



WPI



BSAC

Understanding Corporate Attitudes Surrounding Food Donation and Recovery in Thailand





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An Interactive Qualifying Project submitted to the Faculty of WORCESTER POLYTECHNIC INSTITUTE and CHULALONGKORN UNIVERSITY in partial fulfillment of the requirements for the degree of Bachelor of Science

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SCHOLARS OF SUSTENANCE

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This report represents the work of WPI and Chulalongkorn University undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review. For more information about the projects program at WPI, please see

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Abstract

For this project our team worked with Scholars of Sustenance (SoS), a food rescue organization based out of Bangkok Thailand. The goal of this project was to create a set of recommendations for SoS to use in order to grow their donor base and presence. In order to create this set of recommendations we did research on food rescue in other countries, interviewed SoS, conducted interviews with companies both partnered and not partnered with SoS, and interviewed public and private waste collection services. After our interviews, we secured two new corporate food donors for SoS. Lastly, we brought together all of our findings in order to create a finalized set of recommendations. In the end we believe our recommendations will help SoS gain more partners and donations.

Acknowledgments

Our team would like to thank all of the people that made this project possible and all those that allowed for the project to evolve. Without the help of these people this project and its end results would not have been possible.

First, we would like to thank our sponsor Scholars of Sustenance for working with us to provide a clear end goal for the project, for providing us with pertinent data regarding food donations, and for pushing us as a team to create the best possible solutions.

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Focus on Non-OEM Manufacturers	Griffin	Zach
Focus on Downstream Retailers	Keri	Griffin
Use Direct Marketing Strategy	Varisara/Orawan	Kanrada
Market CSR Budget Reduction	Varisara/Kanrada	Orawan
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Executive Summary

The United Nations Food and Agriculture Organization reports that 9.3% of the Thai population are undernourished ([Food and Agriculture Organization of the United Nations, 2020](#)); however 17.32 million metric tonnes or 64% of Thailand's waste is food ([Sawasdee et al., 2020, p. 65](#)). The problem of food surplus¹ reduction goes hand in hand with the issue of food undernourishment and food insecurity. In Bangkok, the Scholars of Sustenance (SoS) is tackling both food surplus and insecurity by collecting edible food surplus from primarily retailers and hotels and distributing the recovered foods to food insecure populations. Previous research into the SoS has shown that SoS has troubles attracting new donors. This issue has been laid bare by the COVID-19 pandemic which has disrupted SoS's normal donation sources. With the above in mind, our goal is to understand the motivations and concerns Thai food manufacturing companies harbor regarding food donation and based on that understanding provide a set of recommendations, including non-legislative incentives, that will both grow Scholars of Sustenance's donor base and presence.

Over the course of our research we aimed to interview public and private waste disposal companies, SoS partnered and non-partnered food companies, as well as the SoS. These interviews were primarily conducted over either Zoom, phone, and email. We were able to question three private waste collection companies as well as the public Thai Pollution Control Department. We reached out to over 250 companies; however only 12 companies contacted us back, and of those 12 companies, three were already partners with the SoS and two expressed interest in partnering with the SoS.

Based on our interviews we recommend the following:

1. Offer In-Person Waste Audits to Companies
 - a. Most companies interviewed reported negligible food surplus; however SoS stated that there is generally more waste found once they check facilities in person. Currently, the SoS only audits companies once they agree to donate food. By offering this service to any company, the SoS could raise awareness to the

¹ The Scholars of Sustenance uses the term "food surplus" to refer to food waste. Our report uses this same terminology except in interview questions for clarity.

issue of food surplus and gain potential donors. Even if a company chooses not to partner after the audit, they will still gain insights on how to reduce waste.

2. Solicit Non-Food Assistance

- a. Because many companies report negligible food surplus, they believe they cannot help the SoS. Despite their lack of food surplus, Siam Food suggested they could use their trucks to help deliver donated food. Soliciting nonfood assistance provides the opportunity to expand their operational capabilities. By soliciting nonfood donations, SoS can grow the network of companies they work with and also their presence.

3. Focus on Non-OEM Manufacturers

- a. Of the 12 companies that responded, six were original equipment manufacturers ([OEM](#)). These companies produce made to order quantities and have waste reduction policies to increase profit. Additionally because OEMs do not produce their own product, OEMs do not want to be responsible for damage to their clients' brands. Were an OEM to donate to SoS, the company the OEM supplies would lose control of their brand. Therefore if SoS wants to focus on manufacturers, we recommend they contact non OEM companies.

4. Focus on Downstream Retailers

- a. Through interviews, we found that items with short shelf lives are most likely to be donated due to the constant shelf rotation and early expiration dates. Because of this, we recommend targeting food manufacturers that produce items such as baked goods, vegetables, and meat products. Downstream retailers also have less resale options for blemished food, so the SoS will be more likely to find donations.

5. Use Direct Marketing Strategy

- a. SoS should focus its marketing audience to potential donors by emailing potential donors directly and advertising in business oriented publications like "The Cloud" and "The Standard". Doing this would reach more potential donors rather than current marketing strategies which include TikTok.

6. Market CSR Budget Reduction

- a. Corporate social responsibility (CSR) programs are not required by law; however companies that choose to have them gain a good image and reputation. Only one company interviewed had a fixed CSR budget at 1% of profits, but many companies interviewed showed interest in CSRs. SoS already translates CSR activities into environmental impacts, social impacts, and financial reductions from their data-base and pre-existing equations for existing donors for no charge. By specifically marketing this data analysis, SoS could draw potential donors looking for inexpensive CSR activities with tangible numerical impacts.

In addition to our recommendations we were also able to make tangible impacts for the SoS. After our interviews, both Jadjans Chili Paste and Eighty Khaisook committed to partnering with SoS. Additionally the Chulalongkorn University cafeteria system began preliminary engagement with SoS in conjunction with their Chula Zero Waste Initiative. We are proud to have made real world contributions to SoS's donor base in addition to the findings and recommendations laid out in this report.

Executive Summary in Thai (บทสรุปผู้บริหาร)

องค์การอาหารและการเกษตรแห่งสหประชาชาติรายงานว่าร้อยละ 9.3 ของประชากรไทยได้รับสารอาหารไม่เพียงพอ อย่างไรก็ตาม 17.32 ตันหรือร้อยละ 64 ของขยะในประเทศไทยเป็นขยะอาหาร นอกจากนี้ ปัญหาการลดขยะอาหารมักมาควบคู่กับปัญหาการขาดแคลนและความไม่มั่นคงทางอาหาร ในกรุงเทพฯ มูลนิธิ SoS (Scholars of Sustenance) กำลังพยายามแก้ไขปัญหาร้านอาหารเหลือทิ้ง และความไม่มั่นคงทางอาหาร โดยรวบรวมอาหารเหลือทิ้งจากร้านค้า และโรงแรมต่างๆเป็นหลัก จากนั้นจะนำอาหารเหลือทิ้งเหล่านั้นไปแจกจ่ายยังประชากรที่ขาดแคลนอาหาร ซึ่ง ผลการวิจัยที่ผ่านมาแสดงให้เห็นว่า มูลนิธิ SoS กำลังประสบปัญหาในการดึงดูดผู้บริจาครายใหม่ และปัญหานี้ยังเห็นได้ชัดขึ้นหลังจากการระบาดของ COVID-19 ที่ผ่านมา ซึ่งทำให้ช่องทางการบริจาคตามปกติของมูลนิธิเป็นไปอย่างยากลำบาก ด้วยเหตุนี้ คณะผู้วิจัยจึงมีเป้าหมายที่จะทำความเข้าใจบริษัทผู้ผลิตอาหาร และหาแรงจูงใจในด้านการบริจาคอาหาร เพื่อขยายฐานผู้บริจาคให้กับทางมูลนิธิ SoS

ตลอดระยะเวลาการวิจัย คณะผู้วิจัยตั้งใจที่จะสัมภาษณ์บริษัทรับกำจัดขยะ ทั้งภาครัฐและเอกชน รวมไปถึงบริษัทอาหารที่ร่วมมือและไม่ได้ร่วมมือกับทางมูลนิธิ SoS โดยส่วนใหญ่จะเป็นการสัมภาษณ์ผ่านทาง Zoom โทรศัพท์ หรืออีเมล เป็นต้น คณะผู้วิจัยได้มีโอกาสเข้าสัมภาษณ์กรมควบคุมมลพิษ กระทรวงทรัพยากรธรรมชาติและสิ่งแวดล้อม รวมถึงบริษัทรับเก็บขยะภาคเอกชน ด้วยกันทั้งสิ้น สามราย อีกทั้ง ยังได้มีการติดต่อบริษัทผู้ผลิตอาหารมากถึง 250 บริษัทด้วยกัน อย่างไรก็ตาม มีเพียง 12 บริษัทเท่านั้นที่ตอบรับกลับมา ซึ่งสามรายในนั้นเป็นบริษัทที่ได้มีการร่วมมือกับทางมูลนิธิ SoS อยู่แล้ว ส่วนอีกสองรายได้แสดงความสนใจที่จะร่วมมือกับทางมูลนิธิ SoS

จากการสัมภาษณ์ คณะผู้วิจัยมีข้อเสนอแนะดังต่อไปนี้

1. เสนอให้ทางมูลนิธิ SoS มีบริการด้านการตรวจสอบปริมาณขยะอาหารภายในบริษัท

เนื่องจากบริษัทส่วนใหญ่ที่ให้สัมภาษณ์แจ้งว่า ไม่มีขยะอาหารเกิดขึ้นในระหว่างกระบวนการผลิต อย่างไรก็ตามมูลนิธิ SoS เล็งเห็นว่าโดยทั่วไปหากทางมูลนิธิ SoS ได้เข้าตรวจสอบสถานที่ด้วยตนเอง ทางมูลนิธิมักจะพบว่า มีขยะอาหารมากกว่าจำนวนที่ได้มีการแจ้งเอาไว้ ซึ่งในปัจจุบันทางมูลนิธิ SoS สามารถเข้าตรวจสอบปริมาณขยะอาหารได้เฉพาะบริษัทที่ตกลงเป็นผู้บริจาคอาหารเท่านั้น คณะผู้วิจัยจึงเล็งเห็นว่า หากเสนอบริการนี้ให้แก่บริษัทอื่นๆ ทางมูลนิธิ SoS จะสามารถสร้างความตระหนักด้านปัญหาขยะอาหารในประเทศไทย และสามารถเข้าถึงกลุ่มผู้บริจากรายใหม่ แต่ถึงแม้ว่าบริษัทเหล่านั้นจะตัดสินใจไม่ร่วมมือกับทางมูลนิธิ SoS หลังการตรวจสอบปริมาณขยะอาหารก็ตาม บริษัทเหล่านั้นก็ยังคงเกิดความเข้าใจและตระหนักถึงปัญหาขยะอาหารในประเทศไทย

2. แสวงหาความช่วยเหลืออื่นๆ จากบริษัท นอกเหนือจากเรื่องการบริจาคอาหาร

เนื่องจากหลายบริษัทแจ้งว่าไม่มีขยะอาหารเกิดขึ้นในระหว่างกระบวนการผลิต บริษัทเหล่านั้นจึงเชื่อว่าไม่สามารถให้ความช่วยเหลือมูลนิธิ SoS ได้ แต่ถึงแม้จะไม่มีขยะอาหารเกิดขึ้น ทว่าทางบริษัทสยามฟู้ด หนึ่งในบริษัทผู้ให้สัมภาษณ์ ได้เสนอและอาสาให้ความช่วยเหลือในด้านการขนส่งสำหรับการนำอาหารไปบริจาคให้แก่ชุมชนต่างๆ ดังนั้น การขอความช่วยเหลือด้านอื่นๆ นอกเหนือจากเรื่องการบริจาคอาหาร อาจทำให้มูลนิธิ SoS มีโอกาสที่จะสามารถขยายเครือข่ายบริษัท และกลุ่มผู้บริจาคได้

3. มุ่งเน้นไปที่ผู้ผลิตสินค้าประเภท Non-OEM

จากจำนวน 12 บริษัทที่ตอบรับกลับมา มีหลายรายที่เป็นผู้ผลิตสินค้าตามแบบฐาน (OEM) ซึ่งบริษัทเหล่านี้ผลิตสินค้าตามจำนวนที่ลูกค้าต้องการ อีกทั้งทางบริษัทมีนโยบายลดอาหารเหลือทิ้งและขยะอาหารที่อาจเกิดขึ้นในระหว่างกระบวนการผลิต เพื่อลดต้นทุนและเพิ่มผลกำไร ด้วยเหตุนี้ทางบริษัทผู้ผลิตตามแบบฐาน (OEM) ที่ไม่ได้ผลิตสินค้าภายใต้แบรนด์ของตนเอง จึงไม่ยากที่จะรับผิดชอบหรือเพิ่มความเสี่ยงเกี่ยวกับเรื่องชื่อเสียง และแบรนด์ของลูกค้า ดังนั้นหากมูลนิธิ SoS ต้องการมุ่งเน้นหาผู้บริจากรายใหม่ที่เป็นผู้ผลิต คณะผู้วิจัยจึงแนะนำให้เปลี่ยนเป้าหมายและมุ่งเน้นไปยังบริษัทผู้ผลิตอาหารประเภท Non-OEM

