporate objectives, and a company's commitment to responsible business conduct and due diligence. The contents of the claim should be accessible and may need to comply with legal requirements. Also, organizations that develop sustainability standards and guidelines often have rules about how they can be referenced in claims.

45. A claim should contain the following elements:

- **A clear objective** which sets out the **purpose** of tracing, and the sustainability requirement(s) to be met in order to achieve the purpose
- **Description of the traceable asset** for the proposed claim**.**

[13] Conformity Assessment – General principles and requirements for validation and verification bodies, IS0/IEC IS 17029.
[14] ISO standard: ISO/IEC DIS 17029:2018(E), Section 3, "Terms and Definitions".
[15] UNECE, Traceability for Sustainable Trade, A Framework to Design Traceability Systems for Cross Border Trade, ECE/Trade/429, http://www.unece.org/index.php?id=43763 (accessed 17-05-2020).

- **Description of the proposed claim.** The claim should support the objective and should be understandable, clearly stated and defined in terms of the physical characteristics or process(s) connected to the traceable asset.
- **The defined verification criteria.** Criteria should be objective and measurable. They can be a standard, a guideline or other document which describes the sustainability characteristics that a product, process or organization must have in order to conform to the "claim". The criteria are what an auditor compares information against to determine if due diligence has been followed in ensuring a claim.

46. A suggested general format for claims is the following: [Traceable Assets] comply with [Claimed State] in accordance with [Verification Criteria] for/to support [Objective].

#1 Example of sustainability Claim (From Brand Y) Imported knitwear contains ethically grown and traded cotton from Country A and is obtained in compliance with the XYZ standard for ensuring responsible business conduct.
#2 Example of sustainability Claim (From Brand X) Imported Ready-made-garments from suppliers in Country B have been manufactured using good labour practices in accordance with the ILO fundamental labour standards, which support sustainable sourcing.

2. Traceable assets

47. A traceable asset is any product or material [individually, in batches or in trade units] that needs to be tracked along a value chain

(a) Granularity of the traceable asset

48. When deciding which traceable assets to use, the **granularity of the traceable asset** needs to be decided upon.

49. Granularity determines the physical size of the traceable asset, including how aggregated it is. For example, options for the allocation of unique IDs include every individual product, shipping carton of products, production batch, container of goods, etc. In addition, a "production batch" can be defined at different levels of granularity. For example, a yarn manufacturer can typically choose whether they assign a traceable asset ID to a new production batch every day, every shift (e.g. 2-3 times per day) or to every bobbin, in a particular ring-frame machine.

50. Granularity needs to be in line with the type of traceability model that is being implemented. i.e. product segregation, mass balance, or book and claim (for more see section 5 on Traceability models). The most appropriate traceability model will depend upon:

- The nature of the traceable asset; for example, the smallest unit of raw cotton from a farm that can be traced is probably a bale of cotton
- The claim; for example, if the claim says, "this is a real brand X product and not a counterfeit", then the traceable asset will be the finished product and not, necessarily, its components
- The capacities of value-chain participants; for example, some weavers may package their fabric in bolts and some in rolls, so it would make no sense to require the tagging of fabric bolts in a factory that makes rolls.

51. Higher granularity, while it provides greater accuracy, also means higher complexity (more IDs to be used and tracked) and higher costs, both internally and along the value chain (in transformation processes and shipments).

(b) Traceable assets and product transformations

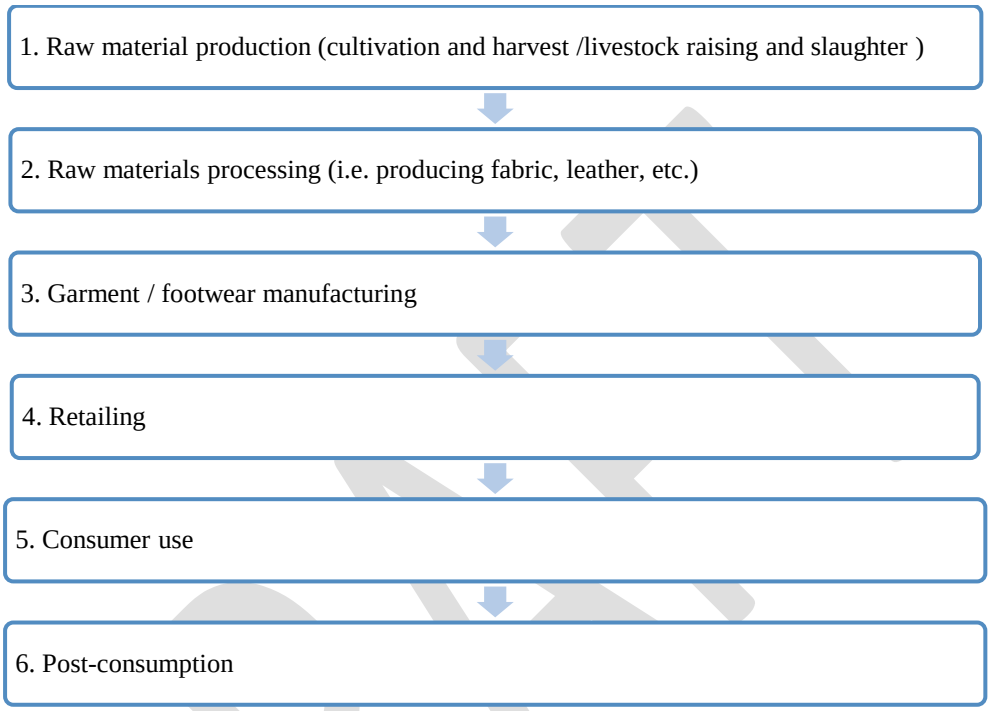
52. Within the textile and leather value chains, traceable assets are periodically used as inputs to processes that transform them into outputs which are new and different traceable

assets. These outputs must also be traced, and linked to their inputs, so that when the customer receives a final product, all of the inputs can be identified – by following the links of the chain back to the beginning.

53. Traceable assets need to be defined for each stage in the value chain and the relationship between traceable assets that are inputs and traceable assets that are outputs need to be clearly defined and recorded.

54. The main value-chain stages for textile and leather products, parts and components, include:

Figure 2.1



55. This can become complicated because there is often not a one to one correspondence. For example, 1 batch of spooled thread might contain 3.5 bales of cotton – of which 0.3 bales came from a bale that was partially used in a previous batch. As a result, there are 3 bales allocated entirely to this batch, and then 0.3 and 0.2 bales (one left over from the previous batch and one that is not completely used in this batch) that will need to be shown as input to two batches.

(c) Traceability information and data collection methodologies

56. Many points in these Guidelines focus on the information related to identifying traceable assets (unique IDs) and identifying the locations and events that the traceable asset passes through along the value chain.

57. At the same time, traceability and transparency of sustainable value chains requires the collection and exchange of information on the sustainability performance of products, processes and organizations in the main value chains stages outlines above. This set of information is determined by the sustainability claim and careful thought needs to be given to the points in the value chain where this information should be collected. Efforts should be made to minimize the amount of data collected and to identify existing sources for the data. Risk-based analyses of value chains impacts are valuable tools for identifying key sustainability data and their collection points within a value chain.

58. In addition, for business reasons, it may be useful to collect other information as part of a traceability system. Information related to product, processes, facilities/organizations and transport may be used by companies to improve the management and efficiency of their value chains, thus creating operational savings that could help "pay for" the collection of sustainability data. Some examples of where traceability information can improve operations

are: greater stock rotation, enhanced use-by data management, reduced shrinkage and distressed product sales, less waste, better management of targets (and rewards for reaching them) as well as improved service levels.

59. The table below gives an overview of the types of information to be collected as part of a traceability and transparency system. The specific data to be collected will vary, depending upon both the sustainability claims to be supported and the value-chain management and sustainability objectives of the implementing parties.

Table 2.2
Traceability Information

Table 2.2
Traceability Information

Product-related information	**Process-related information**	**Facility-related information**	**Transport-related information**
Origin → - Country and/or Region **Composition →** - Materials components - Product components **Technical Specifications →** - Materials specifications - Product specifications **Product identification (IDs) →** - Individual product/material - Product/material batch - Product/material trade unit **Quality →** - Characteristics - Inspections - Certificates/audit reports (product/materials) **Other management information →** - Cost(s) - Sales data - Surplus or damaged materials/product - Risks **Sustainability →** *See table below on sustainability data*	**Process inputs and outputs →** - Input volumes/weights - Output volumes/weights **Process events occurrence →** - Data - Time **Process identification (IDs) →** - Process (product) inputs - Process (product) outputs - Type of process - Equipment (machine) - Machine operator **Sustainability →** *See table below on sustainability data*	**Economic-operator details →** - Supplier - Manufacturer - Subcontractor **Location →** - Main production unit(s) - Subordinate production unit(s) **Facility & economic-operator identification (IDs) →** - Economic Operator - Main facility - Subordinate facility **Sustainability →** *See table below on sustainability data*	**Economic-operator details →** - Transport or freight forwarding company - Owner/Operator of the means of transport **Location →** - For picking up logistics units - For delivering logistics units **Transportation (IDs) →** - Logistics Units - Conveyance means (truck, railcar, ship, container if applicable) **Sustainability →** *See table below on sustainability data*

<table>
<tr><td>Product-related information</td><td>Process-related information</td><td>Facility-related information</td><td>Transport-related information</td></tr>
<tr><td colspan="4">Sustainability related information[16]</td></tr>
<tr><td>Environmental</td><td colspan="2">Social</td><td>Health & Safety</td></tr>
<tr><td rowspan="2">Inputs (Chemicals/Pesticides)
Water consumption and pollution
CO2 generated
Energy
Air pollution
Thermal pollution
Noise pollution
Soil and land degradation
Habitat loss
Deforestation
Biodiversity and ecosystem depletion
Livestock/Animal welfare
Waste/End-of-life →
- Durability
- Recyclability
- Reusability
Environmental management standards implementation</td><td colspan="2" rowspan="2">Human resources & Local communities →
- Child labour
- Forced and compulsory labour
- Land use
Labour practices-Human development & Social dialogue →
- Work & social protection conditions
- Trade unions and collective bargaining
- Wages
- Working times
Employment & Employment conditions →
- Sexual harassment
- Gender inequality
- Discrimination
- Homeworkers</td><td>Health & Safety →
- Norms and standards implementation</td></tr>
<tr><td>Ethics
Compliance with legislation/regulations
Anti-bribery/corruption
Permits
Contracts</td></tr>
<tr><td colspan="4">Sustainability Certificates (or Inspection Reports)</td></tr>
<tr><td colspan="4">Certificate Type
Certificate ID
Issue and expiry dates
Issuing agency ID (optional: name & address)
Standards certified/inspected for
Claim and approved or not
Additional data</td></tr>
</table>

3. Logistics unit

60. Giving IDs to logistics units is important for preserving chain-of-custody information across transport activities. There is, however, nothing more to add to their description than what is found in the table at the beginning of this section.

