



## Recycling of municipal solid waste in the Gaza Strip

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RECYCLING OF CERTAIN items from waste represents an important strategy for poor populations throughout the developing countries. It has been estimated that up to 2% of the population in third world countries survives by recovery of materials from waste (Bartone, 1988). Among the waste management options in contention with landfill are incineration, composting and recycling. Recycling is an alternative to disposing of waste in landfills, thereby reducing the pressure on space in landfills. Recycling may also reduce the amount of land, air, and water pollution as well as reduce pressure on natural resources. Recycling is also a means of job creation and generation of income, especially among low-income groups (Muller, 2002). Recycling of selected materials can be a valuable component of an integrated waste management system. Also reuse and recycling provide an opportunity to capture some value from waste (Conitreau, *et al*, 1984; Beed and Bloom, 1995). The Gaza Strip suffers from a lack of convenient sites for sanitary landfills, and so any means of reducing waste quantities is to be welcomed (El-Hawi, 1997).

This paper argues that recycling should be a more wide spread practice especially in the Gaza Strip where the Palestinians are facing financial and economic constraints. Some of the questions on recycling were raised with municipal officials, decision makers, street sweepers, United Nations Relief and Works Agency (UNRWA), and Non Governmental Organization (NGO's). Responses and interpretations have shown great sympathy with the recycling option as a strategic disposal option alternative to landfilling.

### Objective of the study

This paper aims at evaluating the willingness of the public to participate in recycling activities, and assess recycling from the strategic disposal point of view as an alternative to landfilling in the Gaza Strip. The objectives of the study are to:

- Review, understand and analyse recycling in the Gaza strip.
- Assess public concern on recycling and if the public are willing to use recycled products.
- Assess willingness to start source separation.
- Assess how decision-makers are evaluating recycling from the disposal strategy point of view.
- Analysis of respondents/target group and interpretations regarding recycling.

### Research methodology

Questionnaires and semi structured interviews will be used to gather data. Interpretation of respondents, has been made using quantitative, and qualitative approaches. Specific questions focused on: willingness to use recycled products, willingness to start source separation, whether recycling can be an efficient tool to prolong life span of existing Gazan landfills and as alternative strategy parallel to landfilling option. Sampling were selected Randomly, 50 copies of the questionnaire were distributed to cover the study area (Gaza Strip).

### Target group

The target group have been selected as municipal officials (10), scavengers (10), NGO's (4), UNRWA (5), private sector (5), household (13) and decision-makers (3) categorized to represent:

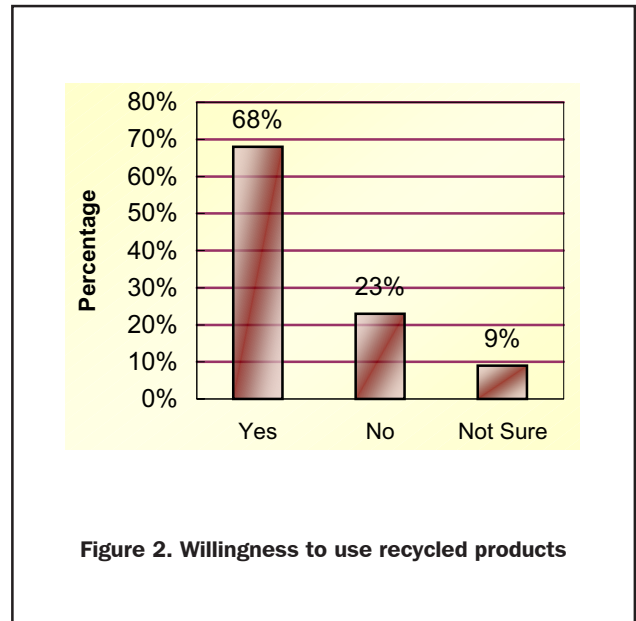
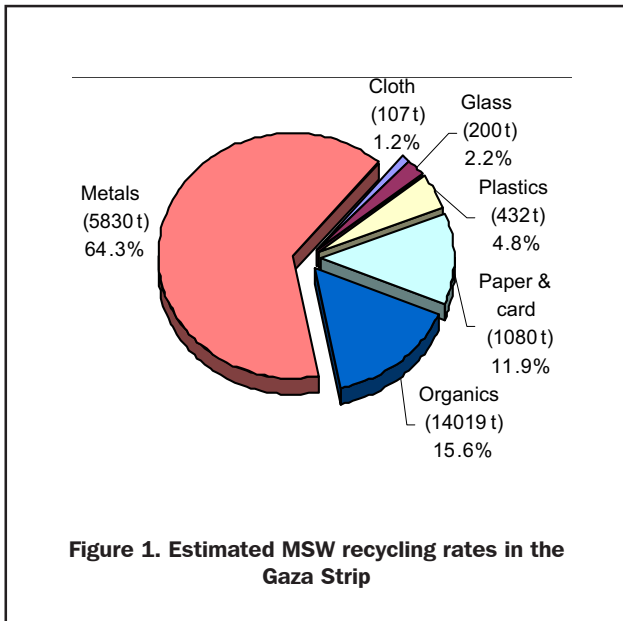
- Those who work in SWM field like ministries (decision-makers and strategy formulators), consultants and private sector.
- Those involved in solid waste recycling like municipalities, village councils, Solid Waste Management Councils (SWMC's) and UNRWA.
- Poor communities who depend on recycling as a means of survival.

### Review of recycling in the Gaza Strip

The informal recycling schemes in low-income countries such as Egypt, India and the Philippines support large numbers of families. Informal collectors retrieve recyclables prior to the disposal of the refuse they pick up; for example, in Cairo, Egypt, some 30,000 zabaleen make up a network of garbage collectors. A pair of zabaleen working with donkey drawn carts can collect garbage from 350 households in a day (Meyer, 1987; Furedy, 1984b).

