

# **Factors Affecting People's Participation in Home Composting in Moratuwa and Kaduwela Municipalities in Western Province of Sri Lanka: A Comparative Study**

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## **Abstract**

Home composting is considered an effective method in solid waste management as composting reduces the amount of solid waste in the place of generation itself. However, many people are reluctant to adopt home composting for various reasons in Sri Lanka. This study examines the most significant factors influencing people's home composting based on Kaduwela and Moratuwa Municipalities (MC) of Western Province in Sri Lanka. Both Municipalities encourage composting programs in their areas. The study population was the total number of households in Moratuwa and Kaduwela Municipalities. For the sample, 2% (1808 households) of the population (households) from both Municipalities were selected randomly. The quantitative research method was used, and data were collected by using a structured close-ended questionnaire. Data were analyzed by using SPSS statistical software with descriptive and inferential statistics. Based on the analysis, the study confirmed that market opportunities for compost, social diffusion, access to the garden, higher family income level, local government intervention, and pro-environmental behavior significantly affect people's participation in home composting in both MCs. In addition to that, attitudes for gardening and general concern for the environment significantly affect Moratuwa MC, while health risks and attitudes for composting significantly

affect Kaduwela MC for the people's participation in home composting. In comparatively, people's participation in home composting in Kaduwela MC relatively performs better than Moratuwa MC.

**Keywords:** Home Composting, Municipal Solid Waste Management, Sri Lanka

## **Introduction**

In contemporary societies, solid waste has become a serious issue, and many countries seek solutions to this issue as it is a high burden to society. Solid waste disposal is a major environmental problem in Sri Lanka right now, and it has become a national problem. Sri Lanka's National Action Plan identifies the dumping of hazardous waste as a major cause of land degradation (Karunasena & Wickramasundara, 2013, as cited in Bandara, 2010). Even though several solutions have been introduced for the solid waste problem in the country, none of them has become a success. Thus, solid waste disposal is one of the leading environmental problems in Sri Lanka.

Saja et al. (2021) mentioned that many areas face severe problems in managing 10 to 50 metric tons of waste per day in Sri Lanka. The generation of Municipal Solid Waste (M.S.W.) in Sri Lanka is 7210 tons per day and the collection efficiency is only 27%; recyclables make up close to 46% of the total collected waste (approximately 12% of total waste generated), and composting accounts for 25% of the total collected waste (approximately 7% of total waste generated) (Basnayake et al., 2019, as cited in Saja et al., 2021). Approximately 60% of the total waste is collected in the Western Province, which is approximately 30% of the total population in Sri Lanka (Dharmasiri, 2020). "Inadvertently, with the current trends continuing, it is likely to rise from 3.5 Metric tons (M.T.s) to 6 M.T.s per day with, each person generating around 0.64 kg waste per day in Sri Lanka with an estimated 4.8 billion M.T. of waste collected per annum in the country" (Dharmasiri, 2020). It is evident

that there is a severe issue of solid waste in Sri Lanka, but the country lacks an effective solution.

Community participation is an energetic method of successful integrated Solid Waste Management programs, and home composting is one the best modes to implement community-based Solid Waste Management (Mamo et al., 2008, as cited in Lekammudiyanse & Gunatilake, 2009). Home composting is the best approach in Solid Waste Management, but it is very limited in practice due to various reasons.

“The vast majority of domestic and commercial waste is natural, rotten, and suitable for compost production” (Gunawardena et al., 2007) that could be used for compost for the soil and recycling for reuse. Even with the highest amount of organic waste at the home level, composting can be done easily at home level seems to be acceptable to only a few families and the existing compost plants use industrial waste with heavy metals that reduce the quality of compost than standard household waste that can produce high-quality compost (Bandara, 2010).

The results of several studies on solid waste management reveal that composting is an appropriate and practical option in managing Municipal Solid Waste (M.S.W.) for many cities in Sri Lanka. Analyzing the composition of solid waste disposed of by the municipalities reveals that the largest fraction of domestic and commercial solid waste is organic, biodegradable, and appropriate for compost production (Gunawardena et al., 2007).

"Open dumping of solid waste has been the most common disposal practice in the country which causes destructive impact to the environment" (Gunawardena et al., 2007). Even though home composting is considered a more effective and economical method that also reduces the amount of solid waste in the place of generation, people's participation in home composting in local governments is not very successful.

However, when compared to other Municipalities (M.C.s) in the Western Province, Kaduwela and Moratuwa Municipalities perform relatively better. Even compared to people's participation in composting in Moratuwa MC, Kaduwela MC is slightly better. Sinnathamby et al. (2016) stated that Moratuwa Municipality collects around 100 metric tons of garbage, and 50 metric tons are recycled and composted. Liyanage et al. (2015) revealed that "solid waste generation in Kaduwela MC was estimated at 200 tons/day, of which about 116 tons are collected, including a biodegradable fraction of 54% to 68%". Also, as per Gurusinghe and Liyanage (2009), nearly 50% of households in the main city do home composting in the Kaduwela Municipality (as cited in Fernando, 2020), and only 7% of people do home composting in Moratuwa Municipality (Bandara, 2010, as cited in Fernando, 2020). Thus, the central question is what causes Kaduwela Municipal Council has more public participation in home composting than Moratuwa MC. Liyanage et al. (2015) have revealed by their study that Kaduwela MC has implemented a package of Solid Waste Management solutions to improve the effectiveness of Solid Waste Management in the area and private sector involvement in both Solid Waste Management in Kaduwela MC is remarkable. Even though several pieces of the literature suggested that lower public participation is a problem for home composting projects, very little attention has been paid to investigate the reasons for the lack of participation in home composting. Thus, this study attempts to investigate factors affecting home composting in the selected MCs. Thus, the findings of this research will be a viable solution as waste is a burning issue of local governments in Sri Lanka.