[16] OECD (2018), OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector; ITC Standards Map (2019); UNEP (2020) draft report for circularity and sustainability in textile value chains (to be issued in September 2020); SA8000® Standard - SAI - Social Accountability International; Sustainable Apparel Coalition (2018); Global Reporting Initiative, Sustainability Reporting Standards (2018), Boston Consulting Group and Global Fashion Agenda (2018); UNECE 2018

4. Unique identifiers (IDs)

61. Traceability requires information about traceable assets, including information about their what, where, when, who and why. To specify the asset and link it to events, each of the following six data components of a traceability system that are related to an event must have a unique identifier (ID) if a system is recording information about that component.

- **Party** (company or individual – farmer, tanner, ginner, weaver, subcontractor...)
- **Traceable asset** (raw material, intermediate or finished product, production or product batch, or trade unit)
- **Facility** (farm, manufacturing site, etc.)
- **Process** (harvesting, spinning, dyeing, etc.)
- **Location** (farm, production site, etc.)
- **Transport** (means of conveyance for goods and **logistics units** used for transporting traceable assets).

62. Each event that affects the traceable asset should be registered and linked to the relevant ID(s).

63. The uniqueness of IDs for traceable assets should be ensured by whomever assigns the ID, which could be a party within a company (i.e. for production batch IDs) or a trading partner in the value chain (i.e. for trade-unit numbers such as packages), etc. It is also important, to the maximum extent possible, that IDs be selected and attached to traceable assets in a way that prevents the ID from being counterfeited or lost.

64. Because value chains include multiple partners, interoperability (ability to exchange data with a minimum amount of transformation) is important. The best way to achieve interoperability is to agree upon a common standard for both IDs and the format of the data to be exchanged. There are many options for ID standards, a number of which are shown in table 2.3 below. For operating purposes, it is important that each supply chain participant have control over their own IDs, within the context of the agreed standard.

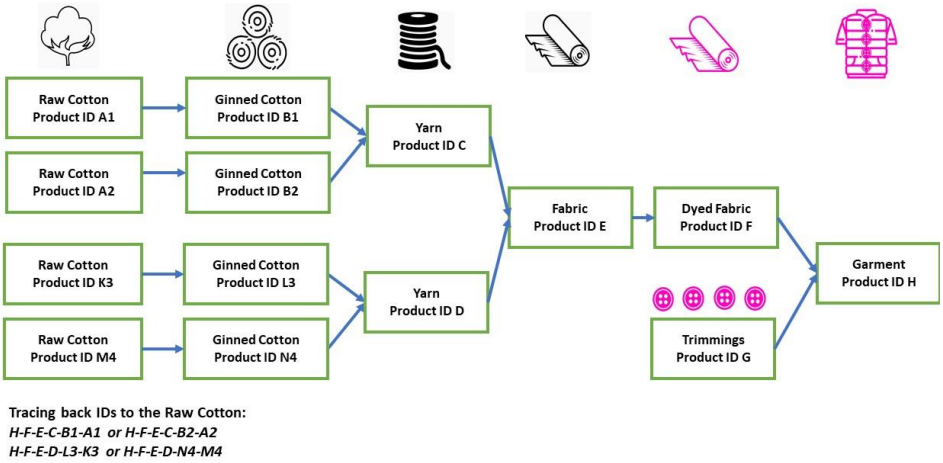
(a) Maintaining traceability information across product transformations in the value chain

65. The majority of traceable assets are transformed as they move through a value chain. Therefore, the effectiveness of a traceability system depends upon maintaining accurate links to information about materials and products as they move through various transformations.

66. For example, at the beginning of the value chain, the traceable asset may be a bale of cotton, which is transformed into thread, then into cloth and, at the end, it may be a shipping carton of cotton shirts. Each of these traceable assets (cotton bale, thread, fabric, carton of shirts, etc.) must have a unique ID that is linked to the unique ids of the input(s) used for its creation.

67. In other words, all the transformations which a given traceable asset passes through should be recorded in a way that it can be associated with its "ancestors" (i.e. the IDs for the inputs to the traceable asset), and with its "progeny" (i.e. the IDs of the outputs where the traceable asset was an input). Because value chains can be quite complicated this can result in different scenarios for the splitting, joining and merging of traceable assets.

Figure 2.2



68. Maintaining accurate links between IDs across the value chain is called *referential integrity*. In order to monitor the referential integrity of identifiers for traceable assets along the value chain, as well as for verifying other traceability information, links must be established between identifiers for traceable assets and identifiers for companies and physical places. A range of options exist for IDs, some of which are given in the box below.

Table 2.3
Examples of IDs

ID	**Type of ID**
United Nations Location Code (UN/LOCODE)	Location
Global Legal Entity Identifier (LEI)	Organization
Global Trade Item Number (GTIN)	Product
National tax IDs for companies	Organization

69. The information linked to IDs depends upon what the "Requestor of Traceability" has asked for and what is needed to perform due diligence in support of the claim. There are a wide range of options including test or audit results, the IDs for inputs, the certification status of value-chain participants and/or the certification of specific locations, production lines or processes within a larger company), etc.

70. In addition to changing when there are transformation events, IDs for traceable assets may change based on aggregation or dis-aggregation events. To give a simple example, aggregation could be the placing of multiple products in one box for sale as "a box" and disaggregation could be the removal of products from a box for the purpose of sale as individual items. If the custody and/or location of goods is being traced, it is also important to record unique IDs for logistics units. A logistics unit is created when traceable assets are aggregated (put together) or disaggregated for the purposes of transport and the size of logistics units can range from boxes to pallets to containers.

71. Information about possession of the goods (for example by processors, sub-contractors, transporters and/or warehouses), is also known as "chain of custody" (see box 2.1). This can be used for inventory management, for locating goods and for identifying who possessed goods and when negative events occur such as damage or "contamination" with goods from outside of the traceability network (i.e. with goods that may not conform with the product claim).

72. Successive links in the value chain between traceable assets, and between traceable assets and logistics units, should be recorded. For this to happen a traceability system should:

- Ensure a secure integration between the physical product levels (represented by the unique IDs for traceable assets) and the information associated with IDs at each level.
- Ensure an accurate history of traceable assets [17] throughout the transformation, shipping and storage processes. This history includes: i) the links between IDs (i.e. between input and output IDs and between logistics-unit and traceable-asset IDs) and ii) the links between traceable-asset IDs and associated information about some or all of the traceability components listed at the beginning of this section.
- Predefine, in line with company objectives and the product claim(s), the information to be recorded during transformation, aggregation and dis-aggregation processes throughout the entire value chain.
- Ensure continuous monitoring and periodic validation of the data recorded at each process stage.
- Associate the flow of information with the physical flow of the products by registering departures and arrivals.

In summary, implementors will need to put in place two types of identifiers:

1) Unique identifiers for the identification of categories or types of entities. For example, types of garments (SKUs), machines, materials, etc. For many of these categories, for example, type of package or type of transport mode, there are existing standards in the form of code lists. Some of these are maintained by industry bodies, some by standards bodies such as UN/CEFACT.
2) Unique identifiers for individual entities. For example, products with serial numbers, companies, production batches, shipping containers, etc.

For some entities both types of identifiers will be needed, for some only one.

Which IDs need to be implemented and when will depend upon the claims being made, the products, processes, etc. Following is a list with some of the entities for which IDs, of both types, are frequently implemented.

Entities for which IDs are frequently implemented			
• Parties • Organizations • Production Facilities • Production Units	• Materials • Products • Product Batches • Production Processes	• Transport means (i.e. trucks) • Transport containers • Logistic Units	• Location (for any entity, but frequently for facilities, storage, transport pick up or delivery, etc.)

[17] In the case of "book and claim" based traceability systems, the certificates used for "booking" the claims must be firmly linked to the traceable asset that the claim is being made about. For example, if the claim is about use of organic cotton and certificates are purchased to claim as organic 100% of a cotton batch A, as that cotton goes through the value chain, and is mixed with cotton for which no certificates were purchased, it is important to ensure that the "claimed" amount of organic cotton content does not exceed the amount of cotton specified on the purchased certificates that come with batch A.

73. Information about possession of the goods (for example by processors, sub-contractors, transporters and/or warehouses), is also known as "chain of custody" (see box 2.1). This can be used for inventory management, for locating goods and for identifying who possessed goods and when negative events occur such as damage or "contamination" with goods from outside of the traceability network (i.e. with goods that may not conform with the product claim).

Box 2.1
Traceability or Chain of Custody?

An often-used definition of **traceability** is found in the International Standardization Organization (ISO) standard 8402 which defines it as: "The ability to trace the history, application or location of an entity by means of recorded identifications." In another ISO example, traceability is defined in ISO 9000 and ISO 22005 as "The ability to trace the history, application or location of that which is under consideration" (Olsen, P., & Borit, M., How to define traceability, Trends in Food Science & Technology (2012), http://dx.doi.org/ 10.1016/j.tifs.2012.10.003).

A "traceability system" is one that implements traceability as described in one of the very similar definitions given above.

Chain of Custody in supply chains has its origin in the legal term which refers to, "A chronological documentation of the handling of evidence throughout a criminal investigation....When a trial takes place, the prosecution and defence use evidence to prove the facts of the case.... A primary means of authenticating an item involves analysing the chain of custody for evidence. This refers to the chronological documentation of who handled it, what they did with it, and where they stored it."[1]

If you substitute "product" or "traceable asset" for "it" in the last sentence, then you also have a good definition for chain of custody in value chains.

This illustrates that the concepts of "traceability system" and "chain of custody" are very close and, at least in some cases, appear to be synonymous (when traceability starts at the moment of creation of a traceable asset). Unfortunately, in the literature on traceability and chain of custody there does not appear to be a consensus on the difference, so one can find different texts that give almost the same definition for traceability as for chain of custody and vice versa.

Therefore, in these Guidelines

- "Traceability" is defined as "the ability to trace the history, application or location of an object" in a supply chain (ISO, 2015).
- "Traceability system" means the practical system of processes, procedures and information exchanges that implements traceability.
- "Chain of Custody" refers to the documented chain of parties who had possession of the goods at every moment between the entry and exit points in the value chain where traceability took place (ISO / PC 308 ISO (draft) standard 22095).

74. Successive links in the value chain between traceable assets, and between traceable assets and logistics units, should be recorded. For this to happen a traceability system should:

- Ensure a secure integration between the physical product levels (represented by the unique IDs for traceable assets) and the information associated with IDs at each level.
- Ensure an accurate history of traceable assets[18] throughout the transformation, shipping and storage processes. This history includes: i) the links between IDs (i.e.

[18] In the case of "book and claim" based traceability systems, the certificates used for "booking" the claims must be firmly linked to the traceable asset that the claim is being made about. For example, if the claim is about use of organic cotton and certificates are purchased to claim as organic 100% of cotton bale A, as that cotton goes through the value chain, and is mixed with cotton for which no

between input and output IDs and between logistics-unit and traceable-asset IDs) and ii) the links between traceable-asset IDs and associated information about some or all of the traceability components listed at the beginning of this section.

- Predefine, in line with company objectives and the product claim(s), the information to be recorded during transformation, aggregation and dis-aggregation processes throughout the entire value chain.
- Ensure continuous monitoring and periodic validation of the data recorded at each process stage.
- Associate the flow of information with the physical flow of the products by registering departures and arrivals.

