

Environment in Humanitarian Action: Global Training Manual Template

Managing Environmental Impacts of Humanitarian Supply Chain, and Logistics





This module was developed as part of the UNEP/OCHA Joint Environment Unit's project titled Localisation of Environment in Humanitarian Action, and is part of a template of a training manual consisting of:

- 1 Introductory Module*
- 11 Technical Modules*
- 1 ToT Module*

The template is an open source and available for any organisation or individual to use or refer to in the development and delivery of their Environment in Humanitarian Action training.

What distinguishes this training manual is its comprehensive and flexible framework. We encourage users to adjust the content to meet with the specific needs within their specific Contexts. We kindly ask that credit is given when using or adapting this resource.

MODULE OVERVIEW

This module examines the environmental impacts associated with all stages of humanitarian supply chains, from planning to end-of-life management. The module explores a wide range of sustainable supply chain management strategies, emphasizing green logistics, sustainable procurement, resource efficiency, and innovative practices. It begins with foundational concepts of supply chain management and progresses to advanced practices, ensuring all participants, regardless of their prior knowledge, gain practical insights into minimizing environmental footprints. Participants will gain practical insights into minimizing the environmental footprint of transportation, storage/warehousing, and disposal activities through energy-efficient, resource-conserving, and waste-reducing strategies. The module is closely linked to Module 7 on Sustainable Energy Management. The module also introduces future trends and innovations in supply chain management, supported by real-world case studies that showcase successful implementations and best practices.

Learning outcomes

By the end of this module, participants will:

1. Analyze the environmental impacts of procurement, transportation, storage, and disposal activities within humanitarian operations.
2. Develop and apply sustainable supply chain management strategies that incorporate principles of green logistics, sustainable procurement, and resource efficiency.
3. Implement advanced practices in energy management, sustainable warehousing, and facilities management to minimize the environmental footprint of supply chain activities.
4. Evaluate the potential impact of emerging trends, innovations, and technologies on the sustainability of humanitarian supply chains.
5. Integrate reverse logistics and end-of-life management strategies to promote circular economy practices in humanitarian contexts.
6. Learn from real-world case studies and best practices, applying lessons learned to enhance the sustainability and efficiency of their own supply chain operations.

Estimated delivery time

Total time: 150 minutes

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FACILITATOR'S GUIDE

Step	Activity	Method	Duration	Materials Needed	Expected Outcomes
1	Introduce the module: Provide an overview of the module objectives, content outline, and expected learning outcomes.	Presentation, plenary discussion	5 minutes	Slides, handouts	Participants understand the module's objectives, structure, and expected outcomes.
2	Facilitate a discussion on the components, impacts, and benefits of the humanitarian supply chain. Guide participants through identifying supply chain components, discussing their environmental impacts, and highlighting the benefits of managing these impacts.	Presentation, Q&A	15 minutes	Slides, flipchart, markers	Participants will identify components, impacts and environmental benefits of the humanitarian supply chain.
3	Highlight key principles of sustainable supply chain management: Discuss the key principles of sustainable supply chain management, including resource efficiency, green procurement, energy management, waste reduction, and life cycle assessment.	Lecture, in-session discussion	15 minutes	Slides, handouts	Understand key principles through interactive Q&A, engaging participants in a dialogue.
4	Discuss sustainable procurement and sourcing practices. Present sustainable procurement approaches, then conduct an interactive exercise using real-world procurement scenarios for participants to analyze and discuss.	Presentation, Q&A, interactive exercise	15 minutes	Slides, handouts	Participants learn sustainable procurement practices and apply them in simulated scenarios.
5	Guide participants through the steps in strategic supply chain planning. Present the strategic planning steps and facilitate an in-class scenario analysis exercise where participants apply these steps to practical challenges.	Presentation, scenario analysis	20 minutes	Slides, flipchart, handouts	Participants practice applying strategic supply chain planning steps through scenario-based analysis.
6	Present sustainable warehousing and facilities management practices. Highlight sustainable practices and conduct a Q&A session to discuss the challenges and opportunities in implementing these practices.	Presentation, Q&A session	10 mins	Slides, flipchart	Participants learn about sustainable warehousing practices and discuss implementation challenges and opportunities.
7	Explore reverse logistics and end-of-life management strategies. Present the concept of reverse logistics and discuss end-of-life management strategies. Facilitate an interactive Q&A to connect these strategies with real-world humanitarian contexts.	Presentation, Q&A session	15 mins	Slides, flipchart	Participants understand reverse logistics and end-of-life strategies, and their application in humanitarian supply chains.

8	Discuss future trends and innovations in sustainable supply chain management. Present emerging trends and facilitate a group discussion on how these innovations can be integrated into current humanitarian supply chains.	Presentation, in-class discussion	20 mins	Slides, flipchart, markers	Participants identify and discuss future trends and their potential impact on supply chains.
9	Present case studies illustrating best practices in sustainable supply chain management. Guide participants through various case studies, emphasizing key lessons and strategies used. Conduct a Q&A session to allow participants to connect the case studies with their own experiences.	Case study presentation, in-session discussion	30 minutes	Case study handouts, slides	Participants will learn from real-world examples of sustainable supply chain practices and discuss how to implement best practices in their own contexts.

