CHAPTER II
LITERATURE REVIEW

2.1. An overview of food loss, waste and wastage

Food is an endless cycle and a fundamental requirement of human life. The shifts in daily habits of food choices, consumption, and disposal have the potential for significant cumulative impact as we strive for sustainable development and reduced pressures on the environment. One of the challenges facing the world is food loss and waste problems. Generally, food loss and waste refer to a decrease, at all stages of the food chain from harvest to consumption in a mass of food that initially intended for human consumption, regardless of the cause (Parfitt et al., 2010), or in summary, food loss and waste is simply a decrease in the quantity or quality of food.

According to (Roodhuyzen et al., 2017)contended that food waste problem has been receiving much attention over the past decades, several studies have examined the topic by adopting various definitions and approaches. Several authors have tried to use different terms in their studies, such as Food wastage (Grandhi & Singh, 2016), food loss (Beretta et al., 2013; Kummu et al., 2012), and food waste (Garrone et al.,2014).

2.1.2. Food loss and waste occurrences and its definition

First of all, it is crucial to understand how food waste and loss occurs. Long story short, food waste, and loss occur throughout the entire chain of the food supply. Food waste occurs at different points in the Food Supply Chain. However, it is mostly revealed and defined at the retail and consumer phase, where the agricultural system's outputs are considered 'food' for human consumption (Parfitt et al., 2010). Food waste can be defined as the food which was meant for human consumption and end up discarded without consumed and still eatable (Koivupuro et al., 2012). Food waste can be divided into two categories, namely avoidable and unavoidable food based on its edibility (Schneider et al., 2007). Food wastage refers to any food lost by deterioration or waste. Thus, the term "wastage" encompasses food loss and food waste (FAO,2013). This study focuses on avoidable food, which is referred to

as food waste. Avoidable food can be defined as the food that could have been consumed before its disposition (Koivupuro et al., 2012). Food loss occurs at the production, postharvest, and processing phase in the food supply chain. Food loss (retail loss or postharvest loss), depending on the technological advancement available within a given country and market influence of agricultural products plays a significant role at this phase (Parfitt et al., 2010).

However, there is no single agreed international definition of food waste and loss apart from a commonly used definition based on different arguments articulated by previous scholars. Food waste and loss can also be defined and characterized based on the food supply chain stages, including postharvest transportation and storage, processing, distribution, and consumer stages. Moreover, some studies tend to exclude losses at the initial stage of production, such as crops left unharvested (Buzby et al., 2014; Roodhuyzen et al., 2017). This distinction tends to directly or indirectly affects the primary measure of food available for human consumption. Some studies agreed that food loss occurs at an early stage of the Food supply chain, while food waste occurs at the late stage of the food supply chain includes retails and consumer stage or level (Losses, H. F.2014). Buzby et al., (2014) define basing on food loss and waste, whereas food loss is involuntarily occurrence and food waste as a voluntary occurrence.

Suggestions from other studies define food loss and waste based on the final destination or end of the food life cycle option, which is concerned about the removal or retaining of food from the food supply chain. On the other hand, some studies consider food as wasted once sent to unproductive uses, which includes incineration or landfills, while food that is composted or converted to any productive uses excluded from consideration of wasted food (Roodhuyzen et al., 2017; Bellemare MF *et al*.,2017).

Other studies define food loss and waste based on the inclusion or exclusion of inedible parts of a given food. Inedibility stands for whether the part expected to be eaten or not, for instance, banana peels and bones; however, the concept of edibility

of food items may differ in context from one culture to another (Blichfeldt et al., 2015; WRAP,2018). Here implies that an undesirable and inedible food item from one region can be an edible part from another side of the coin. Thus, the determinant of loss or waste entirely depends on the socio-culture context of a given area. Some studies define food loss and waste based on nutrition uptake, such as overnutrition. It is considered as food waste because it involves consumption of food beyond human metabolic needs (Blair & Sobal, 2006), and others consider a loss in terms of decrease in quality and quantity of food mass across the Food supply chain (FAO,2013; Roodhuyzen et al., 2017).

2.1.3 Why should we care for food waste and loss?

Prior researches have shown that food waste and loss significantly impact different aspects such as the environment, economy, and society in general. Knowing these problems associated with food waste and loss draws our attention to care for every single unit of food wasted or lost.

