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Efficacy of Knowledge, Attitude and Practices of Households towards Municipal Solid Waste Management in Karachi

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ABSTRACT

Objective: Objectives of the present study are to assess the Efficacy of knowledge, attitude and practices of households on municipal solid waste management and to find out the environmental factors associated with health due to solid waste management which influence to health and major existing problems due to poor solid waste management system in Karachi.

Methodology: In order to assess the Efficacy of knowledge, attitude and practices of households on municipal solid waste management in Karachi, present study randomly recruited 180 respondents from the five towns of two districts of Karachi. A house hold survey was conducted and 36 households were recruited from each town through stratified random sampling technique. Well-structured questionnaire was used for the data collection by using likert scale. SPSS version 22 was used for data analysis.

Results: The results of the present supports that some existing practices of household, unavailability of municipal containers, unavailability of solid waste collection services, less utilization of containers and insufficient knowledge of about recycling or reuse of solid waste are responsible for adverse condition of solid waste management system in Karachi.

Suggestion: Present study suggests that more consolidated strategy for solid waste management needs to be designed and implemented which streamlines the process of waste collection and disposal. Municipalities should also invest in recycling plant, so that all the recyclable material could be collected and processed at one place. Households must be educated and should be given right information of dumping the solid waste. Solid waste management laws should be implemented and citizen should be aware about the penalties.

Keywords: Knowledge, Attitude, Practices, Household, MSWM

1. Introduction

Solid waste management is one of the burning issues of the urban cities of the world. The phenomenon of solid waste management is concerned with living standards, urbanization and consumption patterns of the people (Zurbrugg, 2003). Solid waste is known as the solid waste

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material which has no importance for the particular person who is generating it (World Bank, 2008). The term municipal solid waste management refers to the waste of residential and commercial areas including bio medical wastes.

Pakistan is a developing country and according to the findings of Cox, (2014, pp.3-4) that Karachi is the most populous city and urban center of the Pakistan and it is also ranked 2nd populous Muslim city of the world. Karachi being the most populated city of Pakistan is also considered the backbone of Pakistan's economy with a population of 24 million which is almost 11% of the total population of Pakistan. The population of Karachi is increasing rapidly with twice of national growth rate (Abbas, et al., 2018, pp.79). Paracha, (2014, pp.5-6) stated in his studies that An increasing trends of urbanization, infrastructural development and life style changes has changed the rate of generation and decomposition of solid waste management. It demands extra care and planning which is unfortunately missing out rightly.

The Karachi city now a day is fully loaded with a lot of problems and issues. In which sewerage and solid waste management problem is the most serious problem of the day. Since 1970's it's an increasing trend of urbanization in Karachi city and people start migrating from rural areas to urban areas for the sake of better health services, educational institutions and employment opportunities (Sharif & Raza, 2016, pp.5-6). Geographic location of Karachi has made this city an economic hub of this country. There is an alarming situation that everyday 12000 tons of solid are being generated in the city of Karachi and it has been increasing with every passing day. Everyday 12000 tons of solid waste is being generated in the Karachi city and it has been increasing with every passing day.

According to the findings of one study revealed that 60% of the solid waste of Karachi city is being disposed off in landfills and rest of the 40% of the solid waste remains in the streets (Shahid, et al., 2014, pp.1521-1522). Karachi is divided in 6 districts and it is being administrated and governed by the city government to look after the matter of this city and further it is splitted into 18 sub districts and furthermore every sub district is divided into 178 union councils. It's the prime responsibility of each union council to manage the solid waste system in their respective areas. The Karachi Metropolitan Corporation (KMC) and District Municipal Corporation (DMC) are the two cantonment boards which are working under the City District Government Karachi (CDGK) which look after the management system of solid waste in the city.