4. มุ่งเน้นไปทางผู้ค้าปลีกชั้นปลายน้ำ

จากการสัมภาษณ์ คณะผู้วิจัยพบว่าสินค้าที่มีอายุการจัดเก็บสั้น มักจะถูกนำไปบริจาคเป็นจำนวนมาก เนื่องจากมีการสลับเปลี่ยนหมุนเวียนตลอดเวลา ประกอบกับการมีระยะเวลาการบริโภคที่สั้นด้วยเหตุนี้คณะผู้

วิจัยจึงแนะนำให้มุ่งเน้นไปที่ผู้ผลิตอาหารจำพวก ขนมปัง ผัก และเนื้อสัตว์ เป็นต้น นอกจากนี้ผู้ค้าปลีกชั้นปลายน้ำ ยังมีช่องทางในการระบายสินค้าหมดอายุไม่มากนัก ดังนั้นมูลนิธิ SoS จึงมีความเป็นไปได้ที่จะสามารถหาผู้บริจาดรายใหม่จากผู้ค้าปลีกชั้นปลายน้ำ

5. ใช้อยุทธศาสตร์การขายตรง

มูลนิธิ SoS ควรสื่อสารและใช้กลยุทธ์ทางการตลาดไปตั้งผู้ที่มีแนวโน้มที่จะบริจาค โดยส่งผ่านทางอีเมล หรือการลงโฆษณาผ่านทางสื่อธุรกิจ เช่น The Cloud และ The Standard เป็นต้น การทำการตลาดเช่นนี้ จะสามารถเข้าถึงผู้มีแนวโน้มที่จะบริจาคมากกว่ายุทธศาสตร์การตลาดเดิม

6. ช่วยลดงบประมาณการทำกิจกรรม CSR

แม้ว่ากฎหมายในประเทศไทยจะไม่ได้มีการบังคับให้บริษัทต่างๆ ต้องเข้าร่วมกิจกรรมที่แสดงถึงความรับผิดชอบต่อสังคมและสิ่งแวดล้อม (CSR) แต่ถึงกระนั้น บริษัทที่เข้าร่วมกิจกรรม CSR มักได้รับชื่อเสียงและภาพลักษณ์ที่ดีเป็นผลตอบแทน หนึ่งในบริษัทที่ทางคณะผู้วิจัยเข้าสัมภาษณ์ได้จัดตั้งงบประมาณสำหรับการทำ CSR แบบตายตัวไว้ที่ร้อยละ 1 ของผลกำไรทั้งหมด ทั้งนี้ ทางมูลนิธิ SoS ได้มีการเขียนบันทึกรายงานด้านการส่งเสริมและช่วยเหลือสิ่งแวดล้อม และสังคมให้แก่ผู้บริจาค โดยไม่เสียค่าใช้จ่าย ซึ่งรายงานดังกล่าวสามารถนำไปใช้เพื่อสร้างชื่อเสียงและภาพลักษณ์ให้แก่องค์กร ดังนั้น คณะผู้วิจัยจึงเล็งเห็นว่ามูลนิธิ SoS อาจสามารถลดต้นทุนและดึงดูดผู้ที่มีแนวโน้มอยากจะทำกิจกรรม CSR

นอกเหนือจากคำแนะนำของคณะผู้วิจัยแล้ว ทางคณะผู้วิจัยยังสามารถสร้างผลลัพธ์ที่เป็นรูปธรรมให้กับทางมูลนิธิ SoS ได้อีกด้วย หลังจากการสัมภาษณ์กับทางบริษัท จัดจ้านเจริญสุข จำกัด และบริษัท ไซสุข จำกัด ทั้งสองบริษัทแสดงให้เห็นถึงความมุ่งมั่นที่จะร่วมมือกับทางมูลนิธิ SoS นอกจากนี้โรงพยาบาลสงครณี มหาวิทยาลัยยังเป็นอีกหนึ่งในผู้ที่อยากจะร่วมมือกับทางมูลนิธิ SoS อีกด้วย ทั้งนี้ ทางคณะผู้วิจัยมีความภาคภูมิใจเป็นอย่างยิ่งที่ได้เป็นส่วนหนึ่งในการช่วยเหลือ และ เพิ่มฐานผู้บริจาคให้กับทางมูลนิธิ SoS

Chapter 1: Introduction

“Roughly one-third of the food produced in the world for human consumption every year - approximately 1.3 billion tonnes - gets lost or wasted” ([Worldwide Food Waste, n.d.](#)). In the world that we live in today many of us take the food put in front of us for granted. Farms and companies produce massive amounts of food only for a third of it to be turned into food surplus. Food surplus is a big issue that occurs for many different reasons, almost all of the reasons have to do with the fact that people are careless when handling their food. Thailand is no different

from the rest of the world, in that it also struggles with food surplus. In Thailand food surplus constitutes 64% of general waste produced. Additionally, there has been minimal efforts to try and contain the amount of food surplus produced beyond public marketing campaigns ([Sawasdee et al., 2020, p. 65](#)), ([Srisuwannaket, 2019](#)). Despite this large amount of food surplus, parts of Thailand also still suffers from food insecurity.

Thailand has five main regions, those being North, Northeast, South, Central, and Bangkok. Food insecurity is an issue in each of these areas, but is most prevalent in Bangkok. In total, 9.3% of Thailand's total population struggles with food insecurity. Our sponsor, the Scholars of Sustenance (SoS) is the only organization in the country that is trying to combat this through food recovery; however, previous research found that SoS struggles with communication with donors, and meeting nutrition goals in the meals they provide ([Food and Agriculture Organization of the United Nations, 2020](#)). These issues show multiple shortcomings we could improve upon in order to reduce food insecurity in Thailand.

With the above in mind, our goal is to understand the motivations and concerns Thai food manufacturing companies harbor regarding food donation and based on that understanding provide a set of recommendations, including non-legislative incentives, that will both grow Scholars of Sustenance's donor base and presence. Despite the previous work that our group had researched, there were still several unknowns specific to Thailand that would affect our recommendations. First we needed to understand the exact position of our sponsor SoS in Thailand. We had to better understand what laws they had to operate under, their budget, and their expectations for this project. If we were to come up with a set of recommendations, we first needed to know SoS's expectations and constraints. Based on our previous research, SoS had very few resources and employees. With this in mind, understanding SoS's viewpoint would tailor our recommendations to their ability level. Along those same lines we did not know the influence that SoS held. Figuring that out would also clarify the feasibility of the project. Even if laws allowed food donations, corporate interest would be necessary to produce large food recovery operations. If there were specific barriers to food donation by large companies, then we would have had to identify them. Additionally we did not know if companies were even aware of food recovery and for those who weren't, how did they currently dispose of waste. At the crossroads of a corporation's culture and bottom line, we also needed to understand how

corporate social responsibility programs play a role in companies' attitudes towards food donation.

From our unknowns described above we have identified 4 primary objectives for this project:

- Identify SoS's current standing in Thailand
- Understand Public and Private Waste Collection
- Identify Thai corporate attitudes towards donating surplus food
- Understand CSR as a donation incentive

We believed these objectives could be achieved primarily through many semi-structured interviews. If we could understand a few large companies' and experts' concerns and thoughts about food donation, we could understand and convince most other companies. We planned to conduct interviews with the SoS, and food manufacturers that were partners and non-partners of the SoS. We hoped that by doing so we could get a broad picture of the donation environment in Thailand with regards to food. Once we had collected this information we were able to synthesize our background research to create a set of recommendations that SoS could use to solicit connections with food donors.

There are many different stakeholders all of whom would benefit from the completion of this project. With food insecurity being such a large scale issue in Thailand, our project would impact the lives of many undernourished Thai people as well as their families. When food production companies do not partner with the Scholars of Sustenance, their waste is collected by public or private waste collection companies which contribute to the development of landfills throughout the country. As these landfills decompose, methane is emitted into the atmosphere. Methane is a greenhouse gas which is responsible for smog, as well as many health issues such as asthma. Reducing the amount of waste that is deposited in these landfills would have many environmental benefits as well as societal benefits by the food surplus being relocated to those in need.

Chapter 2: Literature Review

2.1 Food Insecurity

Food insecurity is defined by the United Nations as a state where not every individual has physical, social, or economic access to sufficient, safe and nutritious food to meet dietary needs

for a productive and healthy life. We have identified three main contributors to food insecurity, lack of food accessibility, poverty, and lack of nutritional education. Lack of food accessibility is the inability to acquire food based on the lack of transportation, difficult terrain or the lack of proper cooking equipment and storage (Nord et al, 2008). Poverty refers to the high rates of unemployment and low-income families who can not financially afford sufficient food (Nord et al, 2007). Lastly, lack of nutritional education encompasses education in schools, family traditions, advertisements and the cultural stigma surrounding food consumption (Office of Disease Prevention and Health Promotion, 2020).

In 2019 the World Health Organization, found that two billion people or 25.64% of the world's population experiences moderate or severe food insecurity (Food and Agriculture Organization of the United Nations, 2020). Attempting to address this issue, the United Nations has created a plan for the year of 2030 that includes initiatives that follow the 3 R's: reduce, reuse, and recycle. Effective execution of this plan would result in a 50% reduction in food surplus (Srisuwannaket, 2019). These three R's are incorporated into food insecurity efforts through food surplus accumulation reduction, food surplus reuse by redistribution, and recycling excess food which can not be redistributed, through means of composting systems.

Region #	Region Name	Number of people without access to three meals a day	Percentage of region population
1	Bangkok	658,589	7.93%
2	North	297,922	2.5%
3	Central	1,138,468	6.3%
4	South	532,256	5.4%
5	Northeast	474,805	2.50%



Figure 1: Food Insecurity in Thailand by Region
(National Statistical Office, 2013)

Although nationally, Thailand's food output exceeds dietary requirements, as of 2020, the United Nations estimates that 9.3% of the population is undernourished ([National Statistical Office, 2012](#)), ([Food and Agriculture Organization of the United Nations, 2020](#)). Multiple studies on this have found that the root cause of food insecurity in Thailand is due to poverty; however, poverty's effects on food insecurity differ between rural and urban regions ([Bumrungrkit, 2014](#)), ([Piaseu, 2004](#)). In rural regions agriculture is the dominant occupation, particularly rice farming; however surprisingly most food insecure families were in the agriculture industry. Households that worked in agriculture made up 87.1% of food insecure households in Thailand. Of those households 54.4% were rice farmers ([Isvilanonda, 2003](#)). Bumrungrkit, in their 2014 paper, blames the rising costs of synthetic fertilizers and other farming implements. Additionally, Bumrungrkit states that "Even though these farmers have a sufficient amount of rice to consume, they may be vulnerable to food insecurity due to their high expenditure on the foods they cannot produce" ([Bumrungrkit, 2014](#)).

In urban settings, poverty manifests itself differently. A 2019 study describes the poverty penalty "whereby the urban poor pay more for the same products than their wealthier counterparts. In some cases, this is due to lack of access to cheaper retail outlets located far from low-income settlements" as a contributing factor to urban poor food insecurity ([Boonyabanacha, 2019](#)). Traditionally in Thailand, street vendors provide food to the poor. A 2004 study of the urban poor in Bangkok found that 96% of respondents said that affordability was the main barrier to food. The study also noted that most meals were procured from street vendors ([Piaseu, 2004](#)). The general agriculture policy trend in Thailand has been one of formalization and industrialization. A 2010 case study Bangkok about food access found that this trend can be detrimental to the urban poor. Most people cannot afford supermarkets and must rely on traditional markets; however from 1980 to 2003 the number of traditional markets in Bangkok fell from 220 to 155. Additionally, new wholesale markets are generally built away from areas easily accessible by the poor ([Chung, 2010](#)).

In both rural and urban circumstances in Thailand, poverty exacerbated by modernization affects food insecurity; however the government pushes modernization as a way to alleviate food insecurity. Although the price of modern farming pushes some to food insecurity, Bumrungrkit also admits that integrated farming solutions would help alleviate the lack of nutrition in monoculture farming, yet many farmers are hesitant to adopt new practices due to lack of

education ([Bumrungrkit, 2014](#)). This viewpoint is supported by Royal Initiative being adopted to promote good farming practices. His Majesty's "New Theory" on Managing Agricultural Land promotes splitting up land for different uses including 30% for rice, 30% for other crops, and 10% for livestock as well as education on sustainable farming practices ([Suphapol, 2010](#)). Despite this understanding of food insecurity, tailoring agricultural and development policies to help the poor will satiate food insecure individuals in the short term.

2.2 Sponsor - Scholars of Sustenance

We were working on this project in conjunction with the Scholars of Sustenance. Scholars of Sustenance (SoS), is a food rescue charity that operates in Asia, but is based in the United States. SoS launched their first mission in Bangkok, Thailand in the year 2015. With the success of this first launch, a new operation was added in Indonesia in 2016 ([Scholars of Sustenance, 2020](#)). There are four main organizations which SoS Thailand donates to: orphanages, low income communities, homeless shelters, and refugee facilities ([Maslen et al. 2020](#)). The majority of donations are from local restaurants and hotels throughout Bangkok and Bali. Some of these major donors to the Thai SoS are the Marriott, Millennium Hilton, Centara hotels. Through the food donations of Scholars of Sustenance and the help of their donors, the four main organizations are being provided with sufficient food and nutrition.

