

Waste Management in Humanitarian Logistics

Case Study: Greece Refugee Camps



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Waste management in humanitarian logistics is a critical issue that demands more attention. This thesis looks into the current state of waste management techniques in humanitarian logistics and highlights the lack of acknowledgment, financing, and research on sustainability in humanitarian logistics. The study underlines the importance of sustainability in humanitarian operations and offers ideas for implementing sustainable waste management practices by focusing on how to make waste management in humanitarian logistics more sustainable.

The case study of Greek refugee camps is used to provide practical recommendations for waste management procedures. Recommendations for making waste management more sustainable are based on past research in that sector as well as a series of interviews.

According to the research, only altering the mindset of humanitarian actors, supporting behavioral change, and bringing more responsibility into the sector would result in long-term improvements in the way the humanitarian sector approaches sustainability. Humanitarian organizations must not only recognize that accepting responsibility for their environmental impact is part of their do-no-harm approach and, in the long run, serves their goal of protecting people, but they must also incorporate appropriate responses into their operations in order to continue saving the lives of those in need. This thesis can serve as a solid foundation for further research into the possibilities of more sustainable waste management strategies.

Keywords Waste Management, Sustainability, Humanitarian Logistics, Refugee Camps

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Abbreviations

UN	United Nations
ECHO	European Civil Protection and Humanitarian Aid Operations
ISWA	International Solid Waste Association
EU	European Union
UNEP	United Nations Environment Programme
OCHA	Office for the Coordination of Humanitarian Affairs
IFRC	International Federation of Red Cross and Red Crescent Societies
EEC	Environmental Emergency Centre
WREC	Waste Management, Reverse Logistics, Environmentally Sustainable Procurement and Transport, Circular Economy
ICRC	International Committee of the Red Cross
UNHCR	United Nations High Commissioner for Refugees
OECD	Organization for Economic Cooperation and Development
UNICEF	United Nations International Children's Emergency Fund

1 Introduction

The climate crisis becomes an ever more pressing subject in everyday life. The effects can be felt all over the world and this decade has seen a dramatic increase in climate-related disasters compared to the 1980s (UN, 2021, p.21). With the rising of disasters comes a higher need for humanitarian operations while the number of people in need of humanitarian assistance has tripled over the last decade (George et al., 2020, p.9). Climate displacement has been proven to be a driver of humanitarian crises (Tuomala et al., 2022, p.3) and the global humanitarian overview (2022) states that in 2022, 274 million people were in need of humanitarian assistance and protection. The change of climate is increasingly responsible for humanitarian emergencies making it clearer than ever that the environment is essential to humanitarian action and must be protected (European Commission, 2022). Sustainability and its necessity have been ignored for too long in the context of humanitarian logistics therefore, one of the best ways to increase sustainability in humanitarian logistics is through proper waste management.

Humanitarian logistics are responsible for transporting relief items to where they are needed around the world. During these operations (emergency assistance) waste is generated. Often times the countries/regions that receive humanitarian aid are not equipped to handle additionally generated waste. (ECHO Nairobi, personal communication, 31, March 2023) The improper management of waste has been proven to directly threaten the environment, biodiversity, and human health (ISWA, 2021). And while humanitarian assistance strives to save lives, alleviate suffering, and increase preparation during and after emergencies and crises (George et al., 2020, p.9), at present, the subject of sustainability in humanitarian logistics, especially waste management lacks much-needed attention, funding, and research (Tuomala et al., 2022, p.7). Furthermore, access to waste management information and resources is limited, making the transition to a more sustainable future even more challenging (George et al., 2020).

1.1 Aim and Research Question

This thesis broaches the issue of improper waste management in humanitarian logistics and its impact. It provides insights into the current situation of waste management practices in humanitarian logistics and shows what steps have already been taken to make humanitarian logistics more sustainable, including recommendations and regulations for implementing sustainability in humanitarian operations. This thesis delivers further suggestions on how to make humanitarian logistics more sustainable by focusing on waste management practices in humanitarian logistics. Due to the broadness of the humanitarian sector, different recommendations and regulations for waste management practices are needed. For the sake of more defined results, this thesis focuses on the recommendations and regulations for implementing sustainability in humanitarian operations in Greek refugee camps. A case study is used to apply the information gathered through literature reviews and interviews on how to improve the sustainability of waste management. This way the recommendations have a clear practical value and can be applied accordingly.

The underlying question for this research is:

How can waste management in humanitarian logistics be made more sustainable?

The motivation for this thesis is to draw attention to the dangers that improper waste management during humanitarian operations poses to the environment and the community, to raise awareness not only in the public community but especially within humanitarian organizations, and give some improvement suggestions in order to help the situation of waste management in humanitarian logistics. The case study in particular will be helpful to Greece, as they have struggled with waste management practices in the past. Other countries in similar situations can use the recommendations as well, to revise their waste management practices and hopefully use them to make humanitarian operations in their countries more sustainable.

1.2 Methods

The goal of this thesis is to gain an understanding of the existing data relevant to the subject and put together a conclusive summary that is, later on, used to identify possible gaps in the field and to compare the gathered literature with the author's own research later on.

The literature review includes the definitions for the main terms and highlights already established practices and the latest research related to waste management in humanitarian logistics. Based on the literature review the current state of waste management practices is clearly identified. Furthermore, this thesis aims to relate the theoretical findings to daily work in humanitarian logistics by including recommendations for the improvement of waste management practices that can be applied in practice. As part of the qualitative research, interviews regarding the standpoint on the importance of waste management in humanitarian logistics are conducted.

After the introduction, the first chapter builds the theoretical basis for the analysis later on. During the theoretical framework of humanitarian logistics, sustainability, and waste management, the current situation of waste management in humanitarian logistics, as well as some smaller subjects related are presented and defined. This chapter also includes a description of the country for which later on, recommendations are formed. Greece in general and its need for humanitarian logistics and waste management are addressed. The methodology chapter introduces the strategies and analytic techniques used for the analysis and development of the thesis. In turn, this builds the basis for the following analysis and recommendations on how to improve the situation of waste management in humanitarian logistics.

1.3 Delimitation

The entire supply chain is affected by the logistics. As a consequence, there are many opportunities to improve sustainability. There are even more when it comes to the logistic system of humanitarian action. This work entirely focuses on improving the sustainability of waste management in humanitarian logistics. Humanitarian organizations operate in regions all over the world, based on where their help is needed. Depending on the type of disaster

that has caused humanitarian needs and the area it is occurring, different approaches to waste management are needed. This thesis delivers some general suggestions on how to make waste management in humanitarian logistics more sustainable. At the same time, not all suggestions can be applied to every scenario where waste management practices are needed in humanitarian logistics, which is why this thesis focuses especially on improving waste management practices for refugee camps in Greece.

2 Theoretical Framework

2.1 Humanitarian Logistics

Logistics are a necessity for every organization. According to Waters (2003, p.12), logistics are “responsible for the movement and storage of materials as they move through the supply chain.” As the whole supply chain is affected the activities of the logistics also span over the total extent of the supply chain. Several definitions emphasize that a supply chain is a network that collaborates to produce and distribute goods and services to the end customer. It includes the entire journey of a product, from procurement and purchasing to inward transport or traffic, warehousing, stock control (inventory), material handling moving the material through an operation within an organization, outward transport, physical distribution management, and waste management (recycling, returns, waste disposal). (Waters, 2003, p.13) Just as logistics is imperative for the well-functioning of an organization in everyday life, it is an integral part of humanitarian operations. Humanitarian aid is indispensable for people who have been affected by a disaster or crisis.