5. Traceability models

75. "Traceability model" refers to the organization of a value chain in order to ensure that traceability can be implemented. There are different traceability models whose usefulness depends upon the type of product and the claims being made. The most appropriate model may also change along the value chain. Therefore, value chains may need to implement more than one traceability model. Examples of traceability models which can be applied to products throughout the entire value chain are product segregation, mass balance, and book and claim.

76. The most appropriate traceability model will depend upon factors such as:

- The nature of the traceable asset; for example, the smallest unit of raw cotton from a farm that can be traced is probably a bale of cotton.
- The claim; for example, if the claim says, "this is a real brand X product and not a counterfeit", then the traceable asset will be the finished product and not, necessarily, its components. There are also significant differences in the traceability required for claims about materials (for example type of cotton) and the traceability for claims about processes or organizations (for example, no use of child labour).
- The capacities of value-chain participants; for example, some weavers may package their fabric in bolts and some in rolls, so it would make no sense to require the tagging of fabric bolts in a factory that makes rolls.

Figure 2.3

(a) Product segregation (the preferred and most demanding model)

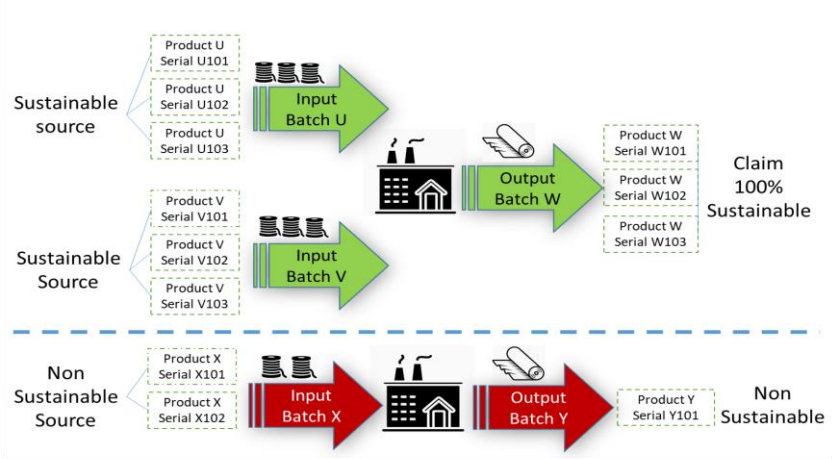
77. The preferred model for a traceability system is product segregation. The objective is:

- Products produced according to the same sustainability standard are strictly separated from other products.
- Bulk raw materials which are certified are strictly separated from non-certified materials (but at the same time allowing mixing of certified materials from different producers).
- Material which is certified is strictly separated from the noncertified materials throughout the value chain to provide traceability from a specific plantation to the final consumers (Identity preservation).

78. With product segregation there is a physical separation of certified materials and products from non-certified materials and products at each stage in the value chain. This ensures that certified and non-certified materials and products are not mixed and that the end product comes from a certified source.

certificates were purchased, it is important to ensure that the "claimed" organic cotton content does not exceed the amount of cotton that comes from bale A.

Figure 2.4
Product Segregation



79. There are two product segregation approaches: Bulk Commodity and Identity Preservation (IP). Whenever sellers are required to be able to identify the supplier of the traceable asset, Identity Preservation is required. For example, in the EU this is the case for timber and fish and in the United States for timber and conflict minerals.

- **Bulk Commodity** separates certified raw materials from non-certified materials but allows mixing of certified materials from different producers. All producers must comply with the certification standards. This model is often used for organic raw materials such as organic cotton or vegetables.
- **Identity Preservation (IP)** also requires segregation of the certified material from the non-certified material but it **does not** allow mixing of certified materials from different producers in the value chain. The IP model enables the traceability of products back to the originating farm, forest or production site. The IP model is sometimes criticized for being cost and resource intensive and requiring advanced technology since all material sources must be strictly separated, controlled and monitored at each stage of the supply chain. In order to implement the IP model, companies must know all their suppliers and collect and verify data at all levels throughout the supply chain.

80. Product segregation requires a well-defined administration and process design in order to be implemented.

(b) Mass balance (a moderately demanding method)

81. It is not always feasible to segregate sustainable and non-sustainable products and materials from the perspective of efficiency and/or production processes. In the Mass-Balance model, products from both sustainable and non-sustainable sources are mixed, but as they move through the supply chain an exact account is kept of the volume ratios. The purpose is to guarantee that the amount of sustainable content claimed is equal to the amount of sustainable products or materials used. As is the case for product segregation, implementing a mass-balance model requires a well-defined administration and process design.

Figure 2.5
Mass Balance

82. This model is commonly used for products and raw materials where segregation is very difficult or impossible to achieve, such as for cocoa, cotton, sugar and tea.

(c) Book and Claim (the least demanding model)

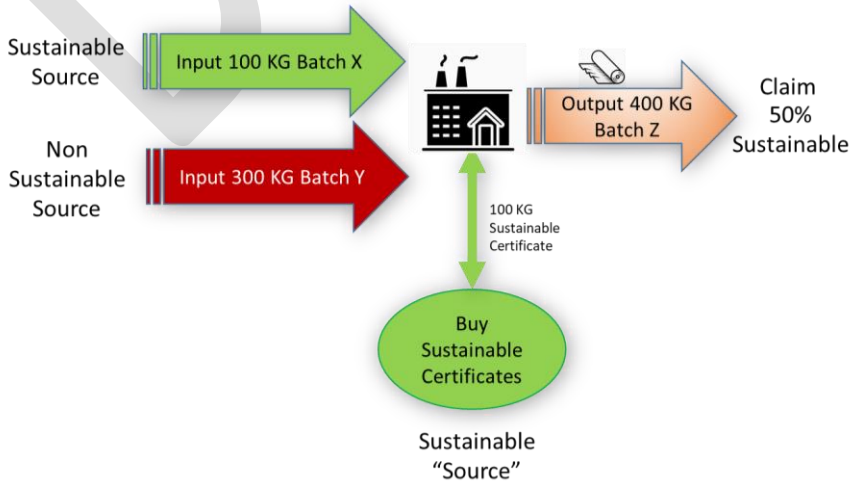
83. If product segregation is impossible (e.g. green electricity) or the registration of the volume ratios of sustainable and non-sustainable products and materials is impossible, a Book & Claim model can be applied.

84. When non-sustainable and sustainable physical products or materials are mixed and sold, the right to claim sustainable sourcing is traded in the form of sustainability certificates. A central authority monitors the sustainability claims by brands and retailers and compares these with the number of certificates issued and traded.

85. In the book-and-claim method there is a free flow and mixing of certified and non-certified assets, with no segregation of assets, so it is actually a mixed product that is sold. Instead, a producing company can obtain sustainability certificates for the volume of goods that it puts into the value chain which are certified as following a good practice. These certificates are then sold via a platform, or by the certifying organization, to companies who use the type of goods in question as inputs to their products. The purchaser of the certificates can then claim that their product supports the sourcing and production of raw materials grown or processed according to the good practice in question – even if it is not certain that their product actually contains certified material.

86. The earnings from the sale of certificates is then used to make payments to the producers whose goods were certified as using the good practice, thus providing an incentive for other growers to be certified.

Figure 2.6
Book and Claim



87. This model is typically used when the production and market conditions make it impractical to sell certified product that has been segregated from non-certified product. At

the same time, this model requires audit trails in order to demonstrate that for every certificate sold, certified growers have been compensated for the associated quantity of certified goods. This model is used for soy and palm oil.

88. In summary, product segregation requires advanced Information and Communication Technology (ICT) implementations, in which the farmers and micro-, small- and medium-sized enterprises (MSMEs) participate. It is used for high-risk and delicate products, such as fresh food, high-value products and products where regulations require that the specific origin of the product be known. Mass balance and the book-and-claim models, on the other hand, require less advanced ICT systems. This is because they are based on a set of rules and require only periodic auditing by stakeholders. As a result, one factor that must be taken into account when selecting a traceability model is the ICT capabilities of participants in in value chains – which vary greatly.

6. Entry and exit points

89. Entry and exit points are the events (activities) at the start and the end of the traceability process within the value chain. At each of these points the traceable asset needs to meet specified criteria.[19]

90. **The primary factor in deciding upon entry and exit points should be the identification of what must be traced, and when, in order to support the claim.**

- Keeping in mind the claim, it is important to clearly establish the authorized activity(ies) or locations where the traceable asset enters and exits the **traceability** system.
- Based on the verification required for a specific claim, the transformation and logistics processes that take place between the entry and exit points in the value chain should be visible. Visibility at each node (activity or location) consists of providing a minimum set of information including a location ID, a timestamp for entry and one for exit from the activity, the ID for the traceable asset coming out of a process and the ID(s) for its ancestors (the inputs). This is greatly facilitated when there are information systems for data interchange, and standards for determining the types and formats of the data elements to be recorded.

91. This means the first step in developing the traceability solution is identifying the entry and exit points (value-chain activities) which mark the start and the end of the value chain that the traceability system will trace. Good choices for Entry and Exit Points are locations where business processes are well controlled, i.e. where there is a high level of automation and business processes are well documented and enforced.[20]

92. The traceable asset is assumed to have specific and defined states at the entry and exit points. An example of typical entry and exit points are landing zones in ports, Customs control points, inspection points, etc. For example, one system for sustainable furs uses a certification system for farms who have an ID that is registered with a third party and each fur has a unique ID tied to the farm it came from. As a result, auction houses can trace a pelt back to its origin. Therefore, the auction house could be a good entry point for a traceability system that supports a claim about good animal welfare practices at fur farms.

93. Another example, from Costa Rica, is for tracing shark fins (an internationally controlled product) where an entry and exit point could be defined as follows:

- Entry Point: Medium or large-scale longline boats must land sharks in a Costa Rican port that is authorised by the Costa Rican Ministry of Fisheries and under no circumstances without the presence of a fishery inspector.
- Exit Point: Submission of Customs declaration for the export of sharks or derived products.

[19] The document ECE/TRADE/429 provides guidelines to take into consideration when deciding upon, reporting and monitoring traceability systems' entry and exit points.
[20] For further detailed, see document ECE/TRADE/429.

7. Verification criteria

94. Verification criteria are the standards and key performance indicators that traceable assets are supposed to meet and the rules for the supporting traceability process. These criteria are the basis upon which verification processes are carried out by auditors or other verification agencies in order to prove that the traceable assets have complied with relevant claims.

95. As discussed above, for the success of a traceability system it is important to have well-defined states at the entry point and the exit point as these are among the verification criteria.

96. Other verification criteria that may be useful include:

- Defined governance options and mandates that assign responsibilities for the co-ordination, implementation and distribution of traceability tasks and their verification.
- Procedures for organizing, recording and reporting **product conditions** at entry/exit points as well as at transformation, aggregation and disaggregation event points (see the section on traceable assets above) as well as the beginning and end of shipment processes in line with regulatory guidelines, standards or certificates or other sustainability criteria.

8. Verification processes: the role of audit and certification

97. A traceability system can be imagined as a filing cabinet because it requires the systematic identification, storing and retrieving of data. Importantly, neither a traceability system nor a filing cabinet care about what types of data are being stored.[21] Fraud and errors can falsify records or render them incomplete; thus, the need to verify data, using comprehensive verification methods, including audit, certification, chain of custody information, and physical markers.[22] The level of verification and the methods used depend upon the requirements defined by the Traceability Requestor.

