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Group Study Report
MOTTAINAI C

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Executive Summary

Sustainable development is defined as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (Brundtland, 1987). With the modernization and economic development of ASEAN countries, sustainable development is increasingly relevant and important than ever to balance economic growth, environmental protection, and liveability for society.

Integrated waste management, which can be defined as efficient resource consumption that reduces the amount of waste produced, is a key concept for achieving sustainability. In particular, this project focuses on food waste management in Kuala Lumpur, Malaysia. Food waste is the highest contributor of waste in Malaysia, at 44.5%. Malaysians waste 15,000 tonnes of food daily, including 3,000 tonnes (20%) that is still fit for consumption. Given that waste disposal methods in Kuala Lumpur includes illegal open dumping and landfills, which poses serious environmental problems, such as leachate contamination in groundwater. There is an urgent need to reduce food waste to minimize its environmental damages.

As structural changes, such as building an incinerator is difficult to implement, hence the project focuses on fundamentally changing human behaviors and culture related to food waste by promoting zero food waste and promoting healthy lifestyle.

This project consists of three phases, namely "Eat All, Waste Less, Stay Healthy". The main focus of this project is on Phase I: "Eat All", where the upstream section of the consumption process in reducing food waste is addressed. This will be done by educating students to plan, cook, consume, and store food efficiently. To ensure that the project results in long-term behavioral changes beyond the timeframe of the activities, it leverages an integrative framework targeting both the cognitive and systemic (social and economic) paradigm for a comprehensive intervention. Subsequently, Phase II of the project addresses downstream of the consumption cycle in "Waste Less". In cases where there is leftover food, the project promotes re-creating new dishes, redistributing to the needy and composting. On a broader perspective, Phase III: "Stay Healthy" fundamentally addresses Malaysia's culture of eating by distracting eating practices. This will be done through promotion of active lifestyles and healthy activities, such as swimming, yoga, and zumba.

By addressing the entire food consumption cycle through the perspective of behavioral change, it increases the long-term sustainability of the habits taught in the programme. In addition, the project goes beyond addressing the food waste issue itself to look at broader situation in the culture of the society.

1. Introduction

The issue of sustainable development has become the global discourse for more than four decades. The United Nations Conference on the Human Environment (Stockholm Conference) in 1972 was the very first attempt to address the issue, followed by the appointment of Brundtland Commission in 1983 and the release of Our Common Future (Brundtland Report, 1987). The later laid a solid ground and concept for countries to address the issue of sustainable development.

Aligning with the global discourse on sustainable development, South East Asia countries, such as Cambodia, Indonesia, the Philippines, Singapore, and Thailand have integrated the concept of sustainable development into national policies. However, progressing towards sustainable development still poses many challenges for countries in ASEAN. The topic of sustainable community design is one of the key areas that ASEAN countries are facing.

1.1. Best Practices from Japan on Sustainable Community Design

From the seminars and field study trips at the IATSS Forum, many lessons learned on sustainable community design were shown, contributed to the concrete understanding on this issue. At the very beginning, the concept of sustainability and Sustainable Development Goals (SDG) initiated by United Nations were introduced. The two questions were emphasized and investigated throughout seminars, field studies, and field trips were: "What is Sustainability?" and "How to mobilize resources to achieve a sustainable community?" These two questions are fundamentally related three main pillars of sustainability concept: Social, Economic, and Environment.

First, the Toba trip set examples to learn how the culture, community bond, and education are integrated to promote and create a sustainable community. It was visible that the community bond was strengthened through the cultivation of education and existing resources of the community. A trip to Kamishima Island, we had an enriching activity, which was a tour guide guided by a group of primary school students on the island. A teacher from the local primary school collaborated with a private tour guide company by providing training and arranging the activity with the aim to enhance the communication skill of the local students. All students received permission from the parents to join the program because the parents believe this will benefit their children and the community as a whole. The bond between the parents, students, teacher, and the community became stronger than ever, and somehow the parents were influenced by students to see the importance of education and tourism development through the tour guide service.

Second, a visit to Moku Moku Farm provided different lessons learned. Aside from the key points related to the agriculture sector, the token system acted as a tool to encourage visitors to consider about how to save resources and reduce labor forces became the key learning point on how to incentivize visitors to get involved. The similar system was found in Sora Tabeyo restaurant where the children receive tokens to claim rewards from the amusement park once they finish their meal. This is a tool to incentivize service users, especially children, to emotionally be aware of the conveyed message and get involved in the planned activity.

The education seminar provided the insight on global citizenship, focusing on how the global citizens can contribute to the society. There are many social issues, which need to be addressed. It is noted that this worthwhile topic for thinking how important it is to learn about the global issues, how the problems can be tackled, and who will involve in the process.

Environment seminar is another main pillar, providing knowledge on low carbon city, sustainable city, and Paris Agreement. The latter emphasized the need of a strong cooperation and commitment from countries around the globe to address the issue of climate change. Related to environmental issues, a visit to Suzuka incineration and recycling center was enriching to learn how the waste is separated and how the process of the incineration is governed. This center accepts waste from households and private companies. On the top of that, a trip to Yokaichi pollution museum offered the learning on how the pollution issue was spreading, how people and communities got affected by severe air pollution, and how the problem was resolved. Learning on the linkage between the pollution and the society, and the imbalance between the economic development and environment was emphasized.

1.2. Interpretation of Sustainable Community

Brundtland report in 1987 defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p.41). Unrestrained development is also a root cause of unsustainability (E. Conrad and L. F. Cassar, 2014). The need to rebalance the growth of economy and the conservation of the environment is important in order to attain sustainable development.

