THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

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Waste Not, Want Not.

Investigating how to tackle the burden of humanitarian assistance packaging waste in crisis-prone areas.

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Table of Abbreviations

ACLED	Armed Conflict Location and Event Data
CEOBS	Conflict and Environment Observatory
CfW	Cash for Work
CTP	Cash Transfer Programme
FDI	Foreign Direct Investments
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German Corporation for International Cooperation GmbH)
GPS	Geographical Positioning System
HA	Humanitarian Actor
IDP	Internally Displaced People
IFRC	International Federation of the Red Cross and Red Crescent Societies
ILO	International Labour Organisation
IMF	International Monetary Fund
ISIS	Islamic State of Iraq and Syria
MA	Municipal Actor
N=	Number of Total Respondents to One Question
NGO	Non-Governmental Organisation
PP	Polypropylene
PPP	Public-Private Partnership
PW	Packaging Waste
PWM	Packaging Waste Management
R=	Number of Respondents Selecting a Specific Option
SDC	Swiss Agency for Development and Cooperation
SWM	Solid Waste Management
UN	United Nations
UNCHS	UN Centre for Human Settlements (now UN-Habitat)
UNDP	UN Development Programme
UNEP	UN Environment Programme

UNHCR	UN High Commissioner for Refugees
UNICEF	UN International Children's Emergency Fund
UNOCHA	UN Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WFP	World Food Programme
WM	Waste Management

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Glossary

Circular Economy

A framework for an economy that decouples economic activity from the consumption of finite resources, by designing waste out of the system (Ellen MacArthur Foundation, 2017).
Within the context of humanitarian packaging, the circular economy has four elements:

1. Production and Procurement: the manufacturing and purchasing of commodities
2. Distribution: the transportation and delivery of commodities to recipients
3. Usage: the use of the commodity, leaving the packaging as 'waste'
4. End-of-Life Management: the treatment of packaging, with the aim of re-introducing as much of the 'waste' back into the production and procurement stage, for the next cycle

Humanitarian Actor

An organisation or individual seeking to accomplish one or more of the objectives of humanitarian action: save lives, alleviate suffering, maintain human dignity during and in the aftermath of crises, and prevent and strengthen preparedness for the occurrence of such situations (OECD, 2012).

Non-Governmental Organisation

A non-profit organisation, that works independently of governments and is generally engaged in social and political issues (Lewis, 2010). In this research a non-governmental-organisation is defined as such an organisation being involved in humanitarian action in crisis settings.

Packaging

According to USAID (2020), there are three distinct levels at which packaging in humanitarian assistance can be defined

1. Primary packaging refers to the packaging materials in direct interaction with the product at the smallest unit of distribution (e.g. a single bag of cereal)
2. Secondary packaging includes combination of multiple primary packaged products (e.g. a crate of five bags of cereals)
3. Tertiary packaging refers to the packaging for freight and distribution that is used to facilitate storage and shipping (e.g. a stretch-wrapped pallet of ten crates of bags of cereals)

Executive Summary

Research Rationale: Why Packaging Waste Management in the Humanitarian Sector is Essential for Sustainable Development

A growing number of people need humanitarian assistance (UNOCHA, 2020), which is intended to save lives, alleviate suffering and restore human dignity during and after man-made crises and disasters caused by natural hazards (Good Humanitarian Donorship, n.d.). At the same time, solid waste management (SWM) is a rising development challenge that remains underfunded and insufficiently addressed in the global sustainability agenda. Humanitarian stakeholders are recognising the negative impacts of poorly managed packaging waste (PW) generated by humanitarian commodity supply chains, and specifically the problems associated with plastic. This research provides insights into how the humanitarian sector can provide sustainable relief and development, by answering the question:

How can packaging waste, generated by humanitarian assistance, be sustainably managed in crisis hotspots?

Research Method and Research Goal

By examining two crisis-prone countries, namely Yemen, which is currently experiencing an emergency, and Iraq, which is in a stage of recovery, the analysis draws comparisons between PW management methods across different stages in humanitarian crises. Through a mixed-method approach, consisting of literature research, quantitative survey analysis, and qualitative interview analysis, this report assesses and evaluates practical methods of managing humanitarian PW at its end-of-life stage and promises to examine:

- **Current challenges in humanitarian packaging waste management in Yemen and Iraq**
- **Best practices that are currently in-use**
- **Experienced humanitarian actors' suggestions for future improvements, through collaborations and integration with existing schemes and infrastructure**

Recommendations for the Humanitarian Sector

To enhance and improve the sustainability of humanitarian assistance provision, this report recommends that the humanitarian sector should:

1. **Enhance the capabilities and freedoms of local people to facilitate their adoption of sustainable SWM practices**
2. **Support the rebuilding and recovery of state capacity**
3. **Foster innovation in SWM by the private sector, and**
4. **Reduce the problem of negative externalities generated by humanitarian PW at its sources**

On a more practical level, actors should implement the following recommendations, which are inspired by the capability approach for local empowerment:

- **Awareness Raising Initiatives on Waste Management**
  - The reutilisation of waste
  - Waste collection
  - Waste separation
  - Inclusion of waste treatment in the project proposal
- **Enhancing Basic Waste Disposal Infrastructure**
  - Waste bin provision
  - Energy-efficient transport options for collection
- **Community-Based Collection Programmes**
  - Community mobilisation through waste collection (e.g. CfW)
  - Clean-up initiatives
- **Stimulating the Market for Waste Recycling**
  - Tenders
  - Contracts
  - Financial support for start-ups in the sustainability sector
- **Vehicle Support and Maintenance**
  - Provision of vehicles
  - Knowledge transfer and support for inspection and maintenance
- **Enhancement of Existing Dumpsites and Landfills**
  - Provision of fencing for current dumpsites to minimise the risk exposed to people and animals which are trespassing
  - Knowledge transfer and training for personnel how to manage waste more sustainable and introduce treatment systems, such as leachate or incineration
  - Increase capacity of existing sites by forms of funding
- **Establish Mobile Hazardous Waste Treatment Facilities**
  - Suitable for crisis context and serve to minimise the environmental and health danger of hazardous and medical waste

The implementation of the recommendations requires coordination between all stakeholders: humanitarian actors, the host government, the local communities, including vulnerable groups, and the private sector. In order to enable local capacity building, the humanitarian actors should provide support for such actors, in the form of expertise, information sharing, training and funding. Ultimately, the humanitarian actors should coordinate among themselves to create commitment mechanisms for implementing the recommendations.

Starting Early: Moving Towards a Greener Supply Chain

While this report primarily focuses on the end-of-life management of packaging waste, practices in earlier stages of the supply chain have to be adapted to fully ensure that the negative externalities experienced by local communities are minimised. By greening the supply chain, humanitarian actors mitigate the risk of packaging waste, possibly by reducing the amount of waste emitted into the crisis area and by substituting plastic with more sustainable alternatives. To achieve this, humanitarian actors must identify and assess sustainable materials, cooperate with suppliers to standardise packaging, and promote recycling and reuse within the host country. This research identifies several upcycling and recycling options for cardboard, single- and multi-use plastic, multi-material wrappers, polypropylene, and metal. For several of these materials, more sustainable alternatives are indicated. Moreover, humanitarian actors may want to consider - depending on the severity of the crisis - whether Cash Transfer Programmes may be more suitable and sustainable than in-kind distribution. This could reduce the PW generated on distribution days and undermine black market dynamics created by an oversupply of a particular commodity.

Approaches to the Humanitarian Packaging Waste Problem

With the problem of humanitarian PW being a negative externality, this study identifies the challenges obstructing solutions, and provides recommendations to tackle the problem.

This study recognises humanitarian PW as a source of various negative externalities on, for example, the environment and health and therefore seeks to identify and provide solutions to overcome the challenges obstructing progression in SWM. Typical solutions to negative externalities in developed countries, such as taxation or privatisation, are less feasible in a high-risk emergency context. Inspired by Ostrom's (1990) 'self-financed contract-enforced game', the humanitarian sector can internalise the costs of PW by engaging in sustainably managed practices through a self-imposed incentive-

compatible monitoring network.

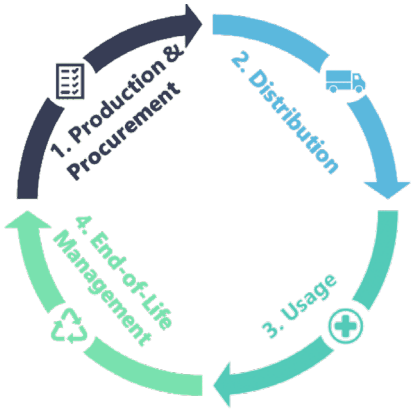
Additionally, by engaging in a collaborative treaty, collective efforts can be combined and humanitarian response may be best tailored to the skills and needs of all involved actors. Accounting for circular economics as well as social welfare, the theoretical 'Humanitarian Doughnut', inspired by Raworth's (2017) Doughnut Economics, serves as a guiding principle for humanitarian waste management. The model sets out a framework for achieving sustainable development by meeting socially just foundations for aid recipients while taking into account the earth's ecological ceiling.

Introduction

A growing number of people need humanitarian assistance (UNOCHA, 2020). At the same time, solid waste management (SWM) is a rising development challenge that remains underfunded and insufficiently addressed in the global sustainability agenda.

Humanitarian stakeholders are recognising the negative impacts of poorly managed packaging waste (PW) generated by humanitarian commodity supply chains, and specifically the problems associated with plastic. In 2020, USAID led a scoping study to examine how PW is being addressed in humanitarian relief. The study found that although there is momentum in the sector to improve the situation, and multiple initiatives aiming to manage and reduce waste, there are still limited known options for sustainable end-of-life waste management to foster circular economics (Figure 1).

Figure 1: Circular Economy



Source: USAID, 2020, p.12

This report assesses and evaluates practical methods of managing humanitarian PW in two humanitarian crisis contexts. The research includes best practices that are currently in-use, as well as suggestions for future improvements. To examine how humanitarian assistance can provide sustainable relief and development, the primary research question is:

> *How can packaging waste, generated by humanitarian assistance, be sustainably managed in crisis hotspots?*

Answering this question has required a mixed-method approach, consisting of literature research, quantitative survey analysis, and qualitative interview analysis. The crisis regions on which this report focuses are Yemen and Iraq. The selection of these two countries was, firstly, due to the gravity of humanitarian crises in both places, and secondly, to draw comparisons between SWM methods in different stages of humanitarian crises, with Yemen currently experiencing an emergency, and Iraq being at a stage of recovery.

By emphasising a community-empowerment approach, this report stresses increasing local awareness and support to make infrastructural developments as effective as possible. In order to coordinate the suggestions across the humanitarian sector, the overarching recommendations are the repetition of this research in other crisis-affected regions, and the creation of a collaborative treaty, that involves organisations committing to helping find solutions to the PW problems in humanitarian settings.

The report begins with an overview of humanitarian assistance and PW, followed by an exploration of the potential ways that actors can handle the negative externalities associated with PW generated by humanitarian assistance. Next, the report introduces the case studies, examines SWM in developing countries and humanitarian actors' roles, and splits the SWM process into its three stages. This is followed by a more developed discussion regarding the methodology and case selection for this research. Finally, analyses of the survey and interviews are presented, which lead to the recommendations and lastly, the conclusion.

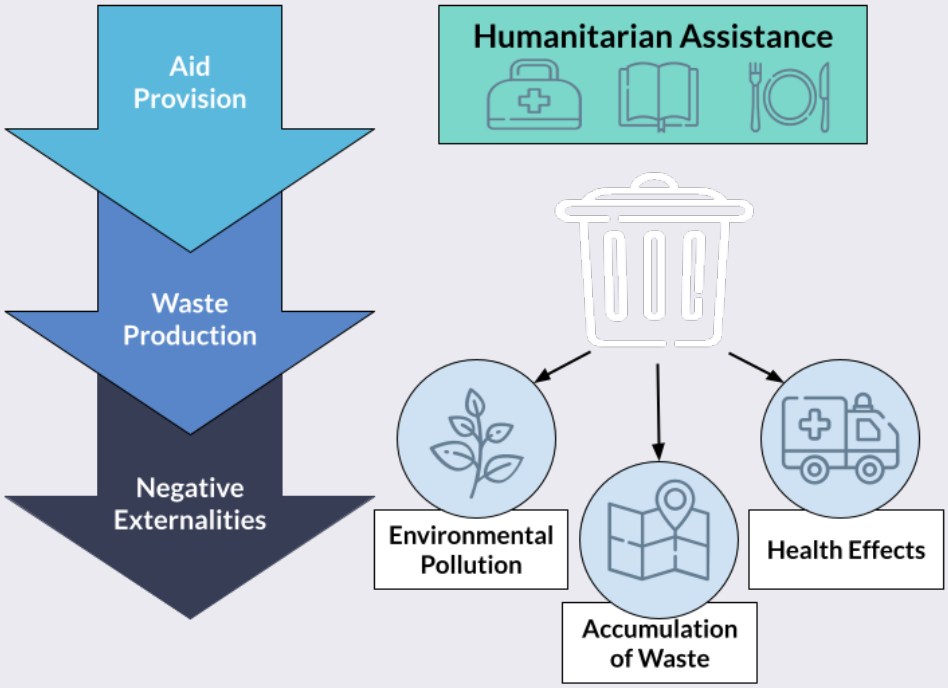
1 Literature Review

Humanitarian Assistance and Packaging Waste

Humanitarian assistance involves a number of actors trying to save lives, alleviate suffering, and restore human dignity (Good Humanitarian Donorship, n.d.). Organisations also contribute to the long-term development of societies (Obrecht & Bourne, 2018).

Operations during and after man-made crises and disasters caused by natural hazards (Development Initiatives, 2019) produce large quantities of PW. Packaging is essential for the protection and delivery of relief items. However, most humanitarian organisations overlook the reality that much of their packaging normally enters the waste stream in the affected region (USAID, 2020), as the urgent need for relief items outweighs their cost calculations of the negative social and environmental consequences (Hughes, 2018) (see Figure 2).

Figure 2: Waste Production in the Humanitarian Sector



Negative externalities from PW introduced by humanitarian actors are borne by the crisis-affected countries and communities and, therefore, directly contradict the humanitarian principle of 'do not harm' (Figure 2). Their lack of capacity to engage in adequate SWM often results in PW either being treated with non-environmentally friendly methods, or not being treated at all. The consequences of poorly managed PW transcend the waste management sector; contributing to the transmission of diseases and affecting public health, all of which disproportionately harms the poorest people (Ackah, 2017; World Bank, 2017).

Approaches to Managing Negative Externalities

Currently, the negative externalities of humanitarian PW are neither reflected in the market price of relief goods, nor in the calculations of humanitarian action's footprint. Studying the negative impacts of PW is required to provide sustainable humanitarian action that minimises the external indirect costs imposed on recipients, such as the unmanaged accumulation of waste.

There are a number of ways to address and counteract negative externalities (Figure 3). For example, a state-enforced Pigouvian taxation policy targets negative externalities and acts as a corrective transfer, that aligns individual marginal costs and benefits, with corresponding social marginal costs and benefits (Witkin, 2019). However, governments in crises tend to lack the required state capacity for effective tax collection, making taxation an unreliable enforcement mechanism for humanitarian actors. Moreover, allocating sole responsibility for SWM to the host government creates additional pressure on them, and denies the shared responsibility for those contributing to the PW problem, including the humanitarian sector.

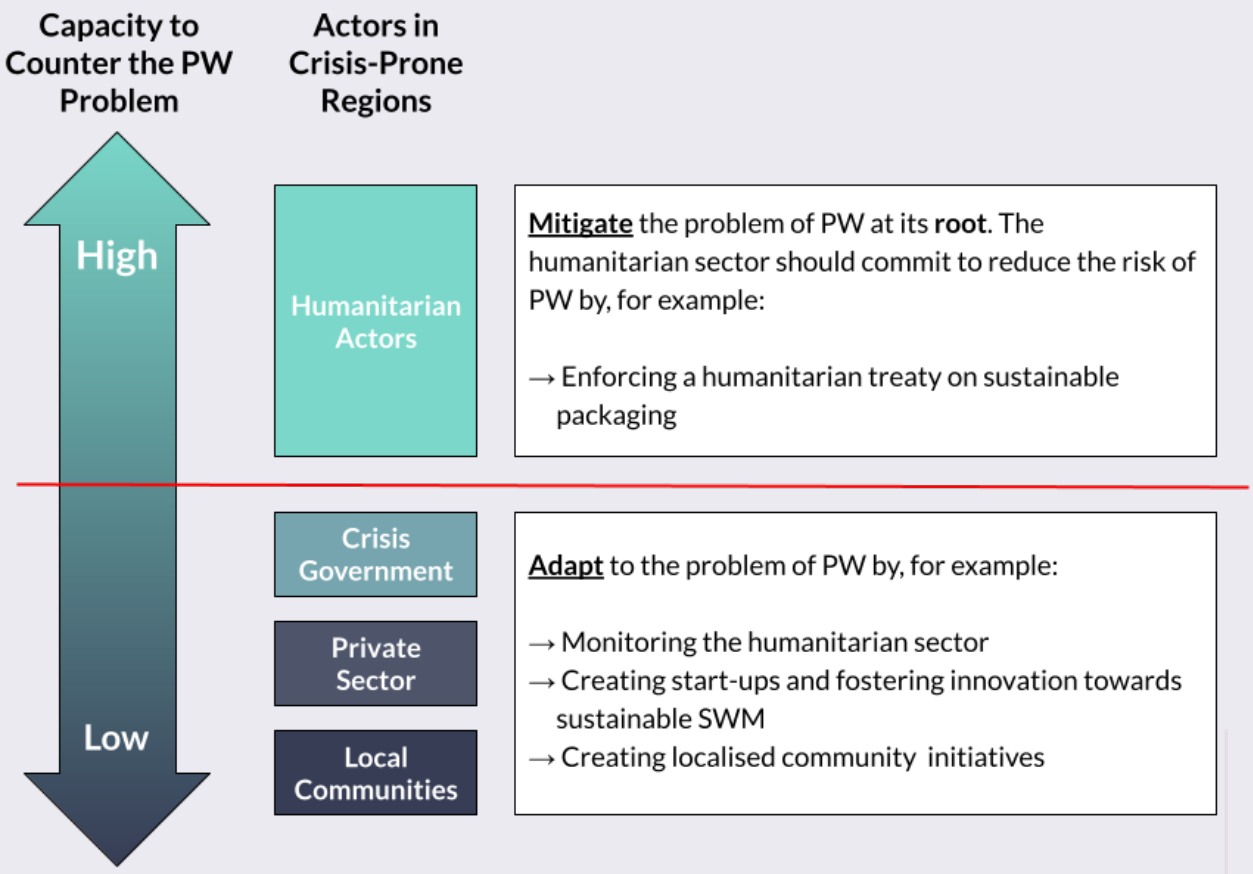
Privatisation can create job opportunities and incentives for future investments and innovations. However, crisis areas are associated with high risk, undermining the incentive structure of the private sector. The private sector is unlikely to function effectively in crisis-

prone economies, and may be exclusionary towards marginalised groups (Paul, 1992). Low state capacity and a weak private sector lead to the service being under-provided, magnifying the problem of packaging entering the local waste stream (Matheson, 2019).

Alternatively, solving waste problems through decentralised local initiatives may empower marginalised groups by improving their social capital and potentially providing formal employment opportunities. Formalised employment roles, increased social safety nets, modern working standards and female empowerment are just a few of the potential spillovers. These factors will strengthen the state from the local-level upwards, making people and the economy less vulnerable (Moser, 1998) – a key interest of the humanitarian sector. Focusing on specific, localised approaches is inclusive and accommodates for variation case-by-case. However, it could neglect the importance of mitigating the structural causes of unsustainable SWM in the first place.