2.3 Cultural Considerations

There were several considerations of Thai culture to take into account. The main consideration being food etiquette and the standards of food consumption. Some of these Thai etiquettes include something as simple as only eating with your right hand and with a spoon. A large cultural difference is the amount of food consumed per sitting. It is common for a guest to show respect in other countries such as Southern Europe by finishing their meal, however, in Thailand this behavior is often seen as being rude. A smile from the guest is acknowledgement enough that the food is delicious while also recognizing the host for their work. Further, many Thais are very opposed to over-ordering and leaving a great deal of food uneaten. This is based on the greedy implications that are associated with this attitude and the waste of animal life.

94.6% of Thais are Buddhist ([Central Intelligence Agency, 2021](#)). When considering cultural barriers, one also needs to consider บุญ or merit making. In Theravada Buddhism,

merit making is committing acts that will bring you closer to salvation. Meritorious acts include meditating, living by the five precepts, donating money to a temple, or donating food to monks. Making merit can be enlightening, but oftentimes it is very transactional as the wealthy can simply expend material wealth. Of particular interest is the act of food donation. Monks are not allowed to cook their own food and instead, every morning must beg for food. At least in Northern Thailand, some residents see donating to non religious organizations as equally meritorious or even more ([Bowie, 1998](#)). Despite a tradition of donations to Buddhist organizations, younger generations may be shifting donations away from Buddhist temples. A recent study done primarily on Generation Y individuals in Thailand found that 58.2% of participants donated over 70% of their donation expenditure to non profits instead of Buddhist temples ([Kachonnarongvanish, 2017](#)). Generation Y is made up of individuals born between 1981 and 2000. They currently make up the largest share of Thailand's population at 28% ([Amornvivat, 2014](#)).

The type of food being consumed is a key factor to understanding what food is being recovered and how those carrying procedures of other countries align with the varying diet of Thai people. Considering the large prevalence of seafood in the Thai diet, this may require some differences in safety precautions due to the high volume of fish. Further, considerations such as climate should be made due to the geographical differences between the researched countries and Thailand. The United States and Thailand are similar in the fact that their regions vary dramatically when dealing with climate. While the temperature stays mostly consistent throughout Thailand, there are large variations in rainfall and humidity. With these factors taken into consideration, Thailand's weather stays at a consistent hot temperature throughout the year, especially in Bangkok. This creates a barrier between countries due to the temperatures they experience and the proper methods to managing food. Additionally the concept of making merit may hinder the ability of donation incentives to work. If on a spiritual level, donations to a non profit are inherently less virtuous, then a moral argument may have to be made rather than an economic or legal argument.

2.4 Corporate Considerations

2.4.1 Corporate Social Responsibility

Corporate social responsibility is defined primarily by ISO26000, the United Nations Global Compact, and as GRI standards. Broadly speaking, CSR is defined as a framework by which companies can integrate environmental, social, and community development goals into their operation ([Prayukvong, 2009](#)). Besides these international standards, the Thai Security and Exchange Commission provides resources to implement CSR activities ([Securities and Exchange Commission, Thailand, 2019](#)); however there are no Thai laws mandating CSR activities ([Srisuphaolarn, 2013](#)). This leaves companies responsible for their own implementation of CSR to varying degrees of engagement. For example, a lighter company gave out 1000 free ashtrays to prevent cigarette littering (Udomkit 2013), while Thai mining companies in the North focused on "economic sustainability after the mine has closed" ([Pimpa, 2014](#)). Specifically, the mining companies supported educational opportunities to women and built up infrastructure. These two different approaches to CSR show the levels of commitment to CSR as a paradigm versus PR stunt. A 2013 paper by [Srisuphaolarn](#) breaks down CSRs into reactive, turn-key, issue-based, recipient-based, and integrated CSRs. Reactive and turn-key CSRs were described as focusing on one-time donations of either resources or manpower. Issue and recipient based CSRs were more focused on long term separate projects. Lastly integrated CSRs focus on internal projects like making more eco-friendly products or offering core services that do more good ([Srisuphaolarn, 2013](#)). Even though the idea of CSR comes from the west, Thailand already has a similar concept in the form of a patron client culture ([Prayukvong, 2009](#)), ([Pimpa, 2014](#)). In this system, more wealthy individuals are expected to help the poor in return for the poor's support. This translates well into CSRs where the wealthy can be seen as the wealthy patron and the communities are the poor clients.

2.4.2 Original Equipment Manufacturing

An original equipment manufacturer (OEM) is a company that produces parts and equipment that can be marketed or developed by another manufacturer. Dole, for example, is an OEM as it uses separate companies for fruit processing and canning, which is then shipped to Dole for further processing ([Kompass, n.d.](#)). Some of the most prevalent types of OEM in Thailand are food processing, such as CPRAM and Global Consumer, and automotive parts,

such as AAPICO. OEMs produce food products for many different companies and commonly work on a made to order operation style. We ended up shifting our focus away from OEM businesses because of their method of operation which limits their food surplus to be a very minimal amount. When COVID cases were rising, one of their main sources of donations, hotels and resorts, were suddenly no longer able to donate food, and because of this SoS is valuing reliability of donations more.

2.5 Global Food Surplus

Food surplus can occur at any step of food production and is a byproduct of food surplus not being properly handled or recovered. Understanding common sources of food surplus is an essential step to reducing it.

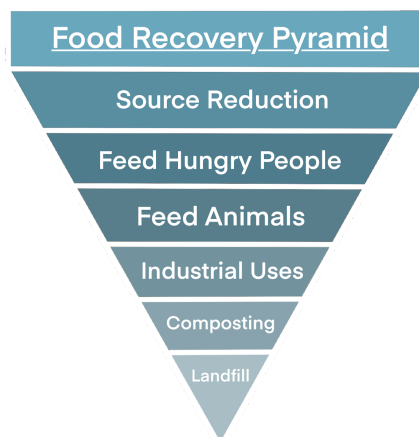


Figure 2: Food Recovery Pyramid

The Food Recovery Pyramid is a graphic going downward from most to least ideal ways to recover food ([Environmental Protection Agency, 2019](#))

One source of food surplus stems from confusion between the ‘best by’ and ‘use by’ labels on consumer goods. Although these labels give the date for when the food will lose its freshness, consumers feel that eating food past this date will be detrimental to their health ([Waste and Resources Action Programme, 2017](#)). Due to this confusion, many people discard edible food. For example, many people dispose of canned goods by the 'best by' date when in fact, “Canned foods are safe indefinitely as long as they are not exposed to freezing temperatures, or temperatures above 100 °F. (37.8 °C)” ([Food Safety Inspection Service, 2015](#)).

Another source of food surplus is food scraps, which are not fit for human consumption but often useful for animal feeds in the food recovery pyramid. Food scraps are generally considered leftovers and food preparation remains. In this case food surplus stems from usable food discarded during food preparation or excess food being prepared that is never eaten. This sort of waste is most seen in the US and at hotels and restaurants. One more source is food rejection. According to the FAO, “Rejection of food products on the basis of aesthetic or safety concerns is often another major cause of food losses and waste” ([Food and Agriculture Organization of the United Nations, n.d.](#)). In many places, food will not be sold by a grocery store because of its undesirable aesthetic. In order to help combat food surplus, some companies will sell the produce with undesirable aesthetics at a discounted price like Misfits Market ([Crook, 2020](#)).

Sawasdee et al wrote “according to statistics 64% of 27.06 million tonnes of Thailand’s waste annually is food surplus, grocery stores in Bangkok throw away an average of 200 kg of food per day and 5-star hotel buffets throw away an average of 50 kg of food after each service period” ([Sawasdee et al, 2020, p. 65](#)). The fact that Thailand’s food surplus accounts for 64% of their general waste is very concerning because this is a high ratio when looking at food surplus and general waste of other countries.

Given that there is a large amount of food being wasted and large numbers of food insecure individuals, food recovery addresses both problems by using food that would have been wasted and redistributing that food to food insecure individuals. The USDA defines food recovery as "the collection of wholesome food for distribution to people in need" ([Food Recovery Committee, 2007](#)). Broadly speaking there are four methods of food recovery also defined by the USDA: field gleaning, perishable produce rescue/salvage, perishable and prepared food rescue, and nonperishable processed food collection. Field gleaning is the collection of food directly from storehouses and fields that would otherwise be discarded or not harvested. Perishable produce rescue/salvage is the recovery of produce from retail markets. Perishable and prepared food is the recovery of prepared foods like cooked meals and ready made items like those found at restaurants and canteens. Lastly, nonperishable processed food collection is the recovery of nonperishable items like canned goods ([Haley and Civita, 2013](#)). Each of these food recovery methods focuses on different steps of the food supply chain and reduces overall food

surplus. By applying these practices in Thailand, food surplus and insecurity could jointly decrease.

2.6 Thai Food Surplus

2.6.1 Waste Collection

In Thailand, food surplus is categorized as municipal solid waste. Organic wastes are usually dumped in open landfills or incinerated while minimal fractions are recycled back or composted for fertilizers. There are public and private service contractors available to collect wastes. Normal households pay a fixed price of 20 baht per month while food manufacturers, hotels and markets pay according to the quantity of wastes produced ([Government Gazette Issue 136, 2019](#)). Waste collection fees are issued once a month, however wastes are collected on a weekly-basis. The current standard service fees from the public sector areas follows:

Amount of waste (X)	Price (Baht)
1000 L > X > 500 L	2450
X > 1000 L	3250

Table 1: Waste Collection by Volume per Month

Municipal solid waste collection fees stated in the Thai Government Gazette (Monthly fee) ([Government Gazette Thailand Issue 136 Special Chapter 170, 2019](#))

Amount of waste (X)	Price (Baht)
1000 L > X > 500 L	180
X >= 1000 L	245

Table 2: Waste Collection by Volume per Pickup

Municipal solid waste collection fees stated in the Thai Government Gazette (Cost per pickup) ([Government Gazette Thailand Issue 136 Special Chapter 170, 2019](#))

Five-star hotels throw food surpluses of around 50 kilograms per service and markets throw away up to 200 kilograms per day ([Özdemir and Güçer, 2018](#)). Under normal conditions, one liter (unit of volume) of water weighs one kilogram (unit of mass). Since most food consists of water, it is common to see food surplus measured in liters.

The collection process does not transfer food surplus directly to the landfill ([Chiemchaisri et al, 2007](#)). Instead, food surplus is allocated to transfer centers and subsequently passed on to landfill sites. Transfer centers are used to accumulate waste from different areas and transfer the collected wastes to designated sanitary landfills in bulk which reduces transportation cost and time. In Bangkok, there are three transfer centers: On-Nuch, Nong Khaem, and Saimai stations, capable of holding approximately 3,500, 2,800, and 2,300 tons of solid waste per day, respectively.

2.6.2 Waste Disposal

The introduction of “Thailand Zero-Waste”- an initiative to follow the three R’s (Reduce, Reuse and Recycle), has emphasized concerns with finding alternatives methods of reducing food surplus like composting and biofuel conversion ([Srisuwannaket, 2019](#)). The hierarchy referred to in Figure 2 shows preferred steps to prioritize regarding food surplus, with disposal on landfills being the least preferred. Although private and public waste collection contractors exist, private contractors do not have the right to discard waste on the public landfills as it is considered the government’s. Private contractors would have to treat the food surplus first and then dispose of it in private landfills or through incineration, making private service pricing more expensive. There are several private waste collection contractors, but composition of private landfills are not disclosed to the public. The following table shows the compositions of the different kinds of municipal solid wastes in the Thai public landfills.

Province	Waste composition (%)									Generation rate kg/capita/day
	Food Waste	Paper	Plastic	Glass	Metal	Rubber	Textile	Yard waste	Ceramic	
Bangkok	43	12.1	10.9	6.6	3.5	2.6	4.7	6.9	3.9	1.5

Angthong	42	13.5	12.4	4.0	3.5	4.1	7.2	9.8	1.9	0.6
Chiangmai	54	11.0	15.1	9.6	2.1	0.9	2.6	1.2	2.1	-
Chiangrai	45	10.0	12.0	10.0	5.0	2.0	2.0	10.0	-	1.1
Kanchanaburi	50	17.7	19.7	2.4	2.0	0.3	0.9	4.6	1.4	0.9
Nakornratchasima	44	20.1	21.0	6.4	2.6	0.5	2.3	1.6	0.9	1.2
Nakornsawan	53	13.2	13.7	0.3	0.4	0.1	0.2	15.7	0.6	0.6
Nonthaburi	52	6.8	28.4	4.3	0.6	1.9	2.1	1.3	1.4	0.6
Pattaya	41	25.0	17.6	4.5	1.3	-	2.6	6.0	-	1.0
Petchburi	55	11.3	19.3	0.6	3.9	4.0	2.7	2.6	0.3	0.9
Phitsanulok	58	5.0	26.2	1.7	1.1	0.7	2.2	3.5	0.5	0.9

Table 3: Physical Composition of Municipal Solid Waste in Bangkok and Selected Provinces in Thailand and their per Capita Generation Rate
(Chiemchaisri et al. 2007)

Solid wastes such as paper and metals are generally recovered; however, not much is being done to reduce food surplus at the disposal stage even though, according to the table, the level of food surplus is much more than other materials.

Based on our research we can see the scope and causes of food surplus globally and on a Thai level. By combining this overview with an outline of Thai culture, corporate practices, and waste disposal methods, we can better inform our methodology to ask informed questions.