Environmentally, it is reported that globally there is 24% of total freshwater resources used for food crop production,23% of the total cropland area, and 23% of total fertilizer use (Kummu et al., 2012). The avoidable food waste generated by consumers in Europe results in a blue water footprint of around 27 litres per capita and day, which corresponds in its magnitude with the total municipal blue water consumption in Europe (Vanham et al, 2015). Meanwhile, the estimated global demand for food would rise to 60% per capita in the year 2050 according to forecasts of the Food and Agriculture Organization of the United Nations (Alexandratos & Bruinsma, 2012). Sustainable Development Goals (SDG) with target 12.3 set by the United Nations (UN) aims to halving food waste at retail and consumer levels by 2030 and reducing food losses along production and supply chains, including post-harvest losses use (UN, 2015). Priority has been set high to reduce food waste in most industrialized countries due to relatively high consumer food waste.

Economically, during agricultural production, there are some cost implications like purchasing pesticide killers, cost of time, and farm preparations cost that involve

sophisticated machines during preparation and harvesting, transportation cost of agricultural produce, and other associated costs of production. It implies that much energy loss in vain. At the same time, simultaneously, food is wasted and lost. Previous studies reported that the total value of food loss and waste in the United States by consumers through retails is estimated to reach $161.6billion, equivalent to ($522 per capita) (Buzby et al., 2014). The composition of this food, which was lost and wasted in total, includes Meat, poultry, and fish ($48 billion, or 30% of total value); vegetables ($30 billion, 19%); and dairy ($27 billion, 17%). A study conducted in 2016 to reflect on the entire food life-cycle in the US indicated that the total value of the food loss and waste is around $218 billion, with $15 billion occurring on-farm, $2 billion in food processing and manufacturing, $57 billion at consumer-facing businesses, and $144 billion in households (ReFED,2016). A similar study conducted in Europe (EU) found that the estimated 88 Metric tons (Mt) of food loss and waste across the food supply chain had a total value of approximately 143 billion euros ($152 billion) (Stenmark A. *et al.*,2016).

Socially, we recognize that many people worldwide have food insecurity problems and sometimes ending a day without a single meal, and some are suffering from malnutrition due to underfed. Nevertheless, throwing food is deemed as ethically and morally unacceptable (Nahman et al., 2012; Thyberg & Tonjes, 2016) because we are selfish enough to allow other people in need to lose their life because of hunger due to the improper behaviour of food wastage. Food waste and loss affect individuals and communities directly and indirectly in social welfare, employment, and health. It is reported that globally around one billion people are malnourished (Naylor,2010).

2.2. Food waste management Hierarchy

Waste hierarchy refers to the ranking system that involves waste management options according to what is best for the environment. The aim is to prevent the occurrence or generation of waste right at the source point. The top-ranking priority is desired in the waste hierarchy ranking system because it provides the least or less environmental impacts than the ranking option down to the hierarchy system. Its main focus on promoting a sustainable environment. See Figure 2 below illustrates the food waste hierarchy. The food waste hierarchy consists of five alternative options of food waste treatment, namely;

1. Prevention

Prevention is the most favourable option in the food waste hierarchy, which its domain function is to prevent the possible amount of food waste generated in a particular source point. Includes prevention of avoidable food waste generation throughout that food supply chain, Avoid surplus food generation throughout the food production and consumption.

2. Re-use

Re-use is the second option in the food waste hierarchy, whereby its primary aim is to retain the amount of food that is thought to be discarded and give a second chance to be used. It involves the re-use of food surplus for people who face food insecurity and poverty through redistribution networks and food banks.

3. Recycle

Recycle is another option of food waste hierarchy that involves diversion of discarded food into non-human consumption alternatives such as turning food waste into animal feed or composts

4. Recovery

This alternative option of food waste management hierarchy involves treating unavoidable food waste and recovery into energy. It can be undertaken through

anaerobic digestion. Under this particular option normally depends on the level of technology for waste treatment.

5. Disposal

Disposal is the less favourable and final option available in the food waste management hierarchy, which involves the disposal of unavoidable food waste into landfills.