(a) Audit

98. To create confidence in a claim an audit process should take place in order to confirm that the predefined rules for the traceability process have been followed, and prove that the traceable assets comply with the defined sustainability requirements and their performance indicators.

99. An audit agency performs audits to protect the integrity of the claim and may include audits of management systems. The agency collaborates with relevant value-chain partners and government agencies. It receives data on relevant events in the value-chain transactions and evaluates the information against the defined conditions and rules.

100. The role of the audit agency is to:

- Examine data from the relevant Entry/Exit Points in the value chain
- Examine data on the business processes recorded between the entry and exit Points (i.e. traceability events)
- Ensure that the data recorded for traceability is consistent with what is actually happening in the value chain
- Monitor and safeguard traceability by ensuring that assets meet entry/exit conditions and rules are applied correctly.

101. The audit agency could be: from the public sector, connected to a ministry; from the private sector, for example an industry association or a private inspection agency; or it could be a public private sector partnership (PPP), such as an inspection agency appointed by a government.

[21] Olsen and Borit, 2013.
[22] Kelly et al., 2011.

(b) Certification

102. Certification of sustainability practices can be an important tool as part of a company's due diligence. At the same time, it is worth mentioning that it is a complementary and not a sufficient tool because it needs to be undertaken following best practices and implemented in conjunction with robust traceability. Certification plays a similar role to that of independent audits (third party validation of sustainability claims), as its role is primarily for verification. Certification can provide trust and facilitate the collaboration process among value-chain actors. At the same time, it imposes additional administrative and organizational costs and, when it is used, best practices should be followed. Certification for sustainability processes that follow best practices:

- Are independent
- Are aligned with internationally recognised standards for sustainability and circularity of value chains in garment and footwear (e.g. ILO fundamental labour standards, OECD due diligence guidelines, etc.)
- Evaluate both environmental and social criteria on a scientific basis
- Follow a risk-based approach
- Verify full chain-of-custody with an eye to avoiding fraudulent mixing of non-certified materials
- Are easy to use and understand
- Are affordable and scalable
- Make training available to small value-chain actors on how to follow the standards and practices upon which the certification is based.

103. Certification bodies should document the governance of their certification process as well as the criteria and methods used, in a transparent and clear manner.

D. Cost allocation and incentive systems

104. Estimating the implementation cost of a traceability and transparency framework and making decisions on cost allocation is a key element in its uptake and implementation. In this connection, a key role is also played by effective and efficient systems of both public and private incentives and accountability mechanisms

105. Costs related to traceability and transparency exist in two forms: the first is the cost linked to the development of the system; the second is the cost for its ongoing implementation, including for data collection, supporting data exchange between systems, inventory management and labelling. In addition, there may be costs associated with meeting sustainability verification criteria such as certification or audit. It is important to highlight that development costs also include identifying and implementing a standardized dataset for information exchange among partners. The use of such standardized datasets is key to ensuring that everyone is "speaking the same language" and that shared data is interpreted consistently and correctly. The decision about which information exchange standards to use should consider not just the costs on a short-term basis, but also the longer-term efficiency gains from having common data standards used by all actors across the whole value chain. The UN/CEFACT information exchange standard for traceability and transparency of sustainable value chains in the garment and footwear industry serves this purpose.

106. When deciding the cost structure for value-chain partners, criteria that could be taken into consideration are:

- How the profit margins are distributed
- The relative price of partners' outputs
- Partners' product volumes
- Partners' needs

- The allocation of benefits from the traceability system.

107. When it comes to incentive systems for value-chain partners, two main types of **incentives** can be identified: financial and non-financial.

108. **Financial incentives** include economic and fiscal incentives, both positive and negative, that **Governments** can adopt to support value-chain traceability and transparency. Among these possible incentives are:

- Financial support to digital technological innovation
- Investments in physical and digital infrastructure
- Direct incentives for the development of interoperable solutions and digitalization
- Preferential financing loans and grants on the base of traceability and transparency criteria
- Funding of feasibility studies and pilot projects, in particular in value chains with a high concentration of SMEs.

109. Governments and, for developing countries, also financial institutions and donors, should consider supporting projects that create shared value for a large number of stakeholders and value-chain actors, giving priority to SMEs and small suppliers in emerging countries.

110. On the other end, **industry actors** such as brands and retailers, could consider implementing private financial incentive schemes for: suppliers of traceable fibres and materials, or suppliers with harmonized, or interoperable systems or small suppliers needing assistance in order to cover part of the initial implementation cost.

111. **Non-financial incentives** are complementary to financial incentives. On the **government** side, such incentives could include:

- Measures to facilitate market access
- Fast-track processes and expedited customs clearance for products with higher traceability and transparency
- Specialized managerial and workforce training
- The development and nurturing of open source tools (see box 2.2)
- Traceability and transparency criteria for green and socially responsible public procurement
- Cradle to cradle criteria as part of an overall policy for waste management supported by government procurement and
- Public visibility, both positive and negative.

In addition, **industry actors** could encourage participation through user-friendly interface designs for the Apps used for data entry to make this as simple as possible and free training for SMEs in their value chains.

112. The underlying principle behind the use of incentives is to lighten the burden for actors such as SMEs, women-led firms and value-chain participants in developing countries.

113. With regard to responsibility**,** a **shared accountability** principle is suggested: every actor in the value chain should be held accountable for any lack of traceability and transparency within their "link" in the chain. The role of Governments is to adopt and enforce regulatory systems (in particular, norms) that create a level playing field both within their country and at an international level. Intergovernmental Organizations and International Non-Governmental Organizations can help by supporting the alignment of initiatives and legislation around a model regulation for traceability and transparency, both in developed countries where value chains are often "designed" and in developing countries where manufacturing and labour-intensive activities are predominant. Legislation should enable accountability and identify remediation mechanisms and mediation actors.

Box 2.2
Definition of Open Source

Open Source makes available free resources, thus facilitating access by SMEs, developing countries and academic institutions as well as allowing large organizations to make better use of their resources. It originated with Open-Source Software and, over the years, has also taken hold in engineering and other fields. A definition of Open Source Software can be found on the website of the Open-Source Initiative (OSI) at https://opensource.org/osd. Open source use is based upon the granting of licences and variety of standard licences meet this definition. The most used are listed at https://opensource.org/licenses.

A summary of the OSI open source definition is below. It is, generally, also applicable to open source in other fields - if one substitutes relevant equivalents for the terms "source code," "program(s)" and "software". Places where there is additional text in the definition are marked with "…"

*"**The distribution terms of open-source software must comply with the following criteria:***

*1. **Free Redistribution**.....*
*2. **Source Code -** The program must include source code, and must allow distribution in source code…*
*3. **Derived Works -** The license must allow modifications and derived works….*
*4. **Integrity of The Author's Source Code**.....The license must explicitly permit distribution of software built from modified source code. ….*
*5. **No Discrimination Against Persons or Groups -** The license must not discriminate against any person or group of persons.*
*6. **No Discrimination Against Fields of Endeavor -** The license must not restrict anyone from making use of the program in a specific field of endeavour....*
7. Distribution of License
The rights attached to the program must apply to all to whom the program is redistributed....
8. License Must Not Be Specific to a Product...
***9. License Must Not Restrict Other Software**... that is distributed along with the licensed software*
10. License Must Be Technology-Neutral..."

E. Supporting role of advanced technologies

114. Global value chains pose great challenges for risk management particularly in the area of sustainability. To address these challenges, an increasing role is being played by advanced technologies such as distributed ledgers (blockchains), Artificial Intelligence (AI), machine learning, the Internet of Things (IoT), and DNA marking – to name just a few.

115. Among the key challenges in value-chain risk management are the need to collect large amounts of trustworthy data across many participants and geographic areas as well as the need to analyse this data in a timely manner. Advanced technologies have an important role in these areas and can help stakeholders to: comply with due diligence; implement traceability and transparency requirements in support of sustainability; and improve their operations.

116. Advanced technologies, such as those listed in table 2.3, can support improved value-chain traceability and transparency by:

- Making standardized information about product origin and other characteristics, such as those for sustainability, available in a transparent and standardized way
- Facilitating the real-time sharing of reliable, up-to-date information
- Assigning reliable digital identities to products, parts and components
- Collecting and storing information about these identities

- Analysing large volumes of data in support of improved risk and operations management.

117. It is important, as discussed in the section on inclusiveness, to ensure that the use of advanced technologies is an inclusive process and not one that ends up excluding participants. At the same time, advanced technologies have a catalytic role to play in creating higher connectivity between value-chain partners and incentives for stakeholders to invest over the long term. They can turn challenges into new opportunities for a responsible industry, building confidence that facilitates trustworthy and efficient data collection and verification as well as improved analysis.

118. There are a number of policies and practices that can support the use of advanced technologies. For instance, access is facilitated by support for training in new technologies, open innovation and open source software (see box 2.2), as well as by the development of information infrastructure such as affordable Internet access and an active ICT services sector.

Table 2.3
List of advanced technologies that can support traceability and transparency

Advanced technologies	**Supporting role in traceability and transparency**
Artificial Intelligence (AI) and machine learning systems	Can use the data from traceability systems for risk analysis, for optimizing value chains and operating processes as well as for tracking textile waste.
Blockchain	Provides enhanced data reconciliation and tracing; trustworthy, real-time data updating and access to the same information by multiple stakeholders - thus providing the same "truth" for everyone; and improved confidence in the trustworthiness of data A separate text box, below this table, describes two recent blockchain initiatives in textile sector.
Internet Cloud Services	Allow multiple parties to share common software services as well as to access and update the same data sources.
Distributed databases and data pipelines	Allow access to data stored in multiple locations using tools similar to those for accessing a single source of data, thus avoiding some of the problems of central database administration while offering an experience that is similar to the user.
Internet of Things	Increase automation in data collection. In addition, as low-energy and sensor technologies for IoT devices advance, they also allow for the automated collection of new data (such as the temperature inside of containers and other logistics units or the use of water/chemicals by manufacturing machinery)
Advanced product labelling • Quick Response (QR) codes • Product DNA labelling • Radio Frequency IDs (RFID) • Near-Field Communications (NFC) labels	Allow the "attaching" of additional data to traceable assets and the automated collection of higher-quality track and trace information. These labelling technologies, which include both digital and physical markers, when used together with other technologies such as blockchain and AI, can also provide: • Greater accuracy in physical raw material tracing through multiple product transformations (i.e. from raw cotton to fabric)

Advanced technologies	Supporting role in traceability and transparency
	• Higher speed and automation • Lower costs in tracking data that is attached to products

Box 2.3
Blockchain pilot projects

Among recent pilot projects supported by public funding is, "**Blockchain for Made in Italy Traceability**". Launched by the Italian Ministry of Economic Development, and developed in collaboration with IBM, this project will assess the use of blockchain technology to implement traceability as a tool for promoting Made in Italy claims and anticounterfeiting. The public support was financial and organizational, the latter being especially relevant given the consultation activities needed in order to guarantee an inclusive approach.[23]

The UNECE **blockchain traceability pilot for organically farmed Egyptian cotton** is supported by EU financing and implemented in partnership with industry actors.[24] It aims to 1) Show the possible use of blockchain technology to support increased connectivity, higher cost-efficiency and strengthened due diligence and the technology's ability to support sustainable sourcing for retailers, brands and manufacturers along the cotton value chain; 2) Demonstrate the capacity of firms operating in the cotton value chain to take risk-informed decisions and use a set of internationally agreed traceability and sustainability standards.