Based on a wide range of knowledge and hand-on experiences from seminars, lectures, and study trips, the definition of sustainable community was interpreted and elaborated through six elements: 1) Decoupling economic development and environment, 2) Multi-stakeholder engagement within community, 3) Cultural preservation and revitalization, 4) Effective utilizations of resources, 5) Economic revitalization, 6) Resilient community with ownership and self-sufficiency (Figure 1.).

Decoupling development & environment	Multi stakeholder engagement within the community	Culture preservation and revitalization
Effective utilization of resources	Economic vitality	Resilient community with ownership and self sufficiency

Figure 1. Elements of Sustainable Community

Decoupling economic development and environment is the stage when economic development is effectively enhanced, while maintaining high environmental quality and natural resources. In term of food waste issue,

decoupling occurs when foods and raw materials in everyday life are effectively utilized, redistributed, and reutilization for solving the problem of food waste and promoting the sound development of society.

Multi-stakeholder engagement is the process where all relevant actors are included in the (development) process. In the case of food waste generation at the levels of school and household, stakeholders include food handlers, parents, teachers, students, food scavengers, and the common folks. These multi-stakeholders need to hold hand in hand and work together to promote efficient food consumption for reaching zero waste community.

Economic vitality encapsulates the terms of healthy economic development and opportunity, resource utilization, and well-being of the community and citizens. This concept encourages small, medium and large business the promotion of innovation, competitiveness, and entrepreneurial skills, which are vibrant to the economic activities. Economic vitality can greatly contribute to the efficient and effective consumption of foods. Small-scaled business units doing composting food waste are an example of new economic activity for promoting economic vitality.

Culture preservation and revitalization are essential parts of communities as daily activities and practices are the reflection of culture, including eating culture. Culture can positively influence ways of shopping, cooking, eating, and storing foods. For the Japanese philosophy "Mottainai" conveys the meaning of everything has value. Applying this philosophy to food waste issues, it means that everything related to food has values and should be appreciated. This culture can be replicated, revitalized and spread in every corner of the community, when this culture instilled in every mind and heart will result to zero food waste.

Resilient community is the ability to anticipate risks, limit impacts, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent changes (Patel, et.al, 2017). This could be applied for the food consumption. Every human being needs to adopt in order to changes to live harmoniously with the environment. In order to come up with this everyone should have the sense of responsibility and ownership for a sufficient and efficient food consumption in the community.

According to scope of the Sustainable Development Goals; SDGs (Barbier & Burgess, 2017; UNDP, 2017), the proposed project: "Eat All, Waste Less, Stay Healthy" mainly addresses 6 Goals of the United Nation Sustainable Development Goals (UN-SDG) in:

Goal 2 Zero hunger: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Goal 3 Good health and well-being: Ensure healthy lives and promote well-being for all at all ages

Goal 11 Sustainable cities and communities: Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12 Responsible Consumption and Production: Ensure sustainable consumption and production patterns

Goal 13 Climate Action: Take urgent action to combat climate change and its impacts

Goal 17 Partnership for the goal: Strengthen the means of implementation and revitalize the global partnership for sustainable development

1.3. Resources Mobilization

In order to attain zero food waste community, resource mobilization is needed that promote sustainable food consumption. According to Claudia (2014), resource mobilization is the process of getting resource from resource provider, using different mechanisms, to implement the organization work for achieving the pre-determined organizational goals. She elaborated that this deals with acquiring the needed resources in a timely cost effective manners. Resource mobilization advocates upon having the right type of resource, at the right time, at right price with making right use of acquired resources thus ensuring optimum utilization of the same.

The technology is much needed to come up with efficient mechanization and technologies in preventing, reducing, and reutilizing food wastes. Financial requisite in order to finance the mobilization of the project and to kick start the initiative, in term of food efficient consumption. Cultural orientation that could promote suitable food consumption, redistributing foods for those in need, and reutilize it for other purposes this could benefit the whole community. Natural resources are resources that are naturally occurred, such as lands, air, flora and fauna etc. (Perman, 2003).

Natural resources can be categorized into two renewable or non-renewable. The depletion of natural resources is considered to be a sustainable development issues (Schilling M and Chiang L., 2011). Therefore, ensuring efficient resource consumption is crucial as some resources would not be depleted and could replenish naturally. Applying this knowledge to food, it is reasonable to mention that food sources mostly come from plant and animals; therefore, resources related to food production and consumption should be efficiently consumed and should be consumed within the limit of nature.

Human capital is defined as the stock of knowledge, habits, social and personality attributes, including creativity, embodied in the ability to perform labor so as to produce economic value (Kwon, 2009). She explains that knowledge was, and still is, transmitted without a formal and extensive school system.

1.4. Designing Sustainable Community in a Localized Context

Related to creating sustainable community, it requires a coordinated joined approach involving a wide range of resources and stakeholders (Mumovic & Santomouris, 2013). During the design process, it is essential to understand that having the same level of understanding should be established, in terms of common current issues. Those issues encourage the group to think what should be done for the society move towards sustainable community. One of the main current issues emerged during the group discussion was waste management in ASEAN countries. With the same understanding, waste management became a never-ending problem till now, particularly for urban areas.

In terms of waste management, an integrated system becomes a key concept for achieving sustainability in this case. Inspired by the concept of integrated waste management, promoting waste management towards sustainability can be defined as efficient resource consumption that reduces the amount of waste produced and contributes to sustainable economic development, environmental protection and social equity.