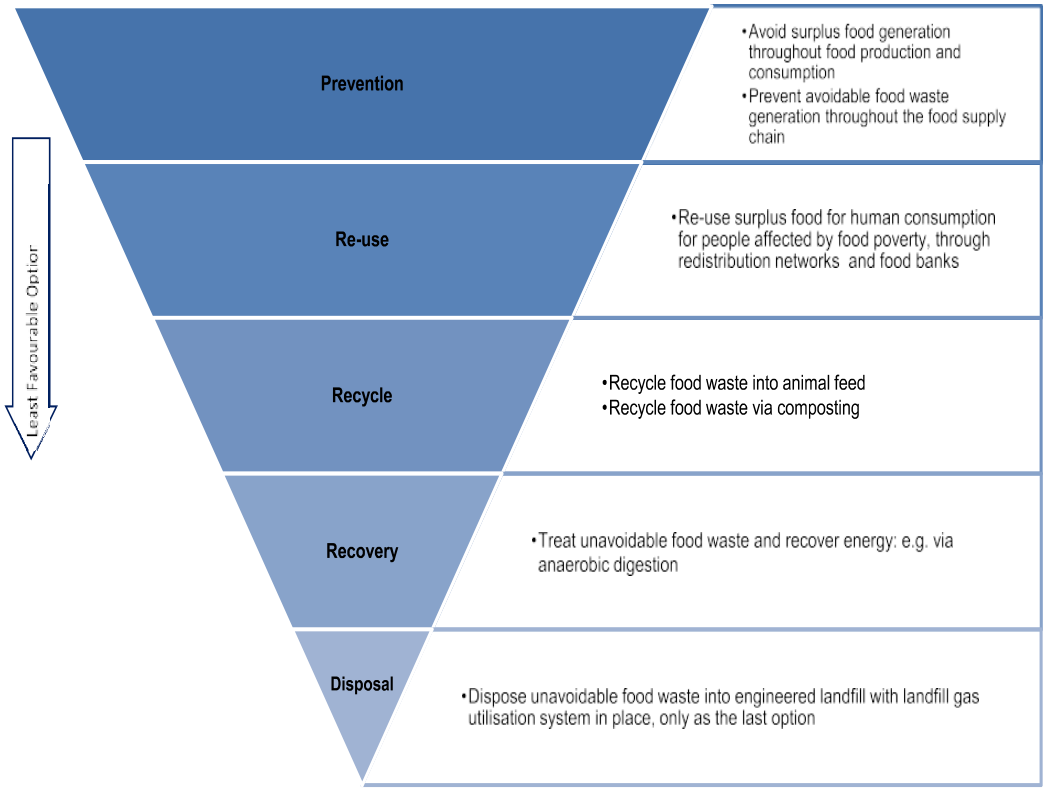

Figure 1. Food waste hierarchy

Source: Papargyropoulou, E., *et al.*,2014

2.3. The role played by the Government of Indonesia and Higher education institutions to manage, prevent and reduce all sorts of waste generation.

Despite having many challenges in this sector, the Government of Indonesia has been providing tireless efforts to ensure proper waste management and reduction of the amount or volume of waste generated from the source point to the disposal point. On the other hand, higher education institutions have not lagged in supporting the government to achieve those goals through adhering to several laws and regulations to emphasises desired waste management activities. The following are some of the efforts and roles played by both government and institutions framework in waste management;

2.3.1 Government efforts to prevent and minimize waste generation in Indonesia

Indonesia consists of several laws and regulations related to waste management but specifically law number 18 of the year 2008 deals with Municipal Solid Waste Management (MSM). This law provides a guideline that the management of MSW consists of waste reduction and waste handling. Under this law waste reduction involves all activities that minimize or limit waste generation through recycling of waste and, or re-using. The crux of this law is to improve environmental quality and public health as well as the effort to utilize waste generated as a potential resource. Mainly, focus on the implementation of government policy by adopting the 3Rs principle (Reduce, Recycle, and Reuse). This law also emphasizes that waste management shall not be deemed as the government responsibility rather should be shared responsibility by all stakeholders including individuals, community as well as business. That means every person is responsible to manage the amount of waste that they produce in their place of jurisdiction, this law targets all consumers and producers. This law is supported by several regulations provision by the government regarding municipal solid waste management which focuses on proper waste management, and to mention a few includes;

Government Regulation No. 81 of 2012: Concerning the management of domestic waste and domestic waste equivalent.

This regulation emphasizes an individual obligation to ensure proper regulation of the volume of waste that they produce. An individual should limit and minimize the amount of waste produces by observing the 3R policy.

