



Knowledge, attitudes and practices synthesis of waste management among horticultural processing MSMEs in Kenya

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Abstract

Horticultural processing Micro, Small and Medium Enterprises (MSMEs) in Kenya utilize raw agricultural produce and generate large quantities of solid and liquid wastes. However, there is limited information on knowledge, attitude and current waste management practices among horticultural processing MSMEs in Kenya. This study sought to establish the current knowledge, attitude and practices on waste management among horticultural processing MSMEs in Kenya. The survey adopted quantitative and qualitative data collection method, thirty-one (31) Certified MSMEs from Nairobi, Central and Western regions were surveyed. using a structured questionnaire. The MSMEs indicated that improper waste disposal has adverse effects on the environment, reuse/reduce/recycle were the core principles of waste management and wastes pollutes the environment. Segregation of wastes was considered good practice while improper waste disposal compromises quality of the environment. Improper waste disposal is harmful to their environment, their work place and neighborhoods ought to be clean (71%) each respectively while different waste management practices were used (6.8%). About 83.9% segregated their waste while 93.5% were not ISO 14001 compliant thereby indicating need for the MSMEs to work towards certification for productivity and external competitiveness. The respondent-s knowledge on wastes reduction showed that majority of the MSMEs employ the principles of reuse and waste minimization to manage wastes at 52% and 45% respectively. This was followed by recycling at 19% and energy recovery at 16%. The standardized beta coefficient on knowledge, attitude and practice on waste management indicated; values of 0.097 (t=0.526), 0.628 (t=4.349) and 0.739 (t=5.913) respectively. Thus, no significant (p=0.603) relationship of knowledge on waste management. There was a significant relationship (p=0.000) between attitude and practices on waste management among Horticultural processing MSMEs. There is need to enhance knowledge through training towards a sustainable consumption production and practices in MSMEs.

Keywords: SCP; Waste Management; KAP; Horticultural Processing; MSME

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Introduction

Waste can be considered as a resource because it could be managed to realize economic, social and

environmental benefits. Effective management of solid and liquid waste is critical in delivering Kenya's constitutional right to a clean and healthy environment for all (GOK, 2013b). Also, waste management is important in advancing the

circular economy to avail green employment opportunities, wealth from the waste sector and realization of the Global Sustainable Development Goals by 2030 as envisioned by the United Nations. The Kenya's National Sustainable Waste Management Policy of 2018 aimed to fully domesticate the waste management in the 47 Counties through improvement of low collection rates, illegal dumping and uncontrolled dumpsites to affordable waste collection, recycling and compositing.

According to Baran (2015), waste is the difference between the extent of output of useful goods and services obtained when all productive factors are allocated to their best and highest uses under rational social order. Waste is a contributor of greenhouse gases, affects global climate change and successively affects Horticultural production activities (UNEP, 2015). Therefore, there's got to develop sustainable waste management technologies in tandem with Sustainable Development Goal number 11.6.1. Further, the United Nations asserts that with rising population and rapid urbanization trends, the population of urban solid waste has continued to increase in recent years, with waste management services needing upgrading and investment (UN, 2015). Disposal of urban solid wastes may be a major problem despite the availability of technologies on effective management systems, Composting, recycling, and biomass gasification together provide enough technology for disposal of urban solid wastes (UNTST Report, 2016).

The reduction in emissions of greenhouse gases, especially methane, from the waste sector is as a result of effective waste management. The increase in greenhouse gas emissions has altered the Global temperature patterns and created a threat to human and environment (Powel *et al.*, 2016). Methane (CH₄) emitted from Landfills is one of the most contributors of to GHGs. According to Kumar *et al.*, (2015), the Municipal solid waste generated by households is considered as the third largest anthropogenic source of Methane emissions constituting 11% of all Global CH₄ emissions.

Sustainable Consumption and production practices is said to be the utilization of services and related products which responds to basic

needs and convey better quality of life while minimizing the utilization of materials also because the awareness of waste and pollution over the life cycle of the services or product so as to not jeopardize the requirements of present and future generations (UNEP, 2015). Further, Akenji (2016) asserts that so as to effectively accelerate a shift to SCP practices, the SDGs would need to transcend the green consumerism.