Making connections between people perception on waste management within a community is a complicated matter. Thus, it is important to understand that basic factors rely on issues, such as culture, geographical matters, etc. From one city to another, there are different characteristics influencing how effective sustainability programs work. For instance, between Kuala Lumpur and Bangkok, there are different culture and perception regarding community waste management. Thus, data collection for obtaining a clear feasibility study is needed.

For this discussion purpose, the discussion for sharing information, knowledge, and experience was limited to current situations of waste management for the countries of group members (Cambodia, Indonesia, Malaysia, the Philippines, Singapore, and Thailand). Singapore has the best practices in integrated waste management while other countries have similar baselines. From the sharing sessions, it had been decided that Kuala Lumpur, Malaysia became the pilot project. Current situations and reasons for the project are described in the next section.

2. Proposed Project: Eat All, Waste Less, Stay Healthy

Based on above description, this section continues with background information on waste management in Malaysia and the detail description of the proposed project.

2.1. Background Information

Waste Management in Kuala Lumpur, Malaysia

The current population of Malaysia is 30.3 million and the capital city, Kuala Lumpur is 7.25 million. Kuala Lumpur has high population density of 6,890 people per square kilometer (World Population Review, 2017).

Waste management is a crucial issue related to the economic status of a country and the lifestyle of its population. Based on the study of Kadir and colleagues, the average municipal solid waste (MSW) generation is 0.5-0.8 kg/person/day; however, the waste generated in the urban area is 1.7 kg/person/day, compared to the worldwide average of 1.2 kg (Kadir, et al., 2013). In comparison to the rural population, urban population contributes more wastes, as there are greater economic activities and wider economic gaps between rural and urban areas.
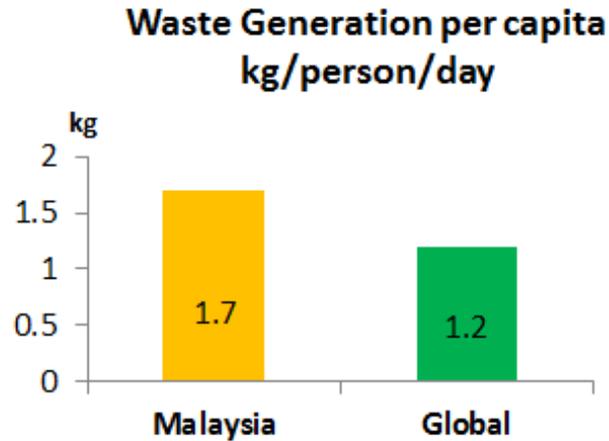
Waste Generation per capita kg/person/day

Figure 2. Comparison of Waste Generation Per Capita

Malaysians produce approximately 30,000 tonnes of waste daily and only 5% are recycled. Moreover, only 10.5% of Malaysians enroll in waste recycling practices (www.malaysiandigest.com, 2015). Over the ten-year from 2003 to 2013, the generation MSW in Malaysia increased more than 91% (Cleanmalaysia.com, 2015). Considering the financial perspective, all that rubbish costed taxpayers almost RM2bil to clean up, and for Kuala Lumpur alone, the cost of public cleansing and waste management is a whopping RM325mil a year (The Star, 2016).

Currently, waste disposal methods for Kuala Lumpur include unsanitary landfills, sanitary landfills, and illegal open dumping (Figures 3 to 5). Landfills cause serious impacts on the environment, such as leachate contamination in groundwater and greenhouse gas emissions. Therefore, Kuala Lumpur faces a serious need to reduce its dependence on landfills, due to its population density and alternative solutions, such as incineration. However, alternatives are difficult to implement. Hence managing solid waste in Malaysia still remains a big challenge.

Figure 3. Open Landfills
Source: Google Images

Figure 4. Sanitary Landfills
Source: Google Images

Figure 5. Dump sites
Source: Google Images

Although there is a national campaign on 3Rs initiative (Reduce, Reuse, Recycle), the public's reaction and participation are still relatively low. According to the Draft KL City Plan, the city targets to reduce the waste generation to 0.6 kg/person/day and to increase the recycling rate to 40% by 2020 (C. Osmi et al., These targets are ambitious and action-oriented measures are required for achieving these targets and for promoting sustainability of MSW.

Food Waste Issues

Food waste is the highest contributor of waste generated in Malaysia at 44.5%, followed by plastics 13.2%, diapers/sanitary napkins 12.1% and paper 8.5% (The Star.com.my, 2016). Malaysians wasted 15,000 tonnes of food daily, including 3,000 tonnes (20%) of waste that are good for consumption. Food waste is also the biggest contribution in landfills (The Star.com.my, 2016). Figure 6 shows the waste composition in Malaysia.
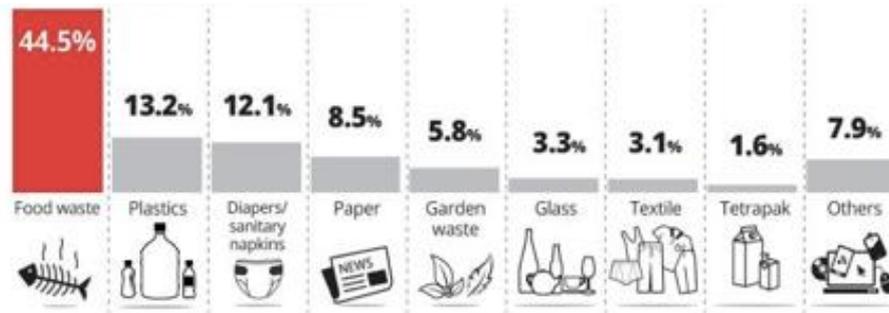
Figure 6. Waste Composition in Malaysia
Source: The Star.com.my, 2016

According to Channel News Asia, it also reveals that the number one source of food waste is from household (www.channelnewsasia.com, 2017). Second source is night markets and Ramadan bazaars, followed by the food courts, while the fourth source is the food and beverage sector (www.channelnewsasia.com, 2017).