With humanitarian crises tending to last longer, there is a growing potential for cooperation between stakeholders (UNOCHA, 2018). One way of managing this cooperation was suggested by Ostrom

Figure 3: Stakeholder Capacity to Counter the PW Problem

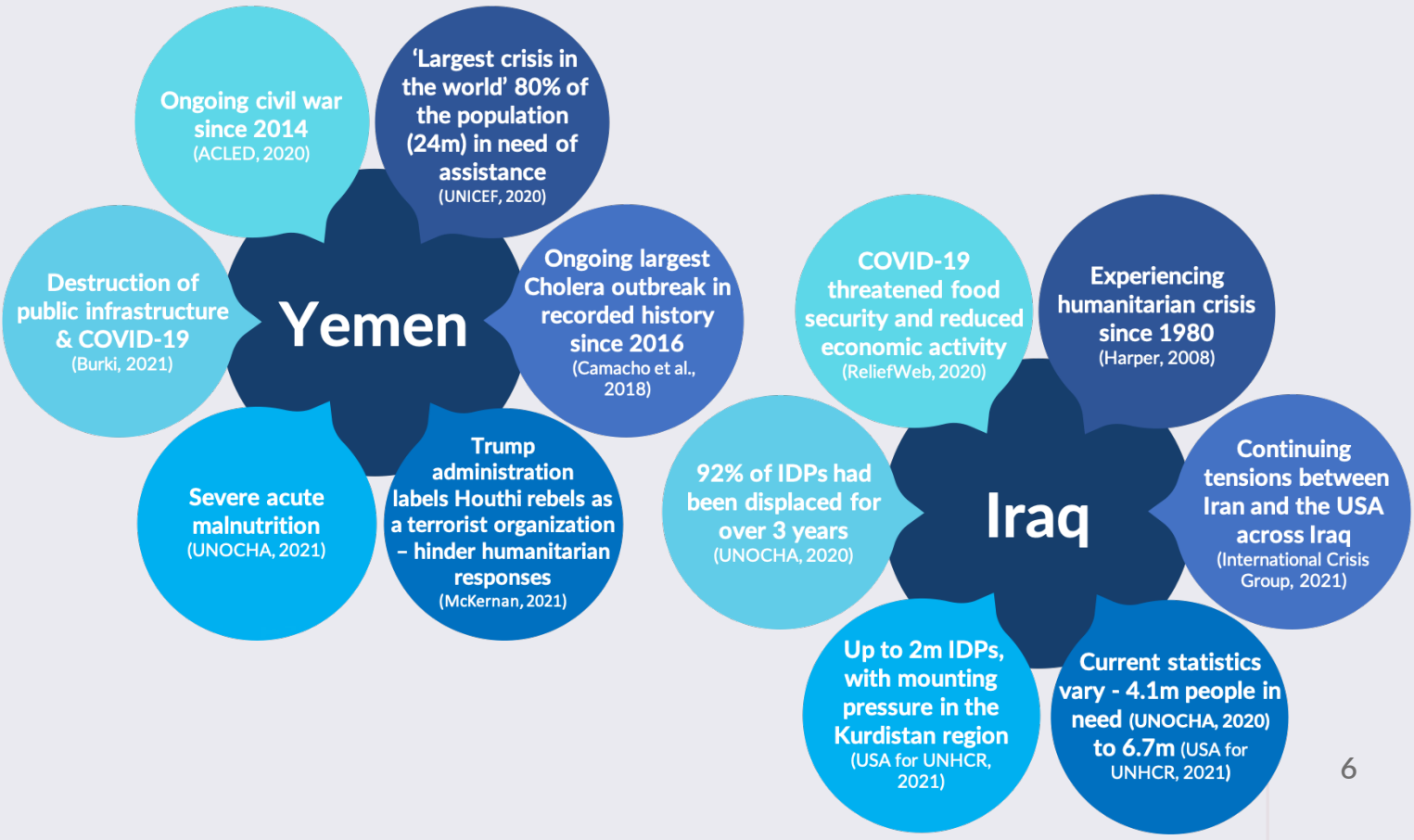


(1990). It entails a 'self-financed contract-enforced game' – the 5th game – in which actors commit to a cooperative strategy that has been designed by themselves. This facilitates humanitarian actors to hold each other accountable, when the host government lacks the capacity to monitor them, and could create a similar incentive structure to a Pigouvian tax, promoting the reduction of the negative externalities associated with PW.

Case Comparison: Yemen and Iraq

This study focuses on Yemen and Iraq, which are located in the Middle Eastern region (Figure 4). Yemen is widely perceived as the 'largest crisis in the world', with 80% of the population in need of assistance (UNICEF, 2020) due to the civil war that has been ongoing since 2014 (ACLED, 2020). Iraq has been experiencing a humanitarian crisis since 1980, with each conflict rolling into the next, although it is currently transitioning into a stage of recovery. The crisis situations in both countries require more humanitarian resources, which has the secondary impact of introducing more PW.

Figure 4: Country Comparison of Yemen and Iraq



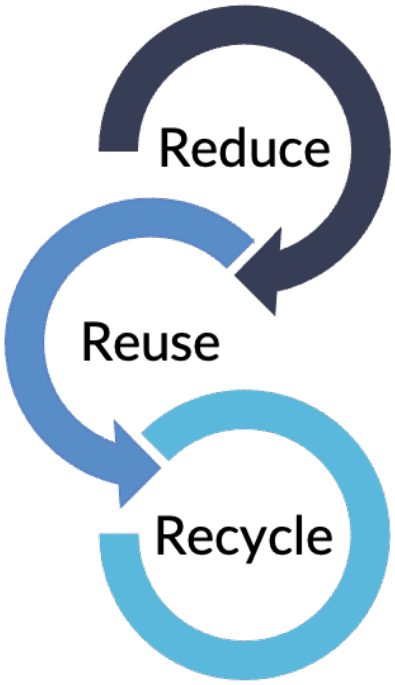
Solid Waste Management in Crisis Settings

Local administrations and municipal authorities are normally responsible for SWM (UNDP, 2016). However, crises diminish the capacity of these bodies to provide key services, resulting in the accumulation of waste at unplanned sites, contributing to the spread of diseases and epidemics (Ministry of Environment Republic of Iraq, n.d.).

Disasters reconfigure state priorities, and SWM will often be a trade-off when simple survival is the 'pre-dominant concern' of the public (Wilson, 2007, p. 204), or when reconstruction and development of other sectors, such as hospitals, roads or telecommunications, take precedence (UNEP, 2019). Pressures are intensified by on-going instability that drains resources, making near-future, holistic solutions unaffordable in both Yemen and Iraq (UNEP, 2019). These limitations on the state's ability to improve SWM mean humanitarian actors should internalise, and implement solutions themselves, as much as possible.

The '3R' Lens

Figure 5: The '3R's



One approach for humanitarian actors is to consider their supply chains. The flow of commodities entering crisis areas means humanitarian agencies should assess their packaging through the '3R' lens: reduce, reuse, recycle (WFP, 2018) (Figure 5). This is part of the global, overarching theme of sustainability, to protect the planet at the same time as protecting lives.

The first 'R' — reduction — is beyond the end-of-life remit of this report. However, it is an essential consideration for organisations, as it prevents the problem before it occurs. A couple of ways this can be accomplished is by 'greening the supply chain' (USAID, 2020), or, with increasing popularity (The Economist, 2018), implementing cash transfer programmes (CTPs), that allow recipients to 'prepare, prioritise, and take care of their family' (Cash and Markets Working Group, 2020).

The last two 'R's—reuse and recycle—constitute sustainable SWM,

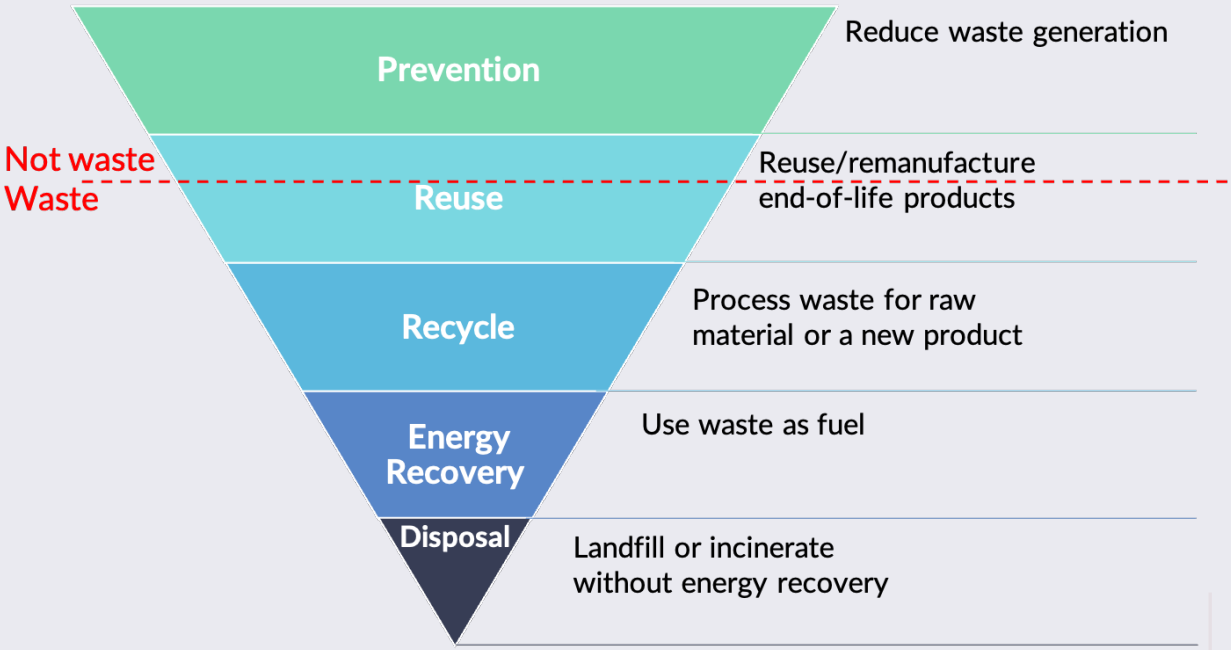
which is composed of three stages: collection, transportation, and treatment (Schübeler et al., 1996).

Solid Waste Management

SWM is a universal issue, however, it costs comparatively more in low-income countries than in high income countries – nearly 20% of municipal budgets in the former case compared to less than 4% in the latter (World Bank, 2017). The disparity between developed and developing countries is a result of the high start up costs of goods and services already available in high-income countries, such as infrastructure (Ferronato & Torretta, 2019). This means developing countries face difficulties in performing the functions necessary for a circular economy, and miss out on the benefits of engaging in sustainable actions that are associated with practices higher in the waste hierarchy (Figure 6).

The challenges of a developing country's underfunded SWM system are intensified during crises, since the impact of an emergency is likely to increase required humanitarian assistance, leading to more packaging entering the region (Development Initiatives, 2019).

Figure 6: Waste Hierarchy



Source: OECD, 2020, p.2

Additionally, developing countries face different SWM problems than developed countries, with most of their waste being dumped in unregulated landfills due to a lack of sustainable facilities (World Bank, 2017). This issue is compounded by a lack of environmental practises and institutions concerning SWM, resulting in problematic methods of disposal, such as communal waste burning (Matheson, 2019). COVID-19 has worsened these concerns, and may even be spread faster by inadequate waste management (Kulkarni & Anantharama, 2020).

Ideas aiming to solve issues within SWM run the risk of compartmentalising the processes of SWM, and neglecting the structural causes of the problems (Marshall & Farahbakhsh, 2013). However, the multilateral nature of SWM means it is widely acknowledged as an 'emergent factor for future social development,' indicating solutions can also directly challenge and overcome these barriers (Ma & Hipel, 2016, 3).

Three Stages of Solid Waste Management

Collection

Collection is the first step towards managing waste. Currently, poor collection services remain an obstacle in developing countries (Matheson, 2019). However, as a human-capital intensive process, improving collection services presents several opportunities for all stakeholders.

Successful reforming of the collection services relies upon a holistic assessment of the whole SWM structure (Zurbrügg et al., 2014). Such an assessment will provide the framework for capacity development – a prerequisite for enhanced project implementation (Alqatabry & Butcher, 2020) – and the social network across which plans must be coordinated.

A role of humanitarian agencies should be to educate local communities on the importance of appropriate SWM, and support a

shift away from unsustainable practices. One approach is to provide recipients of assistance with bins – World Vision provides two bins per eight households in the Azraq camp, in Jordan, to encourage waste separation (World Vision, 2019), although this practice could be replicated in local communities, too. Another approach is establishing a collection routine. UNHCR's (2017) guidelines suggest to collect waste at least twice a week, to break fly-breeding cycles. However, during the onset of the emergency, more waste tends to be generated, requiring more regular collection.

These initiatives should be managed at the community level, and integrated into larger SWM plans (Weir, 2019). This relieves stress on the government, and has been found to be relatively more cost-effective in six developing cities (Challcharoenwattana & Pharino, 2018). It also avoids the distrust in foreign entities that is prevalent in developing countries. The 'long-term reputational integrity' of the project-implementing humanitarian actor is pivotal for popular engagement in Yemen, indicating the need for cooperation with national and local actors (Kimball & Jumaan, 2020, p. 67).

Crucially, this style of project creates new jobs and provides recipients with a sense of dignity that lies in autonomy and productivity (Oxfam, 2017). However, successful community-based programmes rely upon a degree of stability to protect monitoring and incentive mechanisms, therefore posing a bigger challenge in the immediate response to an emergency. From a humanitarian perspective, the project must ensure the inclusion of marginalised people (Oxfam, 2008a) – a key principle of the UN 2030 Agenda for Sustainable Development (UN Department of Economic and Social Affairs, 2015).

Transportation

Once collected, solid waste needs to be transported to the relevant facility, for further separation, treatment, or disposal. Problems arise with the maintenance of these vehicles in developing countries. In Yemen, almost 45% of vehicles in the waste collection fleets of the six governorates were inaccessible, broken, or stolen, although the numbers varied widely, being considerably worse in contested areas,

such as Aden (UNDP, 2015), with similar circumstances applying to Iraq. The lack of financial resources, trained personnel, and quality data collection, all hinder developing countries' ability to improve the maintenance of their vehicles (Mustafa et al., 2018).

Cautious selection is required when purchasing vehicles, followed by skilled maintenance through general and detailed safety inspections and safety controls (GIZ, 2014). Humanitarian actors should aim to help local communities and administrations, by supporting the repair and rehabilitation of broken vehicles, with spare parts, tools, and know-how (UNDP, 2015).

Treatment

The final phase of the SWM process is the treatment of waste. In Yemen, a few cities have controlled and authorised landfills, however, most of the waste collected is disposed of in open, unregulated dumpsites (GIZ, 2014). The coverage of SWM services varies from over 65% in the two main cities in the areas served, to less than 20% in many rural provinces (Weir, 2019). Hazardous waste is collected and disposed of with non-hazardous waste, due to the lack of diversification in types of facilities (Weir, 2019).

There are several challenges to the treatment of waste in crisis areas. First, the poor management of dumpsites leads to unregulated dumping of waste. Missing or damaged fencing allows unauthorised personnel to enter the site (GIZ, 2014). Frequent fires cause health problems, such as respiratory infections, whilst the long-term toxic contamination of the air and ground can have carcinogenic effects on local communities (UNDP, 2015). Covering waste with sand and dirt is one way of minimising the risk of fire (GIZ, 2014).

Second, insufficient capital goods, specifically a lack of functioning machinery, hinders effective SWM. Supporting the rehabilitation of heavy machinery is a key element of improving this problem (GIZ, 2014; UNDP, 2015). In the case of Yemen, the nation's lack of recycling facilities has been a neglected issue in the past, although in 2009, the government did begin to acknowledge the importance of a comprehensive SWM system, and encouraged multilateral

partnerships across the humanitarian, private and informal sectors, to engage in recycling programmes (Weir, 2019).

Third, the lack of permanent, trained staff who are committed to serious SWM, undermines the efficiency of procedures and maintenance. In Yemen, the absence of permanent staff for site management and machine operating has become a key issue at most landfills (GIZ, 2014).

Lastly, the major barrier to transforming these dumpsites into controlled landfills, is the lack of financial capital (GIZ, 2014). As discussed, this constraint is magnified during crises, as the state is confronted with a double burden.

Effective SWM systems need a range of treatment methods, in order to manage different materials. Table 1 shows a few examples of potential treatment methods that are already used in various countries. A more extensive list is attached in Appendix A.

Table 1: Potential Low-Capacity Recycling Solutions

Packaging	Recyclability	Small-scale solutions
Cardboard	Upcycling & recycling feasible	1. Backpacks, cradles, slippers, stools 2. Fire briquettes
Single-Use Plastic	Recycling needs some capacity and expertise	1. 'Ecobricks' 2. Pavement Bricks (Gjenge Makers) 3. Upcycling to toys
Multi-Use Plastic	Recycling nearly impossible, but greatly reusable	1. Jerry cans as water carriers in camps 2. Water cans as low-cost urinal
Multi-material wrappers	Recycling nearly impossible	1. Use for energy generation
Polypropylene	Recycling needs advanced technology	1. Thermal decomposition → Production of vaseline , olefins, gases, and light oils

2 Methodology

This study identifies sustainable management solutions for PW by identifying current challenges and recognising best practices that can be shared across regions. Underlying the practical elements, this research addresses the theoretical problem of negative externalities of unmanaged PW, covering environmental as well as social sustainability. This research will guide humanitarian actors towards solutions that appease both dimensions, by targeting social and economic spillovers that help develop the capacities of crisis-affected countries.

To answer the question *'How can PW, generated by humanitarian assistance, be sustainably managed in crisis areas?'*, this study adopts a mixed-method approach, combining quantitative and qualitative aspects, to create a diversified picture of the situation (McKim, 2017).

By using a quantitative survey, the study measures, categorises, and reveals patterns around packaging waste management (PWM) in humanitarian crises. Through interviews, the study identifies challenges and best practices with anecdotal information, from individual humanitarian actors with experience in Yemen or Iraq. Simultaneously, open-ended literature research was conducted to prepare for interviews, and the gathered data was examined to form appropriate recommendations.

Method of Data Collection

Survey

A survey was sent out to 151 humanitarian actors across both Yemen and Iraq – 79 in Yemen, 72 in Iraq. Twelve responses were received – three from Yemen, five from Iraq, and four indicating their organisations worked in both countries.

This report defines humanitarian actors as those engaging in the 'neutral provision of aid to those in immediate danger' (Rysaback-Smith, 2015, p. 5). Actors were initially identified through secondary research, with additional individuals being contacted through snowball sampling, based on information gathered from earlier respondents. A copy of the survey questions can be found in Appendix K.

Survey Factsheet:

Duration: Dec '20 – Feb '21
Time: 8-12 Minutes

Means: Google Forms
- Tick boxes
- Quantify and rank object and practices
- Short text answers

The low response rate (7.95%) is accountable to several factors. One challenge was finding appropriate email addresses for individual humanitarian actors in the target region, rather than general organisation contacts. Another challenge was the probability that many of the survey emails may have entered the spam folder of actors' accounts. Additionally, the response rate could also indicate PW not being considered a priority, or the emails not reaching the necessary person with sufficient knowledge about the PW issue to fill out the survey. However, the response rate could also be a result of the humanitarian practitioners who are working in crisis hotspots being too busy to fill in the survey, especially during COVID-19, and over the Christmas period. The low response rate could indicate that those who did respond might have a vested interest in humanitarian SWM, providing the study with more informed knowledge.

Interview

The standardised survey provided a broad overview that helped design the questions asked in semi-structured, individually adjusted interviews. The interviews revealed detailed, contextual information concerning the current state of SWM, and individual experiences of success and failures in PWM.

Of twelve survey respondents, seven agreed to participate in an individual follow-up interview – a response rate of 58.33%, –

two discussing experiences in Yemen, and five focusing on Iraq. Interviews were prepared by adjusting a general interview template, based upon their survey response (Appendix L).

Interviews lasted between 40 minutes and 2 hours, and, with the consent of the interviewee, were recorded on Zoom. An anonymised list of interviewees is attached in Appendix M.

Method of Analysis

Beyond analysing the literature, the information from surveys and interviews was analysed and, when possible, plotted onto charts. Interviews were transcribed using Zoom, analysed by the research team, and open-coded to identify and categorise patterns, through 1) challenges, 2) best practices, and 3) participant suggestions.