In last two decades Karachi is facing terrible situation of solid waste, law and order situation, crimes and terrorism. As in past few years provincial and federal Government main focus was to knock down the terrorism and crime and to control the law and order situation of the city, So that's why across of the city including elite enclave of urban area garbage is piling out everywhere. The situation of emergent areas of Karachi regarding solid waste is totally unaffordable and below the life standards and much dangerous to living situation. Handling the problem of solid waste management is the burning problem of any developing country. Abas & Wee, (2014, pp.3-4) explored in his study that it is a great challenge for any developing city to manage the menace of

solid waste. There is as such no proper estimate that how much solid waste is available in cities but a rough guess by urban planner is that it might be in thousands ton from which mostly dumps in alleyways and road which takes months to remove by local government for proper dispose off (Marshall & Farahbakhs, 2013, pp.992-993). The local government almost fails to remove maximum solid waste, so from many decades citizen make a practice to burn garbage which entirely chocked the whole locality and also a main cause to produce diseases.

Expert says that mitigation measure taken by state and state-sponsored are vain and have no long lasting effects. State does not operate properly in solid waste management due to many reasons and does not have a tangible plan for solid waste management. For example; it is not clear when garbage will be lifted and where it has to be disposed off and what will be next plan to make it effective. Proper dispose off garbage is not only make a city neat, clean and green but it can be also useful to generate energy, creation of compost from organic waste as well recycling of material in a holistic manner which can also increase the state revenue . Solid waste is also an income source for the poor people because it is also sold out like other materials too (Rehman, 2013, pp.34). If there is need to make proper model cities, then it is much needed that state and elected members have to run campaign to sensitize citizen for proper dispose off solid waste.

1.1 Objectives:

The objectives of present study are as following.

1. To find out the respondents demographic and socio economic characteristics of study area
2. To examine the existing knowledge of households towards municipal solid waste management
3. To examine the attitude of households towards municipal solid waste management
4. To examine the existing practices of households towards municipal solid waste management
5. To find out the environmental factors associated with health issues

1.2 Hypothesis:

Hypothesis of the present study are as following.

H1: Households attitude towards SWM is positively affected by efficacy of Knowledge

H2: There is a significant relationship between environmental factors related to health & major problems in area because of poor SWM

1. Literature Review:

According to the definition of World Bank, (2008) solid waste is known as the solid waste material that has no importance for the particular person who is generating it. It is estimated that Karachi total population is almost 24 million The city of Karachi generates more than 12,000 tons of solid waste every day, which has been increasing over time. Rehman, (2013, pp.33-34) stated in his study that Pakistan environmental protection act was passed in 1997 for the environmental, wildlife protection and conservation of renewable sources. Federal government also introduced the national sanitation policies in 2006 (Ministry of Environment, 2006; Al-Maaded, et al., 2012, pp.188). The basic objective of these policies was to focus on recycling, reduction, and reuse. These policies are outlined for the efficient system of solid waste management for the appropriate disposal of this heap of dumps properly.

Municipal authorities are responsible for the proper disposal of household waste, chemical waste and industrial waste properly. In this regard in 1990 an Integrated Sustainable Waste Management (ISWM) model was developed for the betterment of urban areas (Guerrero, Maas, & Hogland, 2013, pp.224). The majority almost 88 percent of citizen believe that a solid waste is a biggest problem of city which can be mobilize for positive change but many of them is needed from government organization or so-called local municipal to manage the city waste issue. Zurbrugg, (2003) stated in his studies that Solid waste management is a great challenge for the urban cities of the world. Solid waste is directly concerned with the urbanization. Open sewerage system is another issue which is found everywhere and open water found standing on the roads especially in the streets of Karachi which creates hurdles and problems for the citizens.

Another factor burning of this solid waste management smoke becomes the reason of air pollution (Ejaz & Janjua, 2012, pp.168-169). The waste change is diversified due to dramatic change in consumer behavior and lifestyle as well production process. Improper solid waste management is a key factor of these crises in Karachi city which not only make a cause of viral and bacterial disease but also produce new diseases. Open dumping of solid waste in Karachi is one of the biggest factors creating environmental and health problems for the citizen. Healthcare and growing diverse methods of treatment produce hazards medical waste, while induction of modern lifestyle with electronics products has given a rise to electronics waste with hazards substances. Rubber, plastic paper and biological waste is a common waste of industries (Muller, Mendelsohn, & Nordhaus, 2011, pp.1652-1653). The collection and transportation management system of the solid waste is also unhygienic. It is the responsibility of municipal authorities to manage this solid waste properly. Open dumping of this solid waste of household waste, offices, factories, hospitals and industrial waste pollute the environment , ultimately which becomes the cause of several diseases for the citizen.