A humanitarian supply chain is a distinctive type of supply chain that focuses on delivering aid in the most efficient way to people in need (Gustafsson, 2022). The actors operate under a “no harm policy” and aim to better the lives of the affected people short and long term (Bonis Charandle & Lucchi, 2018). These create unique challenges which differentiate the humanitarian supply chain from the usual supply chain. As a result, humanitarian logistics should be distinguished from standard logistics. As a basis, this thesis will rely on the definition of humanitarian logistics from the Evaluation of Humanitarian Logistics within EU Civil Protection and Humanitarian Action, 2013-2017. “Humanitarian logistics refers to the

processes and systems involved in mobilising people, resources, skills and knowledge to help vulnerable people affected by natural disasters and complex emergencies” (Fenton et al., 2019).

2.2 Sustainability

As one of the best ways to increase sustainability in humanitarian logistics, waste management is an integral part of sustainability. In academic literature, there are many different definitions of the term sustainability. Depending on the aim, direction, and field it is used in the definitions vary. United Nations Brundtland Commission defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” (1987) Over time the term has evolved. What many studies agree upon is that the concept of sustainability can be roughly divided into three dimensions. The dimensions of social, economic, and environmental. (Purvis et al., 2019) While speaking of sustainability in this thesis the focus will be on environmental and social aspects. Included in the environmental aspects of waste management are for example contamination of soil, water, and air. Included in the social aspects of waste management are for example the health risks of residents.

2.3 Waste Management in a Time of Disaster

The United Nations defines waste management as: “The total supervision of waste production, handling, processing, storage, and transport from its point of generation to its final acceptable disposal.” (UNEP, n.d.)

Waste management is distinguished between liquid and solid waste management. Solid waste management includes the collection, storage, transportation, processing, treatment, reuse or recycling options, and final disposal of waste (European Commission, 2022, p.23). Important for humanitarian logistics is the differentiation between different types of waste, as they require different methods of disposal. The most common distinction is made between different types of solid waste: Plastic waste, organic waste, medical waste, electrical waste, and other solid waste. (UNEP/OCHA Environment Unit, 2014, p.20). Waste management can be viewed as part of disaster waste management during humanitarian activities. Disaster waste can be generated both during the disaster and later during the recovery process. Large

amounts of solid and liquid waste can endanger public health and harm the environment. Disaster waste covers both solid and liquid waste produced by a disaster. (UNEP, 2013, p.3)

Based on the IFRC Disaster Relief Emergency Fund of 2021, most disasters were located in Central and South Asia, Africa, and South America. (European Civil Protection and Humanitarian Aid Operations, 2022) Based on the locations where the donations were needed it can be concluded that that is where humanitarian action and humanitarian logistics mainly operate. The EU budget of the European Civil Protection and Humanitarian Aid Operations for 2023 amounts to 1.7 billion Euros. The fund is being divided in millions between Africa (€513), Middle East and North Africa (€382), Asia and Latin America (€237), and southeast Europe and European neighbors (€208). The rest is used for sudden emergencies and other unforeseen humanitarian crises. Examples of disasters that demand humanitarian action are urban fires, civil unrest, conflicts, droughts, earthquakes, epidemics, floods, volcanic eruptions, wildfires, windstorms, and population movement. (European Civil Protection and Humanitarian Aid Operations, 2022)

After a disaster, impacted communities frequently seek out and set up informal settlements or are relocated to displacement camps. Huge amounts of waste accumulate in refugee camps through the increase in packaged goods and other relief items. (EEC, n.d.) Implementing proper waste management, including waste collection and disposal, is challenging without accountability and a clear line of responsibility (Bjerregaard & Meekings, 2008).

2.4 Humanitarian Crisis

Humanitarian aid is dependent on logistics. It becomes necessary when there is a crisis that cannot be handled by the local community or government alone. The term crisis is used in many different ways depending on which context it is used. Generally speaking, a crisis is an uncertain situation that poses risks as well as opportunities for the affected and must be overcome. (Canyon, 2020) The United Nations defines a humanitarian crisis as “a singular event or a series of events that are threatening in terms of health, safety or well-being of a community or large group of people.” (United Nations, n.d.) For the management of such a crisis, proper strategies and techniques are needed in order to identify, manage, and contain the damage of the crisis (Canyon, 2020).

2.5 Current Situation

Waste management is one of the most urgent and underfunded sustainability-related problems (George et al., 2020, p. 3). Many studies regarding the subject of sustainability in humanitarian logistics have highlighted the importance of including waste management in their everyday proceedings. In order to fully commit to sustainable waste management it must be implemented in the whole supply chain. (Tuomala et al., 2022) Over the last decade, the need for humanitarian aid has risen. The global humanitarian overview (2022) states that in 2022, 274 million people were in need of humanitarian assistance and protection. That is 39 million people more than in 2021, which was already the highest figure in decades. They also state that up to 216 million people may have to move from their own country by 2050 due to the effects of climate change. (UN, 2021, p.7)

Waste management must be seen as part of the bigger picture in order for humanitarian logistics to have long-term sustainability. With the rise in the need for humanitarian assistance (George et al., 2020, p.3) embracing sustainable practices in their operations becomes a necessity. George et al., (2020, p.9) make clear that if humanitarian logistics continue the way they have been operating they will be the cause of future disasters and other major problems for the communities. Previous studies have proven the direct effects improper waste management in humanitarian logistics has on the community.

Humanitarian logistics are resource intensive and result in a considerable amount of waste (Tuomala et al., 2022, p. 2) which can be generated on all levels of operations in humanitarian logistics. From procurement, transport, tracking, and local transportation to warehousing and waste management. That is why it is important to consider the entire supply chain when talking about sustainability in logistics. (ECHO, 2022, p.17) If the waste of the operations is not disposed of properly it can cause further harm to the environment and its people who are already affected by the disaster that has disrupted their home life. The most dire effects are the contamination of soil, water, and air. While the improper disposal of solid waste leads to the contamination of groundwater/essential water sources, the poor disposal of medical waste, for example, infected bandages or body tissues, can lead to the transmission of diseases. According to the research of Tuomala et al. (2022, p. 16), the most common practice of getting rid of hazardous and medical waste are improper incineration practices. Burning

mixed waste releases large amounts of dioxin, mercury, and other pollutants, which are harmful to the environment and humans. (UNEP/OCHA Environment Unit, 2014, p.65)

Tuomala et al., (2022, p.7) mentioned that even though there hasn't been enough research in the field of sustainable humanitarian logistics there are already destructive consequences known that can be traced back to the improper waste management of the humanitarian logistics in their operation countries. George et al. (2020, p.3) have found that the waste management dilemma is especially serious in nations or communities receiving humanitarian aid, which frequently lack enough infrastructure or management mechanisms to handle waste generated through the assistance. Waste can collect and remain in communities permanently, or it can lead to incorrect disposal techniques, which have negative consequences for communities and the environment, as well as increased stress on already stressed municipal systems. (George et al., 2020, p.3).

2.6 Examples of previous Humanitarian Operations

There are many instances where improper waste disposal has caused problems. The difficulty occurs in documenting these scenarios and generating best practices from the experience. (UNEP/OCHA Environment Unit, 2014, p.16) To visualize how important waste management in humanitarian logistics is and what damage waste can cause during humanitarian operations two instances have been included in this thesis.