Facilitator notes

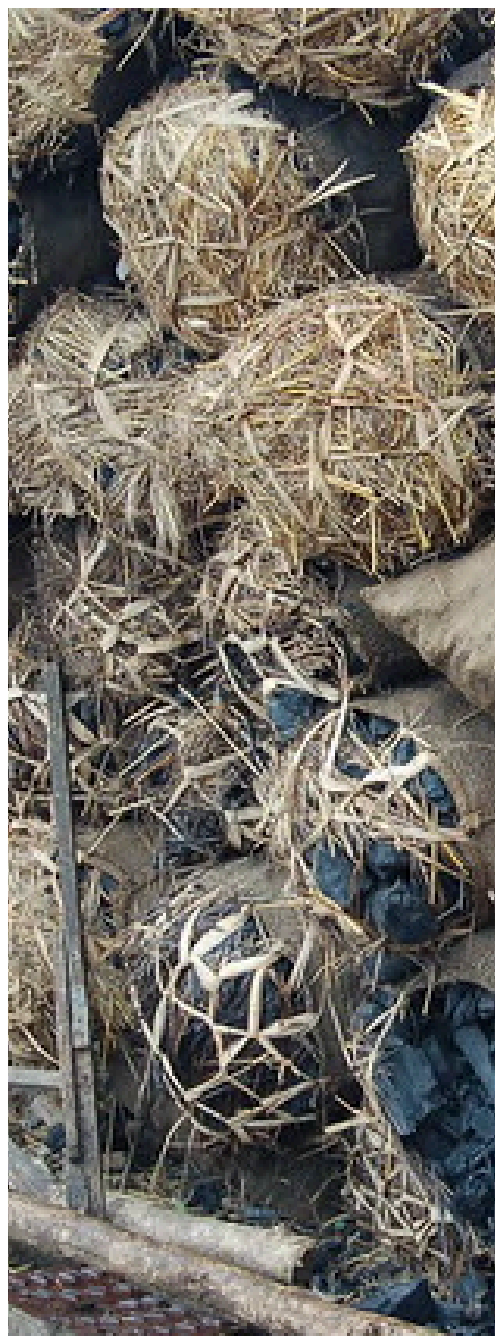
Section 1: Introduction to supply chain environmental impacts

Key points

- Highlight the significance of managing environmental impacts in humanitarian supply chains.
- Introduce key principles of sustainable supply chain management.

Background information

- The humanitarian supply chain involves the planning, implementing, and controlling of the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption to meet the requirements of beneficiaries.
- Humanitarian supply chains are essential for delivering aid but can have significant environmental impacts due to transportation, storage, and procurement activities.
- Supply chain management involves planning, implementing, and controlling the efficient, effective flow and storage of humanitarian goods, services, and related information from the point of origin to the point of consumption to meet the requirements of beneficiaries.
- Implementing sustainable practices in supply chains can reduce these impacts and enhance the overall sustainability of humanitarian operations.
- Components of the humanitarian supply chain include procurement, transportation, storage, and disposal of goods and materials needed in humanitarian operations.
- Environmental sustainability is about responsible interaction with the environment to conserve natural resources and protect global ecosystems, supporting health and well-being now and in the future.



Content development: Introduction to supply chain environmental impacts

Table 1: Humanitarian supply chain components, impacts and benefits

Aspect	Description	Environmental Impacts	Benefits from the Environment
Planning	Involves forecasting needs, accepting donations only if they meet specific standards, and optimizing logistics to minimize waste.	Poor planning can lead to overstocking, increased reliance on airfreight (high carbon footprint), and inefficient resource use.	Effective planning minimizes waste, optimizes transport, and minimizes carbon emissions by choosing less carbon-intensive modes of transport. Thoughtful planning ensures that resources are used efficiently, minimizing environmental impact while enhancing the sustainability of humanitarian operations.
Sourcing	The process of selecting and acquiring goods and services needed for humanitarian aid, focusing on responsible procurement.	Sourcing materials without environmental consideration can lead to deforestation, biodiversity loss, and a higher carbon footprint.	Sustainable procurement practices ensure that resources are sourced responsibly, reducing the environmental impact and preserving resources for future use. It supports ethical supply chains and promotes environmental stewardship in the humanitarian context, which can improve community relations and reduce long-term operational risks. While there may be upfront costs associated with sustainable procurement, these practices contribute to long-term environmental and operational benefits. Sustainable sourcing ensures the availability of resources for future needs.
Production	Refers to the activities involved in creating or assembling humanitarian goods, often customized for local contexts (e.g., hygiene kits).	Unsustainable production processes can lead to high energy use, waste generation, and pollution, especially when local production is not environmentally managed.	Environmentally responsible production reduces energy consumption, lowers waste, and supports local economies through sustainable practices. Encouraging local and sustainable production can also reduce logistics costs and environmental impact associated with distribution, aligning humanitarian response with environmental best practices.
Distribution	Encompasses the comprehensive movement of goods, including:- Transportation: Movement of goods from suppliers to storage facilities and then to distribution points.- Warehousing/ Storage: Storing goods in warehouses until needed, with emphasis on proper inventory management and energy efficiency.- Last-mile Delivery: Final stage of delivery, often in challenging environments, to affected populations.	High fuel consumption and emissions from trucks, planes, and ships; inefficient routing, warehousing energy use, and poorly maintained vehicles increase environmental impacts and operational costs.	Optimizing routes, using fuel-efficient vehicles, integrating low-carbon transport options, and employing energy-efficient warehousing reduce emissions and fuel consumption. Effective distribution planning ensures timely delivery of aid while preserving fragile ecosystems and enhancing overall efficiency in crisis settings.

Return/ Disposal	Managing unsold, unused, or expired goods and waste, including environmentally responsible waste disposal and recycling efforts.- Reverse Logistics: Processes involved in returning goods for disposal, recycling, or repurposing, ensuring a closed-loop supply chain.	Improper disposal or handling of returns, including packaging and expired items, causes pollution and health hazards; lack of end-of-life disposal planning results in significant environmental degradation.	Recycling, composting, and proper disposal reduce pollution and help maintain healthy ecosystems. Responsible waste management practices not only protect the environment but also align with humanitarian principles of do-no-harm and supporting community health and sustainability.
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Table 2: Importance of sustainable energy management in humanitarian operations