Open trucks which collect the solid waste from the different areas of Karachi that is also an unhygienic practice while transporting it from one place to dumping yards or landfill areas. In

order to address the prevailing issue it is the dire need of the time to make long term policies and plan to combat this menace of solid waste from Karachi (Sabir et al., 2016, pp.157-158). Recycling is always tough job which needs a proper organized management, in this process street-picker, collector of waste, recycling plants, recycling goods buyers are involved in a systematic manner (Jilani, 2007, pp.273-274). Rubber, wood raw material, medical waste, glass, metal, used cans are main items are used in recycling process which estimated generate livelihoods 65,000 households. It is the primary responsibility of government to provide a clean and healthy environment to its citizen. The purpose of present study is to identify the flaws which are creating hurdles for the proper solid waste management system in Karachi and it will also be the helpful for the policy makers to make the effective policies and procedure to combat this menace of solid waste management system effectively. The effective implementation of the solid waste management system in Karachi will not only prevent the citizen from hazardous environmental effects but it will also be much helpful to combat the menace of solid waste issue from the streets of Karachi.

3. Methodology:

Present study has designed to assess the Efficacy of knowledge, attitude and practices of households on municipal solid waste management in Karachi. Population of the present study were residing people in district central and district south of Karachi. District south is consist of one town namely Saddar town and district central is consist of four towns namely; North Nazimabad Town, Liaquatabad Town, New Karachi Town and Gulberg Town. To assess the knowledge, attitude and practices of household about solid waste management system in the study area, a total of 180 sample size was recruited for the data collection from the five towns of two districts of Karachi. A household survey was conducted and 36 households were recruited from each town through stratified random sampling technique. Similar sampling technique was adopted by the Warunasinghe & Priyathna, (2016) in his study. Well-structured questionnaire was used for the data collection by using likert scale. SPSS version 22 was used for data analysis. After data analysis, it is presented in the shape of appropriate charts and graph.

4. Data Analysis:

Table 4.1: Descriptive Statistics

Variable	Mean	Std. Deviation	Skewness	Kurtosis
Knowledge	5.5538	.49024	.782	.758
Attitude	5..4507	.52999	.358	1.029
Practices	5.2097	.52927	.138	1.286

Results of the above mentioned table 4.1 computes the construct of knowledge, attitude and practices of household regarding SWM. Results of the table indicate that all variable have positive value of kurtosis and the variable practices of household have a highest value of kurtosis which is 1.286. The values of all variable are in the range of $^{+}$ 3.5, so it can be assured that data has a normal tendency.In the table further results shows that variable knowledge of household has a highest skewness value which is .782 whereas the variable practices of household has a lowest skewness value which is .138.

Table 4.2: Reliability of construct

Variable	Cronbach's Alpha	Mean	Std. Deviation
Knowledge	0.61	5.5538	.49024
Attitude	0.83	5.4507	.52999
Practices	0.72	5.2097	.52927

Cronbach's Alpha shows the reliability of data or questionnaire and for the reliable data the value of alpha should be equal to or more than 0.6 is acceptable. In present study Cronbach's Alpha value for six items of knowledge of household regarding SWM is 0.61, the value of six items of variable Attitude of household regarding SWM is 0.83 and the value of six items of variable Practices of household regarding SWM is 0.72, which shows that data is reliable and suitable for use in this research.

Table 4.3: Respondent's demographic and socioeconomic characteristics

Variable	Frequency	Percentage	Variable	Frequency	Percentage
Gender			**Family Type**		
Male	102	56.7	Nuclear	82	65.6
Female	78	43.3	Joint	71	39.4
Age Group			Extended	27	15.0
20-24 Years	50	27.8	**Job Status**		
25-29 Years	89	49.4			
30-34 Years	37	20.6			
35-39 Years	4	2.2			
40 & Above Years	0	0	0-19 Thousand	2	1.1
Family Members			20-39 Thousand	24	13.3
<3 Members	2	1.1	40-59 Thousand	106	58.9
4-6 Members	97	53.9	60-79 Thousand	42	23.3
7-9 Members	78	43.3	80 & Above Thousand	6	3.3
10 & Above Members	3	1.7			