2.2. Problem Statement

In Malaysia, several factors have contributed to food waste problems. Figure 7 summarizes factors aggravating the quantity and the management of food waste in Malaysia. The first three root causes will be addressed in Phase 1 which is "Eat All". The fourth and fifth root cause will be addressed in Phase 2: "Waste Less" and finally the last cause will be addressed in Phase 3: "Stay Healthy".

Figure 7. Root causes of food waste in Malaysia
Source: The Star.com.my, 2016

Firstly, eating habits have dramatically transformed as living standards have improved where people can afford to buy more food products. The age of consumerism has resulted to a consumption society. For example, people tend to buy a larger coffee instead of a small one since they can afford it although they know they could not finish it.

Secondly, the perception on the value of food is closely linked to food waste in Malaysia. Food is also relatively cheap. On average, a meal would cost RM 4-5 (100 yen). Therefore, the perception of food is cheap

and easy to access clouds the mindset of Malaysians to buy more, eat more and do not have any appreciation of the value of food and the resources used to produce the food.

Thirdly, type of foods also involves in the amount of food waste. Generally, Malaysian food style of cooking is wet. Most of the dishes have gravies, such as curries and soups. Most of the times, gravies are not consumed and later being thrown away. Furthermore, many ingredients are used in the cooking, including spices and variety of onions. Whenever a Malaysian family gathers for a meal, 3-4 dishes are usually served, resulted in a high amount of food waste originated from food preparation. These cooking and eating practices contribute to the increasing amount of food wastes.

Fourthly, food is closely tied to Malaysian hospitality. Believing that more is better than not enough, hosts tend to prepare abundant amounts of food for guests. Guests would be hard pressed to attend any function without a spread of dishes on offer.

Fiftyly, multi-ethnic Malaysia comprising of Malay, Chinese, and Indian prides itself on being a food haven. Food is closely linked to its identity, with every tourism campaign boasting the diverse dishes the nation has to offer – from traditional Malay "nasi lemak" to Indian banana leaf rice. Having many festivities add up to this issue as food waste can increase by up to 50% during the festive periods (www.channelnewsasia.com, 2017).

Lastly, eating culture in Malaysia strongly influences the amount of food waste and health of people. Malaysians also have the *eating culture* where people would hang out with friends and eat at "Mamak Stalls" - food establishments which serve Malaysian Indian food. The Mamak Stall usually opens 24 hours and is extremely popular among young adults and teenagers who find it a safe place to hang out with friends during the night and also because it is quite affordable. It becomes an integral part of urban life in Malaysia influencing eating habits of Malaysians. Due to eating practice and culture, obesity is also indirectly the outcome of these eating habits. Malaysia has the highest obesity rate in Southeast Asia. This was based on Economist Intelligence Unit's "Tackling Obesity in ASEAN" report, which covered Malaysia, Singapore, Indonesia, Thailand, the Philippines and Vietnam. The report said in Malaysia, the prevalence of obesity was at 13.3 per cent, while overweight was at 38.5 per cent. (nst.com.my, 2017).

With having all these factors in line with food waste problem in Malaysia, there is an urgent need to address this issue in an integrated, holistic manner, not just on reducing on food waste itself but repurposing, redistributing and composting. Adding on healthy lifestyle to the whole spectrum will broaden the long-lasting impacts in solving this issue.

2.3. Project Overview

The "Eat All, Waste Less, Stay Healthy" project will take place in Kuala Lumpur, Malaysia as a pilot project. It consists of three phases which will be implemented in 10 years as explained below. However for this project proposal we will explain in detail on Phase I activities. Phase II and Phase III will just be an overview.

- *Phase I* – "Eat All" targets at schools and households which will then be connected to communities. It will address the issues of food waste prevention and reduction. Starting at one primary school and expanding to several schools, activities in Phase I will be conducted during the first 3 years of the project and it is hoped that these implemented activities will be embedded in the environmental education curriculum. As iterated before this phase will address on the consumption issues, food value appreciation and cooking style.

- *Phase II* – "Waste less" targets at food waste reutilization (livestock feed, *new* dishes menu, etc.), distribution (food banks, charity activities, etc.), and composting (fertilizers for farming and gardening activities). The targets for implementing these activities are households, communities, food and beverage companies, restaurants, and also social enterprises. In this phase, citizens in Kuala Lumpur are encouraged and engaged in the full loop of 3Rs (Reduce, Reuse, Recycle) related to food waste in their daily life. This phase will address the issues of hospitality expectations where food is always prepared in abundance, as to reutilize, distribute and compost the food waste.

- *Phase III* – "Stay Healthy" targets at Kuala Lumpur city as a whole. The focus is to promote healthy and active lifestyle. The activities will be strongly related with sports, hobbies, and enriched lifestyle in line with zero waste mindset (swimming, Zumba, dances and yoga classes for residential communities). These activities are meant to distract people from the "eating culture" that Malaysians have.

2.4. Objectives

Starting from the seriousness of food wastes in Kuala Lumpur, this project sets a challenging goal and achievable objectives to solve the problem. The goal and objectives are formulated to fundamentally resolve the food waste problem, while addressing the topic of healthy and active lifestyle in Kuala Lumpur.