Category	Principle	Description	Real-World Application
Concept	<i>Resource efficiency</i>	Utilizing resources efficiently to minimize waste and environmental footprint; Reduces waste and conserves resources, leading to sustainable operations. Responsibility: Primarily managed by the buying organization through improved inventory management and operational practices that conserve resources.	Implementing best practices in inventory management and resource utilization.
	<i>Green procurement</i>	Prioritizing the purchase of environmentally friendly products and services, which reduces the carbon footprint of procurement activities. Responsibility: The buying organization sets procurement standards, while suppliers adhere to environmental certifications.	Sourcing from suppliers who adhere to environmental standards and certifications; mitigating emissions from procurement activities.
	<i>Energy management</i>	Implementing energy-efficient practices and renewable energy solutions in all supply chain activities; Reduces energy consumption and greenhouse gas emissions, promoting sustainability. Responsibility: The buying organization is responsible for integrating energy-efficient technologies, while suppliers ensure that energy-efficient products are available.	Using renewable energy sources and energy-efficient technologies in logistics and storage.
Practice	<i>Waste reduction</i>	Reducing waste through better inventory management; Recycling and sustainable packaging solutions; Minimizes environmental impact and promotes recycling and reuse. Responsibility: Buying organizations implement waste management practices, while suppliers provide recyclable or reusable materials.	Implementing the waste management hierarchy: Reduce (minimize packaging), Reuse (use refillable containers), Recycle (implement recycling programs).
	<i>Livelihood generation and local market support</i>	Sustainable supply chains can create livelihood opportunities and support local economies by promoting upcycling, recycling, and the use of local materials. Responsibility: Buying organizations support local market initiatives, while suppliers provide locally sourced, eco-friendly products.	Working with local communities, like Aga Khan Agency for Habitat – AKAH-initiative in Syria, working with women to produce cloth bags, which reduces packaging waste and generates income.

Method	<i>Life cycle assessment</i>	Life cycle assessment is a method used to evaluate the overall environmental impact of a product or process, from its creation to its disposal; helps in identifying areas for improvement and making informed decisions to reduce environmental impact. Responsibility: The buying organization conducts assessments to guide sustainable procurement choices; suppliers provide data on environmental impacts.	Assessing different water purification systems used in refugee camps to identify which option minimizes environmental impact, including energy use and waste generation; conducting life cycle assessments for two products (e.g., biodegradable vs. conventional plastic packaging) and choosing the one with the least environmental impact.
	<i>Carbon footprint calculator</i>	Carbon footprint calculation is a method to measure the amount of greenhouse gases emitted directly and indirectly by an event, project or product, expressed as a carbon dioxide equivalent (CO ₂ e). Responsibility: The buying organization conducts assessments to guide sustainable procurement choices; suppliers provide data on carbon footprint.	Measuring the carbon footprint of a humanitarian logistics network to identify opportunities for reducing emissions through optimized transportation routes and the use of alternative fuels.

Section 2: Strategic supply chain planning for environmental sustainability

Key points

- Introduce a wide range of strategies for minimizing environmental impacts across all stages of the supply chain, including procurement, transportation, warehousing, and distribution.
- Highlight the significance of reverse logistics and end-of-life management strategies in creating a sustainable supply chain.
- Emphasize the importance of green logistics practices and sustainable facilities management in reducing the environmental footprint of supply chain operations.
- Discuss the integration of innovations such as electric vehicles, route optimization, and green warehouse designs that enhance the efficiency and sustainability of supply chain activities.
- Highlight a hierarchy of actions inspired by the 5R principles (Reduce, Reuse, Recycle, Recover, and Redesign), emphasizing prioritization of strategies that offer the greatest environmental impact reduction in humanitarian context, such as reducing air freight and shifting to greener modes of transport.
- Encourage prioritizing actions that have the highest environmental impact, such as switching from air to sea freight or reducing professional travel, to maximize sustainability outcomes.

Background information

- **Hierarchy of actions in humanitarian supply chain sustainability:** In the context of humanitarian action, applying a structured approach to environmental sustainability means prioritizing actions that reduce the environmental footprint of operations. Inspired by the 5R principles, humanitarian supply chain planning should emphasize reducing waste and emissions as the primary focus, followed by reusing resources, recycling materials, recovering value from surplus items, and redesigning processes to be more environmentally friendly.
- **Prioritization of high-impact strategies in humanitarian action:** Not all actions have the same environmental benefits in humanitarian settings. Prioritizing high-impact strategies, such as reducing reliance on air freight (a significant emitter of greenhouse gases), switching to sea and rail transport, and local sourcing, can lead to substantial reductions in emissions and resource use. These actions are particularly important in humanitarian contexts, where minimizing the environmental impact can also reduce logistical costs and enhance the overall effectiveness of aid delivery.

- **Strategic supply chain planning:** Strategic supply chain planning for environmental sustainability involves a holistic approach to minimizing the environmental impacts of supply chain activities. This includes forecasting demand accurately to avoid overproduction and waste, allocating resources efficiently, and planning for contingencies to mitigate environmental risks.
- **Green logistics:** Green logistics practices are integral to reducing the environmental footprint of transportation and distribution activities. This includes using fuel-efficient vehicles, optimizing delivery routes, consolidating shipments, and employing electric or hybrid vehicles to reduce emissions.
- **Sustainable procurement:** Sustainable procurement and sourcing strategies involve selecting suppliers based on their environmental performance, ethical practices, and sustainability credentials. Incorporating environmental criteria into procurement decisions ensures that goods and services support long-term environmental goals.
- **Warehousing and facilities management:** Sustainable warehousing practices focus on reducing energy consumption, minimizing waste, and utilizing renewable energy sources. Facilities management plays a crucial role in ensuring that storage and operational facilities are designed and operated with sustainability in mind, including water conservation, waste management, and energy efficiency.
- **Reverse logistics and end-of-life management:** Reverse logistics and end-of-life management are critical components of a sustainable supply chain, ensuring that products and materials are reused, recycled, or disposed of in an environmentally responsible manner. This includes managing the return of surplus goods, safe disposal of hazardous materials, and decommissioning and rehabilitating sites post-operations.
- **Innovations in freight and transport:** Innovations such as electric vehicles, route optimization software, and multi-modal transport strategies are revolutionizing how goods are transported in humanitarian contexts. These innovations help reduce emissions and costs, improve operational efficiency, and align with environmental sustainability goals.
- **Future trends and technologies:** Emerging trends and technologies, such as digitalization, IoT, and sustainable packaging, are reshaping the landscape of supply chain management. These innovations offer new opportunities to reduce the environmental footprint of supply chain activities while enhancing operational efficiency and resilience.

