

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENTS OF SUPPLY CHAIN AND INFORMATION SYSTEMS AND
GLOBAL AND INTERNATIONAL STUDIES

Greening the Refugee Crisis: Identifying Intersections Between
Humanitarian Logistics and Sustainable Supply Chains

FAITH GONGAWARE
SPRING 2021

A thesis
submitted in partial fulfillment
of the requirements
for the baccalaureate degrees
in Supply Chain and Information Systems and Global and International Studies
with interdisciplinary honors in Supply Chain and Information Systems and
Global and International Studies

Reviewed and approved* by the following:

Robert A. Novack
Associate Professor of Supply Chain and Information Systems
Thesis Supervisor

John C. Spsychalski
Professor Emeritus of Supply Chain Management
Honors Adviser

Jonathan Abel
Associate Professor of Comparative Literature and Asian Studies
Honors Adviser

* Electronic approvals are on file.

ABSTRACT

More and more, the world is confronted with wicked problems that require innovative thinking by all stakeholders to create solutions. Perhaps the most broadly recognized of these concerns today lies in the increasing severity of anthropogenic climate change. Intractable from this conflict is the increase in forced migration of individuals linked to oppression and environmental concerns, leading to overwhelmed refugee camps worldwide. Both of these challenges are only worsening and demand attention in order to minimize eventual suffering and ensure the protection of both human and environmental rights.

This thesis approaches the needs for environmental stewardship and greater care for refugees from a supply chain perspective. The work presented here was conducted to identify methods through which to make supply chains serving refugee camps more environmentally and socially sustainable. First, a review of the existing literature on climate change, the refugee crisis, sustainable supply chains, supply chains serving refugees, and green humanitarian logistics was completed. Using this background, interviews were completed with leading researchers and individuals in the field of humanitarian and refugee logistics. The synthesis of all of this information revealed unifying themes between perspectives for creating more sustainable supply chains for refugee camps.

TABLE OF CONTENTS

LIST OF FIGURES	iii
LIST OF TABLES	iv
ACKNOWLEDGEMENTS	v
Chapter 1 Introduction	1
Chapter 2 Background	4
Chapter 3 Methodology	13
Chapter 4 Analysis and Results	16
Chapter 5 Conclusion.....	25
BIBLIOGRAPHY	27
ACADEMIC VITA.....	29

LIST OF FIGURES

Figure 1: IPCC graphic delineating global climate change impacts, their intensity, and the confidence level of these predicted impacts.....5

Figure 2: UNHCR chart illustrating the growth in total population of forcibly displaced peoples. 6

LIST OF TABLES

Table 1: Interviewee Names and Positions 13

ACKNOWLEDGEMENTS

I would like to dedicate this thesis to refugees around the world. Their courage motivates me to work towards a more just future.

First, I want to thank every individual who I had the privilege of interviewing for this thesis. Your work and willingness to help others learn is truly making a difference.

I would like to also extend my gratitude to Dr. Novack for his support and guidance from the first time I stepped foot in 473 Business Building as a new Smeal student. Your encouragement led me to choose supply chain and reminded me every step of the way why it was the right decision. Thank you for your endless patience and ability to make me laugh throughout the writing of this thesis.

Thank you to my best friend and COVID-19 isolation buddy, Abigail Slate. There's no one I would have rather struggled through this year with and am grateful every day for the person that you are.

Finally, I am forever grateful to my family for being the strongest support system I could ever ask for. I would not be the individual I am today without you. In particular, to my mom and dad, thank you for believing in me even when I did not believe in myself.

Chapter 1

Introduction

In 2006, former United States Vice President Al Gore released the documentary *An Inconvenient Truth*. The film, which detailed the crisis of global warming in depth, led to the awakening of a societal fervor surrounding the degrading state of the planet. The dilemma of a changing climate and rapidly declining environmental stability was not a new problem, though.

Five years later, in 2011, the Syrian Conflict began over mounting concerns with a dictatorial government. As families began to flee the worsening violence, refugee camps started to appear throughout Jordan, Turkey, and other nearby nations. With a more globalized media system than ever before, people around the world were flooded with images of refugee boats reaching shores after their harrowing journey and tales of the distress filled camps across the world. Similar to the emergency of the environment though, this new attention was being directed at a problem that had existed for generations.

Though two very different events, global warming and the refugee crisis do share two major commonalities. These crises were both solidly established well before they entered mainstream Western consciousness in the 2000s and both promise to cause wide-spread catastrophes and suffering. As early as the nineteenth century, humans began to predict their own potential to harm the Earth. By the 1950s, data was being collected to confirm these hypotheses. Now, over fifty years later, a multitude of literature exists detailing the disastrous consequences of human unsustainability. From rising sea levels that will lead to extensive flooding, to impaired ecosystems, intense fluctuations in weather patterns, and reduced human health, these impending effects make it clear that sustainability has become an imperative. Likewise, the modern-day refugee crisis can be traced back decades to migrations following the world wars in the early

1900s. While the coverage of Syrian refugees shed new light on the topic, displaced persons come from countries around the world - in 2018, the UNHCR estimated there were 25.4 million refugees in the world (Gokul, 2018).

The disasters of the world's environment and an ever-growing number of refugees are inextricably connected despite residing in two seemingly unrelated fields. Displaced people are sure to feel the consequences of climate change at a disproportionate rate due to their already vulnerable living situations. Furthermore, these consequences are expected to lead to increased conflict and loss of shelter creating an acceleration in forced migration.

With this knowledge in mind, it is of the utmost importance that all possible steps are taken to mitigate these outcomes. Opportunity for improvement in both areas lie in the camps in which many refugees live. As these living situations become more permanent than originally expected, it is vital to rethink the ways in which their supply chain systems function in order to implement more sustainable practices while maximizing their efficacy. In doing so, the environmental footprint of these shelters can be reduced while ameliorating the living conditions for the refugees there.