Above mentioned table 4.3 indicates that during the house hold survey majority of the respondents 56.7% were male followed by 43.3% female were recruited for the present study and the majority of the respondent's age was 25-29 years 49.4% followed by 20-24 years 27.8%, 30-34 years 20.6% and 35-39 years 2.2% and further results of the present study highlights that significant respondents almost fifty four (53.9%) family size was consist on 4-6 members, followed by 7-9 members 43.3%, less than 3 members 1.1% and 10 & above family members ratio was 1.7.

Results of the Present study identify that significant 65.6% of the respondents during the house hold survey they belong from nuclear families followed by joint family structure 39.4% and extended family structure 15% and majority of the house hold 58.9% monthly income was 40-59 thousand PKR followed by 23.3% respondents income is 60-79 thousand PKR, 13.3% income is between 20-39 thousand PKR, 3.3% respondents are those whose house hold monthly income is more than 80 thousand PKR and remaining 1.1% of the respondents house hold monthly income was less than 19 thousand PKR.

Table 4.4: Knowledge of household regarding MSWM

Variable	Frequency	Percentage	Variable	Frequency	Percentage
Major problems in area because of poor SWM			**Access to solid waste primary or secondary collection service**		
Bad Smell	75	41.7	Not At All	66	36.7
Dirty Environment	48	26.7	A Little	39	21.7
Mosquito Abundance	32	17.8	Moderately	65	36.1
Cause Fly Menace	8	4.4	Mostly	10	5.6
Blockage Of Gutters	9	5.0	**Prevalence Of Solid Waste In Your Area**		
Pollute Water Sources	8	4.5	Very Prevelant	155	86.1
Bad Smell	75	41.7	Not Prevelant	14	7.8
			Indifferent	11	6.1
Knowledge Of Recycle Or Reuse Of Solid Waste			**Availability Of Municipal Containers**		
No	167	92.7	Not At All	72	40.0
Yes	13	7.3	A Little	48	26.7
			Moderately	56	31.1
			Mostly	4	2.2

Results of the table 4.4 shows that regarding prevalence of solid waste in the respective residential area. Majority of the respondents revealed that solid waste was very prevalent 86.1%, followed by not prevalent 7.7% and indifferent 6.1%. Further the variable major problem in study areas because of poor solid waste management, Statistics of the table shows that majority of the respondents 41% revealed that bad smell is the major prevalent problem in areas due to poor SWM followed by dirty environment 26.7%, mosquito abundance 17.8%, cause of fly menace 4.4%,

blockage of gutter 5% and remaining 4.5% of the respondents stated that polluted water resource is major issue due to poor SWM. Results of the study Trihadiningrum et al., (2015, pp.7-8) support regarding access to SW primary or secondary collective services provided in the area results shows that 36.7% of the respondents revealed that there is as such no access to solid waste primary or secondary collective services provided in the area.

Furthermore, Majority of the respondents 40% described that municipal containers are not available in the area followed by moderately 31.1%, a little 26.7% and remaining 2.2% are mostly satisfy with the availability of municipal containers in the area. The respondent's knowledge of recycle or reuse of solid waste in the study area significant 92.7% of the respondents said they don't have knowledge of recycle or reuse of solid waste in the house where as only 7.3% of the respondents said they have knowledge of the respondents of recycling and reuse of solid waste. Researcher asked from those respondents who have knowledge of recycling of solid waste either they recycle or reuse the solid waste in the house but all of those 7.3% respondents said they don't recycle or reuse solid waste.

