

PUBLIC AWARENESS AND WILLINGNESS FOR RECYCLE IN JORDAN

Mohammad Aljaradin^{1*}, Kenneth M Persson¹, I. Al-Itawi Hossam²

¹Department of Water Resources, Lund University (SWEEDEN)

²Department of Natural and Chemical Resources, Tafila Technical University (JORDAN)

*Corresponding author: Mohammad.Aljarain@tvrl.lth.se

ABSTRACT

Jordan has seen a large increase in population during the past five decades as a result of population growth and forced migrations, and also, accompanied with this increase, a cultural and economical development that has improved the standard of living and changing consumer habits in the community, resulting in a clear increase in the volume of waste. These changes urges the need for finding proper ways of making the living conditions for the people of Jordan more sustainable, recycling has been adopted as an important way to reduce waste and ease the use of landfills in many countries of the world. The residential area is a good place to start and practice recycling as a substantial part of all waste is generated there every day. This paper (MSW) among residential, with specific focus on university students. A total of 1000 residents were surveyed using 3 types of questionnaires designed to pattern their views on recycling of MSW and to test their willing for recycling, but also to examine their knowledge and awareness of recycling benefits on a social, economical and environmental basis. In total 28 questions have been asked in a computer based survey to the students. The result clear that the recycling knowledge between respondent is very low. However, they hold a positive attitude toward the willing for learning more. Respondent also aware of the environmental and economical benefits from recycling, whereas they have negative attitude toward walking more distance and for paying more for better recycling

Keywords: Jordan; recycling; awareness; willingness, economic and environmental benefits.

1. INTRODUCTION

The excessive solid waste production is growing problem in Jordan so the search for effective solution became a priority for the governments, at present most of countries all over the world following the most environmental friendly approach to combat the challenges and problems associated with MSW by the adoption of the integrated waste management: reduction, reuse and recycling (Troschinetz and Mihelcic 2009), recycling of waste materials in developing countries is growing and is driven by economic necessity associated with poverty (Haque, Mujtaba et al. 2000; V. Femia 2009).

Recycling is generally accepted as for implementing municipal waste management strategy, recycling reduces the total amount of waste that is disposed of, and conserves natural resources (Shekdar 2009).

Table 1. The Physical Composition of MSW (Daradki 2008)

Compositio	%
Kitchen	62.64
Paper	11.15
Ceramics	0.28
Garden	0.41
Plastics	16.45
Glass	2.06
Fabrics	4.32
Metals	2.06
Others	0.63

Table (1) represent the physical composition and typical percentage distribution of MSW in Jordan, it can be noticed that the major fraction of composition is food and paper waste (organics which implies a high value of moisture content), as expected, since Jordan is a developing country, and food is the major component of the solid waste stream generated in developing countries (Mrayyan and Hamdi 2006). Also one can notice that 80% of the total municipal solid wastes are decomposable and recyclable, and the remainder is inert matter. In general terms, MSW in Jordan is characterized by a high organic content, with combustible matter (consisting of plastic, paper and kitchen garbage) comprising some 90% of the total waste (METAP 2004).

The total estimated daily generation of municipal solid waste in Jordan is about 3800 tons/day (Daradki 2008), disposed at 20 sites (Alfayez 2008). The northern region contributes about 780 tons/day, the middle region totals about 2620 tons/day, and the southern region contributes about 400 tons/day, the generation rate of solid

waste in Jordan is 0.9 kg/capita/day (Manoj Chopra 2001; Daradki 2008; METAP 2008). It varies, however, in cities and rural areas. The generation rate may be as high as 1.0kg/capita /day in big cities, where in towns and rural areas it might be as low as 0.6kg/capita/day (Manoj Chopra 2001; METAP 2004; H. Abu Qdais 2009).

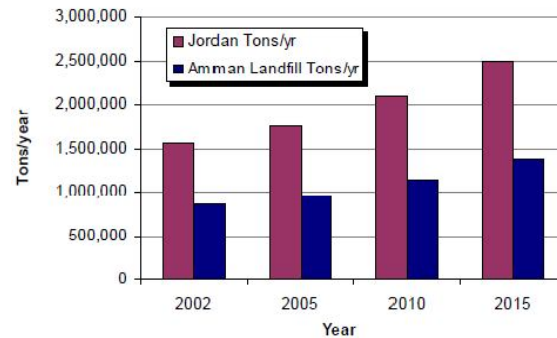


Fig. 1. Projected waste generation 2010-2015^(METAP 2004)

In Figure 1, the projected waste generation in Jordan is presented, we can see the actual amount of solid waste generate over the last ten years, and the projected amount of MSW for the next five years. The MSW has increased steadily, which mainly can be attributed to the increase of population, the change of living standard and by an increase of the waste collection with time. The amount of MSW collected in Amman city is reported to be as high as 90% in 2008 (Nobani 2008).