During harvesting, Horticultural runs close to a billion pounds of produce as postulated by the annual Agricultural report for Georgia, USA (Acedo and Weinberger, 2016). These processes also end in material that's rotten that has had undesired spots not noticed within the field, or that's far away from packing lines and not transported to consumers. The situation is similar to Kenya's Horticultural processing Micro, Small and Medium Enterprises and therefore forms the basis of this study. Proper handling of discarded products can reduce the potential for environmental pollution while also protecting the individual who is liable for the discarded materials. Fruits and vegetables are the foremost utilized commodities among all the horticultural crops consistent with FAO report (2012) but wastes generation within the sector is becoming a significant economic and environmental problem. For example, FAO (2018) has estimated that losses and wastes in fruits and vegetable processing are the very best among all kinds of foods and should reach up to 60%. It has also been reported that the horticultural processing MSMEs produce significant wastes products which constitutes about 25% to 30% of an entire commodity (FAO, 2018). These wastes are composed of seed, skin, rind and pomace and consistent with Food and Agricultural Organization, (2016), they contain good and a few of the potential valuable bioactive compounds like carotenoids, polyphenols and dietary. The major wastes streams are organic (including fruit and vegetables rejects, peels and pomace) and other staple wastes. As the urban population in major centers in Kenya and other East African Countries grows, so does the solid and liquid waste management become a burden, a situation worsened by poor funding for urban sanitation departments and a scarcity of enforcement of sanitation regulations. At least 100 million people in East Africa lack access to improved sanitation

(Troschinetz and Mihelcic, 2016). Residents living on the brink of the dumpsite are therefore exposed to environmental and disease risks. Without proper controls, solid waste is usually dumped in abandoned quarries or similar sites (JICA, 2016). In Nairobi, for instance, municipal waste is taken to the Dandora dumping site, a former quarry. The disposal sites are, in most cases, located in environmentally sensitive, low-lying areas like wetlands, forest edge or adjacent to bodies of water. They often don't have liners, fences, soil covers and compactors as is in most developed countries (Troschinetz and Mihelcic, 2016). The world is becoming more urbanized and developed with populations rapidly increasing annually and consumption levels are reaching historic levels (Desa, Kadir *et al.*, 2016). Therefore, having effective and sustainable waste management systems in situ will help regulate waste disposal and can help alleviate a number of the pressure on production and consumption practices. Moreover, waste would have detrimental effects, if left unmanaged, on both environmental and human health (Narayana, 2016). The study therefore sought to determine influence of knowledge, attitude and practices on waste management amongst horticultural processing MSMEs in Kenya.

Knowledge, attitude and practices on Wastes Management

A number of researches have been done on knowledge, attitudes and practices on wastes management. Adogu *et al.*, (2015) research findings showed that awareness of waste management accounted for 90% and a positive attitude on waste management was 97.5%. According to UNEP (2015) study industries/processors undertake their own disposal of mixed waste and transport to non-designated waste landfills. The research by Akenji *et al.*, (2016) on waste disposal and management also showed a result of tested hypotheses of 0.05 level of significance- negative attitude towards management and disposal of wastes.

Some people such as the trash pickers of DANDORA DUMPSITE in Nairobi, Kenya see "waste" as a resource or a way to make an income in an otherwise limited job market. On the other hand, you have a majority of people living in the developing world that see waste as a burden and a problem that needs to be addressed. To say

people in developing countries don't recognize trash as an issue is an untrue statement. The opposite is often true. However, recognizing trash as a problem does not prevent littering or other negative behaviours concerning waste management (Moore, 2012). This attitude-behaviour gap often emerges and can be further affected by a variety of reasons including convenience, social norms, lack of public participation, and lack of education and awareness on better ways of managing wastes (O'Connell, 2011).

Within this attitude/behaviour gap exists an inconsistency between one's values and actions. This specifically refers to the discrepancy between people's concern over the environmental harm posed by household waste and the limited action by those same people to reduce their waste or engage in other pro-environmental behaviours (O'Connell, 2011).

Other times people become accustomed to throwing their waste in streets and other inappropriate places, as there had been no formal system for sorting and disposal in their community, so when changes are implemented people are not changing their disposal behaviour out of pure habit and custom (Yousif and Scott, 2007). The lack of interest in the environment creates a culture of non-participation of communities in decision-making processes.

There is a distinction between knowledge and information and being presented with the information without prior knowledge may be ineffective in creating change. However, if prior knowledge of waste management was met with new information, these communities may be more willing to accept it and implement these changes. The need to improve public awareness of, and community participation in, waste management has been widely recognized by researchers as necessary to create sustainable waste systems and to promote environmental citizenship amongst community members (Lumbreras, 2014). A study done in Palestine focused on this educational gap came to the conclusion that there was a positive relationship between the level of education and the participatory behaviour of the people in applying

the 3Rs in waste management, (Al-Khatib *et al.*, 2015).

Theoretical Framework

A theory presents a systematic way of understanding behaviours, events and/or situations. It is a set of interrelated definitions, concepts, and propositions that predicts or explains events or situations by specifying relationships among the variables (Glanz, 2017). The theoretical framework thus provides a platform for expressing a theory of a research study. It presents and describes the theory that explains why the research problem under study exists (Swanson *et al.*, 2013). The outstanding

theory reviewed relevant to this study was the Behavioural Change Theory as discussed below.