Evaluation and Justification of Methodological Choices

Field research in Yemen and Iraq, the most desirable method of data collection, was not feasible, due to time and resource limits, especially during COVID-19. The mixed-method approach, by combining quantitative and qualitative information, was the best alternative, given the circumstantial constraints.

The advantage of using semi-structured interviews is the possibility for comparisons between respondents, unlike unstructured interviews, but facilitates follow-up questions that approach the key differences and similarities, challenges and opportunities, unlike completely structured interviews.

A sample selection concern that arose from the low response rate, is that responding humanitarian actors may have a strong engagement in the field of PWM already, possibly distorting results from the reality of the wider sector. Consequently, the results from the survey and interviews are not accurately representative of the

broader humanitarian sector.

Literature research formed the third pillar of the study; placing the experiences and suggestions of respondents into the broader context, to mitigate the impact of self-selection bias. However, this is still based on limited data, so the possibility of respondents possessing fundamentally different views on packing waste management than those who did not respond, cannot be ruled out.

Case Selection

The focus of this research is humanitarian assistance in crisis situations, which includes man-made disasters, disasters caused by natural hazards, and disease outbreaks (Kohrt et al., 2019). This broad field was narrowed down to man-made crises within the Middle East region.

As mentioned previously, the Yemeni crisis is currently one of the world's worst cases (Nassereddine et al., 2021). The gravity of the situation led to its selection as an exploratory example of PWM in the humanitarian sector, however, due to data concerns, the study needed to expand its scope to Iraq, to facilitate convenience sampling.

The selection of Iraq was inspired by John Stuart Mill's 'Method of Difference' concept (2011). Both Yemen and Iraq are located in the Middle Eastern region, allowing for loosely defined comparisons in cultural and organisational structures. Additionally, both are experiencing man-made humanitarian crises. This provides a basis for comparing their SWM practices.

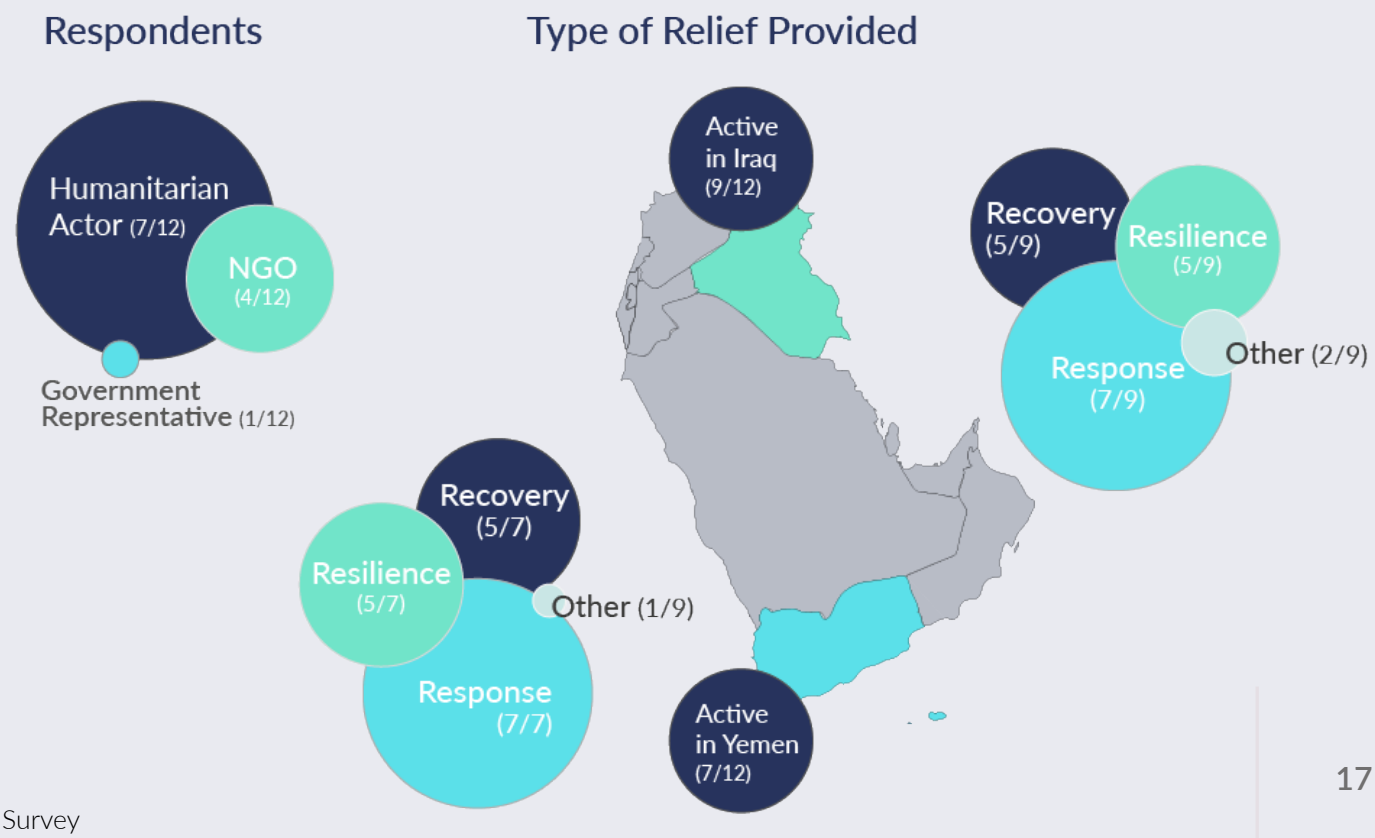
Holding characteristics constant, such as region and type of crisis, allows the study to adjust the independent variable of the nature of the current humanitarian responses, between emergency response, and resilience and recovery. This distinction allows the study to make recommendations across a wider context of humanitarian crises.

3 Analysis

Survey Analysis

As noted, there were 12 responses from 12 organisations operating in Yemen or Iraq – three for Yemen, five for Iraq, and four responded for both countries (Figure 7). 80% of respondents (R=10) indicated their organisation has been active for more than 15 years in their country, five in each (Appendices B & C). The same number of respondents from both countries indicated their organisation is undertaking response (R=7), resilience (R=5), and recovery (R=5) humanitarian operations (see Appendices D & E).

Figure 7: Overview – Survey Respondents and Type of Relief Provided



Source: Survey

Similarly, the forms of assistance change according to the respective needs of recipients (Tables 2 & 3). WASH and health assistance are the most prominent types of assistance indicated by surveyed humanitarian actors in both countries, however there is greater provision of food and shelter support in Yemen, due to the emergency leading to an under-supply in basic necessities. This variation is reflected further in the types of relief commodities provided (Appendices F & G).

Table 2:
Form of Assistance Provided by Interviewed Humanitarian Actors in Yemen

Multiple-Choice Question: What form of humanitarian assistance does your organisation provide?

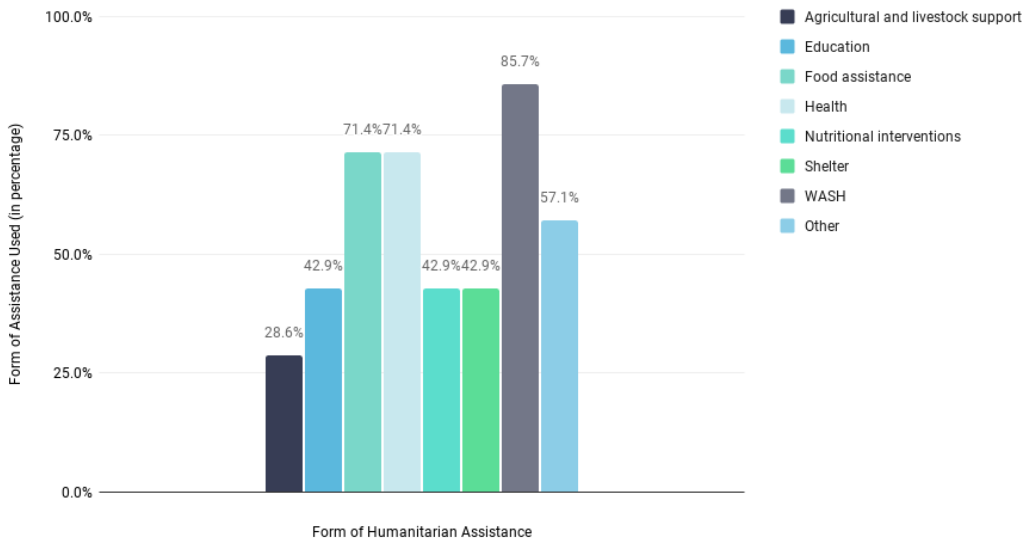
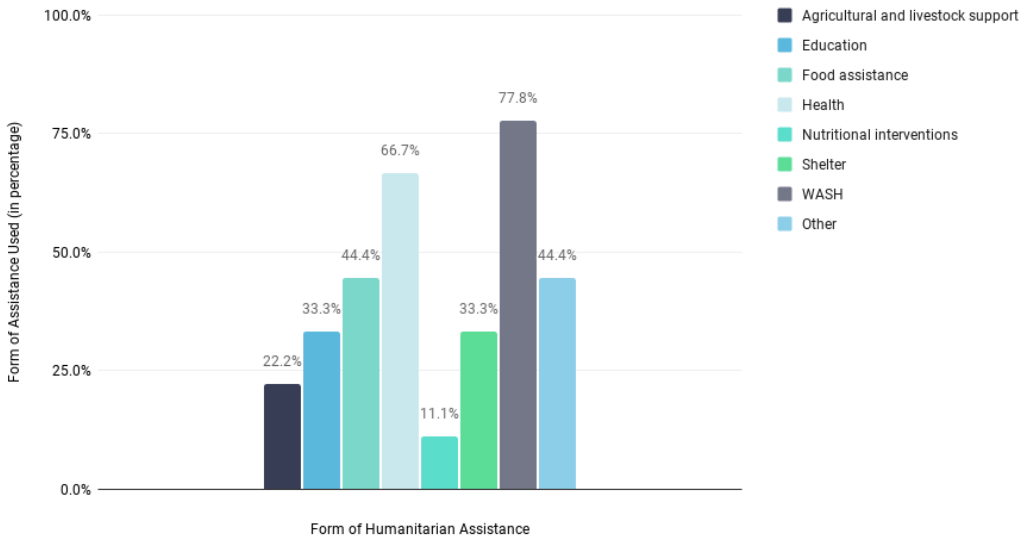


Table 3:
Form of Assistance Provided by Interviewed Humanitarian Actors in Iraq

Multiple-Choice Question: What form of humanitarian assistance does your organisation provide?



Source: Survey

The material that forms the relatively largest share of waste generated by the humanitarian actors surveyed in this study is cardboard, likely due to its prominent use in secondary packaging of most relief commodities (Tables 4 & 5). These tables also show relatively more single-use and multi-use plastic waste being produced in Yemen, which might be related to the greater amount of food being distributed.

Table 4:
Waste Generation of Interviewed Humanitaran Actors Operating in Yemen

Question: Identify the quantities of each type of waste generated by you from 0 (none) to 5 (most).

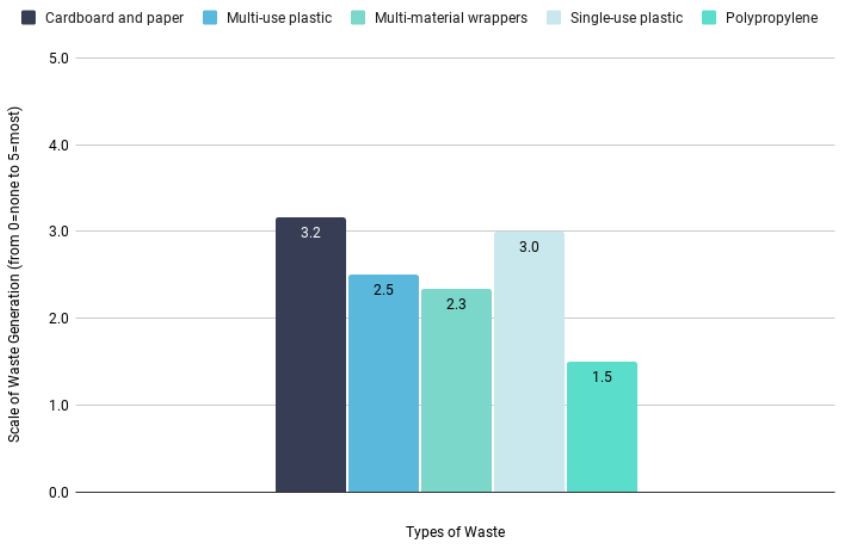
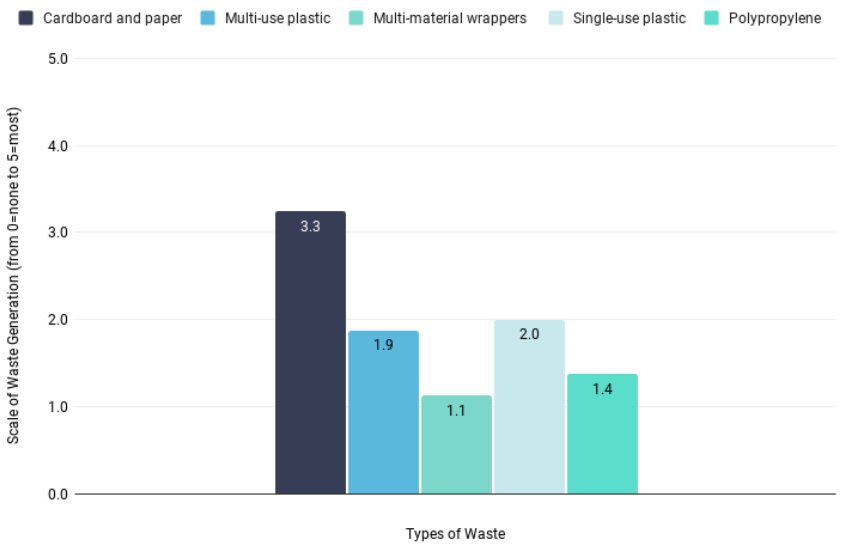


Table 5:
Waste Generation of Interviewed Humanitaran Actors Operating in Iraq

Question: Identify the quantities of each type of waste generated by you from 0 (none) to 5 (most).



Source: Survey

50% (R=6) of respondents indicated working with local partners for SWM (Appendix H). Three actors in Yemen, and one in Iraq, suggested their waste is disposed of at 'controlled landfills' 33% (R=4) (Tables 6 & 7). In Iraq, the most common answer for how the majority of the organisations' packaging waste is managed was 'Don't Know', being selected by 44% (R=4) of responses. This appears to be the result of actors letting the local authorities take responsibility for the treatment and disposal of their waste, without being aware of their guidelines or processes.

Table 6:
Solid Waste Management Method of Interviewed Humanitiarian Actors in Yemen

Multiple-Choice Question: How is the majority of your packaging waste managed?

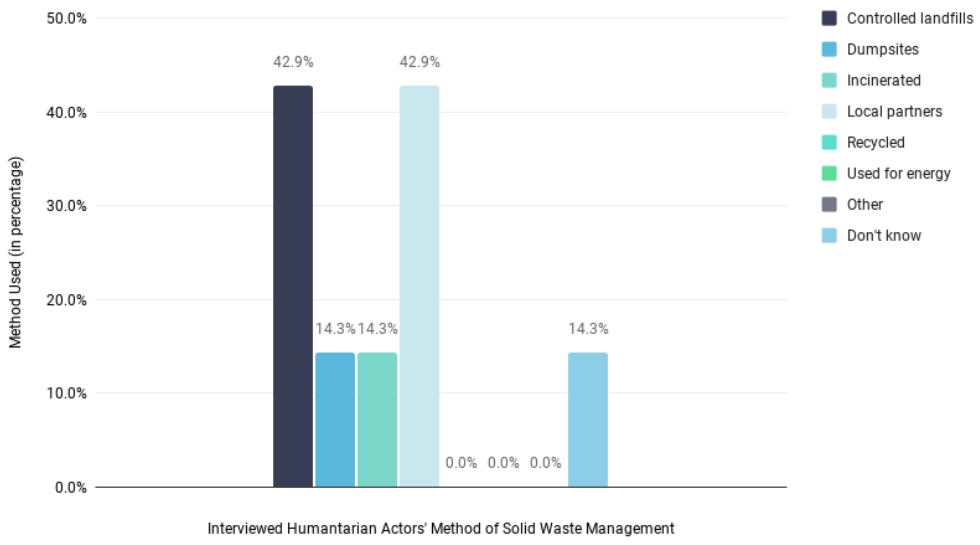
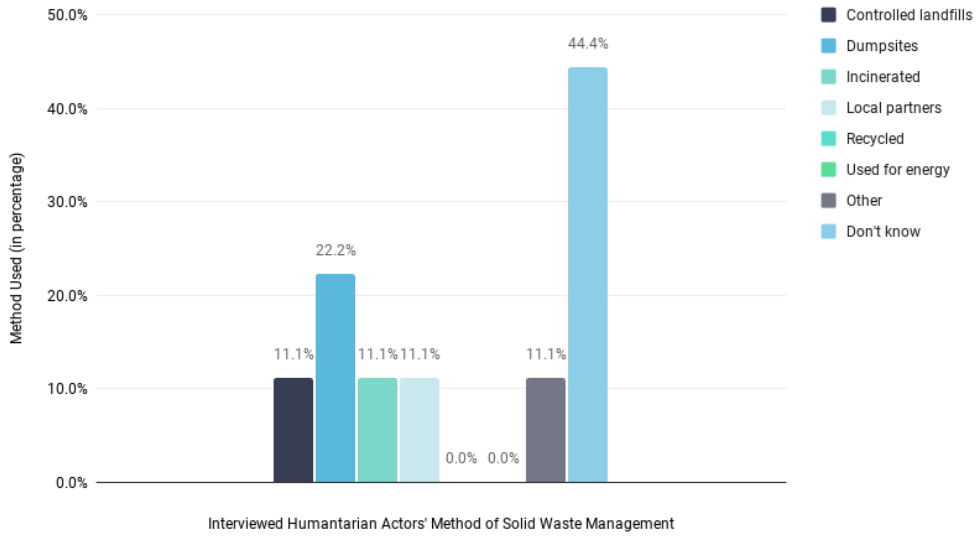


Table 7:
Solid Waste Management Method of Interviewed Humanitiarian Actors in Iraq

Multiple-Choice Question: How is the majority of your packaging waste managed?



Source: Survey

Addressing the question of which SWM guidelines organisations follow, 33% (R=4) indicated to not follow any, and of those that do, 75% (R=6) follow governmental regulations, 50% (R=4) follow the guidelines set by the humanitarian sector, and 37% (R=3) follow self-imposed rules (Table 8). 75% (R=6) indicated these guidelines are well applied in practice. Moreover, respondents were asked to indicate how important they perceive SWM to be, on a scale of 1 (low) to 10 (high), meaning scores of 1 to 5 indicate SWM is not very important, and scores of 6 to 10 show SWM is important. The mean average perception of importance was 4.6, and '1' was the modal value (R=3). This suggests SWM not to be a primary concern of most of the responding actors. However, 42% (R=5) indicated a score of 6 or above, suggesting the importance of SWM varies across organisations (Table 9).

Table 8:
Regulations Followed by Humanitarian Actors

Question: Whose regulations do you follow?