The pilot will cover traceability of sustainability characteristics across all the production steps of the value chain and includes the identification of relevant business and sustainability data as well as of key hotspots in the cotton value chain and related sustainability criteria and verification tools. When completed, a stakeholder group will assess the pilot's scalability to other textile fibres. The pilot will also test the use of DNA markers to keep the connection between the physical and digital assets being traced with the support of blockchain technology.

119. Given the large variety of available technology-based solutions for supporting traceability and transparency, it is important to have appropriate criteria for evaluating and selecting them. Some suggestions for possible "best practice" criterium are given in the table below.

Table 2.4
Matrix of criteria for selecting technology-based solutions tools for traceability

Criteria/need for selecting technology-based solutions	Impact
Ease of use ("user friendliness")	A key factor in the uptake of technology and its correct application by users is the ease with which it can be used.

[23] Source: https://www.mise.gov.it/images/stories/documenti/IBM-MISE-2019-INGLESE.pdf
[24] The pilot is implemented in collaboration with brands Hugo Boss, Stella McCartney, Vivienne Westwood and Burberry, raw material providers Alba-Group, Albini and Filmar, standard-setting bodies and technology providers GOTS, OEKO-TEX, ZDHC and in collaboration with Organic Cotton Accelerator, Textile Exchange, Cittadellarte Fashion B.E.S.T and the Italian Ministry of Economic Development and UNIDO.

Criteria/need for selecting technology-based solutions	**Impact**
Interoperability with a wide range of systems, platforms and technologies for the purposes of data collection, validation and publication	Interoperability is a key element in collecting and sharing data across multiple stakeholders and systems.
The use of existing international standards such as UN/CEFACT standards, for data acquisition, transmission and exchange	Data standards greatly facilitate interoperability and the exchange of data across systems.
The ability to use automatic rules in a system, and to efficiently change those rules as the environment evolves	Greater efficiency and the ability to modify a system based on experience and changes in the environment. The ability for implementing organizations to change decision parameters also reduces IT maintenance costs and reduces the risk of vendor "lock-in"
Virtual and physical training is available to support the use of technology solutions	Good quality training encourages actors' engagement and good uptake
Simple, lean and accessible processes	Such processes are more cost-effective because of the reduced time and effort to achieve organizational goals and they are also more likely to be correctly implemented.
Technology solutions (such as IoT) that provide direct access to real-time information on sustainability in manufacturing processes, such as water, chemical and energy use.	Better, more accurate information about processes both for sustainability reporting and operations management
Differentiated information access rights, allowing the existence of a central data source but giving system owners the ability to give "reading and updating" rights according to the roles and interests of stakeholders.	More transparent sharing of information and efficient changes in the "sharing" status of data. For example, one NGO could be given information about current working conditions and another information about current water usage (but not working conditions).
Quick and efficient scaling solutions and partnerships	Cost effective implementation in systems where growth may lead to large numbers of stakeholders
Support for SMEs	Traceability which can be extended further up the value chain in order to include SME suppliers
Technology solutions that do not create "lock-ins" which make it difficult to change systems or suppliers	The ability to be more flexible and change systems in the light of evolving technology or needs – or if a given technology solution does not perform as promised.

120. The above can be used as input into the specifications for a system. When developing purchasing (procurement) specifications and/or developing regulations that require

technology it is best practice to define the requirements in a technology-agnostic way. This means defining the performance parameters that must be met and **not** specifying the use of any particular technology/ies. For example, one system performance requirement could be the processing of X number of transactions in Y time and with a maximum error rate of Z – or the ability to track goods back through 5 supplier tiers and 8 product transformations (for example the transformation from raw cotton into cotton thread). Specifications linked to a particular technology or version of a standard should be avoided in order to mitigate the risk of rapid obsolescence or irrelevance for systems and regulations.

121. It is also important to keep in mind that while technology may provide useful tools, data quality and, therefore, system reliability, can be impacted by a number of non-technological factors. These include what information is captured, when and by whom as well as data-quality controls that are in place. Therefore, when designing traceability systems, regardless of the technology used, data accuracy and neutrality need to be a priority as well the auditability of the system.

F. Creating inclusiveness in traceability systems

122. In order to implement a resilient traceability framework and create shared value, policymakers and industry actors must be inclusive. This means addressing the digital divide, ensuring gender equality, supporting SMEs and taking into consideration the special needs of developing countries. How to approach inclusiveness in each of these areas is addressed in the sections below.

123. In addition, when designing a traceability framework, in order to be inclusive, it may be necessary to take a differentiated approach to implementation. This means tailoring requirements to the capacity of value-chain partners based on "steps" which may go from a basic manual record-keeping process to one that is highly automated.

124. Policymakers should also be approached since they can play a catalytic role in creating multi-stakeholder and multi-sectoral dialogues on inclusiveness as well as by supporting coordinated action. Multi-sectoral initiatives can make a special contribution by sharing the results of efforts already taken in other high-risk sectors such as agri-food, timber and minerals in order to address the issues described below.

1. The digital divide

125. Most of the technologies used in traceability and transparency systems are based upon the digital revolution and, therefore, pose the risk of deepening the digital divide between urban and developed country stakeholders and rural, low-income, and developing country stakeholders. In global trade, smaller actors who fail to keep up with the pace of digitalized processes could be undermined, resulting in substantial socio-economic impacts.

126. From the outset, it is critical to consider several potential impediments to the use of technology, keeping in mind that the most important are often cost and access, followed by language and a lack of available training.

127. Some actions that can, at least partially, address these concerns include making available low-cost devices and user-friendly[25] data collection tools to ensure that smaller actors (at farm and factory levels) in producing countries can provide the required information. In order to have efficient and effective tools, their design should take into consideration the language of users, communication channels and the provision of content which will build the confidence needed to support widespread use.

128. Lastly, engagement and participation are important prerequisites for enabling technology. For all stakeholders, these can be strongly supported by solutions that are as simple as possible, easily accessible, cost-efficient, and flexible in their implementation. In

[25] (Google, Microsoft) https://www.microsoft.com/design/fluent; https://www.microsoft.com/design/inclusive/; https://material.io/

addition, it is essential to have awareness-raising on the potential of technology and capacity-building for using technology-based solutions

129. In order to have a successful implementation of tracking and tracing across an entire supply chain, it is important that an evaluation of stakeholder's technological readiness be undertaken, and preliminary actions taken to alleviate any issues highlighted by these evaluations.

130. Policymakers and key industry actors also have a key role to play in scaling up innovative solutions to these problems, as well as spurring coordinated action, collaborative approaches, and partnerships in order to ensure the accessibility of technology at a global scale for all stakeholders.

2. Gender considerations

131. The search for flexibility, higher productivity and low prices, have had two main results: i) the outsourcing of textile and apparel work to developing countries and, 2) in all geographic regions, the prevalence of women in the workforce – undoubtedly influenced by both the image of the sector and the generalized practice of paying lower wages to women (UNEP, 2020). The clothing industry directly employs 60 to 75 million[26] people worldwide, of which about 75 percent are women, which is a very substantial share of the industry's workforce and of the support for the industry's economic growth. Nonetheless, only an exceedingly small percentage of women reach management and supervisory roles.[27]

132. As emphasized in the OECD Due Diligence Guidance for Responsible Business Conduct,[28] gender-issues are a key element when implementing due diligence. As a result, activities need to have tailored approaches for evaluating adverse impacts (human rights, environment, health, etc.) which are specific to women in an industry where employment is often precarious, informal or irregular.

133. Supporting gender equality with traceability systems depends upon the claims being made regarding gender and how these will be validated and registered in the traceability system. Therefore, it is important to work with local partners to identify measurable indicators. Some examples of gender-related claims are given in table 2.5.

134. When deciding upon actions in support of gender equality it is essential to assess how impacts may differ for women depending upon their circumstances, which may include accumulated vulnerabilities (e.g. women who are also home-based workers, migrants, minorities, etc.) and to consider women's specific positions at all stages of the production chain.[29]

135. To create real change will require supporting women's economic empowerment and their promotion into leadership positions along value chains. Traceability and transparency can have an impact by measuring the results of measures taken to reach these goals.

Table 2.5
Samples of gender-related Claims

The apparel item (product/part/component) from *X suppliers* in *Y country* was manufactured in a factory which provides job opportunities for women in working conditions which comply with the standard Z.

[26] (UNECE-UN/CEFACT 2017) TEXTILE4SDG12 Transparency in textile value chains in relation to the environmental, social and human health impacts of parts, components and production processes.
[27] European Commission (2017) STAFF WORKING DOCUMENT – Sustainable garment value chains through EU development action.
[28] OECD (2018), OECD Due Diligence Guidance for Responsible Business Conduct.
[29] OECD (2018), OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector, OECD Publishing, Paris.

The apparel item from *X suppliers* in *Y country* was manufactured in a factory which has women in leadership and management positions based upon policies which comply with the standard Z.
The apparel item (product/part/component) from *X suppliers* was manufactured in *Y* factory which endorses the standard *Z* promoting equal remuneration for women and men workers for work of equal value
The imported apparel item (product/part/component) from *X suppliers* was manufactured in *Y* factory which has been audited as compliant with standard Z for the prevention of gender-based discrimination and violence in the workplace.

3. Small- and medium-sized enterprises

136. Traceability can be a costly activity and, when this is the case, it puts enterprises on an unequal footing depending upon their size, available resources and human capacity. On the other hand, systems for improved traceability and transparency can be beneficial to smaller actors, particularly SMEs, if they simplify the procedures, bring cost-efficiencies, add value and help the SME to upgrade their practices. One core principle for widespread uptake and participation in a traceability system is flexibility in its implementation and the avoidance of a one-size-fits-all approach. The goal of traceability is not to overwhelm actors in the value chain, it is to improve their sustainability footprint over the long-term in order to create a responsible and resilient industry.

137. Small- and medium-sized enterprises (SMEs) account for a large share of companies in the industry, thus it is essential to consider their limited human and financial capacity prior to designing and implementing a traceability framework. To support this approach, UNECE-UN/CEFACT is proposing the use the traceability approach, taking into account the different capacities of smaller actors and larger enterprises. SMEs can be better integrated into a traceability system through a combination of financial and non-financial incentives such as increased market access, facilitated payments, specialized managerial and workforce training, infrastructure investment, fast-track processes and public visibility. Specific support also should be given to SMEs on technical and organizational aspects.

138. When developing a traceability system there are also some specific actions needed in order to enhance the trust between value-chain partners, such as in-person meetings and in-the-field visits in order to have a clear view of what data is collected and by whom. Longer-term, stable contracts also ensure confidence by helping to re-assure participants with regard to the purpose of the data being collected.