Behavioural Change Theory

This reasoning was directly associated with the supposition that if people were better informed, they would become more aware of environmental problems and consequently, would be motivated to behave in an environmentally responsible manner. Many of these models are linked knowledge to attitudes and attitudes to behaviour. Thus, as evident in Figure 1, when knowledge increases, environmentally favourable attitudes that lead to responsible environmental actions are developed (Hungerford & Volk, 1990).

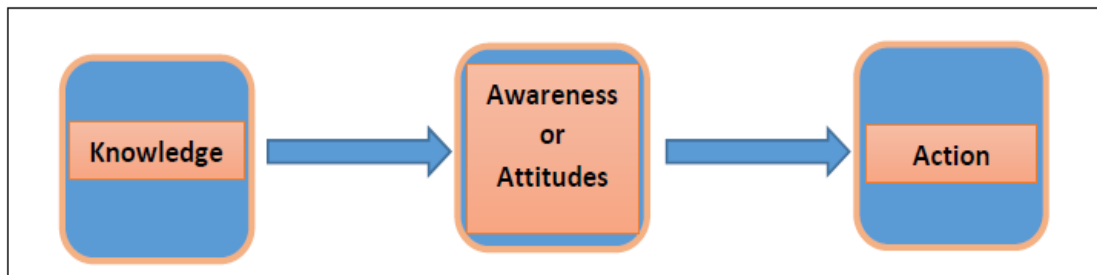


Figure 1: Behavioral change Model (Adapted from; Hungerford & Volk, 1990)

The behavioural model provides a basis to consider a possible relation existing between environmental knowledge, environmental awareness and attitude and how these can translate to action or inaction. A good knowledge of environmental variables may not necessarily imply good and sustainable environmental behaviour. This means that once the horticultural processing MSMEs are taken through training on wastes management, resource use for example water, energy and thereafter gain knowledge, then they are bound to be aware of the consequences. Being aware of the consequences of employing Sustainable Consumption and Production practices in their daily operations, then changes are likely to occur in terms of attitude and actions. (Dijksterhuis *et al.*, 2010)

Materials and Methods

Sampling and Sampling Design

The research adopted descriptive survey method where target population was 34, with a sample

$$n = \frac{N}{1 + N(e)^2}$$

size of 31 derived from Nairobi, Central and Western regions based on Certified Horticultural Processing MSMEs in Kenya who were fully trained on waste management and their impacts on the environment. The study employed the use of structured questionnaires as an instrument for data collection facilitating descriptive statistical analysis such as mean, range, frequency distribution and percentages. Regression analysis and t-test were used to ascertain the significant relationships between the variables.

Target Population and Sample Size

The target population comprise of 34 certified processing MSMEs and random stratified sampling techniques were used to select the samples size using Taro Yamane’s formula (1967).

Where;

n = the sample size,

N = the population size and

e = the level of precision.

$$n = \frac{34}{1 + 34(0.05)^2}$$

$$n = \frac{34}{1 + 34(0.0025)}$$

$$n = \frac{34}{1.085}$$

$$n = 31 \text{ Certified horticultural processing MSMEs}$$

Equation (1)

Results

This section presents the findings and interpretation of the results of the research. It includes the demographics of the respondents, Knowledge, Attitude and Practices (KAPs) influence on waste management amongst the processing MSMEs and the relationships between the variables.

Demographic information of respondents

Majority of the respondents 58.1% were females, while 41.9% were male. On Marital status, the results in Figure 2 indicates that 90.3% of those engaged in horticultural processing MSMEs businesses are predominantly married thereby demonstrating the family business tier, while 9.7% of respondents were either single, separated or divorced.

The survey data revealed that the majority of those involved in Horticultural processing MSME businesses are aged between 31-40 years (38.7%), followed closely by 18-30 (25.8%), 41-50 (19.4%) and 51- 60 (12.9%) years of age respectively, while those above 61 years of age, was only one person at 3.2% (see figure 3).

Among the respondents, 64.6% indicated that they had undertaken College/Diploma and undergraduate degree courses to certification, while 22.6%, 9.7% had Master's degree and secondary school level qualifications respectively as shown in Table 2. In Figure 4, the results show that most of the Horticultural processing MSMEs business were started between 1-3 years ago (41.9%), 38.7% were above 6 years, 16.1% and 3.2% accounted for 4-6 years and below 1 year respectively.

