

# Reframing Households' Food Waste Prevention Behaviour: A Conceptual Unified Framework Proposition Integrating Religiosity

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## Abstract

Out of many matters in the global environmental issues, household food waste is one of the concerns in today's world. Like many other countries, Malaysia is also facing the same issue, and it is expected to continuously aggravate in years to come. Even with the efforts and campaigns made by the Malaysian government and non-governmental organisations (NGOs), food waste is still escalating yearly. This issue comes into question whether Malaysian households possess adequate environmental systems knowledge or not, as several previous studies suggested that individuals who display higher levels of general environmental knowledge tend to demonstrate pro-environmental behaviour, which includes food waste prevention. Therefore, efforts to improve the quality of environmental situations, coupled with detrimental impacts of food waste that worsen from time to time, demand new ways of thinking about connections between households' environmental system knowledge and their attitudes towards food waste prevention behaviour. The proposed conceptual unified framework argues that understanding the environmental systems knowledge is essential in determining the success of food waste prevention behaviour through the proper environmental attitude, with the insertion of religiosity factor as a potential catalyser. In other words, this research note is an effort to understand the role of environmental system knowledge and the mediating effect of pro-environmental attitudes towards households' food waste prevention behaviour. The religiosity factor is integrated as a moderator.

## **Keywords:**

Environmental systems knowledge; pro-environmental attitude; food waste prevention behaviour; households

## **1 Introduction**

The economic expansions in the last two decades have drastically improved the earnings, living standards of the people, and affordability to food access, consequently contributing to the higher amount of food waste (Ismail et al., 2020; Jereme et al., 2018). Statistics showed that Malaysians generate about 15,000 tons of food waste daily, and households as the largest contributor to overall food waste by an average of 32%, with individual households generating 0.5 kg to 0.8 kg per day (Abd Razak et al., 2018; Jereme et al., 2016; Ramdzan et al., 2018).

The excessive disposal of household food waste undoubtedly creates several environmental problems such as climate change, pollution, and impairing the scenery (Lim et al., 2016; Mokhzani, 2017; Rahman, 2020; Sahib, 2019). Due to the fact that household food waste comprises mostly organic materials, the decomposition process emits a high volume of methane gas, one of the greenhouse gases that contributes to the ozone layer depletion and global warming, thus resulting in climate change (Mokhzani, 2017; Rahman, 2020; Sahib, 2019). The effects of climate change have been and currently felt in Malaysia since 1998 whereby the average temperature reading of 26 °C to 36 °C during daytime compared to 24 °C to 32 °C in the last three decades (Rahman, 2018). Although the annual variation of the daily mean temperature may be small which about 2°C to 3°C, the diurnal variation may be as large as 12°C. By 2050, projections show that Malaysia's going to be hotter with a temperature rise of up to 1.5°C. (*Malaysia Climate Data Projections*, 2021). Although the causes are not solidly based on the household food waste compared to deforestation and unsustainable development, it somewhat causes the causation (Rahman et al., 2019).

Muhamma (2020) and Narudin (2018) espoused that food waste disposal not only affected the environment but also increased people's health risks. Out of many cases, the alarming images of pollution caused by a large number of polystyrene food packaging boxes, mineral water bottles, and other household food waste on the coast of Kampung Sim-Sim, Sandakan, Sabah is the obvious example. The water and sediment tests conducted from the seawater samples showed that it was contaminated that endangered human health and marine ecosystems (Muhamma, 2020).

A bad habit of throwing food waste in the wrong places, according to Abdullah (2018), is another issue related to Malaysian households. The irresponsible households' habit is not only occurring in the rural, but also in semi-urban, and even worst in the urban area. This practice evidently has caused the presence of pests like rats and flies, which are the agents of the transmission of diseases like cholera and diarrhoea that

affect human health, causing a deteriorating environment. She further contended that the overflow of water from garbage (e.g., food waste) flowing into nearby rivers, causing a bad smell in the surrounding area, polluting the air due to the release of toxic gases, harmful leachate that absorbed into the soil that gives negative impacts to the plantation. For instance, the residents of Taman Pulai Utama Housing Flats, Skudai, Johor, are upset with the attitude of the people that throwing huge piles of garbage, including the food waste that caused a foul odour and disease outbreaks (Narudin, 2018). A similar case happened in Sungai Petani, Kedah, in which several locations in this district have been detected as illegal dumping sites of the household waste disposal and burning that caused a foul odour that affected unpleasant surroundings (Zakaraya, 2020).