This research considers the intersection of humanitarian and sustainable logistics to identify methods for bettering the current operations of refugee encampments. A thorough review of existing literature will be conducted to understand gaps in the knowledge. Building upon this, interviews will be conducted with field experts to provide a deeper comprehension of the constraints and needs of these supply chains in real life. Ultimately, this paper will propose suggestions for overall improvement of supply chain networks serving refugees.

Note to Readers

It is important to acknowledge that this research was conducted in the United States – a privileged, Western country – by an individual who has not experienced any aspects of the refugee crisis first-hand. Though this investigation was undertaken with the intent of learning how to create more viable living conditions for people all around the globe, the perspectives presented are limited by an inability to understand the nuances of the lived experiences of refugees. Additionally, the suggested solutions are not intended to push the need for more sustainable behavior on to underprivileged populations. Refugees and other vulnerable peoples suffer much greater consequences while contributing far less to the climate crisis. The recommendations put forth are designed to accompany far reaching systemic alternatives in order to secure a more sustainable future. Furthermore, the conditions and stories of refugees cannot be generalized into one category. Acknowledgement and validation of the individual circumstances of each camp, family, and person as well as their inherent personhood and rights is inalienable above all else.

Chapter 2

Background

The Climate Crisis

Though climate change is now a discipline that has been studied for years, there are alarming new findings regarding its progress and impact every year. At the time of the writing of this paper, the most recent report from the Intergovernmental Panel on Climate Change (IPCC), a leading voice in climate science commissioned by the United Nations, was completed in 2014. A key headline highlighted by the report's authors points out the abundantly evident impacts of human activity on the warming of the globe.

Of the many effects of climate change identified by the IPCC, those of chief concern relate to global temperatures and water. In the three decades leading up to the 2014 report, each reached temperatures of record highs since the year 1850 (IPCC, 2014). Additionally, as ice masses melt and sea levels rise at increasingly rapid rates, the composition of the world's oceans have also changed through increased acidification and warmer temperatures (IPCC., 2014). A massive amount of evidence points to humans as the largest contributor to these concerns. The 2014 report states, "It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in [greenhouse gas] concentrations and other anthropogenic forcings together," (IPCC, 2014).

These unprecedented levels of greenhouse gas (GHG) emissions can be traced back to human population increase, intense economic development, and many side effects of the two including excessive resource use and increased expectations for quality of life. Unchecked, all of the aforementioned effects of climate change will lead to widespread plant and animal species extinctions, the genesis of new diseases and poorer health, worsened poverty, and heightened

rates of human displacement (IPCC, 2014). Ultimately, these consequences will be felt most acutely by those already worst off - impoverished, rural communities currently lacking access to resources and growth. Figure 1, a climate graphic from the 2014 IPCC report, shows these inequities by depicting effects of climate change in each region and the amount that global warming specifically has contributed to the effect.

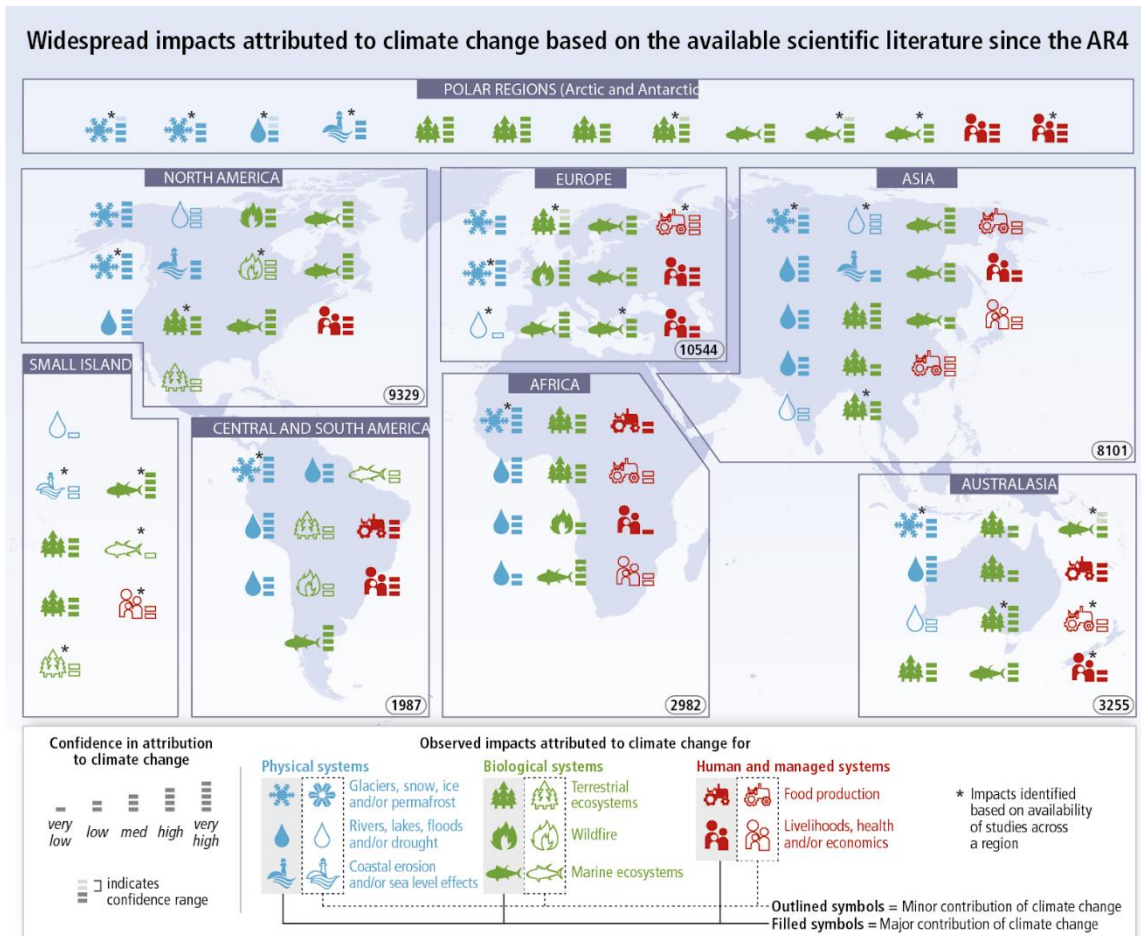


Figure 1: IPCC graphic delineating global climate change impacts, their intensity, and the confidence level of these predicted impacts.