This study seeks to answer the following research questions

1. What are the significant factors affecting people's participation in home composting in the selected MCs?

2. Why people's participation in home composting in Kaduwela MC is relatively better than Moratuwa MC?

Moratuwa and Kaduwela MCs located in Colombo District, Western Province in Sri Lanka, are the study areas of the research. The Kaduwela Municipal Council (MC) consists of three regions, namely Battaramulla, Kaduwela, and Athurugiriya. Kaduwela Municipal MC has commenced a waste management project and collects 50 - 60 tons of waste every day ([www.kaduwela.mc.gov.lk](http://www.kaduwela.mc.gov.lk), 2019). The Municipality receives approximately 90 tons of garbage a day; among this, 40% are non-degradable wastes are sent to recycling and upcycling initiatives. The remaining 60%, nearly 35 million, was spent on composting; among them remaining 20% - 25% of waste was sent to landfills that are now gradually being brought down by the biogas unit ([www.fit.lk](http://www.fit.lk), 2016).

Moratuwa is a town located on the south side of the Colombo District. The Moratuwa Municipality area is divided into 17 wards (UNDP / UN-Habitat, 2002) and 42 GN (Grama Niladhari - Village Officer) divisions (Data Collection Survey, 2016). In the Moratuwa MC, the Public Health Department is responsible for SWM activities. The department is headed by the Chief Public Health Inspector (CPHI). Public health inspectors (PHI) and supervisors (SV) assigned under the CPHI supervise waste collection services and road cleansing activities by zones. According to the information, the collected waste is 72 tons/day (Data Collection Survey, 2016).

## **Literature Review**

The literature section illustrates the theoretical background for the study, definitions, theories, and empirical research on people's participation in home composting.

## **People's Participation in Home Composting**

“People's participation in home composting could be defined as people's involvement in home composting to take responsibility for separating, collecting, treating and using their biodegradable organic waste” (Jasim & Smith, 2006). Thus, it generally refers to people's involvement in composting solid waste. “Home composting is a voluntary approach to waste management and is dependent on the attitudes and willingness of homeowners to take responsibility for separating, collecting, treating and using their biodegradable organic waste” (Jasim & Smith, 2006).

## **Household**

In this study, households mean “all the people in a family or group who live together in a house” (www.collins dictionaries.com, 2021). People's participation is viewed as a process by which individuals are involved in initiating, deciding, planning, implementing, and managing the group and its activities (Samah & Aref, 2009).

## **Solid Waste**

“Solid Waste is any material that arises from human and animal activities that are normally discarded as useless or unwanted” (Tchobanoglous et al., 1993, as cited in Puopiel, 2010). Municipal Solid Waste means “the non-liquid waste material generated by public and private sectors through households, commercial establishments, agricultural activities, industries and institutions” (Farrell & Jones, 2009, as cited in Samarasingha et al., 2015).

## **Theories on Home Composting**

Several theories are explained by people's behavior in-home composting are discussed in the proceeding section.

### ***Theory of Planned Behavior***

Ajzen (2005, as cited in Goh et al., 2012) explained the Theory of Reasoned Action and its extension of the Theory of Planned Behavior as a person's intention to perform (or not to perform) behaviour is the most important determinant of action. Goh et al. (2012) argued that this model can be used to illustrate households' recycling behaviour including composting.

### ***Theory of Reasoned Action (T.R.A.)***

As per Al-Suqri and Al-Kharusi (2015), the behavior can largely be predicted by the individual's attitudes towards performing the behavior in question, through the intervening effect of behavioral intention. The important attitudes in this process are those that are specific to the specific behavior being studied, it is not sufficient to consider the individual's attitudes more generally (Ajzen, 1988; Fishbein & Ajzen, 1975, as cited in Al-Suqri & Al-Kharusi, 2015). According to the theory, a person's intentions about performing a behaviour (which ultimately determine whether they will do so) are influenced by social pressures or "subjective norms", which arise from their individual's perceptions of what others will think about them performing the behaviour in question (Vallerand et al., 1991, as cited in Al-Suqri & Al-Kharusi, 2015).

### ***Integrated Model of Household Waste Management Behaviour***

Solid Waste Management is “a term that is used to refer to the process of collecting and treating solid wastes” ([www.conserve-energy-future.com](http://www.conserve-energy-future.com), 2021). Tucker and Speirs (2001) emphasized that none of the models related to home composting may succeed unless those are integrated. Further, to achieve a full description of Household Waste Management Behaviour, home composting needs to be set alongside all other waste management activities including source reduction, reuse, and recycling. Therefore, it is necessary to consider how home composting might be linked to those other activities to

provide a holistic description of Household Waste Management Behaviours (Tucker & Speirs, 2001).