There are outnumbered reported cases of household food waste other than a few examples mentioned above, and it is undeniably creating adverse environmental problems (Abdullah, 2018; Muhamma, 2020; Narudin, 2018; Zakaraya, 2020).

## **2 Past Studies**

Several researchers assumed that the lack of environmental knowledge is one of the underlying reasons for environmental problems, among others (Bashir, 2018; Clay, 2005; Muzamir, 2020). Schultz et al. (1995) accentuated that when a person does not possess sufficient environmental knowledge, it would be difficult to develop their positive environmental behaviour; thus, effective and sustainable policies will be hard to achieve. This notion was consistent with other researchers' view that existing environmental problems could result from the public's lack of environmental knowledge (Harring & Jagers, 2018; Trumper, 2010). However, Courtenay-Hall and Rogers (2002) and Kollmuss and Agyeman (2002) argued that a general and broad environmental knowledge itself is not sufficient to predict environmental behaviour because the information is broad rather than specific; thus, people could not rationalise the link between them.

Besides general environmental knowledge, a more specific knowledge known as environmental system knowledge influenced a positive environmental behaviour (Díaz-Sieffer et al., 2015). Janmaimool and Khajohnmanee (2019) and Kaiser and Fuhrer (2003) expand the environmental system knowledge into two attributes that are: 1). human-environmental system knowledge such as political ecology and sustainable development, and 2). geography-environmental system knowledge such as basic knowledge of environmental and ecological systems and the current state of environmental situations.

Several investigations suggested that environmental knowledge is linked with environmental attitudes (Arcury, 1990; Fujii, 2006; Juvan & Dolnicar, 2014; Vermeir & Verbeke, 2006). Environmental attitudes, as described by Chen et al. (2014) and Luo and

Deng (2008), as a set of beliefs and values of an individual who cares for eco-friendly activities and issues. Arcury (1990), Barber et al. (2009), and Flamm (2009) noticed that environmental attitudes tend to be positively changed in accordance with the higher levels of environmental knowledge. They suggested that environmental knowledge along with environmental attitudes represents a catalytic factor in promoting positive environmental behaviours. However, their studies were only looking into the relationship of the general environmental knowledge with the environmental attitudes and did not focus on the specific types of environmental knowledge. As a result, there is a gap in understanding how the specific types of environmental knowledge, particularly the human-environmental system knowledge and geography-environmental system knowledge, influence or affect environmental attitudes.

Besides the link between the environmental system knowledge and environmental attitudes, pro-environmental behaviour is considered the outcome of environmental attitudes (Meinhold & Malkus, 2005; Paswan et al., 2017). However, Janmaimool and Khajohnmanee (2019) contented that although the relationship of these variables was found to be interrelated, the results could be diverse and depending on the regions and the types of pro-environmental behaviour. In this context, pro-environmental behaviours denote the behaviours that consciously seek to minimise the negative impact of one's actions on the environment (Kollmuss & Agyeman, 2002). Singh (2009) classified pro-environmental behaviour into two broad categories: correction and prevention. The correction behaviour is the actions taken to correct or remedy the already impacted environment, while the prevention behaviour prioritises avoiding the environmental impacts before they occur. Although both of them seemed to be equally important, the importance of prevention behaviour is put forward in the context of this study. In view of food waste issues, Corsini et al. (2018) and Papargyropoulou et al. (2014) suggested that prevention is the most advantageous option instead of the correction actions once it has been generated. Henceforth, as the focus of this study, food waste prevention behaviour is recognised as one of the pro-environmental behaviours.