Ministry of Public Work Regulation No. 3 of 2013: The provision of facilities and infrastructures to handle domestic waste and domestic waste equivalents

This regulation mainly focusing on the efforts to provide various facilities and infrastructures that used for proper waste treatment from the point of generation to the disposal point. The regulation ensures that the treatment process of all organic and inorganic wastes is properly conducted within all-region in the country without any adverse impacts to the environment and humans.

Presidential Regulation No. 97 of 2017: Concerning the National strategy policy on managing domestic waste and domestic waste equivalents.

This regulation serves as one of the important guidelines for formulating various policies and strategies at different levels of administration within the country. This regulation seeks to achieve the long and short-term plan of the government to implement the 2025 vision of Clean-from-Waste Indonesia. Under this policy also known as "Jakstrans", the main target is to improve management and reduction of domestic waste and domestic waste equivalents by 30% reduction from the point source of waste generation and 70% processing of the waste produces by the year 2025.

2.3.2 Institutional framework and effort to prevent and minimize waste generation, a case of Universitas Diponegoro (UNDIP)

Higher education institutions like any other institution have the role to play when it comes to waste management. Universities are described as micro-cities and therefore waste generation within these institutions is inevitable. Diponegoro University (UNDIP) is a state-owned institution that contains a well-established waste management system and has the vision to achieve an environmentally friendly campus(eco-campus) and pioneer as the role model for all other institutions in the country. Diponegoro University is one of the universities which deploy various policies that aim at ensuring proper waste management and improve the quality of the environment through the adoption of various laws and regulations

responsible for proper waste management in the country. This can be revealed in the circular letter number 27 of 2019 of the Rectors' of Diponegoro University which emphasizes adherence to the principles in line with Law Number 18 of the Year 2008 concerning Waste Management which inform that all stakeholders who produce domestic waste and domestic waste equivalents with exceptional of hazardous waste(B3) must undertake waste management at the point source of waste generation through the application of 3R principle (Reuse, Recycle and Reduce). But also, UNDIP adheres to the sustainable development goals (SDG's) and principles to ensure institutional sustainability. The University of Diponegoro under the circular letter number 29 /UN7.P/SE/2019 developed seven(7DG'S) sustainable development goals that are being recently implemented to ensure various activities within the university are carried out while observing and implementing the established development goals (http://sustainability.undip.ac.id).

2.4. Related studies on food waste problem in the Household and Higher learning Institutions

The food waste problem has been argued from different perspectives; some studies found that the level of awareness and understanding of consumers about this problem is quite dramatic and exciting. Revealed by the study of Gaiani et al., (2018) reported that consumers tend to be aware of the problem in most cases. However, they are not aware of how much they are throwing off and eventually underrate their food waste (Aschemann-Witzel et al., 2015). The implication of this situation is to say some people waste food knowingly while considering themselves fewer wasters just because they do not know how much food is wasted. This alarming situation needed to be resolved immediately by emphasizing awareness campaigns among consumers that would focus on effective methods to minimize or halt the problem of food waste generation right at the point source to lessen this confusion.

Other studies suggested that financial concern to the amount of money lost due to food waste is a significant factor for motivation to minimize food waste compared to environmental concern factors (Gaiani et al., 2018; Neff et al., 2015; Schanes et al, 2018). It is imperative to understand that food waste has a significant impact on

different aspects of life, such as economic, environmental and social(Von Braun, 2007), which should be given equal importance when it comes to resolving the problem at hand. Food waste and loss are regarded as the squandering of valuable and scarce resources such as soil, energy, and water, resulting in economic inefficiencies and most definitely impose adverse environmental impact (WRAP, 2015).

