

Factors Influencing Household Waste Management Behavior.

M. El-Hoz, Ph.D.

Department of Civil Engineering

The University of Balamand

P.O.Box 100, North Lebanon

mervat.elhoz@balamand.edu.lb

Abstract

Reducing and recycling household waste have become an area of prime concern for the municipalities which are the direct responsible for this sector. Women play an essential role in environmental and community urban services. In most societies, they are responsible for many tasks including childcare, shopping, cooking, and cleaning. The objective of this study was to assess the Women Waste Practices (WWP) toward waste management in low-income urban community. The link between behavior, practices, perception and management of municipal solid waste in this community was studied. It is found that the level of household income determines lifestyle, consumption patterns and cultural behavior. In addition, it is a determinant of level of education which is a component in the level of understanding. Regarding the level of environmental concern and knowledge on environmental issues, they are not women priority due to many reasons. As a conclusion, Women's cooperation is essential for the long-term success of any project concerning urban services especially that the volunteer women proved to be the controlling factor in achieving the survey objectives which resulted that over 60% of the respondents showed their readiness to participate in the second phase of this study which is a pilot project for sorting at their houses.

Keywords: Women waste participation, waste collection, education, behavior, social and economical analysis.

1. Introduction

Municipal solid waste management (MSWM) is one of the essential services that any healthy community must have. Solid waste management services forms the core of municipal services and cannot be sustained without community cooperation. To this end, efforts are needed to assess the profiles of the community as each district is unique and so are the needs, aspirations and challenges. Men and women may differ in their attitudes towards public health and community cleanliness, and have markedly different preferences for how to address public health and environmental problems. These differences, at the most local level, affect the type of services women and men would like to see developed in their communities (Muller, 1998). In most societies, women are responsible for the municipal work, which include many tasks such as childcare, shopping, cooking, cleaning and well-being of their husbands (Scheinberg, *et al.*, 1999). Moreover, Arcury, Scollay, & Johnson (1987) stated that females are usually associated with recycling tasks, because it is an activity that is deeply rooted in the domestic area where women traditionally have more authority of decision and execution. Therefore, the participation of women in the integration of MSWM program is essential to ensure effective service delivery and contribute to the empowerment of women. To foster awareness of socio-cultural factors, service delivery must be assessed through a gendered lens as women are the primary users of basic services provided by municipalities.

Besides that, many less developed countries are characterized by a large lifestyle gap between the elite and the poor (Hossain & Moore, 1999) which calls for the designing of appropriate solid waste systems that are equitable and affordable by all sector of the population especially those that were historically disadvantaged. To plan sustainable MSWM requires not only a knowledge of the nature of wastes generated by households, but also an understanding of how wastes are used in communities. This is important because waste reduction and recycling are the basic premises of all waste management (Furedy, 1990). Moreover, many surveys aim to describe the characteristics of a specific population, such as socio demographic conditions (e.g. age, sex, education, and income) people's behavior, practice, social and economic circumstances and people's attitudes and opinions. Social surveys intended to obtain information through questionnaires are generally recognized as a standard method of data collection. Furthermore, socio-demographic variables are found to relate to recycling behavior in a special way. Generally, young and female have higher scores on recycling indices than other groups do (Barr *et al.*, 2001). On the one hand, concrete knowledge shapes recycling behavior (Gamba & Oskamp 1994 and Vining & Ebreo 1990) and on the other, abstract knowledge may be an important predictor of pro-environmental behavior (Hines *et al.*, 1987).

Lebanon has numerous laws related to solid waste management (SWM) dating back to 1931. However, the Lebanese civil war that lasted approximately 15 years had adverse effects on law enforcement, and consequently on solid waste collection and disposal. In addition, there is no well-defined national policy on waste management, and there are not any specific regulations regarding the treatment of waste (El-Hoz, 2007). Unfortunately, legislation also does not provide clear guidelines on how and when councils should integrate gender both in its internal functions and procedures, and in service provision.