Chapter 3: Methodology

In order to create a list of incentives to attract food donors to partnering with the Scholars of Sustenance, we set out to complete the following sub objectives: (1) understanding public and private waste collection operation and fees, (2) determine food manufacturers' interest in food donation, (3) understand corporate social responsibility and (4) understand SoS's standing in

Thailand. This section will take a deeper dive into the details of the objectives and the methodology of completing these tasks.

3.1 Understanding Public and Private Waste Collection

To fully understand waste collection, we interviewed both private and public waste collection companies. One area that the SoS requested we look at is the cost of waste collection. Currently, the SoS collects food from donors for free. Understanding the costs associated with waste collection will inform our understanding of reasons companies may choose not to donate.

3.1.1 Interview Public Waste Collection Contractor

Our team decided to interview public municipal solid waste contractors in the Bangkok area in order to obtain useful information about how service fees work and its pricing for bulk food surplus of producers. These public disposal fees were then compared with both private disposal fees and the cost-free services of SoS. Although waste disposal fees are officially published on the Thai Government Gazette (Government Gazette Thailand Issue 136 Special Chapter 170, 2019), since each district may differ in price hence, we contacted the public services for further clarification. Aside from the fees associated with waste collection, we also gained information on the collection process itself and information on waste sorting requirements prior to collection. These potential steps in the collection process are important to note based on convenience of working with certain waste collectors. The list of questions we asked public waste collection contractors can be found in [Appendix A](#).

3.1.2 Interview Private Waste Collection Contractor

Aside from public services, private services offering solid municipal waste management are also used in Bangkok. Depending on what type of waste the business produces, a private waste collection service may be utilized. We interviewed these private collection contractors for information which we then compared to the operation of SoS in terms of efficiency and pricing. We collected information regarding how waste is collected, and how businesses are charged for these services. The list of interview questions and disposal companies that we contacted to compare service fees could be found in [Appendix A](#) and [Appendix C](#).

3.2 Determining Food Manufacturers' Interest in Food Donation

We interviewed both donors and non-donors to the SoS in the food manufacturing industry. We chose which food manufacturers to interview based upon both suggestions from SoS as well as perceived shelf life of the food product being manufactured. These criteria were chosen because SoS wanted us to focus on the consistency and volume of donations with a stated goal of 4 tonnes of food per day. The questions presented below will be delivered first via email. Following this initial delivery of questions, an interview will be conducted over either Zoom or telephone depending on the preference of the interviewee. The list of companies we contacted can be found in [Appendix C](#).

3.2.1 Interview Non SoS-partnered Food Manufacturers

Our team decided to interview food manufacturers to understand their perception on food surplus and find out where they stand on food donation in Thailand as well as how much they spend on food disposal services. For our interviewee selection we had three criteria: location, contactability, and product shelf life. Because SoS only has four food loading vehicles that operate within the vicinity of Bangkok, we have decided to focus interviewing food manufacturers in Bangkok. Because we aimed to select larger companies with easily accessible contact information that would have the resources to engage with our inquiries, we reached out to companies listed on thaifoodbusiness.com/company/list, a directory run by the Marshall Cavendish Business Information company. Lastly because we needed to find consistent sources of food surplus, we focused on companies that sold products with shelf lives of three months or below because those products are more likely to be discarded. Contact was first initiated by email and upon further interest, a phone interview was set up. In our background we found that at least in the United States and Italy, companies are hesitant to donate due to perceived logistical costs and lack of awareness. Our questions have been tailored to first identify if the company produces food surplus, then understand their awareness regarding both the SoS and food surplus. The list of interview questions can be found in [Appendix A](#).

3.2.2 Interview SoS Partnered Food Manufacturers

Our team decided to interview current SoS-food donors to gain insight on the reasons why these donors have partnered with SoS and the impact it has had on their company. SoS has

reached out on our behalf to 8 companies that they currently partner with. Once contact had been made, we extended an official letter provided by the University to the interviewees requesting their participation in our project. Those companies are listed in [Appendix C](#). By understanding donors' relationships with SoS, we can learn how the relationship started, specific logistics, and reasons for continued partnership. The list of interview questions can be found in [Appendix A](#).

3.3 Understand CSR

Companies throughout Thailand often participate in charity work as an act to better the community and pay it forward. This is called the business' [CSR](#) or corporate social responsibility and often involves the integration of environmental, social and community development goals into their operation process. Although CSR requires large amounts of money to fulfil this responsibility and is not mandated by any laws, companies often feel a moral obligation to contribute to the community. We will complete this objective by creating an additional set of questions for our interviews with food manufacturers regarding CSR. The list of interview questions could be found in [Appendix A](#).

3.4 Understand SoS's Current Standing in Thailand

To better understand the current standing and relations of SoS in Thailand, we conducted interviews with SoS to learn more about their connections and current partnerships with food companies. We aimed to gain insight on their operations such as pickup and delivery and the training that is required for food companies prior to partnership with SoS. These interviews allowed us to have a better understanding of the outcome SoS is looking for and their priorities when forming partnerships with new food companies. The list of interview questions are outlined in [Appendix A](#).

Chapter 4: Results and Analysis

4.1 Findings from Interviews with SoS

During coronavirus, SoS lost much of their donations from hotels and restaurants which warranted their request for us to focus on food manufacturers. SoS specifically wanted consistency and volume as opposed to nutrition. In addition to these food related findings, we learned SoS also provides detailed monthly and yearly company specific reports to food donors.

The data consists of dietary breakdowns, populations served, numbers of meals provided, and various conversions to environmental figures like carbon emissions saved or amount of electricity saved. This report service is very popular among donors as it can boost their image with numbers. Of note is that SoS reported that some companies even asked for a report even if they had not donated for the month. SoS also reports several future goals including providing a data subscription service which would provide food donors with a more detailed monthly and yearly report.

4.2 Findings from Interviews with Private Waste Collection Companies

During our research we have found a very limited number of private municipal waste collection companies in Thailand. The list of private waste collection companies are found in [Appendix C](#). After reaching out to this small list we formulated, we were able to make contact with three private waste collection companies. All of the companies we interviewed shared that they take into consideration the distance between the client and the waste collection company.

4.2.1 Green Gold Waste

Green Gold Waste is a waste collection company with ISO 1400 certification. The company accepts hazardous materials such as expired food seasonings, contaminated water, batteries, and municipal wastes from various factories. In addition, the company also collects non-hazardous wastes such as copper, aluminium, plastics and paper wastes. The fee is fixed at 1500 Baht per tonne per time without any hidden costs.

4.2.2 One More Link

One More Link is a waste collection and treatment facility. Wastewater is collected by the company to then be treated into usable water. For non-hazardous wastes, the company converts them into fertilizers via composting processes. The price rate ranges from 500 to 1500 Baht per tonne per time however this range tends to differ according to distance. Additionally, One More Link offers audit services inside factories.

4.2.3 Ai-co Waste

Ai-co waste collects non-hazardous wastes such as liquid waste from food factories, drinks, biological sludge, municipal waste such as dairy, fruit peels and food surplus. These wastes are collected, analyzed and treated under the ISO/IEC 17025 certification and converted to other value-added materials such as fertilizers.

4.3 Findings from Interviews with Public Waste Collection Companies

The data used to analyze public waste collection companies were from the Thai Government Gazette Issue 136 Special Chapter 170 on Bangkok waste collection fees. We found that for food manufacturers, waste disposal fees were charged depending on the quantity of waste produced. We also interviewed the Thai pollution control department for further insights. We have also contacted the Ministry of Environment for an interview however we did not receive a response.

4.3.1 Thai Pollution Control Department

We were able to interview the director of the hazardous waste and environmental waste management division, Suthisa Paulpermpoon. It was found that 72% of the total municipal waste in Thailand are placed in sanitary landfills, 15% undergo composting programs, 8% are placed under mechanical biological treatment (a new method to tackle organic wastes and turn them to biogas fuel) and 5% of Thailand's total municipal waste undergo incineration. Recently, Thailand has not separated municipal wastes. The department is still tracking for data on the amount of municipal waste produced in upstream processes such as production and manufacturing stages. We also found out that this department also uses private services. Such private services are "Sasomsub" and "Pairojsomphong Group" for incineration and placing in sanitary landfills.

The municipal waste collection fees in Bangkok are charged according to the Government Gazette for Bangkok. Normal households are charged with a 20 Baht rate every month and waste is collected every week. Owners that produce sufficiently more waste than normal households are charged according to quantity as shown in the table below. The fee collections are categorized into two options, per time and per month. For per month, the wastes are collected on a weekly-basis but fees are charged once a month. For per time, wastes are

collected only if the clients call for specific collections and fees are charged for that particular service. For instance, if food manufacturers had an unexpected quantity of waste that day, they can call for an additional per time service. A list of fees are shown below.

Government Gazette for Bangkok (2562)					
Municipal Waste fees (per Time)			Municipal Waste Fees (per month)		
Amount	Unit (L)	Fees (Baht)	Amount	Unit (L)	Fees (Baht)
<= 500	L	125	<=20	L	40
500-1000	L	180	20-500	L	65/20L
>1000	L	245/1000L	500-1000	L	2450
			>1000	L	3250/100L

Table 4: Public Municipal Waste Collection Fees

4.4 Findings from Interviews with Non-SoS Partnered Food Manufacturers

From the 247 companies contacted, eight companies contacted back and two companies (JadJans Chilli Paste and Eighty Eight Egg Whites) are interested in forming a partnership with SoS. The list of non-SoS partnered food manufacturers are found in [Appendix C](#). From our interviews, we found out that most food manufacturers in Thailand are [OEMs](#), so they produce food products for different brands. In addition, most companies claim that they do not produce much waste in order to maximise profit and use public waste services. Since [CSR](#) activities are not compulsory by law, not every company participates in doing CSR activities. Some companies have CSR budgets (around 1% of annual profits) for CSR activities for brand image boosting purposes. Unfortunately, none of the companies that we contacted heard about the SoS. We believe that the SoS is an excellent middleman for CSR collaborations, and companies engaging in CSR activities may be interested in utilizing this untapped potential to help others as well as lower their own CSR budgets.

4.4.1 Siam Food

Siam is an [OEM](#) company that specializes in producing mostly canned pineapples. About 90% of Siam’s product is canned pineapple while the other 10% is made up of canned papayas and mangos. In an interview when asked about food surplus, Siam’s representative claimed that

the company did not create much food surplus. But, the waste that the company created was categorized into fallen/damaged pineapples from production, solid waste from the canteens leftover food, and pineapple peels. The fallen/damaged pineapples are discarded, the same applies to the waste from the canteen, and the pineapple peels are sold for animal feed. The overall conclusion given by Siam's representative was that the company did not create much food surplus. During the interview with Siam, we found that they had never heard of SoS before. When asked if Siam would ever consider partnering with SoS we found that Siam believed that a partnership would not be possible because due to the fact that they are an OEM company. They fear that it could damage reputations of all partnered businesses, in addition Siam would need permission from the Thai FDA. Siam did, however, propose that they might be interested in a [CSR](#) relationship to help transport donated goods so long as the donations followed the same routes that their company uses. Lastly, through the interview it was found that Siam does participate in CSR outreach, this consists of donating products to nearby schools and communities.

4.4.2 Eighty Eight

Eighty Eight is an [OEM](#) that specializes in producing egg white products including ready-to-eat egg white sticks, egg white tofu, and crispy egg whites with an average shelf life of 45 days. They are headquartered in Bangkok, but their factory is located in the Northern region of Thailand. Eighty eight reported minimal food surplus; however there are protocols in place for waste that is produced. Eighty Eight reports the following as main sources of food surplus: eggshells, eggs nearing expiration, and eggs with black dots. Notably, egg yolks are not considered food surplus as they are either sold to bakeries or used to make *foi thong*, a Thai egg yolk dessert. Eighty Eight reports using eggs with black dots to make egg tofu and boiling eggs near expiration for dog feed. Despite reporting a low amount of food surplus, Eighty Eight still desired to donate food because the owner felt it was a huge problem. Currently, Eighty Eight sells food that did not pass quality control at a reduced price, but in the future Eighty Eight plans to donate these products to hospitals and elderly homes. Although Eighty Eight had never previously heard of SoS prior to the interview, they expressed interest in partnering with SoS when asked. Interestingly, Eighty Eight, unlike other OEMs, was not concerned about branding because they had confidence in their product. When taking the above into account, it is important

to note that the interviewee and proprietor of Eighty Eight was a Chulalongkorn University alumnus themselves which may have increased interest in the project and SoS.

4.4.3 Anan Industry

Anan industry is an [OEM](#) company that specializes in producing fruit jelly products. The company rarely has waste produced as products are made to order. In addition, fruits used are artificial substitutes which can be kept for an extended period of time preventing the need of using fresh fruits and hence, lower fruit surplus. Anan industry did not disclose how much waste is produced however, the company's mode of disposal was found out to be using public services where they pay around 500 Baht per month. This company focuses on production and does not pay much attention to charity. The company has never heard of the SoS.

4.4.4 Catering Thai

This company is a catering company that prepares Thai cuisine on a small scale. The company defines small scale as preparing food for 50 people or less. There is negligible leftover food because it is made to order. The food is delivered and catered directly to the client's location where excess food would be the client's or host area's responsibility. The real waste produced from this company would be fruit and vegetable peels. Furthermore, this company has never heard of the SoS.