Some studies reported that individuals with high environmental awareness or consciousness are likely to waste less food (Williams et al, 2012). While other studies include of Qi & Roe, (2016) associated food waste problems with gender and reported that women are more sensitive when it comes to food wastage and hence they are more likely to minimize the amount of food waste, contrary to the study of Principato et al., (2015)which found out gender has no any influence on food waste problem regardless of the individual behaviour, underscored that inadequate knowledge about the impacts of food wastage tends to increase food waste. Abeliotis et al., (2014) associate higher learning institutions with the knowledge of food labels, which are positively related to food waste reduction. This implies that higher learning institutions should pioneer the role of preventing and reducing food waste generation within their campuses and developing strategies that would practically reduce food waste problems in a broad sense. Some studies (Emanuel & Adams, 2011; Wilkins *et al.*, 2000) indicate that understanding the perception of university students over the environmental implication of their food choices and others is one among the significant step to develop a practical approach that enables students to boost their awareness and tackle down various sustainability issues within the campus**.**

Several studies have acknowledged the significance of incorporating Higher education institutions on the issues related to sustainability challenges regarding various uncertainty originated from different aspects such as Environmental, Societal, and Economic in which the world of today is facing. Higher education institutions are deemed to play an essential role in shaping and enabling students to become active and responsible citizens (Kagawa, 2007). Universities and Higher

education Institutions are essential instruments used to create and promote innovative approaches that prepare students to deal with different environmental and sustainability issues. Organic waste, such as food waste, has become part and parcel of the environmental problem recently, of which students from Higher learning Institutions are supposed to deal with them appropriately. There is an excellent opportunity to reduce food waste in higher learning institutions compared to a household level. This problem is particularly important to be addressed in these Institutions because there is the provision of environmental education, which helps transform students' perception, behaviour, attitude, and change of their lifestyle to avoid, prevent, and minimize waste generation. Moreover, the same knowledge is applied to disseminate the community through different mediums of communication.

According to Svanström et al.,(2008) contended that to foster behavioural change through education, there is a need to consider the importance of systemic and holistic thinking, the integration of different perspectives, promotion of skills such as problem-solving, critical thinking, creative thinking, self-learning, communication and teamwork and becoming an effective change agent. While Wals *et al*.,(2006) underscored "Transformative learning" as an essential element to make students able to integrate, connect, confront, and reconcile multiple ways of thinking and handling uncertainty. The universities' roles are increasingly moving beyond their limited space from old science-driven approaches and models and diversify their roles in society than before (Zilahy et al., 2009).

Taylor et al, (2009) conducted a study on Food and Non-Edible, Compostable waste in a University Dining Facility, which revealed that tray systems in all-you-can-eat university dining facilities promote food waste generation as compared to university which adopts tray less system and la carte food pricing service. Based on the results of this study concluded and recommended that the Colleges and Universities have ample opportunity to promote affirmative social change and influence their students through sustainable practices and policies they adopt, particularly in consideration of the number of students they serve. It can be achieved

through the modification of their food service policies. The study also underscored the importance of providing education to students to promote awareness and support sustainable practices in food waste management in university settings.

The generation of food waste in university institutions is inevitable as the number of students increases; the study of Desa et al, (2011) revealed that this increment of students' number promotes the generation of waste and displays an escalating growing pattern. This study further Identified sources of waste generators predominantly within the university setting, including residential colleges, cafeterias, faculties, and administration blocks: students, staff from academic and non-academic divisions, and visitors. Even though there is an opportunity for students to learn different skills in these Higher learning institutions, including environmental education, yet the problem of generating too much waste, which in reality can be halted or avoided, is persisting. This raises the concern of understanding whether the problem is propagating because of inadequate knowledge about food waste within these universities or other factors such as behavioural could be the prime reason for the problem.

Early studies have been pointing out that in Higher learning institutions (Universities and Colleges), food waste can easily be spotted and managed, hence could be the right place to resolve several environmental problems which are brought about by improper waste management within university settings (Cerutti et al., 2017). Household waste management is difficult to manage than institutional waste management. Thus, these institutions must be the leading examples within the surrounding communities. Another study suggested that for schools and learning institutions to resolve food waste-related problems, there should be an improvement in food consumption, and waste at school should be effectively studied (García-herrero et al, 2019). According to the study of Ms et al., (2016) has shown that one of the reasons for food waste on the school campus is the behaviour of students to engage in socializing activities more than focusing on eating what is on the table, the results suggested that about 78% of the respondents believe that is the reasons behind this problem.