Haiti 2010: After an earthquake hit the country in 2010 humanitarian operations did their most to help the people in need. In the process, a lot of waste accumulated. Mostly plastic bottles and other in-kind donations. (Cravioto et al., 2011) At the time Haiti had no solid waste management in place and there was nothing the operating humanitarian could have relied upon. As a result of neglecting waste management, waste could be found at the beach, and clogging the drains of the street. After some heavy rain, the clogged drains caused major floodings which worsened the already precarious situation of the Haitian people. Researchers believe that these floodings and the following environmental contamination led to the largest outbreak of cholera in the recent history of the country. (Zarei et al., 2019, p.5)

Another example of how neglecting waste management practices worsened the situation of the environment and present inhabitants are the initial post-tsunami clean-up operations in the Maldives. After the tsunami in 2004, the operating humanitarian organizations worsened the conditions by piling debris on the beaches. The different types of waste were not separated. Demolition waste, household waste from former dumpsites, vegetation, metals, and hazardous compounds were gathered at the beach where it would wash into the sea and contaminate groundwater, threatening the local people. (UNEP/OCHA Environment Unit, 2014)

The improper disposal of waste does not only have negative effects on the environment but the health of the people who live there. The Environment and humanitarian action report of 2014 put it clearly and very simply when it stated that neglecting proper waste management practices threatens, “the very people the humanitarian response is designed to support”. (UNEP/OCHA Environment Unit, 2014, p.6)

2.7 Regulations for Waste Management

For a long time, waste management has played a secondary role in humanitarian logistics (George et al., 2020, p.17). With the lack of attention, there were no regulations in place to hold participants accountable (UNEP/OCHA Environment Unit, 2014, p.22). The European Commission has been working towards a change in that regard. They have introduced minimum environmental requirements and recommendations for EU-funded humanitarian aid operations. These minimum environmental requirements include waste management guidelines that are supposed to become mandatory in 2023. The different requirements cover waste management practices in different areas. Including public health, water sanitation and hygiene, shelter and settlements, food assistance, sustainable supply chains, sustainable management of solid waste and chemicals, and more. They are the first donors that have implemented mandatory requirements. (ECHO Nairobi, personal communication, 31, March 2023) There are various other guidelines and standards set for humanitarian operations, but these don't hold the organizations accountable. Most organizations follow national and local guidelines for the disposal of waste. Problems occur when there are no or nonsufficient guidelines in place. (WREC team, personal communication, 07 March 2023)

2.8 Do Sustainable Practices contradict Humanitarian Objectives?

Including more sustainable practices in humanitarian logistics brings forward many changes and a high commitment to the cause from the organizations (Dubey et al., 2020). At first glance, it seems like these changes hinder the work of humanitarian organizations and stand in contrast with the humanitarian objective (Rojo-Gallego-Burin et al., 2020). The humanitarian objective is based on the do-no-harm policy. First and foremost, that means that humanitarian operations provide necessary measures and precautions so that not the people nor the environment are harmed. They work towards protecting all people regardless of nationality, ethnicity, or religion. (IFRC, 2017) During an emergency/disaster response, environmental aspects are often overlooked. Sustainability is secondary to delivering aid and assisting the population. At the same time, environmental protection is critical to humanitarian action for a variety of reasons. Most of the core issues that evoke humanitarian action are fundamentally rooted in the environment. (European Commission, 2022) Including sustainability and environmental responsibility in the operations is not separate from saving lives. By supporting environmental sustainability, the population is also supported, and lives are saved. Ultimately sustainability in humanitarian operations is an essential component of the do-no-harm principle because it saves lives. (ECHO Nairobi, personal communication, 31, March 2023)

2.9 Green Procurement and Lifecycle Assessment

During the course of our Interview the Information Management Officer for the WREC project mentioned that as part of the supply chain, procurement is one of the contact points where sustainable practices achieve the most change (Information Management Officer, WREC team, personal communication, 07 March 2023). While packaging is critical to ensure that life-saving aid reaches those who need it, it also generates large amounts of waste that can harm human health and the environment. As a result, many humanitarian organizations are rethinking their packaging practices and turning to sustainable or green sourcing. (Tuomala et al., 2022)

In context, experts nowadays talk about sustainable or green procurement. The United Nations defines green procurement as a process aimed at procuring goods, services and works

with a reduced impact on the environment throughout their life cycle (European Commission, n.d.-a). It is based on three pillars of sustainability - quality, social and environmental (ICRC, 2021). Taking environmental factors alongside quality and financial factors into consideration. It entails looking beyond standard economic metrics and making decisions based on the total life cost, associated risks, success measurements, and societal and environmental repercussions, and it demands that procurement be placed in a broader strategic framework. (UN, 2020).

The environmental aspects of green procurement include minimizing potential negative effects on the environment, using long-lasting products and materials, reducing packaging where it is not needed, and using recycled and reused materials where possible. The social aspect of green procurement includes ethical standards for all participants, such as labor and deontological practices, health and safety, and hardship working conditions. (Ely & Insabato, 2022) The ICRC/IFRC have created a code of conduct of ethical standards for all participants. The economic impact of green procurement includes the long-lasting lifetime of products, reparability, and upgradability. (ICRC, 2021)

As part of green procurement and a sustainable supply chain, lifecycle assessment is another aspect that should be taken into consideration when talking about reducing waste in humanitarian logistics. Lifecycle assessment is defined by the European Commission “as the compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle”. (European Commission, n.d.-b) The assessment of the lifecycle of a product is based on four phases - goal and scope, inventory analysis, impact assessment, and interpretation (European Commission, n.d.-b).

2.10 Greece

Greece is a country located in southeastern Europe. It shares borders with Albania, Bulgaria, Macedonia, and Turkey. From the south and west the Aegean Sea, Ionian Sea, and Mediterranean Sea surround the country. Greece covers around 130 thousand km² and has a population of approximately 10.7 million people. (DEstatis, 2023)

2.10.1 Refugee Situation in Greece

Over the last decade, many refugees and migrants have used Greece as a transit point to Europe. In 2022, 18,778 refugees and migrants arrived in the country. Most of them came from the State of Palestine, Afghanistan, Somalia, and the Syrian Arab Republic. (UNICEF, 2022, p.2) As a consequence of climate change and other conflicts, the number of refugees and migrants coming to Greece has considerably increased. The UN Refugee Agency estimated that by the end of 2022, approximately 119,700 refugees and migrants were living in Greece (UNICEF, 2022). That is 134 percent more than in 2021.

Resources in Greece have been severely strained by the influx of refugees and migrants, especially in the Aegean Sea islands where many of the arrivals first land. Of the 18,778 refugees and migrants coming to Greece 12,758 arrived by sea (UNHCR, 2022). Human rights organizations and international organizations have harshly criticized the living conditions in the refugee camps on the Greek islands as a result. Many camps are overcrowded and lack essential amenities like healthcare, clean water, sanitary facilities, and proper waste management systems (UNICEF, 2022, p.2).

2.10.2 Waste Management in Greece

Waste management has been a major challenge for Greece in recent years. Insufficient infrastructure as well as low public awareness and involvement have contributed to Greece not meeting the EU waste management targets of 2020. (OECD, 2020) The prevalence of illegal dumping and unofficial waste management techniques have been Greece's biggest problems concerning the management of waste (OECD, 2020).