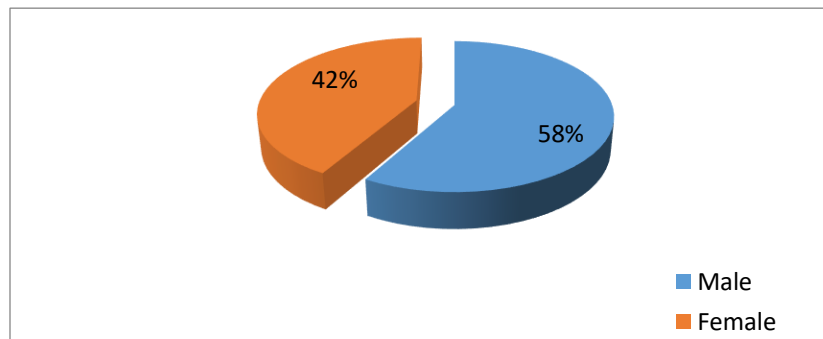


Figure 2. Gender of the study respondents

Table 1. Marital Status of respondents

Marital Status	Frequency	Percentage	Valid Percentage
Single	2	6.5	6.5
Married	28	90.3	90.3
Separated/Divorced	1	3.2	3.2
Total	31	100.0	100.0

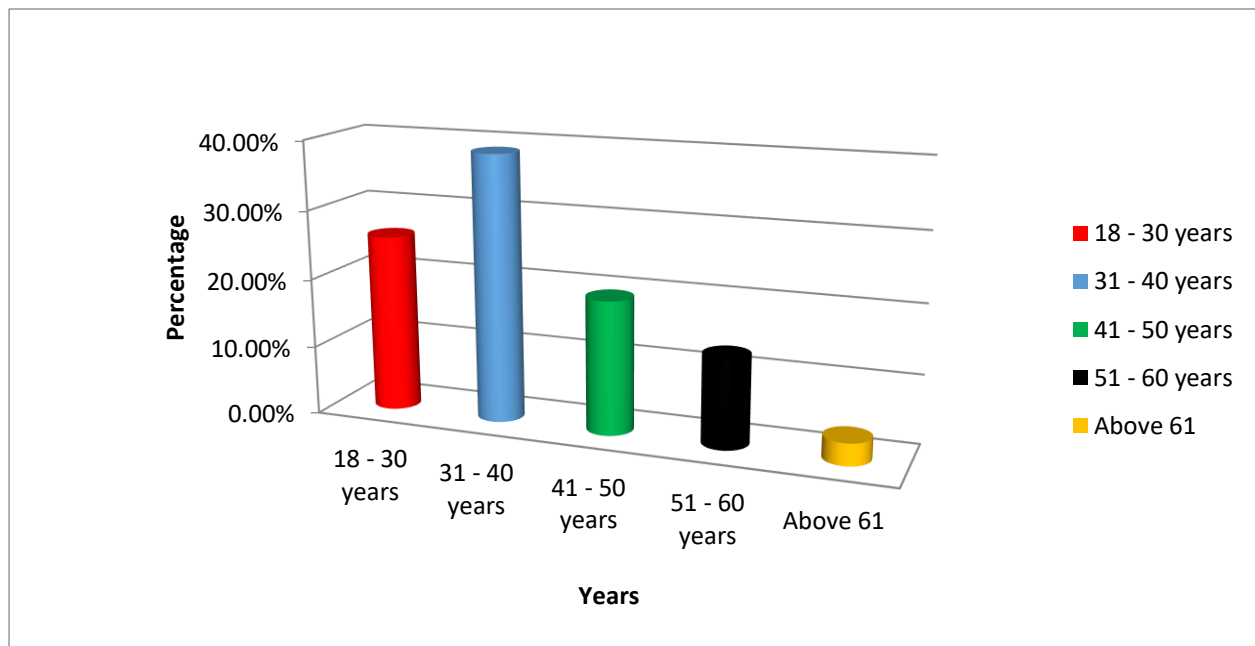


Figure 3. Age of Respondents

Table 2. Educational Level of respondents

Education Level	Frequency	Percentage	Valid Percentage
Primary	1	3.2	3.2
Secondary	3	9.7	9.7
College/Diploma	10	32.3	32.3
Undergraduate Degree	10	32.3	32.3
Master's Degree	7	22.6	22.6
Total	31	100.0	100.0