Table 4.5: Attitude of household regarding MSWM

Variable	Frequency	Percentage	Variable	Frequency	Percentage
Willingness to pay for solid waste collection and disposal waste			**Importance of spending money in solid Waste collection for family's health**		
Not At All	3	1.7	Not At All	3	1.7
A Little	8	4.4	A Little	3	1.7
Moderately	47	26.1	Moderately	27	15.0
Mostly	100	55.6	Mostly	78	43.3
Completely	22	12.2	Completely	69	38.3
Type of solid waste generated in the house			**Private solid waste collector association contributed for proper waste management**		
Ash	1	.6	Not At All	47	26.1
Sweeping	117	65.0	A Little	65	36.1
Paper	3	1.7	Moderately	68	37.8
Food Leftover	40	22.2			
Metal	6	3.3			
Plastic/Bottles	13	7.2			

Results of above mentioned table 4.5 about willingness of household to pay for solid waste collection and disposal waste in the area. Majority of the respondents 55.6% said that they are mostly willing to pay for solid waste collection and disposal waste in the area followed by moderately willing 26.1% , completely willing 26.1%, a little 4.4% and remaining 1.7% are not willing to pay for solid waste collection and disposal waste in the area.

Furthermore, perception of the respondents the importance of spending money for solid waste collection for the family health. Majority of the respondents 43.3% said that they mostly consider that it is very much important to spend money for solid waste collection for the better health of the family followed by moderately 15%, completely 38.3%, a little 1.7% and remaining 1.7% consider that it is not as such important to spend money for solid waste collection for the better health of the family.

Results of the respondents regarding contribution of private solid waste collector association for proper waste management in the area. Majority of the respondents 26.1% said they do not believe that private solid waste collector association contributed for proper waste management in the area followed by moderately response 37.8% and remaining 36.1% of the respondents believe a little that private solid waste collector association contributed for proper waste management in the area.

Further the results regarding type of solid waste generated in the house, Majority of the respondents 65% stated that sweeping is solid waste mostly generated in the house followed by 22.2% responded as food left over, plastic material & bottles 7.2%, metal 3.3% and ash .6%

Table4.6: Practices of household regarding MSWM

Variable	Frequency	%age	Variable	Frequency	%age
Collection of solid waste outside the house			**How solid waste is dispose off outside the house**		
Dumping Outside	33	18.3	Metal Bin	41	22.8
Door To Door	16	8.9	Plastic Bin	77	42.8
Block Collection	35	19.4	Plastic Bag	56	31.1
Backyard	56	31.1	Other	6	3.3
Municipal Container	35	19.4	**Where solid waste is dispose-off outside the house**		
Other	5	2.8	Open Dump Outside The Yard Municipal Container	50	27.8
What type of material is used to store solid waste in the house				43	23.9
			Open Spaces Such As Open Ditch, River, Roadside	56	31.1
Metal Bin	28	15.6	Open Burning	10	5.6
Plastic Bin	105	58.3	Other	21	11.7
Plastic Bag	27	15.0			
Other	20	11.1			

Results of the above mentioned table 4.6 shows the perception of the respondents regarding where solid waste is collected outside their houses. Majority of the respondents 31.1% response was backyard followed by 19.4% block collection, dumping outside 18.3%, municipal container 19.3%,

door to door collection 8.9% and remaining 2.8% of the respondent's response was any other method of collection of solid waste outside the house.

Furthermore, the results regarding variable that where solid waste is collected outside their houses. Majority of the respondents 31.1% response was backyard followed by 19.4% block collection, dumping outside 18.3%, municipal container 19.3%, door to door collection 8.9% and remaining 2.8% of the respondent's response was any other method of collection of solid waste outside the house.

Majority of the respondents 58.3% said that they use plastic bin to store the solid waste in the house followed by plastic bag 15%, metal bin 15.6% and remaining 11.1% use other material to store the solid waste material in the house. Further, the finding of the study reveal that Majority of the respondents 42.8% said that they use plastic bin to dispose off the solid waste outside the house followed by plastic bag 31.1%, metal bin 22.8% and remaining 3.3% use other material to dispose off the solid waste material outside the house. This study offers results that support work previously performed by other researchers (Sabir et al., 2016, pp.157-158).

Results of the table also compute the variable about where respondents dispose off the solid waste outside the house. Majority of the respondents 31.1% said they dispose off solid off in open spaces such as open ditch yard/road side followed by open dump outside yard 27.8%, municipal container 23.9%, open burning 5.6% and remaining 11.7% of the respondents response was any other. The researcher during study take the opinion of the respondents that if they dispose off solid waste on open fields then what is the main reason of this practice. Majority of the respondents stated that no municipal services are available in the area.