4.4.5 Snack House

Snack House is a wholesale caterer that produces baked goods for various coffeehouses and international schools. Snack house reported a large amount of leftover bread generated during the production process. Despite a large amount of leftover bread, some will be donated to the temple for fish feeding, and the rest will be discarded. Snack houses used public collection services where they pay approximately 500 Baht per month. Furthermore, Snack house had never heard of the SoS. When asked if Snack house would consider donating the leftover bread, it was found out that they wanted to donate a good quality bread, not the leftover bread.

4.4.6 Betagro

Betagro is a food manufacturer that produces items such as chicken, pork and fish. Based on the production of mainly raw food items, the majority of their products have a short shelf life of around five days. Unlike most companies we contacted, Betagro is not an [OEM](#) and does not utilize the services of an OEM for their food production. Because this company does not use any outside vendors, they manage many steps of the food production operation. These steps start with farming and end with packaging and selling. Since there are many steps of this process, there is very little to no waste. All scraps are repurposed and often used as feed for the animals on their farms. Any additional food items that are not as high quality after production are sold at a discount in stores. Currently, Betagro uses public municipal waste collection once all food surplus has been sorted and distributed accordingly. Additionally, Betagro has their own foundation called The Saitarn Foundation which promotes learning and teaching possibilities to the young people of the community and serves as their [CSR](#) project. When asked about SoS and food rescue charities, Betagro expressed interest yet some hesitation due to SoS being unknown. With some additional information about SoS and meetings regarding the goals and intentions of both companies, Betagro would consider a partnership.

4.4.7 Thai Airways

Initial contact with a representative from the Thai Catering department of Thai Airways was made over the messaging application Line, and a list of questions found in [Appendix A](#) were sent. Subsequent communication occurred over Line. Thai Catering produces the inflight meals as well as providing on the ground for Thai Airways. The person contacted was able to provide an overview of their operations; however due to COVID-19's effect on Thai Airways they were unable to provide many specifics. Thai Catering has practices in place to reduce food surplus, specifically in regards to their raw materials used. Thai Catering tries to use as much from raw foods as possible by incorporating different parts of a single food item into different final menu items. Food surplus that cannot be reprocessed is sold to fish food manufacturers. Unfortunately, due to COVID-19, specific data on their food surplus and [CSR](#) budget was unable to be gained for the current year. Upon requesting data regarding previous years, we were told that the person with that knowledge had been laid off since Thai Airways had halted all CSR activities in order to focus on rehabilitating their company.

4.4.8 Jadjans Chilli Paste

Jadjans is an [OEM](#) that specializes in producing chili paste products. Jadjans company claimed that negligible food surplus was generated during the production process since most food surplus could be used to manufacture by-products or sold to other companies to maximize profit. For instance, used oil from the production process was sold for biodiesel. Therefore, only chili pastes left in the processor was considered to be food surplus. Jadjans company claimed that all chili paste products always meet the production standard. Also, when the customer demands a new recipe, Jadjans company provides a product testing process to ensure customer satisfaction before manufacturing the products. Therefore, the company didn't experience low-quality or low-graded products, resulting in minimal food surplus. Jadjans company used public collection services where the company pays around 40-80 Baht per month. Jadjans company doesn't participate in any [CSR](#) programs; however, in the future, if Jadjans company was able to generate enough profit, the company would use 1-2% of total profit for participating in CSR programs. Although Jadjans company had never heard about SoS when asked. However, when our team introduced the SoS, Jadjans company had shown interest in partnering with the SoS.

4.4.9 A&J Thai fruit

A&J Thai fruit is a non-[OEM](#) that specializes in producing coconut products. About 90% of A&J Thai fruit products are fresh coconuts while the other 10% are processed coconut jellies. The fresh coconuts are sold in Thailand and also exported overseas to countries such as China and the United State of America. The fresh coconuts have a shelf life of approximately two months while the processed coconut jellies have a 14-day shelf life. During the interview, A&J Thai fruit reported minimal food surplus. However, the waste that the company actually created consisted of packaging such as waste papers and PVC straps. Products that do not meet the company's quality requirement such as coconuts acquired are too ripe or not fully matured are sold as promotion outside the main markets. In addition, the company's mode of disposal was found to be public waste collection services. Furthermore, this company has never heard of the SoS. Currently, A&J Thai fruit participates in [CSR](#) projects that mostly focuses on water treatment and sponsoring education. This company suggested looking at downstream areas of the food production chain to increase possibilities of finding food surplus. This is because upstream

areas (manufacturing sector) would still have options to sell their products while downstream areas (retailing and catering sectors) do not.

4.4.10 Chulalongkorn University Cafeterias

There are 12 main cafeterias in Chulalongkorn. The list of cafeterias are found in [Appendix C](#). Chulalongkorn is in its fourth year of implementing “Chula Zero Waste” policy within the university. Chula Zero Waste is a collaborative project between the university’s environmental research institute, physical resource management office, and its faculties aimed to reduce wastes such as plastic, paper, metal and food to zero. In Chulalongkorn, food surplus issues have been seen in cafeterias. From our interview, the Chulalongkorn cafeteria supervisor was interested in considering different means to manage food surplus. The university’s food surplus is placed into a biodigester machine to produce bio-fermented water used as fertilizers for the university’s plants; however, there is still no proper management on food surplus. The university has already built connections with food vendors within the university as well as those within the property management of Chulalongkorn University (PMCU) which includes Samyan market and Suanluang square. With the SoS’ expertise in food management and reallocation, the university’s cafeteria supervisor was willing to collaborate and has requested a future meeting with the SoS members for more details.



Figure 3: Interview with Chulalongkorn University’s cafeteria supervisors

4.5 Findings from Interviews with SoS Partnered Food Manufacturers

Three SoS partnered companies were interviewed: Tesco Lotus (Food retailer), Tofusan (Non-OEM) and S&P Syndicates (Food Retailer). From our interviews, we found out that even after donating to the SoS, their waste disposal fees would not be reduced as those fees are usually fixed rates. The reason why these companies partnered with the SoS was because SoS’ policies align with their missions where they strive to work for a greater cause.

4.5.1 Tesco Lotus

Tesco Lotus is a large grocery store chain based in Bangkok and has been partnered with SoS since 2017. In this time, they have not had an issue with SoS due to their clear donation protocols. During donation collection, Tesco keeps all packaging labels and does an initial screening to separate edible and non edible food, which is then further checked by SoS. Since starting their partnership, Tesco’s waste costs have decreased because there are no hidden costs while donating, and SoS sorts through all plastics and packaging, returning them in Tesco baskets at a later date. When asked about the issue of food surplus in Thailand, Tesco Lotus

agrees there is an issue, and believes that many Thais do not know the full impact of food surplus. Tesco believes that a legislation regarding food donor protection could only help some of the issues SoS faces when trying to find new donors. They stated that although the law could be helpful, there are other factors that contribute to food donation such as having access to food distributors and time constraints.

4.5.2 Tofusan

Tofusan, a soy production company, initially found out about SoS by researching companies that could make use of their unsold ultra high temperature soy milk. Their initial reason for donating was to give new life to their unsold new product, but kept the partnership going for the [CSR](#) aspect of donating. When donating, Tofusan does not remove any product labeling because all products are donated before the expiration date. Since parting with SoS, Tofusan has not seen a reduction in waste disposal fees. Their public disposal fees are currently between 1000 and 2000 Baht, the same range as years prior. Tofusan also agrees with and acknowledges the issues of food surplus in Thailand as a whole, highlighting that this issue is most prominent in the restaurant and food industry sectors. When asked what SoS could improve on, Tofusan stated that SoS should focus on a wider range of underprivileged communities. They have not had any issues with donating to SoS since partnering, and believe that legislation regarding food donor protection would ease the fears of businesses that are currently wary of partnering.

4.5.3 S&P Syndicate

S&P Syndicate is a bakery retailer's store and has partnered with SoS since 2020. S&P partners with SoS because of the sustainability policy of the company. Furthermore, the company believed that all of the products that are donated are baked goods, no workload on the company side and SoS provided a great coordination with S&P Syndicates too; however, donating food to the SoS doesn't help reduce the company's waste collection expense. This is due to most S&P chains being located in shopping malls which are already provided with designated areas to discard waste. In addition, the company wants SoS to increase ways of distribution of the products to underprivileged communities. Finally, the company believes that

there are two main ways to help gain donors: tax deduction and easing concerns for unexpected food donation circumstances.

4.6 Finding from Interview with a Marketing Professor

While considering methods to create incentives to attract food manufacturers to collaborate with the SoS, we also expanded our research to marketing strategies and interviewed a Chulalongkorn University marketing professor, Assistant professor Theeranuch Pusaksrikit. It was found that direct marketing strategies such as direct marketing emails, phone calls, using audience targeted online news platforms and exposure to market place groups to build connections and allow exposure in the manufacturing world would be more effective than using regular facebook advertisement to promote the SoS as it does not target our focus group, which is food manufacturers.

4.7 Recommendations

The following recommendations reflect what we believe will best help SoS attract new and consistent donors, based on our interviews. Recommendations 4.7.1 and 4.7.2 appeal to [CSR](#). Recommendations 4.7.3, 4.7.4, and 4.7.5 focus on attracting more likely donors. Lastly, recommendations 4.7.6 and 4.7.7 focus on appealing to cost reduction measures.

4.7.1 Offer in Person Waste Audit Services

After conducting interviews with non-SoS partnered manufacturers, we found that many of those companies believe they do not create sufficient food surplus. Although from a manufacturing standpoint it might seem as if little to no food is being wasted, SoS has noticed that some companies have recorded small amounts of food surplus prior to partnership with SoS yet are responsible for a large amount of food donation after their first food pickup. Based on these companies being unaware of their waste tendencies, we suggest that SoS market an in-person audit service. This service will analyze the manufacturing process of a company and note any production steps that produce as well any which has collection potential for SoS. This audit would help potential donors identify areas of waste which could then be addressed internally or through partnership with the SoS. Companies would be incentivized to do this because an audit would give companies the chance to optimize production. Simultaneously, an

audit would give SoS the opportunity to address the feasibility of partnering with SoS by emphasizing the presence of food surplus in their specific production process.

4.7.2 Solicit Non-Food Assistance

Interviews conducted with non-SoS partnered manufacturers found that many companies self report little to no food surplus; however many companies seemed eager to still partner with SoS. For instance Siam Food stated that while food donation might not be feasible, they could transport donated products so long as drop points were along Siam Food's normal delivery routes. We recommend that in addition to food donations SoS also solicit non-food contributions. This recommendation will not only help SoS operationally, but expand companies' opportunities to help SoS that would otherwise claim to not waste food. SoS should try to appeal to a company's sense of [CSR](#) rather than trying to market a service since SoS is asking for a commitment of either time or products that would not otherwise be wasted.

4.7.3 Focus on Non-OEM Manufacturers

Of the 247 companies we emailed, twelve companies responded, and of those twelve companies 6 were [OEMs](#). Additionally these companies self reported very little food surplus produced in part because each company had their own policy to minimize waste. OEMs did not want to be responsible for damage to their clients' brands. Were an OEM to donate to SoS, the company the OEM supplies would lose control of their brand. Therefore if SoS wants to focus on manufacturers, we recommend they contact non OEM companies. Furthermore, non-OEM manufacturers will have more decision making power on working with SoS than OEM manufacturers.

4.7.4 Focus on Downstream Retailers

During our interviews with food manufacturers, we found that items with short shelf lives are most likely to be donated due to the constant shelf rotation and early expiration dates. Because of this, we recommend targeting food manufacturers that produce items such as baked goods, vegetables, and meat products. Focusing on these main food groups, SoS will be provided with a more consistent and reliable food source due to the short turn around. Further, downstream retailers being low on the food supply chain leaves the final destination of

blemished food to be Scholars of Sustenance. Aesthetically blemished high quality food is still a beneficial donation to SoS and we recommend targeting downstream retailers as an angle to increase the abundance of food donations.

4.7.5 Use Direct Marketing Strategy

Another recommendation that we propose is for SoS to use a direct marketing strategy. We recommend this marketing strategy over social media or other big non-targeted methods because this will be the most cost effective for SoS being a small organization. To properly execute this strategy SoS should first reach out directly to prospective companies via email. In addition to this SoS could use more targeted online promotion such as “The Cloud” and “The Standard”. Lastly, SoS could promote themselves in places such as the Chula Market Place in order to boost their exposure.

4.7.6 Market CSR Budget Reduction

Another recommendation for the SoS is to use a [CSR](#) budget reduction as an incentive to attract more food donors. During our interviews with food manufacturers, we found that large companies in Thailand considered participating in CSR programs. Although CSR programs are not compulsory by law, those companies still initiate their CSR programs and budget for the greater good. If companies were to collaborate with the SoS, no costs would be charged for CSR activities and hence, lower the initially appointed CSR budget of the company. Moreover, the companies would also gain a good image and reputation since the SoS would provide a CSR report displaying how much food donations could help the community and lessen environmental impacts. Usually, companies have to write up a report on CSR program impact which requires an extensive amount of data processing and that requires hiring experts to analyze. Since the SoS is a data-oriented organization that is able to translate CSR activities into environmental impacts, social impacts, and financial reductions from their database and pre-existing equations, the companies could reduce CSR expenditures. In addition, the SoS already has equations to convert food products to monetary values which could also reduce CSR budgets. Therefore, we recommended that CSR budget reduction would incentivize donating food to SoS.