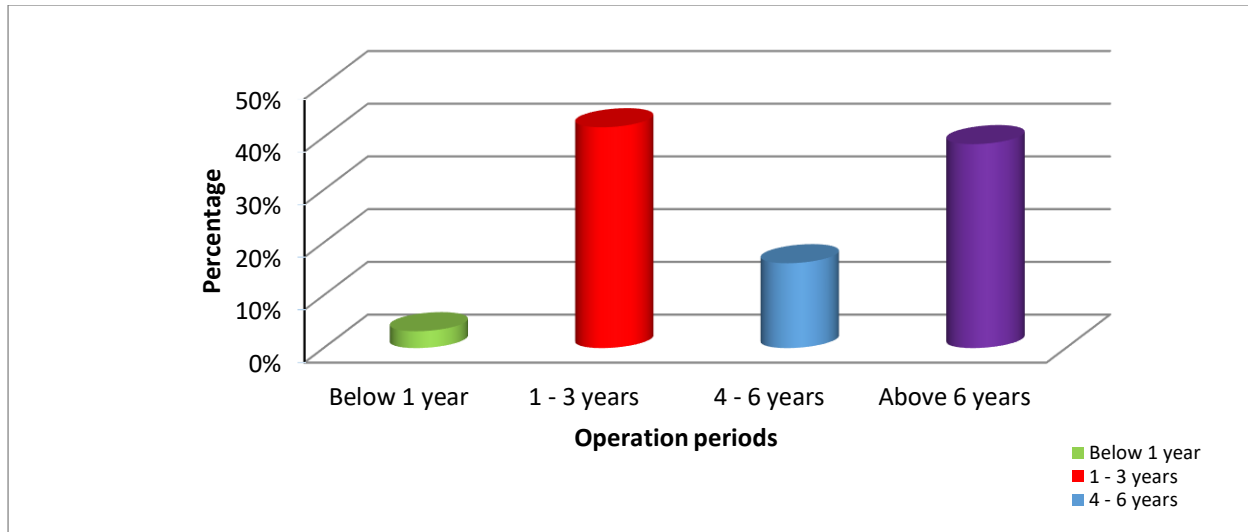


Figure 4. Period in operation/Business by the MSMEs

Knowledge, Attitude and Practices on Waste Management

Knowledge on Waste Management
 Results from surveyed data revealed that, majority of the Horticultural processing MSMEs were aware of the impacts of improper waste management, yet it was observed that handling of waste was still a major challenge among the horticultural processing MSMEs surveyed. For example, all the 31 of the respondents agreed that improper waste disposal has adverse effects on the environment. The result further showed that, reuse/reduce/recycle were the core principles of Table 3. *Knowledge on Waste management*

waste management, wastes pollute the environment, at 100% each and segregation of wastes is considered good practice, improper waste disposal compromises quality of the environment at 96.8% each. This means that they have ideas of the negative impacts of wastes within the environment. The respondents also acknowledged that dumping of wastes in streams/ rivers/ bush and discharge or disposals anyhow of wastes into the environment are not acceptable at 90.3% and 93.5% respectively.

Statement	TRUE (%)	FALSE (%)
a) Improper waste disposal has adverse effects on the environment	100.00	0.00
b) Banning of plastic wastes is good for the environment	48.40	51.60
c) Dumping of wastes in streams/ rivers/ bush is acceptable	9.70	90.30
d) Improper Waste Management does not pose safety hazard to food processing firm	6.50	93.50
e) Segregation of wastes is considered good practice	96.80	3.20
f) Improper waste disposal compromises quality of environment	96.80	3.20
g) Reuse/Reduce/Recycle are the core principles of waste management	100.00	0.00
h) Wastes pollute the environment	100.00	0.00
i) The best way of dealing with solid wastes is by burning	60.6	39.4
j) I can discharge/ dispose anyhow my wastes into the environment	6.50	93.50
k) Do you know that reduction in consumption of resources will lead to less waste generation?	96.80	3.20
	Std.	0.922
	Dev.	

Attitude on Waste Management

Table 4 shows the attitude of the respondents on waste management. Ranking the respondents' responses attitude towards waste management, the results showed that "improper waste disposal is harmful to our environment," my workplace

and neighborhoods should be clean had the highest mean (M= 4.710) each while, 'the government is responsible for the management of wastes and not me" had the lowest mean (M= 1.970). This means that the respondents had high and positive attitudes on waste management in their firms.