139. Civil-society organizations such as non-governmental organizations and trade unions also can play a key role in empowering actors by guiding and training local small stakeholders, not only to collect and enregister the data needed to meet the core requirements of a traceability framework, but also to showcase the value added of enhanced traceability and transparency to the local community in terms of social (labour conditions) and economic aspects (marketing and competitive assets).

4. Integrating developing countries

140. Global value chains in garment and footwear are scattered globally and upstream value-chain activities (from farming/cultivation and raw materials processing to manufacturing) are mainly undertaken in low and middle-income countries. When implementing traceability, low and middle-income countries' concerns must be considered. Much of what is said about inclusion for SMEs, also applies to low and middle-income countries, in part because the majority of their enterprises are SMEs. For example, just as for SMEs, in order to assure the effective functioning of a traceability and transparency solution, before implementation, an evaluation needs to be made of a solution's feasibility for actors located in the affected low and middle-income countries.

141. Enhanced traceability and transparency can support efforts by developing countries to implement due diligence and to identify and mitigate adverse impacts related to sustainability hotspots such as pollution, excessive energy use and poor labour practices.

142. It is also important to showcase, to national authorities, customs and industry associations, the added economic value of traceability, transparency and sustainability as tools for facilitating global market access and fostering domestic economies. For example, traceability and transparency can highlight and prove a product's origin, content and quality in order to attract a higher and fairer price. They also have the potential to support further market access by showing compliance with international and regional standards. For instance, being able to prove that a product meets the EU rules of origin may enable the product to be exported tariff-free. In addition, there is an increasing competitive advantage for producing and exporting countries if they can prove that they have taken action to support improved environmental sustainability and working conditions through the enforcement of internationally and acknowledged standards in social and labour sectors.

143. Enterprises in low and middle-income countries need to be open to implementation and willing to put forth effort for its implementation. In return, the price that the industry in emerging economies receives for their goods needs to reflect this extra effort for traceability and transparency.

144. Governments and government authorities need to put in place an enabling environment for traceability and transparency which comprises not only supporting regulations, but also technical infrastructure (notably affordable Internet access and ICT services), support for research and open-source technology solutions, and training for policymakers, officials and smaller stakeholders.

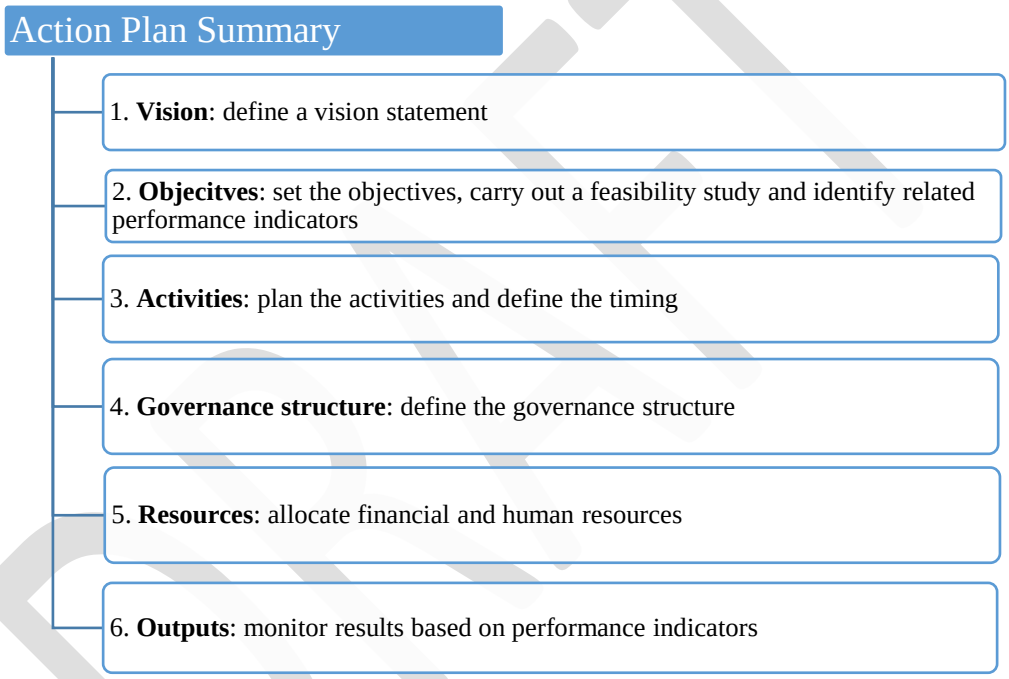
145. Intergovernmental and international organizations, finance institutions and national development agencies have a key role to play in providing financial support for capacity development activities and, in particular, for training on the implementation of international standards.

Annexes

Annex I
Formulation and implementation of a traceability and transparency Action Plan

1. When setting and implementing a traceability and transparency system, companies should consider developing an Action Plan in order to define a vision with specific objectives, corresponding activities, and key performance indicators. Such an Action Plan should also define a governance structure for implementing the foreseen activities, a budget for the needed financial and human resources, and mechanisms for monitoring and communicating progress against the defined performance indicators and timeframes. These steps are summarised in Figure A.2 below and are described in more detail in the remainder of this annex.[30]

Figure A.1
Action plan summary



1. Define a vision statement

2. The vision statement summarizes the objectives of a traceability and transparency system and the benefits for the stakeholders involved. The aim of the vision statement is twofold: it provides guidance and direction, and it serves as inspiration and a source of motivation. It should start from and be consistent with the overall corporate sustainability strategy since traceability and transparency are key enablers of higher sustainability performance and more efficient value-chain management.

- *Example: Our vision is to promote the application of the highest social, environmental and health & safety principles during the creation of products for our customers, throughout our entire value chain.*

[30] UNECE (2015): Guide to drafting a National Trade Facilitation Roadmap: https://www.unece.org/fileadmin/DAM/trade/Publications/ECE-TRADE-420E.pdf

2. Set the objectives, carry out a feasibility study and identify related performance indicators

3. The objectives define more in detail the future outcome that needs to be accomplished. Each objective contributes to the achievement of the vision statement. Objectives contemplated in the Traceability and Transparency Action Plan should be specific, measurable, attainable, relevant and time bound (SMART). The plan should be developed on the basis of a gap analysis, identifying the main requirements for a traceability system implementation and related resource needs. It should also set performance indicators to monitor and assess the achievement of the objectives or their results (i.e. Key Performance Indicators (KPIs)).

- *Example: The number of value-chain steps with an identified and verifiable sustainability claim as a percentage of the total number of value-chain steps.*
- *Example: The number of tracked value chain steps for each material and semi-finished/finished product against the total number of value-chain steps.*
- *Example: The number of identified and disclosed value-chain partners against the total number of value-chain partners.*

4. When formulating sustainability claims for products and their processes, the firm must clearly link them to the traceability and transparency objectives defined in the Action Plan. as well as to their verification criteria, data requirements, and related performance indicators. All of these elements are required in order to a vision of increased sustainability performance through improved traceability and transparency.

- *Example: Attain full traceability for the top 30% of our products, by collecting information about products and process characteristics, throughout the whole value chain, within 3 years.*
- *Example: Achieve full transparency for the top 30% of our products by providing easy access, clarity and regular updates about suppliers' compliance with our company's sustainability goals, throughout the whole value chain, within 3 years*.

3. Plan the activities and define the timing

5. The Action Plan needs to define how the objectives will be achieved, in other words, which activities should be implemented. In the context of the Action Plan, an activity is a specific action or project that will implement a traceability and transparency tool or solution.

6. Implementing a traceability and transparency system shall be considered with a long-term view.

7. Typical decisions concerning activities to achieve a *traceability objective* are about:

- The different types of information related to traceability that should be collected and recorded as well as by whom and how
- Which specific information needs to be shared, with who and how
- How frequently information will be shared
- Which technologies will facilitate the collection and sharing of information
- How should information be stored (according to who needs to have access to the data and how often)
- The performance indicators to be monitored
- When the content of the information should be reviewed
- How to best communicate information to end consumers to inform their decision-making.

8. Typical decisions concerning a *transparency objective* are the same as for traceability information but are about the information needed to verify sustainability claims – so one of the key additional questions for transparency is, "What information do we need in order to verify our claim?".

9. In addition, the following key considerations are important: easy access, clarity and regular updates. The examples below[31] refer to effective disclosure when publishing value-chain facility information, but can be easily extended to activities to enhance transparency of the value chain:

- It is important to guarantee easy access to information by making information easily and freely accessible on websites; and making information available in formats that are downloadable files and enable machine-readable searches.
- It is important to guarantee clarity in the disclosure by: clearly stating what precisely is being published and what definitions are being used; clearly stating whether all authorized subcontractors used by cut-make-trim factories for processes to complete a brand's products are included; indicating the aggregate volume of business that is captured by the disclosure and the percentage of total supplier factories published; indicating exclusions from disclosures, if any, and impending plans to expand disclosures.
- It is important to guarantee regular updates by: specifying the date when the information was last updated and how frequently the information is publicly updated; communicating achievements should not be considered a marginal activity since it is needed to justify the traceability claims, to educate consumers and to inspire other industry players with the final goal of improving garment and footwear sustainability performance.

10. Some examples of related objectives are below.

- *We will invest (amount)EUR in advanced traceability technologies to reduce time and cost, increase the accuracy and speed of data and allow product authentication...*
- *Next year we will conduct (x) number of audits for traceability, which will allow us to identify inefficiencies, enable improved control and monitoring of product quality, have better recall management by identifying the origin of defects, and enhance coordination among actors of the supply chains...*
- *Next year we will carry out (x) individual meetings with suppliers in our production clusters, concerning specific aspects of traceability in their supply chain.*
- *In total, next year (x) suppliers will be provided with training on the subject of traceability and transparency of value chains in collaboration with our sustainability, product development, marketing and purchasing teams.*
- *By the end of next year we will make information about (x) suppliers available easily and freely on our website.*

4. Define the governance structure

11. The Action Plan should include an outline of the governance structure required to manage and implement the activities. The detailed governance structure and the functions and composition of the Steering Committee will vary from company to company, in accordance with a company's organizational charts for sustainability related functions. In general, a governance structure should report to the top management of a company, to ensure that sustainability objectives are integrated into staff responsibilities and the functions of managers and staff at all levels.

12. The ideal structure in a "vertical" organization consists of a Steering Committee that depends directly on the Head of Sustainability and includes representatives from each department/function that is involved in the implementation, monitoring and communication of identified activities and achieved results. The ideal structure in a "horizontal" organization consists of an interconnected network of representatives from each department/function, including the Head of Sustainability, coordinated by a Steering Committee. The departments/functions that are involved in the implementation of each activity, such as

[31] Transparency Pledge: https://transparencypledge.org/good-practices-regarding-company-disclosures/

product development, operations (including quality control), marketing and communication, should be appointed, and the working groups to manage activities and projects should be formed.

