

Sustainable Logistics

“Sustainable Logistics and Supply Chain” is an evolving concept in the world of logistics practice that can be described as an integral transformation of logistics strategies, structures, processes, and systems towards a more rational and effective use of resources in supply-chain activities, ranging from the supply of raw materials to the transformation processes, the storage, the packaging, the distribution and the management of the end of the lifecycle of products. Sustainable logistics is becoming more and more relevant in the transition from a linear economic model (based on extraction, transformation, distribution and consumption cycles) to a circular model of economy, whose main goal is to extend the products life and rationalize the use of resources over time.

Sustainability is made up of three pillars: the economy, society, and the environment. These principles are also informally referred as “the 3 Ps” - Profit, People and Planet. By finding a balance among them, logistics can provide the best service while still enforcing and assuring a more conscious resources use.

Green logistics applies a three-dimensional life cycle approach, as opposed to the traditional one-dimensional, economics only focused approach. Following the three-dimensional approach does not necessarily mean that the level of effort and times will increase by three. However, as the organisation reduces its impact on the environment and support positive social behaviours, there may be a return on overall “value for money.”

Pillar	Types of effects
Economic	<ul style="list-style-type: none">• Economic regeneration• Sustainable economic development• Development of Environmental Management Systems• Total cost of ownership and life cycle costing• Value for money• Poverty reduction
Environmental	<ul style="list-style-type: none">• Environmental resource management• Urban planning• CO2 reduction• Alternative energies: e.g.: solar, wind• Water management• Sustainable agriculture• Marine resources management• Protection of ecosystems• Pollution and waste management

Pillar	Types of effects
Social	<ul style="list-style-type: none"> • Human rights • Clean drinking water • Food security • Fair pay and labour law protections • Anti-child labour and forced labour laws • Fair trade • Health and safety • Gender equality including universal education • Child mortality and maternal health • Healthy lives and well-being for all

World Bank - Sustainable Procurement (2019)

There is a wide range of initiatives to make logistics as green as possible, and each organisation should evaluate its own goals, capacities and plans to achieve them.

Best practises exist that allow a more sustainable balance between economic, environmental, and social objectives. These might include:

Area of Activity	Actual Situation	Steps to Improve	Benefits
Transport	Fleet causing high amounts of pollution, air quality reduced.	Measure the movements, costs and maintenance of transport to gather data about their use. Invest accordingly in proper maintenance depending of the needs and the selected strategy. This might include: redrawing shorter routes, investing in green vehicles, etc.	Lowered emission transport units, well maintained and following repair plans that reduce environmental and economic cost by increasing the efficacy.
Distribution	Distribution channels not well organised or with big inefficiencies.	<p>Plan supply chain and procurement taking into account the cost to manage the waste produced.</p> <p>Effectively connect places of production with the distribution points, including using proximity to storage/distribution points as a selection criteria.</p> <p>Assess the production line or third level distribution channels of your suppliers for waste or misuse.</p>	Faster deliveries, increased flexibility for late requests, and time savings on managing waste.
Procurement	Price based selection that potentially hides unethical or not environmentally friendly activities.	<p>Create and apply selection criteria that matches the ethical and environmental policies of the organisation.</p> <p>Research initiatives that other organisations are putting in place and adapt them to your situation.</p>	Reputation increase.
Storage	Product loss by degradation caused by poor storage condition, or damages during in-storage movements.	<p>Make improvements in the infrastructure to facilitate cargo movement. Use solar light and natural ventilation.</p> <p>If the infrastructure is going to last more than two years, invest in solar or wind power sources and manage your power consumption. (Power Supply section).</p>	Save money and time.

Area of Activity	Actual Situation	Steps to Improve	Benefits
Packaging	Excessive use of non-biodegradable materials.	Choosing the appropriate mode of transport with enough time, to be able to understand how the cargo is packed and labelled. Try to find a good compromise between safety and handling; Reduce packaging or/and use reusable or biodegradable materials. Example - corrugated cardboard and other forms of paper-based packaging.	Resources saved.