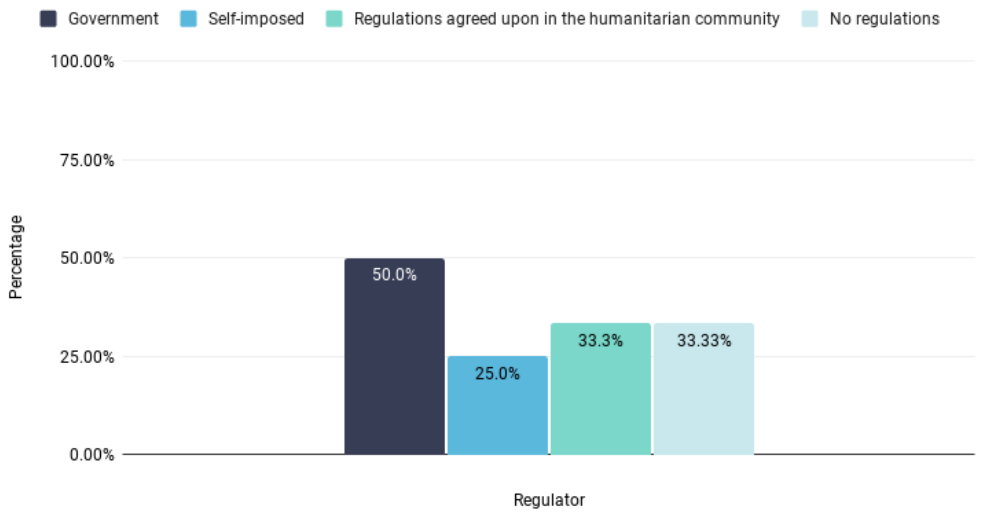
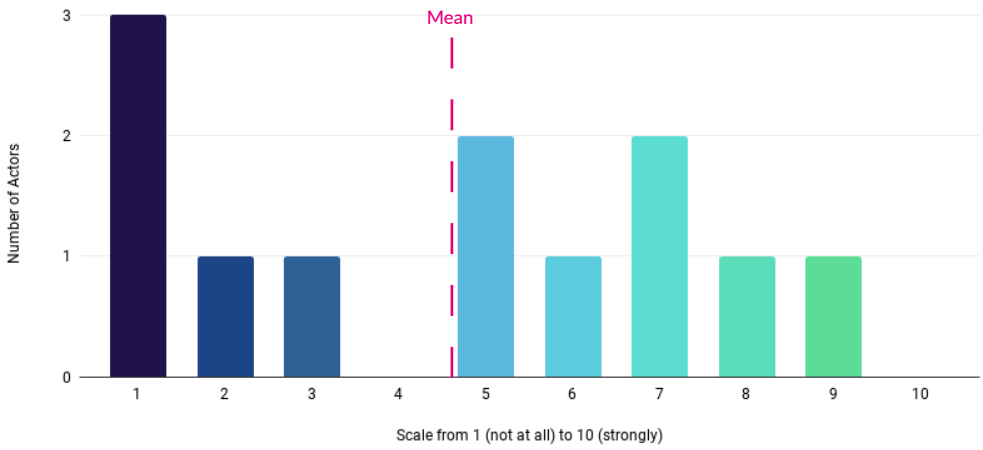


Table 9:
Perceived Importance of Humanitarian Actor's Waste Management

Question: Is packaging waste management perceived as a problem for your organisation?



Source: Survey

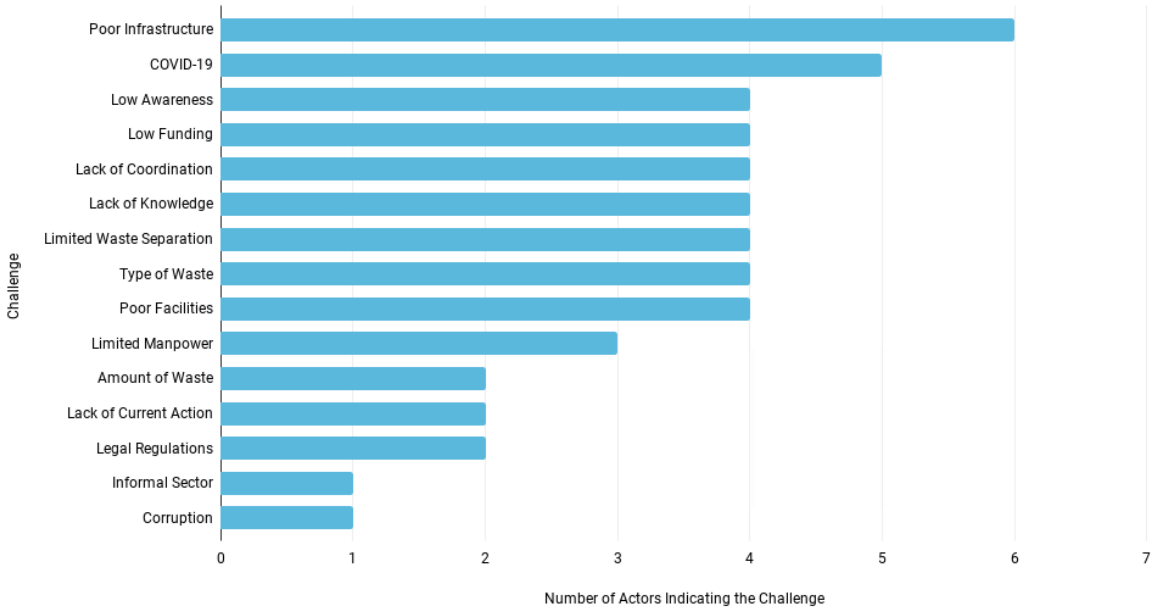
Interview Analysis

Following the survey, seven qualitative interviews were conducted. Interviewees included five humanitarian actors (HA), one local NGO, and one municipal actor (MA), with two participants responding for Yemen – HA1 and HA2, and five for Iraq – HA3, MA1, NGO1, NGO2 and NGO3. The interviews revealed the actors' first-hand experiences with challenges and best practises in SWM, and their suggestions for what should happen. Collected data was coded and categorised into themes and topics, as presented in Tables 10, 11, and 12.

Challenges

The most common challenges to SWM that participants noted are poor infrastructure, and currently, COVID-19. In Yemen, poor infrastructure means that collection is entirely insufficient. HA1 mentioned most waste is simply burned on street corners, however even the waste that is collected, as indicated by HA2, is transported to dumpsites where there is "no further disposal or processing of waste." In Iraq, infrastructural limitations are prevalent in later stages of SWM, with NGO1 recognising that hazardous waste is treated in the same facilities as non-hazardous waste, with mobile

Table 10:
Challenges Regarding Packaging Waste Identified by Humanitarian Actors
Coded Interview Analysis Based on Emerging Categories (N=7)



Source: Interviews

treatment stations for hazardous waste only recently becoming a practice. Additionally, MA1, NGO2, and NGO3 said there is a lack of properly operating landfills.

"Actually there is no further disposal or processing of waste" - (HA2)

MA1 works in SWM in a relatively well-developed region of Iraq, and pointed out that COVID-19 has increased the amount of PW due to online shopping, which combines with lockdowns reducing the operating of their facilities, resulting in an accumulation of uncollected, untreated waste, that was identified by HA3, MA1, NGO1, NGO2, NGO3. These concerns reflect the limited availability of recycling and other sustainable SWM facilities, that was mentioned by four interviewees.

Five participants spoke of the lack of awareness and knowledge as a significant challenge for SWM, too. In Yemen, HA1 pointed out that there are strong, negative connotations of SWM, especially handling other peoples' waste, and HA2 mentioned there is a lack of information regarding what happens to waste once it is collected. In Iraq, HA3 suggested there is little understanding about the processes of SWM, NGO1 pointed to the limited knowledge about the dangers of mixing hazardous and non-hazardous waste, and MA1 said there is a shortage of skilled labour, who know, for example, how to implement leachate controlling systems in facilities.

A major, underlying problem tied to several points, is funding. Funding was mentioned by four participants. MA1 said that since 2012/2013, their overall budget has been cut by 75%, due to the conflict with ISIS and the economic crisis. Additionally, HA1, NGO1 and NGO2 mentioned that the government has no money to invest in infrastructure, treatment plans or vehicle maintenance. MA1, NGO1, and NGO2 also spoke of a lack of skilled personnel and manpower, due to underfunding.

HA1, HA2, HA3 and NGO1 all pointed to a lack of coordination, too, because SWM "needs a lot of actors to cooperate." HA1 discussed coordination within the humanitarian sector, mentioning the "generational clash" between older, "dinosaur" actors, and younger actors who are more engaged in green innovation. HA2 pointed towards the separate nature of country-level and organisational

regulations on SWM as a challenge, however, alongside NGO1, they recognised the potential to gather momentum behind these two guidelines to improve future coordination.

Adding to this, the type of waste being a primary concern was mentioned by four actors, compared to the quantity of waste being referred to only twice. HA1 addressed tertiary packaging from shipping as having no secondary value, and MA1 pointed toward non-recyclable materials with no resale value being problematic. HA2 said that PW was a concern for imported goods, however during emergency responses, commodities are purchased locally, and it is harder to enforce packaging regulations on intermediary suppliers.

There "never will be a good time" to start tackling the SWM issue in a crisis hotspot, "so why [...] not [start] right now?" (MA1)

Corruption, interestingly, was noted as less of a challenge than legal gridlock, which MA1 and NGO1 see as inhibiting proactive decision-making by those engaging with SWM, and could be improved to benefit all stakeholders. As MA1 said, there "never will be a good time" to start tackling the SWM issue in a crisis hotspot, "so why [...] not [start] right now?"

Best Practices

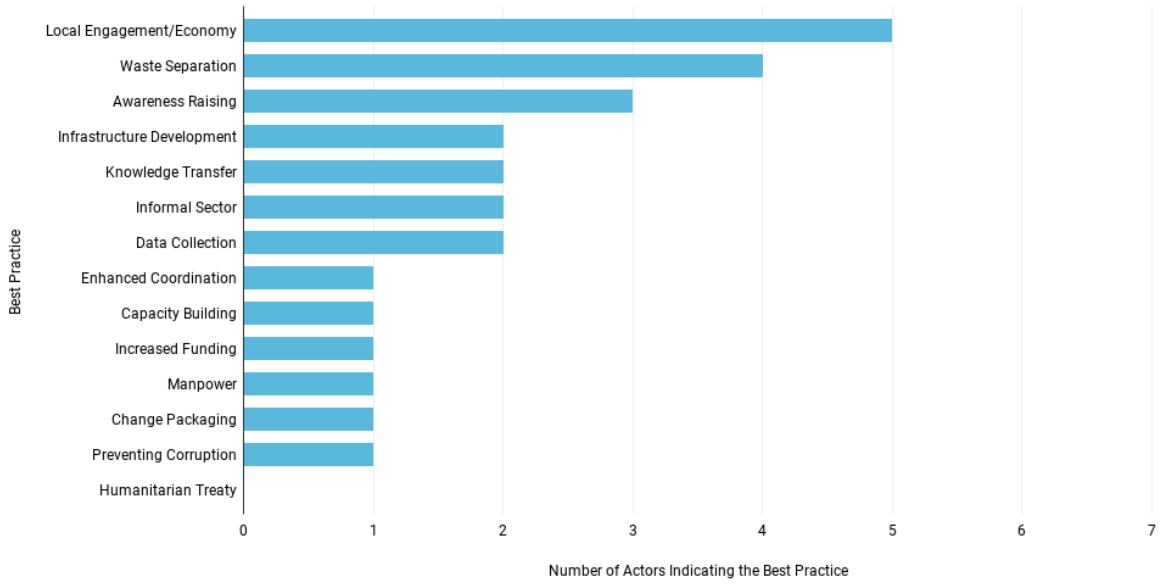
"within a month, the whole refugee camp was spotless clean" - (HA1)

The most common solutions to SWM that participants advocated - mentioned five times - involve engaging with the local communities and economy, through a variety of approaches. HA1 mentioned two ideas. One targeted female heads-of-household, who were paid with leftover finances following distribution, to collect waste from around their camp in Darfur, Sudan, and "within a month, the whole refugee camp was spotless[ly] clean." The other example referred to a project at the ICRC Nairobi headquarters, where international organisations began working with local partners, separating, treating, and selling their solid waste to local recycling firms. After several years, it now generates a substantial amount of revenue on selling waste alone. One limiting factor on this is the requirement of a stronger private sector, that is not yet present in Yemen, but is growing in Iraq. NGO2 currently works alongside the WASH cluster and government in Iraq, and has noticed a trend in emerging local start-up enterprises who now help support the sustainable treatment and disposal of waste in the region.

HA3 indicated two connected practices that create income for local communities, while encouraging productivity and innovation. First, the local procurement of relief items, which has the benefit of suppliers mostly using traditional, manageable packaging, and second, the provision of competitive contracts for waste

Table 11:
Best Practices Regarding Packaging Waste Identified by Humanitarian Actors

Coded Interview Analysis Based on Emerging Categories (N=7)



Source: Interviews

collection and transportation. MA1 already cooperates with local and international organisations through contracts for SWM, and conducts auctions to sell solid waste to generate profit.

Waste separation was mentioned by interviewees four times as a challenge, and also four times as a target for solutions. NGO1 pushes for hazardous and non-hazardous waste separation programmes, as demonstrated by their medical waste treatment facility, which they hope to scale-up as soon as possible. HA3 and NGO2 both distribute separate waste bins, for recyclable and non-recyclable waste, to the areas where they are distributing commodities to, in refugee camps as well as local communities, with the guidance of the central government. These activities align with MA1, who stated a comprehensive plan for waste separation and collection is being launched in 2021.

Awareness raising initiatives were spoken about by three participants, with three different approaches. NGO1 has recorded videos of the waste produced by humanitarian organisations, allowing NGO1 to show the organisation and hold them accountable. HA1 recalled a clean-up project on a humanitarian and hospital compound in southern Yemen, that unintentionally spilled over into the local community, leading to it being joked about as “the only clean place in the entire province.” Alternatively, MA1 increased awareness and sustainable activities through media campaigns, for example, which also reinvented the perception of those engaged in SWM as “environment protectors”.

Two participants also discussed infrastructural capacity development projects that their organisations are undertaking. MA1 mentioned their contractual agreements with private companies to gradually expand and develop treatment facilities. To enhance sustainable practices in the transportation process, NGO1 suggested the GPS tracking of vehicles, to make sure the collectors took the waste to the appropriate facilities.

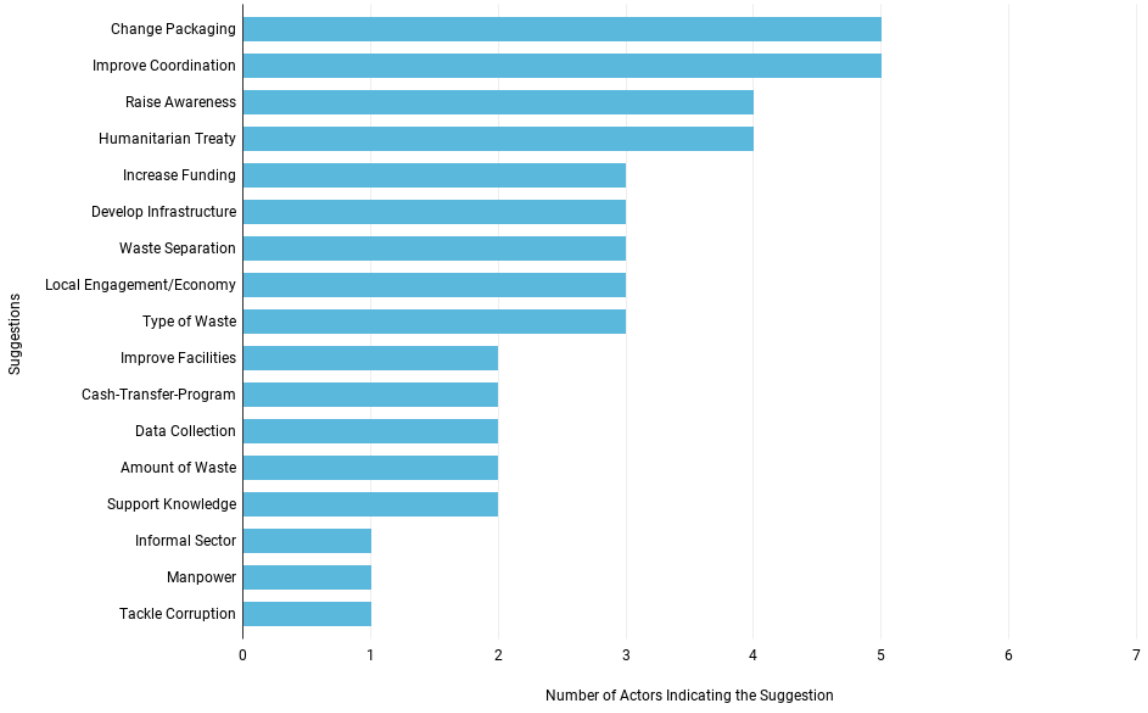
Participant Suggestions

Interviewees were given the opportunity to suggest recommendations that they would like to see implemented. Interestingly, the most popular ideas involved processes further up the waste hierarchy, being mentioned nine times by six of the participants. In fact, no recommendations that could be solely implemented within the host country were discussed by actors from Yemen. This indicates the need to reduce external indirect costs prior to commodities entering the economy, as regions experiencing more immediate, severe crises have a more limited capacity to cope with PW.

The need to change packaging was mentioned seven times. The most prevalent concern was the plastic used in packaging, as HA1, HA2, HA3, MA1 and NGO2 all suggested replacing plastic with either a biodegradable alternative, or a more reusable commodity, because as MA1 stated, the issue is not the quantity of waste, rather the type of waste.

Although the survey found cardboard to be the most common material in packaging waste, the emphasis of HA1 was not to reduce

Table 12:
Suggestions Regarding Packaging Waste Identified by Humanitarian Actors
Coded Interview Analysis Based on Emerging Categories (N=7)



Source: Interviews

cardboard, as it became an asset for recipients, who burn it as a source of heat. Although this is not ideal in terms of sustainability, it provides a use to recipients, and HA2 suggested removing ink from cardboard to prevent people inhaling toxic smoke.

Alternatively, NGO1 and HA3 mentioned cash transfer programmes as a different method of delivering assistance that prevents waste entering the region, and stimulates economic growth.

Within the host country, improved awareness and coordination were the most common recommendations. Awareness, HA2, MA1 and NGO1 stated, is necessary for the holistic enhancement of SWM, with NGO1 expanding their point to suggest humanitarian agencies should provide information on their waste management when proposing projects. NGO3 said raising awareness is necessary to "improve the mental connection between waste and the environment," and generate momentum behind local initiatives.

Coordination was highlighted in five interviews, with HA2, HA3 and NGO1 stressing coordination between the humanitarian sector and local entities, such as local firms and administrations. MA1 mentioned coordination with waste pickers, in order to provide jobs for young people and engage with local firms, while HA1 focused on vertical coordination within the humanitarian sector, as the "real talk is always going to happen at the national level, or clusters," which can form significant bottom-up pressure on international humanitarian organisations' headquarters.

"Real talk is always going to happen at the national level, or clusters" - (HA1)

To accomplish this, data collection practices were recommended as an area for improvement by HA3, who suggested this would help organisations manage their waste better, and conduct internal audits of waste management practices. NGO1 also emphasises data collection as a mechanism to hold organisations accountable for their waste production.

MA1 said improved collection can be achieved by providing more bins, and encouraging collection as a job opportunity for young people. NGO3 identified the need to separate waste as the first

priority, however they were also conscious of difficulties with coordination and funding this.

"Funding issue is greater than the knowledge issue" - (NGO3)

Funding, as mentioned earlier as a challenge, is an underlying theme for many of the interviewees' ideas, with NGO3 stating the "funding issue is greater than the knowledge issue." Funding can be used for facility construction and expansion, as suggested by MA1, creating more job opportunities. NGO1 said that the broader shift towards sustainable development should be promoted through the inclusion of SWM in project proposals, which may increase funding opportunities.

Transportation was only mentioned by NGO1, who suggested equipping collection trucks with GPS technology for transparency purposes, could be implemented on a wider basis. They also suggested decentralising SWM would be more effective, as waste collectors can be more easily held accountable locally than through the state mechanisms, alongside encouraging and training drivers to operate waste facilities.

Considering treatment facilities, MA1 emphasised providing knowledge and maintenance support to develop in a sustainable manner. Additionally, humanitarian organisations can be consultants for improving existing treatment facilities.

Achieving these ideas, NGO1 said, requires collaborative humanitarian action to instil accountability, as they mentioned there is high potential for waste reduction if awareness is formalised. This perspective is supported by HA1, who suggested the SWM should be addressed before it becomes a problem, and HA3, who stated guidelines should be enforced and communicated on more humanitarian platforms.