### **Empirical Evidence on Factors Affecting People's Participation in Home Composting**

The literature revealed that socioeconomic and demographic variables, (particularly income level, and access to the garden), the intervention of local authorities (distribution of compost bins, advisory and monitoring services, financial benefits), other factors are the availability of market opportunities, people's attitudes (attitudes on composting and recycling, attitudes on gardening, general concern about environment), social norms and diffusion, health risks and pro-environmental behaviour affects people participation in home composting. Those factors among with the support of empirical research findings will be discussed in the proceeding section in detail.

### **Socioeconomic and Demographic Variables**

#### ***Income Level***

According to Mustapha (2013), people's composting rate is higher when their income level is greater as well as when their income level is lower; their composting rate is also lower. People's living standards directly affect their home composting participation (Bandara, 2010). Gamba and Oscamp (1994, as cited in Schultz, 2015) revealed through their study that higher-income earners have higher involvement in recycling.

#### ***Access to Garden***

Nsimbe et al. (2018) noted "the possession of a garden was a significant explanatory variable associated with household composting", because people who have gardens may most likely use compost, the end product of composting in their gardens, as a soil conditioner. "The E.A. survey of home composting (E.A., 2000, as cited in Jasim & Smith, 2006) showed there was a

statistically significant relationship between an increase in the rate of composting kitchen or garden waste amongst householders with access to an allotment or garden compared to the group without access to these facilities”.

### ***The intervention of Local Authorities***

There are different local government initiations to influence people’s participation in home composting. “Composting projects implemented by local authorities have many social benefits such as reducing health problems, improving scenic beauty, reducing environmental pollution, generating job opportunities while producing alternatives for chemical fertilizer” (Samarasinha, et al., 2015).

### ***Distribution of Compost Bins***

"Compost bins are structures built to house compost. They are designed to facilitate the decomposition of organic matter through proper aeration and moisture retention" (Beaulieu, 2016). These kinds of compost bins will be very much helpful for household-level composting as it is the basic instrument for it. Availability of compost bins free of charge or at a low cost is necessary for composting at household levels. As measures to promote people’s participation in home composting, some Municipal Councils provide compost bins (National Solid Waste Management Support Centre, 2011).

### ***Availability of Advisory and Monitoring Services***

National Solid Waste Management Support Centre (2011) stated that municipal councils provide information to encourage people's participation in home composting. Vicente and Reis (2008, as cited in Vitor & Mathinho, 2009) emphasized the importance of information about recycling that is required to increase households' levels of participation in recycling. Information and knowledge are important for any reason, and better-informed citizens on how to recycle are more likely to participate than others; more and better information and knowledge about recycling programs make easy the

process and reduce the perception of difficulty while it is an essential condition for the effectiveness of participation (Vicente & Reis, 2008, as cited in Vitor, & Mathinho, 2009). Vicente and Reis (2008) noted that the success of a recycling program depends on citizens' active participation in that recycling process and the reliability of information available through media.

### ***Financial Benefits***

Household-level participation in home composting will be influenced through financial benefits such as tax reduction, grants, incentives, and subsidies. Samarasinha et al. (2015) stated that lack of funds, reluctance to impose new taxes or fees as constraints of home composting. Vicente and Reis (2008) said that the success of a recycling program depends on citizens' active participation in that recycling process, and providing incentives for households affect people's active participation in recycling behavior.

### ***Availability of Market Opportunities***

According to Rouse et al. (2008), marketing is about identifying and targeting customers and succeeding to sell products that satisfy customers at a price and in sufficient quantity to ensure the success of a business and although compost is a highly effective soil conditioner, which can reduce the need for chemical fertilizers. Rouse et al. (2008) and Fernando (2020) revealed that a good market to sell finished compost products motivates individuals to compost at the household level as it is an opportunity to earn new income easily.

### ***Attitudes on Home Composting***

Attitudes mean "a predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. Attitude influences an individual's choice of action, and responses to challenges, incentives, and rewards" (Business Dictionary, 2016). People's attitudes may positively or negatively influence their participation in home composting. According to Jasim and Smith (2006), the relationship between people's

attitudes and demographic factors leads to people's participation in home composting. As per Theory of Reasoned Action (T.R.A.) Ajzen and Fishbein, (1980, as cited in Vitor & Mathinho, 2009) stated, "the attitude towards the behavior refers to the evaluation, positive or negative, the individuals have on the behavior, it reflects their awareness on the outcome of that behavior and how they evaluate this outcome".

### ***Attitudes on Gardening***

According to Edgerton et al. (2009), gardening affects people's participation in home composting behavior and individual's interest, knowledge, and frequency of participation in gardening. But Edgerton et al., (2009) revealed that people's favor in household gardening does not directly influence people's participation in home composting.