There are many recycling initiatives going on for various components of the solid waste stream at different stages of the waste management process in Jordan these initiatives is under taken by informal sector. However this process is not well managed.

The informal waste recycling systems that already exist in some part of the country reduce the cost of formal waste management systems as they reduce the quantity of waste for collection, resulting in less money and time spent on collection and transport (Wilson, Velis et al. 2006).

Despite the health and social problems associated with informal recycling, it provides significant economic benefits that need to be retained.

Some of the recycling activated is carried out before the solid waste reaches the final disposal sites for the separation of recyclable materials, paper, metals and plastics; however, much is done at the disposal sites by scavengers.

Big landfills in Jordan is rented to private sector, Alakidr landfill is rented with 60000 JD /year, Alhsinyat 40000 JD/ year, and Alhmra landfill with 20000 JD/ year (Daradki 2008; METAP 2008). The waste recycling process depends mainly on the prices of the sorted materials as shown in table 2.

Table 2. The prices of some sorted materials

(JD/Ton)	Price	Recycle materials
	300	plastic
	200	Colorful fabrics
	350	A white cloth
	250	Iron
	110	Aluminum
	65	Cardboard

Organic waste separated from vegetable market, Amman Municipality slaughterhouse and food waste separated from selected restaurants is transported to the biogas plant located near russaifa landfill to be treated an aerobically in a reactor to generate biogas and electricity (Alfayez 2008).

on the other hand some formal initiatives, alzarqa municipality had implement a pilot recycling project to test the technical and economic feasibility of full scale recycling project, the project selected 25 school in alzarqa where the municipality provided all the needed containers beside material recovery facility have been built. However, the project has been discontinued due to high costs (METAP 2008).

A successful recycling program requires the general public to participate in sorting and recycling. Nowadays the government represented by municipalities doesn't provide the appropriate location and equipments for recycling, this situation is not encouraging house hold and public to participate successfully.

To stand at the actual situation and the obstacles which stand against developing this sector series of studies should be conducted.

In our research survey was conducted to examine the level of willingness and awareness of recycling of Municipal Solid Waste between house hold and university students.

The research will answer many questions which hopefully will provide a good toll for the dissection makers for encouraging recycling in recent future.

2. METHODOLOGY

Samples and data was collected by a survey conducted in march 2010 at Tafila Technical University and Surrounding area, A total of 1000 student were randomly surveyed using 3 types of questionnaires, In total 28 questions have been asked in a computer based survey to the students in Arabic language and by personal interviewers by students for household living nearby the university, these questions were measured by a 7-point Likert type scale (1. Strongly Disagree, 2. Disagree, 3. Slightly Agree, 4. Agree, 5. Strongly Agree. 6. Have no opinion. 7. Do not know) this method was used by (Vining and Ebreo 1992; Huang, Zhang et al. 2006; Vicente and Reis 2007; V. Femia 2009) .

The first section was on demographics with question about age, gender, education level and occupation, second section intends to measure the awareness's between student and house hold about recycling (practices, benefits, responsibilities) also testing the availability of the needed facilities for recycling, and the third section intend to study the welling for recycling in home, university, and the willingness for attending and participating in recycling programs.

3. RESULT AND DISCUSSION

Table 3. The demographic composition of the survey

Sex	N (Number)	%
Male	489	50.5
Female	480	49.5
Age		
8-24 Years	871	89.9
Above 24 Years	98	10.1

3.1. Knowledge for Recycling

One of the questions in the survey was designed to test the knowledge for recycling on a scale of zero to ten; 77.3% from of the respondents choose less than five, this low rating could be attributed to the fact that 64.2% did not have learned a lot from school, university and municipality for recycling activities, the raising awareness on recycling between residence is very low and insufficient this was clear where 71.7% from the respondents doesn't know which waste materials can be recycled.

Answering a question if the solid waste in general is being handled properly by the university/municipality; 65.8% disagree and 22.6% agree with 11.6% have no opinion. 71.8% of the respondent's don't think that the municipality/university provides the necessary equipment for recycling.

3.2. The Willing for Recycling

Answering if you would contribute to separate recyclable from non-recyclable waste; 63.3% Disagree, this could be related to the fact that 52.2% think that recycling is not their own responsibility where 73% think it is the responsibility of the municipality and 40.1% think it is the producer of the good responsibility also answering a question if I would recycle more if I learned more on what extent the country benefits economically; 75.6% agreed and for the environmental benefits 69.5% agreed, also in general 83.7% agreed that the recycling of solid waste is important for the country.

On the other hand answering a question about the willing for participating and attending program for recycling awareness only 18.6% agrees to participate and 22% agree to attend.