The municipalities are responsible for SWM services and have a greater role in preventing, managing and cleaning up pollution. The understanding of the demographic characteristics of communities within the local authorities' operational area is vital for the delivery of accessible, affordable, relevant, acceptable and effective services. However, over the years, lack of infrastructure, inefficient institutional setup, weaknesses in financial and technical resources, have led to an inadequate and inefficient provision of services at various levels (El-Hoz, 2005). The Municipality of Tripoli has a waste management crisis, prompted by the limitation in municipal funding; the lack of awareness and public education, and the lack of technical staff and workers to fulfill the requirements needed for good supervision and make clean city. Therefore, SWM is still far away from the concept of sustainability. At the municipal level, the Department of Cleanliness is in charge of waste services. Through this department, the municipality follow up the works related to solid waste problems in the city (such as cleaning the common areas in residential buildings, and micro waste collection) and supervise the operation of the private company which is responsible for street sweeping, waste collection and transport to the controlled dump (El-Hoz, 2009).

The municipality is at present, through its Environmental Committee, attempting to improve the current waste management system in the city through a waste reduction strategy which includes sorting, re-use and recycling. It is believed that the most effective way to reduce waste is to deal with it at source and the lack of public participation or consensus can delay or even stop the execution of such project. Therefore, the aim of this research is to give a good snapshot of Women Waste Practices (WWP), understand the factors that motivate women to

participate in source separation of waste in low income area where the identification of these factors will then be utilized to assist in the implementation process of public participation in the waste reduction program.

2. Study Area and Methodology

Tripoli is the second capital of Lebanon, located in the north of the country, with a population of approximately 250,000 and an area of 17.46 km². The amount of municipal solid waste that arrives to the controlled dump represents approximately 92% of the total waste, with an average of 192 tons/day. Solid waste collection is carried daily. The capacity of trucks used for collection is 5m³ and 10m³. Households deposit their wastes in uncovered 660 liter and 1100 liter containers placed by the operator at different locations (e.g., street corners) in different neighborhoods.

Tripoli demonstrates noticeable socio-economic differences that are significant as it is a city with a diverse society. The study area is one of the 11 districts of city called Tabbaneh. Its population is 8,636 persons distributed in 1436 houses in an area of 21.2 hectares, where the density population is 407, the second highest in the city (Environment and Development Observatory, 2008). This area is a residential, commercial, with soft industry and faces lots of social and economical problems as a consequence of the Lebanese conflict. Tabbaneh is a poor area with a complete different society by itself, dissimilar to the other districts of the city where most people living in are not Tripolitan but coming from the surrounding regions known by their low incomes. The area has no childcares, only two primary schools (one is private and the other is public), no secondary or technical schools but two charity ones for illiteracy. Figure 1 shows the location of this area.

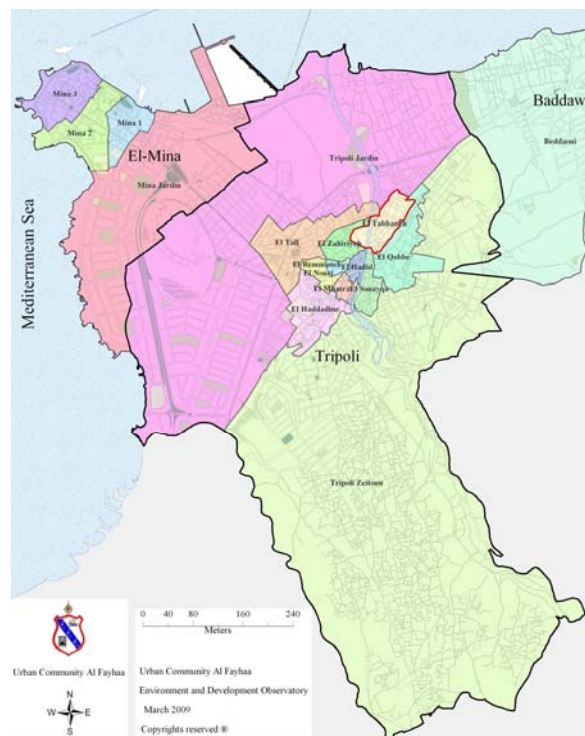


Figure 1. Tabbaneh Area.