The recycling sector in the Gaza Strip will probably grow quite slowly because there is no established pattern to follow. Currently, a very small fraction of solid wastes is recycled, mainly steel scrap and a small amount of organic. The total MSW recycling is 9,068 tonne/year out of 215,000 tonne/year (a recycling rate of **4.21** per cent). Metals 5830 tonne, organics 1419 tonne, Paper and card 1080 tonne, Plastics 432 tonne, glass 200 tonne and cloth 107 as shown in Fig 1 (field work by researchers).

Some of the small micro-enterprises working in the Gaza Strip as middlemen collecting scrap to be sold to Israel for



\$ 30/ton. Paper and cardboard are being collected and reprocessed locally as egg pots and boxes (Personnel interview).

It was estimated in 1992 that, the agricultural sector was generating over 2400 tons of plastic waste each year, most of which was burned in the open. Although contaminated with soil, and perhaps with pesticides, this source of plastic waste may be of some interest to the recycling industries (Coad, 1997).

Before recycling can make a significant impact on quantities of waste to be disposed of, it will be necessary to develop reprocessing facilities and markets for recyclable materials, and to develop public awareness to motivate the public to consume less and separate recyclable materials. At the present it is not helpful to provide machinery for recycling - the situation is not yet ready for large-scale operations (Coad, 1997).

**Results and interpretations**

**Willingness to use recycled products**

Are you willing to use recycled products? What aspects favour recycled products in the Gaza Strip? This question has been raised to households, NGO's, Palestinian institutions, UNRWA. Results of respondents were 68% with yes option, while 23% with no option and 9% were not sure. Health aspect was the main concern of respondents followed by religious and cultural aspects as shown in Fig. 2.

*High demand on recycled products among low and middle-income communities in the belief that, recycled products are cheaper than new ones (Household).*

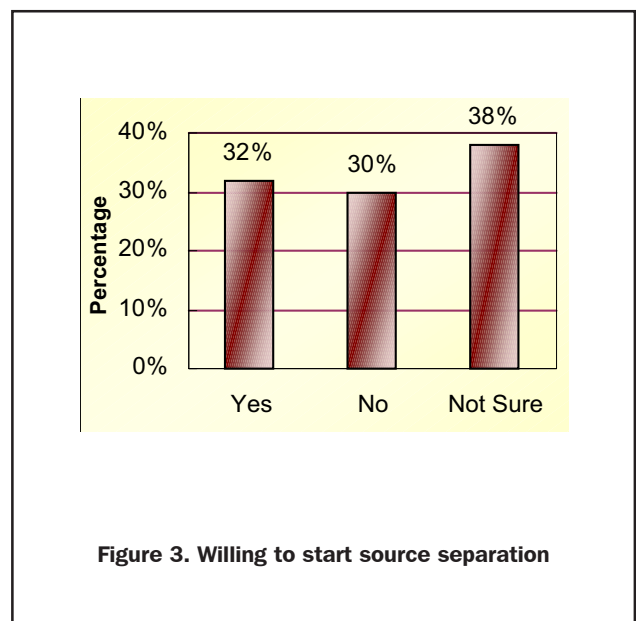
**Willing to start source separation**

Are you willing to participate in source separation? The public has responded positively by 32% and 30% were with the no option and 38% were not sure as depicted in Fig.3.

This can be explained by lack of awareness on source separation and no incentives from municipalities are provided to encourage the public to start source separation.

*Its not worth spending time and effort sorting some items from the solid waste being generated in the Gaza Strip since less benefits and low market is existing for recycled materials (Street sweeper).*

*The public participation in source separation is an important for the success of any recycling program (Environmental NGO).*



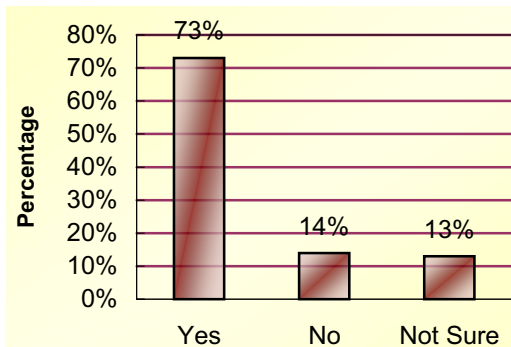


Fig. 4. Recycling as Disposal Option

Figure 4 . Recycling as disposal option

### Recycling as disposal option

Do you see recycling as an environmentally sound disposal strategy of MSW?

This question has been raised to Ministry of Local Government, Ministry of Environmental Affairs, municipalities, village councils UNRWA, NGO's.

Respondents were 73% with yes option, while 14% with no option, and 13% were not sure as shown in Fig. 4.

*Recycling of MSW should be adopted as an environmentally sound disposal strategy parallel to landfilling since it saves collection and control of waste related diseases (Decision-Maker).*

### Conclusion

Recycling of MSW seems to be the most efficient and sustainable SWM due to the following benefits: reduction in raw materials, saving in energy, reduction in pollution and employment creation.

Recycling is being highlighted due to the current political and economic situation prevailing in the Gaza Strip as a source of survival strategy for poor communities.

High willingness of public to use recycled products however, Public health was the main concern of respondents followed by religious and cultural aspects.

Respondents could be motivated to start source separation. However, awareness programs on source separation and incentives from municipalities to encourage the public to start separation are not available.

Recycling as an environmentally sound disposal strategy parallel to landfilling is being highlighted by decision-makers.

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