The Refugee Crisis

Though the rampant refugee emergency in Syria remains a popular example of pervasive forced migration, the United Nations High Commissioner for Refugees (UNHCR), a UN advocacy agency, currently lists twelve additional situations around the world as major crises. The organization recently reported on trends and current statistics in their 2019 reports.

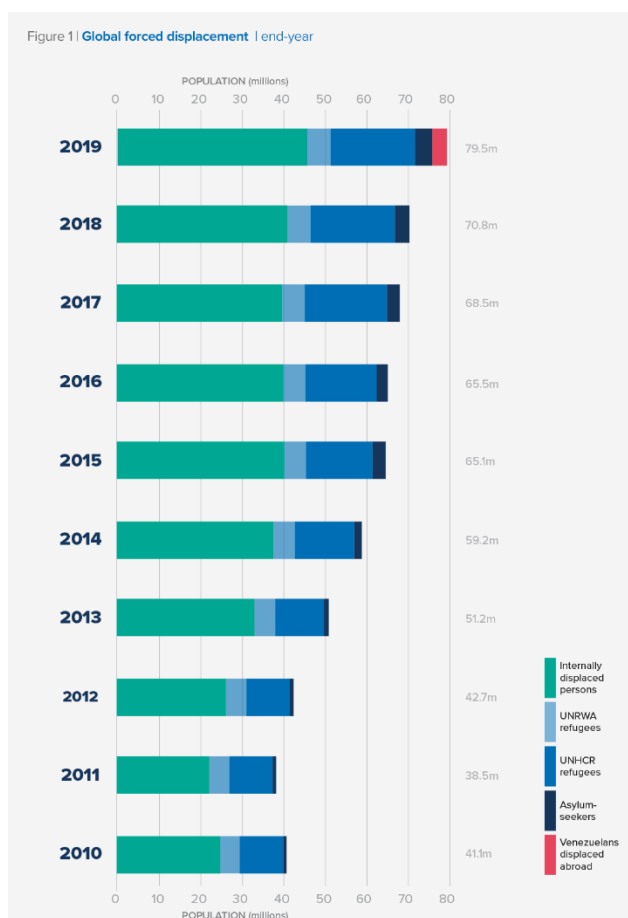


Figure 2: UNHCR chart illustrating the growth in total population of forcibly displaced peoples.

Illustrating the growing range and direness of forced migration around the world, is the recent growth of the UNHCR's population of concern. Figure 2, a graph from the UNHCR annual report, provides a visual representation of the upwards trend in refugee populations

broken down by other identifying characteristics. In 2009, this group included 36.4 million individuals. Throughout the following decade, this number grew over forty percent to 86.5 million in 2019. Of this number, twenty-six-million individuals fall under the legal definition of a refugee, meaning that one percent of the globe's total population has been driven from their homes due to persecution or fear of some kind. Furthermore, of the total one-hundred-million displaced peoples throughout that decade, only 3.9 million have been repatriated to their country of origin (UNHCR, 2021).

Generally speaking, individuals seeking refuge can resettle in three primary ways. First, refugees can self-settle in a new city or country without officially registering or receiving government aid. In these scenarios, refugees attempt to integrate themselves into a host community that is often incredibly different than their original home. Second, refugees may settle in organized encampments funded publicly or by non-governmental organizations (NGOs). These camps consist of a large, concentrated population of displaced individuals who often compete for resources with their host community. Finally, and less commonly, some refugees come to reside in agricultural settlements. Much like organized camps, these are official refugee sites, but employ structured agriculture programs to encourage self-sufficiency (Jacobsen, 1997).

Though some refugees do find success in their new living circumstances, there are many challenges irrespective of the individual's settlement pattern. Both in independent and supported settlements, resources are limited and often unable to meet the needs of either the previously established host community and newly self-settled refugees or the entirety of a localized encampment. This can result in food insecurity, lack of proper housing, or unserved medical needs amongst refugees. Furthermore, gender-based and sexual violence are common in refugee camps as well as isolation from and conflict with host communities (UNHCR, 2021).

Crises Combined

While each crisis on its own presents more than sufficient reason to warrant a significant global response, one compelling reason for action arises when considering the exacerbated consequences of the linkages between both. Ultimately, the effects of climate and environmental disasters are forcing more and more people out of their homes each year, causing a new designation, “environmental refugee,” to be coined (UNHCR, 2021). Likewise, as refugee settlements swell, so does the need for resources and competition over said resources. These population shocks lead to rapid resource depletion coupled with waste creation (Jacobsen, 1997).

While it is important to note that assigning responsibility for improving the climate, and thus their own difficult circumstances, solely onto refugees would be unjust, it is clear that sustainable changes need to be made wherever possible. Given the natural intersections of the human gravity of these challenges, it is rational to merge their solutions to supplement other mitigation efforts.