4.7.7 Waste Disposal Fee Reduction

Marketing waste disposal fee reduction would not incentivize donating food to SoS. After our interviews with waste collection contractors, we have found that disposal fees are very inexpensive and are often included in rent payments for company spaces. Additionally donating to SoS would require the processing and sorting of waste a step normal waste disposal does not require. Therefore we recommend against SoS marketing waste disposal fee reduction as an incentive for prospective companies to donate.

Chapter 5: Impacts

Over the course of our research not only were we able to gain insights into various stakeholders regarding food donation, but also build tangible connections. We are proud to report that through our interviews, we were able to form two new partnerships for SoS: Jadjans Chili Paste and Eighty Eight Khaisook. Additionally, in conjunction with the Chula Zero Waste Initiative, the Chulalongkorn University cafeteria system is exploring partnership opportunities with SoS. We are excited that our project led to real growth for SoS, and look forward to seeing these partnerships mature.

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Appendix A: Interview Protocols

A.1 Consent Script

We are third year students at the department of Chemistry, Faculty of Science Chulalongkorn University in collaboration with students from Worcester Polytechnic Institute on an Interactive Science and Social research Project (ISSP) addressing the food loss and waste management issue in Thailand. In order to collect data and evaluate the circumstances on food surplus, food surplus and food surplus disposal, we would like to invite you to participate in our research study by answering some questions through an online interview on whichever days between February 5 till 19, 2021. This interview would take approximately one hour. Interview responses will be kept confidential and be used for research purposes only. The file attached includes some of the questions that would be asked during the interview session. Please feel free to contact us if any questions arise or more information is needed by email at waste2wealth.issp@gmail.com or call through the phone number 083-929-4965.

A.2 Interview Scholars of Sustenance

We plan to interview the SoS to understand their position in Thailand as well as details of the services they provide. We hope to use this data to understand the feasibility of our recommendations.

Questionnaire examples

1. What is your most constant and consistent source of donation?
2. What exactly have you done in the past to get donations?
3. What is your largest donor's reason for donating?
4. What incentivizes existing donors?
5. Are you more concerned about volume or nutrition?
6. What sorting of the waste is necessary prior to pick up of the food?
7. Do the participating companies pay for an outside waste collection source still?
8. What data do you collect from partner organizations?
9. How is the data processed?
10. What form is the final processed data delivered to partner organizations?
11. Who are SoS' Recipients?
12. What is the SoS' donation population?

A.2 Interview Public Waste Collection Contractor

We plan to interview Public waste collection contractors because we need to compare waste pickup pricing between public, private, and SoS. Public waste collection contractors are

often used by smaller businesses, and the fees associated with them are typically included in the cost of rent.

Questionnaire examples

1. What waste do you collect?
2. What percentage is food waste?
3. How do you collect?
4. Frequency of collection?
5. Do you charge a flat-rate or charge according to waste volume?
6. Where do you allocate waste to?
7. Open or closed landfill?
8. How do you manage the organic waste?
9. Do you have incineration systems to deal with this type of waste?
10. Do you think food waste is a problem in Thailand?
11. Are there any challenges faced during collection?
12. In what way is the public system better than private systems?
13. Why do you think some food companies choose to use private services?

A.3 Interview Private Waste Collection Contractor

We plan to interview private waste collection contractors because we need to compare waste pickup pricing between public, private, and SoS. Private waste collection contractors are often used by large businesses, and they are used because of the larger volume of waste produced by these businesses.

Questionnaire examples

1. How do you collect waste for a business?
2. Frequency of collection?
3. Does fees have a flat-rate or charge according to waste volume?
4. Where do you allocate waste to?
5. Open or closed landfill? Do you own that land or is it rented?
6. How do you manage the organic wastes?
7. Do you have incineration systems to deal with this type of waste?
8. Do you think food waste is a problem in Thailand?

9. What makes you different from public sectors?
10. What are the most common challenges faced during waste collection?
11. Why do you think some food companies choose to use private services?

A.4 Interview Non-SoS Partnered Food Manufacturers

By interviewing food manufacturers that are not partnered with SoS we plan to gain information on how many of these businesses are aware of SoS, and if they are opposed to donating their edible food surplus. We also are interested in if these companies follow CSR and have any sustainability policies SoS could work with.

Questionnaire examples

1. Does your company create food waste?
2. Why and how is food waste created?
3. How does your company currently go about disposing of food waste?
4. What type of food is typically wasted?
5. How much food goes to waste at the hands of your company?
6. How much of that wasted food is still edible?
7. What does your company look for in charitable partners?
8. Has your company ever heard of Scholars of Sustenance?
9. Would your company ever/have you ever considered partnering with SoS?
10. Has your company ever had a CSR (Corporate Social Responsibility)?
11. Does your company have any sustainability policy?

A.5 Interview SoS Partnered Food Manufacturers

Interviewing SoS partnered food companies will allow us to determine the factors that led to these businesses choosing to partner. We could apply these findings when interviewing other companies which would ideally increase the amount of donors.

Questionnaire examples

1. Why does your company donate food to SoS?
2. By donating food to SoS, does it really save your company's operation cost?
3. Does it cost more for packaging when your company donates food to the SoS?

4. Is your company required to separate edible food from the non-edible food?
5. Does your company think that food waste is a problem in Thailand?
6. Previously, what type of disposal did your company use and why?
7. Were there any challenges faced during the company's collaboration with the SoS?
8. What aspects of SoS would your company like to see improved?
9. How was your company introduced to the SoS?
10. If there is a "Good Samaritan Law" would your company think that more companies would like to collaborate with the SoS?

A.6 CSR Related Questions for Interviews with Food Manufacturers

Questionnaire examples:

1. Does your company currently have a CSR project?
2. How important is CSR to your company?
3. Are you interested in a CSR project?
4. What kind of CSR project is your company doing?
5. Do you have budgets for CSR activities?
6. How do you quantify the benefits of your CSR?
7. Do you follow an international standard (GRI, ISO, etc) for CSR reporting?
8. What aspects do you find cumbersome or inconvenient about CSR?

Appendix B: Additional Background Research

Appendix B contains background information regarding international food recovery policies. Though this information is important, it is found in the appendix because due to restrictions in Thailand this route cannot be pursued any further.

B.1 France

In a similar sort of government intervention, France has passed some of the strictest laws on food recovery. LAW No. 2016-138 of February 11, 2016 "Relative à la lutte contre le gaspillage alimentaire". This law requires supermarkets to sign contracts with food banks and charities on food donations. If supermarkets do not comply, they are penalized 3,750 Euros. The

food donated under the French Law must be traceable. If the donated food poses high-risk such as raw meat or highly destroyed packaging, it should not be donated. In addition, mislabeling is tolerated if corrected information is provided separately or informed of beforehand. Furthermore, food that past its expiry date must not be donated. Food beyond best before date can be allowed if it does not pose any safety risks. French authorities also recommend contract signing with food recipients to efficiently track and specify liabilities. Despite these provisions, the law does not provide liability protection to food donors ([Meulen, 2015](#)) ([LAW No. 2016-138 of February 11, 2016 on the fight against food waste \(1\)](#)). Since the passing of the French law there has been a 24% increase in donations since the 2016 law was passed ([Mourad and Finn, 2019](#)). One paper postulates that this may be due to the cultural awareness around the subject of food surplus ([Eubanks, 2019](#)); however the effect could also stem from the 60% tax discount for item value ([Saltzman et al, 2019](#)).

B.2 Italy

In Italy, laws have recently been passed that codify food recovery. LAW 19 August 2016, n. 166 lays the groundwork for food recovery in Italy. Specifically the law defines what food can be donated and who is responsible for its safety. In addition to allowing edible food to be donated, it allows for unlabelled food to be bought by food donors. Food donations must be given for free, and the food covered by must comply with all applicable laws. The Italian law also has a provision for allowing the government to donate illegal food that is confiscated by the government. Interestingly, unlike laws from other countries, there is a provision to provide funding to implement food recovery. Every year from 2017-2018, 1 million euros was endowed to research labelling and other food recovery topics ([Law No. 166 on the donation and distribution of food and pharmaceutical products for purposes of social solidarity and food waste prevention](#)). In addition, Italy's laws allow for up to a 15,000 euro deduction from waste tax for donated foods ([Vogt, 2016](#)). On top of this law, another recent Italian decree directs the collection of surplus milk from dairy producers to feed the needy ([Ministerial Decree approving National Program 2020 for the distribution of food to the most vulnerable people, Italy](#)). In this case direct government intervention is being used to recover food.

For small scale companies, the Milan authority has established a “neighborhood hub” to ease donation of surplus food. The hub helps in reducing storage costs, charity collection costs

and ensuring proper food regulations ([Comune di Milano et al, 2018](#)). For bureaucratic simplifications, Italian bureaucratic procedures require additional costs for governmental services. Such services include legitimizing license fees, monitoring of transactions, issuing service fees in different localities, holding conferences between various counterparts and so forth. These procedures are often time consuming and pose a financial burden to companies undergoing bureaucratic operations. In Italy, bureaucratic procedures of food donors are simplified by allowing donation reports to be submitted online, on a monthly basis. This eases the mode of communication with authorities and reduces disbursements on setting up meeting conferences.

Donation details include factoring opportunity costs with respect to aspects of disposal of waste and recycling ([Busetti, 2019](#)). Furthermore, submission of reports provides a reduction in waste collection service fees. In 2016, food manufacturers in Italy could request for governmental waste collection fee reduction proportional to the amount of food donated ([Giacalone, 2017](#)). Since food surplus means revenue loss to food manufacturers, having fee discounts means a financial benefit to them. New economic incentives in Italy permits municipalities to establish waste fee discounts for donors under the Italian law. Government aids are provided to fund some operations in charity food distributions.

Law type	Policy Programs
441/2005	Accepted food donations as a VAT-exempted activity
80/2005	Established food donations as a means to deduct taxable income
155/2003	Protection of food donors under the Good Samaritan Law
166/2016	Increased variety on donated food (food past Best Before Date, confiscated and mislabeled food) Discounted waste fees from municipalities

Table 5: Italian Food Donation Policies ([Busetti, 2019](#))

Challenges regarding Italian food donation policies are still prevalent. Although legalizing donation of food after Best Before Date (BBD), helped increase food donation, there are some instances where food donors keep their products until the last minute (donate food after BBD) before donating. This limits the variety of charity organizations that can accept this type of donation. For instance, organizations that prepare meals are able to make use of the donated food while organizations that require longer shelf-life may not be able to accept that donation. In addition, many manufacturers resist donations due to risk of company reputation. The Good Samaritan Law and laws legalizing food donation after BBD helps alleviate this problem; however, the social stigma still persists in the present day. This could be reduced by raising awareness on social acceptance of food past the Best Before Date.

B.3 South Korea

In the past, a traditional South Korean meal known as banchan is often discarded as food surplus, contributing to one of the world's highest food wastage rates. As a result, South Korean generate more than 130 kilograms of food surplus each year and recycle only 2% of its food surplus. Fortunately, the South Korean government has taken radical action to ensure that surplus food is recovered ([Broom, 2019](#)). The South Korean government implemented a landfill ban on the disposal of food surplus in 2005 ([Broom, 2019](#)). Afterward, in 2013, the South Korean government instituted a law that requires residents to separate food surplus from other garbage and imposes a fine on anyone who doesn't recycle food surplus. Furthermore, the government initiated compulsory food surplus recycling using unique biodegradable bags ([Broom, 2019](#)). Thus, all residents have to pay for bag fees to discard food surplus. According to the researchers, approximately 10 million residents in Seoul have to pay for their food surplus, and a typical four-person family spends \$6 a month on food surplus fees ([Thompson, 2017](#)). This charge actively encourages home composting. The bag fees account for 60% of the cost of running the scheme, which has raised the proportion of food surplus recycled from 2% in 1995 to 95% in 2019. Notably, the South Korean government has already permitted the use of recycling food surplus as a fertilizer, which drives the expansion of the country's urban farm movement ([Broom, 2019](#)).

Additionally, the Korea food bank network was developed as a formal care system supported by the government. Hence, the promotion of food banks under government patronage in South Korea would be different from other countries like the United States, where the food bank operates as an informal care system ([Kobayashi et al, 2018](#)). In general, the food bank serves as a social welfare organization that collects surplus food donated by manufacturers and donates to underprivileged communities. The food bank could resolve food loss issues, provide food for individuals who cannot afford to buy it, and environmental impacts due to food surplus. Moreover, the Korean government also gave significant subsidies for the nation's food bank system, leading the Korean food bank system to continue growing in number and become the largest food bank in Asia ([Admin, 2012](#)). The South Korean food bank system has a type of state-centered model, in which the state takes the initiative in governing the food bank ([Kim, 2015](#)). This model provided an advantage when the food bank encountered inadequate support from the public. According to the food donation encouragement act, promoting government subsidies for food banks has become the South Korean standards ([Kobayashi et al, 2018](#)). For instance, the increase in food donations will mostly depend on the availability of additional delivery staff. Thus, the local government provided subsidies to pay for labor costs and some operation funding ([Kobayashi et al, 2018](#)).