Goal of the project is to achieve **zero food waste & healthy and active lifestyle and society in Kuala Lumpur.**

Objectives of the project are to:

- Prevent and minimize food wastes in Kuala Lumpur
- Reutilize and redistribute nearly-expired foods in Kuala Lumpur
- Establish healthy and active lifestyle in Kuala Lumpur

2.5. Framework: 6 Sources of Influence Model

Based on the Report entitled "Motivating Sustainable Consumption", methods to address sustainable behaviors can be categorized into three main approaches: individualist, systematic, and integrative paradigms (Jackson, 2005). For the individualist paradigm, it emphasizes cognitive factors of the individual for behaving more sustainable. This approach assumes that sustainable behaviors will be enrolled when people have environmental attitudes and values (see e.g., Aini et al. 2002; Jansson, 2011; Stern et al. 1986). Although this approach emphasizes on cognitive

factors of people, it is criticized for neglecting external contexts and societies connected to people.

For the systemic paradigm, it focuses on economic and social variables for enabling sustainable behaviors, implying that people will enroll in sustainable behaviors when there is a provision of suitable technologies, proper infrastructures, and economic incentives (see e.g., Jacobs & Bailey, 1982/3; Witmer & Geller, 1976). Although this approach acknowledges contextual factors for promoting sustainable behaviors, it is criticized for the lack of cognitive factors.

For the integrated paradigm, it considers both internal variables of people and social contexts for facilitating sustainable choices (of behaviors) (e.g., Nijhuis & Spaargaren, 2006; Spaargaren & Van Vliet, 2000). As the integrated approach emphasizes both cognitive factors of people without and external influences, this approach was chosen for in this study. Out of several models from the integrated approach, the *Six Sources of Influence Model* (Grenny et al., 2013), emphasizing cognitive factors of people, while not neglecting conducive environments for behavioral changes, is selected as a backbone framework for this project to apply to students and parents for motivating, engaging, and enabling them to minimize food wastes.

Before describing the detail *Six Sources of Influence Model*, the *Elephant-Rider Model* - Heath and Heath (2011) is employed to deeply understand the cognitive factors for decision-making process of people. The *Elephant-Rider Model* is used to explain that there are two decision-making systems in human beings. There is an emotional side (the Elephant) and the rational side (the Rider). Most of us think that the Rider controls the Elephant, however, the Elephant is powerful in influencing behavior. For example, in attempting to eat healthily, even though the Rider understands the reasons for doing so, the individual may still face challenges in sticking to the diet, as the Elephant may feel unmotivated. Hence, to change behavior, there is a need to direct the rider and motivate the Elephant.

Six Sources of Influences Model proposes that there are six sources of influence that can help one change any human behavior.
- Personal Motivation – whether you want to do it.

- Personal Ability – whether you can do it.

- Social Motivation – whether other people encourage the right behaviors.

- Social Ability – whether other people provide help, information or resources.

- Structural Motivation – whether the environment encourages the right behaviors.

- Structural Ability – whether the environment supports the right behaviors

2.6. *Phase I: "Eat All" Project*

As the issue of food waste is an alarming issue for Malaysia, including Kuala Lumpur, Phase I (Eat All) is addressing the prevention and

reduction of food wastes from schools and households, which are the most preferable options from the environmental perspective.

Objectives – Reduce food waste from the school and household (20% reduction from baseline within 1 school-term); Establish new social norm for food consumption at school and household.

Scope of work - School and households of students; Students (grade 4-6, age 10-12) with the involvement of parents and teachers.

Target School – One of Primary School in Kuala Lumpur will be selected as a pilot school to firstly implement the project. One criterion to select the school is that the school has to be integrated with Environmental Education (Meerah et.al, 2010), including schools in the Keramat Zone. Selecting the school with integrated Environmental Education will complement the activities of this project. The Environmental Education Curriculum have been implemented since 1993, based on Malaysian National Education Policy (NEP) yet knowledge, attitude, and skills, participation levels towards environmental matters among the student show a low to moderate level (Khalid, et.al, 2011). This project will emphasize what students have studied in a more comprehensive manner.

Strategy - Engaging students and parents in minimizing food waste along the consumption processes through three sets of activities: 1) Orienting and Measuring, 2) Shopping and Cooking, and 3) Consuming.

Measurement - To measure the success of Phase I, two measurements are required as pre- and post-measurements. The first measurement is weighting the amount of food waste to quantitatively measure the difference of the food waste amount. The second measurement is conducting the survey and observation to qualitatively measure changes on social norm for food consumption.

Toolkit - To facilitate several activities in Phase I, three main tools are developed to motivate and enable students and parents to minimize their food wastes. These tools are 1) Infographic Booklet, 2) Token Rewarding System, and 3) Storing Tool Kit as mentioned below.

Infographic Booklet contains many useful information and documents for students to use in their daily life for minimizing food waste and preparing healthy and yet easy-to-cook meals. Contents of the Infographic Booklet includes: 1) Smart recipe: easy and less-ingredient recipes of nutritious meals, 2) Lunchbox plan sheet: planning sheets for preparing meals, 3) Shopping list: planning sheets for shopping for foods and raw materials, 4) Storage guideline: information sheets on shelve life of foods and raw materials and methods of food storage, and 5) Re-create recipe: recipes for recreate new foods from nearly-expired foods.

Token Rewarding System is employed to collectively motive students to finish their meals. Tokens will be rewarded (by teachers and parents) to students when they finish up their foods at school and home. This model was inspired from Sora Tabeyo restaurant, where children are given with tokens when they finish their meals and in exchange they get free rides in the amusement park.