Part of the Solution: Sustainable Supply Chains

In the design of a traditional supply chain, some chief concerns include efficiency, cost reduction, and quality control. However, ensuring sustainability and minimizing detrimental consequences of supply chains are becoming ever more relevant for organizations’ reputations, risk mitigation strategies, and long-term cost savings. In the 1990s, an early definition of a green supply chain stated its role as, “integrating environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life,” (Morana, 2013). Now, making more sustainable supply chains

has grown so imperative that the United Nations created a guide through their Global Compact identifying human rights, the environment, labor, and anti-corruption as four key focuses for supply chain design (Sisco, Cody, et al., 2015).

There are two identifiable phases to implementing sustainability measures throughout a supply chain. First, organizations must consider sustainability and supplier management to assess the ethicality of different sourcing processes to root out any issues at the very beginning of their supply chain (Seuring and Müller, 2008). Evaluating supplier sustainability requires increased coordination between parties but can be simplified through regular supplier self-assessments, external audits, or through the use of a third-party reporting company (Sisco, Cody, et al., 2015).

Then, organizations should look internally and consider the sustainability of their own actions or products by, for example, conducting life cycle assessments (Seuring and Müller, 2008). Within an organization's own supply chain, green practices can be carried out in processes of design, operation, and transportation. By employing an ecological perspective to the initial design of products and networks, organizations can set out to reduce waste and energy usage and increase product lifecycles and reusability. Operations sustainability should focus on manufacturing processes, waste management and minimization, and engineering reverse logistical systems. Finally, transportation efforts can include using more fuel-efficient transport methods and designing more systematic routes (Morana, 2013).

Part of the Solution: Supply Chains Serving Refugees

Though there are a number of ways in which refugees may settle, the purpose of this research will focus on coordinated logistics systems serving refugee encampments. The inherent complexity and uncertainty of humanitarian crises poses a uniquely situated supply chain and logistical challenge. Contributing to these circumstances are the potential lack of infrastructure in

an affected area, the area's inaccessibility, the sheer expanse of the affected area, intensive time constraints, lack of adequate technology and labor, security concerns, and the number of stakeholders involved. It is for these numerous reasons that supply chain adaptability and agility are of utmost importance in humanitarian situations (Wassenhove, 2006).

In disaster management, there are four key phases to a response: mitigation, preparedness, response, and rehabilitation. Refugee networks are primarily concerned with preparedness (establishing systems before an event occurs) and response (the immediate reaction to an event) (Seifert et. al; 2017). The preparation phase is particularly difficult logistically because of the uncertainty of when and where networks will be needed. Methods of preparation include knowledge management, initiation of responsive operations networks, and forging of collaborative relationships. The response can be seen as a multi-phase process. The first seventy-two hours of response is designated as the most critical and resources will be transported with an emphasis on effectiveness over cost. As time passes, responders attempt to better balance efficacy and cost (Wassenhove, 2006).

Of these many challenges facing logistics networks for refugee communities, one that has recently risen to prevalence is the view shift throughout the 2000s of refugee camps from temporary settlements to more permanent solutions. Previously relegated to a status as "warehouses" for refugees, more and more individuals are remaining in camps for long periods of time necessitating changes to the ways in which camps are set up as well as serviced. Many scholars suggest that this repositioning will require more integration into host communities and a bottom-up approach to camp design (Jahre et. al; 2018).

For this evolving view of camps, there are a number of priorities to be addressed in early phases of camp creation. First, accessibility and assessment of existing infrastructure is necessary

to identify possible locations. Next, prioritization is placed on identifying water and food sources near the camp. Many times, not all of these elements will be present at once, and in extreme cases, none are available. Case studies in the Ethiopian camp of Bur-Amino and the Turkish Karkamis camp provide examples of needing to establish entire ground transport networks and water procurement systems respectively when setting up a new camp (Jahre et. al; 2018).

Distribution of further provisions and services differs between camps but is most often provided by the primary NGO serving the location or the host community's government. If implemented, bottom-up strategies could emphasize trading with local communities and empowerment of refugee independence (Jahre et. al; 2018).

Overall, there is no universal method to adequately respond to a refugee crisis. The individual complexities of political and cultural circumstances as well as logistical considerations require dexterous and coordinated supply chains to fulfill the needed efficiency to help as many people as possible. It is helpful to consider the supply chain through a private sector lens; the entire process is saddled with the heavy burden of creating “a completely new supply chain in mid-course while simultaneously improving ‘product quality,’” (Wassenhove 2006).

Merging the Solutions

While both sustainable supply chains and supply chains serving refugees have large reserves of research written about them, the combination of the two has relatively little literature available. There are a few pieces written about specific challenges to overcome, such as the paper, “Innovative Solutions for Reusing Packaging Waste Materials in Humanitarian Logistics” by Alberto Regattieri et; al. However, there has been insufficient investigation into overall practices for improving the sustainability of humanitarian logistics networks.

One paper that calls for further research in the area charges the short-term mindset applied to humanitarian logistics as being at fault for this. Because of the urgent nature of refugee crises, long term planning and risk considerations are rare, causing an ignorance of sustainable thinking (Klumpp, 2015). Arguably though, as humanitarian logistics are driven by a servitude to livelihoods, it is imperative that sustainability is included in system considerations.

Klumpp ultimately defines the objective of sustainable humanitarian logistics as being to,

“Assure every human being—especially in situations of disasters and emergencies—a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services by planning, implementing, and controlling the efficient, effective forward and reverse flow and storage of goods, services and related information throughout the whole supply chain in a manner that meets the needs of the present without compromising the ability of future generations to meet their own needs,” (Klumpp, 2015).

Using this definition as a guide, organizations serving refugees can combine the existing agility of their supply chains with contemporary thinking on sustainable logistics to be better able to serve humankind in the long term.

The next section of this thesis will outline the methods utilized to synthesize this existing knowledge with additional first-hand accounts of sustainable and humanitarian supply chain networks.