The WREC Project

Protecting the environment is especially important in humanitarian sector; environmental degradation - due to conflict, natural disasters – is a cross-cutting issue and requires a coordinated intervention to make sure that life-saving activities today don't have unintended impacts that need cleaning up tomorrow. Recent studies on environment in humanitarian action have consistently identified logistics as a stage of supply chain where the risk of unintended impacts is high and where there is a need to [embed environmental expertise to identify scalable solutions](#). To this end, the Global Logistics Cluster with the support of a coalition of humanitarian organizations - Danish Refugee Council (DRC), the International Federation of Red Cross and Red Crescent Societies (IFRC), Save the Children International, and the World Food Programme, set up the Waste Management Measuring, Reverse Logistics, Environmentally Sustainable Procurement and Transport, and Circular Economy (WREC) Project to produce harmonized guidance on waste management and greenhouse gas emissions, increase knowledge and awareness in the humanitarian community about green logistics, and support practitioners in environmental impact reduction, with a special focus for sustained field-based solutions.-

The [WREC Project](#) is bringing together humanitarian partners, the private sector, and academia to make sure that today's life-saving activities don't have unintended environmental impacts that need cleaning up tomorrow. As part of this, the Global Logistics Cluster plays an active role in coordinating and collaborating with those leading complementary initiatives to ensure that this information is both available and contextualized for field-level practitioners' use. You can access the WREC platform here to learn more about the most recent initiatives in humanitarian logistics and find useful guidance to reduce the environmental impacts associated to humanitarian logistics operations.

Sustainable Logistics Planning and Monitoring

Environmental Checklist

This series of questions can be used as a check-list to focus on key areas for consideration in the humanitarian sector:

- What environmental risks do your organisation's activities pose?
- Do the materials you use pose any danger to the environment, staff or beneficiaries?
- Do you know what impact the material that you supply (including its disposal) and services you provide have on the environment?
- Do you know the quantity or type of waste you produce?
- Do you know how this waste is disposed of or what the cost is?
- Is your organisation operating the most cost-effective method of controlling or eliminating pollution risk?
- Are there hidden benefits such as greater efficiency, or even straightforward business opportunities (for example, commercial utilisation of waste) from adopting alternative methods of controlling or eliminating the pollution risk?
- Are you aware of existing environmental standards and legislation in the country in which you are operating?
- What arrangement do you have for monitoring compliance with environmental legislation?
- Is senior management actively engaged in ensuring that proper attention is given to environmental considerations in your organisation?
- Could you improve your environmental image to the donors and employees?
- Are you highlighting your environmental performance to donors?

Environmental Management Systems (EMS)

Logistics and transport activities have been identified as having a major impact on the environment. Consequently, authorities have started to develop significant legislation at both national and international level. Targets for improving environmental performance have been set by the international community via a range of international agreements and meetings, from the Rio Earth Summit in 1992 to the adoption of the Sustainable Development Goals at Rio+20 in 2015 and the climate change related meetings of the Kyoto Protocol, in particular the Paris Accord. International agreements of particular relevance to logistics personnel include the Basel-Rotterdam-Stockholm conventions on management of wastes, the Montreal Protocol on protecting the ozone layer (covering substances including air conditioning gases) and the Minamata convention on phasing out mercury.

Environmental impacts are best managed using a systematic approach that helps organisations to understand all their impacts and address them in some sort of priority order. The most common tool is an environmental management system (EMS), and the best known approach to EMS is laid out by the International Organisation of Standards (ISO) 14000 series of standards. The ISO 14000 family addresses various aspects of environmental management and have been adopted by more than 300,000 organisations worldwide. The first three standards deal with environmental management systems (EMS).

- [**ISO 14001:2015**](#) Guidance for requirements for an EMS.
- [**ISO 14004:2016**](#) General guidelines on implementation.
- [**ISO 14005:2019**](#) Guidelines for a flexible approach to phased implementation.

The other standards and guidelines in the family address specific environmental aspects, including:

- Labelling.
- Performance evaluation.
- Life cycle analysis.
- Communication and auditing.

These standards provide a framework for managing environmental issues rather than establishing performance requirements. The process that starts with a senior management commitment and the creation of an environmental policy and leads on to:

- Documenting environmental impacts, prioritising them and setting goals for improvement.
- Awareness.
- Planning how stakeholder obligations (including legal requirements) and targets will be met.
- Implementation (including operational controls).
- Training and communicating with staff.
- Control of relevant documentation.