Also answering if I would walk 20, 200, 1000 meter for recycling, 53%, 42%, and 27% agreed respectively beside 55% declared that they cannot pay extra for better recycling service. The responsibility for recycling has positive correlation to the age where 73% of the people above 21 years feel it is their own responsibility where 69% of them are females.

4. CONCLUSION

The Majority of the respondent doesn't know sufficiently on how or where to recycle, this is due to the fact that efforts for effective recycling programs in the country is not started yet, and it seems that the awareness program which offered is not sufficient and needed to be more efficient.

From the survey it is apparent that waste separation at point of generation is not easy to accomplish in Jordan in this time due to several reasons, Lack of awareness among the public regarding recycling (practices, benefits, responsibilities) and the unwillingness among the majority of people to cooperate in waste separation.

87% of the residence aware of the economical and environmental benefits to the country from recycling, but their willing to participate and paying for more effective recycling is very low.

Also one of the findings from this study that the people learned more of recycling from the school 27.3%, university 20.3% and 17.3% from municipalities, however this is low but could be good indication where to start, majority agreed that they will recycle more if they learned more.

According to the survey the recycling is not developing where 74.8% says that they haven't increased the amount of recycling compared to the previous year.

In the other hand 70% of the respondent strongly agreed that they would like the university or municipality or the government to set up proper handling and recycling program.

In this study the females feel more responsible for recycling more than men, but their knowledge for recycling appears less than them.

Finally, you cannot expect people to do recycling in their school, university home and work, if you did not provide them with the basic facilities needed and without teaching them how to recycle. Many agreed that awareness program should be started to learn them about recycling benefits and to teach them how to recycle.

Somehow the government in some point could need to enforce the source separation at generation point.

REFERENCES

1. Alfayez, E. K. (2008). Solid Waste Management in Jordan: Present Situation and Future Challenges. Middle East Recycling, Waste & Environmental Management Exhibition & Congress, Kempinski Hotel, Dead Sea - Jordan.
2. Daradki, G. A. (2008). The Jordanian experience in the management of solid waste, Corporation for Environmental Protection Arabic report.
3. H. Abu Qdais, F. A. a. L. Q. (2009). Solid Waste Landfills as a Source of Green Energy: Case Study of Al Akeeder Landfill. International Conference and Exhibition on Green Energy & Sustainability for Arid Regions & Mediterranean Countries. Amman, Jordan.
4. Haque, A., I. M. Mujtaba, et al. (2000). "A simple model for complex waste recycling scenarios in developing economies." *Waste Management* 20(8): 625-631.
5. Huang, P., X. Zhang, et al. (2006). "Survey and analysis of public environmental awareness and performance in Ningbo, China: a case study on household electrical and electronic equipment." *Journal of Cleaner Production* 14(18): 1635-1644.
6. Manoj Chopra, D. R., Wail Abu-El-Shaar (2001). US-Jordan Municipal Solid Waste Management Collaborative Research, The National Science Foundation. VA 22230.
7. METAP (2004). Regional Solid Waste Management Project in Mashreq and Maghreb Countries, Jordan.
8. METAP (2008). Development of Strategic Framework for Private Sector Participation in MSW Management report. Jordan, Ministry of Environment
9. Mrayyan, B. and M. R. Hamdi (2006). "Management approaches to integrated solid waste in industrialized zones in Jordan: A case of Zarqa City." *Waste Management* 26(2): 195-205.
10. Nobani, H. A. (2008). Municipal Solid Waste Management at Amman City Middle East Recycling, Waste & Environmental Management Jordan.
11. Shekdar, A. V. (2009). "Sustainable solid waste management: An integrated approach for Asian countries." *Waste Management* 29(4): 1438-1448.
12. Troschinetz, A. M. and J. R. Mihelcic (2009). "Sustainable recycling of municipal solid waste in developing countries." *Waste Management* 29(2): 915-923.
13. V. Femia, P. O. c. (2009). Waste and Recycling Behaviors -Do Domestic or Commercial Recycling Programs Raise Awareness and Cause Best Practice. Sardinia 2009, Twelfth International Waste Management and Landfill Symposium S. Margherita di Pula, Cagliari, Italy, CISA.
14. Vicente, P. and E. Reis (2007). "Segmenting households according to recycling attitudes in a Portuguese urban area." *Resources, Conservation and Recycling* 52(1): 1-12.
15. Vining, J. and A. Ebreo (1992). "Predicting Recycling Behavior from Global and Specific Environmental Attitudes and Changes in Recycling Opportunities." *Journal of Applied Social Psychology* 22(20): 1580-1607.
16. Wilson, D. C., C. Velis, et al. (2006). "Role of informal sector recycling in waste management in developing countries." *Habitat International* 30(4): 797-808.