Chapter 3

Methodology

This thesis was completed by conducting interviews with individuals in fields relevant to sustainable and refugee supply chains. Conversing with individuals with experience in relevant areas allowed for the application of first-hand knowledge to the literature review that was conducted.

Six individuals were interviewed representing backgrounds in both fieldwork and research experience:

Interviewee Name	Interviewee Position
Vincente Escribano	Former Head of Supply Management Logistics Services at the United Nations High Commissioner for Refugees
Dr. Carleen Maitland	Associate Professor & Co-Director of the Institute for Information Policy at Pennsylvania State University
Dr. Luk Van-Wassenhove	Henry Ford Chaired Professor of Manufacturing and Director of the Humanitarian Research Group at INSEAD
Dr. Maria Besiou	Professor of Humanitarian Logistics and Dean of Research at Kühne Logistics University
Dr. Mahyar Eftekhari	Associate Professor of Supply Chain Management at Arizona State University
Dr. Jose Holguin-Veras	William H. Hart Professor of Civil and Environmental Engineering and Director of the Center for Infrastructure, Transportation, and the Environment at Rensselaer Polytechnic Institute

Table 1: Interviewee Names and Positions

These individuals were chosen because of their extensive background working in humanitarian logistics. As an experienced actor in an intergovernmental aid organization,

Escibano provided unique insight from his direct exposure to the realities of servicing refugee camps. Dr. Maitland's focus on technology has taken her to refugee camps in Africa and the Middle East to implement innovative solutions to improve refugees' quality of life. A leader at the INSEAD global business school, Dr. Van Wassenhove has pioneered the study of sustainable supply chains and specifically applied that to his work at the school's Humanitarian Research Group. Dr. Besiou researches at both the INSEAD group and the Kühne Logistics University and serves on the board of the Journal of Humanitarian Logistics and Supply Chain Management. Dr. Eftekhar has conducted considerable research in the area while collaborating with non-governmental organizations such as the Red Cross and Catholic Relief Services. Finally, Dr. Holguin-Veras is a recognized expert in both sustainable and humanitarian logistics and has received a number of awards for his work including the 2013 White House Champion of Change award.

Interview Guide

Each interviewee was asked four questions. Specifically, Maitland and Escibano were asked a slightly different set of questions because of the uniqueness of their expertise area (questions 2, 4, 5, 6 were used for Maitland and questions 1, 3, 5, 7 were used for Escibano) while all other interviewees were asked questions 3, 4, 5, 7.

1. Could you give an overview of the typical process to design/implement a supply chain for refugee camps (since this process often must happen in a rapid, ad-hoc way)?
2. In your experience with individuals serving refugee camps (i.e., NGO members, UNHCR employees, etc.) is sustainability a priority of their operations?

3. Where would you envision the ideal balance between sustainability and efficacy/timeliness lying in services to refugee camps?
4. Where have you seen the most obvious shortcomings for efficacy in refugee camps' supply chain/infrastructure/operations? For sustainability?
5. How can sustainability measures be implemented in ad-hoc supply chains operating under extreme uncertainty (i.e., the rapid set up time, potential limits on existing infrastructure, etc.)? What are some of the biggest challenges to doing so?
6. In what ways could you envision technology and innovation supporting/facilitating the prioritization of sustainability in the context of refugee camps?
7. Often, refugee camps end up becoming permanent living situations. How do you think sustainability priorities could shift long-term versus an initial response to a crisis?

These questions were designed in order to gain a deeper understanding of the intricacies and nuances existent in humanitarian supply chains that are not evidenced in the available literature. The questions revolved primarily around tradeoffs, feasibilities, and priorities. All of these concepts would uncover best practices to navigate situations that present slightly differently in real life than in the theories found in the literature review. Each interviewee's answers were then grouped into content categories to highlight themes across conversations.

Chapter 4

Analysis and Results

For each of the questions in the interview guide, each respondent's answers were qualitatively analyzed for major themes. Afterward, key themes among all interview answers were acknowledged. The following represents the issues identified for each question in the interview guide and the commonalities between responses.

Question 1

“Could you give an overview of the typical process to design/implement a supply chain for refugee camps (since this process often must happen in a rapid ad-hoc way)?”

This question was asked of Vicente Escribano to gain foundational insight into the complicated supply chain processes employed by aid agencies because of his leadership of these efforts in one organization. Much of the planning for these supply chains take place in advance of a disaster to expedite response times at the onset of a disaster. Generally, this planning includes strategic placement of inventory resources and employees to minimize necessary transport distances and avoid higher cost freight options for any given location. Currently, there exist four warehouses in Africa, two in the Middle East, one in North America, and one in Europe. Following the initial response, more particular actions are tailored to the specific circumstances of need with an emphasis on efforts to draw from in-country supply networks.

Question 2

“In your experience with individuals serving refugee camps (i.e., NGO members, UNHCR employees, etc.) is sustainability a priority of their operations?”

Interviewee Carleen Maitland was asked this question in particular because of her unique level of experience with fieldwork at refugee camps in the Middle East and Africa. Generally speaking, environmental sustainability is starting to be incorporated more into agency decisions; however, countervailing efforts deny these efforts of coming to fruition. Primarily, these constraints arise out of budgetary necessities to accept material donations for distribution to refugees. Often, the sources of these donations do not consider the environmental impacts (i.e., single use packaging, chemical content, or supplier ethics) of the provisions and the detriment is already incurred by the time it reaches refugees. Additionally, the phenomena of ill-advised philanthropy has led to increased “donation dumping” for items that do not provide utility to the organizations or refugees.

Question 3

“Where would you envision the ideal balance between sustainability and efficacy/timeliness lying in services to refugee camps?”