The Questionnaire

A structured questionnaire was designed to gather data consisted mainly of three parts: (1) “Personal Information” including age, marital status, socio-economic characteristics of the household heads education and the level of income; (2) “Environmental Issues” such as environmental and waste management literacy, waste management practices at the household; public’s degree of satisfaction on municipal waste management services and (3) “Personal Waste Prevention Practices” where this part gathers questions relating to waste recovery and avoidance practices. Some questions were also included to facilitate oral discussions and assessment of opinions. The total number of questionnaires was 82. Table 1 states some questions of this survey.

3. Field Investigations and Data Collection Process

The survey is a part of a comprehensive study on the improvement of the waste management system of the city. Field investigation involved cooperation between the Municipality of Tripoli through its Environment Committee and volunteer women from different NGOs. Pre-meetings were made at the municipality and a targeted approach with a distinct effort was used to ensure the active participation of volunteer women, explain the objective and methodology of the process to be followed and encourage them to participate before the preparation, distribution and collection of the survey. In fact, the presence of three women councilors elected at the municipal level for the first time in the history of the municipality and especially that the person in charge of the Environmental Committee is one of these women who has the environmental competence as a career, influenced and encouraged many volunteer women to participate in this study, considering that female councilors have a strategic role to play in representing, addressing and ensuring municipalities respond to women’s needs. Furthermore, the increased participation of women within the municipal structure have also foster a change in attitude towards women’s involvement in public life and expand women’s opportunities beyond those traditionally assigned to them.

The survey was carried out in May 2008 in the homes of approximately 100 surveyed participants and involved also interviews in order to understand their perceptions of waste (e.g. minimizing, reusing and separating waste) in their houses and investigating the practical applicability of different practices to manage waste on a daily basis in addition to the provision of information on their socio-economic conditions and how this influences SWM services. Added to this, it is believed that, by understanding the diversity of the local culture of home-owners and their waste disposal practices, will help to introduce measures to reduce the amount of waste generated by the affected community and will assist the improvement of the solid waste management system in the city.

4. Findings of the Survey

The research revealed a complex landscape of attitude - action relationships influenced by factors ranging from personal characteristics to social and institutional contexts. Attention to this complexity by policy makers in Tripoli will be essential since the management of household waste is to be improved.

Table 1. Some Samples of the Questionnaires Asked in the Survey

<p><i>Demographic Information</i></p> <ul style="list-style-type: none"> ➤ Your Household Role: <input type="checkbox"/> Housewife , <input type="checkbox"/> employee, <input type="checkbox"/> Prefer not to say ➤ Household/Personal Income per month: <input type="checkbox"/> < \$ 350, <input type="checkbox"/> \$ 350 - \$700, <input type="checkbox"/> > \$700 ➤ Children in Household: <ul style="list-style-type: none"> <input type="checkbox"/> Children aged < 12, <input type="checkbox"/> Children aged 12-18, <input type="checkbox"/> Children aged > 18, <input type="checkbox"/> No children <p><i>Environmental Issues</i></p> <ul style="list-style-type: none"> ➤ I have a ___ concern with maintaining a good place to live. <ul style="list-style-type: none"> <input type="checkbox"/> High, <input type="checkbox"/> Average, <input type="checkbox"/> Very low, <input type="checkbox"/> No concern ➤ I have a ___ level of concern about the environment. <ul style="list-style-type: none"> <input type="checkbox"/> High, <input type="checkbox"/> Average, <input type="checkbox"/> Very low, <input type="checkbox"/> No concern ➤ Environmental protection makes no difference to the quality of my life. <ul style="list-style-type: none"> <input type="checkbox"/> Strongly Agree, <input type="checkbox"/> Agree, <input type="checkbox"/> Unsure, <input type="checkbox"/> Disagree, <input type="checkbox"/> Strongly Disagree ➤ There are more important things in today’s society than environmental problems. <ul style="list-style-type: none"> <input type="checkbox"/> Yes, <input type="checkbox"/> No <p><i>Solid Waste Management</i></p> <ul style="list-style-type: none"> ➤ Are there any containers where you live? <ul style="list-style-type: none"> <input type="checkbox"/> Yes, <input type="checkbox"/> No ➤ What is the distance from your house to the nearest solid waste container? _____ ➤ Among the following, which municipal waste management treatment methods are currently used by your city? <ul style="list-style-type: none"> <input type="checkbox"/> I don’t know 38, <input type="checkbox"/> Landfill, <input type="checkbox"/> Compost plant, <input type="checkbox"/> Incineration ➤ In case of a problem what is the way of communication with the municipality? <ul style="list-style-type: none"> <input type="checkbox"/> I contact directly with the municipality, <input type="checkbox"/> My husband or my son takes care of that <input type="checkbox"/> If I go to the municipality, I doubt they will help me <input type="checkbox"/> The owner of the building or the building committee is responsible ➤ How do you feel about the current situation of solid waste disposal, dumping, sorting, etc.? explain _____ ➤ Are you satisfied with the location, size and numbers of the containers in your street? _____ <p><i>Personal Waste Prevention Practices</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> I buy products that can be used again and again, and avoid disposable ones. <input type="checkbox"/> I buy/use rechargeable batteries when I need to use batteries. <input type="checkbox"/> I look out for products made from recycled materials. (e.g. notepads, printing paper, kitchen glassware etc.) <input type="checkbox"/> I reuse plastic bags, or use my own durable bags when going shopping. <input type="checkbox"/> I reuse glass bottles and jars, and/or plastic containers. (e.g. for food storage)
--