Apart from the role of environmental system knowledge and attitudes in predicting pro-environmental behaviours, the religiosity factor was also believed to play a pivotal role. McDaniel and Burnett (1990) refer to religiosity as a belief that there is God, and that God has guiding principles for people's behaviours and deeds in life. Religious consumers have been shown to be more humane and caring (Minton et al. 2020). This could be seen when Izberk-Bilgin (2012), Felix and Braunsberger (2016), and Parsad et al. (2022) noticed that religiosity moderates the environmental relationship between attitudes and pro-environmental behaviour, with the higher religiosity reflecting higher environmental attitudes and vice versa. Religious people are believed to have higher levels of environmental concern than less or non-religious consumers because of the guidance from the religious text to care for God's creation, including the environment

with the same level of love and care (Kempton et al., 1996; Leary et al., 2016; Minton et al., 2018; Thompson et al., 2022). Nonetheless, some research shows the opposite findings where religious people have lower levels of environmental concern because they have other more prominent concerns in life or view the religious text as encouraging dominant behaviours (Schultz et al., 2000; Brandt & Reyna, 2011; Minton et al., 2015). These competing perspectives provide an interesting lens to view as there is still no clear answer as to how religious versus non-religious consumers view household food waste issues. In fact, no study has yet examined the impacts of the interactions of religiosity in a predominantly Islamic country, specifically between the environmental system knowledge and pro-environmental attitudes on the food waste prevention behaviour.

From the highlighted matters, the extent to which households' environmental system knowledge attributes to influence their pro-environmental attitudes and its impact on food waste prevention behaviour are unknown. In other words, can the human-environmental system knowledge and geography-environmental system knowledge positively create the pro-environmental attitudes and be translated into food waste prevention behaviour among the households? In addition, do religiosity factors increase the household consumer's pro-environmental attitudes and food waste prevention behaviour?

In fact, all these suppositions are unknown as not many of the available studies holistically looked at the relationship or the causes and effects of those variables from household food waste. Many of the available studies to date are centrally focused on the management of generated food waste (Jereme et al., 2018; Lim et al., 2016; Ramdhan et al., 2018), food waste scenarios in the hospitality and foodservice industry (Kasavan et al., 2019; Papargyropoulou et al., 2019), household food wastage prevention in the context of communication studies discipline (Abd Razak et al., 2018), the impact of Movement Control Order (MCO) due to Coronavirus Disease (Covid-19) on food waste generation (Ismail et al., 2020), and government waste policy on household waste disposal (Jereme et al., 2016; Moh & Manaf, 2014). Thus, to fill the gap and in line with the above-mentioned issues, a conceptual unified framework on households' food waste prevention behaviour is proposed.

### **3 A Unified Framework on Households' Food Waste Prevention Behaviour**

Initially, Hines et al. (1987) developed a theory of ERB that addresses both cognitive and affective constructs in the view of environmental education (see Figure 1). The key components of Hines's theory of the Environmental Responsibility Behaviour approach included two prerequisites of intention to act: 1). the cognitive construct which consists of the knowledge of environmental issues and action knowledge (i.e., action skills, action

strategies), and 2). the affective construct which entails the personality factors (i.e., attitudes, locus of control, personal responsibility). Figure 1 below depicted the Environmentally Responsible Behaviour Theory by Hines et al. (1986):