Storing Tool Kit is a systematic storing system for food and raw materials. The tool kit comprises of storage boxes and customizable

labels, which will be distributed to students to be used at home. Storage boxes can be used to store food and raw materials. Customizable labels are meant to be used for writing down preparation/expiration date of food and raw materials. Along with the content of Storage Guidelines in the Infographic Booklet, students and parents are able utilize the Storing Tool Kit to correctly prioritize what foods and ingredients to be used before the expiration date, so that all foods and raw materials will be utilized.

2.7. Detailed Activities and Evaluation of *Phase I: "Eat All" Project*

2.6.1. Orientating and Measuring

Objectives – The project will be launched during *First Week of School* activities and next week after that. The activities will introduce more about *current waste problems* around the environment *to familiarize* all of the actors involved within community. This stage also explained more about *how is food waste became an issue* in their daily life and the *effect to the society*.

Duration – This stage will be conducted within *two weeks* as data collection and used as measurement "before and after" activities.

Activities – There are fun activities during Orientation Week at schools as mentioned below.
1) *Monitor what you throw away* – First week will be designated as "Dear Diary" that let the students write down their daily eating habits (preference menu, cooking style, etc.). There will be two sessions within this agenda. First, at **school,** at the end of lunch session, all the waste is collected in separate categories and weighed by students and teachers, and school staffs. Students bringing a lunchbox to school or buying from cafeteria are encouraged to consider how they can have a food waste-free lunch in future. Secondly, at **home**, students with the assistance of parents are asked to weigh their food waste from their unfinished meals during dinner and breakfast.

2) *An enriching visit to landfill and farming areas* – The next week will be educating and memorable visit to a landfill for observing serious situations of waste and to a farm for seeing the difficulty of food production. This will enable the children to appreciate more on how the food is produce and put on the table.

2.6.2. Shopping and Cooking

Objectives – The main activity is Lunchbox Plan, which aims to inculcate the habit of planning for their meal and promote the efficient usage of cooking ingredients to reduce food waste. This activity is critical as it targets the upstream of the consumption process, which is the priority of the Phase I initiative.

Activities – There are fun activities during Shopping and Cooking activities as mentioned below.

1) *Smart shopping* – At home, students will have shopping experience together with their family. The activities will focus on planning lunchbox meals using a shopping list and how to shop effectively (saving cash - buy exactly what you need and have a plan B). Students will be empowered to plan and implement a zero-waste meal by doing up a shopping list of ingredients to buy.

2) *Smart cooking* - At home, students will have kitchen experience with their family, how to make their own healthy lunchbox meals and share with other students at school during lunch time.

Prior to the activity, they will learn in school about recipes of various easy-to-prepare and nutritious meals, which uses minimal ingredients. Through this process, they will learn important skills, such as planning for their meal in advance to reduce waste of ingredients, taking note of nutrition of their meals and enjoy the cooking process, so they cherish the food on their plate. As explained before this is to improve the cooking habit of Malaysians of having too much ingredients in their cooking. An Infographic Booklet manufactured from recycled materials containing a shopping list template and simple healthy recipes are provided to students (Figure 8).
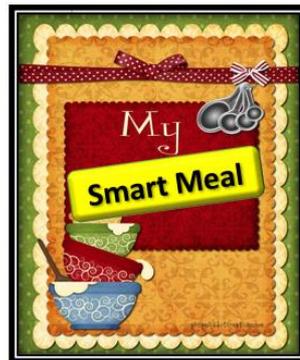

Figure 8. Infographic Booklet
Source: Google Images

2.6.3. Consuming and Storing

Objectives – This activity employs two tools: Token Rewarding System and Storing Tool Kit. As a part of food waste reduction, the activity aims at inculcating the habit of finishing food on the plate and promoting efficient consumption of foods and cooking materials through a systematic storage system.

Activities – Token Rewarding System and Storing Tool Kit are employed in minimizing food waste from consumption and storage. To collectively incentivize students to eat up the meal for avoiding generating food waste, teachers and parents rewarded tokens to students who finish their meals at home and school. Awarded tokens of all students in the same classroom are collected in a jar displayed in the classroom, so that it could motivate students to fill up the jar for reclaiming special rewards,

such as field trip and or a class party. Next to positive motivation, this group effort creates peer pressure among students to finish up their meals for filling up the jar faster.

Figure 9. Token Reward System
Source: Google Images

To educate students and assist their parents in efficiently and systematically storing foods and raw materials for avoiding spoiling foods, Storing Tool Kit together with the Storage Guideline in the Infographic Booklet, students and parents are equipped with storage boxes with customizable labels to "better store" foods and raw materials. Moreover, they can easily adopt the idea of "first in, first out" to prevent food waste generation.

2.6.4. Designing the Programme by Leveraging Behavioral Insights

To ensure long term behavior change beyond the duration of the project, it is designed based on behavior change framework as explained in section 2.5. The project aligns the Elephant-Rider model to the Six Sources of Influence model for a comprehensive framework. The project is designed such that it "Motivates" the Elephant and equips "Rider" with "Ability". The following table demonstrates how the project addresses each source of influence:

	Motivation for the emotional side (Elephant)	Ability for the logical side (Rider)
Personal	Whether you want to do it. • Develop a sense of accomplishment in students when they plan their own meal and finish the food. • By bringing students to witness the environmental problems at landfills and the difficulty of growing crops, the project encourages an appreciation of the issues of excessive waste and the value of food.	Whether you can do it. • Inculcate students with the skills and knowledge equipped to minimize waste.