Monitoring

Once an EMS is set up, it is then formally monitored through an auditing process, which will identify any missed targets, procedures not followed or new procedures needed, and document corrective actions required to ensure the EMS meets its objectives. Managers are required to engage in this process and review the system performance on a regular basis. Performance review may lead to the policy or

objectives being changed or updated, in light of the audit reports or changes in circumstances. This process should encourage a commitment to continuous improvement in environmental management as well as ensure that the organisation is not exposed by failing to meet its legal and moral obligations.

Performance Measurement

Organisations with environmental management systems will attempt to monitor their performance, and simple measures might include:

- Volume of fuel used to keep an operations running over a defined period of time, including:
 - Operating vehicles.
 - Running generators.
 - (If possible) fuel used by third party transport providers.
- Proper maintenance and repair of equipment, including:
 - Monitoring the changing/degrading performance of generators and vehicles.
 - Monitoring consumption of dependant/support equipment (tyres, filters, etc).
 - Proper disposal of waste oils and lubricants.
- Proper transport utilisation, including:
 - Avoiding sending vessels empty or partially loaded.
 - Sharing transport resources with other agencies.
 - Understanding international transport needs, especially items transported by air.
- Setting targets for reducing waste reduction, including:
 - Minimising spoilage and expiration of stored items.
 - Reducing packaging requirements for relief items.
 - Environmentally friendly disposal of expired commodities.
 - Ensuring a proper disposition plan for all items.

Minimising Negative Environmental Impacts

Sustainable Energy Production

Humanitarian organisations often work in austere, off-grid environments. Using generators that burn petrochemicals is extremely common. While generators may be

unavoidable in many contexts, there are steps agencies can take to reduce waste and environmental impact.

- Set standard working hours for generators – generators already have limits to the lengths of time they can operate, and where security permits agencies may choose “off hours” to avoid burning fuel when unnecessary.
- Properly service and maintain generators wherever they are in use. Properly serviced generators also will save money and enhance security.
- Invest in a solar electric or battery backup system to generate and supply electricity to offices and compounds. Battery and solar systems are often great tools to augment power systems, and can be used alongside regular generators.

For more information on the proper methods of [maintaining a generator](#), on selecting and installing a [solar electric system](#), and on using [battery back-up systems](#), please reference the [electrical power generation](#) section of this guide.

Sustainable Use of Vehicles

Vehicles are widely used within the humanitarian context, and operating in and around them is almost unavoidable. There are many steps to take to ensure the most sustainable and environmentally friendly performance of vehicles. These might include:

- Selecting fuel efficient vehicles and ensuring right-sizing of fleets.
- Driver training to reduce accidents and improve fuel consumption.
- Monitoring fuel consumption.
- Monitoring vehicle utilisation in terms of both payload and empty running.
- Conducting preventative maintenance, as a poorly serviced vehicles use more fuel.
- Dispose of used tyre casings, batteries, motor oil and other vehicle waste responsibly.

A proper maintained fleet has the advantage of being both environmentally friendly, but also cost efficient. For more information on [vehicle selection](#), [vehicle and fleet monitoring](#), and [proper maintenance](#), please reference the [vehicle and fleet management](#) section of this guide.

Waste Management

Unintended by-products of humanitarian action (e.g. plastics and packaging required to safeguard the quality of the relief items, food or non-food, hazardous materials from

organizations' vehicle fleets like used tyres, motor oils and lubricants, batteries and end-of-life vehicles, dangerous fumes from the burning of waste) impact negatively on local human and ecological health, and they typically occur in contexts where systems to manage them sustainably do not exist. Waste management can be defined as the set of practices, processes and policies aiming at measuring and reducing the overall waste volumes of an organization. Typically, waste management practices should be prioritised according to the following scheme:

- Reduce
- Reuse
- Recycle

The final objective of effective waste management is reducing waste at the source, for example avoiding unnecessary packaging, banning single-use plastics and introducing mechanisms to plan needs in a way to minimize the quantity of waste or by-products to dispose of.