### ***Social Diffusion***

"Diffusion is a social process through which cultural knowledge, practices, and materials spread from one social system to another" (Crossman, 2016). Society and its impacts cannot be avoided easily and it should concern how culture influences people's participation in home composting. According to Edgerton et al., (2009), social diffusion is not a significant factor that affects people's participation in home composting as home composting is normally carried out in the backyards of households.

### ***Health Risks***

Harrison et al. (2004) identified the importance of good personal hygiene practices when handling compost. Proper personal sanitation is the most effective method for controlling the impact of any pathogens in the compost. Wash hands after handling compost and use gloves, and if the compost is particularly dusty, watering is a good option (Harrison et al., 2004).

### ***Pro-Environmental Behavior***

Pro-environmental behavior means whether people participate in newspaper recycling, glass recycling, buying recycled products, reusing materials, and aluminum can be recycling, donating to jumble sales/charity, declining excess packaging, and buying/growing organic vegetables) other than composting (Edgerton et al., 2009). It is important to encourage pro-environmental behavior in achieving sustainability (Turaga et al., 2010, as cited in Griffiths, 2015).

### ***General Concern on Environment***

Edgerton et al. (2009) noted that general environmental concern of people and their participation in other pro-environmental behaviors do not significantly influence people's participation in home composting and highlighted a possible point of contrast between them composting and other pro-environmental behaviors.

Based on an exploratory study, Fernando (2020) noted several reasons for people's participation in home composting. Composting is the most suitable way to dispose of any organic waste and use compost for gardening and as a natural fertilizer, concern about the environment and good health, difficulties in disposing of organic waste, economic benefits, and influence from local authorities (Fernando, 2020).

### **Hypotheses Development**

Based on the literature review, the following hypotheses are developed;

H1: Availability of Market opportunities for composts significantly affect people's participation in home composting.

H2: Social Diffusion significantly affects people's participation in home composting.

H3: No Health Risk significantly affects people's participation in home composting.

H4: Access to the Garden significantly affect people's participation in home composting.

H5: Higher Income levels of households significantly affect people's participation in home composting.

H6: Local Government Intervention significantly affects people's participation in home composting.

H7: Pro-environmental Behavior significantly affects people's participation in home composting.

H8: Attitudes on Composting significantly affect people's participation in home composting.

H9: Attitudes on Gardening significantly affect people's participation in home composting.

H10: General Concerns on Environment significantly affect people's participation in home composting.

## **Methodology**

The study's methodology was a quantitative research approach. The study areas of the research were Moratuwa and Kaduwela MCs located in Colombo District in the Western province in Sri Lanka. The study population was the total number of households in both MCs, which is 41459 households in Moratuwa MC (Council Details, 2011/12) and 48935 in Kaduwela MC (Kaduwela Municipal Council, 2009). The study selected the sample representing 2% from each MC population: approximately 835 households from Moratuwa MC and approximately 984 households from Kaduwela MC. Altogether the sample size was approximately 1819 households. The sample was selected based on a random sampling method. Data were collected using a structured, close-ended questionnaire administered by several data collectors and two research assistants to increase the response rate. Collected data were analyzed by using SPSS statistical software and interpreted by using descriptive and inferential statistics.

## **Analysis and Discussion**

In this section, the study illustrates demographic data analysis, descriptive analysis of research variables, reliability and validity of continuous variables, and logistic regression analysis for both MCs. The discussion is carried out with scholarly findings.

### **Analysis of Demographic Variables**

Among the total sample of the study, which is 1819 families from both Moratuwa and Kaduwela MCs, the majority of the family members are between 31 to 55 age level which is 36%. Among the households in the sample, 49% are male, and 51% are female. Most of the sample has passed G.C.E. O/L, which is 37%. Very few households in the sample have educated above the level of bachelor's degree that is only 0.12%. Among the total sample of both MCs, 90% has the main income source. Among them 50% earn income between 20,001 and 40,000 and only 2% earn 80,001 to 100,000 monthly income. The majority of the total sample, which is 86%, lives in single-story houses, and only 0.5% lives in three-story houses, while 13% lives in two-story houses. There are 94% lives in detached houses, and 2% lives in Flats/Apartments while 4% lives in Semi-detached houses. Among the total sample, 92% have ownership of their house, and only 8% live in rent. Among the total sample, 79% have access to the garden, and 21% do not have access to the garden. The majority, which is 78%, do not engage in composting and only 18% of the sample engaged in composting, while 4% has discontinued composting. From Moratuwa MC, only 17% engage in composting while 80% do not engage in composting and 3% have discontinued composting. In Kaduwela, MC, only 19% engage in composting while 76% do not, and 5% have discontinued composting.

About 78% have never engaged in composting in their entire lifetime of the total sample. 47% are from the Moratuwa MC, and 53% are from the Kaduwela MC. From an overall perspective, the majority of the households

have never engaged in composting due to the reasons that they do not have a garden (27%) and their garden is too small (22%) and due to other personal reasons (19%). From the Moratuwa MC, there 39% have never engaged in composting because they do not have a garden and 29% is due to other personal reasons. From the Kaduwela MC, 35% have never engaged in composting due to their garden being too small and 17% because they do not have a garden.