Social	Whether other people encourage the right behaviors. • Fellow students exert peer influence on each other to complete their food when they eat together. • Parents follow through at home and encourage their children to complete their home task.	Whether other people provide help, information or resources. • Students learn from school the detailed aspects of reducing waste at every stage of the lifecycle of food. • While the initiative educates students in school, there is also reverse education where the students bring what they've learnt about shopping planning and food storage back home to educate their parents.
Structural	Whether the environment encourages the right behaviors. • The token system is established as a visible reminder and tangible reward for students to finish their food.	Whether the environment supports the right behaviors. • The booklet with shopping plan serves as a guideline to minimize waste. • The food storage tool kit facilitates easy adoption of storage practices at home.

2.8. Future Outlook

Based on the current status and expected outcomes of the project (Phase I) in Kuala Lumpur, it is foreseeable that there are several challenges for the Phases II and III. The first challenge is involving more stakeholders in implementing the project, as new phases will involve a wider range of stakeholders at both community and city levels. In addition, Phase III will promote new patterns of active and healthy lifestyles and cultures to enhance the levels of sustainability of the city of Kuala Lumpur and its citizens.

As soon as the outcome of the project becomes available, it is essential to draw lessons learned. These lessons learned would be useful for other ASEAN countries when others implement or replicate the project for solving the problem on food waste and promoting healthy and active lifestyles, which are crucial aspects of sustainable community.

Based on lessons learned from IATSS Forum, there are many challenges that need to be addressed for ASEAN countries for promoting sustainable community, especially waste management. A few key challenges are described as followings. At a fundamental level, comprehensive aspects of sustainable development should be embedded in the policy for developing communities.

Moreover, the initiation of bottom-up projects should be leveraged by relevant stakeholders, including local and national governments, as a bottom-up approach reflected actual needs of people and local economic, social, and environmental contexts. Last but not least, it is important for countries in ASEAN to both raising awareness of people on sustainable development, while developing enabling systems and infrastructure for promoting changes toward sustainability.

3. Postscript
3.1. Lessons Learned

Group study learning processes - For the group study, it went through several stages before the completion of final presentation and final report. The discussion processes began with the sharing lessons learned from field studies and seminars related to sustainable community design. After sharing lessons learned among team members, current problems connected to sustainability in the countries of all members are shared. These problems were grouped and categorized for performing root cause analysis. At this stage, completed overviews on sustainable community based on the Japanese contexts and the current situations of ASEAN countries were derived. All group members further shared ideas and interests for prioritizing problems for selecting the topic.

To arrive at the chosen topic, consensus process was required, as there were two equally important topics (sustainable mobility vs. waste management) and all members could not find reasons not to select either topic. Therefore, voting process was required to select the topic to arrive at the suitable topic - waste management. With the chosen topic in mind, the group further discussed about the possible location for implementing the project based on the severity of the waste problem in the countries of group members. The conclusion from the discussion was that the city of Kuala Lumpur, Malaysia was selected, as the problem of waste was challenging. With the chosen topic and location in mind, the group

further researched and discussed about waste management in Kuala Lumpur to narrow down the scope of the project. Based on available information and interests of group members, the group made a decision to address the issue of food waste in Kuala Lumpur.

The next step was to design and conceptualize the project. The discussion began with the topic of setting goal and objectives, followed by series questions regarding "framework, implementation site, activities, methods, and tools" to be used in the project. During this process, many ideas were shared among group members for shaping a concrete outline of the project. Gearing towards the completion of final report and presentation with a limited time and a pressing deadline, tasks were mutually shared among members based on willingness, skills, and interests.

Reflecting on these learning processes, lessons learned derived from the group work can be drawn. Several working approaches and tools were utilized to arrive at fruitful discussions and successful outcomes. Key approaches and tools are summarized as followings.

Open brainstorming and discussion: Brainstorming and discussion are crucial for group study, as ideas, information, knowledge, and experiences from members are suitably shared and discussed to arrive at the best possible outcomes.

Comparative analysis: Comparative analysis enables to see differences and gaps related to situations and practice of different countries. Acknowledging these differences is meaningful for decisions makings and conceptualizing and planning the project.

Root cause analysis: To design the project and activity for tackling the problem, it is essential to know actual causes of the problem. Root cause analysis offers ways to identify roots of the problem and ensures that the designed project and activity could resolve the problem.

Bottom-up and top-down approaches: In formulating the project to address the problem, it is possible to approach the problem from either bottom-up or top-down approaches. Each approach offers different points of view.

Democratic working style: It is important that group members have equal rights to share ideas and vote. Open, yet democratic working style ensures equal rights, prevents the domination of individuals, and promotes fairness in the group work processes.

Shifting from a team with alternating roles to a performing team: The roles of facilitator, secretary, presenter, and timekeeper were initially alternated in the group to ensure that all group members experience all roles in the team. Towards the end of the group study, roles were not clearly divided; however, all members contributed on what ones could and are good at. The team was clearly shifting toward a performing team, as the performance and outcome increased over the time.

3.2. Challenges

Having different backgrounds, in term of education, specialization, experience, work and cultural country upbringing, the team endured the clash of ideas and opinions. Selecting the topic was a tough task. The first step to overcome this issue was to write down all individual ideas on the white board. The next step was to share information on the problems and challenges of every country. Topics of discussion included environmental degradations, food sufficiency, disaster, politics, economic and so on. From this starting point, common problems of every country were summarized in a detailed manner.

Every member's ideas and opinions were always considered and integrated into the project development processes. To ensure knowledge-sharing environment, it was decided that opinions of every member opinion should be respected. Sometimes, discussions and argument got heated created conflicts among members; however, intervention methods were introduced to solve the conflict, such as consulting, mediating, and giving more time and space.