For this reason, the government's support has become an important factor that helps maintain the human resources of the South Korean food bank. Besides, tax reform also had a significant impact on food donations. Food and beverage companies could receive 100 percent tax deductions for their food donations without an upper limit. In contrast, non-food and beverage companies can receive a tax deduction with an upper limit of 30 percent for the donation of non-food items and money ([Kobayashi et al, 2018](#)). Therefore, this tax reform had a considerable influence on South Korean companies' donation behavior. Altogether, the government's provisions, such as tax reform and the food donation encouragement act, have significantly supported the food donations among the public and the companies in South Korea. Thus, the food bank system in South Korea has gradually developed within a short period. Additionally, more than 40,000 welfare organizations receive donated food from the food bank. ([Kim, 2015](#)). As a result, the food bank as a formal care system in South Korea could be used as a benchmark to establish a food bank in other countries.

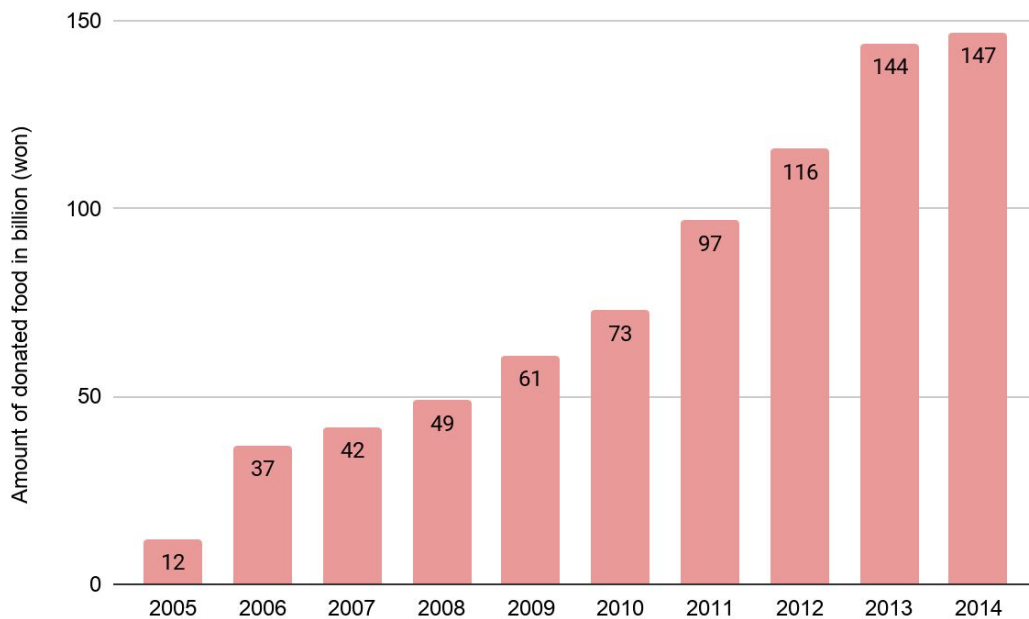


Figure 4: Trends of Food Donations to South Korean Food Bank in Cost Basis
[\(Kobayashi et al, 2018\)](#)

B.4 Japan

The Food banks in Japan were founded in 2007. Its plan involves leftover food, expiration date, and how the organization uses food creatively instead of destroying it. To solve this problem it became the first effective attempt to set up a food bank in Japan.

First, the involvement of technology in food surplus is clearly seen in Japan. In recent years, smartphones have played an important role in reducing food surplus. In 2018, a mobile application called TABETE was launched in cities such as Tokyo and Osaka, which means "Please Eat" in Japanese, and aims to "preserve" food that may be wasted using digital technology. The app is now used in more than 500 stores and has more than 200,000 registered members. People can download the application and log in as a member for free. The application allows stores to post pictures and prices of foods that need to be "saved", while consumers can search nearby stores, place orders online, pay, and then pick up the goods at the agreed time [\(Second Harvest, 2013\)](#).

In addition to these technological rollouts, laws have been passed to raise awareness about food insecurity. Japan's 2019 Food Loss Act specifically mentions how edible food goes to

waste and that there are food insecure individuals in Japan. The law calls upon local legislatures to come up with their own food recovery laws while simultaneously imploring businesses to come with food surplus strategies. The law also establishes a food loss reduction month to bring awareness to the issue ([Law on Promotion of Reduction of Food Loss](#)).

With the influence of TABETE and national initiatives, some local governments in Japan have also taken the initiative to cooperate and use the platform to promote the reduction of food surplus. Moreover, they also mobilized local stores to become TABETE members, showcased food materials they may waste, and called on the public to "preserve" them ([Kyodo News, 2020](#)).

In March, due to the COVID-19 epidemic, people in Hamamatsu City, Shizuoka Prefecture began to eat less. Many restaurants and restaurant reservations in Hamamatsu City have been cancelled, and a large amount of food prepared by the restaurants have been wasted. Related organizations there use TABETE to call on people to buy food. Furthermore, the problem of food surplus is very complex and may cause a lot of waste in the process of production, processing, storage, transportation, sales and final consumption. Although, TABETE's goal is to sell waste, the non-profit organization Mottainai Food Center is still working hard to curb waste caused by shelf life issues ([Kyodo News, 2020](#)).

An increase in the use of TABETE illustrated that people really pay attention to the food surplus. Therefore, Japan's Ministry of Agriculture will launch an online system in the fiscal year 2020 to connect the management of food banks with food donors to support people and families in need, while reducing food surplus ([Kyodo News, 2020](#)). The food industry accounts for a significant proportion of overall food surplus, with a reduction and recycling rate of more than 80% ([OECD, 2010](#)). With the Food Waste Recycling Law adopted in 2001 and amended in 2007 and 2015, the Government of Japan has improved its strategy to combat food surplus. The aim of the legislation is to minimize the final disposal of food surplus by means of initiatives to avoid waste and reduce waste, to encourage the use of recycled resources in food-relevant industries in order to increase the recycling of food surplus as animal feed, fertilizer and energy generation.

Within Japan, there are many variables driving food surplus. For instance, the use by companies of the "one-third rule" may have a negative effect. This practice forces wholesalers to supply food goods to consumers during the first third of the "best-before date" period between harvest. However, if delivery is not reached within this time frame, retailers have the right to

reject wholesalers' goods. This causes wholesalers to throw out perfectly edible food ([Skinner, 2020](#)).

Finally, the country's high reliance on imports of natural resources is the primary driving force of the government's robust promotion of food surplus recycling ([OECD 2010](#)). This caused the self-sufficiency rate of Japan's livestock feed was as low as 26 percent in 2011, which means that most of them are currently imported from abroad. The "Basic Plan for Food, Agriculture and Rural Areas" was formulated by the Japanese government, which aims to increase the feed self-sufficiency rate to 38 percent by 2020 through the implementation of recycling for the production of ecological feed ([OECD, 2010](#)).

B.5 United States of America

The United States is a patchwork of federal, state, and municipal laws, so understanding their framework requires understanding all three levels. Federal law can supersede state and municipal laws, but state and municipal laws can also enhance existing federal law. The Bill Emerson Good Samaritan Food Donation Act was passed in 1996 to “establish a uniform national law to protect organizations and individuals when they donate goods in good faith”. This law laid the legal groundwork for successful food banks since it removed liability of donors and food banks except in the case of gross negligence and intent. As of 2013 there have been no lawsuits either civil and criminal regarding donated food ([Haley, 2013](#)). Despite this federal law in effect, there are still barriers to recovering food. A 2016 survey by the Food Waste Reduction Alliance found that besides unfounded liability concerns, the next biggest barrier to surplus food donation was transportation ([Food Waste Reduction Alliance, 2016](#)). Transportation is costly since it includes maintaining vehicles and preparing surplus to be transported.

To alleviate costs and encourage food donation, Congress included provisions regarding food donation in the 2015 Protecting Americans from Tax Hikes (PATH) Act. The Protecting Americans against Tax Hikes Act allows any company to deduce up to 15% of income from taxes. The act values donated food at 25% of market value ([26 U.S. Code § 170](#)). The act only applies to donated food that is apparently wholesome. To meet this criteria, the food must be donated and cannot be exchanged for money, it must be given to the needy, and it must comply with all regulations ([26 U.S. Code § 170](#)). This ensures that the food is charitable and safe to eat. Tax incentives also exist on the local level as well. As of 2017, ten states offer tax incentives to

recover food. These incentives include deductions and credits ([Schultz, 2017](#)). Most recently, the United States passed the Coronavirus Aid, Relief, and Economic Security Act, known as the CARES Act. This legislation has multiple plans to aid the American people, but more specifically, it increased the amount a company can deduct to 25% ([United States of America, 2020](#)). Part of the concern in America around food was around a hit to reputation if donated food caused injury even with liability protections ([Cohen 2006](#)). By using tax incentives in addition to liabilities, America has been able to make sure there are less food donation shortages.

B.6 Commonwealth (UK and New Zealand)

In the United Kingdom, food donation charities must register under the same category as other food dispensaries like restaurants. This means that they are held to the same sanitation and safety standards ([Food Standards Agency, 2020](#)). The United Kingdom does not offer the same liability protections as other countries, therefore food agencies must work with their suppliers to determine liability ([Midgley, 2013](#)). The United Kingdom's lack of liability protection may contribute to less people wanting to donate. In New Zealand, the Food Act of 2014 adds a provision that grants immunity for civil and criminal liability stemming from food donation as long as the food was good when it was donated and safety instructions were provided by the donor ([Food Act 2014](#)). Unlike the American liability protections, the New Zealand law requires instructions to be provided which may be helpful when receiving food from many different sources.

B.7 Brazil

Brazil this year passed a law to protect food donors and recovery organizations. The Brazilian law is very similar to the United States laws in that it focuses very heavily on the liability aspect of food recovery. Although the food must initially be compliant with all applicable food safety laws, there is only liability if there is malicious intent. The law also states that during COVID, government procurement of food will focus on smaller family operated farms and fisheries to offset the effects of COVID ([Law No. 14.016 providing for combating food waste and donating surplus food for human consumption. Brazil](#)).

	Tax Credit	Tax Reduction	Tax exemption	Good Samaritan Law	No VAT for food donation purposes	Food Bank
Thailand						
France	✓				✓	✓
Italy		✓		✓	✓	✓
South Korea		✓				✓
Japan				✓		✓
United States of America		✓		✓		✓
United Kingdom						
New Zealand				✓		
Brazil				✓		

Table 6: Fiscal Incentives and Policies on Food Donation by Country

B.8 Tax Exemption

Currently SoS is able to run food operations from donated food and donated money. The SoS tried to apply for tax exemptions so that the SoS could provide incentives for more food donors to donate. However, the Thai excise department does not recognize the SoS's efforts as its revenue is focused on operational costs but not directly to the unprivileged communities. The food donated does not translate to money in terms of charity; therefore, the Thai excise

department does not recognize it as direct financial help to the underprivileged communities. Hence, other alternative incentives are needed.

Appendix C: Companies Contacted

This appendix contains all of the companies that we have contacted for the project. The companies are categorized by: Non-SoS partnered companies, SoS partnered companies, Private waste collection contractor, and Public waste collection contractor.

C.1.1 Non-SoS Partnered Companies

1. บจก.ไผ่สุข (Eighty Eight)
2. เซฟโจวแคทเทอริง Chefjowcatering - รับจัดเลี้ยงนอกสถานที่
3. CATERING CRG
4. Capital O 746 Luxor Hotel
5. โต๊ะจีนเจ๊ียบนครปฐม
6. Catering Bangkok
7. โหระพา แคทเทอริง
8. Kouen Sushi Bar
9. Baan Saranrome
10. i do catering
11. ทเวนตีโฟร์ แคทเทอริง
12. The Chef Catering Co.,Ltd.
13. ร้านอาหารเหลาออนไลน์ By หงส์เคทเทอริง
14. BENEFCO LTD
15. Daily Foods Co., Ltd.
16. Sun Lee Group (Head Office)
17. CATERING EVER
18. Krua-A-Roi
19. โหระพา แคทเทอริง
20. บริษัท ทรี - มินิทส์ ฟู้ด เซอร์วิสเชส (ประเทศไทย) จำกัด
21. ซอสามสาย รับจัดเลี้ยงนอกสถานที่
22. อิ่มสุขแคทเทอริง
23. Terrena Catering
24. boxa catering

25. บจก. โฮเม(ประเทศไทย) Homey (Thailand) Co Ltd
26. Berli Jucker Foods Co.,Ltd
27. Premium Food Thailand Co., Ltd.
28. บริษัท วี.ไทยฟู้ดโปรดักท์ จำกัด
29. Thai Cosmos Foods Co.,Ltd.
30. Food Incidence Co.,Ltd.
31. Openland Foods Trading Limited Partnership Company(หจก.โอเพนแลนด์ ฟู้ดส์ เทรดดิ้ง)
32. บริษัท เจ.เอ็ม. อุตสาหกรรมอาหาร จำกัด
33. HappyChef (Thailand) Co., Ltd.
34. Pataya Food Industries Ltd.
35. Thai Agri Foods Public Co., Ltd.
36. Thai Yamazaki (Factory)
37. Siam Foods PCL.
38. Tofusan Company Limited
39. บริษัท เวิลด์ ออฟ ฟู้ด จำกัด
40. ITS Nutriscience Co., Ltd.
41. Bio Fresh Foods (Thailand) Co., Ltd.
42. Ottoman enterprise co.,ltd
43. Bangkok Ham Products Supply Co., Ltd.
44. LAEMTHONG CORPORATION GROUP
45. SMS Corporation
46. Thai German Meat Product Company Limited
47. บริษัท จีเอสบี อินเตอร์เนชั่นแนลจำกัด
48. บริษัท จีเอสบี อินเตอร์เนชั่นแนลจำกัด
49. Best Country Beef
50. Betagro Tower
51. บริษัท ชารินรดา ฟู้ดส์
52. AMERICAN-EUROPEAN PRODUCTS CO.,LTD.
53. Secret Recipe
54. กาโตว์ เฮ้าส์ Gateaux House
55. Jagota (Thailand)
56. Lhian Thai Rice Vermicelli Co.,LTD.
57. บริษัท ไพศาล ฟู้ด จำกัด
58. บริษัท ไทชั่นฟู้ดส์ จำกัด
59. Cute Products Plus Co.,Ltd.