Table 4. Attitude on Waste management

Statement	1 SD (%)	2 D (%)	3 N (%)	4 A (%)	5 SA (%)	Mean	Std dev
a) I am happy with the way wastes is handled by my firm	0	3	10	48	39	4.230	0.762
b) Improper waste disposal is harmful to our environment	0	0	0	29	71	4.710	0.461
c) My work place and neighborhood should be clean	0	0	0	29	71	4.710	0.461
d) It's my responsibility to ensure waste is disposed of appropriately	0	0	0	42	58	4.580	0.502
e) I don't care that burning of wastes can be harmful for my health and to others	61	29	0	10	0	1.580	0.923
f) I am responsible for re minding other employees on proper waste disposal	0	0	0	55	45	4.450	0.506
g) Our firm is not making effort to manage wastes	42	36	1	10	0	1.900	0.978
h) So long as my environment is clean, I do not care about others	45	39	7	3	7	1.870	1.118
i) I am too busy to be concerned about waste management	45	45	3	3	3	1.740	0.930
j) I prefer working in a clean place rather than where wastes are piled	0	3	0	42	55	4.480	0.677
k) Educating the public on proper waste management is sure way to fix the waste problems	0	0	3	55	42	4.390	0.558
l) Waste is one of the environmental problems thus needs urgent attention by all of us	0	0	0	48	52	4.520	0.508
m) Waste is a resource	0	3	7	45	45	4.320	0.748
n) I prefer segregation of wastes into different bins than in one	0	0	0	42	58	4.580	0.502
o) Cleanliness is next to godliness	0	0	0	39	61	4.610	0.495
p) It's important to keep the environment clean because it has much right as human beings	0	0	3	39	58	4.550	0.568
q) I'm superior in the universe so why should I care about the environment	58	13	7	13	10	2.030	1.449
r) Reusing bags for shopping is good for reducing wastes	55	0	3	39	3	4.260	0.815
s) I do encourage the reduction of wastes amongst my colleagues, neighbours and across all levels of the society	55	0	0	45	0	4.450	0.506
t) The society should be sensitized on waste management	48	0	0	52	0	4.520	0.508
u) People improperly dispose of wastes since they lack waste management facilities	29	19	19	23	10	3.350	1.305
v) The Government is responsible for the management of wastes and not me	10	48	10	0	32	1.970	0.912

Note; (SD-Strongly Disagree, D-Disagree-Neutral, A-Agree-Strongly Agree)

Practices on Waste Management amongst MSMEs

The results in Table 5 showed that there were different waste management practices used by the surveyed horticultural processing MSMEs, accordingly, 96.8% of respondents acknowledge this. The results also showed that among the 31 horticultural processing MSMEs surveyed, 93.5%

have competent employee to implement EMS Policy, and 83.9% do separate their wastes into streams. But about 93.5% of the respondents were not ISO 14001 (EMS Compliance) Certification thereby indicating that there is need to further encourage the MSMEs to work towards such certification for better productivity and external competitiveness.

Table 5. Waste management Practices

Statements	Yes (%)	No (%)
a) Are you aware of waste management practices in your firm?	96.8	3.2
b) Do you separate your wastes according to their components?	83.9	16.1
c) Do you practice solid waste storage?	51.6	48.4
d) Does your firm have Environmental Management System?	51.6	48.4
e) Is your firm ISO 14001 Certified?	6.5	93.5
f) Does your firm have a competent employee to implement an EMS Policy?	93.5	6.5

Methods of Waste Reduction amongst MSMEs Waste Reduction

The respondent's knowledge towards wastes reduction showed that majority of the MSMEs employ the principles of Reduce, Minimization and reuse to manage wastes at 52%, 45% and 32% respectively. This was followed by Recycle at 19% and Energy recovery at 16% as shown in Table 6. This means that all the Horticultural processing MSMEs have embraced the principles of wastes reduction.

Waste Storage

Amongst the different aspects of waste storage methods, 52% indicated that their waste storage facilities are kept clean and neat, 48% stores waste at collection points, Large containers are used to accommodate larger volumes of waste before collection while bins are consistently labelled with correct information and have different colours to help in sorting of wastes at 29% and 23% respectively as shown in Table 9. The results show that proper waste storage is highly practiced by the horticultural processing MSMEs.

Waste Transportation/Transfer

According to the results shown in Table 6 on waste transportation/transfers, 61% of the

respondents Transfer/Transports wastes safely to disposal sites, the efficient participation of the MSMEs on collection and transfer of wastes at 58%, and transfer of waste is done in compact containers at 42%, indicating that the respondents understands the impacts of improper wastes disposal on the environment.

Waste Processing

The respondents were also tasked to indicate the aspects of wastes processing in their firms. Those who highly supported the development of an EMS system and reused or recycled wastes other than throw them away were all at 45% while 39% indicated they highly practiced Treatment of wastes and modification of production process and equipment-a positive attributes towards Sustainable production and consumption practices.

Waste Disposal

The results in Table 6 below on waste disposal methods showed that the majority of the horticultural processing MSMEs use their wastes to feed animals at 61% followed by disposal through socially environmentally acceptable manner and also discourages burning of wastes at 55% each respectively.