Content development: Strategic supply chain planning

Table 2.1: Steps in strategic supply chain planning

Step	Description	Real-World Application
Demand forecasting	Predicting the needs for goods and services to minimize excess and waste.	In disaster response, forecasting the need for shelter materials helps reduce overstocking and waste, ensuring efficient resource use.
Resource allocation	Assigning resources, such as vehicles and personnel, in a way that maximizes efficiency and minimizes environmental impact.	Allocating resources to use sea freight instead of air freight where feasible reduces carbon emissions; preference for local procurement to reduce emissions and other environmental impacts.
Contingency planning	Preparing for unexpected disruptions in the supply chain, such as disasters or transportation delays.	Developing alternative transport routes in anticipation of seasonal floods helps avoid delays and environmental damage.

Supplier evaluation	Assessing suppliers based on their environmental practices and performance to ensure sustainable sourcing.	Partnering with suppliers that use eco-friendly materials and processes reduces the overall environmental footprint of the supply chain.
Monitoring and reporting	Continuously tracking the performance of supply chain activities to ensure alignment with environmental goals.	Implementing tracking systems to monitor fuel consumption across the fleet and adjusting routes to minimize emissions.
Risk management	Identifying and mitigating risks related to environmental impacts in supply chain operations.	Implementing risk assessment protocols to address potential environmental hazards in transportation and storage.
Collaboration and stakeholder engagement	Working with stakeholders, including suppliers, local communities, and environmental organizations, to align supply chain practices with sustainability goals.	Engaging with local communities to develop supply chain practices that are culturally and environmentally sensitive.

Table 2.2: Sustainable procurement strategies

Strategy	Description	Real-World Application
Green supplier selection	Choosing suppliers that demonstrate strong environmental performance and sustainability practices.	Selecting suppliers for disaster relief materials that use recyclable packaging and energy-efficient production processes.
Ethical sourcing	Ensuring that goods are sourced from suppliers who adhere to fair labor practices and sustainable production methods.	Sourcing fair-trade food supplies for humanitarian aid distributions, supporting both local economies and environmental sustainability.
Sustainable contracting	Integrating environmental and sustainability criteria into contracts with suppliers.	Including clauses in contracts that require suppliers to minimize packaging waste and reduce carbon emissions during the delivery of goods.
Local sourcing	Prioritizing the procurement of goods and services from local suppliers to reduce transportation emissions and support local economies.	Sourcing construction materials for shelter projects from local suppliers to minimize carbon emissions and support the local economy.
Green procurement policies	Developing and implementing procurement policies that prioritize the purchase of environmentally friendly products and services.	Establishing a procurement policy that mandates the use of recycled materials for packaging and documentation in supply chain operations.
Life cycle costing	Evaluating the total cost of ownership of goods, including environmental impacts, to make informed procurement decisions.	Selecting equipment with lower energy consumption over its lifecycle, even if the initial purchase cost is higher.
Supplier development	Working with suppliers to improve their environmental practices and align them with the organization's sustainability goals.	Providing training and resources to suppliers on sustainable farming practices for food procurement in humanitarian operations.

Environmental product specifications	Defining specific environmental criteria for products, such as the use of sustainable, recyclable, or eco-friendly materials.	Setting specifications for sustainable materials in all procurement contracts, such as biodegradable packaging or products with high recycled content.
Sustainable materials	Prioritizing the use of materials that have a lower environmental impact throughout their lifecycle, including recycled, biodegradable, or renewable materials.	Using biodegradable plastics for packaging or recycled construction materials for shelters in humanitarian settings to minimize environmental impact.

Table 2.3: Green freight and transport strategies

Innovation	Description	Real-World Application
Electric vehicles (EVs)	Use of EVs for transporting goods to reduce greenhouse gas emissions during their use phase and decrease overall carbon footprint.	Deploying electric trucks for last-mile deliveries in urban areas affected by disaster, reducing GHG emissions, noise and air pollution compared to traditional vehicles compared to traditional vehicles.
Biogas-powered vehicles	Use of biogas as a sustainable fuel derived from organic waste, reducing emissions, and managing waste simultaneously.	Utilizing biogas-powered trucks for logistics operations in humanitarian settings, reducing carbon emissions and reliance on fossil fuels
Route optimization	Using software to plan the most efficient routes, reducing travel time and fuel consumption.	Implementing route optimization software to reduce the distance and time required for delivering aid supplies in rural areas.
Multi-modal transport	Combining different modes of transport, such as road, rail, and sea, to minimize environmental impact.	Utilizing rail and sea transport for bulk goods to reduce reliance on air freight in delivering humanitarian aid.
Use of drones	Employing drones for delivering small, high-priority goods to remote or inaccessible areas, reducing the need for large vehicle deployments.	Using drones to deliver medical supplies to remote villages in mountainous regions during disaster response.
Hybrid vehicles	Incorporating hybrid vehicles into the fleet to reduce fuel consumption and emissions.	Using hybrid vehicles for field assessments in areas with poor infrastructure, balancing fuel efficiency with operational flexibility.
Telemetry and telematics	Implementing telemetry systems to monitor vehicle performance and driver behavior, optimizing fuel efficiency, and reducing emissions.	Installing telematics in fleet vehicles to track fuel consumption, route efficiency, and maintenance needs in real time.
Cargo consolidation	Grouping shipments to optimize vehicle loads and reduce the number of trips required, minimizing fuel use and emissions.	Consolidating shipments of food and medical supplies to disaster zones to reduce the number of trips and associated emissions.
Reduce freight and mileage	Implementing measures to minimize the distance goods travel and overall freight volume, reducing environmental impact.	Prioritizing local sourcing and optimizing supply routes to minimize the miles goods travel, thus reducing the carbon footprint in humanitarian logistics operations.
Shift from air to sea freight	Switching freight from air, which is highly emissive, to sea, which has a lower carbon footprint per ton-km.	Moving non-urgent humanitarian supplies by sea instead of air to significantly cut down on emissions associated with international transport of goods.