4 Recommendations

Three potential pathways for PWM by humanitarian actors were identified during the research, though only one provides long-term sustainable solutions. While setting up organisations' **own treatment facilities** remains a suitable small-scale option for hazardous waste, it is not feasible for larger volumes of PW. The common practice of **exporting waste** to other regions might be a solution for specific types of waste, where there is no alternative. Still, this study does not advocate for this option since it carries a number of other negative effects, and possibly creates a dependency dynamic. It may be necessary to export the waste if it is not going to be managed, however MA1 stated, "it is not [a] good option [for humanitarian actors] to take their waste back," since it can also be a great development opportunity. Accordingly, this report focuses on the third solution of supporting local capacity development to increase local actors' abilities to cope with the additional burden of PW. This follows the capability approach of Amartya Sen (1999) and recognises the importance of enhancing people's possibilities to choose how to improve their situation. This promises the best long-term outcome for all stakeholders, including the recognition of the value of certain types of waste and the creation of opportunities to improve livelihoods.

Generally, the key stakeholders in crises are the local population, the host government, the private sector of the affected country, and the humanitarian sector – all of whom have different capacities to tackle the PW problem (see Figure 3).

To mitigate the lack of capacity at its roots, there is the need for structural intervention, which needs to come from the more capable stakeholders. In order to tackle each challenge identified by UNEP's '#BeatPollution' campaign (Appendix I), humanitarian actors should aim to:

1. Enhance capabilities of local people to facilitate their adoption of sustainable WM practices
2. Support rebuilding of state capacity
3. Foster innovation in WM by the private sector
4. Reduce negative externalities of humanitarian PW at its source

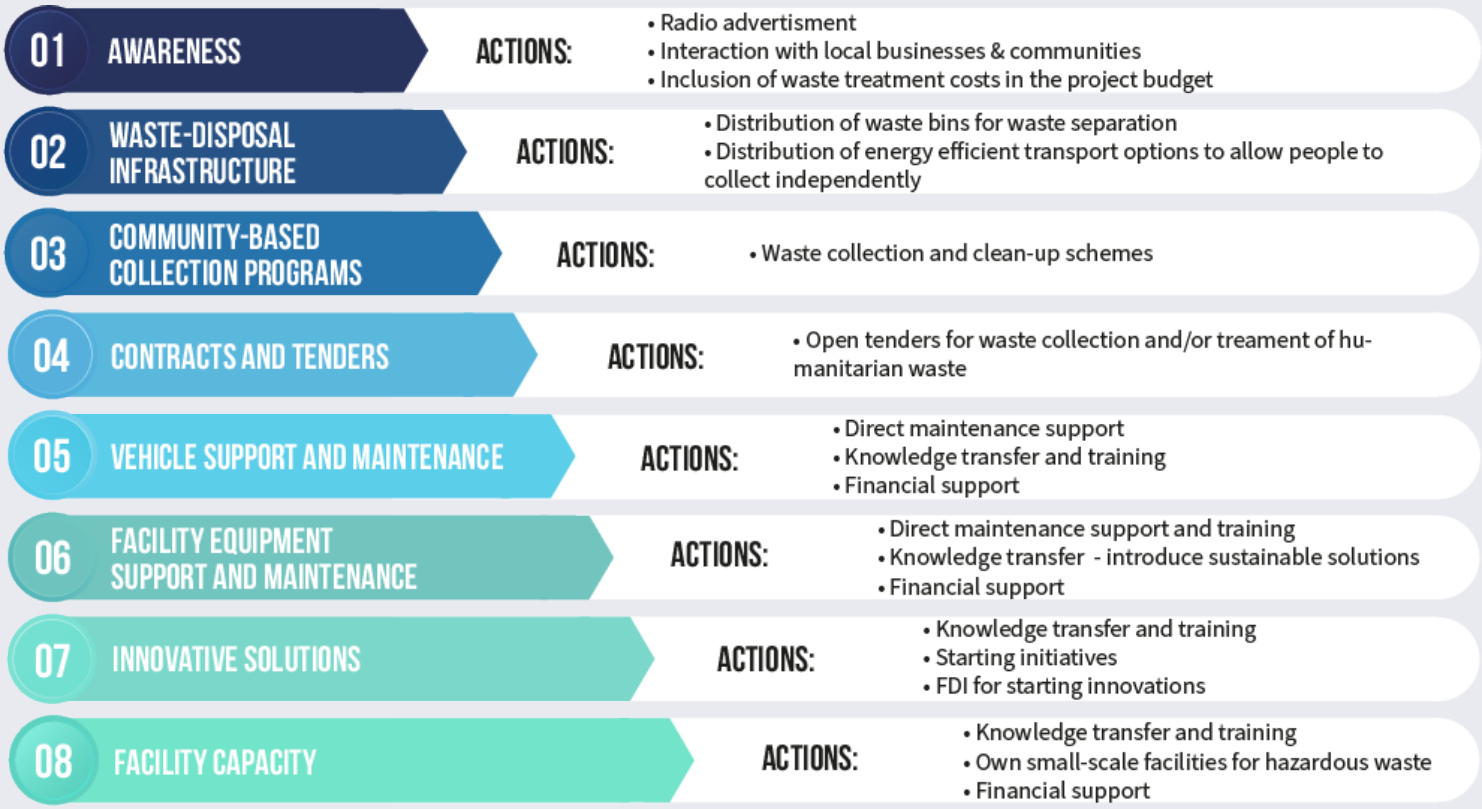
The recommendations this report proposes are based upon the information collected through literature, the survey, and interviews. They are ordered by their relative *ease of implementation* and *impact potential*, which varies across the stages of humanitarian response. To clarify, the ease of implementation is subjective and context-relevant, however, the recommendations are organised in a way that the first few ideas require less capital than the later suggestions, and the implementation of one proposal will empower the next to have as large an impact as possible. They should not be understood as universally linear trajectories of progression, but rather as setting a sustainable foundation for local actors to build upon independently. For a brief summary of the capacity-building recommendations found by this study, see Figure 8.

Financial capital and machine infrastructure are significant blocks to the improvement of SWM in crisis situations. However, the policies overcoming these barriers require sufficient human capital to sustain progression. This means bottom-up support from local

communities is essential, although this needs to be assessed within each project's specific context.

Therefore, at the forefront of these recommendations is the suggestion to replicate this study in other crisis hotspots, first in each country, and then in each region, to ensure the applicability and success of initiatives across a vastly heterogenous social landscape.

Figure 8: Summary of Recommendations



Improving End-of-Life SWM in Crisis Hotspots

Awareness

The first recommendation emphasises the need for **awareness raising initiatives**, which four interviewees regard as a major contributing factor to better SWM. The main issues to raise awareness of are 1) reusing waste rather than throwing it away, 2) separating waste, and 3) waste collection.

Awareness-raising ensures **the impact of other projects diffuses further** across the SWM system, as more people engage with sustainable practices. Particularly important is the separation of biological and non-biological waste, and at a later stage, the separation of non-biological waste into recyclable and non-recyclable (Oxfam, 2008a).

MA1 ran a successful programme through media channels that increased awareness of SWM concerns by using 'buzzwords' (Cornwall, 2007, p. 474) to **destigmatise working in the SWM sector**, especially as a collector. This becomes an opportunity to **elevate informal workers' social status** and chances of earning a formal wage.

Furthermore, awareness and knowledge campaigns on recycling and upcycling methods can support citizens and workers by **introducing upcycling options** that require little capacity, like *Ecobricks* or *fire briquettes* (See Appendix A). Humanitarian organisations supporting this process can also advocate for the inclusion of local firms in this advancement, **helping the emerging private sustainable SWM sector**.

From another angle, NGO1 pointed out that humanitarian actors must be made aware of the problems their waste causes, by making waste treatment obligatory in their project proposals. Moreover, they **must calculate the treatment within their budget** or include financing for setting up local solutions.

Waste Disposal Infrastructure

Suitable infrastructure is key for sufficient, sustainable SWM. The first step of this is providing **waste bins**. MA1 and HA3 both recalled programmes where their organisation distributed bins, to local communities and within refugee camps. Providing bins can become more complex in urban areas, and **evolve with growing requirements**, to eventually provide bins for other items, such as metal and glass, or clothes for charity. Additionally, UNHCR have recorded a successful initiative where they provided tricycles to informal waste collectors, allowing them to cover wider areas, carry more waste, and **increase their flow of income** (UNHCR, 2020).

Community-based Collection Programmes

The livelihoods of crisis-affected people is a key priority for humanitarian organisations. **Supporting community-based SWM programmes** has numerous social and economic spillovers; such as mobilising human capital and establishing a market between the informal and formal sectors. This contributes more towards the recovering, or developing, economy (La Porta & Shleifer, 2014), and is an opportunity for humanitarian organisations to establish and improve labour standards (ILO, 2016).

Recipients benefit as active, autonomous people in these projects. 'Natural entrepreneurs' (Mitchell, 2005, p. 301) among the affected groups have the expertise to provide key support for service delivery, and in return, gain a source of revenue (Oxfam, 2017). Moreover, roles can be integrated into traditional cultural relations, down to the household unit.

Women account for 30% of cash for workers in the Za'atari camp, in Jordan, as **'community mobilisers'** – a crucial role that contributes to the 96% participation rate in the refugee camp (Oxfam, 2017, p. 9). Research indicates that by introducing female-earned income to the household resource pool, expenditure on education, healthcare and food increases, improving future human capital (Alderman et al., 1995)

Interviews highlight engagement with local actors as a best practice and recommendation. As HA1 mentioned a clean-up

initiative on a humanitarian compound that rapidly spilled into the local community, leading to it becoming the **"cleanest place in the province"**, demonstrating the desire of local communities to live in more healthy environments.

Ultimately, community approaches to SWM present a **symbiotic opportunity** for humanitarian organisations and the well-being of local communities.

Contracts and Tenders

By supporting the market for recycled waste, humanitarian action can **stimulate domestic innovation in the sustainability sector**. This will require funding and technical support for state and local agencies. Once a diverse private sector begins to develop, more likely after an emergency than during, innovative enterprise will provide an array of approaches to the sustainable treatment of waste.

Private firms can help fund and improve waste collection, transportation, and treatment mechanisms when state capacity is limited, by purchasing waste through tenders. **Contracts help local waste traders** accumulate raw materials for recycling, and **create formal employment** opportunities by engaging with local contractors, as practised by MA1. Humanitarian actors can optimise this process during crises by shortening the tendering period and lowering the minimum number of candidates. Additionally, by introducing competition among firms, **contractors will be more inclined to innovate and increase capacity**, lessening common issues that arise during crises, such as missed collections.

Vehicle Support and Maintenance

Humanitarian actors should also **prioritise funding the purchasing, repairing, and maintaining of low-emission vehicles for local administrations** (UNEP, 2019; World Bank, 2017). Context-dependent, diversified support is required for establishing a waste collection fleet (UNDP, 2015).

In small, low-populated areas waste may be transported with handcarts, while more sparsely populated regions can be managed with tricycles, therefore allowing decentralised, community-based SWM projects (UNHCR, 2020). More densely populated areas may require a more centralised approach, in order to afford more advanced technologies and equipment to cope with the extra waste (Oxfam, 2008b).

The humanitarian sector can **provide knowledge and support** for local communities in purchasing and inspecting their vehicles (GIZ, 2014), however the long-run aim should be to **empower local communities** to be able to sustain maintenance and safety checks independently.

The bottom line is transportation methods should be as **simple and cheap** as possible (Oxfam, 2008b). This includes the planning of waste collection to make routes as time- and cost-efficient as possible (GIZ, 2014).

Organisations can also host hackathons to **promote innovation**, creating new solutions to problems across the SWM system. In Iraq, a regional hackathon in 2019 was won by a team who created an integrated recycling solution that connects citizens to recycling plants, via freelance drivers receiving Careem credit (Re:Coded Team, 2019).

Lastly, to ensure transparency around how waste is managed once collected, NGO1 recommends establishing a **monitoring programme of collection vehicles** through GPS.

Equipment Support and Maintenance

Supporting existing SWM infrastructure and equipment can be labelled **status-quo enhancement**, and applies to several processes - a couple are listed below.

First, this can focus on **improving the current shortcomings of fencing around landfills**, to limit the access of unauthorised personnel (UNDP, 2015). Without proper fencing, there is a safety

hazard for both those entering, and those who may suffer from the negative externalities of the unmonitored dumping of waste.

Second, literature and interviews revealed that SWM systems tend to break down due to poor maintenance of equipment, as a result of a lack of knowledge or funding. Hence, approaches to breakdowns should **directly support the maintenance of broken machinery**, as pointed out by MA1, and **indirectly help the system through knowledge transfer** on maintenance and systems of improvement, such as leachate management. **By funding training courses** that increase the capacity and capability of local communities to maintain equipment, there is a greater incentive to create permanent formal employment opportunities.

Innovative Solutions

Although hosting hackathon events may discover widely applicable solutions to issues in SWM, there may also be a delay in the endogenous development of sustainable SWM practices. However, humanitarian actors can help by introducing innovative ideas from outside the affected region to accelerate this process.

This can be accomplished with **foreign direct investments (FDIs)**, or by **establishing an initiative** within the country. An exemplar suggestion could be recommended in connection with MA1's experience, who mentioned that single-use plastics carry the most implications due to the difficulty of recycling the material. Literature research uncovered a firm in Kenya, Gjenge Makers, who process single-use plastic and sand to make paving bricks (Gjenge Makers, (n.d.). **Financing the start-up** of such an initiative **introduces a new method** to treat otherwise unmanageable waste in Iraq, and also cuts the greenhouse gas emissions produced by plastic waste trade.

Facility Capacity

As mentioned, the **lack of financial capital to transform dumpsites into sustainable solutions is an inherent barrier** to enhanced SWM (GIZ, 2014). This is indicated in Iraq by MA1, who had their overall budget cut by 75% since 2012/13 due to the economic crisis, despite

the increased volume of waste to manage as a result of more IDPs and refugees in their region. Interviews revealed that in Yemen, even 'controlled landfills' have fallen into disrepair, becoming more akin to dumpsites.

Building entirely new facilities is capital intensive, so a more affordable solution may be **improving and expanding current facilities**. This includes providing new machinery and systems, such as leachate management or an incinerator, that will **make the dumpsites more sanitary and profitable**. In the Za'atari camp, Oxfam provided the camp's recycling centre with a shredder, which increased the value of the waste they sold to local firms by 50% (Oxfam, 2017). This type of **decentralised waste processing empowers community-based programmes** by generating more income, further encouraging more efficient waste collection and innovation. However, given the expense of this, and need for demand, this should be considered during resilience and recovery responses, rather than during emergencies.

An alternative approach to making waste disposal sites more sanitary has been developed by NGO1, through their **mobile hazardous waste treatment vehicles**. They view this project as a success, and due to the relatively low initial costs of procuring equipment and training operators for one week, they have commented on the possibility of **upscaling** this initiative in other crisis contexts. This could be especially impactful in Yemen, where an acute shortage of resources to safely treat hazardous waste led to it being dumped alongside other waste (GIZ, 2014).

See Figure 9 for a representation of the recommendations.

Figure 9: Summary of Recommendations to Improve End-of Life WM

The Humanitarian Supply Chain

The need for change earlier in the supply chain has been repeated throughout the survey, interview responses, and within this report. The capacities of countries experiencing crises to sustainably handle end-of-life SWM are inherently unpredictable. To ensure the negative externalities experienced by local communities are minimised, humanitarian assistance practices in earlier stages of the supply chain have to be adopted.

Greening the Supply Chain

To **'green the supply chain'** (USAID, 2020), the humanitarian sector needs to identify and assess sustainable materials, cooperate with suppliers to standardise packaging, and promote recycling and reuse within the host country. This refers to three major approaches that humanitarian actors need to enact in this process, namely 1) **adapting of packaging materials** to local communities' ability to manage sustainably, 2) **mitigating the impacts of packaging** wherever possible, and 3) the **cooperation with other actors** to implement and reinforce these changes.

As presented, some materials are harder to manage sustainably than others. Consequently, **changing the packaging material and reducing the amount of packaging** earlier in the supply chain needs to be seriously considered (Table 13). The next section on 'Packaging' presents several recommendations for how to improve PWM.

Targeting these proposals during the procurement and distribution stages promises effective results. Besides the general reduction of packaging, CTPs could be an effective solution in certain circumstances, which will be elaborated further.

Lastly, cooperation was identified by several interviewees as a major challenge and recommendation. Collective action can increase the positive effect of any mitigation or adaptation strategy considerably and speed up its implementation. An overview of this idea will be provided in the last part of this report.

Packaging

In terms of the material composition of packaging, the study indicated the following recommendations for Yemen and Iraq. This might be transferable to many crisis situations but needs to be assessed within each crisis context.

Table 13: Recommendations on Packaging Materials

Packaging	Current Situation	Proposed recommendation
Cardboard	Mostly burned by recipients	1. Reduce ink to reduce health and environmental impact 2. Encourage upcycling awareness
Single-Use Plastic	No treatment facilities / capacity available	1. Introduction of innovative solutions like Gjenge Makers 2. Shift to biodegradable alternatives
Multi-Use Plastic	Recycling nearly impossible	1. Awareness & knowledge campaign on reuse and upcycling possibilities 2. Reduction where possible
Multi-material wrappers	Recycling nearly impossible	1. Support implementation of mechanical and feedstock recycling 2. Shift to biodegradable alternatives
Polypropylene	Recycling needs advanced technology	1. Support implementation of thermal decomposition 2. Shift to biodegradable alternatives

Evidently, there are limited environmentally friendly solutions to manage plastic packaging. Whilst incineration plants may be the best method of reducing PW, it destroys resources and requires large amounts of energy. Reducing the amount of packaging, or shifting to biodegradable or reusable alternatives for packaging are preferred.

Cash Transfer Programmes

Alternatively, switching from in-kind relief to CTP **minimises the waste produced**, by 1) allowing affected people to tailor their purchases to their needs, which NGO1 suggested would undermine the black market for in-kind commodities that often appears during crises and 2) reducing the amount of packaging used in humanitarian assistance. CTP **decreases transportation costs** and involves fewer intermediaries, enhancing the efficiency of relief provision. By reducing the costs of delivery, humanitarian agencies are able to use finances to support other operations, such as infrastructural development.

The effects of CTPs **spill over into multiple dimensions of the local community**; invigorating market activity, supporting local markets and formal employment opportunities, and contributing to economic growth. However, there are limitations on the success of CTPs. When market supply chains are likely to be disrupted in crises and countries face high price volatility, in-kind distribution ensures that people receive the necessary commodities, regardless of the fact whether the market can provide such goods. Moreover, CTP may also cause inflationary pressures on commodity prices within isolated markets due to an increase in the money supply. To counteract such inflationary pressures, NGO1 explained that they implemented price controls within refugee camp markets to decrease the threat of monopolistic price-setting. This indicates that CTPs may be more suitable in the recovery phase than during the emergency, while in-kind may be suitable during the onset of crisis. Another concern is that locally purchased items may still have packaging, but be of lower quality, and more likely to end up in the waste stream more frequently, requiring further replacements (UNHCR, 2020).