Sometimes, the team was diverted from the discussion due to the overloaded information being put on the table and the distraction of digital devices. The issue was resolved by outlining the scope of important information to be considered and integrated. To minimize the distraction from digital devices, "digital detox" practice was adopted.

Limited time and pressing deadline become concerned issues. To overcome these challenges with fair quality output, workloads and tasks were divided to every member based on their expertise and ability. Moreover, utilizing uniqueness of the group with diverse knowledge, skills and talents were practiced for successful outcomes. For example, a group member with marketing skills took up the role of preparing presentation. There were also experts in the fields of environment, engineering, and information technology.

References

Aini, M., Fakhru'l-Razi, A., Lad, S., & Hashim, A. (2002). Practices, attitudes and motives for domestic waste recycling. *The International Journal of Sustainable Development & World Ecology, 9*(3), 232- 238

Barbier, E. B., & Burgess, J. C. (2017). The Sustainable Development Goals and the systems approach to sustainability. Economics Discussion Papers, No 2017-28. *Kiel Institute for the World Economy. http://www. economics-ejournal. org/economics/discussionpapers/2017-28 Page*, *2*(2).

Claudia Goldin, Department of Economics Harvard University and National Bureau of Economic Research. "Human Capital", 2014

Conrad, E., & Cassar, L. F. (2014). Decoupling economic growth and environmental degradation: Reviewing progress to date in the small island state of Malta. *Sustainability*, *6*(10), 6729-6750.
Grenny, J., Patterson, K., Maxfeld, D., McMillan, R. and Switzler, A. (2013), Infuencer: The New Science of Leading Change, McGraw Hill, New York, NY
Heath, C., & Heath, D. (2011). Switch: How to change things when change is hard. New York: Broadway Books
http://ijceg.ump.edu.my/images/ARTICLES/Vol.4/selection4.pdf, 2013.

http://cleanmalaysia.com/2015/09/04/waste-management-in-malaysia-in-the-dumps/ 2015

http://www.mdpi.com/2313-4321/1/2/254/htm, 2015

http://www.thestar.com.my/metro/community/2016/05/30/managing-kls-rubbish-residents-in-the-city-are-more-conscious-of-the-amount-of-waste-they-generate-a/#Rqre2zihpCPueJlj.99 2016

http://www.thestar.com.my/news/nation/2016/05/24/malaysians-waste-15000-tonnes-of-food-daily/, 2016
http://www.malaysiandigest.com/news/550622-malaysia-s-recycling-rate-is-still-low.html, 2015
http://www.undp.org/content/undp/en/home/sustainable-development-goals.html, 2017
http://worldpopulationreview.com/countries/malaysia-population/, 2017

http://www.channelnewsasia.com/news/asiapacific/what-a-waste-malaysia-s-struggle-with-excess-food-8735458, 2017
http://www.channelnewsasia.com/news/asiapacific/what-a-waste-malaysia-s-struggle-with-excess-food-8735458, 2017
http://www.channelnewsasia.com/news/asiapacific/what-a-waste-malaysia-s-struggle-with-excess-food-8735458, 2017

https://www.nst.com.my/news/nation/2017/06/246538/malaysians-most-obese-region, 2017

Jackson, T. (2005). Motivating sustainable consumption. London: Sustainable Development Research Network

Jacobs, H.E., & Bailey, J.S. (1982/3). Evaluating participation in a residential recycling program. *Journal of Environmental Systems, 12*(2), 141-152

Jansson, J. (2011). Consumer eco-innovation adoption: Assessing attitudinal factors and perceived product characteristics. *Business Strategy and the Environment, 20*(3), 192-210

Kadir, S. A. S. A., Yin, C. Y., Sulaiman, M. R., Chen, X., & El-Harbawi, M. (2013). Incineration of municipal solid waste in Malaysia: Salient issues, policies and waste-to-energy initiatives. *Renewable and Sustainable Energy Reviews*, *24*, 181-186.

Keeble, B. R. (1988). The Brundtland report: 'Our common future'. *Medicine and War*, *4*(1), 17-25.
Kwon, D. B. (2009, October). Human capital and its measurement. In *The 3rd OECD World Forum on "Statistics, Knowledge and Policy" Charting Progress, Building Visions, Improving Life* (pp. 27-30).

Mumovic, D., & Santamouris, M. (Eds.). (2013). A Handbook of Sustainable Building Design and Engineering:" An Integrated Approach to Energy, Health and Operational Performance". Routledge.
Nijhuis, J. O. (2013). *Consuming mobility. A practice approach to sustainable mobility transitions.* (Ph.D.), Wageningen University, Wageningen

Patel, S. S., Rogers, M. B., Amlôt, R., & Rubin, G. J. (2017). What Do We Mean by 'Community Resilience'? A Systematic Literature Review of How It Is Defined in the Literature. PLOS Currents Disasters.
Perman, R. (2003). Natural resource and environmental economics. Pearson Education.
Spaargaren, G., & Van Vliet, B. (2000). Lifestyles, consumption and the environment: The ecological modernization of domestic consumption. *Environmental Politics, 9*(1), 50-76

Stern, P.C., Dietz, T., & Black, J.S. (1986). Support for environmental protection: The role of moral norms. *Population & Environment, 8*(3), 204-222

Witmer, J.F., & Geller, E.S. (1976). Facilitating paper recycling: Effects of prompts, raffles, and contests. *Journal of Applied Behavior Analysis, 9*(3), 315-322