Choose greener transport service providers	Selecting freight and transport service providers that offer low-emission and sustainable options.	Partnering with logistics companies that prioritize green transport solutions, such as electric or hybrid fleets, for the delivery of aid supplies.
Reduce mileage and fuel consumption	Implementing strategies to decrease fuel consumption through better vehicle maintenance and driving practices.	Introducing fuel-saving programs and driver training for humanitarian fleet operations to optimize driving behavior, reduce idling, and enhance fuel efficiency.

Table 2.4: Sustainable warehousing and facilities management practices

Practice	Description	Real-World Application
Energy-efficient lighting	Installing LED lighting and motion sensors to reduce energy consumption in warehouses.	Retrofitting warehouses with LED lights and motion sensors, reducing energy use and costs in disaster response storage facilities.
Use of renewable energy	Utilizing solar panels or wind energy to power warehouse operations.	Installing solar panels on warehouse roofs to power operations, reducing reliance on fossil fuels during humanitarian missions.
Sustainable building materials	Constructing warehouses with recycled or sustainable materials to reduce environmental impact.	Using reclaimed wood and recycled steel in warehouse construction for emergency storage facilities in disaster-prone areas.
Water conservation	Implementing water-saving technologies and practices, such as rainwater harvesting and low-flow fixtures.	Installing rainwater harvesting systems in logistics centers to reduce reliance on municipal water supplies in arid regions.
Waste management programs	Establishing programs for recycling and responsible disposal of waste materials generated in warehouses.	Implementing a comprehensive recycling program for packaging materials, including cardboard, plastics, and metals.
Green warehouse design	Designing warehouses to maximize natural light, ventilation, and energy efficiency.	Constructing warehouses with skylights and energy-efficient HVAC systems to reduce reliance on artificial lighting and heating/cooling.
Sustainable inventory management	Adopting inventory management practices that reduce waste and optimize the use of resources.	Implementing just-in-time inventory practices to minimize the need for large stockpiles, reducing waste from expired goods.
Temperature standards in warehouses	Maintaining optimal temperature settings in warehouses to reduce energy consumption and preserve goods.	Implementing temperature control systems that minimize energy use by maintaining temperatures suited to stored goods, reducing waste and energy costs in humanitarian storage facilities.
Energy-efficient HVAC systems	Installing energy-efficient heating, ventilation, and air conditioning systems to reduce energy use.	Upgrading to energy-efficient HVAC systems in warehousing facilities to reduce the carbon footprint associated with temperature control in humanitarian operations.
Low-emission refrigeration	Using refrigeration systems that minimize emissions and use environmentally friendly refrigerants.	Installing low-emission refrigeration units that use natural refrigerants in warehouses storing perishable aid supplies, reducing the environmental impact of cold storage.
Biodiversity-friendly landscaping	Incorporating native plants and sustainable landscaping practices around facilities.	Planting native species around warehouses to reduce water use and support local biodiversity while enhancing the aesthetics of humanitarian logistics centers.

Reverse logistics and end-of-life management strategies



Recycling programs

Implementing systems to collect and recycle materials, such as packaging or outdated equipment.

Real-World Application:

Establishing a recycling program for plastic packaging and used electronic devices in disaster response operations.



Product return

Managing the return of unused or surplus goods to suppliers for reuse or resale.

Real-World Application:

Arranging the return of surplus medical supplies to suppliers for redistribution to other areas in need during a humanitarian crisis.

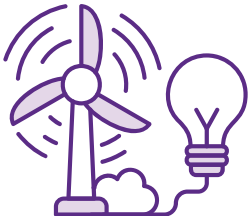


Safe disposal of hazardous materials

Ensuring that hazardous materials, such as batteries or chemicals, are disposed of in an environmentally friendly manner.

Real-World Application:

Setting up protocols for the safe disposal of expired or damaged medical supplies in disaster-affected areas to prevent environmental contamination.

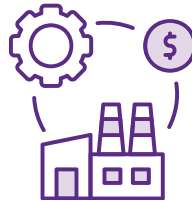


Asset recovery

Recovering and reusing assets such as vehicles, containers, and equipment from completed operations.

Real-World Application:

Retrieving and refurbishing temporary shelters from decommissioned camps for use in future disaster response efforts.

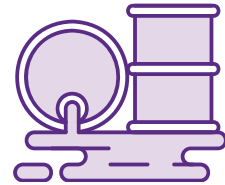


Remanufacturing and refurbishment

Refurbishing and remanufacturing equipment and parts to extend their lifecycle and reduce waste.

Real-World Application:

Refurbishing medical equipment to extend its use in field hospitals rather than disposing of it after a single deployment.



Donation of surplus goods

Refurbishing and remanufacturing equipment and parts to extend their lifecycle and reduce waste.

Real-World Application:

Donating surplus food supplies to local communities after the completion of a humanitarian mission, reducing spoilage and waste.



Decommissioning and site rehabilitation

Safely dismantling and restoring sites after the end of operations to minimize environmental impact.