2.5. Research gap

Previous studies conducted in universities based on a survey of students' awareness, knowledge attitude, and behaviour explored general environmental education, for example, a study of Schmidt, (2007) investigating the impacts of environmental courses introduced to University college students to examine their attitudes and behaviours. The study of Soares et al, (2018), conducted a simple awareness campaign to promote food waste reduction in university canteens; others include Deliens et al, (2014), focus on determinants of eating behaviour in University students. Some studies specified general food consumption habits based on nutrition composition (Al-khamees, 2009); others, explored existing different eating habits between University men and women at fast-food restaurants (Driskell et al., 2006). But all of these studies were conducted in different contexts. In this regard, the current study offered specific knowledge to the body of literature by exploring university students' awareness of food waste problems and their behaviours towards food waste, which were not explicitly explored by previous studies (Mandasari, 2018; Islam, 2020).

On the other hand, most of the studies similar to the current have been conducted in developed countries (Alattar et al., 2020; Clark & Manning, 2018; Jagau & Vyrastekova, 2016). Therefore, provide an opportunity to address this study from the perspective of developing countries like Indonesia, particularly in the University setting. This study bridges the gap that was yet to be filled by the previous literature and presented it as the research gap to which the current empirical work is designed to address.

2.6. Theoretical review of food waste behaviour

To begin with, it is very important to understand that food waste is strongly influenced by individual behaviour or habit (Robinson *et al*.,2002). This can be explained intensively by giving a glance to the Theory of Planned Behaviour (TPB) developed by (Ajzen,1991). The theory explains that every action performed by human are determined by person's intention under the influence of his/her attitude combined with subjective norms and perceived behaviour control. As described by Ajzen, (1991), the TPB is recently one of the most popular social-psychological models for understanding and predicting human behaviour. This theory simply enables us to explain, predict as well as understanding human behaviours under the condition that the individual involved to perform any particular action is voluntary and self-controlled. The intention to conduct a particular behaviour is assumed to be determined by three considerations as follows;

1. Attitude toward the behaviour

This is the first part of the TPB which intend to find out a person's attitude toward a particular behaviour by consideration of their *behavioural belief or outcome of belief* which means what individual belief on the outcome of performing a certain behaviour (for example concerning this study is the attitude toward the behaviour of throwing edible food), another consideration includes the *outcome of evaluations*, this simply means how worthwhile do individuals consider that outcome of the performed behaviour.

2. Subjective norms

This is the second part or consideration of the TPB which intended to find out the person's subjective norms which are made up of their *normative beliefs* which simply means what an individual thought on the significant others think about a certain behaviour (For example; Food waste behaviour), and the other part includes *Motivation to comply* which means how motivated we are to act in line with others view on a given behaviour.

3. Perceived behaviour Control

This is the third part of the TPB which intend to find out individuals' *control beliefs* which are made up of *self-efficacy beliefs* which imply that how confident we are to achieve the change despite the barriers (for example; are we capable of reducing and eradicating avoidable food waste behaviour?), and another one includes *perceived extended barriers* which mean that external factors that an individual perceive might prevent a particular set of goals to be achieved. In summary, the perceived behaviour control is characterized by people's perceptions of the easiness or difficulty of performing a particular behaviour in question.

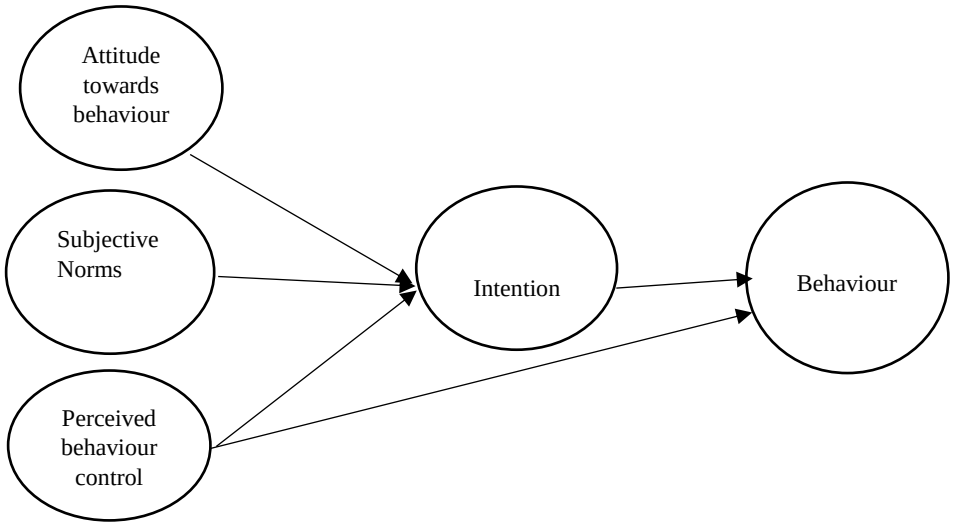

Figure 2 The theory of Planned Behaviour (Ajzen,1991)