4.1 Background Information

Gender, age, marital status, education, occupation, household role, income, and number of children in household were investigated. The sample of women interviewed was aged between 21 and 65 years with an average of 35 years where they are mostly married. A household size

has a maximum of 8 living in very small houses. Over 47% of the sample population is children < 18 years old which means that this population is still economically productive and young. Moreover, the proportion of women with education is very low. Data shows that the majority of the respondents are below high school level of education (>70%). Concerning the economic situation, it is found that approximately 60% of the people earn less than \$350 per month, the minimum level of salary in the country, and that 81% of the total respondents are unemployed. Moreover, the poverty situation was behind the improper educational level of the youth which prevents them to continue their studies. Pupils are the first to drop out of schools, where males go to work to bring additional income and females stay at home. This is in accordance with Todaro (1992) who stated that in the low-income district, population has a low level of education which leads to a high rate of unemployment and fertility. On the subject of housing, only 32% of the respondents are house owners, whereas the remaining represents those renting from a landlord. Figure 2 presents the demographic information about the Tabbaneh Area.

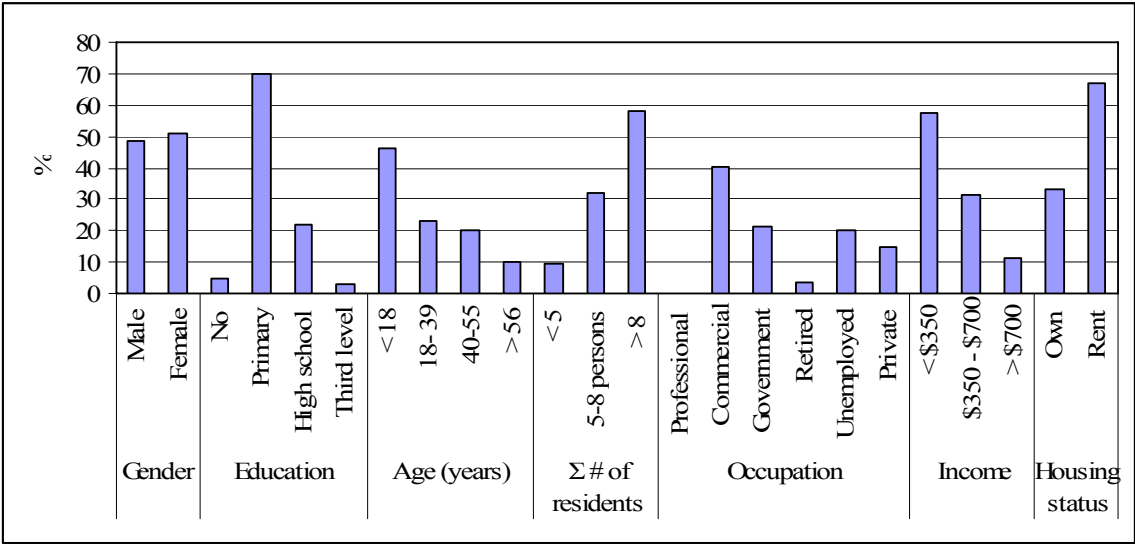


Figure 2. Demographic Information about the Tabbaneh Area

4.2 General Environmental Issues

Good and bad examples of environmental practices in the surveyed area should be used to establish social influence and demonstrate what kinds of behaviors are friendly to the environment. In terms of interest in environmental problems, the results show that the majorities are not very interested in environmental problems, and 32% of women respondents expressed lack of concern towards the management of waste in the city. Figure 3 shows the percentage of the participants’ environmental concerns. People are very concerned about their and their children health, but not aware of the right information