Effective steps to understand the different waste streams on site, identify the most suitable disposal options, and continuously improve on-site waste management include:

- Introducing a Solid Waste Inventory; This exercise allows to identify all the waste generated and disposed of either on-site and/or off-site. It is completed by performing a physical inspection of current waste storage locations in the compound/facility and/or referring to invoices from waste contractors.
- Identifying the most appropriate disposal methods for each type of waste, from “Best option” to “Last resort”.
- Identification of local contractors and potential with adequate capacity to treat and dispose of hazardous and non-hazardous waste in collaboration with procurement teams.
- Set-up and regular inspection of storage areas to ensure separation of waste streams.

Sustainable Packaging

Logistics departments of humanitarian agencies frequently deal with packaging of materials. Packaging represents one of the greatest challenges to environmentally friendly logistics while at the same time being vital in shipping and storage.

Packaging has consequences for transportation, storage methods, and space requirements of a given space. Packaging can increase the unit cost if it hinders optimisation of storage space. Many industries have developed forms of packaging

that can withstand the stresses of transport but do not justify the expense of returning them to the point of origin, being used once and then discarded.

Steps to take when planning packaging:

- Plan for biodegradable overpacking such as cardboard cartons.
- Where possible, plan for recovering packing materials, recycling them locally or even returning them to the vendor for re-use. Suppliers and the buyers should seek to recover and recycle or effectively dispose of packaging.
- Reduce the size of packing, requiring less space to store and less fuel to transport.
- Investigate local companies that may engage in environmentally friendly solid waste disposal and recycling.
- Where packing cannot be made from bio-degradable material or material reduced, consider kitting and repackaging into sustainable packing before the last mile of distribution to avoid uncontrolled disbursement of wasteful materials.

Green Facility Management

There are many steps agencies may take to enhance the sustainability of working and living premise and warehouses. These might include:

- Avoiding wasting water by using water efficient taps, leak prevention and recycling methods.
- Install energy efficient light bulbs.
- Using interceptor tanks to avoid run-off pollution from fuel dispensing areas.
- Phase out of ozone-depleting gases from air conditioning systems in warehouses and compounds.
- Develop a strategy for managing e-waste (old computers, communications equipment) and batteries.

In warehouse and stock keeping:

- Utilise proper stock management methods to avoid infestation, spoilage, damage and expiration, all of which lead to waste and disposal.
- Exercise careful management and monitoring of hazardous chemicals to avoid spillage or leaking.
- Taking steps to better manage the production, collection and disposal of waste, including packaging wastes.

For more information on proper stock keeping methods, please reference the [warehousing and physical stock management](#) section of this guide. [Managing fuel](#) and

handling [hazardous materials](#) can also be found.

Green Procurement

" Sustainable procurement is the act of adopting social, economic and environmental factors alongside the typical price and quality considerations into the organisations handling of procurement processes and procedures. (CIPS)

The procurement process is an excelling time to assess and commit to green logistics practices. Sustainable procurement considers the environmental, social and economic consequences of design, materials used, manufacturing methods, logistics and disposal. In green procurement organisations can meet their needs for goods, services, and utilities in a way that achieves value for money while still addressing principles for sustainable development.

The aim and challenge of sustainable procurement is to integrate environmental and social considerations into the procurement process. One of the most powerful methods is to choose the appropriate selection criteria with sustainability in mind, clearly inform potential bidders, and ensuring all requirements are properly met. A guide to developing [solicitations for vendors](#) can be found [procurement](#) section of this guide.

Example of selection criteria might include:

Economic	Social	Environmental
Previous/current experience Accreditation by independent certification organisation.	Accreditation by independent certification organisation to a standard.	Impact of materials used and processes of production.
Productivity/service capacity.	Evidence that workers know their rights and responsibilities at work.	Impact of packaging.
Design robustness/innovation.	Presence of independent trade unions or effective management/worker committees which address workers' priorities, including pay, hours and conditions.	Impact of transport (air freight from Europe may be greater than sea freight from Asia/Africa).
Whole-life costing of product	Sub-supplier practices and conditions.	Impact of product life cycle.
Switching cost of current supplier.	Participation in multi-stakeholder initiatives that educate and change practices to address ingrained problems.	