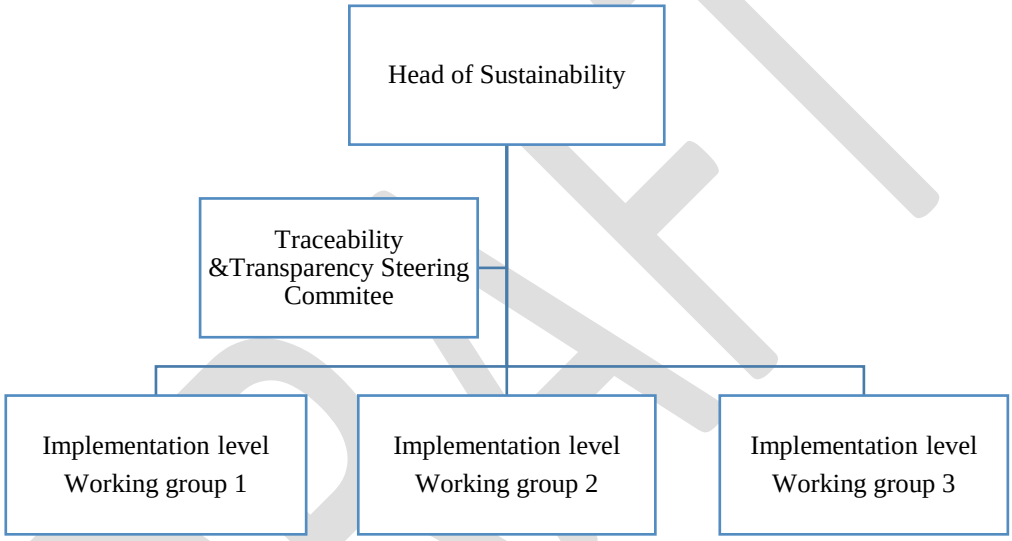
13. Also, from the beginning, it is important to include activities that focus on stakeholder communication and collaboration: this will ensure that all traceability stakeholders understand the common objectives and the scope of the activities in the Action Plan.

14. Sample governance structures are shown in Figure A.2.

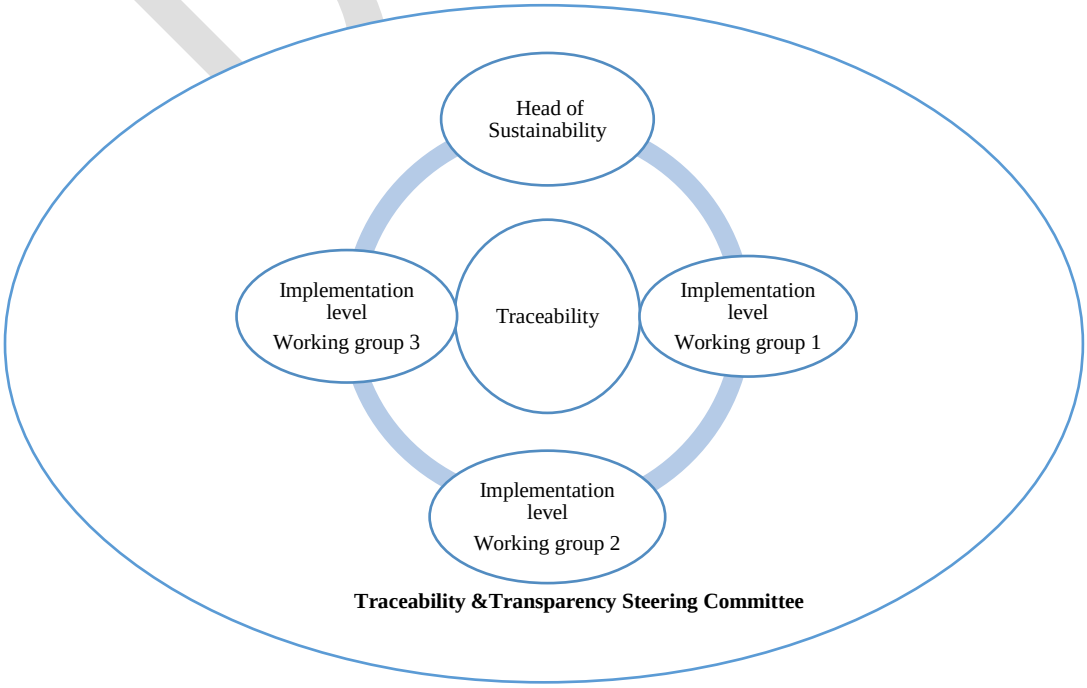
5. Allocate resources

15. This section of the Action Plan should describe the necessary human and financial resources needed for the implementation of the activities, as well as the overhead budget for the management of the Action Plan. Allocating human and financial resources, with a detailed, results-based budget, ensures that the Action Plan is linked to a commitment to allocate the resources needed for its implementation.

Figure A.2
Sample governance structure: vertical organization



Sample governance structure: horizontal organization



6. Monitor results

16. Monitoring and evaluation against predefined performance indicators are core elements of an Action Plan.

17. Performance indicators to measure progress against expected accomplishments, will vary according to the actors and the role they play in the value chain. Setting performance indicators should start from identifying the main traceable assets linked to sustainability claims, based on the results of the risk-analysis of the value chain.

18. Traceability related indicators could measure the level of traceability of selected products, with their parts and components (traceable assets) along the value chain, e.g. number of business processes covered. Transparency related indicators should cover the disclosure of information about the selected traceable asset, e.g. names and addresses of suppliers' production facilities and information that can be used to verify conformity with sustainability principles (such as certifications and audits or other controls).

Examples

1. Vision

Our vision is to promote the application of the highest social, environmental and health & safety principles during the creation of products for our customers, throughout our entire value chain

2. Objectives

2.1 Attain full traceability for the top 30% of our products, by collecting information about products and process characheristics, thoughout the whole value chain, within 3 years

2.2. Achieve full transparency for the top 30% of our products by providing easy access, clarity and regular updates about suppliers factory information, throughout the whole value chain, within 3 years

3. Performance indicators

3.1 Number of value-chain business processes covered by the traceability system

3.2 Number of suppliers for which information is made available and accessible on the website,....

4. Activities

4.1. We will invest (amount)EUR amount in advanced traceability technologies to reduce time and cost, increase the accuracy and speed of data and allow product authentication...

4.2. Next year we will conduct (x) number of audits for traceability, which will allow us to identify inefficiencies, enabling control, the monitoring of product quality and recall management to identify the origin of defects and enhance coordination among actors of the supply chains...

4.3. Next year we will carry out (amount) individual meetings with suppliers in our production clusters, concerning specific aspects of traceability in their supply chain.

4.4. In total, next year (x) suppliers will be provided with training on the subject of traceability in collaboration with our purchasing teams.

4.5. By the end of next year we will make information available about (x) suppliers, by making information easily and freely accessible on the website...

5. Governance structure

5.1 Vertical vs horizontal governance structure

6. Resources

6.1 Human and final resources in support of the activities to be detailed in an annexed budget

7. Outputs

7.1. Through investments in advanced technologies we were able to increase the accuracy and speed of data exchange by (xx) and allow product authentication across our value chain.

7.2. Through the increased number/alignment of audits for traceability we were able to publish verification data for at least 30% of our products.

7.3. The meetings with suppliers resulted in an agreement on the design of a joint traceability system.

7.4. The increased transparency resulted in higher ranking in (xx) the Transparency Index.

19. Such indicators could be combined in a *Traceability and Transparency Index* to measure a company's performance in collecting and sharing relevant data and information with key value-chain actors and supporting sustainability claims.

20. Enhanced traceability and transparency of the value chain allow more informed management decisions about the selection of value-chain partners; enhanced compliance with legal, regulatory and reporting requirements; enhanced access to public incentive systems for advancing the green and circular economy; and better management of reputational risk . As a result, related KPIs concern, for example: reduction of system integration costs; reduction of number of lawsuits or sanctions; reduction of intermediation costs; reduction of number of quality related issues.

7. Communicating the results and related recommendations

21. Communication supports learning and success, internally with value-chain partners and customers, and also with the public at large. Communication methods can range from incorporating reporting and communication requirements on the implementation of the Action Plan into the overall sustainability strategy; to the establishment of reporting mechanisms to monitor progress, such as a Traceability and Transparency Index; to the sharing of good practices and lessons learned across relevant multi-stakeholder industry platforms and initiatives.

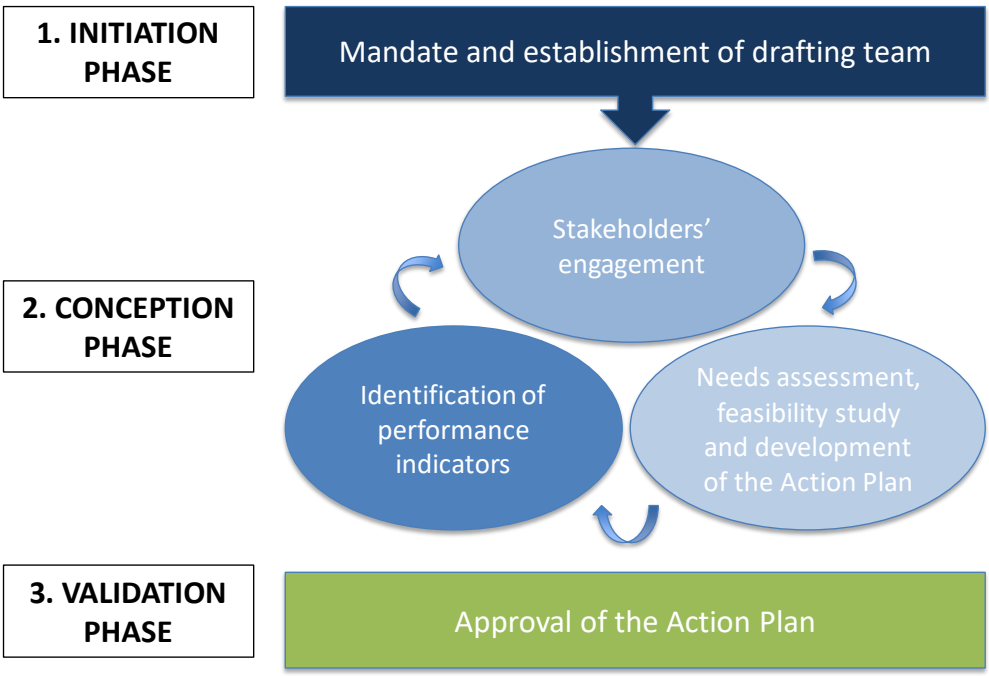
22. The **drafting process** for an Action Plan has three major phases (see figure A.3):

(a) **Initiation Phase**, where the Head of Sustainability needs to request the development of a document that describes the Traceability and Transparency strategy.

(b) **Conception Phase** that consists of drafting the document itself. It includes three stages: 1) engaging stakeholders, 2) discussion with stakeholders on existing issues and possible activities to be undertaken as well as 3) defining the performance indicators to measure the achievements and results of the different activities. The outcome of the second phase is a consolidated draft Action Plan document.

(c) **Validation Phase**, where the document is presented to the internal decision makers in order to receive formal endorsement to start the implementation of the activities included in the Action Plan.