Among the total households' 37% are discontinued due to other personal reasons, and 26% are discontinued due to time constraints. From the Moratuwa MC, there are 40% discontinued composting due to time constraints, and 31% are discontinued due to other reasons. From the Kaduwela MC, 40% of households have discontinued composting due to other personal reasons, and 23% have discontinued because they have stopped gardening.

Among the total households who are composting, about 56% use closed bins, 20% use pit composting, and 19% use pilling composting. Among the Moratuwa MC, about 56% use closed bins, 22% use pit composting, and 20% use pilling composting. Among the Kaduwela MC, about 54% use closed bins, 19% use pit composting, and 19% use pilling composting. Among the total sample who are composting, the majority, 38% are composting for more than five years. About 46% are from Moratuwa MC, and 48% are from Kaduwela MC composting for more than five years.

### **Descriptive Analysis of Research Variables**

Among the total sample from both Moratuwa and Kaduwela MCs, only 18% were involved in home composting. In comparatively, about 19% of people in Kaduwela MC and 17% in Moratuwa MC involved in home composting, and 67% of the total sample of both MCs indicated a market available for home composts. Among the MCs, 70% from the Moratuwa and 65% from Kaduwela MCs mentioned that there is a market available for composts. In both

Moratuwa and Kaduwela MCs, 16% of them stated that there is a social diffusion towards home composting. In comparatively, 23% from Kaduwela and 7% from Moratuwa MCs, mentioned about social diffusion towards home composting. Among the total sample, 93% of the majority indicated that there is no health risk from home composting. In comparatively 96% of the people from Kaduwela MC and 90% from Moratuwa MC stated that there is no health risk from home composting. Among both Moratuwa and Kaduwela MCs, nearly 79% of the households mentioned that they have access to the garden. In comparatively, 82% of the families in Kaduwela MC and 75% from Moratuwa MC said they have access to the garden. In both Moratuwa and Kaduwela MCs, majority which is 50% of the households' income level are from Rs.20,001 to 40,000. In comparatively, 51% of the households from Kaduwela MC and 50% from Moratuwa MCs' income level are from Rs.20,001 to 40,000. Among the total sample, 83% of the people mentioned that local governments have no intervention in home composting. Only 0.9% stated that local governments have a high intervention in home composting. In comparatively, 86% of the people from Kaduwela MC and 79% from Moratuwa MC indicated no government intervention in home composting. Only 1% of the people from Kaduwela MC and 0.8% of households in Moratuwa MC mentioned that local government intervention is high. There is a higher level of pro-environmental behavior, positive attitudes towards home composting and gardening, and general concern on the environment in the households from Kaduwela MC than the households from Moratuwa MC.

### **Reliability and Validity of Continuous Variables**

The reliability and validity of the three continuous variables, namely, Attitudes on Composting, Attitudes on Gardening, and General Concern on Environment, were conducted. The reliability coefficient values of the variables in this study are higher than 0.7, and the variables are considered for

further study analysis as the variable coefficients seem satisfactory enough. An alpha level of 0.7 or above is generally acceptable (Cronbach, 1951; Karunasena & Deng, 2012; Hair et al., 2006). The factor analysis was used to screen all the continuous variables and their items to ensure the validity of the factors. As per the analysis, each item of the three variables identified higher alpha values greater than 0.5. Therefore, all of the items were considered valid for further analysis. Average Variance Extracted value of 0.50 and higher indicates a sufficient degree of convergent validity (Hair et al., 2011).

### **Logistic Regression Analysis**

Logistic Regression was conducted to examine the effect of each independent variable on the dependent variable of people's participation in home composting. Table 01 and table 02 illustrates the logistic regression analysis of both Moratuwa and Kaduwela MCs, respectively. In the table, the Wald test ("Wald" column) is used to determine the statistical significance for each of the independent variables. There is no multi-co-linearity problem in the model developed based on Moratuwa MC and Kaduwela MC as none of the Variance Inflation Factor (V.I.F.) is greater than 5 and also the Tolerance Statistics is not below 0.20 (Dennis, 2011; Bush, 2009, as cited in Anuradha & Fernando, 2015).

### **Logistic Regression Analysis for the Moratuwa Municipal Council**

This study conducted logistic regression analysis for both MCs separately. In table 01, Logistic Regression was used to examine the effect of each independent variable on the dependent variable of people's participation in home composting based on Moratuwa MC