As suggested by previous literature, Theory of Planned Behaviour (TPB) has proved to be one of the essential and most popular theories used to explain consumer behaviours and broadly used in different contexts such as food waste-related behaviour (Conner and Armitage, 2002; Rezai et al., 2012) and has provided a predictive power of all its classical variables (attitudes, subjective norms, perceived behaviour control and intentions) on a particular behaviour. Some of the studies to mention a few includes; For instance, Ghani et al.,(2013) explored food waste separation behaviour at home using the TPB and added new construct of situation factors, other different studies which used this theory to explain food waste behaviour include (Stancu et al.,2015; Russell et al., 2017; Aktas et al., 2018; Mondéjar-Jiménez, J.A., et al,2016; Graham-Rowe et al., 2015)and many more.

As stated by (Ajzen,1991), the theory (TPB) is very open upon inclusion of new predictors or construct provided its addition can help to increase the variance in the model based on the selected behaviour and given context. A study by soorani et al., (2019) deployed a TPB extended model by inclusion of feeling of guilty in predicting intention to reduce food waste and food consumption management behaviour. On their study found that the main drivers of positive food consumption management behaviour were the subjective norm, attitude, perceived behavioural control, feeling of guilt, and intention of not wasting food. The study of Sirieix et al., (2017) seek to explore how consumers' concern about food waste, culture, social norms and emotions contribute to consumers' attitudes and behaviours associated with doggy bags. On their study revealed an important role played by subjective norms in influencing individual behaviour towards food waste in the form of personal norms and social norms. The study found that personal norms encourage not to waste while social norms encourage leaving leftovers among consumers; asking for a doggy bag in a restaurant generates immediate shame while leaving leftovers to pose anticipated regret and guilt to consumers.

Mondéjar-Jiménez., et al, (2016) in their exploratory study on behaviour towards food waste of Spanish and Italian youths, found out that perceived behaviour control plays a significant role in influencing individual intention and modify behaviour towards food waste. He extended the TPB by including situational factors such as sales and marketing strategies which were found to influence negatively individual behaviour towards food waste. Another study of Visschers., et al,2016 based on a survey on the motivators and barriers of self-reported amounts of food waste in households recognize the important role of perceived behaviour control, the results of this study revealed that perceived behavioural control is an important direct predictor or determinant of intention to reduce food waste as well as food waste behaviour. This study also extended the TPB by including additional factors namely household planning habits and good provider identity. Whereby the former found to play a significant role in consumers' intention to avoid food waste while the latter found to increase the amount of food wasted in a household.

Based on this foundation, the study of Stefan et al., (2013) divided consumers' attitudes towards food waste into two groups as measured variables include Moral aspects and concern-based variables respectively. This study revealed an important role played by moral attitudes and concern towards food waste. Results from this study indicated that moral attitudes and lack of concern have a significant positive and negative impact on the intention not to waste food. Another study by Principato et al.,2015 also recognizes the important role of individual concern towards food waste. The study found out that the rising concern towards food waste tends to modify individual behaviour to reduce leftovers and hence minimizing food waste generation.

This current study also recognizes the work done by Stefan et al., (2013) and included the two aforementioned variables in the model to divide the original variable namely Individual attitudes toward the behaviour. On the other hand, the current study introduced another construct in the model namely awareness. As suggested from previous studies that individual awareness is one of the important factors to consider when developing a model for analysing food waste behaviour (Quested et al., 2013). Prior research indicated that individuals with high environmental and civic consciousness are likely to waste less food (Williams et al., 2012; Parfitt et al., 2010; Barr, 2007). While an individual with high economic concern about food waste is more likely to modify their behaviour towards food waste (Stefan et al. 2013). Therefore, the construct awareness introduced in the current study is divided into two types or variables includes the variable awareness of environmental and social impacts or consequences of food waste problems and awareness on the economic impacts or consequences of food waste problems. The ground for this division is based on the previous literature which identifies significant differences of awareness on intention to avoid food waste, food waste behaviour and all classical variables in the TPB when introduced into two categories as explained by (Stancu et al.,2015).