To improve waste management in Greece, particularly in urban areas, there have been initiatives in recent years. To decrease waste production, boost recycling rates, and encourage sustainable waste management practices, the government has implemented a number of policies and initiatives. In 2018 Greece introduced a tax that decreased the use of single-use plastic bags. In 2019 the landfill tax was introduced which brought more accountability to local authorities. (OECD, 2020) In June 2021 the national waste prevention program was approved by the Ministerial Council. It outlines the steps that have to be taken in order to reach the objectives set by the European Union. (European Environment Agency, 2022) In response to

the actions taken, the waste management service industry in Greece grew at an average annual rate of 4.3% between 2018 and 2023 (IBISWorld, 2022).

Various statistics on Greece's overall waste generation and recycling rates in contrast to the rest of Europe can be found on the European Environment Agency's (2022) or OECD's (OECD.stat, 2023) websites. Statistics on collecting systems (reuse, recycling, and waste disposal) solely include waste generated by industry and households (municipal waste). They focus for example, on the rate of municipal waste recycling (European Environment Agency, 2022) and plastic recycling (European Parliament, 2023) in Greece. No sources could be found that indicate documentation of humanitarian waste generation and disposal methods in Greece exists. Furthermore, no official, publicly accessible figures on waste generation in humanitarian logistics could be obtained on a global scale. A literature review conducted by the WREC organization on waste management and reverse logistics in the humanitarian context only named journal articles and other academic and non-academic publications as references. None indicated the existence of any statistics relating to waste management in humanitarian logistics. (Tuomala et al., 2022)

3 Methodology

3.1 Interpretivism

As stated before in the literature review, waste management in humanitarian logistics is an important topic lacking awareness (European Commission, 2022, p.63). In order to grasp the full understanding of the subject it is necessary to understand the experiences, beliefs, and values related to the topic. Integrating human interest into the study, as well as reflecting on different aspects of the issue, allows the multifaceted subject to be understood in all its complexity. As part of this thesis, the interpretivist approach is based on the naturalistic approach to data collection, such as interviews and observation of literature. Interpretivism integrates human interest into a study. With the help of interviews, a deeper understanding can be gathered from the subjective experiences of the individuals. (Saunders et al., 2012)

3.2 Inductive Approach

Research is conducted inductive. Deductive methods begin with building a theory and build on the data collected, while inductive methods are more concerned with generating new theories from data. Inductive methods are often used in qualitative research, where researchers collect data through non-numerical methods. (Saunders et al., 2012) After data is collected, researchers analyze it to identify themes, patterns, and other meaningful insights that can be used to develop new theories or hypotheses. One of the main advantages of induction is its flexibility and adaptability. This approach allows researchers to explore new areas of study and develop theories or hypotheses that may not have been considered before. In addition, inductive methods can help researchers better understand complex social phenomena that are difficult to quantify. (Gabriel, 2013)

As this thesis seeks to raise awareness about the importance of waste management in humanitarian logistics, it is important to explore previous studies on the subject and develop new recommendations for the future. This inductive approach begins with a literature review of materials associated with waste management practices. After establishing a common ground of knowledge interviews are conducted to deepen the understanding of already developed theories. This builds the foundation for the later developed recommendations that may not have been considered before in this specific aspect and will be helpful in the future.

3.3 Qualitative Choice

Qualitative research is characterized by collecting and analyzing non-numerical data, to identify patterns, themes, and meanings. In this thesis, qualitative research is conducted through interviews and content analysis. In comparison to the quantitative method, qualitative research is more flexible and open, which is particularly helpful for complex subjects that rely on the inclusion of human experiences and emotions. (Myers, 2008) Specifically in this thesis, a qualitative approach ensures that all variables that must be considered when improving waste management techniques in humanitarian logistics are taken into account.

The qualitative research in this thesis is based on three online interviews conducted with interviewees who have technical and practical expertise in the field of waste management in humanitarian logistics, disaster management, and sustainability. In the methodology chapter the content of the interviews will be analyzed and together with the information gathered from the literature review recommendations on how to make waste management practices in Greek refugee camps more sustainable are formed.

3.4 Strategy

3.4.1 Literature

The data collection aims to establish a foundation of already established information in the field of waste management practices in humanitarian logistics. Therefore, this research includes some older literature used for defining the main aspects of the subject, as well as research that extends beyond published academic literature to include grey literature. This is necessary in order to identify the key elements of old and new research during the analysis. Later on, new developments can be based on these key aspects.

The use of a "semi-systematic review" in this thesis is justified by the fact that waste management and sustainability have numerous definitions (Snyder, 2019). This literature review was conducted through a keyword search in the Hamk library, google scholar and also includes non-academic sources. Some of the keywords were: "waste management", "sustainability", "humanitarian logistics", "disaster management", "sustainable supply chain", and "waste management regulations". When the title or keywords indicated humanitarian logistics, waste management, and/or environmental sustainability as the focus, the literature was added to the reading list. For the academic literature, only peer-reviewed literature was included. The grey literature primarily consists of organizational documents, reports, and governmental data focusing on humanitarian logistics, waste management, and environmental sustainability. For this research, only English and German literature was considered. After reading through the literature some were eliminated based on their relevance to the thesis subject. To keep the thesis focused, research addressing reverse logistics and debris management was excluded from the data collection.

3.4.2 Interviews

The three interviews conducted as part of the research for this thesis allow a more precise understanding of certain aspects of the subject (Hitchings, 2012). The experiences of the interviewees from various fields provide new perspectives and insights that can be coherently linked together under the subject of the thesis. The most significant and relevant information can be gathered using qualitative interviews. (Dowling, et al., 2016) For this thesis, the phenomenological interviewing method was used. Based on this, the questions for the interviews were individually adapted to apply them in the context of the interviewee's experience (Bevan, 2014). The sampling of people for the interviews was not random but based on their working environments and skill sets in the fields and their relevance to the thesis. The first interview was held with the Information Management officer of the WREC Team on March 07th, 2023. The second interview was held with the Global Technical Expert on Environmental Sustainability in Humanitarian Action of the European Commission on March 31st, 2023. The last interview was conducted with an employee of the Humanitarian Logistics Organization (HLO) which specializes in disaster management on April 14th, 2023. In order to outline the importance of waste management people with similar interests and mindsets working in comparable fields, have been interviewed. Some people may have other opinions on the matter that are not represented in this study.

The interviews all begin with an open question about the most important aspect of the interviewee's profession. The method of questioning allowed the interviewee's responses to be detailed and personal because they were not constrained by rigorous questions. The interviews contained between four and six questions. The questions were prepared individually beforehand for each interview. At the same time some leeway was maintained, allowing the interviews to be tailored to the interviewee's specificities and responses (Patton, 2015).

The key themes discussed in the interviews were the main objectives of the organizations the interviewees belong to, the barriers and obstacles the interviewees have come in contact with during their work to establish more sustainable practices, the current situation of waste management in humanitarian operations, and the connection between waste management and disaster management.

3.5 Content Analysis

Content analysis is used to evaluate patterns, themes, and relationships within a piece of content (Patton, 2015). After gathering the data, it must be analyzed (Gabriel, 2013).