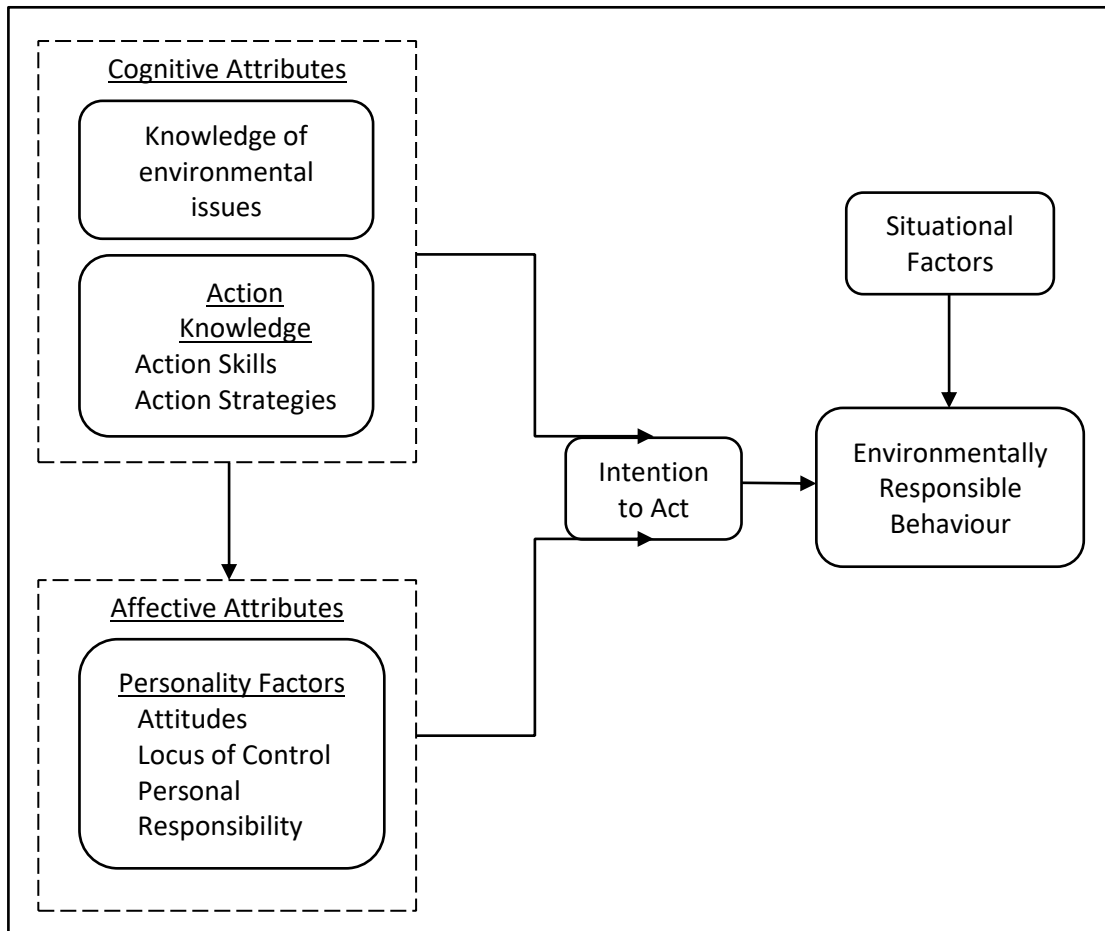


Figure 1: Environmentally Responsible Behaviour Theory  
Source: Hines et al. (1987)

Through the Environmentally Responsible Behaviour Theory's evaluation and dealing with the proposed unified framework, three adjustments and calibrations could be made. First, the cognitive attributes of knowledge are suited within the scope of environmental systems knowledge attributes comprising the human-environmental or geography-environmental systems knowledge, subsequently linked either directly towards households' food waste prevention behaviour (responsible environmental behaviour) or through the mediation of pro-environmental attitudes (affective attributes). Human-environmental systems knowledge in this perspective includes the knowledge on the political ecology and sustainable development, whereby geography-

environmental systems knowledge consists of the understanding of the environment and ecology, and the environmental situations.

Second, the affective attributes are adjusted and fitted with the pro-environmental attitudes related to the households' combination of positive emotions, beliefs, and intentions regarding environmentally related actions. Unlike cognitive attributes that provide theoretical knowledge of the environment, the affective attributes of pro-environmental attitudes act as the reinforcer through the emotions, beliefs, and intentions in applying the environmental systems knowledge towards households' food waste prevention behaviour. It is conjectured that environmental attitudes mediate between the environmental systems knowledge and households' food waste prevention behaviour. This is in line with the supposition from Arcury (1990), Barber et al. (2009), and Flamm (2009) that environmental knowledge along with environmental attitudes represents a catalytic factor in promoting positive environmental behaviours.