Table 4.7: Regression Table (H1)

Variable	Un St. Co ---------- Beta	St Error	St. Co ---------- Beta	T	SIG
KNOWLEDGE	.660	.063	.610	10.445	.000

Dependent variable: *Attitude,* ***Independent variable:*** *Efficacy of Knowledge*
R2: 0.369, Adjusted R2: 0.421, P<0.01

In above mentioned table 4.7 hypotheses were tested through regression model. Results of the Table found that cause and effect of independent variable on dependent variable value of R square is 0.369, which indicates the 36.9% variation on dependent variable attitude of household on SWM due to change in independent variable efficacy of knowledge variance effect Beta value which is 0.660 indicates that knowledge of household regarding SWM has a positive effect on household attitude

Table 4.8: Cross tabulation between environmental factors related to health & major problems in area because of poor SWM (H2)

	Major problems in area because of poor solid waste management situation							
vironmental factors related to health	Bad Smell	Dirty Environment	Mosquito Abundance	Cause Fly Menace	Blockage Of Gutters	Pollute Water Sources	Not Good For Eyes	Total
Solid & Liquid Waste Disposal	47	6	2	0	1	2	0	58
Water & Supply Safety Measure	18	22	6	3	2	1	0	52
Food Hygiene	5	8	19	1	1	0	1	35
Clean Home	2	7	3	3	0	0	0	15
Personal Hygiene	3	1	1	0	4	0	2	11
Rodent Insect Control	0	4	1	1	1	2	0	9
Total	75	48	32	8	9	5	3	180

X^2: 157.849[a]; DF: 30; Sig Level: 0.000; R: .684;

Results of the above mentioned table 4.8 highlights relationship between environmental factors related to health & major problems in area because of poor SWM. For the existing hypotheses, Chi-Square test is applied. Results show that chi square value 157.849[a] which is greater than the DF value which is 30. That's why the value of P which is 0.000 shows highly significance results. Therefore the alternate existing hypothesis entitled "There is a significant relationship between environmental factors related to health & major problems in area because of poor SWM" is highly significant at 0.000 value. Therefore the value of co-efficient correlation .684 also shows a strong relationship between these two variables.

5. Discussion and Conclusion

Waste disposal and treatment is a linked exercise, from garbage generation to disposal, and must be addressed in a systematic way. An increasing trend of urbanization, infrastructural development and life style changes has changed the rate of generation and decomposition of solid waste management. Geographic location of Karachi has made this city an economic hub of this country. Everyday 12000 tons of solid waste is being generated in the city of Karachi and it has been increasing with every passing day. The main objective of this study was to assess the Efficacy

of knowledge, attitude and practices of households on municipal solid waste management, health factors related to health and major existing problems due to poor solid waste management system in Karachi.

Findings of the present study explored that attitude and practices of household can play a significant role for the proper and successful alleviation of solid waste. The results support some existing practices of household, unavailability of municipal containers, unavailability of solid waste collection services, less utilization of containers and insufficient knowledge of about recycling or reuse of solid waste are responsible for adverse condition of solid waste management system in Karachi. The results of the study revealed that illegal dumping is one of the largest faced by society. In every DMC there is a lack of dumping sites which encourage illegal dumping habits among residents. The collection and transportation management system of the solid waste is also unhygienic in Karachi. Findings of the present study concluded that Karachi is facing different health and environmental problems due to poor solid waste management. Open dumping of this solid waste of household waste, offices, factories, hospitals and industrial waste pollute the environment , ultimately which becomes the cause of several diseases for the citizen.

5.1 Study Suggestion:

In order to address the prevailing issue it is the dire need of the time to make long term policies and plan to combat this menace of solid waste from Karachi. Some SWM steps must be launched without delay. Present study suggests that:

- More consolidated strategy for solid waste management needs to be designed and implemented which streamlines the process of waste collection and disposal.
- The Sindh administration must evolve a working relationship with KMC, take stock of the situation, set priorities and devise a monitoring mechanism.
- Municipalities should also invest in recycling plant, so that all the recyclable material could be collected and processed at one place
- Society must be educated and should be given right information of dumping the solid waste.
- Solid waste management laws should be implemented and citizen should be aware about the penalties
- Public-private partnership options can be explored for specialised domains such as hospital waste management. Such attempts must essentially involve local private entrepreneurs in a bid for capacity building

Reference

Abas, M. A., & Wee, S. T. (2014). The issues of policy implementation on solid waste management in Malaysia. Issues, 2(3), 1–7.