Nearly every response to this question included an emphasis on the prioritization of human lives during the earliest, most urgent stage of a crisis. As recognized in the literature review, the response phase of disaster management must fulfill the requirement to save as many human lives as possible. In this situation, time becomes the number one priority and other considerations (such as cost or sustainability) will be ignored by necessity. The consensus of the interviewees was that in this immediate short-term perspective, it is impossible for sustainability to take precedence. This emphasis on short versus long-term considerations was another shared component. The respondents decidedly confirmed that environmental considerations (while differing based on circumstances) were more likely to occur in the long run.

Question 4

“Where have you seen the most obvious shortcomings for efficacy in refugee camps’ supply chain/infrastructure/operations? For sustainability?”

The supply chain deficiencies for both service levels and sustainability in refugee camps were overwhelmingly attributed to a lack of coordination amongst organizations servicing these encampments. Typically, humanitarian disasters necessitating refugee settlements receive aid from a number of actors. These include the local governmental authorities, international governmental organizations (IGOs) such as the United Nations, and non-governmental organizations (NGOs) such as Médecins Sans Frontières (Doctors Without Borders), Oxfam, and the National Red Cross.

In particular, operations by NGOs suffer from inefficiency because of the need to compete for donors. To do so, organizations must provide evidence of their work through key performance indicators (KPIs) such as the number of people reached, the amount of goods distributed, or the diversity of services offered. These statistics are then used to convince donors of which efforts are most deserving of their support. An unwillingness to share information can lead to an uneven distribution of goods among refugees when certain individuals receive goods from multiple organizations creating shortages. This lack of transparency can also result in an ineffective product mix being transported to the camps when multiple groups provide duplicate goods. Ultimately, these shortcomings hurt the ability to adequately serve refugees’ needs, hinder efforts for fuel efficient transportation, and increase waste through a mismatch of supply and demand. By failing to recognize their common goal of saving lives and maximizing quality of life thereafter, aid actors disregard the potential for economies of scale and limit their ability to provide for their beneficiaries.

Another common restriction to sustainable operations was the lack of organizational prioritization of the cause. Three interviewees concurred that while environmental concerns may be cited as a consideration, most stakeholders continue to emphasize cost, availability, and timeliness above all else. Unless the donors assert their desire for increased sustainability, it is unlikely that organizations will truly concentrate much effort into these concerns.

Question 5

“How can sustainability measures be implemented in ad-hoc supply chains operating under extreme uncertainty (i.e., the rapid set up time, potential limits on existing infrastructure, etc.)? What are some of the biggest challenges to doing so?”

One of the most common propositions for increasing sustainability was to preemptively include environmental thinking into the design of services and camps. Opportunities for this preparedness were identified primarily in infrastructure and provision planning.

To increase sustainability of the infrastructure of refugee camps, common implementations of environmental consciousness can be conceived in advance and applied in camps as they come to be. For example, solar arrays have been created at locations such as Zaatari refugee camp in Jordan because of a recognition of the land availability at remote sites on which encampments are normally constructed. Some operational facets, such as sanitation and waste management, require an understanding of the camp’s needed capacity before being constructed. However, these components can implement some premeditation through standardized solution offerings such as recycling facilities and refugee staffed programs to create responsible disposal and engagement for individuals. Additionally, re-use can be facilitated by identifying processes that use similar resources and consciously considering their placement

throughout the camp. For example, Maitland described the possibility of locating water intensive activities (such as clothes washing stations and garden areas) near one another with systems in place to encourage multiple uses of a resource. By institutionalizing a sustainability focus, the initial design of long-term camp facilities can include environmental considerations rather than requiring inefficient adjustments later on.

In terms of goods delivered to refugees, augmented planning could also lead to more efficient distribution, inventory management, and waste minimization. Predictive models can be used to identify at-risk areas (taking into account factors like political instability, social unrest, and environmental variability) in which to concentrate inventory stockpiles and invest in ground transportation and infrastructure. In doing so, faster response times as well as more environmentally efficient transportation could both be achieved. Products for which demand is guaranteed during any disaster (i.e.; water, food, medicine, and shelter) can be redesigned to minimize packaging waste or engineered for reusable or multipurpose packaging. Additionally, material donations are often given without consideration or knowledge of the practical needs at camps increasing organizations' sortation and disposal obligations. Facilitating the decrease of these kinds of donations and encouraging monetary support instead will help to mitigate unnecessary associated waste and costs of this philanthropy.

Question 6

“In what ways could you envision technology and innovation supporting/facilitating the prioritization of sustainability in the context of refugee camps?”

This question was also tailored for Maitland's particular expertise area in technology. A number of strategies were delineated for improvement of sustainability through innovation. First,

available data regarding refugee camp operations in general (and their sustainability in particular) is incredibly limited. Augmented technology within camps could enable expedited data collection and sharing in order to identify sustainable alternatives. Additionally, investments in innovation within camps can further self-sufficiency and contribute to local development and quality of life. There does exist a caveat in the usage of technology with vulnerable populations, however, in that the ethics of introducing new innovations require informed consent and education for involved persons.

Question 7

“Often, refugee camps end up becoming permanent living situations. How do you think sustainability priorities could shift long-term versus an initial response to a crisis?”

Suggestions for long-term solutions varied widely among interviewees. However, there was broad agreement that sustainability measures were significantly more possible in long-term considerations for camps. Though there was not consensus on the methods through which to do so, there were two concepts that garnered a few mentions from different interviewees.