2.7. Conceptual model

A conceptual framework is a simplified systematic conceptual structure of interrelated elements in some schematic form, which describes the relationships between and among variables (Myrdal, 1970). For this study, the conceptual framework provides a detailed explanation of the relationship among factors/variables whereby in this study includes endogenous latent variables which act as dependant variables(Intention to avoid food waste, Desired food waste behaviour) and exogenous latent variables which act as independent variables includes (Concern about food waste, Moral attitude, subjective norms, perceived behaviour control, student awareness on environmental and social impacts and awareness on economic consequences of food waste problems). Other variables for this study are treated as subjective or background variables such as gender and age.

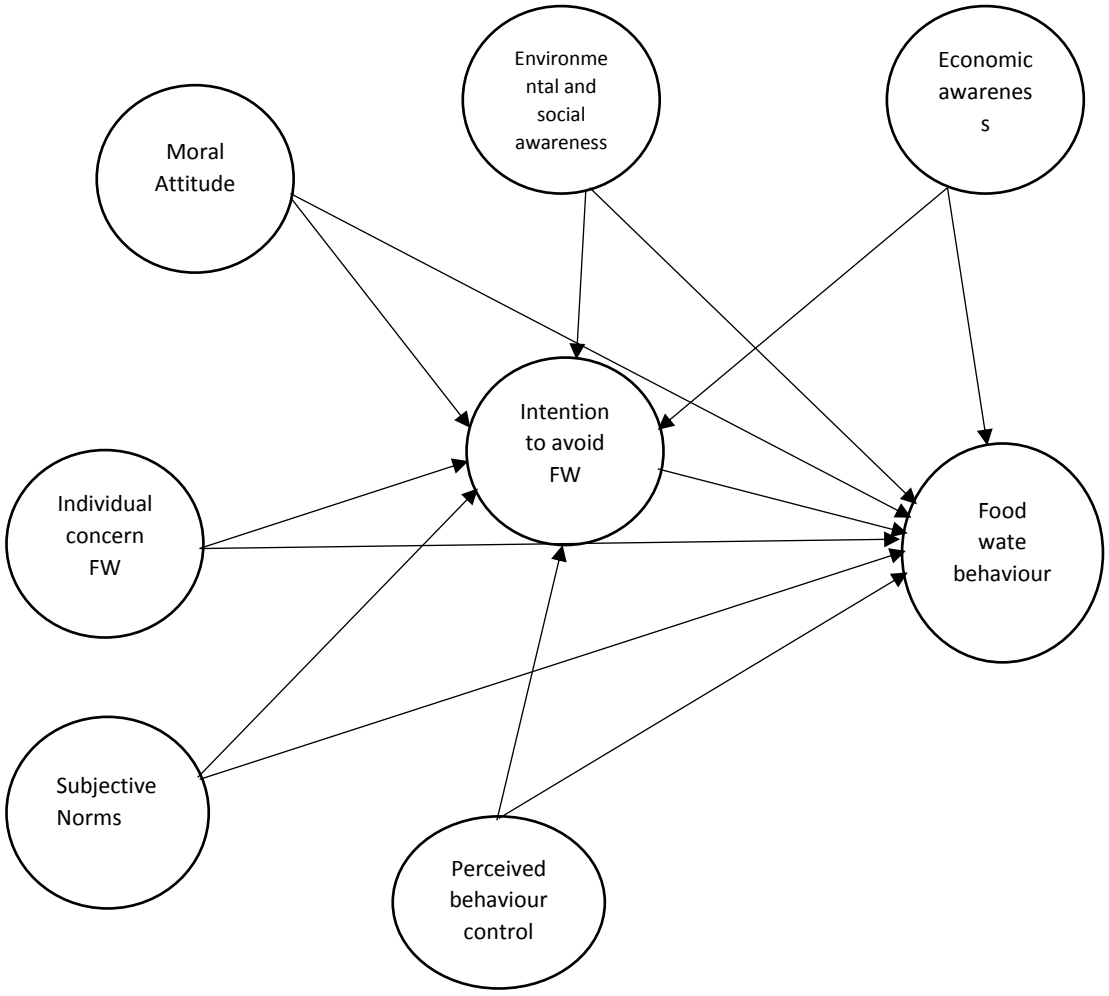

Figure 3. Conceptual framework model (source: Author)