concerning environment and their responsibility to save it. The respondents are aware of problems close to them such as offensive odor caused by scattered waste on the street. However, they are not well informed about problems related to the disposal site. Hence, they are not aware of their role in MSWM. For many of them, to throw waste on any spaces is a normal behavior. This attitude is caused by lack of education and information where many respondents, 76% proposed the need of awareness campaigns. Moreover, it was unclear how they define the term “environment” or

what criteria they had when they chose the answer “they are interested in environmental issues”. It can be assumed that the meaning of “environment” is mixed with that of hygiene. So, despite the ambiguity of the term, there is no doubt that ecological awareness is the most efficient factor in developing environmental behaviors (Vining & Ebreo, 1992). Moreover, ecological awareness increases its antecedent effect when it is measured in a self-perceived way (Scholder, 1994), and like other attitudinal patterns, it refers to a specific object of concern (Folz, 1991).

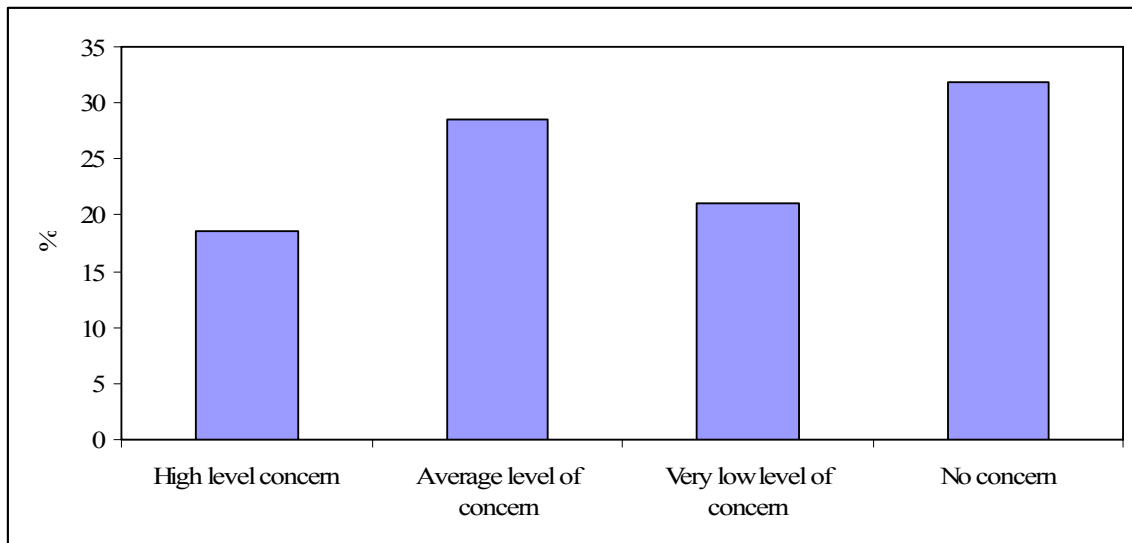


Figure 3. Percentage of Participants' Environmental Concerns

However, there are also some women, 63% of respondents showed their unbelief in the support of the government in improving the level of cleanliness in their area. This attitude reflects the hard efforts needed to convince this part of people in the importance of their involvement in the management of public issues. This shows as well that the real change in behavior does not occur without essential change in the present relation between government and citizens. Moreover, there is a feeling among a high rate of women that they are not concerned in these issues not because they believe that their contribution will not be distinct but because they believe that women are not equal with men in their profession. Therefore, educational and campaign programs should be developed and what has been done so far is not enough nor appropriate. Moreover, the success of the waste management system depends on the degree of public participation where women are therefore a basic element of this system.