Coordinating Efforts across the Humanitarian Community

While most of the recommendations in this report are fairly practical, coordinating efforts across crises responded to by humanitarian organisations will be difficult, requiring sustained collective action, which relates back to Ostrom's (1990) 5th game. To manage this

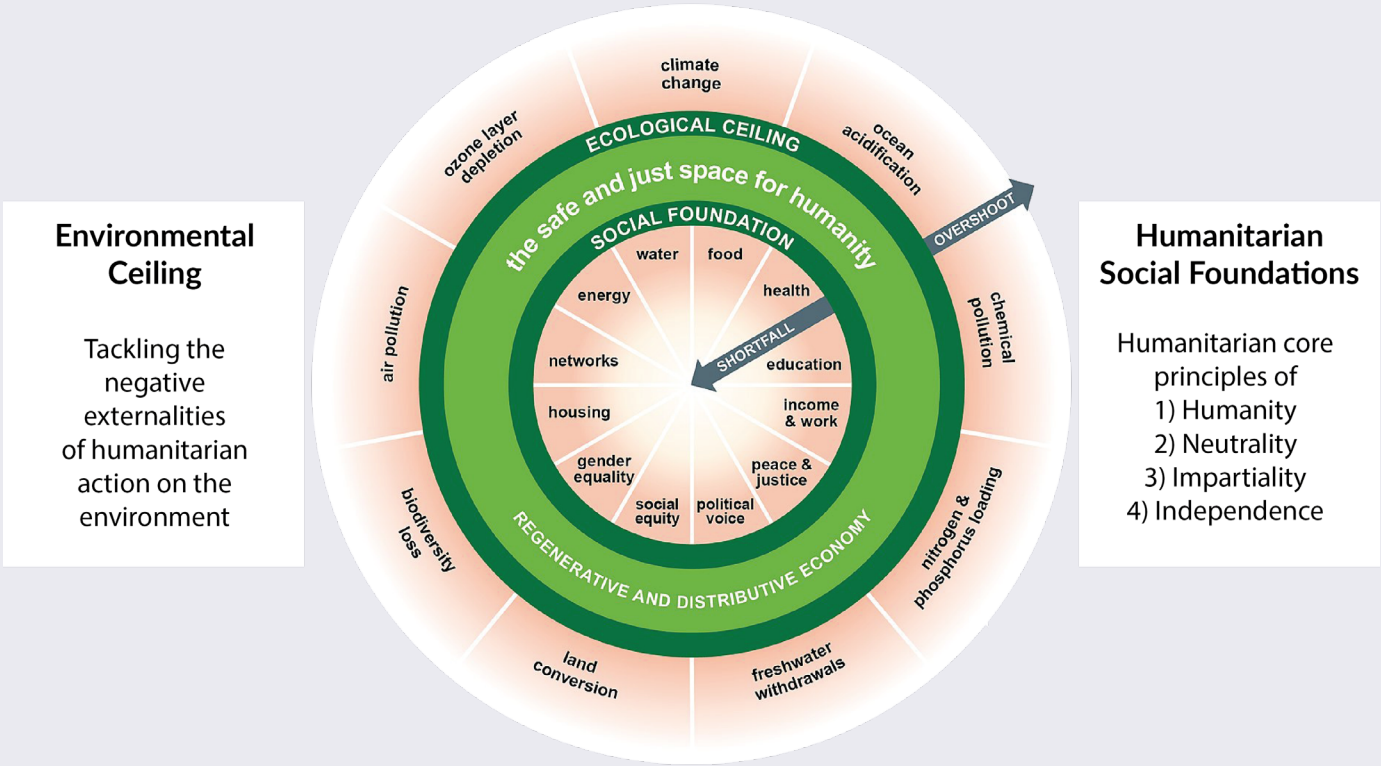
vast coordination, this report's final suggestion is a collaborative treaty, that is based upon the idea of a humanitarian doughnut model (see Figure 10).

The Humanitarian Doughnut Model

The concept of the humanitarian doughnut is founded upon ideas established by Kate Raworth (2017) in *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*, where she incorporates elements of capability and vulnerability into Rockström et al.'s (2009) planetary boundary. Inspired by the sustainable development goals, she accounts for the environment while adding twelve social foundations, to ensure that people do not fall short of life essentials. This dual approach aims to tackle poverty within the earth's environmental boundaries.

This study proposes the adoption of the 'Humanitarian Doughnut' as a guiding principle for humanitarian action. To make humanitarian action become entirely socially and environmentally sustainable,

Figure 10: The 'Humanitarian' Doughnut

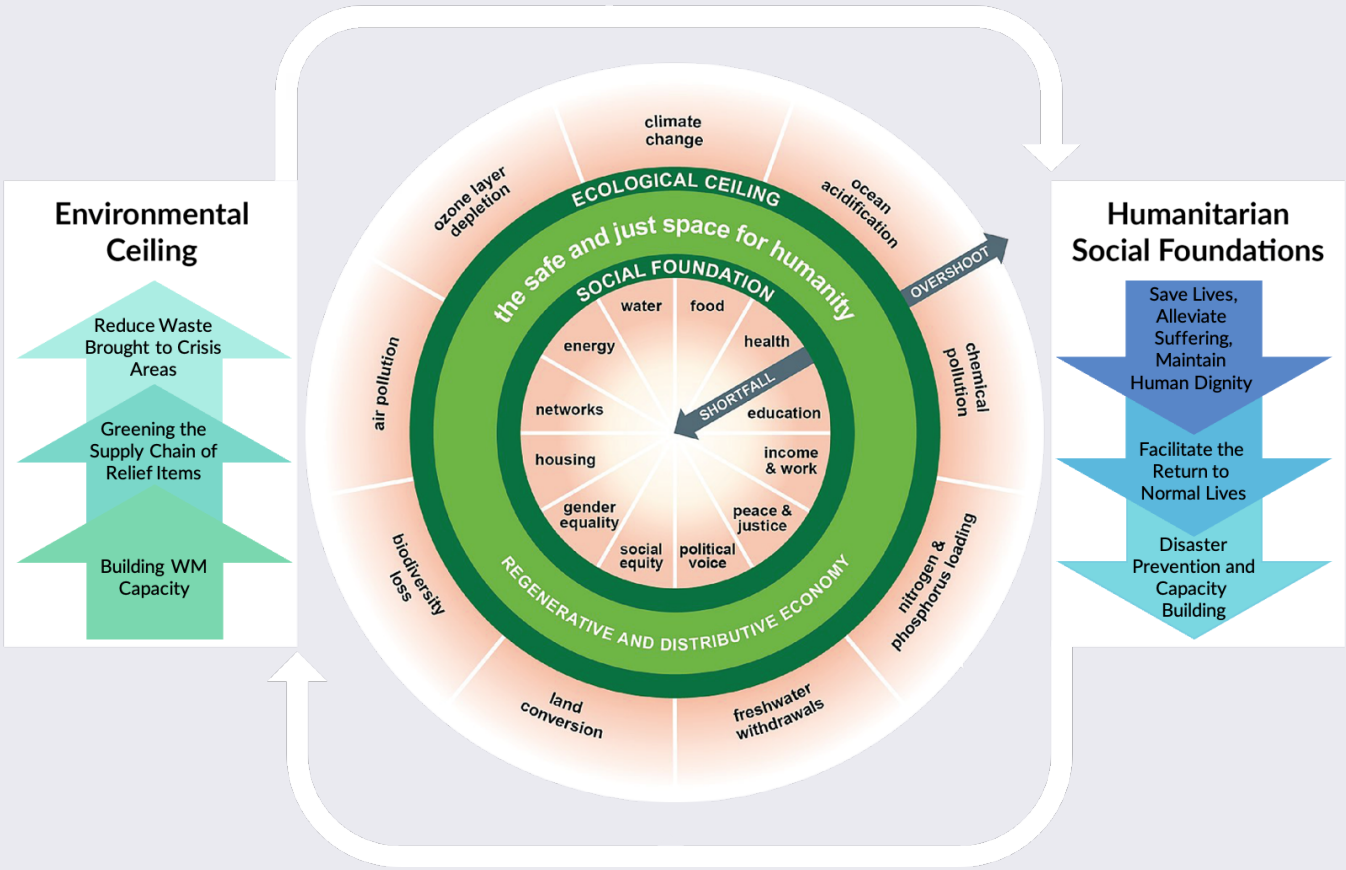


Source: (Raworth, 2017) - modified

vulnerable groups need to be able to meet their *just and social foundations*, while assistance provision should not threaten the ecological limits of the planet.

Figure 11 demonstrates how humanitarian actors could apply these ideas to the PW problem in crisis situations.

Figure 11: A Doughnut Model of Humanitarian Action and Waste Reduction



Source: (Raworth, 2017) - modified

Collaborative Treaty

The rationale of the humanitarian doughnut can form the basis for the understanding and adoption of a collaborative treaty among humanitarian actors, that encourages them to commit to the reduction of the negative externalities associated with their PW. The potential for such an agreement was revealed by USAID's scoping study (2020), and further demonstrated by every interview participant showing eagerness to engage in such a treaty. This will

ensure continued commitment to solving the PW issue, and provide another basis for horizontal coordination among humanitarian organisations, to maintain the standard of assistance being delivered (Obrecht & Bourne, 2018), and complement the implementation of ideas from other sustainability programmes, such as the Sphere Humanitarian Charter and Minimum Standards in Humanitarian Response (Sphere Association, 2018), or the IFRC's Climate and Environment Charter for Humanitarian Organisations (IFRC, 2021).

Actors could commit to a goal in reducing the negative externalities of PW - across environmental, health, and social dimensions - such as to reduce or totally ban their organisation's use of single-use plastic (UN System Chief Executives Board for Coordination, 2019). To achieve this, actors need to 1) collect data on PW, 2) reduce PW, and 3) substitute current packaging for sustainable alternatives. The treaty will encourage enhanced coordination, collective action, information sharing, and enable monitoring, accountability and enforcement mechanisms, as indicated in Ostrom's (1990) theory. By acting as a collective, the humanitarian sector will be able to implement policies, such as switching to sustainable alternative materials, more rapidly than by acting as individual organisations, due to the common line in negotiations and cooperation with suppliers and intermediaries.

The codified commitment towards sustainable innovation could lead to positive spillovers across the humanitarian supply chain. It allows humanitarian actors to act as one entity to encourage cooperation with donors and deepen the relationship with the private sector, whilst having greater bargaining power and one uniting goal in negotiations. Furthermore, the reduction of health and environmental problems in recipient countries, as well as the potential increase of formal employment opportunities for local communities, can lead to increased attractiveness to donors (NGO1).

5 Conclusion

This study has approached the PW issue experienced in humanitarian crises, recognising the key problems and challenges obstructing solutions, and provides recommendations to address these barriers. The need for local capacity development is essential as a long-term solution, and is beneficial to all the stakeholders in a crisis. Through this development, organisations are able to tackle problems in PWM within their specific context.

Recommendations based on the information gathered through the survey and interviews considered both the capabilities of stakeholders, and the gradual development of local and state capacity to handle PW sustainably. By increasing public awareness, enhancing small-scale infrastructure, and supporting community-based programmes, the local market is encouraged to engage in tenders, and prioritise the maintenance of productive capital. Growing demand stimulates economic growth and local innovation, which humanitarian organisations can support, or if there are barriers, introduce innovative solutions from elsewhere. The last, and most resource-intensive, recommendation is supporting the expansion of existing facilities, or construction of larger treatment facilities, that practise sanitary, sustainable SWM.

Outside the end-of-life remit of this report, however, interviewees were certain that the most impactful changes could happen earlier in the humanitarian supply chain. This would involve the changing of packaging materials, during packaging design or the procurement of commodities, in order to 'green the supply chain', or switching from in-kind relief, to CTPs.

In order to coordinate the humanitarian effort across these recommendations, a collaborative treaty, rooted in the logic of

Ostrom's 5th game, would tie actors into committing to reduce the negative externalities of PW on crisis-affected countries, and could be designed through the concept of the humanitarian doughnut. Connected to this, is the need to conduct studies similar to this report in other crisis hotspots, with the hope of identifying more solutions to the SWM problems faced by stakeholders. These attempts would benefit from more extensive field research, to generate more in-depth, context dependent insights.

Ultimately, there are two limiting factors on the progress toward the goal of making SWM in crisis settings more sustainable. First, the unpredictable nature of humanitarian crises means PWM is not a priority. And second, there is no singular panacea to SWM, particularly in the sectoral and diverse environments of humanitarian crises. However, eliminating the PW problem through productive, communal solutions will lead to crisis-affected people experiencing improved well-being, enhanced social capital, and increased capacity, to continue to recover independently (Ostrom, 2000).

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Appendix

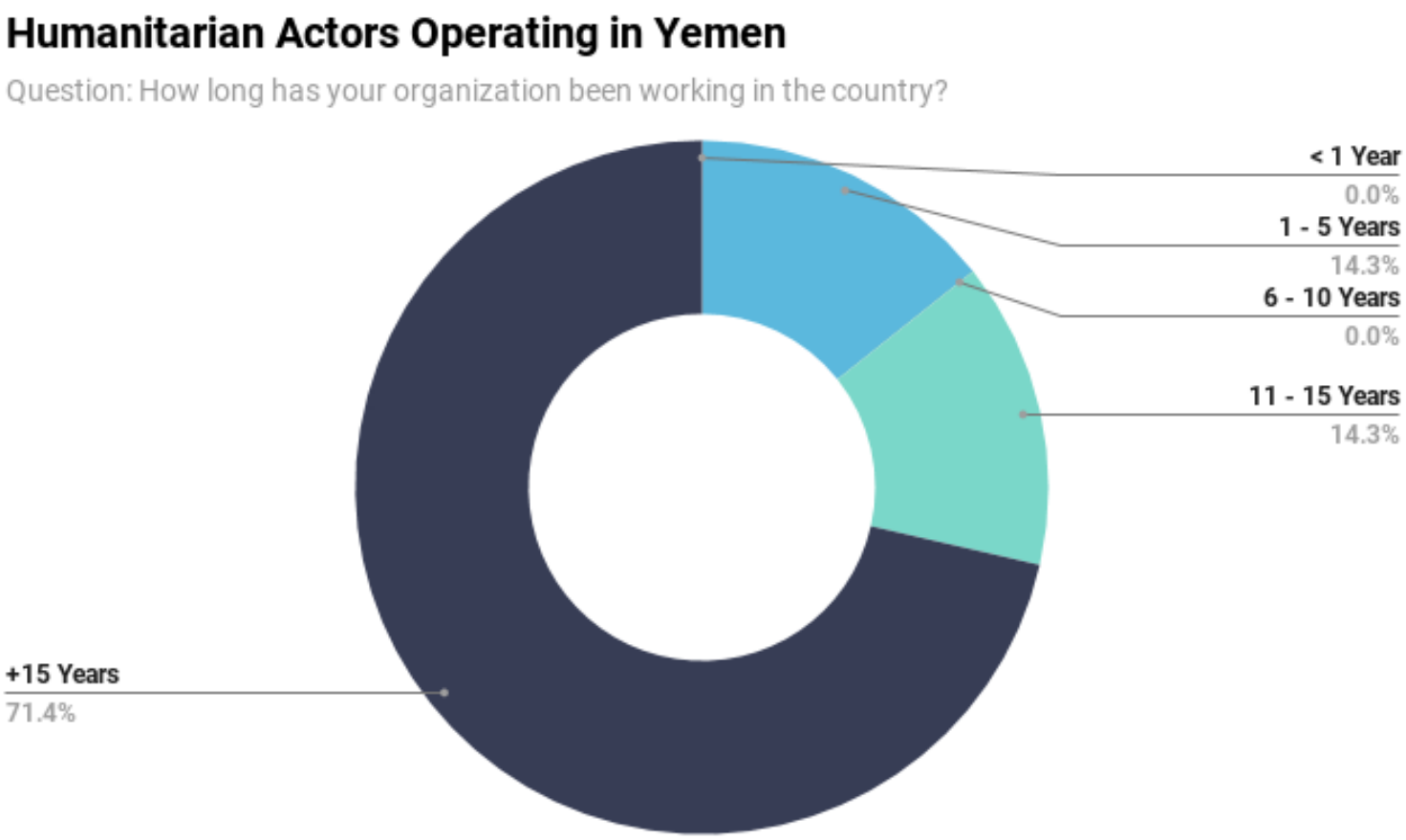
List of Appendices

Appendix A: Treatment Solutions for Different Types of Waste Generated by Humanitarian Assistance

Type of Waste	Treatment Solutions	Result of Treatment	Capacity Needed for Treatment	Management Type
		Single-Use Plastic		
Plastic bottles	Upcycling – through crafting (NGO3 interview)	Toys, clubs, decoration	Very Low	Local – Decentralised, Circular Economy
Plastic bottles and single-use plastic	Upcycling – by turning bottles into "Ecobricks" (Ecobricks, n.d.)	Construction block for low-cost housing, Construction of furniture	Low	Circular Economy, Zero Waste
Single-use plastic waste	Selling to local recycling companies (Oxfam, 2017; World Vision, 2019)	Income, Recycled goods	Low (one-off cost for facilities, ongoing CfW costs)	Local – Decentralised, Circular Economy, CfW
All types of plastic	Upcycle plastic by shredding and turning into "pavement bricks" (Gjenge Makers, n.d.)	Construction block for pavements	Medium (need for processing facility and labour)	Zero Waste, Circular Economy, Local Companies, Start-Ups, CfW
All types of plastic	Turn plastic into 3D printing material (The New Raw, n.d.)	3D printable items (Benches, tools etc.)	Medium (one-off cost for the printer, ongoing cost for turning waste into printing mass)	Circular Economy, CfW
		Durable Multi-Use Plastic		
High-density polyethylene (Jerry Cans)	Upcycle into Collapsible Water Container (UNICEF, n.d.)	Water Carrier	Very Low	Local – Decentralised, Circular Economy
High-density polyethylene (Jerry Cans)	Upcycle into urinals (Khanna, 2020)	Urinals	Low	Local – Decentralised, Liquid Waste Management
		Mixed Material Plastic		
Any mixed material plastic	Upcycle into concrete (MacRebur, 2021)	Pavement, Roads, Foundation for Buildings	Medium to High (facilities for rendering waste into concrete)	Circular Economy, Start-Ups, PPP
		Polypropylene		
High-density polyethylene, low-density polyethylene, polystyrene and polypropylene plastics	Upcycling through AT based thermal decomposition (DeNeve et al., 2017)	Fuel	Low "affordable for low-income countries" (p. 122)	Local – Decentralised, Circular Economy

Type of Waste	Treatment Solutions	Result of Treatment	Capacity Needed for Treatment	Management Type
		Multi-Material Wrappers		
Wrappers of humanitarian goods	Feedstock recycling, Mechanical recycling (grinding, re-granulating, compounding) (Sustainable Packaging Coalition, n.d.)	Energy generation, Virgin Feedstock and variety of other goods (such as plastics, chemicals, intermediates and fuels)	Medium to High (required capacity development and knowledge training)	Circular Economy, Local Companies, Start-Ups, (capital intensive)
Wrappers of humanitarian goods	Remove packaging in country of origin before bringing to recipient country, if SWM system is sufficient (NGO3 interview)	Reduction of amount of PW brought to humanitarian crisis	Very Low (only feasible when importing from country with good SWM and when wrappers not needed)	Centralised Guidelines (changes in earlier process stages)
		Cardboard		
Cardboard	Return for cash/food in camps (NGO1 interview)	Material	Low	Circular Economy, CfW (incentives in camps)
Cardboard	Upcycling (WFP, 2018; Regattieri et al., 2018)	Furniture, Toys, Backpack, Cradle, Slippers, Stools	Low	Local – Decentralised, Circular Economy
Cardboard	Upcycling (HA1 interview; HA2 interview)	Fire briquettes (for heating/cooking)	Low	Local – Decentralised, Capacity Approach
		Metals		
All types of metals, solid waste from camps	Disposal of materials for cash/work, turn into assets (NGO1 interview)	Primary metal assets	Low	Circular Economy, Zero Waste
		Hazardous Waste		
Medical waste	High pressure and steam to sterilize hazard (NGO1 interview)	Non-hazardous waste	Low to Medium (one-off costs for waste truck, then labour costs)	Circular Economy, NGOs, Local Companies (reducing hazard)
Notes:	This table depicts only a few of the many possible upcycling and recycling possibilities for waste generated by humanitarian packaging			