3.5.1 Accountability

Sustainability in humanitarian logistics is a problem that concerns all participants, but most of them don't feel responsible enough to take action. Actors in humanitarian logistics, particularly humanitarian organizations, are aware that their actions have negative implications, with waste generation being one of the most significant. (ECHO Nairobi, personal communication, 31, March 2023) They prioritize saving lives, reducing suffering, and boosting readiness for disasters (George et al., 2020) without realizing that applying sustainable waste management techniques would assist in reducing the majority of the issues. They know this but don't acknowledge that it is also their responsibility to see to the proper management of the waste (ECHO Nairobi, personal communication, 31, March 2023).

A survey done by the WREC project (2022) has discovered that 74% of organizations don't have solid waste management in place. Only 9% have a measuring mechanism. At the same time, 69% of organizations are planning to implement more waste management practices in the future (Bhada-Tata et al., 2018 p.7). To support this new development, the WREC project has set up strategies and guidelines on how to handle waste and reduce the organization's environmental impact (Information Management Officer, WREC team, personal communication, 07 March 2023). Most donors have taken a similar approach. They have developed guidelines for the humanitarian organization they are sponsoring. However, in order to genuinely change the approach that humanitarian organizations take, a strict set of requirements must be established. As of this year (2023), ECHO is the first donor in humanitarian logistics that has set minimum environmental requirements for the organizations they are working with. These requirements are mandatory for the organizations and used to hold them accountable for the negative impact they cause on the community. In this situation especially the donors have the power to bring forward real change in humanitarian logistics. (ECHO Nairobi, personal communication, 31, March 2023)

Another factor is the lack of contact between organizations and governmental institutions. In some countries, there are already some waste management practices in place that the organizations could rely on. Not so in other countries. With no adequate policies in place, the operating organizations cannot be held accountable. (UNEP/OCHA Environment Unit, 2014, p.24) Local public entities manage 70% of local waste management in countries in need of humanitarian logistics (Bhada-Tata et al., 2018 p. 7). If there is no transparency and collaboration among the government, local authorities, and organizations, efforts will be duplicated, and waste management would be less efficient. (Information Management Officer, WREC team, personal communication, 07 March 2023).

3.5.2 Waste Management as Part of Crisis Management

Declaring waste management as a component of crisis management and addressing it as a crisis is crucial in order to emphasize the topic's urgency and gain necessary resources. Accepting the current situation in humanitarian logistics for what it is – a waste crisis – means recognizing waste management as a component of crisis management. (Zorpas et al., 2021, p.4)

In the context of waste management in humanitarian logistics, there are a number of issues that can be related to crisis management. In order to guarantee the safety and health of the affected populations as well as to lessen the impact of disasters on the environment, waste management is a crucial part of crisis management in humanitarian aid. (Humanitarian Logistics Organization (HLO), personal communication, 14, April 2023) To protect the population and their way of life from disasters, comprehensive disaster risk management works to minimize current risks, prevent future hazards, and manage residual risks on a national and worldwide level for both natural and man-made disasters. (Lacher & Ghanemi, 2021) During a disaster, the catastrophe risk phase model can be used to manage disaster-related tasks. Four main phases make up the model: disaster prevention, disaster preparedness, disaster response, and the disaster recovery phase (Cozzolino, 2012, p.8). The model in context with other regulations provides clarity on who needs to do what, before during, and after a disaster (IFRC, 2017). Incorporating waste management practices into the catastrophe risk phase model can result in minimizing the environmental impact of disasters

and protecting the safety and health of impacted communities. During the disaster response, a short-term strategy to waste management should be considered to ensure that the garbage is handled in the most effective way possible without putting too much strain on the humanitarian operators during difficult times. A more long-term approach should be taken in the disaster recovery phase, where the short-term solutions are reassessed, and with the help of the organizations, the waste is disposed of in a more sustainable way. These actions will precede the phases of disaster prevention and preparedness, where assessments can be made based on the experiences and proper long-term structural changes can be included, hopefully leading to fewer man-made disasters and a more prepared approach to waste management during disasters. (Humanitarian Logistics Organization (HLO), personal communication, 14, April 2023)

3.6 Long-term and Short-term Approach

There are various approaches that can be taken to make waste management in humanitarian logistics more sustainable. To achieve the best possible results for waste management practices, the approach's goal must be determined. Thus, deciding if the goal is to achieve long-term change or short-term improvement. Depending on the final goal actions must be chosen accordingly. Gathered from the analysis of the literature and the interviews a number of strategies could be identified to be more successful for either long-term or short-term approaches.

3.6.1 Long-term

It is crucial to mention that the core problem behind insufficient waste management in humanitarian logistics cannot be fixed by humanitarian organizations alone. That is why a long-term approach to making humanitarian logistics more sustainable is needed. Countries and communities receiving assistance often lack sufficient infrastructure or management systems to handle the waste associated with the assistance. (ECHO, 2022, p.63) Without assistance from outside, humanitarian organizations will not be able to drastically change the present situation. Current conditions of waste management in humanitarian logistics cannot stay as they are at present. That is why guidelines, suggestions, and legislations are essential to improving the efficiency of waste management in humanitarian logistics and to ensuring

that no further harm comes to the region that has already been affected by a disaster. (ECHO Nairobi, personal communication, 31, March 2023)

The WREC project has taken the lead and is working to make the supply chain in humanitarian logistics more sustainable and waste-free. Their main agenda is to build a collective and reduce the impact the humanitarian community has on the environment. The goal is for the collective/association to have an easier time accessing necessary recourses. The collective would share intellectual property like experts, best practices, and know-how but also shipping routes, planes, cars, and suppliers. This will not only help to reduce waste but the overall environmental impact. (Information Management Officer, WREC team, personal communication, 07 March 2023) A collaboration between humanitarian operations will also allow for easier answerableness. Strategies and guidelines are much simpler to implement when all collaboration participants follow the same set of rules. Establishing a collaboration is a great way to take the sole responsibility for implementing sustainable practices from the individual organization and divide it. (Information Management Officer, WREC team, personal communication, 07 March 2023) A problem that could be gathered from the personal experience of the interviewees is that the humanitarian logistics sector is still very rigid. There are still many organizations that the WREC team and ECHO have come in contact with that don't want to share information, vehicles, or other useful supplies. The creation of a database that enables other organizations to access and utilize the data and assets of other organizations is a challenging task. (ECHO Nairobi, personal communication, 31, March 2023)

Green procurement

One way of establishing more sustainability in humanitarian logistics is to use preventive instead of reactive methods. Waste is generated all over the supply chain in humanitarian logistics and humanitarian organizations are the ones that have to deal with the management of the accumulated waste. If less waste was generated during the different stages of the supply chain, humanitarian organizations would have less waste to manage which would make the managing and depositing of waste easier to handle. It also enables them to increase the efficient management of the waste that is unavoidable during operations. One strategy that would deal with the source of the problem is green procurement (Ely & Insabato, 2022).

Over the last few years, the WREC project has put more research and resources into green procurement. The main objective is to create a platform for partners to share information, avoid duplication, and over-ensure the complementary sharing of resources. (Information Management Officer, WREC team, personal communication, 07 March 2023) From participants of the last WREC coordination meeting, on green procurement, it could be gathered that 58% of them indicated that their organization does not have a mechanism in place to verify the environmental sustainability of the products that they are sourcing and 30% were not aware of what their organization is doing to establish such mechanism. (Ely & Insabato, 2022) So far, the project has worked out a set of recommendations that can benefit the efficiency of green procurement. The goal is to create a database tool to map sustainable and inclusive purchasing criteria and make it available to international NGOs as well as to local partners and provide free access to the public (Tuomala et al., 2022, p.3). Including green procurement practices in humanitarian logistics operations is a lengthy process that will not bring immediate improvement but rather benefit in the mid to long term (ECHO Nairobi, personal communication, 31, March 2023).