Real-World Application:

Removing temporary structures and rehabilitating land used for refugee camps to restore it to its natural state

Section 3: Future trends and innovations

Key points

- Highlight emerging trends in sustainable supply chain management.
- Discuss innovations in transportation, storage, and procurement.
- Explore the potential impact of these trends and innovations on humanitarian operations.
- Emphasize the growing importance of integrating digital tools and technologies across all stages of the supply chain to enhance efficiency and sustainability.
- Highlight the increasing role of cross-sector collaboration and partnerships in driving innovations and implementing sustainable practices.

Background information

- Future trends and innovations are continuously shaping the landscape of sustainable supply chain management. Keeping abreast of these changes helps organizations remain competitive and sustainable.
- Innovations in areas such as technology, materials, and processes can significantly reduce the environmental footprint of supply chain activities and improve efficiency.
- Global environmental policies, such as the Paris Agreement, and emerging regulations on sustainability and carbon emissions are increasingly influencing trends in supply chain management. These global frameworks highlight the urgency of adopting sustainable practices.
- While these innovations offer significant benefits, there are challenges to their implementation, including the cost of technology adoption, resistance to change, and the need for new skills among supply chain professionals.

Content development: Future trends and innovations

Case Study	Context	Environmental Challenge	Humanitarian Response
Digital technologies	Digitalization and IoT	The use of digital technologies and the Internet of Things (IoT) to enhance supply chain visibility and efficiency.	Real-time tracking of goods, predictive maintenance for transportation, and automated inventory management, leading to more responsive and efficient humanitarian operations.
	Blockchain technology	Implementation of blockchain for transparent and secure supply chain transactions.	Enhanced traceability of products, reduced fraud, and improved trust among stakeholders, ensuring more secure and reliable supply chain processes.
	Big data analytics	Leveraging big data analytics to gain insights into supply chain performance and identify areas for improvement.	Enhanced decision-making, increased transparency, and improved efficiency in supply chain management, enabling better resource allocation and risk management.
Sustainable practices	Electric and autonomous vehicles	Use of electric and autonomous vehicles for transportation.	Reduced emissions during the use phase, lower fuel costs, and increased efficiency in logistics operations, making them more sustainable and resilient.

Sustainable practices	Green supply chain financing	Access to capital tied to sustainability performance, encouraging the adoption of sustainable supply chain practices.	Incentivizes organizations to adopt and scale sustainable supply chain practices, supporting long-term environmental and financial sustainability.
	Advanced recycling technologies	Use of advanced recycling technologies, such as chemical recycling, to break down complex materials into reusable materials.	Increased recycling rates, reduced waste, and allowing for the recovery of valuable materials that would otherwise contribute to pollution.
Operational efficiency	Artificial intelligence (AI)	Use of AI to optimize supply chain operations, including demand forecasting, inventory management, and logistics planning.	Increased efficiency, reduced waste, and improved decision-making processes, enhancing the overall effectiveness and sustainability of supply chain management.
	Telemetry and telematics	Advanced vehicle tracking systems that optimize fuel efficiency and reduce emissions through real-time monitoring.	Enables precise fuel management, reduced operational costs, and enhanced environmental performance across vehicle fleets.
Innovative manufacturing	3D printing	Adoption of 3D printing technology for on-demand production of parts and products.	Reduced need for inventory storage, lower transportation costs, and minimized waste, particularly in remote or disaster-prone areas.
	Decentralized manufacturing	Localized or decentralized manufacturing to reduce transportation emissions and enhance community resilience.	Reduced carbon footprint from transportation, increased responsiveness to local needs, and stronger community resilience in disaster-prone areas.
Resource management	Supply chain resilience	Innovations focused on enhancing supply chain resilience, particularly in response to climate change and disasters.	Adaptive logistics strategies and the use of real-time data for risk management, ensuring supply chain continuity in the face of disruptions.

Section 4: Case studies and best practices

Key points

- Present relevant case studies that illustrate successful implementation of sustainable supply chain practices.
- Highlight lessons learned and best practices from these case studies.
- Provide real-world examples to reinforce the concepts discussed in previous sections.

Background information

- Case studies are an effective way to demonstrate the real-world application of sustainable supply chain practices in humanitarian contexts.
- Best practices from these case studies can provide valuable insights and guidance for other organizations seeking to implement similar strategies.
- By examining these examples, we can understand the challenges faced, the solutions implemented, and the outcomes achieved, offering a comprehensive view of sustainable logistics and procurement in action.

Content development: Case studies and best practices

Case Study	Context	Environmental Challenge	Humanitarian Response	Lessons Learned
Green logistics in Lebanon	Implementation of sustainable logistics practices by the ICRC.	Reducing waste and environmental impact of logistics operations.	ICRC provided seedlings in plastic trays to affected communities and later collected and returned the trays for reuse. The project was initiated after the Beirut port blast to support local home-scale planting initiatives.	Reusing materials can significantly reduce waste and operational costs, while promoting sustainability. Collaborating with suppliers to establish a return system for used trays can effectively manage resources and minimize environmental impact.
Sustainable procurement in Afghanistan	Distribution of NFIs (Non-Food Items) in prisons.	Reducing plastic waste in packaging.	Replaced plastic bags with cardboard, saving more than 60,000 plastic bags annually.	Simple changes in packaging materials can lead to significant reductions in plastic waste.
Waste reduction in Kenya	Shelter Box's response to the ban on single-use plastics.	Complying with local environmental regulations and reducing plastic waste.	Removed unnecessary plastic packaging from six frequently used relief items, avoiding nearly 200,000 plastic bags since 2021.	Engaging suppliers in sustainability discussions can lead to significant waste reduction and compliance with local regulations.
Fleet optimization in Costa Rica	The Costa Rica Red Cross is the largest ambulance service provider optimizing fleet usage.	Reducing fuel consumption and carbon emissions.	Implemented vehicle tracking systems, introduced fuel-efficient driving, and optimized routes.	Efficient fleet management can result in substantial cost savings and reductions in carbon emissions.
Reusable packaging in Sierra Leone	EMERGENCY's initiative to switch from plastic bags to reusable plastic boxes for pharmaceutical products.	Reducing plastic waste from packaging.	Transitioned to heavy-duty plastic containers for distributing health commodities, reducing the use of more than 1 million plastic bags over 10 years.	The switch to reusable containers demonstrates how a small initial investment can lead to significant environmental benefits and long-term cost savings.
From Waste to Wheels: Transforming Jordan's Transport Sector	Jordan's initiative to convert waste collection fleet to bio-CNG.	Reducing greenhouse gas emissions from transport and managing landfill methane emissions.	While not directly within a humanitarian context, this project addresses key environmental and public health challenges that indirectly support humanitarian principles by improving air quality, reducing greenhouse gas emissions, and managing waste. This approach enhances the overall resilience of urban communities, including vulnerable populations who may be impacted by pollution and poor waste management, aligning with broader humanitarian goals of safeguarding human health and promoting sustainable living conditions.	Collaborative, context-specific approaches that leverage local resources can successfully address environmental and public health challenges, demonstrating the potential for broader application in enhancing urban resilience and supporting sustainable development in humanitarian settings.