The first approach was to increase self-sufficiency and host community integration over time. Some refugee camps have achieved small degrees of autonomy through community gardens, refugee-managed storefronts, refugee-led education, and host community assimilation. In doing so, refugees are able to support environmental efficiency by requiring less outside support while also increasing their individual agency and feelings of purpose. Furthermore, these efforts can benefit host communities by stimulating local economies and encouraging cultural exchange between those inside and out of the settlement. However, these efforts are often hindered due to host country labor regulations, cultural and linguistic barriers, land viability, and

lack of start-up resources. Investments in governmental collaboration, cultural education (for refugees and hosts), and entrepreneurial and agricultural education could all help develop local procurement and lessen reliance on outside aid. Additionally, Escribano detailed a burgeoning interest in private public partnerships (PPP) to bolster refugee self-reliance. These partnerships would create commercial ventures within camps at which refugees could shop using financial aid. These initiatives, originating out of aid dependency, could eventually lead to job opportunities and a closer proximity to normalcy for refugees.

The second recommendation posited that the aid community required a perception shift away from a traditionally myopic viewpoint. Upon agreement with the importance of sustainability in the long term, a number of respondents called attention to the reality that many camps have become lifetime settlements, necessitating design for longevity. For example, some Palestinian refugees still live in camps established after the Arab-Israeli wars over seventy years ago in 1948. There are others throughout the world that have lasted since the seventies, eighties, and nineties. While the definition of a refugee camp maintains a designation as a temporary haven, there is now a whole generation of refugees who have spent their entire lives in these camps. Ultimately, resettlement in refugees' country of origin is often impossible while danger and oppression remain. Settlement in other, more developed nations is likewise limited because of growing trends of nationalism in these locations globally. The outdated belief that refugee camps are intended for short time horizons leads to inferior decision making both for the social and environmental sustainability of settlements. A paradigm shift toward long-term solutions is necessary among agencies, donors, and governments in order to facilitate the implementation of sustainable solutions from the onset of a crisis.

Overall Takeaways

Throughout all of the interviews and across different questions, there were three important takeaways that could hold implications for future refugee camp supply chain development.

1. Organizational collaboration and prioritization

First, adjustments to organizational and donor priorities are needed in order to emphasize the most important outcomes of the work. Using greater information sharing and collaborative planning techniques, aid agencies can work together to better align supply and demand and capitalize off each others' comparative advantages. Doing so will enable consolidated transportation, minimized shortages or waste, and cost savings that can be redirected to sustainability investments.

A promotion of sustainable interests by donors is necessary in conjunction with this change in organizational priorities. As noted by Eftekhar in his interview, donors are analogous to customers of for-profit businesses. Their voices ultimately wield the power to guide groups' overarching strategies and goals since donations are contingent upon their satisfaction with agencies' performance. By promoting sustainability content to patrons, agencies may be able to sway donor preferences toward greater advocacy for environmental stewardship.

2. Proactive planning and design

Secondly, a commitment to environmental sustainability can be achieved by embedding considerations from the earliest stages of response planning. Though the specifics of each disaster require individualization of services once a response is under way, there are general

needs that can be predicted for any situation that involves refugees. For example, every crisis will require the provision of food, water, medical treatment, and shelter. Inventory can be acquired and processes designed in anticipation of needs in order to proactively incorporate sustainability measures before the urgency of a disaster sets in. For inventory, this may take shape as product and kitting design to match urgently needed items and allow for alternative uses of packaging and item reuse. Processes that are identified as impactful to the environment, such as water sanitation and waste management, should be assigned protocols for environmental responsibility best practices to be employed immediately at the outset of a disaster.

3. *A shift to long-term perspectives*

Finally, the broadest reaching progress is needed in the lens through which the refugee crisis is viewed. The definitions of refugees and refugee camps were determined decades ago and have not been updated to reflect the reality of the situation as it exists today. Though repatriation and settlement are important ideals to strive for, the fact is that these options are not always plausible. It is vital that aid organizations approach their operations with the mindset of building systems and structures that may have to last a very long time. By acknowledging this reality and designing camps in a way that ensures longevity, less monetary and material resources will be needed for reconstruction in the future ultimately decreasing waste and increasing the quality of service given to the individuals in need.

Chapter 5

Conclusion

This thesis aimed to identify methods to make supply chains serving refugee camps more environmentally sustainable. These practices would contribute to the immediate need for substantial environmental stewardship as well as increased operational capacity to serve vulnerable refugee populations. Using a broad-reaching literature review as well as informational interviews, three key takeaways were found that could be implemented for future improvements. First, coordination between organizations serving refugees and donor prioritization of sustainability will allow for increased efficiency and emphasis on sustainable outcomes. Second, supply chains and operational systems should be proactively designed with sustainability in mind. Third, camps should be designed for long-term functionality to avoid the need to rebuild in the future and maximize the quality of living conditions. Ultimately, these actions should be applied by organizations that serve refugees including local governments, intergovernmental organizations (IGOs), and nongovernmental organizations (NGOs) in order to fulfill these institutions' imperative to cultivate a better future for affected individuals.

These research outcomes are limited by a few factors. First, because of the open-ended nature of the interview guide, respondents' answers varied widely in terms of scope and depth. There was further information given that is not presented in this paper as well as topics that could have been explored even more in depth. Second, it is vital to acknowledge the vast differences between different refugee camps throughout the world, making it difficult for information to be generalizable. No two refugee experiences are the same, and solutions for each camp will differ depending on relative wealth, language barriers, cultural expectations, nature of the crisis, and many other characteristics. Though these recommendations are intended to act as a

guide for action, each circumstance should be assessed for individual needs as well. Finally, as addressed in the introduction chapter, it should be noted that this research has been completed in an affluent, Western country. Field work was unable to be completed due to the COVID-19 pandemic and results have not been able to be examined through a critical lens of greater understanding of the realities of the refugee crisis.

In the future, there is great potential for this research to be expanded upon, including contending with the aforementioned limitations. Further research could examine the practicalities of implementing the recommended practices and identify more specific action steps to do so. Additionally, greater understanding is needed for the intersectionality of environmental sustainability and social conditions within camps to ensure that the perspective of refugees is considered in decision making processes. Ultimately, this and future work could have regulatory implications impacting the world's ever-changing environment and living conditions of refugees.