*Table 01: Variables in the Equation (Local authority = Moratuwa)*

	<b>Variables in the Equation</b>							
	<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>Sig.</b>	<b>Exp (B)</b>	<b>95% C. I. for EXP(B)</b>	
							<b>Lower</b>	<b>Upper</b>
<b>Availability of Market Opportunities</b>	1.569	.476	10.852	1	.001	4.804	1.888	12.220
<b>Social Diffusion</b>	3.821	.700	29.778	1	.000	45.656	11.573	180.110
<b>No Health Risks</b>	.371	.488	.577	1	.447	1.449	.557	3.774
<b>Access to the Garden</b>	2.557	1.030	6.168	1	.013	12.903	1.715	97.104
<b>Family Income Level</b>			13.516	5	.019			
- <b>Rs.20,001 to 40,000</b>	.084	.379	.049	1	.825	1.087	.517	2.286
- <b>Rs.40,001 to 60,000</b>	.493	.499	.975	1	.323	1.637	.616	4.354
- <b>Rs.60,001 to 80,000</b>	1.040	.698	2.218	1	.136	2.830	.720	11.121
- <b>Rs.80,001 to 100,000</b>	2.935	.877	11.190	1	.001	18.821	3.371	105.071
- <b>Rs.100,001 or above</b>	1.101	1.511	.530	1	.466	3.006	.155	58.146
<b>Interventions of Local Government Authorities</b>			19.178	3	.000			
- <b>Minor Intervention</b>	.483	.371	1.692	1	.193	1.620	.783	3.354
- <b>Moderate intervention</b>	5.297	1.550	11.686	1	.001	199.716	9.582	4162.63

- <b>High Intervention</b>	4.467	1.646	7.368	1	.007	87.099	3.461	2192.12
<b>Pro-environmental Behaviours</b>								
<b>Attitudes on Composting</b>	.330	.093	12.733	1	.000	1.391	1.160	1.668
<b>Attitudes on Gardening</b>	.929	1.203	.596	1	.440	2.531	.240	26.733
<b>General Concern on Environment</b>	4.133	.899	21.131	1	.000	62.374	10.707	363.356
<b>Constant</b>	-1.04	.492	4.541	1	.033	.351	.134	.919
	-17.3	3.572	23.578	1	.000	.000		

*Source: Survey Data*

According to the significant values of each independent variable, namely, availability of market opportunities for home composts, Social diffusion, Access to Garden, Family income level, Local government interventions, Pro-environmental behavior, Attitudes on Gardening, General Concern on the environment is identified as statistically significant at  $p < 0.05$  level. But Health risks and Attitudes on composting are not statistically significant ( $p > 0.05$ ) with the dependent variable. When it relates to the different income levels, only the income level from Rs.80, 001 to 100,000 is significantly correlated with the dependent variable, but other income levels from Rs.20, 001 to 40,000, Rs.40, 001 to 60,000, Rs.60, 001 to 80,000, and Rs.100, 001 or above are not statistically significant. Among the levels of local government intervention, moderate and high-level MC interventions significantly affect the dependent variable, but the level of minor intervention of the MC is not statistically significant with people's participation in home composting.

Based on the assumption of Ceteris Paribus (that is, all other variables remain constant) in Moratuwa MC. Increasing the availability of market opportunities for home composts is associated with more likely to increase people's

participation in home composting 4.8 times than when there is no market opportunity available. When people perceive a social diffusion on home composting, people in home composting is 45 times more likely than when there is no social diffusion. Furthermore, access to the garden was associated with participating in home composting, 12 times more likely than when there is no access to the garden. When a family income level is from Rs. 80,001 to 100,000, it is about 18 times more likely to participate in home composting. Moreover, when the local government intervention is moderate and high, it is about 199 times and 87 times more likely to participate in home composting than when there is no local government intervention. When people have pro-environmental behavior, people's participation in home composting is likely to increase about 1.4 times than when there is no pro-environmental behavior. Furthermore, when people have positive attitudes towards gardening, people's participation in home composting is 62 times greater than when they do not have positive attitudes towards gardening. When people's concern for the environment is associated with home composting, it is 0.35 times more likely to increase in home composting than when people are not concerned for the environment.

### **Logistic Regression Analysis for the Kaduwela Municipal Council**

This study used Logistic Regression to examine the effect of each independent variable on the dependent variable of people's participation in home composting based on Kaduwela MC

*Table 02: Variables in the Equation (Local authority = Kaduwela)*

	B	S.E	Wald	df	Sig.	Exp (B)	95% C.I.for EXP(B)	
							Lower	Upper
<b>Availability of Market Opportunities</b>	2.351	.484	23.574	1	.000	10.497	4.063	27.117
<b>Social Diffusion</b>	2.013	.292	47.462	1	.000	7.485	4.222	13.272
<b>No Health Risks</b>	2.113	.655	10.400	1	.001	8.270	2.290	29.861
<b>Access to the Garden</b>	1.920	.540	12.631	1	.000	6.821	2.366	19.665
<b>Family Income Level</b>			14.918	5	.011			
- <b>Rs.20,001 to 40,000</b>	.336	.355	.895	1	.344	1.399	.698	2.804
- <b>Rs.40,001 to 60,000</b>	1.060	.410	6.675	1	.010	2.887	1.292	6.452
- <b>Rs.60,001 to 80,000</b>	1.358	.630	4.647	1	.031	3.888	1.131	13.363
- <b>Rs.80,001 to 100,000</b>	-.834	1.014	.676	1	.411	.434	.060	3.170
- <b>Rs.100,001 or above</b>	2.413	1.227	3.872	1	.049	11.172	1.009	123.64
<b>Interventions of Local Government Authorities</b>			69.690	3	.000			
- <b>Minor Intervention</b>	2.768	.347	63.603	1	.000	15.921	8.065	31.432
- <b>Moderate intervention</b>	2.039	.776	6.905	1	.009	7.679	1.679	35.128
- <b>High Intervention</b>	2.811	.885	10.089	1	.001	16.621	2.934	94.161