Appendix B: Years of Operation in Yemen

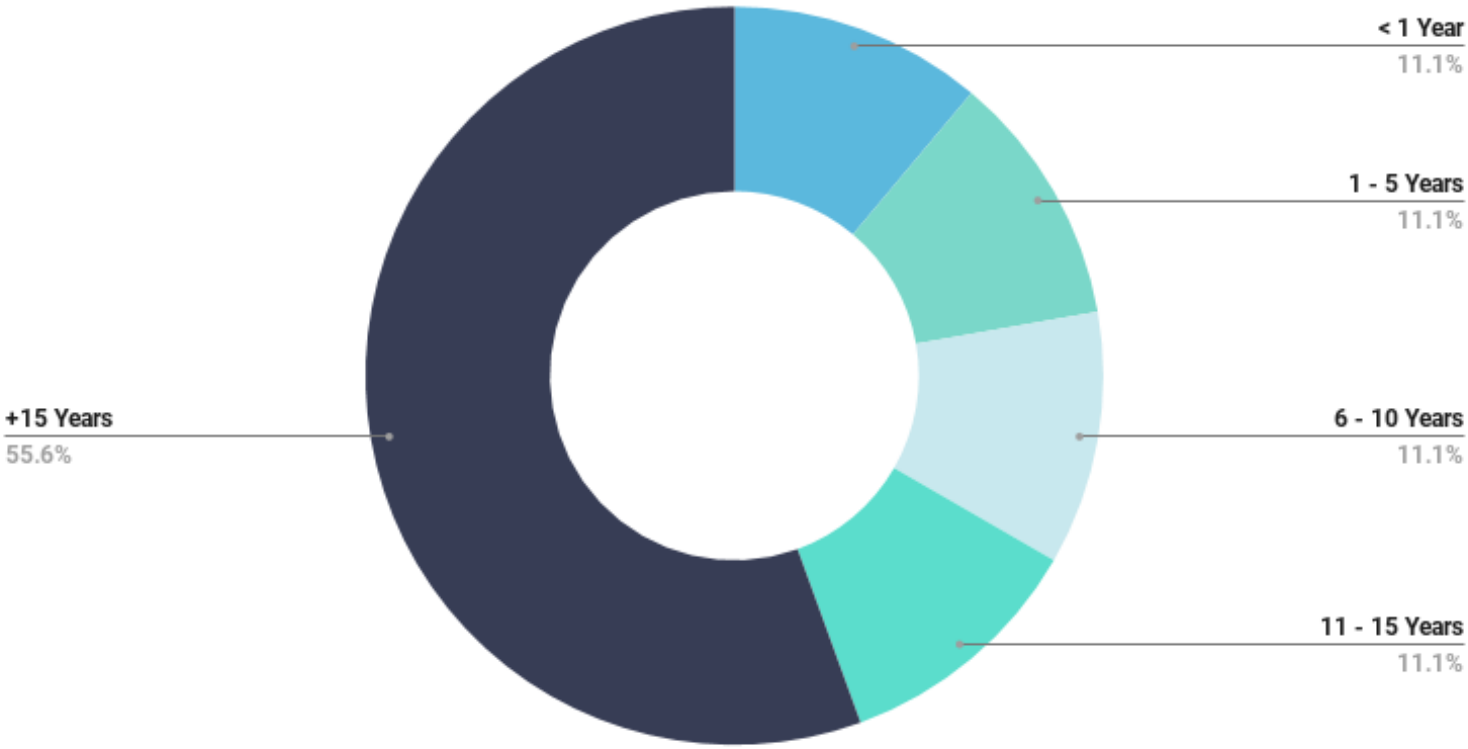


Source: Survey

Appendix C: Years of Operation Iraq

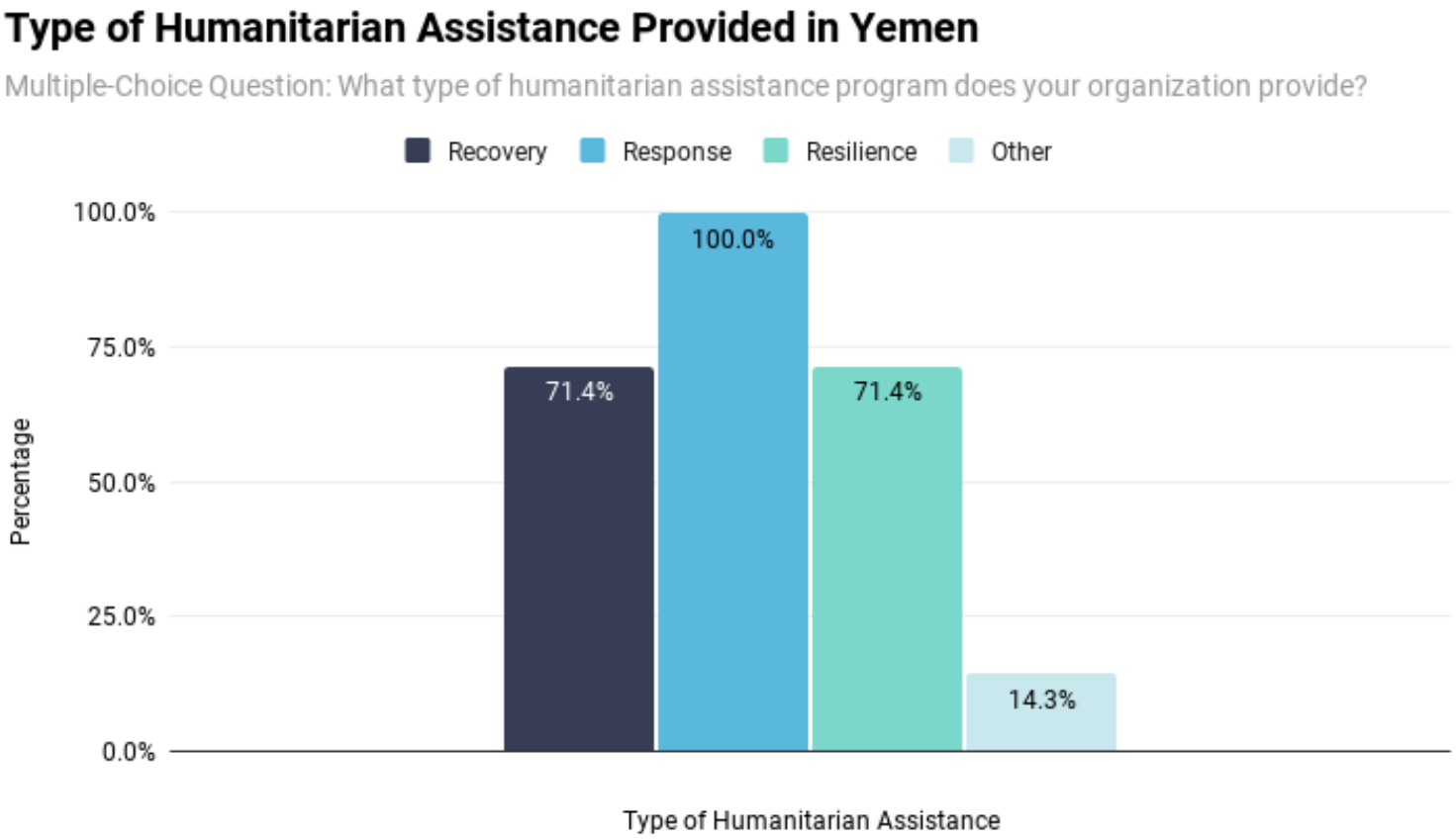
Humanitarian Actors Operating in Iraq

Question: How long has your organization been working in the country?



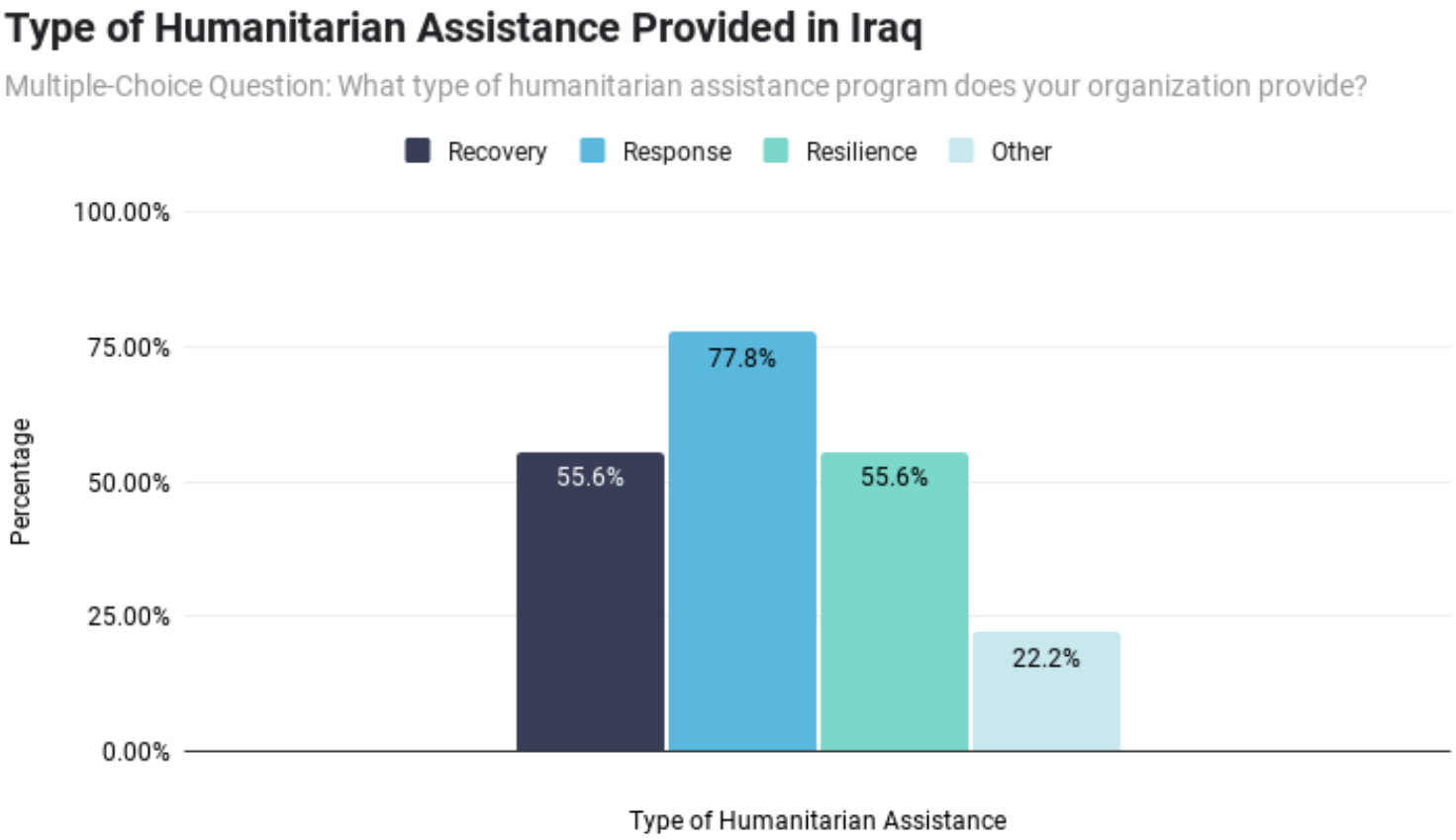
Source: Survey

Appendix D: Types of Humanitarian Assistance in Yemen



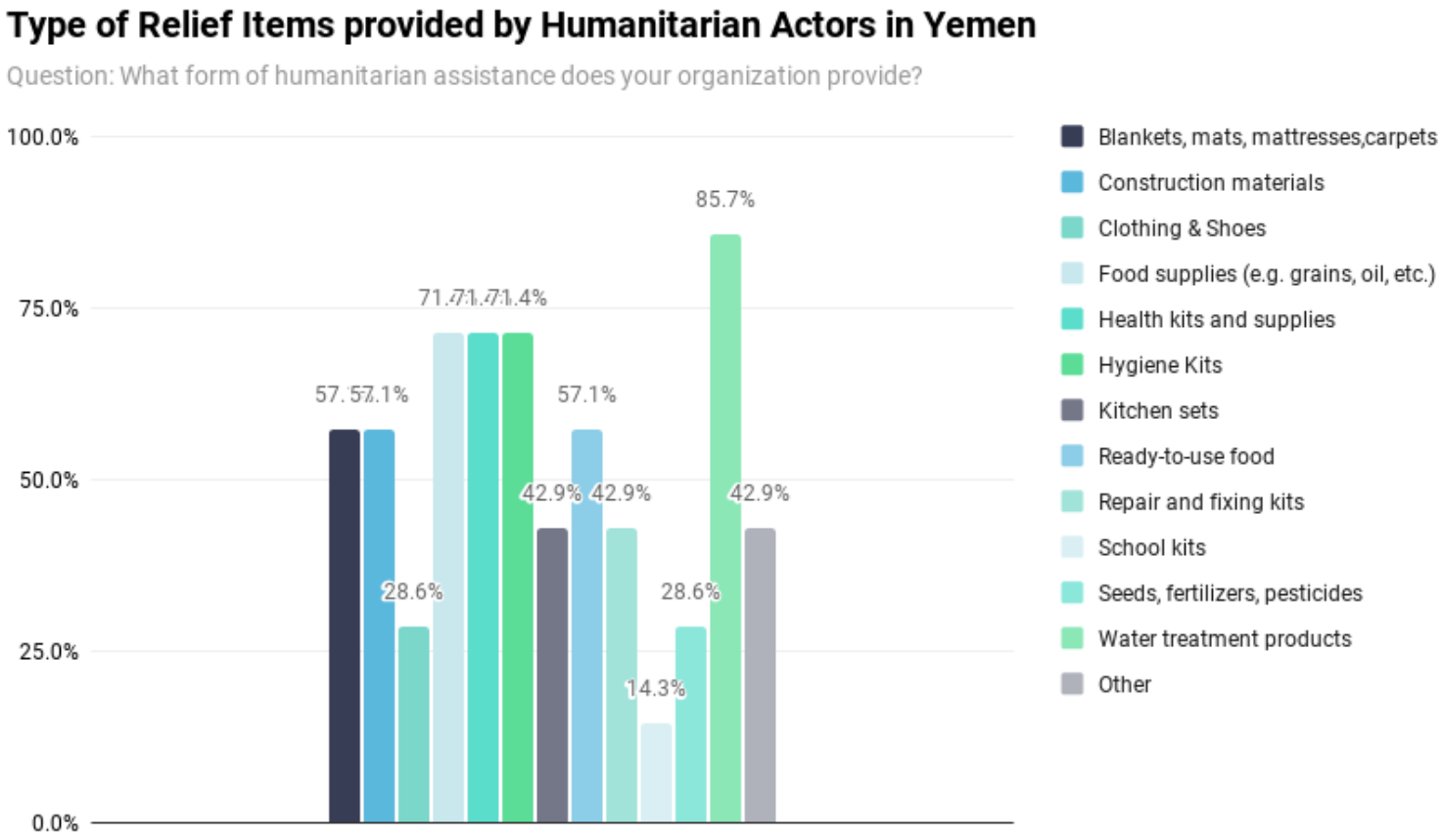
Source: Survey

Appendix E: Types of Humanitarian Assistance in Iraq



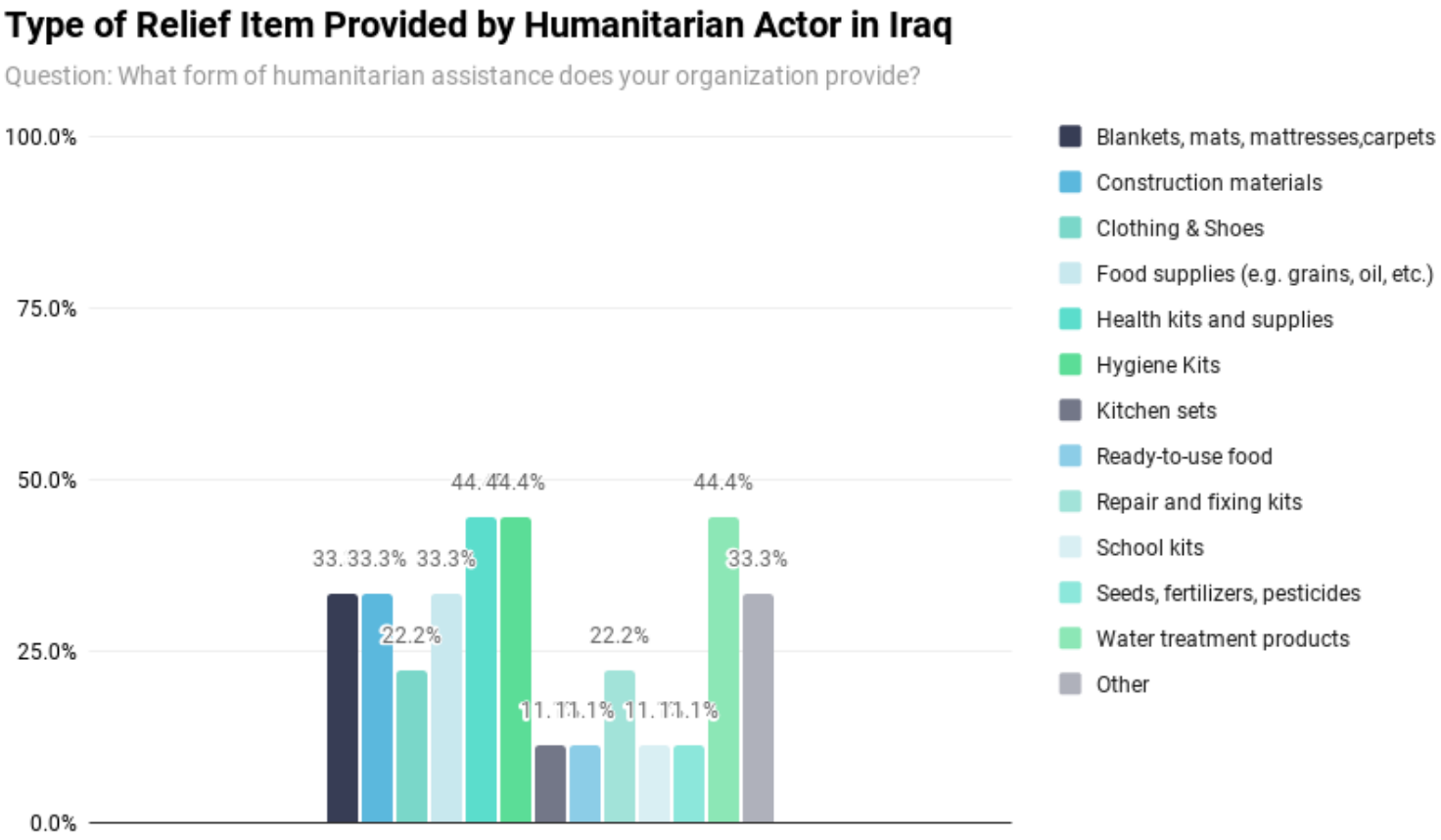
Source: Survey

Appendix F: Types of Relief Items in Yemen



Source: Survey

Appendix G: Types of Relief Items in Iraq



Source: Survey

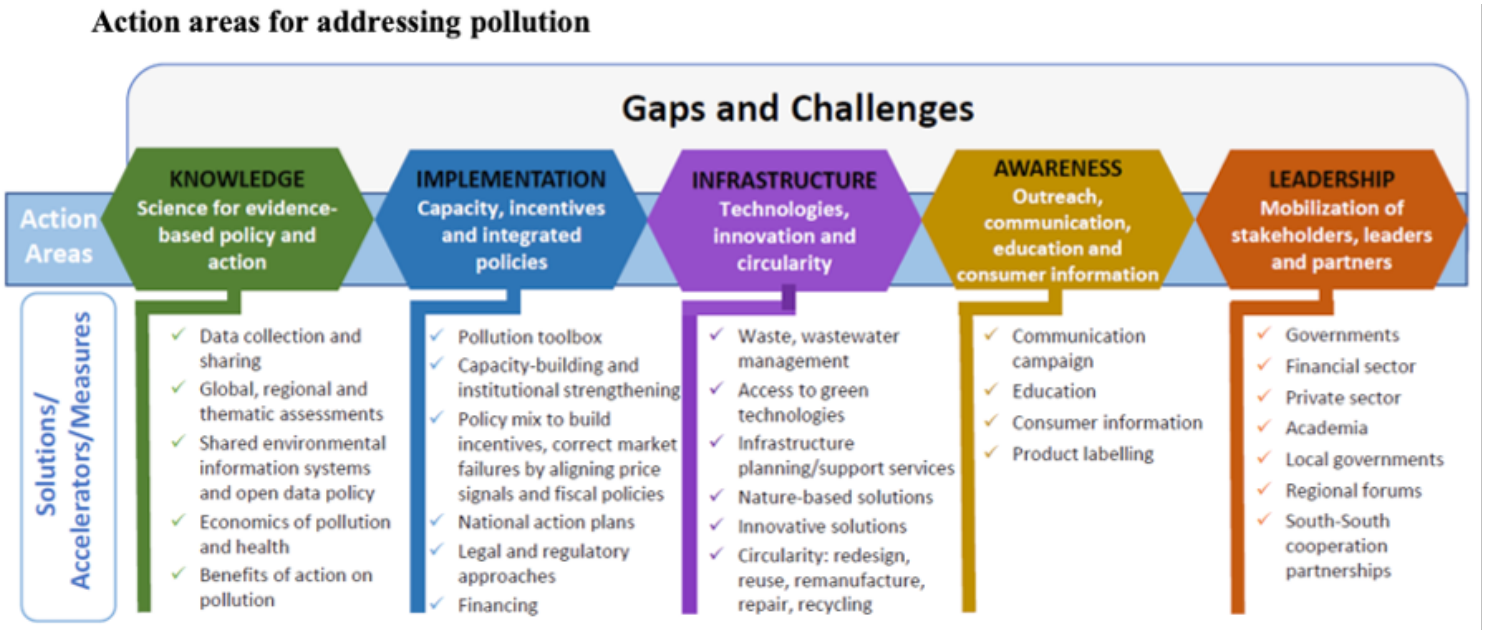
Appendix H: Engagement with Local Actors

Engagement with Local Partners

Question: Do you engage with local partners to manage waste (e.g. promote recycling / composting of

Source: Survey

Appendix I: Towards A Pollution-Free Planet



Source: 'Implementation plan "Towards a Pollution-Free Planet"' (UNEP, 2018, p.14)

Appendix J: Terms of Reference

Terms of References

Project: 'Waste not, Want not'

This consultancy project seeks to recommend ways of minimising the impact of packaging waste generated by the delivery of humanitarian assistance in crisis hotspots, namely Yemen and Iraq, in order to improve the sustainability of these operations.