Though the challenges of climate change and the refugee crisis are far from new developments, they are also far from being solved. A rising global consciousness of the guaranteed disastrous consequences of these situations mandate that human behaviors change and change now. It is certain that these changes will not come easily, but by drawing on innovation, open mindedness, and human empathy, the world can and must secure a better future for all humans - especially those most at risk.

BIBLIOGRAPHY

Gokul, K S. “A Brief History of Global Refugee Crisis: From Origins to Contemporary

Scenario.” *Countercurrents*, Countercurrents, 29 July 2018,

countercurrents.org/2018/07/a-brief-history-of-global-refugee-crisis-from-origins-to-contemporary-scenario/.

IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

JACOBSEN, K. “Refugees' Environmental Impact: The Effect of Patterns of Settlement.”

Journal of Refugee Studies, vol. 10, no. 1, 1997, pp. 19–36.,

doi:10.1093/jrs/10.1.19.

Jahre, Marianne, et al. “Approaches to the Design of Refugee Camps.” *Journal of*

Humanitarian Logistics and Supply Chain Management, vol. 8, no. 3, 2018, pp.

323–345., doi:10.1108/jhlscm-07-2017-0034.

Klumpp, Matthias. “Sustainable Humanitarian Logistics Research—A Conceptualization.”

Humanitarian Logistics and Sustainability, 2015, pp. 49–63., doi:10.1007/978-3-

319-15455-8_4.

Morana, Joelle. *Sustainable Supply Chain Management*. Wiley, 2013.

- Seifert, Lysann, et al. "Humanitarian Supply Chain Management Responding to Refugees: a Literature Review." *Journal of Humanitarian Logistics and Supply Chain Management*, 2018, doi:10.1108/jhlscm-07-2017-0029.
- Seuring Stefan, and Müller Martin. "From a Literature Review to a Conceptual Framework for Sustainable Supply Chain Management." *Journal of Cleaner Production*, vol. 16, no. 15, 2008, pp. 1699–1710., doi:10.1016/j.jclepro.2008.04.020.
- Sisco, Cody, et al. "Supply Chain Sustainability: A Practical Guide for Continuous Improvement, Second Edition." United Nations Global Compact, 2015.
- UNHCR. "Global Report 2019." United Nations High Commissioner on Refugees, 2019.
- Van Wassenhove, L N. "Humanitarian Aid Logistics: Supply Chain Management in High Gear." *Journal of the Operational Research Society*, vol. 57, no. 5, 2006, pp. 475–489., doi:10.1057/palgrave.jors.2602125

ACADEMIC VITA

FAITH N. GONGAWARE

faith.gongaware@gmail.com

EDUCATION

THE PENNSYLVANIA STATE UNIVERSITY

Schreyer Honors College and Paterno Fellows Program
Smeal College of Business | B.S. | Supply Chain and Information Systems
College of the Liberal Arts | B.S. | Global and International Studies
Health and the Environment concentration, International Business minor

University Park, PA
May 2021

MASARYK UNIVERSITY

Student in Central European Education Connection Czechmates semester study abroad
www.justczechingin.weebly.com

Brno, Czech Republic
Feb. 2019 - Jun. 2019

THE EXPERIMENT IN INTERNATIONAL LIVING

Student in five week study abroad program exploring culture and sustainability

Vietnam
July 2016

WORK EXPERIENCE

VIRTUAL INDIRECT PROCUREMENT INTERN

The Estée Lauder Companies

Consolidated over 120,000 data points from three Excel files into comprehensive airline contract data monitoring and analysis tool
Created category sustainability strategy baseline and contributed 2% toward function's FY target for assessed spend

New York, NY
Jul. 2020 - Aug. 2020

BUSINESS AND FINANCE INTERN

MIM Software

Organized monthly expenses and biweekly invoicing using Quickbooks, Excel, and Qlik Sense

Cleveland, OH
Jun. 2019 - Aug. 2019

JUNIOR MARKETING SPECIALIST INTERN

IBM: Central Europe Client Innovation Center

Worked in a cross cultural workplace representing over 86 nationalities
Project managed the creation of an exhibition showcasing IBM's volunteer initiatives and updating an onsite IBM museum tour

Brno, Czech Republic
Feb. 2019 - May 2019

SERVICE & LEADERSHIP

RESEARCH ASSISTANT *Smeal Center for the Business of Sustainability*

Develops research program by creating databases, establishing benchmarks, and producing advertisements

University Park, PA
Jan. 2020 - Present

RESIDENT ASSISTANT *Schreyer Honors College, Globe Floor Special Living Option*

Serves as a resource for 70 residents for academic, emotional, and disciplinary support
Part of team dedicated to transforming dynamics and procedures to increase effectiveness and morale

University Park, PA
Aug. 2019 - Present

STUDY ABROAD PEER ADVISOR *Penn State Education Abroad Office*

Holds weekly office hours to counsel prospective study abroad students in planning international study
Represents education abroad office at events and presentations throughout the year

University Park, PA
Aug. 2019 - Present

ZERO WASTE COMMITTEE *Student Sustainability Advisory Council*

Develops recommendations with stakeholders for adoption of waste reduction goals university-wide
Presents proposal to university leadership and advocates for implementation

University Park, PA
Aug. 2019 - Present

TEACHING ASSISTANT *Honors Supply Chain Management 301*

Monitored learning outcomes, established class procedures, and held office hours for 25 students

University Park, PA
Aug. 2020 - Dec. 2020

HONORS

Beta Gamma Sigma Business Honor Society

2020 - Present

Provost Award

2017 - 2021

Academic Excellence Scholarship

2017 - 2021

Elks Scholar And Most Valuable Student Finalist

2017 - 2021