Life cycle assessment

Several tactics can be used to promote green procurement. To begin, existing data from Life Cycle Assessments can be used to make informed assumptions about similar products. In order to ensure that suppliers understand the significance of sustainability in procurement, suppliers can also be invited to training and awareness sessions. (Information Management Officer, WREC team, personal communication, 07 March 2023) Life cycle assessments are one of the most effective ways to reduce waste in humanitarian logistics (ECHO Nairobi, personal communication, 31, March 2023). The life cycle analysis examines not only the life cycle of the packet or container but also the entire supply chain. An assessment of the general situation allows one to plan ahead and find alternative, more sustainable options that generate less waste. Not always but in numerous cases, predictions can be done so the response is better fitting to the purpose. With a proper assessment, which includes assessing the already available resources, facilities, and infrastructure necessary for waste management, a surplus of products that will be unused and go to waste can be prevented. The assessment of the lifecycle is dependent on several factors. For example, if the situation the humanitarian organization is operating in is stable or unstable.

A stable situation in the context of humanitarian aid would for example be a refugee camp that has been occupied for a longer period of time. In that case, assessments can be based on already existing data rather than only past experiences. An unstable situation would be for example the first time period after a tsunami. Due to a shortage of time, proper assessment is not possible during that time period, and humanitarian actors must rely on historical data. (ECHO Nairobi, personal communication, 31, March 2023) That is why it is critical to create a collective database of well-documented practices that can be utilized as a source for reviewing and after-action learning. (UNEP/OCHA Environment Unit, 2014, p.16).

Another aspect of the assessment is the different types of waste. Different types of waste require different disposal methods and systems. It is essential to implement the most effective waste management practices to prevent harm to the environment and human health. (UNEP/OCHA Environment Unit, 2014, p.20) The types of waste that need to be managed include solid waste (plastic waste, organic waste, tires, electronic waste), liquid waste, medical waste, and hazardous waste (IFRC, 2022). A great tool for the assessment of the negative impact humanitarian organizations have on the environment is the Environmental Marker. The Marker is used as a proxy indicator to determine how much consideration is given to the environment during a project design (UNEP/OCHA Environment Unit, 2014, p.12). Ideally, this would provide a foundation of data that the organization could later use to relate its activities to.

Consequently, investing in green procurement and lifecycle assessment allows the participants/actors to fight the problem of pollution at its root. Less waste management is required later on if the supply chain is less polluted in the beginning. Resulting in less stress for the humanitarian organizations operating in the logistics sector. Following the life cycle assessment would allow humanitarian operations in the future to work more productively and better adjusted to the specific situation. In addition, other educational work and the flow and exchange of information is a great start toward more sustainable humanitarian logistics.

3.6.2 Short-term

All the above-mentioned strategies are great for making humanitarian logistics more sustainable and improving the approach towards more sustainable waste management. But

they will not immediately impact the waste management done in disaster areas where humanitarian organizations operate. The only way to bring immediate impact is to deal directly with the waste. (ECHO Nairobi, personal communication, 31, March 2023) One of the easier methods to implicate into the organization's process is the sorting and separation of waste. If there are no proper destinations where waste can be separated accordingly, temporary deposition sights need to be identified where the waste can be stored without causing harm to the local environment and people until it can be properly disposed of later on by the organizations or local authorities.

According to the WREC Survey, plastic waste poses the greatest pollution threat while also providing the greatest opportunity for improvement (WREC, 2022). One crucial step towards proper waste management is the separation of reusable and recyclable materials and organic waste from the rest. Even small steps can make a difference, as this reduces related costs and makes final disposal strategies easier. Recycling and organic waste recovery can also reduce the amount of waste sent to landfills, which in turn reduces pollution. (European Commission, 2022, p.27) Guidance needs to be provided by locals, particularly during the transition from dumping waste anywhere to having designated locations, because only if the solutions chosen are appropriate to local needs will they continue to exist long after the humanitarian organizations have left.

4 Results

This thesis has discussed the humanitarian logistics sector's need for sustainable waste management, its current situation, and possibilities on how to implement waste management practices in humanitarian logistics and how to make waste management more sustainable.

It is clear that waste generation cannot be completely eliminated in humanitarian logistics. In some areas, it is required to provide the necessary aid. If there is no access to fresh water, alternatives need to be provided, and these generate waste. If sensitive medicine needs to be delivered to the people, it is important to protect it even if that results in more generated waste. With the help of properly established waste management, waste production can be limited in certain areas, and the waste that is produced can be dealt with accordingly. Investing in the improvement of waste management and its infrastructure in countries most

in need of humanitarian aid will benefit humanitarian logistics (short-term) as well as the population and sustainability of the region (long-term). In addition, it will prevent the worsening of current disasters and the triggering of future disasters.

This work established a baseline to understand the substantial negative impact that humanitarian logistics as part of all humanitarian activity cause on the environment. Key themes and subjects that arose repeatedly while analyzing the research and conducting the interviews were the need for more attention, research, and accountability. Many researchers as well as the interviewees have agreed that research in the field of alternative more sustainable solutions to the packaging of relief items is necessary to reduce waste generation. More attention to the subject is required. The previously noted absence of statistics on waste management in humanitarian logistics in general, but particularly in Greece, demonstrates the lack of importance given to the subject. The attention of donors must be caught in order to fund further research. Furthermore, accountability is essential to the success of the future of more sustainable waste management practices. Without accountability implementing proper waste management is challenging as most of the humanitarian actors don't feel responsible enough to act without being compelled to do so. Another topic that came up frequently was the advantage of forming associations to share resources and intelligence among individual humanitarian organizations. Especially during the interview with the information management officer of the WREC team, it became clear that the efficiency of the operations would increase by joining an association.

All interviewees agreed that reform is needed in the industry, but that the humanitarian sector, may not be prepared for the shift. As a result, the change must be implemented gradually. The best way to convince everyone concerned that change is required is to educate them on the dangers of improper waste management and the benefits of sustainable practices. Educated humanitarian actors could then teach the local population about waste management, as well as conduct proper assessments of the waste management issue, appropriately interpret them, and decide on the next actions to take. More sustainable practices can thus be achieved even with limited resources.

All of the concepts and areas discussed above contribute to the objective of more sustainable waste management in humanitarian logistics. Especially, the personal insights acquired from

the interviews were very fascinating. These ideas came from personal experiences and could not have been reached from a simple book review. One of the insights gained through personal communication in regard to the subject of education was the struggle humanitarian actors face on a daily basis in a still highly inflexible sector that prevents them from introducing new rational and more lasting solutions.

In the following, the gathered information on the subject will be used to give individually adapted recommendations for more sustainable waste management practices in Greek refugee camps.

5 Recommendations for Greece

As a result of the influx of refugees and migrants over the last decade, many refugee camps have been established in Greece. The practices of waste management and how their sustainability can be improved to benefit the people and their lives in those camps must be discussed in light of Greece's historical struggle with waste management. According to the acquired information, there is no acknowledgment that inadequate waste management in Greek refugee camps is a problem. This is untrue: Human rights and international organizations have strongly criticized the living conditions in Greek refugee camps. (UNICEF, 2022) Depending on the location and severity of the emergency/disaster that the humanitarian actors are facing, different types of recommendations are more suitable than others. In the case of the Greek refugee camps, the recommendations will focus on actions, that if executed correctly will improve the current situation of the camps in a short period of time.