4.3 Personal Waste Prevention Practices

It was observed that the educational level of the respondents was associated with littering behavior and with the waste avoidance potential. Families whose waste managers had received a secondary education showed a high waste avoidance potential. The analysis of questionnaires shows that there is lack of knowledge on solid waste separation, reuse and recycling in this area. 80% of the respondents reuse glass jars, bags, etc. but they do not know that these issues are needed to prevent recoverable materials from taking up precious and decreasing landfill space. Regarding waste management, 46 % of the respondents are of the opinion that low participation in this issue is a direct result of a general lack of awareness and

information. Besides that, the survey results indicated that there is discrepancy between people's attitudes and their actual behaviors. Poverty and lack of education may indeed be a relevant cause of domestic solid waste mismanagement in Tabbaneh. Moreover, the per capita income of the respondents was found to be associated with the respondents' littering behavior, material recovery behavior, and with their self-perceived potential for waste avoidance to a certain limit.

Likewise, improper discharge habits by residents and other waste generators such as vegetables street vendors were also noted as a major contributor to inefficient waste collection. Researcher observed many cases where loose waste was discharged along the road instead of placed in bags. This habit slows down the collection process. Waste was also placed along the curbside after the vehicle had already passed through the area.

Concerning the opinion about the current collection service, women's perception of waste collection efficiency is very negative. In total, 90% of the household respondents were unsatisfied with the current collection service as waste left on the street after the collection service, the insufficient number of waste containers in their area where many streets are not covered with them, and the very bad state of the existing ones (rusted, burned, not standing well on their bases, etc) were main reasons for dissatisfaction. It was common to find waste overflowing the container and scattered on the ground, as scattered waste also creates unsanitary and unhygienic conditions in the area around the containers. So, the generally low level of services of the local waste utilities and the unorganized waste disposal practices of people illustrate how poor the situation is and this certainly represents a poor basis for high motivation and participation in newly imposed waste minimization plan.

To better understand the situation in Tabbaneh, a geographic information system (GIS) map was created to generate GIS database of solid waste with data entry of the details - spatial and attributes - bins, routes, quantity, etc. The analysis techniques were composed of database generation and map visualization. The GIS map and data collected also highlighted the issue of the lack of open spaces as a factor influencing household management attitudes and behaviors, in addition to the inadequate number of containers allocated in this condensed area, and the inappropriate collection program implemented by the private company. Figure 3 shows the locations of these containers in this area.

4.4 Factors Affecting Household Participation in Municipal Waste Reduction

The primary factors hypothesized to influence household participation in municipal waste reduction have all proven to have some relationship to the observed trends. Household location (suburb), poverty, income, and education, especially environmental education, all are to a large extent interrelated and affect household participation in domestic waste management.

Concerning the proposition of implementing a pilot project on waste reduction in this area and the respondents' participation, 60% of them agreed to join this project under the condition of the provision of garbage containers, waste separation bags and better waste management services.