The consulting team at LSE will agree with its clients Emilia Wahlstrom and Amanda George — representatives of UNEP & UNOCHA — on the following Terms of Reference to carry out a study on Solid Waste Management in Yemen and Iraq.

Vision Statement

Finding sustainable solutions to managing humanitarian packaging waste in crisis hotspots.

I. Background:

The UNEP/OCHA Joint Environment Unit is the United Nations entity tasked with addressing the environmental dimensions of emergencies and plays an important role in harnessing knowledge and guidance aimed at strengthening the environmental sustainability of humanitarian action. The Joint Initiative is a multi-stakeholder initiative aimed at linking environmental and humanitarian objectives.

An increasing number of people need humanitarian assistance and solid waste management is a rising development challenge which remains underfunded and insufficiently addressed. The waste management issue has only been amplified by the COVID-19 crisis. Humanitarian stakeholders are recognising the negative impacts stemming from poorly managed humanitarian commodity supply chains, and specifically the impacts associated with plastic waste. In 2020, USAID, in collaboration with humanitarian assistance stakeholders, conducted a scoping study, outlining how packaging waste is being addressed in humanitarian relief. The study found that there is great momentum in the sector and multiple initiatives aiming to manage and reduce

waste (notably in an environment where many countries are imposing plastic import bans). However, there are still limited known waste management options and little systematic engagement by humanitarian actors with private sector and municipal/ national waste management actors.

Arising questions:

- How can packaging waste, generated by humanitarian assistance, be sustainably managed in crisis hotspots?
- What schemes exist in crisis hotspots to manage humanitarian packaging waste?
- What good practices exist, and which recommendations can be made based on this specific crisis context?

II. Objectives

1. Assessment of how humanitarian packaging waste is currently handled in operations in Iraq and Yemen
2. Assessment of needs of humanitarian actors for SWM in operations in Iraq and/ or Yemen
3. Identifying existing waste management systems and analyse how packaging waste could be better handled in future in operations in Iraq and/or Yemen
    a. Highlight best practices, identify opportunities for improvements to improve packaging waste management through existing schemes and infrastructure
    b. Policy recommendations for humanitarian actors

IV. Methodology

The team will carry out two different types of research:

1. Desk-based research: The team will independently review literature of current solid waste management practices in humanitarian contexts.
2. Interviews and survey: The team will independently carry a survey and interviews primarily with humanitarian actors and NGOs, engaged in SWM in Iraq and Yemen. If feasible it will also interview humanitarian organisations and government representatives.
    - Part 1: Standardised surveys
    - Part 2: Stakeholder and project adjusted interviews

The client will help support the team's research, by suggesting sources of data and potential contacts, when necessary.

V. Final product

The team will provide these outputs:

1. Indicate the types of waste being bought into Iraq and Yemen as humanitarian commodity relief packaging
2. Initial assessment of Iraq and Yemen's capacity to manage humanitarian packaging waste
3. Recommendations for humanitarian actors to address and reduce the negative impact of humanitarian packaging waste

VI. Timeline & Milestones

The client and the consulting team agree on communication on regular meetings over the course of the project, following the course of different steps:

November:

- Introductory research
- Inception presentation
- Design standardised survey

December:

- Start sending out surveys
- Scheduling interviews

January:

- Scheduling and conducting interviews
- First survey analysis

February:

- Conduct interviews
- First interview analysis
- Finalise survey analysis
- Submit first draft of final report

March:

- Finalise interview analysis
- Editing and finalising of report
- Interim presentation
- Final report submission: 26th March 2021
- Final presentation: 29th March 2021

Appendix K: Survey Questions

Project Introduction & Survey Instructions

An increasing number of people need humanitarian assistance and solid waste management (SWM) is a rising development challenge. However, SWM remains underfunded and insufficiently addressed. In 2020, Sustainability In Humanitarian Supply Chains: A Preliminary Scoping of Improvements In Packaging—a multi-partner scoping study on humanitarian packaging waste management—found that there is great momentum in the sector and multiple initiatives aiming to manage and reduce waste. However, there are still limited known waste management options and little systematic engagement by humanitarian actors with the private sector and municipal/ national waste management actors. This LSE study is conducted for the UNEP/OCHA Joint Environment Unit and the Joint Initiative on Sustainable Humanitarian Assistance Packaging Waste Management and aims to support humanitarian actors to adopt an environmentally sustainable packaging strategic and operational approach at all stages of their operations, minimizing negative impacts on recipients of assistance.

This survey will take 8-12 minutes to complete.

Any type of personal information (i.e. the name, the position and the organization) will be anonymized and used for statistical purposes only.

Email address: _____
What organisation do you work for? _____
What position do you hold in the organisation? _____

1. Do you give permission for your answers to be used in this research?

[ ] Yes [ ] No

2. Which of the following countries does your organization operate in?

[ ] Yemen
[ ] Iraq
[ ] Both

3. How long has your organization been working in the country?

Yemen [ ] < 1 year
[ ] 1 - 5 years
[ ] 6 - 10 years

[ ] 11 - 15 years
[ ] > 15 Years

Iraq [ ] < 1 year
[ ] 1 - 5 years
[ ] 6 - 10 years
[ ] 11 - 15 years
[ ] > 15 Years

4. What type of humanitarian assistance program does your organization operate in the area? Please select all appropriate answers.

Yemen [ ] Response
[ ] Recovery
[ ] Resilience
[ ] Other (Please specify): _____

Iraq [ ] Response
[ ] Recovery
[ ] Resilience
[ ] Other (Please specify): _____

5. What form of humanitarian assistance does your organisation provide?

Form of Humanitarian Assistance	**Yemen**	**Iraq**
Agriculture and livestock support (e.g. seed provision, fertiliser subsidies or extension services)	[ ]	[ ]
Education	[ ]	[ ]
Food assistance (e.g. direct food-based transfers, food subsidies, cash transfers or vouchers)	[ ]	[ ]
Health	[ ]	[ ]
Nutritional interventions (e.g. food supplements)	[ ]	[ ]
Shelter	[ ]	[ ]
WASH	[ ]	[ ]
Other	[ ]	[ ]

If other, please specify which ones and in which country: _____

6. What type of relief items does your organisation provide in the country? Please select all appropriate.

Type of Relief Items	Yemen	Iraq
Blankets, mats, mattresses, carpets	[ ]	[ ]
Construction materials	[ ]	[ ]
Clothing & shoes	[ ]	[ ]
Food supplies (e.g. grains, pulses, oil, etc.)	[ ]	[ ]
Health kits and supplies (e.g. first aid, face masks, etc.)	[ ]	[ ]
Hygiene kits (e.g. menstrual hygiene, sanitisation kits, etc.)	[ ]	[ ]
Kitchen sets	[ ]	[ ]
Ready-to-use food (e.g. therapeutic food, supplementary food, etc.)	[ ]	[ ]
Repair and fixing kits	[ ]	[ ]
School kits	[ ]	[ ]
Seeds, fertilizers, pesticides	[ ]	[ ]
Water treatment products	[ ]	[ ]
Other	[ ]	[ ]

If other, please specify which ones and in which country: _____

7. Do you collect data on the types and volumes of packaging from the above listed items?

[ ] Yes
[ ] No
[ ] Unsure

8. How much waste do you generate of each material? Please rank the quantity of waste from 0 (none) to 5 (most packaging waste).

Packaging Material	Yemen	Iraq
Cardboard and paper	[ ]	[ ]
Durable, multi-use plastic (jerry cans)	[ ]	[ ]
Multi-material wrappers (metalized flexible plastics, sachets)	[ ]	[ ]
Single-use plastic	[ ]	[ ]
Polypropylene (poly-woven) bags	[ ]	[ ]
Other	[ ]	[ ]

If other, please specify which ones and in which country: _____

9. How is the majority of your packaging waste managed after it has been distributed/ used?

	Yemen	Iraq
Disposed of in regulated landfills (adhering to norms and standards)	[ ]	[ ]
Disposed of at dumpsites (e.g. non-regulated or unauthorized sites)	[ ]	[ ]
Incinerated	[ ]	[ ]
Management outsourced to local partners	[ ]	[ ]
Recovered/Recycled	[ ]	[ ]
Waste used for energy (Waste-to-energy)	[ ]	[ ]
Other	[ ]	[ ]
Don't know	[ ]	[ ]

If other, please specify which ones and in which country: _____

10. Is packaging waste management perceived as a problem for your organization? (1=Not at all ; 10=Strongly)

1	2	3	4	5	6	7	8	9	10
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

11. Does your organization follow guidelines for managing packaging waste once it has reached its end-of-life?

[ ] Yes (→ Next Question: 12)

[ ] No (→ Next Question: 18)

12. Whose regulations do you follow?

[ ] Government-imposed regulations

[ ] Self-imposed regulations

[ ] Regulations agreed upon in the humanitarian community

[ ] Other

If other, please specify: _____

13. How effectively are these regulations applied?

[ ] Well applied (→ Next Question: 14)

[ ] Partially applied (→ Next Question: 15)

[ ] Not well applied (→ Next Question: 17)

14. Please indicate which ideas have been well applied in managing solid waste more sustainably. (→ Next Question: 21)

15. Please indicate which guidelines have not been well applied in managing solid waste more sustainably.

16. Please indicate which ideas have been well applied in managing solid waste more sustainably. (→ Next Question: 21)

17. Please indicate which guidelines have not been well applied in managing solid waste more sustainably. (→ Next Question: 21)

18. If your organization does NOT follow specific guidelines to manage waste sustainably, select what best describes your organization's progress:

[ ] There are currently no improvement plans (→ Next Question: 21)

[ ] Ideas have occurred to us, but we have not implemented them. (→ Next Question: 19)

[ ] Ideas have occurred to us and we are in the process of implementing them. (→ Next Question: 20)

19. Please indicate which ideas have been developed in managing solid waste more sustainably. (→ Next Question: 21)

20. Please indicate any ideas that have been developed in managing solid waste more sustainably, and are in the process of being implemented. (→ Next Question: 21)

21. Do you engage with local partners to manage waste (e.g. promote recycling / composting of products, provide incineration facilities to burn waste, etc.)?

[ ] Yes [ ] No

Please provide the names of your partner organizations for waste management.

Following this survey, we would like to request an interview with an in-country representative of your organization working in solid waste management in your Iraq / Yemen operations. Please provide the contact information of the most appropriate person to speak to (name, organization, and contact information) here:

Name :_____

Organization :_____

Contact information :_____

Appendix L: General Interview Questions Template

'Waste Not, Want Not' Interview Questions

Introduction

This LSE student consultancy project, in coordination with the UNEP/OCHA Joint Environment Unit and the USAID-led Humanitarian Packaging Waste Joint Initiative, is tasked with identifying practical solutions to managing humanitarian packaging waste in the crisis hotspots Yemen and Iraq. This is a critically undervalued element to humanitarian responses, with health and environmental consequences that contradict the key tenet of humanitarian logic: do no harm.

The LSE team are seeking to a) understand to what extent local solid waste management are capable, and willing, to engage with packaging waste generated by the humanitarian industry, and b) make practical recommendations to improve this sector, whether proposing innovative ideas, or adapting practises that are currently implemented on a fragmented basis.

We are very appreciative of your support and commitment to this project, which we hope will improve humanitarian operations for everyone. Thank you.

Questions

1. You indicated that your organization operates in Iraq _____ (Yemen; Iraq; both), providing _____ (type of humanitarian assistance) and _____ (form of humanitarian assistance. Could you summarize your operations or the project(s) within the country?

2. How does this generate waste? What types of waste?

3. During your work, how have you been involved in Solid Waste Management in _____ (Yemen, Iraq, both)?

Solid Waste Management

4. In the survey you indicate that most of your waste is managed through _____ (i.e. disposal, incineration etc). Can you elaborate on the chosen management method(s) and actors involved?

    a. Why has your organization chosen these specific types of waste management?

i. What are the benefits with the current waste management method?
ii. What challenges/shortcomings are associated with the method currently used?

5. Only if it applies: You indicated that you are working with local partners to manage waste.

a. Who is/are the local partner(s), and why have you chosen them?
b. What is the role of the local partner(s) in dealing with humanitarian packaging waste?

Guidelines

6. Only if applies: In the survey you indicate that you (do not) follow guidelines for managing packaging waste once it has reached its end-of-life. Could you elaborate on that?

a. If applies: You indicate that you follow guidelines imposed by _____.
    i. What agency enforces the regulations? How are they enforced?
b. Do you think self-imposing solid waste management rules upon your organization is a good idea (i.e. maybe as a collaborative treaty with other humanitarian actors)?
    i. What would be a feasible target for your company to reduce waste by in one year (as a percentage of total waste produced currently)?
c. If applies: In the survey you indicate that the guidelines are applied _____ (well/partially/not well). In your opinion, are regulations well adapted to the problems you face when managing humanitarian packaging waste?
    i. What problems do you encounter?

Data Collection Practices

7. Data Collection: In the survey you indicated that your organization does/does not collect data on the types and volumes of packaging.

Only if applies:

a. If data is collected, what type of data and how is it used?
b. If you do not collect data, why is that so?
    i.Would the organization benefit from data collection?

Changing Waste Management

8. In the survey you indicate that packaging waste management is/is not perceived as a problem in your organization. Only if applies: Semi-priority: If it is perceived as a problem, do you have plans to deal with packaging waste?

9. What are the challenges of managing solid waste in Iraq/Yemen?

a. In the survey you indicated that your organization mostly generates _____ (type of packaging waste). Are there more sustainable packaging ways for the items you provide?

10. You indicate that your organization has _____ (fill in according to survey: a) implemented plans, b) developed yet not implemented plans), what have you considered to improve humanitarian packaging waste management?

a. Have any improvement ideas been implemented?

i. If not, why not?

ii. If yes, have they been successful/unsuccessful?

11. What policy and/or practical recommendations would you make to improve humanitarian packaging waste?

Appendix M: Interview Consent Form

'Waste Not, Want Not'

London School of Economics

Department of International Development

Information for participants

Thank you for considering participating in this study which will take place between 2/12/2020 and 26/3/2021. This information sheet outlines the purpose of the study and provides a description of your involvement and rights as a participant, if you agree to take part.

Research outline
This project is aiming to provide a clear roadmap of current practises in the managing of humanitarian packaging waste, in Iraq and Yemen, how these can be improved, and what barriers there are to this improvement. All research will be remote, involving desk-based research, as well as a survey and interviews. A final phase will feature focus groups in January-February, to get professional opinions on our suggestions prior to final report submission.

Do you have to take part?
It is up to you to decide whether or not to take part. You do not have to take part if you do not want to. If you do decide to take part, we will ask you to sign a consent form which you can sign and return in advance of the interview, or sign at the meeting.

What will your involvement be?
You will be asked to participate in an interview, which will explore your observations and opinions on the management of packaging waste in humanitarian operations. It will last 45mins to an hour. Your participation in the final phase focus groups will require a second of these forms, which will be sent to you closer to the time.

How do you withdraw from the study?
You can withdraw from the study at any point until 28/2/2021 without having to give a reason. If any questions during the interview make you feel uncomfortable, you do not have to answer them. Withdrawing from the study will have no effect on you. If you withdraw from the study, we will not retain the information you have given thus far, unless you are happy for us to do so.

What will your information be used for?
The records from this study will be kept as confidential as possible. Only the LSE team and their academic supervisor will have access to the files and any audio tapes. Your data will be anonymised – your name will not be used in any reports or publications resulting from the study. All digital files, transcripts and summaries will be given codes and stored separately from any names or other direct identification of participants. Any hard copies of research information will be kept in locked files at all times.

Limits to confidentiality: confidentiality will be maintained as far as it is possible, unless you tell us something which implies that you or someone you mention might be in significant danger of harm and unable to act for themselves; in this case, we may have to inform the relevant agencies of this, but we would discuss this with you first. This is precautionary, and highly unlikely to impact upon this study.

Who has reviewed this study?
This study has undergone an ethics review in accordance with the LSE Research Ethics Policy and Procedure.

Data Protection Privacy Notice
The LSE Research Privacy Policy can be found at: https://info.lse.ac.uk/staff/divisions/Secretarys-Division/Assets/Documents/Information-Records-Management/Privacy-Notice-for-Research-v1.1.pdf

The legal basis used to process your personal data will be legitimate interests. The legal basis used to process special category personal data (e.g. data that reveals racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, health, sex life or sexual orientation, genetic or biometric data) will be for scientific and historical research or statistical purposes.
To request a copy of the data held about you please contact: glpd.info.rights@lse.ac.uk

What if you have a question or complaint?

If you have any questions regarding this study please contact the researcher, Sam at s.m.rudnick@lse.ac.uk. If you have any concerns or complaints regarding the conduct of this research, please contact the LSE Research Governance Manager via research.ethics@lse.ac.uk.

If you are happy to take part in this study, please sign the consent sheet attached.

Consent Form

'Waste Not, Want Not'

London School of Economics

PARTICIPATION IN THIS RESEARCH STUDY IS VOLUNTARY

I have read and understood the study information dated [DD/MM/YY], or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.

YES / NO

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and that I can withdraw from the study at any time up until 28/2/2021, without having to give a reason.

YES / NO

I agree to the interview being audio recorded (this will not be shared beyond the study team).

YES / NO

I understand that the information I provide will be used for the 'Waste Not, Want Not' consultancy project report, and that the information will be anonymised.

YES / NO

I understand that any personal information that can identify me – such as my name, address, will be kept confidential and not shared with anyone beyond the study team.

YES / NO

Please retain a copy of this consent form.

Participant name:

Signature: _____ Date _____

Interviewer name:

Signature: _____ Date _____

Appendix N: Anonymised List of Interviewees

Location of Operation	Interview Partners	Shortcut
Yemen	Humanitarian Actor 1	HA1
	Humanitarian Actor 2	HA2
Iraq	Humanitarian Actor 3	HA3
	Non-Governmental Organisation 1	NGO1
	Non-Governmental Organisation 2	NGO2
	Non-Governmental Organisation 3	NGO3
	Municipal Actor 1	MA1