Third, in dealing with this study, the situational factors are predisposed as the religiosity moderation. Izberk-Bilgin (2012) and Felix and Braunsberger (2016) stated that religiosity moderates the environmental attitudes, with higher religiosity levels reflecting higher environmental attitudes. In this context, religiosity is presented as an indicator for the individual's level of understanding of the religious teachings, manifested through their environmental attitudes and consequently towards the households' food waste prevention behaviour. With this connotation, it is presumed that the increase and decrease of individuals' environmental attitudes and the subsequent toward households' food waste prevention behaviour are somewhat associated with their religiosity level. The religiosity factor is considered to have the potential to act as a catalyst in moderating the effect of heightening or lowering the predicting power of environmental systems knowledge towards environmental attitudes.

In light of the above discussions and drawing upon a review of the Environmentally Responsible Behaviour Theory, the major predictors and the relationship between variables of interest in this study (independents against moderating, mediating, and the dependent) is diagrammed through the conceptual unified framework as shown in Figure 2 below:

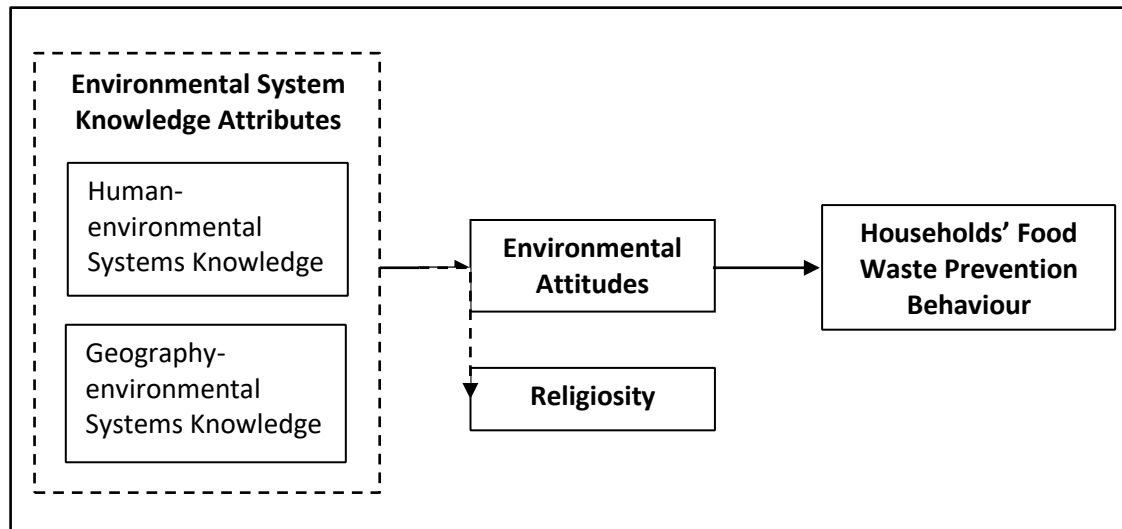


Figure 2: Proposed Conceptual Unified Framework

The proposed conceptual unified framework depicts the role of environmental systems knowledge in influencing the households' food waste prevention behaviour. In detail, five conjectures could be made: 1). The environmental systems knowledge attributes are predicted to directly influence households' food waste prevention behaviour, 2). The environmental systems knowledge attributes are predicted to directly influence the pro-environmental attitudes, 3). The pro-environmental attitudes are predicted to influence the households' food waste prevention directly, 4). The pro-environmental attitudes are presumed to mediate the relationship between environmental systems knowledge attributes and the households' food waste prevention behaviour, 5). The religiosity factor influences the strength of the relationship between environmental systems knowledge attributes towards pro-environmental attitudes, whether increased or decreased.

#### 4 Conclusion

Due to the negative environmental impacts of the households' food waste, the efforts to improve the quality environmental situations demand a more comprehensive view on the households' food waste prevention behaviour. Besides, the integration of religiosity factor is considered to have the potential to act as a catalyst in moderating



the effect of heightening or lowering the predicting power of environmental systems knowledge towards environmental attitudes. This research note is an effort to understand the role of the environmental system knowledge and mediating effect of pro-environmental attitudes towards households' food waste prevention behaviour, with the religiosity factor is integrated as a moderator toward households' pro-environmental attitudes. Such inputs are expected to enhance the development of pro-environmental attitudes, which consequently results in households' food waste prevention behaviour, to be specific.

## 5 About the author

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