Figure A.3
Three-phase model for the drafting process of a Traceability and Transparency Action Plan

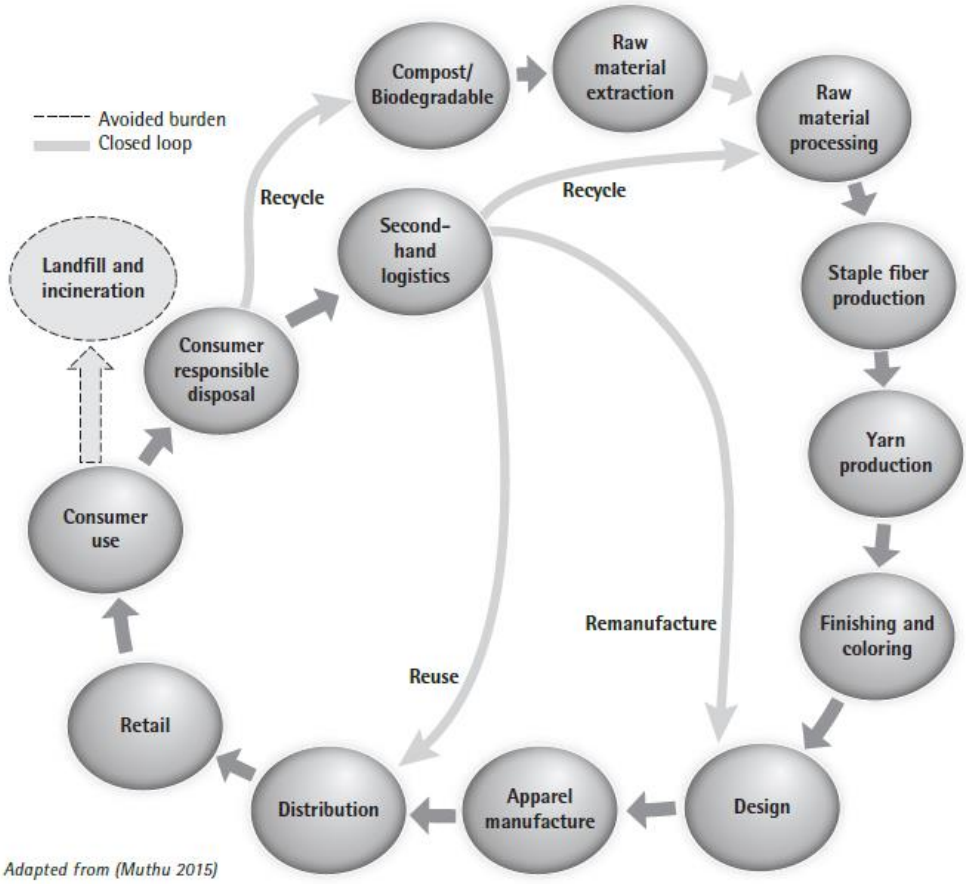


23. "The three phases "Initiation", "Conception" and "Validation" are sequential, meaning they are only executed once and in this order. At the same time, the three stages in the Conception phase - engaging stakeholders; assessing needs, identifying objectives and activities and conducting a feasibility study; and defining performance indicators - are iterative in nature and may need to be repeated several times. Each stage can unveil further issues in the processes, or new proposals for how to address them. As a consequence, it might be necessary to revisit previous findings, to redefine the corresponding activity or include new ones, to reconsider the performance indicators and to (re-) engage stakeholders."

Annex II
Glossary

Circularity of a production process refers to the ability of such process to retain the value of products, materials and resources in the economy for as long as possible

Figure A2.1 Circularity in textile and footwear value chains



Source: Rusinek, M. et al., 2018[32]

Claim is a high-level statement about a characteristic of a product, or about a process or an organization associated with that product (traceable asset). In order to show that the characteristic is true, it is necessary to trace the asset as it moves through the value chain, *ECE/TRADE/429 (2016) Traceability for Sustainable Trade.*[33]

Code is a character string (letters, figures or symbols) that for brevity and/or language independency may be used to represent or replace a definitive value or text of an attribute. Codes usually are maintained in **code lists** per attribute type (e.g. colour).

Due Diligence is an ongoing, proactive and reactive process through which enterprises can prevent and mitigate adverse impacts related to human rights, labour rights, environmental protection, and bribery and corruption in their own operations and in their supply chains. *OECD 2018.*[34]

[32] Blockchain for a Traceable, Circular Textile Supply Chain: A Requirements Approach (2018), M. J. RUSINEK, H. ZHANG, N. RADZIWILL, 4 SQP VOL. 21, NO. ASQ.
[33] UNECE, Traceability for Sustainable Trade, A Framework to Design Traceability Systems for Cross Border Trade, ECE/Trade/429, http://www.unece.org/index.php?id=43763
[34] OECD (2018): OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector.

Economic Operator is a business or other organization which supplies goods, works or services within the context of market operations. The term is used in public procurement to cover suppliers, contractors and service providers.

Entry and Exit Points are the events (activities) at the start and the end of the traceability process within the value chain. At each of these points the traceable asset needs to meet specified criteria.

Unique Identifiers (IDs), information collected to follow the path of a traceable asset, that is linked to it. The traceable asset must have a unique Identifier (ID). IDs are also required for all of the traceability/transparency components that information is collected about; examples include, enterprises, locations, processes and transportation units.

Logistics Units contain traceable assets for transport and/or storage. Most often they contain aggregated traceable assets but logistic units may also contain disaggregated traceable assets. Logistics units are given IDs in order to follow the traceable assets they contain. This is done by recording the IDs of the traceable asset(s) and linking them to the ID of their logistics unit.

Materials are raw, unprocessed substances

Products are processed, finished items that are offered for sale. That is, they are manufactured combinations of materials and perhaps other products, processed to create items

Product Certification is the process of certifying that a certain product has passed performance and quality assurance tests, or qualification requirements stipulated in regulations.

Sustainability, in this context, is understood as the manufacturing, marketing and use of garment, footwear and accessories, and its parts and components, taking into account the environmental, health, human rights and socio-economic impacts, and their continuous improvement through all stages of the product's life cycle.

Sustainability Claims to support sustainable development objectives should be selected based on a value-chain risk analysis, corporate objectives, and a company's commitment to responsible business conduct and due diligence. The contents of the claim should be accessible and may need to comply with legal requirements. Also, some organizations that develop sustainability standards and guidelines have rules about how they can be referenced in claims.

Sustainability Criteria can be a standard, a guideline or other document which describes the characteristics that a product or process must have in order to conform with the "claim". The criteria are what an auditor compares information against to determine if due diligence has been followed in ensuring a claim.

Track and Trace (TT) standard

Traceable asset is any product or material [individually, in batches or in trade units] that needs to be tracked along a value chain. Within garment and footwear it is, "any item (for example an object, a product or other traded item or a service) that needs to be tracked along a supply chain." (UNECE Traceability for Sustainable Trade Guide).[35] It can also be thought of as the unit that one wants to trace or record information about in a traceability system.

Traceability is understood as "the ability to trace the history, application or location of an object" in a supply chain (*ISO, 2015*).[36] In this context, it is defined as the ability to "identify and trace the history, application, location and distribution of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labour (including health and safety), the environment and anti-corruption" (*UN Global Compact*

[35] Idem.
[36] ISO 9001:2015, Quality Management Systems - Requirements

2014);[37] and "the process by which enterprises track materials and products and the conditions in which they were produced through the supply chain" *OECD, 2018*[38].

Traceability Framework is the entire ecosystem supporting value-chain traceability including policies, systems, support, and promotion. It covers the use of traceability across the entire value chain – from the extraction and processing of raw materials, to finished product branding and retailing, consumption and post-consumption activities.

Traceability Model refers to the organization of a value chain in order to ensure that traceability can be implemented. There are different traceability models, whose usefulness depends upon the type of product and the claims being made. Examples of traceability models which can be applied to products and processes throughout the entire value chain are product segregation, mass balance and book and claim.

- **Product Segregation:** The preferred model for a traceability system is product segregation. The objective is to have products produced according to the same sustainability standard are strictly separated from other products. With product segregation there is a physical separation of certified materials and products from non-certified materials and products at each stage in the value chain. This ensures that certified and non-certified materials and products are not mixed and that the end product comes from a certified source.
- **Mass balance:** In the Mass-Balance model, products from both sustainable and non-sustainable sources are mixed, but as they move through the supply chain an exact account is kept of the volume ratios. The purpose is to guarantee that the amount of sustainable content claimed is equal to the amount of sustainable products or materials used. This model is commonly used for products and commodities where segregation is very difficult or impossible to achieve, such as for cocoa, cotton, sugar and tea.
- **Book and Claim:** In the book-and-claim method there is a free flow and mixing of certified and non-certified assets, with no segregation of assets, so it is actually a mixed product that is sold. Instead, a producing company can obtain sustainability certificates for the volume of goods that it puts into the value chain which are certified as following a good practice. This model is typically used when the production and market conditions make it impractical to sell certified product that has been segregated from non-certified product. This model is used for soy and palm oil.

Traceability Rules describe how the business processes between an Entry Point and an Exit Point need to be organized so that the Claim is met." *ECE/TRADE/429 (2016) Traceability for Sustainable Trade.*[39]

Traceability System refers to all of the practical processes, procedures and technology needed to create a functional traceability system. It does not refer to the surrounding ecosystem with its policies, incentives, promotion, etc. A *traceability system* together with its surrounding ecosystem of supporting policies, incentives and promotion measures, forms a *traceability framework*.

Trade Unit is a unit used in trade; for example, the unit shown on an invoice which could be, among many options, a "package" or a "bale" or a "container" – this depends upon the product and the trading partners.

Transparency relates directly to relevant information been made available to all elements of the value chain in a standardized way, which allows common understanding, accessibility, clarity and comparison. *European Commission 2017.*

UN/CEFACT Core Component Library is the part of the registry/repository in which Core Components shall be stored as Registry Classes. The Core Component Library will contain

37 United Nations Global Compact Office (2014), A Guide to Traceability A Practical Approach to Advance Sustainability in Global Supply Chains.
38 OECD (2018): OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector.
39 Idem.

all the Core Component Types, Basic Core Components, Aggregate Core Components, Basic Business Information Entities and Aggregate Business Information Entities.

UN/CEFACT Modelling Methodology (UMM)

(a) Most activities can be decomposed into business processes that are more generic to a specific type of business (UN/CEFACT)

(b) The UMM Meta Model is a mechanism that allows Trading Partners to capture the details for a specific business scenario using a consistent modelling methodology.

Use case is the specification of a sequence of actions, including variants, that a system (or other entity) can perform, interacting with actors of the system. See use-case instances. A use-case class contains all main, alternate flows of events related to producing the "observable result of value". Technically, a use-case is a class whose instances are scenarios.

Verification Criteria are the standards and key performance indicators that traceable assets are supposed to meet and the rules for the supporting traceability process. These criteria are the basis upon which verification processes are carried out by auditors or other verification agencies in order to prove that the traceable assets have complied with relevant claims.

Verification Process: a verification is "confirmation of a claim, through the provision of objective evidence, that specified requirements have been fulfilled". In the context of traceability, the verification process is carried out by a verification (audit) body that analyses traceability events and validates the information about them against the verification criteria and any other transparency system rules.

XML Schema

(a) An XML schema is a document that describes the valid format of an XML dataset. This definition include what elements are (and are not) allowed at any point what the attributes for any element may be the number of occurrences of elements.

(b) A generic term used to identify the family of grammar-based XML document structure validation languages to include the more formal W3C XML Schema Technical Specification, Document Type Definition, Schematron, Regular Language Description for XML.