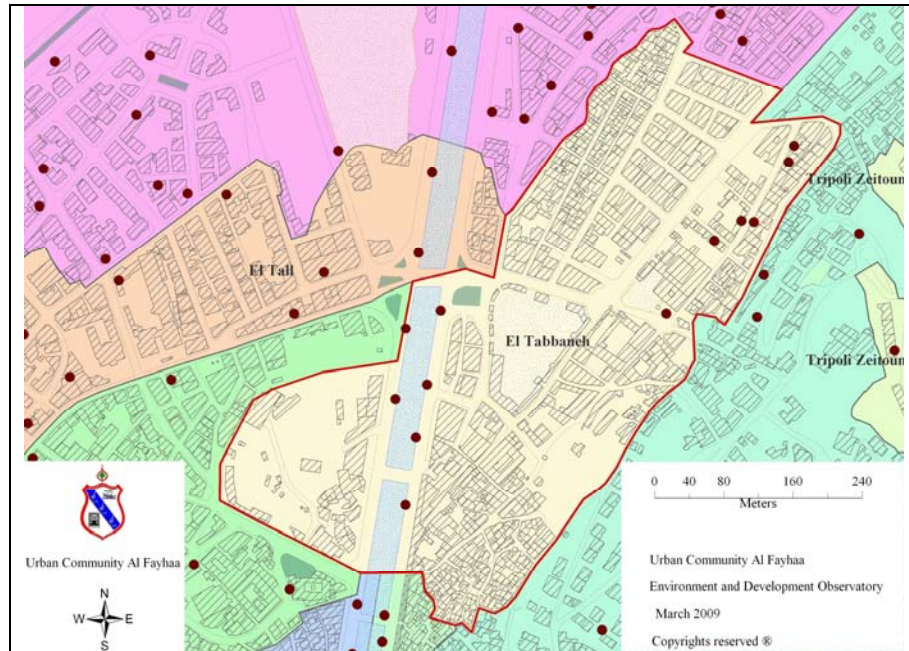


Figure 3. Locations of Containers in the Tabbaneh Area

5. Conclusion

This paper has highlighted important aspects that need to be taken into consideration in the design and delivery of domestic solid waste services where an effective and sustainable MSWM cannot be achieved by focusing on the technical aspect alone. Each stakeholder in the society has to play its part in order to acquire a sustainable and integrated system as a whole.

The study concluded that there are no easy solutions to the problems related to (SWM) in this area. The disappearance of open spaces, inadequate number of containers, inadequate waste collection services, bad distribution of educational services, poverty, deterioration of built-up areas are the main problems of Tabbaneh. Therefore, the SWM system should be formulated based on a precise grasp of natural and socioeconomic conditions, the state of the present SWM system and the lifestyle of local residents along with the opinions of all the people in the target area. So, in addition to technical solutions, encouraging attitudes in favor of waste prevention is inevitable and involves some kind of awareness campaigns, and the infusion of some level of general environmental knowledge. The findings from this research provided too concrete evidence that such general knowledge are significantly related to the behaviors studied. As highlighted by Alessa *et al.* (2003), the provision of information about the outcomes of particular behaviors may be all that is necessary to create voluntary compliance. Improving knowledge links a person to his/her environment in such a way as to increase responsible behaviors.

Also, public education efforts to improve public participation in waste reduction programs, to keep communities clean, and promote proper waste disposal habits by residents should be included especially that to improve the efficiency of waste reduction program, so encouraging people to separate waste in the home is necessary and active public involvement is indispensable for a sustainable MSWM system. Furthermore, local residents have to recognize the importance of following waste discharging rules and realize their responsibility, where it is

necessary to achieve better communication among the collection service company, local residents and local authority concerned.

On the other hand, the study concluded that the conduction of survey before the implementation of any project related to waste management add the understanding of the diversity of the local culture of home-owners and make a contribution to the improvement of service provision, and the essential need for the residents participation and how information campaigns will be directed in creating practical implementation through active participation in effective waste management. The questionnaires demonstrated that encouraging waste sorting and recycling are unlikely to be effective if their implementation is not tailored to the individual behaviors and services. Moreover, findings suggest that the level of household income and education is indeed correlated with life style of the household. The level of income is a determinant of level of education and the level of education is an ingredient in the level of understanding, and actual behavior.

This study also found that trends and tendencies representing the whole country do not represent localized regions. This is especially true in cities such as Tripoli, where the geographic, demographic, and cultural diversities within it are large enough to affect environmental perceptions, values, and behavior. This is a safeguard against simplification in underlining the need to grant special consideration to the variations of waste reduction behavior.

Finally, women's cooperation is essential for the success of any waste management project, especially that the volunteer women proved to be liable, and be the controlling factor in achieving the survey objectives where 60% of the respondents showed their readiness to participate in the proposed waste reduction pilot project at their homes. Therefore, the empowerment of women is critical in the support of new initiatives in urban services and environmental protection; also, attention to gender can increase project effectiveness, avoid costly mistakes, and ensure equitable access to livelihoods, resources or benefits which the project makes available.