<b>Pro-environmental Behaviours</b>	.227	.070	10.392	1	.001	1.255	1.093	1.440
<b>Attitudes on Composting</b>	2.192	.486	20.340	1	.000	8.956	3.454	23.222
<b>Attitudes on Gardening</b>	.628	.515	1.483	1	.223	1.873	.682	5.142
<b>General Concern on Environment</b>	.122	.347	.123	1	.726	1.129	.572	2.229
<b>Constant</b>	15.90	1.785	79.405	1	.000	.000		

*Source: Survey Data*

As shown in Table 02, the availability of market opportunities for home composts, Social diffusion, No Health Risks, Access to Garden, Family income level, Local government interventions, Pro-environmental behavior, Attitudes on Composting statistically significant ( $p < 0.05$ ) with the dependent variable of people's participation in home composting. However, attitudes on gardening and General Concern on Environment do not statistically significant ( $p > 0.05$ ) with people's participation in home composting.

Under the assumption of Ceteris Paribus, in Kaduwela MC, an increase of the availability of market opportunities for home composts was associated with an increase in people's participation in home composting ten times than when there is no market opportunity. When people perceive a social diffusion towards home composting, people's participation in home composting is seven times more likely than when there is no social diffusion. Access to the garden is six times more likely to participate in home composting than when there is no access to the garden. When family income level is from Rs.40 001 to 60,000 and Rs. 100,001 or above, it is about two times and 11 times more likely to increase in people participating in home composting. Further, when people prevent health risks, people's participation in home composting is eight times likely to increase than when there are disposed to health risks. When the local government interventions are minor, moderate, and high, people's

participation in home composting respectively 15 times, 07 times, and 16 times than when there is no local government intervention. Moreover, when people have pro-environmental behavior, their participation in home composting is 1.2 times likely to increase than when they do not have pro-environmental behavior. When people have positive attitudes toward composting, their participation in home composting is eight times likely to increase when they do not have positive attitudes toward composting.

### **Comparison of People's Participation in Home Composting in Moratuwa and Kaduwela MCs**

When the availability of market opportunities for home composts increases, people's participation in home composting is more likely to increase ten times from Kaduwela and 4.8 times from Moratuwa MC; when people perceive a social diffusion towards home composting, people's participation in home composting is more likely to increase seven times from Kaduwela MC and 45 times in MC. When accessing the garden, people participating in home composting are more likely to increase 06 times from Kaduwela and 0.07 times in Moratuwa MC.

In Kaduwela MC, when family income level is from Rs. Rs.40, 001 to 60,000, people's participation in home composting is likely to increase 2.8 times, and when family income level is Rs. 100,001 or above, people's participation in home composting is likely to increase 11.1 times. In Moratuwa MC, when family income level is from Rs. 80,001 to 100,000, people's participation in home composting is likely to increase by 18.8 times.

In Kaduwela MC, when the local government's intervention is minor, moderate, and high, people's participation in home composting is likely to increase 15, 7, and 16 times. In Moratuwa MC, when the local government's intervention is moderate and high, people's participation in home composting is likely to increase 199 and 87 times, respectively.

When people have pro-environmental behavior, their participation in home composting increases 1.2 times from Kaduwela MC and 1.4 times in Moratuwa MC.

In Kaduwela MC, when people prevent health risks and have positive attitudes on home composting, people's participation in home composting is likely to increase 08 times and 09 times, respectively. But in Moratuwa MC, Prevention from health risks and positive attitudes on home composting do not significantly affect people's participation.

In Moratuwa MC, when people have positive attitudes towards gardening, and general concern for the environment, people's participation in home composting is likely to increase 62 times and 0.35 times, respectively. But in Kaduwela MC, positive attitudes towards gardening and general concern for the environment do not significantly affect people's participation in home composting.

According to the study's findings, people's participation in home composting in Kaduwela MC is relatively better than Moratuwa MC. Many households in Kaduwela MC involve in composting than Moratuwa MC. Availability of market opportunities for home compost, social diffusion, access to the garden, higher levels of family income, moderate and a higher level of government intervention, pro-environmental behavior significantly affect people's participation in home composting in both MCs. In addition to that, attitudes for gardening and general concern for the environment significantly affect people's participation in home composting in Moratuwa MC, and no health risk and attitudes for composting in Kaduwela MC significantly affect people's participation in home composting.