Table 6. Methods of waste reduction used

Statement	1 NP (%)	2 LP (%)	3 MP (%)	4 HP (%)	5 VHP (%)	Mean	Std. Dev
a) Reduce	13	10	19	7	52	3.740	1.505
b) Reuse	23	7	29	10	32	3.230	1.543
c) Recycle	58	3	16	3	19	2.230	1.627
d) Minimize	23	3	19	10	45	3.520	1.630
e) Energy recovery	48	10	19	7	16	2.320	1.536
Waste Storage Methods							
f) Storage bins have different colours to help with sorting of wastes	26	23	7	23	23	2.940	1.569
g) Bin are consistently labelled with correct information	29	26	3	13	29	2.870	1.668
h) Wastes are stored at collection points	7	16	16	13	48	3.810	1.376
i) Storage facilities in the firm are kept clean and neat	3	16	13	16	52	3.970	1.278
j) Large containers are used to accommodate larger volumes of wastes before collection	7	16	3	32	42	3.870	1.310
Transportation/Transfer of Wastes							
k) Wastes is safely transported/transferred to disposal sites	7	13	10	10	61	4.060	1.365
l) Successful collection and transfer of wastes materials depends also on the efficient participation of the MSME	3	13	19	7	58	4.030	1.278
m) Transfer of compacted wastes is done in closed containers	19	16	10	13	42	3.420	1.628
n) Waste Processing Methods							
o) Support the development of the EMS Policy in the firm	10	7	13	26	45	3.900	1.326
p) Treatment of wastes	68	13	13	3	39	1.610	1.054
q) Modification of production process and equipment	7	13	19	26	36	3.710	1.270
r) Reuse or Recycle wastes other than throw away	10	10	16	19	45	3.810	1.376
Waste Disposal Methods							
s) Discourages burning of wastes	3	7	23	13	55	4.100	1.165
t) Burning of wastes is practiced	39	19	23	7	13	2.350	1.404
u) Cleared refuse sites in the firm premises	23	13	19	7	39	3.260	1.632
v) Dispose wastes through socially and environmentally acceptable manner	0	7	19	19	55	4.230	0.990
w) Selling to others	32	3	13	19	32	3.160	1.695
x) Feed to animals	7	0	23	10	61	4.190	1.195
y) pen dumping	77	13	3	0	7	1.450	1.060

Note; (NP-Not Practiced-Low practiced, MP-Moderately Practiced-Highly practiced and VHP-Very highly practiced)

Regression Analysis to show the relationships of Variables

The succeeding Tables; 7, 8 and 9 below present the relationships among the variables of the study.

Influence of knowledge on waste management among horticultural processing MSMEs in Kenya

According to the regression analysis on Table 7, influence of knowledge on waste management among horticultural processing Micro, Small and Medium Enterprises (MSMEs) had no Significant

with a p-value of (0.603b). Which is higher than 0.05 level of significance and therefore, the results were not statistically significant. The standardized Beta Coefficient on Knowledge on

waste management indicated; Beta 0.097(t=0.526). That means, respondent's knowledge does not affect waste management efforts amongst these MSMEs.

Table 7. Influence of knowledge on waste management

Model Summary						
R	R Square	Adjusted R Square		Std. Error of the Estimate		
.097a	0.009	-0.025		1.379422		
ANOVA						
	Sum of Squares	df	Mean Square	F	Sig.	
Regression	0.526	1	0.526	0.276	.603b	
Residual	55.181	29	1.903			
Total	55.707	30				
Coefficients						
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	
(Constant)	1.815	2.437		0.745	0.462	
Overall score on knowledge of waste management	0.144	0.273	0.097	0.526	0.603	

Influence of attitude on waste management among horticultural processing MSMEs in Kenya.

The regression analysis result showed that there was significant relationship or influence between Attitude and Practices with the p-value (0.000b) on waste management amongst Horticultural processing MSMEs as shown on the regression analysis Table 8 and 9 respectively. The

standardized Beta Coefficient of attitude on waste management indicated; Beta= 0.628 (t=4.349). In behavioral actions, one's intention is influenced by attitude towards the action and subjective norms. The more fervent the intention is, the more likely the behavior will be performed, reinforcing the Theory of Planned Behavior as postulated by Ajzen (1991).

Table 8. Influence of attitude on waste management

Model Summary						
R	R Square	Adjusted R Square		Std. Error of the Estimate		
.628a	0.395	0.374		1.078243		
ANOVA						
	Sum of Squares	df	Mean Square	F	Sig.	
Regression	21.992	1	21.992	18.916	.000b	
Residual	33.716	29	1.163			
Total	55.707	30				
Coefficients						
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	

	B	Std. Error	Beta		
(Constant)	1.555	0.402		3.863	0.001
Attitude	0.514	0.118	0.628	4.349	0.000

Influence of practices on waste management

Table 9: Influence of practices on waste management

Model Summary						
R	R Square	Adjusted R Square		Std. Error of the Estimate		
.739a	0.547	0.531		0.933243		
ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Regression		30.45	1	30.45	34.962	.000b
Residual		25.257	29	0.871		
Total		55.707	30			
Coefficients						
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
(Constant)		0.557	0.46		1.212	0.235
Waste management practice		1.171	0.198	0.739	5.913	0.000