ACTIVITIES

1. Introduce case studies:

- **Objective:** Introduce participants to real-world examples of sustainable supply chain practices in humanitarian contexts.
- **Activity:** Present the case studies (e.g., green logistics in Lebanon, Sustainable procurement in Afghanistan). Use slides to highlight key points, including the environmental challenge, response, and lessons learned.
- **Duration:** 10 minutes
- **Discussion points:**
 - *What were the key environmental challenges?*
 - *How did each response address the identified challenges?*
 - *What lessons can be applied to other contexts?*

2. In-class discussion: analyzing case studies

- **Objective:** Engage participants in an analysis of case studies to identify challenges, responses, and lessons learned.
- **Activity:** Participants discuss the provided case studies in small groups or pairs, focusing on sustainable practices in logistics, procurement, and waste management.
- **Duration:** 20 minutes
- **Discussion points:**
 - *How were the environmental challenges managed?*
 - *What innovative strategies were used?*
 - *Can these strategies be adapted to other humanitarian contexts?*

3. Interactive exercise: developing sustainable supply chain plans

- **Objective:** Apply sustainable supply chain principles to a hypothetical scenario.
- **Activity:** Participants work in groups to create a plan integrating sustainable supply chain practices into a given scenario, focusing on procurement, transportation, and waste management.
- **Duration:** 30 minutes
- **Discussion points:**
 - *What sustainable strategies did your group propose?*
 - *What challenges might arise during implementation?*
 - *How would you address these challenges?*

4. Q&A session: best practices and lessons learned

- **Objective:** Facilitate a deeper understanding of sustainable supply chain practices.
- **Activity:** Conduct a Q&A session where participants ask questions related to the case studies and share insights gained from the discussions.
- **Duration:** 15 minutes
- **Discussion points:**
 - *What are the most impactful practices identified?*
 - *How can these lessons be applied to future humanitarian operations?*
 - *What further resources or skills are needed to implement these practices?*

5. Group activity: applying best practices to local contexts

- **Objective:** Enable participants to adapt best practices to their own operational settings.
- **Activity:** Participants collaborate to outline how a selected best practice could be adapted to their local context, including potential barriers and solutions.
- **Duration:** 30 minutes
- **Discussion points:**
 - *How can these practices be adapted locally?*
 - *What support is needed to implement these adaptations?*
 - *What are the anticipated impacts on environmental sustainability?*

RESOURCES

Materials

- **Slides:** Used for presentations to introduce key concepts and case studies.
- **Handouts:** Include key points, principles, objectives, and guidelines for reference during and after the session.
- **Flipcharts and markers:** Used for group discussions, brainstorming sessions, and presentations to visually capture and share ideas.
- **Projector and screen:** Essential for displaying slides and multimedia content during presentations and discussions.
- **Laptop or computer:** For running presentations, simulations, and accessing digital resources.
- **Printed case studies and examples:** For analysis and discussion in various activities, providing real-world context.

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Delivery method

- **Lectures:** Present key concepts, principles, and strategies related to sustainable supply chain management. Use case studies and examples to illustrate real-world applications and challenges.
- **Q&A sessions:** Facilitate question and answer sessions to engage participants and deepen their understanding. Address any questions or concerns participants may have regarding sustainable practices.
- **Group work:** Engage participants in group discussions and activities to foster collaboration and deeper understanding. Encourage participants to share their experiences and knowledge during exercises.
- **Interactive exercises:** Conduct hands-on activities such as case study analysis and the development of sustainable strategies in hypothetical scenarios.
- **Simulations and role-playing:** Utilize role-playing exercises and simulations to allow participants to practice integrating sustainable supply chain practices into hypothetical scenarios.
- **Presentations and plenary discussions:** Use presentations to provide an overview of key topics and facilitate plenary discussions to engage all participants in the learning process.

Assessment tools

- **Quizzes:** Short quizzes should be administered at the end of each major section to assess participants' understanding of key concepts related to sustainable supply chain management. These quizzes should cover topics such as green logistics, sustainable procurement, reverse logistics, and future trends.
- **Case study analysis:** Participants should engage in case study analysis to apply theoretical knowledge to real-world scenarios. This can be done individually or in groups, followed by a discussion of the findings, focusing on challenges, solutions, and lessons learned from the case studies.
- **Interactive simulations:** Simulations should be used to place participants in decision-making roles where they must apply concepts such as route optimization, sustainable warehousing, and end-of-life management. The outcomes of these simulations can be assessed for alignment with sustainable practices.
- **Reflection questions:** Reflection questions should be provided at the end of each section to encourage participants to think deeply about how they can apply what they've learned to their work. These questions should focus on the challenges of implementing sustainable supply chain practices and their potential impact.
- **Feedback forms:** Feedback forms should be distributed at the end of the module to gather participants' views on the content, delivery, and relevance of the module. This feedback should be analyzed to make continuous improvements to the training program.
- **Group presentations:** Participants should be divided into groups and tasked with developing a presentation on a specific aspect of sustainable supply chain management, such as waste reduction or energy management. The presentations should be assessed based on the comprehensiveness of the strategy, creativity, and practicality of the solutions proposed.
- **Practical assignments:** After the module, participants should be given a take-home assignment where they apply a specific sustainable supply chain strategy in their work environment, then report back on the outcomes and challenges faced, providing an opportunity for real-world application and reflection.