60. บริษัท มอนเด นิสชิน (ประเทศไทย) จำกัด
61. FOODLAND SUPERMARKET CO LTD
62. NSL Foods Public Co., Ltd. (สำนักงานใหญ่ Bangbuathong)
63. บริษัท ศรีกรุงบิสกิต จำกัด
64. Thai Liwayway Food Industries Co.,LTD.
65. บริษัท ดิง ซอสเซจ จำกัด
66. Thai Coconut
67. Agro-On (Thailand) Co.,Ltd.
68. ERAWAN FOOD PUBLIC COMPANY LIMITED
69. IFC Inter-Food Co.,Ltd.
70. Cititex Group
71. Pan Asia (1981) Company Limited
72. Pranburi Hotei Co.,LTD.
73. Prosper Foods Industry, LTD
74. ITS Nutriscience Co., Ltd.
75. Sun Lee Group (Head Office)
76. General Starch Limited (GSL)
77. URC (Thailand).Co.,LTD.
78. JFC Enterprise Co., Ltd.
79. บริษัท บ่อพลอยฟู๊ด อินดัสทรี จำกัด
80. First Confectionery Ltd.
81. บริษัท พลวรรธน ฟู๊ดส์ จำกัด
82. NPP Food Co.,Ltd.
83. King Milling (Suratthani) Co.,LTD.
84. Diamond Grains
85. S.Khonkaen Foods Public Company Limited
86. Monty & Totco Co., LTD.
87. Vita Food Factory 1989 Company Limited
88. Great Food (Dehydration) Co.,Ltd.
89. บริษัทจำกัดคันทรีเฟรชแดรี่
90. CP All Public Co.Ltd
91. บริษัท ไทยเพรซิเดนท์ฟู๊ดส์ จำกัด (มหาชน)
92. Taokaenoi
93. Tropical Canning (Thailand) Public Co., Ltd.
94. Patum Rice Mill and Granary Public Co.Ltd.

95. Thai Frozen Foods Association
96. Anan Industry โรงงานผลิตนำเข้าสินค้าอุตสาหกรรม
97. CATERING THAI
98. Snack House Company Limited
99. Bangkok Fine Foods Company Limited
100. บริษัท จีเอสบี อินเตอร์เนชั่นแนลจำกัด
101. Nestle Thailand
102. Company CPF (Thailand) Co., Ltd. (Thailand).
103. CPRAM Co., Ltd. Head Office
104. Wan Thai Foods Industry Company Limited
105. THAI Catering @Silom
106. THAI Catering
107. Thai Catering ร้านPuff&Pie
108. Puff&Pie TG การบินไทย สำนักงานใหญ่
109. บริษัท หยั่น หว่อ หยุน คอร์ปอเรชั่น กรุ๊ป จำกัด (สำนักงานใหญ่)
110. K.P. Foods Supply Co.,Ltd. (Manufactory)
111. บริษัท เอ็น.พี. ฟู้ดส์ เทค (ประเทศไทย) จำกัด
112. F Plus
113. บริษัท เอ็น เอส ที ฟู้ด อินดัสทรี กรุ๊ป จำกัด
114. City Food Company Limited
115. บริษัท ไชลูชั่นอินกรีเดียนส์ จำกัด
116. บจก. โฮเม(ประเทศไทย) Homey (Thailand) Co Ltd
117. Mishima Foods (Thailand) Co.,Ltd
118. บริษัท ตราแมคครัว จำกัด
119. บจก. เอื้ออารี ฟู้ด โปรดักท์
120. Nam Prik Krung Chan Suda
121. Thai Fishsauce Factory (Squid Brand) Co.,Ltd.
122. B.Foods Product International Co.,LTD.
123. Sime Darby Oils Morakot Public Company Limited
124. Jim's Group Co.,Ltd
125. บริษัท อัจฉิตอินเตอร์เนชั่นแนลเฟิพเพอร์แอนด์สไปซ์ จำกัด
126. Chanapa Food Co., Ltd
127. Sunsaucе Foods Industry Corp., Ltd. (Office)
128. Sunsaucе Food Industrial Co., Ltd.
129. Thai Theparos Food Products Public Co.,LTD

130. บริษัท เซนลิตเซ่นฟู้ดส์ จำกัด (โรงงาน)
131. Mahachai Thai Food Co.,LTD.
132. Four Foods Co.,LTD.
133. บริษัท เอสทูเค ฟู้ดส์ จำกัด
134. KEWPIE (THAILAND)CO.,LTD.
135. Kewpie Thailand Company Limited
136. Northern Garlic and Seasoning Limited Partnership
137. Unilever Thai Holding Co,Ltd.
138. Tang Sang Hah 唐雙合
139. Calbee Tanawat Co.,Ltd. (Head Office)
140. ME Bakery
141. Unilever Thai Holding Co,Ltd.
142. Veggie Tales Group Co.,Ltd.
143. โรงงานผลิตเส้นก๋วยเตี๋ยว หงษ์ทองคู่
144. Sahapankao Co.,Ltd.
145. Phatthana Phokkhapan co.,ltd.
146. K.R.S. Spicy Food Co.,Ltd.
147. บริษัท พี.เอ็ม.เค.นู้ดเดิ้ล แฟมิลี่ จำกัด
148. บริษัท พรีเมียร์ มาร์เก็ตติ้ง จำกัด (มหาชน) สำนักงานใหญ่
149. โมนาทฟู้ด เอ็นเตอร์ไพรส์
150. Starbucks
151. Mondelez International (Thailand) Co.,Ltd.
152. Doi Kham Food Company Limited
153. F & N Dairies (Thailand) Limited
154. The Thai Dairy Industry Company Limited
155. บริษัท โบวเบเกอรี่เฮ้าส์ จำกัด (Bow Bakery House Co., Ltd.)
156. บริษัท โอเอ ซัพพลาย แอนด์ เซอร์วิสเชส จำกัด
157. Hanami Foods Company Limited
158. Blue Ocean Power Co., Ltd.
159. Useful Food Co., Ltd.
160. M.I.W. FOOD by M.I.W GROUP
161. Sawai Trading Ltd., Part
162. Winnapa Co.,Ltd.
163. บริษัท ไทยเซ็นเตอร์ฟู้ด โปรดักส์
164. บจก. เจียเม็งมาร์เก็ตติ้ง (ข้าวหงษ์ทอง)

165. ข้าวตราฉัตร @ AIA capital center
166. บริษัท โรงสีเอกไรซ์ จำกัด
167. บริษัท คนมีเส้น จำกัด (โรงงาน)
168. Tang Hua Bua Yai Light Mill Limited Partnership
169. Thongpad cold storage 888
170. บริษัท ไท่ ห่าว ซื่อ กรุ๊ป จำกัด
171. SUNSHINE INTERNATIONAL CO., LTD.
172. Welcome to KCG - KCG Corporation - บริษัท เคซีจี คอร์ปอเรชั่น จำกัด (สำนักงานใหญ่)
173. บริษัท ทีอาร์เอฟ ฟีดมิลล์ จำกัด
174. บริษัท โซนิส สตาร์ช เทคโนโลยี จำกัด
175. บจก. คิวบิก ฟู้ดส์ แอนด์ แคทเทอร์ริง
176. J. T. T. Company Limited
177. บริษัท ไท้อี้อาหารเพื่อสุขภาพ จำกัด
178. JMF
179. Exotic Food PCL (Bangkok Office)
180. บริษัท กิจบรรลือ มัลติ-ฟู้ด จำกัด
181. นอติลุสฟู้ด (ไทยแลนด์) Nautilus Food (Thailand) Limited
182. บริษัท เอ็นเอฟ ฟู้ด จำกัด
183. Good Life Center
184. บริษัท อุตสาหกรรมน้ำปลาระยอง จำกัด
185. S&P Syndicate Public Company Limited
186. Tesco Lotus Co.Ltd
187. GOODS TRADING CO., LTD.
188. Khumsup Asia goods trading Co., Ltd
189. Thai Pure Coconut Co.,Ltd.
190. CoCo Fresh Tea & Juice Lotus Onnut
191. GCF International Co., Ltd
192. Flora Capital CO.,Ltd
193. Mango star
194. Yenly Yours
195. A&J Thai Fruit Co., Ltd.
196. Thai Pure Coconut Co.,Ltd.
197. Coconut Siam Export Co Ltd
198. Asiatic Agro Industry Co., Ltd.
199. Pure Foods Co., Ltd.

200. Foodtech Products (Thailand) Co., ltd.
201. โรงงาน แอปเปิ้ลเชฟ ประเทศไทย จำกัด
202. บริษัท อุตสาหกรรมนมไทย จำกัด
203. บริษัท เอสทูเค ฟู้ดจำกัด
204. มามาเบเกอร์รี่
205. Minor Cheese Co.,LTD.
206. Chiangrai Cheese - Sales Outlet
207. บริษัท ฟอนเทียรา แบรินดส์ (ประเทศไทย) จำกัด
208. Yakult Sales Bangkok Company Limited
209. Betagen Co., Ltd.
210. CP-Meiji (ซีพี-เมจิ)
211. Farm Chokchai
212. เต้าหู้นมสด ตรา เจ้าจุก บริษัท เอ็นเอ็นซี. โปรตักส์ จำกัด
213. FrieslandCampina(Thailand) PCL. - Samrong Plant
214. ศรีฟ้าเบเกอร์รี่ สาขากรุงเทพ (อนุสาวรีย์ชัยสมรภูมิ)
215. Egg Delivery ไข่ไก่-ราคาส่ง
216. ประชาพงษ์ฟาร์ม ไข่เป็ดสด
217. ขนมบ้านอัยการ
218. Always Fresh Intertrade. Co., Ltd.
219. บริษัท กรีนเดย์ แฟมิลี่ จำกัด
220. Blue River Products Limited
221. Blue Elephant Cooking School & Restaurant Bangkok
222. ฟาร์มฮัก ผักอินทรีย์ ปลอดภัย
223. A-BEST CO.,LTD
224. getfresh by Dressed at Mercury Ville
225. Salada Organic Kitchen
226. Home Fresh HydroFarm
227. 7-Eleven
228. Farm to Table, Organic Cafe
229. Ohkajhu Organic Restaurant
230. SALAD FACTORY
231. Jones' Salad Silom
232. บริษัท ดำเนินฟู้ด จำกัด
233. เฉาก๊วยนายอ่อง
234. HappyFresh Thailand

- 235. Dairy Home Restaurant
- 236. Mary Anne Dairy Products Co., Ltd
- 237. Prothai Co.,LTD.
- 238. ACK Food Tech Co., Ltd. - Wangnoi
- 239. KFC
- 240. บริษัท วาย ซี ซี อินเทอร์เน็ต จำกัด
- 241. Mahachai Food Processing Co.,LTD.
- 242. BUTCHER beef&beer สาขาเจริญราษฎร์
- 243. บริษัท มายด์ ฟู้ดเซอร์วิส จำกัด
- 244. บริษัท ธาริกัน ฟู้ดส์ จำกัด
- 245. Food Gallery Co.,Ltd
- 246. บริษัท สามพรานฟาร์ม จำกัด
- 247. บริษัท ปรุณรสไทย จำกัด
- 248. Wings Factory
- 249. T.C.Natural Co.,LTD
- 250. Southern Dairy Co., Ltd. (บริษัท เซาท์เทิร์นแดรี่ จำกัด)

C.1.2 SoS Partnered Companies

- 1. Tofusan
- 2. S&P Syndicate
- 3. Tesco-Lotus

C.1.3 Private Waste Collection Contractors

- 1. Green Gold Waste
- 2. One more link
- 3. Al co-waste

C.1.4 Public Waste Collection Contractors

- 1. Government gazette
- 2. Department of pollution control

C.1.5 Chulalongkorn Cafeteria

1. iCanteen (Faculty of Engineering cafeteria)
2. Chula Chakrabongse cafeteria
3. Chula Dormitory cafeteria
4. Chula university office canteen
5. Faculty of Education cafeteria
6. Faculty of Political Sciences cafeteria
7. Faculty of Economics cafeteria
8. Faculty of Arts cafeteria
9. Faculty of Communication arts cafeteria
10. Faculty of Dentistry cafeteria
11. Chula Phat 9 cafeteria
12. Chula sports complex cafeteria