## **Discussion**

Similar to the findings of this study, many scholars have identified significant factors affecting people's participation in home composting. Bandara in 2010, Guerrero et al. (2013), as cited in Rashmika and Edirisinghe in 2016 found

that availability of market opportunities is a significant factor affecting home composting. Furthermore, Crossman in 2016, Edgerton et al. in 2009, Park et al. in 2002 confirmed that social diffusion significantly affects home composting. Moreover, various levels of income level significantly affect home composting has been confirmed by Edgerton et al., in 2009, Parfitt et al. (1997), as cited in Jasim and Smith in 2006, Mustapha in 2013, Bandara in 2010. Furthermore, Local authorities' intervention is significantly affecting people's participation in home composting have been confirmed by previous scholars, namely; Vicente and Reis (2008) as cite in Vitor and Mathinho in 2009, Hoornweg et al. in 2000, Beaulieu in 2016, Jacobs et al. 1984 cited by Vitor and Marinho in 2009, Lekammudiyanse and Gunatilake in 2009, Bandara in 2010. Moreover, Pro-environmental behavior significantly affects people's participation in home composting. The same finding was confirmed by Edgerton, et al. in 2009, Turaga et al. (2010); Kollmuss and Agyeman (2002), as cited in Griffiths in 2015, Vining and Ebreo (1989); Hopper and Nielsen (1991); Kilner (1992); Howenstine (1993), as cited in Tucker and Speirs in 2001. Access to the garden as a significant factor affecting people's participation in home composting have been confirmed by Jasim and Smith in 2006, Bandara in 2010, Hoornweg, et al. in 2000, Edgerton et al. in 2008. Besides that, Attitudes on home composting has been identified as a significant factor by Jasim and Smith in 2006, Vitor and Mathinho in 2009, Ajzen and Fishbein (1980); Vicente and Reis (2008) as cited in Vitor and Mathinho in 2009; Valle et al. in 2005, Edgerton et al. in 2009, Park, et al. in 2002. Furthermore, Attitudes on gardening as a significant factor affecting people's participation in home composting have been confirmed by Edgerton, et al. in 2009. General concern on the environment also as a significant factor affecting people's participation in home composting have been confirmed by Schultz et al. (1995) as cited in Edgerton et al. in 2009. Finally, Prevention from health risks as a significant factor affecting people's participation in

home composting have been confirmed by Hoornweg et al. in 2000, Harrison et al. in 2004.

## **Conclusion and Recommendations**

The study was conducted based on Kaduwela and Moratuwa MCs in Western Province in Sri Lanka. Comparatively, the study analyzed both MCs to identify the significant factors affecting people's participation in home composting and its better performance. The study found that the availability of market opportunities for home composts, social diffusion, access to gardens, higher levels of family income level, moderate and higher level of government intervention, pro-environmental behavior significantly affect people's participation in home composting in both MCs. Specifically, attitudes for gardening and general concern for the environment significantly affect Moratuwa MC's and no health risk and attitudes on home composting significantly affect Kaduwela MC's people's participation in home composting. It could be concluded that people's participation in home composting in Kaduwela MC is relatively better than Moratuwa MC. Finally, policy recommendations for both Moratuwa and Kaduwela MCs to uplift the existing composting behavior of households are presented as follows.

### **Recommendations**

Policy Guidelines for Both Moratuwa and Kaduwela Local Governments to Uplift the Current Composting Behaviour of Households will be suggested as follows:

- Expand more market opportunities for home compost. Create and facilitate the market for home composts, by making aware people about the availability of market opportunities for composts, providing enough knowledge to people for having the capacity to explain the benefits of composting products to their customers, making suitable arrangements to maintain a good price for compost products in the market.

- Increase local government's intervention by providing compost bins for free of charge or compost bins at concessionary prices at the request of the people. Provide advisory and monitoring services for people in home composting, facilitate necessary financial assistance such as tax reduction for composting, other grants, and incentives for composting people.
- Uplift the people's pro-environmental behavior by discouraging excess packaging, encouraging them to reuse waste, and recycling newspapers, glasses, aluminum. Encourage buying recycled products, selling or donating reusable wastes, growing and buying organic vegetables.
- Influence people to initiate and continue home composting with interaction and interference among their family/neighbors and other counterparts. Social diffusion could be done by uplifting other initiatives such as local government intervention, availability of market opportunities, and pro-environmental behavior.

#### **Specific Recommendations to Moratuwa LG**

- Nurture people's attitudes on gardening and people's positive concern for the environment. Support people for gardening and improving people's general concern on the environment pleasantly, conveniently, timely, and economically.
- Motivate people by providing required assistance and awareness of the benefits of gardening and active involvement in protecting the environment in different aspects such as economically, ecologically, and psychologically.

#### **Specific Recommendations to Kaduwela LG**

- Design programs and projects for acknowledging people to provide proper composting sanitary behavior and provide necessary sanitation equipment to avoid composting health problems as diminishing health risk is a

significant factor affecting participation in home composting people's lives Kduwela LG.

- Support the composting people by making them aware of the composting process, its benefits, support, and assistance provided by the LG. to motivate them for composting with more positive attitudes.
- Design awareness programs in an attractively and convenient manner with economic benefits.
- Motivate people by providing required financial and instrumental assistance for initiating and continuing home composting and providing awareness of the benefits of composting economically, ecologically, and psychologically.

If the recommendations stated in the above are implemented and maintained adequately with direct political and administrative support and commitment, it will enhance people's participation in home composting.

### **Limitations and Further Research**

This research is based on only two Municipal Councils of the Western province in Sri Lanka. The generalization of the research findings may not be reasonable to other local governments situated in other Provinces. Future research could undertake regarding the rest of the country's Municipal Councils.

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