Acknowledgements

The author would like to thank the GIS Department at the Observatory of Environment and Development at The Urban Community Al-Fayhaa Al-Fayhaa for accomplishing the GIS maps of this research.

References

1. Alessa, L., Bennett, S. M. and Kliskey, A. D. (2003). Effects of knowledge, personal attribution and perception of ecosystem health on depreciative behaviours in the intertidal zone of Pacific Rim National Park and Reserve. *Journal of Environmental Management*, 68, pp.207-218.
2. Arbuthnot, J. (1977). The roles of attitudinal and personality variables in prediction of environmental behavior and knowledge. *Environment and Behavior*, 9(2), 217-232.
3. Arcury, T., Scollay, S., & Johnson, T. (1987). Sex differences in environmental concern and knowledge: The case of acid rain. *Sex Roles*, 16(9/10), 463-473.

4. Barr, S., Gilg, A. W. and Ford, N. J. (2001). A conceptual framework for understanding and analysing attitudes towards household-waste management. *Environment and Planning A*, 33, pp.2025-2048.
5. Derksen, L., & Gartrell, J. (1993). The social context of recycling. *American Sociological Review*, 58, 434-442.
6. El-Hoz, M. (2005). 'Current Solid Waste Management in the Municipal Union of Al-Fayhaa'. Paper presented at the workshop on "Pilot Project for Coastal Litter Management", Lebanon. Project financed by UNEP-MAP-MEDPOL and entrusted to Union of Northern Associations-UNADEP.
7. El-Hoz, M. (2007). Municipal Solid Waste Management in Semi Urban Areas. The Twenty-Second International Conference, On Solid Waste Technology and Management, Philadelphia, Pa U.S.A. 18 – 22 March.
8. El-Hoz, M. (2009). Women Participation in Municipal Solid Waste Sorting and Recycling. The Twenty-Fourth International Conference, On Solid Waste Technology and Management, Philadelphia, Pa U.S.A. 15 – 18 March.
9. Folz, D. (1991). Recycling program design, management, and participation: A national survey of municipal experience. *Public Administration Review*, 51(3), 222-231.
10. Furedy, C. 1990. Women and solid wastes in poor communities. The 16th WEDC Conference on Infrastructure for Lowincome Communities, Hyderaad, India.
11. Gamba, R. J., and S. Oskamp. 1994. Factors influencing community residents' participation in commingled curbside recycling programs. *Journal of Environment and Education*, Vol. 26, pp. 587–612.
12. Hines, J. M., H. R. Hungerford, and A. N. Tomera (1987). Analysis and synthesis of research on responsible environmental behavior: a meta-analysis. *Journal of Environment and Education*, Vol. 18, pp.1–8.
13. Hossain N., and Moore M. (1999). Elites, Poverty and Development. A background paper for the World Development report 2000/1 on poverty. June 1999.
14. Muller, Maria S. (1998). The Collection of Household Excreta in Urban Low-income Settlements, WASTE/ENSIC, Gouda/Bangkok.
15. Environment and Development Observatory, (2008). Environment and Development Situation, Report No.25. The Urban Community Al-Fayhaa.
16. Scheinberg, A, Muller M and Tasheva EL (1999). Gender and Waste. Integrating gender into community waste management: Project management insights and tips from an E-mail conference, 9-13 May 1998. Sept 1999.
17. Scholder, E. (1994). Do we know what we need to know? Objective and subjective knowledge effects on pro-ecological behaviors. *Journal of Business Research*, Vol. 30, pp. 43-52.
18. Todaro, M.P. (1992). *Economics for Developing World: An introduction to principles, problems and policies for development*. Cape Town: Prentice Hall.
19. Vining, J., and A. Ebreo. 1990. What makes a recycler? A comparison of recyclers and nonrecyclers. *Journal of Environment and Behavior*. Vol. 22, pp.55–73.
20. 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*, Vol. 22, pp. 55–73.