Refugee camps in Greece are part of a long-time crisis. The years that have passed offer the possibility for a proper assessment of the situation. During the first part of the assessment, it should be checked if there is an already established system for waste management in the area. The easiest solution would include working together with local authorities and using their capacities and network during the time humanitarian organizations' help is needed in the area. The additional waste can overwhelm the systems in place, so individual long-time solutions should be found by working together with the locals. After seeing the reports of the situations most refugee camps in Greece seem to be in, it can be concluded that this might not be an

option for most organizations. Waste management in Greek refugee camps is not a priority, there are no rules, guidelines, or anything regulated by the government to assist the people living there. This is why humanitarian actors/organizations must develop their own evaluation steps when they cannot rely on the country/region.

To improve the healthcare situation/sanitary situation in Greek refugee camps the establishment of proper waste management is essential. The management of waste can reduce the dangers for the environment and the people living in those conditions.

If the humanitarian organization cannot rely on a local network, data needs to be gathered from each campsite to bring forward the best possible way to handle the management of the waste.

Questions that need to be asked during this assessment are:

1. Is there infrastructure for the transport and dumping of waste?
2. Is there a capacity for temporary dumpsites in the area, that are far enough from the population, and water source so that it would not affect their health?
3. Are there waste separation practices in place?
4. What is the quantity and type of waste produced?

These four questions build the essential base for establishing waste management practices. If there is an overwhelming amount of waste in a refugee camp that endangers the lives of the refugees and humanitarian actors working and living there, the first issue that needs to be addressed is where to put the waste. During the assessment, temporary dumpsites and ways to get the waste to them need to be identified. If at all possible, the waste needs to be separated before being transported to the dumpsites to allow proper disposing of later on after the crisis has passed. Even just separating organic material that can be composted from other solid materials like plastic, can already be a relief to the environment. Separating medical, electrical, and other solid waste from each other is the next step to achieving more sustainable waste management. For most medical waste incineration is chosen as a disposal method to reduce the risk of infections and diseases. Burning mixed waste can release harmful pollutants (European Commission, 2022, p.65) and contaminate water land, and air (UNEP/OCHA Environment Unit, 2014, p.20). Separating medical waste from the rest results in less air pollution and fewer health risks for the refugees. The quantity and type of waste are

important for transporting and separating the produced waste. This can later on help in finding ways to reduce waste production. Through all of this, the humanitarian actors need to work with local authorities in line with their regulations to achieve the best results. Once a system for basic waste management practices is established a deeper going assessment needs to be performed.

Questions that need to be asked during this assessment are:

5. Is there a need for educating people on proper waste management practices, and the dangers of improper waste management?
6. Are there products that can be recycled, reused, or replaced by more sustainable ones?
7. Is the organization able to financially sustain these sustainable practices?

Educating the local population, the refugees, and the humanitarian workers on how to handle waste, its separation, and its disposal is integral to making sure that they are not harmed during the process. The education can come through experts provided by the donors as well as templates and other guidelines. But also educating people at home about what donations are necessary and which donations amount to just more waste is important. Donations are important but the wrong kind of donations leads to overflowing warehouses and unnecessary waste that could have been avoided through clear communication. The goal for the future should be for waste management and other sustainable practices to become an integral part of the everyday life of the people living in the refugee camps and also of the humanitarian actors. If the management of waste becomes a habit rather than a chore, new opportunities can be gained from that.

Through the assessment of quantity and type of waste in the first part, it is easier to identify which waste can be avoided, and which waste can be recycled. Not all waste generation is preventable, but some more sustainable options can be found, that achieve the same quality while generating less waste. In refugee camps, the majority of damage is done by items big or small that are not used or are used for a very small amount of time. (ECHO Nairobi, personal communication, 31, March 2023) Items that are of low quality and therefore have a low lifespan also contribute to the problem. In one of the interviews, the use of solar lamps was mentioned. Which in itself is not a bad idea. They were distributed amongst the people but

broke after only a couple of months because of their bad quality, producing a high amount of unnecessary waste. A surplus of items, bad quality items, and items that are simply not needed is often the result of bad planning. In refugee camps, tents and shelters are excess items that oftentimes go to waste. (ECHO Nairobi, personal communication, 31, March 2023) A huge part of reducing waste production in refugee camps is proper assessment and planning. Additionally, optimizing the storage of relief items, especially pharmaceutical items can be beneficial. Many items go to waste because they surpass their used-by date. Some waste generation could be avoided by using a first-in, first-out approach and closely monitoring storage facilities.

Using reusable products and products with a longer lifespan can work in favor of humanitarian actors, particularly in longer-lasting crisis situations like the refugee camps in Greece. An example of reusable products that would not only decrease waste production but also improve the living situations of the refugees would be reusable period products.

After the high of the crisis has passed long time solutions should be found that properly dispose of the waste stored at temporary dumpsites. Alternative sites should be found where the waste can be transported, in order to be processed under the new regulations the Greek government has proposed.

Most humanitarian organizations excuse their lack of sustainability and consideration of waste management with the lack of money. Gathered from the information received during the interviews there are many steps that can be taken without sacrificing much of the budget. If there are no additional human resources available, educating the stationed humanitarian actors and the refugees on proper waste management practices does not take up much time or money. Instead of reacting to the overflowing waste later on, acting proactive and establishing waste management practices from the beginning will later save money, resources, and time. Sourcing the necessary money is not the issue, changing the mindset of the organizations is. (ECHO Nairobi, personal communication, 31, March 2023)

The above-mentioned recommendations are focused on improving the waste management practices in the refugee camps as fast as possible to achieve better living situations and reduce the negative environmental impact of humanitarian operations. Long-term solutions

applicable to this case would be: establishing a collaboration between humanitarian organizations/actors in humanitarian logistics, investing in green procurement, setting mandatory standards and/or requirements, as well as raising awareness of the problem and changing the mindset of actors in humanitarian logistics.

Establishing a collaboration between humanitarian organizations/actors in humanitarian logistics offers up many possibilities. The sharing of resources like facilities, vehicles, and intelligence results in best practices being available to different organizations. Collaboration also eliminates work duplication, allowing for the most efficient work possible. (Information Management Officer, WREC team, personal communication, 07 March 2023) Clear responsibilities can be established between participants allowing for more accountability. Furthermore, engaging with professional organizations (like the Chartered Institute of Procurement and Supply Chain) can help build a talent pool of professionals with the necessary skills to make sustainable procurement decisions. To make green procurement more accessible, practical ready-to-use tools and templates can be provided. Similar approaches have been taken in the past, but there is no one-size-fits-all solution to green procurement. In the context of Greece, special analysis and tailored solutions are necessary. The mindset of procurement practitioners and other humanitarian actors must also shift to overcome the standard approach to purchasing and instead consider the long-term effects of relief items. Training and awareness-raising on environmental sustainability are necessary to ensure that humanitarian actors have the knowledge and skills to make sustainable decisions. Lastly, support from donors is necessary to ensure that more sustainable relief items are purchased. Donor support and the support of the government are also needed to set mandatory standards that will hold humanitarian actors accountable for the negative impact their actions have on the environment. It has to be taken into consideration that compliance with the requirements should not compromise the humanitarian response and their ability to help people.