Discussion

To find out the relationship between knowledge and waste management, regression analysis was employed and the results indicated that there was no significant relationship between knowledge and waste management amongst Horticultural processing MSMEs in Kenya. This is supported with the Theory of the Behavioural Model as postulated by Hungerford & Volk, (1990). The weak relationship between knowledge, environmental attitudes and behaviour can be associated with the refusal to abandon the comforts of modern life and responsibility as postulated by (Diekmann and Preisendorfer, 2000). This is also in concurrence with the previous studies conducted by Jones and Donlap (2000) Franson and Garling (2000) and Ifegbesan (2010).

In this context, knowledge is important to waste management among the horticultural processing MSMEs. Training them to understand the

indiscriminate disposal of waste to the environment and better management alongside human health, will empower them to act responsibly on environmental management and sustainability. (Desa, Kadir, *et al.*, 2015). Above all, waste awareness is an environmental campaign phenomenon which aims not only to educate people on the consequences of improper waste management, but also to form their right attitude which will consequently motivate them to act appropriately on waste disposal mechanisms within their environment.

However, the results on practices used to manage wastes, showed a significant relationship on waste management amongst the surveyed horticultural processing MSMEs in Kenya as indicated on Table 8 and 9. This is in concurrence with Ajzen, (1991) Theory of Planned Behavior. On the other hand, while it is true that human beings may be drawn by one's intentions and attitude, it could also be argued that self-interest can play an important role in the decision-making

and acting as anchored in the Rational Theory of Choice as postulated by Adams Smith-who asserted that individual acts with prudence and logic. The decision to act or not to act is based on rational calculation and the choice is made available options that will guarantee the greatest satisfaction or profit to the same individual. (Green and Fox, 2017).

The Theory, implies that proper waste management may not always be altruistic rather it may be influenced by weighing its costs and benefits within a given organization. Ehrampoush and Moghadam (2015) conducted a cross-sectional study of knowledge, attitude and practice of solid waste disposal and recycling of 237 students from Yazd University of Medical Sciences. The findings showed that students had moderate knowledge of solid waste disposal. But their knowledge did not influence them to practice segregation of solid wastes into different wastes streams. This also concurred with Adeolu and Adeolu, (2016) study on Knowledge, attitude and practices of 358 students in the Secondary School towards waste management in Ibadan, Nigeria.

Furthermore, the results revealed that the respondents surveyed are "aware of waste management practices used in the firm," have a competent employee to implement environmental management systems" (EMS) and they do separate their wastes according to the components or streams at 96.8%, 93.5% and 83.9% respectively, concurring with the UNEPA study report of 2015.

Conclusion and Recommendations

This paper therefore has demonstrated that, attitude, practices and the horticultural processing MSMEs are significantly correlated, while knowledge is not. For effective environmental management, the horticultural processing MSMEs requires tailor-made awareness on impacts of waste on the environment. This will enable them become more concern with the ever-mounting problems of wastes while undertaking production and consumption to a sustainable manner. Therefore, there is a need to implement a strategic approach an Environmental Management Systems (EMS) to

support a successful waste management. This is because, the MSMEs play an integral role in making their employees conscious of the repercussion of their actions towards waste management and environmental management (i.e. reasoned actions), planned behavior (i.e. Planning appropriately on waste management) as stipulated in ISO 140001 rational choice (i.e. in terms of costs and benefits that might accrue).

More so, the MSMEs needs to be taught continuously on sustainable consumption and production practices thereby promoting effective and efficient waste management. The county leaders also need to offer incentives towards sustainable environmental management in order to motivate the MSMEs. Emphasis on the necessity for information about environmentally responsible behaviors, like recycling and waste minimization, must be presented in a culturally and emotionally appropriate context. Behavior change and waste prevention policy must be designed with convenience in mind, supported the requirements of today's households for time and space. This has been proven to encourage householders who are consumers of horticultural processed products to interact in waste management practices, as long as such a scheme is well publicized.

More emphasis to be put in establishing sorting centers amongst Horticultural processing MSMEs as platforms for resource recovery while minimizing amounts of solid wastes finding their way into disposal sites.

Despite the presence of legislative and institutional frameworks governing both solid and liquid waste management, thereby is so much wastes as a result of indiscriminate littering and illegal dumping, thus illustrating lack of coordination and enforcement of various laws amongst the 47 Counties in Kenya (Njoroge *et al.*, 2015). The study explicates the intricacies between Knowledge, attitude, and practices of the horticultural processing MSMEs before and after training on waste management aspects towards a paradigm shift in their mindsets and adopting Sustainable consumption and production practices (SCP).

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