Abbas, A., Fatima, K., Mahmood, S. & Imran, M. (2018). Impacts of Internet Usage on Youth Behavior: A Case Study of University Students in Karachi. *Conference Proceeding (4th MDSRIC-273),* 4(2018), 74-84

Al-Maaded, M., Madi, N., Kahraman, R., Hodzic, A., & Ozerkan, N. (2012). An overview of solid waste management and plastic recycling in Qatar. *Journal of Polymers and the Environment*, 20(1), 186–194.

Cox, W. (2014). Largest World Cities. Retrieved from http://www.newgeography.com/ content/004280-largest-world-cities-2014

Ejaz, N., & Janjua, N. S. (2012). Solid waste management issues in small towns of devel- oping world: A case study of Taxila City. *International Journal of Environmental Science and Development*, 3(2), 167–171.

Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management*, 33(1), 220–232.

Henry, R. K., Yongsheng, Z., & Jun, D. (2006). Municipal solid waste management challenges in developing countries: Kenyan case study. *Waste Management*, 26(1), 92–100.

Jilani, S. (2007). Municipal solid waste composting and its assessment for reuse in plant production. *Pakistan Journal of Botany*, 39(1), 271–277.

Marshall, R. E., & Farahbakhsh, K. (2013). Systems approaches to integrated solid waste management in developing countries. *Waste Management*, 33(4), 988–1003

Ministry of Environment. (2006). *National Sanitation Policy 2006* [Government of the Islamic Republic of Pakistan].

Muller, N. Z., Mendelsohn, R., & Nordhaus, W. (2011). Environmental accounting for pollution in the United States economy. *The American Economic Review*, 101(5), 1649–1675.

Paracha, N. (2014). Visual Karachi: From Paris of Asia, To City of Lights, To Hell on Earth. Retrieved from http://www.dawn.com/news/1134284

Rahman, M. A. (2013). Revisiting solid waste management (SWM): A case study of Pakistan. *International Journal of Scientific Footprints*, 1(1), 33–42.

Shahid, M., Nergis, Y., et al. (2014). Environmental impact of municipal solid waste in Karachi city. *World Applied Sciences Journal*, 29(12), 1516–1526.

Sharif, A., & Raza, S. A. (2016). Dynamic relationship between urbanization, energy consumption and environmental degradation in Pakistan: Evidence from structure break testing. *Journal of Management Sciences*, 3(1), 01–21.

Sabir, W., Waheed, S. N., Afzal, A., Umer, S. M., & Rehman, S. (2016). A study of solid waste management in Karachi city. *Journal of Education & Social Sciences*, 4(2), 151-163. http://doi.org/10.20547/jess0421604205

Trihadiningrum, Y., Laksono, I. J., Dhokhikah, Y., Moesriati, A., Radita, D. R., & Sunaryo, S. (2015). Community activities in residential solid waste reduction in Tenggilis Mejoyo District, Surabaya City, *Indonesia. Journal of Material Cycles and Waste Management*, 1(1), 1–10.

Warunasinghe,W.A.A.I., & Yapa, P. (2016). A survey on household solid waste management with a special reference to a peri-urban area (kottawa) in Colombo. *Procedia food sciences*, 6(2016),257-260. https://doi.org/10.1016/j.profo.2016.02.038.

Yoo, K.-Y., & Yi, S. (2015). Evaluation and development of solid waste management plan: A case of Seoul for past and future 10 years. *Journal of Material Cycles and Waste Management*, 17(4), 673–689

Zurbrugg., (2003). Solid waste management in developing countries. Retrieved from: http://bscw.ihe/nl/pub/bscw,cgi/S48ab2699/d1354352/basic_of_SWM.PDF