6 Conclusion

The urgency of the climate problem is being felt globally, with a large increase in climate-related disasters since the 1980s leading to an increased need for humanitarian operations (UN, 2021, p.21). Climate displacement is a major contributor to such crises, having caused

the number of people in need of humanitarian assistance to triple in the last decade (George et al., 2020, p.9). According to the global humanitarian overview for 2022, 274 million people required humanitarian help and protection that year, with climate change increasingly to blame for such situations (European Commission, 2022). Proper waste management is an effective way to increase sustainability in humanitarian logistics, as waste generated during emergency assistance can threaten the environment, biodiversity, and human health when not handled correctly (ISWA, 2021).

The underlying question for this research was:

How can waste management in humanitarian logistics be made more sustainable?

For the sake of more defined results, this thesis focused the recommendations and regulations for implementing sustainability in humanitarian operations on Greek refugee camps. The case study applied the information gathered through literature reviews and interviews. Throughout this thesis, the importance of sustainable waste management practices has been highlighted. The most successful approaches that make waste management techniques in humanitarian logistics more sustainable could be acquired through literature analysis and interviews. This thesis adds to the literature on sustainable practices in humanitarian logistics by emphasizing the link between sustainable waste management methods in humanitarian logistics and the negative environmental effects they have. Further, this knowledge is used to make recommendations that can be put into action. This thesis can be used to examine further ideas and possibilities for the future of humanitarian logistics sustainability.

As a result, there are numerous efforts that need to be implemented to make waste management practices in humanitarian logistics more sustainable. However, the material gathered in this thesis indicates that only changing the mindset of humanitarian actors, fostering behavioral change, and bringing more accountability into the sector will result in long-term improvements in the way sustainability is approached in the humanitarian sector. The donors' perspective, in particular, must change. If more donors recognize the importance of taking action and advancing sustainable practices in the humanitarian logistics sector, organizations will be forced to adapt to the new criteria.

Despite the fact that the existence and necessity of sustainable practices in humanitarian logistics have received more acknowledgment in the last years, the main challenge to bring more accountability to the practices remains. The humanitarian industry may be unprepared for all of the changes. However, improvements must occur. Humanitarian organizations must not only recognize that accepting responsibility for their environmental impact is part of their do-no-harm approach and, in the long term, serves their goal of protecting people, but they must also include appropriate responses in their operations to continue saving the lives of those in need. Consequently, changing the way humanitarian logistics see sustainable practices, including waste management, will require the support of donors, which means that their attitude toward sustainability must be readjusted to what is necessary today in order to continue to help people in the future.

Limitations and future research

Although this thesis aids in comprehending the issue of waste management in humanitarian logistics, its limits must be recognized when evaluating the research's conclusions. Acknowledging the existence of limitations and biases improves the transparency of the work (Ross & Bibler Zaidi, 2019). The researcher's values and judgments may taint the thesis, portraying an influenced picture of the actual reality (Lingard, 2015). Certain limitations must be addressed because interviews were chosen as a source of information. The interviews for this thesis were conducted in a limited amount of time; with additional time, more detailed research including interviews with experts from different fields may be conducted. Strong opinions are expressed that can be biased because the interviews were made intentionally to represent the interviewees' personal perspectives and areas of expertise. Due to the interviews' open structure, the data gathered during them can be challenging to compare. At the same time, the generalization of the findings is a concern (Price & Murnan, 2004). Generalization is limited in this thesis by using a real-life practical case to put the suggestions into practice.

There are options for waste management practices that additionally provide opportunities to the local community. It was not included in the final recommendations since it is irrelevant to the situation in Greek refugee camps, but it should be recognized as a possibility. In many regions where humanitarian logistics operate, partnering their waste management techniques with local waste pickers can provide new job opportunities as well as a long-term solution to

the waste management problem in that area. Humanitarian organizations should consider using the generated waste. It can be gathered and recycled with the help of waste pickers that usually have already established systems in place. (Zorpas et al., 2021)

The potential that can arise from incorporating waste management methods into catastrophe waste management modules and structures was mentioned in the thesis but would be fascinating to investigate further in the future as it offers real potential to provide the needed accountability and structure that is lacking in the humanitarian sector.

Reverse logistics is another issue to explore when discussing how to improve sustainability in humanitarian logistics. Because reverse logistics is a large issue in its own right and could not be discussed in its entirety, the author chose not to address the topic in this thesis. This thesis provides an excellent foundation for further research into the possibilities of more sustainable waste management techniques through reverse logistic strategies.

7 References

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Appendix 1: Interview Questions

Interview One, Information Management Officer, WREC team, personal communication, 07 March 2023

1. Can you tell me a bit more about the project and the main reason the project was created in the first place?
2. On your website it says that The WREC Project seeks to reduce the adverse environmental consequences of humanitarian logistics through awareness, practical guidance, and real-time environmental expertise. What in your opinion are some of the most important steps you have already taken and are planning on taking in the future? What are some concrete examples?
3. What would you say are the main barriers or obstacles that you have come in contact with - the project had to overcome?
4. What do you think of the Current Situation of Regulations for waste management in humanitarian logistics? Do you have an opinion on that
5. How does the project need to adapt to make accomplishing the set goals easier?

Interview Two, ECHO Nairobi, personal communication, 31, March 2023

1. Would you mind giving an overview or a bit of insight into the activities you are involved in as a Global Expert on sustainability in ECHO?
2. Would you agree that there is a lack of awareness regarding waste management practices in the humanitarian logistics?
3. Would you agree that taking environmental considerations into account is integral to upholding the 'Do No Harm' principle that humanitarian organizations operate under?
4. What would you say are the main barriers or obstacles that you have come in contact with, as part of your activities in the waste management sector?
5. What do you think of the Current Situation of Regulations for waste management in humanitarian logistics from the view point of one of the biggest humanitarian donors?

6. Do you think building an association of humanitarian operations would make building long-term sustainable practices in humanitarian logistics easier?

Interview Three, Humanitarian Logistics Organization (HLO), personal communication, 14, April 2023

1. What comes to your mind when you think about sustainable disaster management?
2. Where are the connecting points between disaster relief and logistics?
3. In your article, you talk about Katastrophenrisikomanagement-Phasenmodell /Disaster management phase model. Can waste management in your opinion be seen as part of disaster management? If yes, would it be beneficial to include it in the phases of the model?
4. Do you think building an association of humanitarian operations would make building long-term sustainable practices in humanitarian logistics easier.

Appendix 2: Statutory Declaration**EIDESSTÄTLICHE ERKLÄRUNG**

Ich erkläre an Eides statt, dass ich die vorliegende Arbeit selbstständig verfasst, andere als die angegebenen Quellen/Hilfsmittel nicht benutzt, und die den benutzten Quellen wörtlich und inhaltlich entnommenen Stellen als solche kenntlich gemacht habe. Auch wurde diese Arbeit noch an keiner Hochschule als Studienleistung eingereicht.

19.05.2023

Ort, Datum

L. Sprenger

Unterschrift

STATUTORY DECLARATION

I declare that I have authored this thesis independently, that I have not used other than the declared sources/resources, and that I have explicitly marked all material that has been quoted either literally or by content from the used sources. This thesis has not been submitted as a course achievement at a different university.

19.05.2023

Place, Date

L. Sprenger

Signature