Reflection and review questions

- **Introduction to supply chain environmental impacts**
 - *How do environmental impacts in humanitarian supply chains affect the sustainability of operations?*
 - *Why is it crucial to understand the components and benefits of the humanitarian supply chain in the context of environmental sustainability?*
 - *What are the key principles of sustainable supply chain management that you have learned in this module?*
 - *Can you provide examples of how sustainable supply chain practices can be integrated into your current operations?*
 - *What challenges might you encounter when trying to implement these principles, and how can they be overcome?*
- **Environmental impacts and benefits of managing them**
 - *What are the main environmental impacts associated with transportation, storage, procurement, and disposal in humanitarian supply chains?*
 - *How does managing these impacts contribute to operational efficiency and sustainability?*
 - *What specific strategies can you employ to minimize these environmental impacts in your work?*
 - *How does compliance with environmental standards enhance the reputation and long-term viability of your organization?*
- **Sustainable supply chain management strategies**
 - *Which sustainable supply chain management strategies do you find most relevant to your work, and why?*
 - *How can green logistics and sustainable procurement practices reduce the environmental footprint of your operations?*
 - *What role does resource efficiency play in minimizing waste and conserving resources within your supply chain?*
 - *How can you implement energy management and waste reduction techniques in your current projects?*
 - *What are the benefits and challenges of conducting life cycle assessments in humanitarian supply chains?*
- **Future trends and innovations**
 - *How can emerging trends like digitalization, IoT, and blockchain technology be leveraged to improve supply chain sustainability?*
 - *What innovations in transportation, storage, and procurement have the potential to reduce environmental impact in humanitarian contexts?*
 - *How do you see the role of renewable energy and electric vehicles in shaping the future of humanitarian logistics?*
 - *How can sustainable packaging and circular economy models be integrated into your supply chain to reduce waste and conserve resources?*

- **Case studies and best practices**

- *What lessons did you learn from the case studies presented in this module that you can apply to your own work?*
- *How can the sustainable practices illustrated in the case studies improve the effectiveness and efficiency of your operations?*
- *What are the common themes across the case studies, and how can these lessons be adapted to different humanitarian contexts?*
- *Can you identify any opportunities for collaboration within your organization or with external partners to implement these best practices?*

- **Final review and reflection**

- *How has this module changed your understanding of managing environmental impacts in humanitarian supply chains?*
- *What are three key takeaways that you will apply in your work to promote environmental sustainability in supply chain management?*
- *How can the strategies and innovations discussed in this module enhance the long-term sustainability of your humanitarian operations?*



KEY TAKEAWAYS

- 1. Understanding environmental impacts of humanitarian supply chains:**

Humanitarian supply chains encompass procurement, transportation, storage, and disposal activities, all of which have significant environmental impacts. Understanding these impacts is essential for implementing sustainable supply chain management strategies that reduce the overall environmental footprint of humanitarian operations.
- 2. Key principles of sustainable supply chain management:**

Principles such as resource efficiency, green procurement, energy management, waste reduction, and life cycle assessment are crucial for minimizing environmental impacts. Integrating these principles into supply chain management helps enhance operational sustainability and resilience.
- 3. Strategic supply chain planning:**

Effective planning across all stages of the supply chain, including demand forecasting, resource allocation, and contingency planning, is key to minimizing waste and optimizing environmental performance. Collaboration with suppliers and stakeholders plays a vital role in aligning supply chain practices with sustainability goals.
- 4. Sustainable procurement and sourcing:**

Sustainable procurement involves selecting suppliers based on their environmental practices, ethical sourcing, and sustainability credentials. This approach ensures that goods and services support long-term environmental objectives, such as reducing emissions and supporting local economies.
- 5. Innovative freight and transport strategies:**

Innovations like electric and biogas-powered vehicles, route optimization software, and the use of drones can significantly reduce emissions and improve operational efficiency. These strategies align with green logistics principles, reducing the carbon footprint of transportation activities in humanitarian contexts.
- 6. Sustainable warehousing and facilities management:**

Sustainable practices in warehousing, such as using renewable energy, energy-efficient lighting, and water conservation, help reduce the environmental impact of storage activities. Green warehouse designs and sustainable inventory management further enhance the sustainability of facilities management.
- 7. Reverse logistics and end-of-life management:**

Reverse logistics and end-of-life management strategies promote the circular economy by ensuring that products and materials are reused, recycled, or disposed of responsibly. These practices reduce waste, support resource conservation, and minimize environmental liabilities.
- 8. Future trends and innovations in supply chain management:**

Emerging trends such as digitalization, IoT, blockchain, and sustainable packaging are transforming supply chain management by enhancing transparency, efficiency, and sustainability. Integrating these innovations can drive significant improvements in humanitarian supply chains.
- 9. Case studies and best practices:**

Case studies highlight successful examples of sustainable supply chain practices, such as green logistics in Lebanon, sustainable procurement in Afghanistan, and waste reduction initiatives in Kenya. These real-world examples provide valuable insights and practical guidance for implementing sustainable practices.
- 10. Application of sustainable strategies in humanitarian contexts:**

Applying sustainable supply chain strategies in humanitarian contexts helps reduce the environmental footprint, improve resource efficiency, and enhance operational effectiveness. Ongoing learning, adaptation, and collaboration with partners are essential for scaling these practices and achieving long-term sustainability in supply chain management.



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