Source: CIPS, Chartered Institute of Purchasing and Supply Chain, (2013). [Ethical and sustainable procurement](#).

Ongoing procurement has had such an impact on green logistics that ISO has developed a specific Standard able to guide every procurement decision.

- **ISO 20400** Sustainable procurement standard.

Formed on the bases of ISO 26000 for Social Responsibility, sustainable procurement relies on:

- Assess the organisational “buying culture” - Understand how and from who the organisation buys/sells to, the control over sub-suppliers as well as sub-supplier capacities to accommodate green demands, and if green requirements are realistic and expressed clearly.
- Know the organisation supply chain - Evaluate the cost of the supply chain, and the proportion of the revenue that goes towards paying suppliers. Assess the suppliers societal and environmental impact.
- Think strategically; Consider the risks and opportunities of working more closely with the main suppliers across the whole life cycle of products and services.
- Get buy-in from top management - Ensure key decision makers are on board and aware of the benefits, opportunities, and possible consequences of implementing sustainable procurement into the organisation.

Reverse Logistics

Reverse logistics has been traditionally defined as the process of moving a product from its point of consumption to the point of origin to recapture value or ensure proper disposal. It is one of the fastest developing fields of commercial logistics, resulting in continuously changing scope and significance. Reverse logistics includes activities that:

- Avoid return of assets or items.
- Reduces materials in the forward system so that fewer items flow back.
- Ensures the possible reuse and recycling of materials and packaging.

It is important to ensure that aid projects are handled in a responsible manner and that they do not end up causing long term damage to the very people and societies that they are intended to assist.

Reverse logistics is the management of all the activities involved in the flow of goods, demand information and money in the opposite direction of the primary logistics flow, including reduction in the generation of waste, and management of the collection,

transport, disposal, and recycling of hazardous, as well as non-hazardous waste, in a way that maximizes the long-term profitability of the business.

Reverse logistics covers a broad range of items and activities and can include:

- Movement of capital items and equipment to the next emergency response.
- Removal of containers and packaging from an area of intervention.
- Destruction of spoiled food commodities and out of date pharmaceuticals.
- Return of rejected goods to suppliers.
- Movement of excess or over-supplied goods to other programmes or organisations.

Reverse logistics occurs in the humanitarian sector when:

- Downscaling of activities:
 - Goods have to be moved to different programmes or disposed.
 - Evacuation due to insecurity - may result in the suspension of activities when goods have already been purchased and have to be returned to the supplier or used in other programmes.
- Closing programmes or ending of emergencies prompts the handover of items
- Products are recalled by their manufacturer
- Rejected goods are returned to the vendor due to:
 - Incorrect orders.
 - Incorrect deliveries.
 - Deliveries being delayed and goods no longer useful to the programme.
 - Damaged goods.
 - Goods on warranty or going for repair.
- Back-trucking of packaging materials for re-use or disposal.

In all instances listed above, there are cost implications that should be taken into consideration during the budgeting and planning period.

Circular Economy

The circular economy is based on three principles, driven by design:

- Eliminate waste and pollution
- Circulate products and materials at their highest value
- Regenerate nature

A circular economy is underpinned by a transition to renewable energy and materials. A circular economy decouples economic activity from the consumption of finite resources. It is a resilient system that is good for business, people and the environment.

Sustainable Logistics Tools and Resources

Sites and Resources

- [Sustainable Procurement guidance for practitioners to sustainable procurement in World Bank IPF projects, World Bank, \(2019\)](#)
- [CIPS, Chartered Institute of Purchasing and Supply Chain, \(2013\). Ethical and sustainable procurement](#)
- [UN, United Nations, \(2006\) Procurement practitioners handbook](#)
- [Fleet Forum](#)
- [Clean Fleet Toolkit](#)
- UN WFP, Safe Management of Hazardous Waste in WFP Workshops ([English](#), [French](#))
- [USAID BHA \(2020\), Sustainability in Humanitarian Supply Chains](#)
- [Global Logistics Cluster & Hanken University \(2022\), Waste management and Reverse Logistics in the Humanitarian Context](#)
- Ellen MacArthur Foundation, "[What is a circular economy?](#)"