



RESEARCH ARTICLE

ASSESSMENT ON BENEFITS OF ENVIRONMENTAL-ECONOMIC WASTE RECYCLING IN MASHHAD DURING 2013-2015

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ARTICLE INFO

Article History:

Received 18<sup>th</sup> October, 2017  
Received in revised form  
26<sup>th</sup> November, 2017  
Accepted 21<sup>st</sup> December, 2017  
Published online 19<sup>th</sup> January, 2018

Key words:

Waste, The economy  
Recovered, Mashhad,  
Environment.

ABSTRACT

This was across - sectional study that was conducted in 2014. The purpose of this study was to characterize the quality and quantity of recyclable waste in Mashhad city in terms of the economic value and environmental impact. On the other hand, the energy from burning them and the resulting benefits were studied. The results show an average of 1,656 tons of waste is produced in the city of Mashhad; the per capita waste production per person is 630 grams per day. Based on the physical analysis of waste in Mashhad, during 1389, 1390, and 1391, there were 630,650, 700 put rescible materials, 209, 208, 230 Paper, 198, 212, 230 Metal, 235, 223, 240, plastics, 160, 190, 187 glass, and 98, 110, 99P at respectively. If we do full recycling of solid waste per day in 2278 to 91 million Rials profit, it only results in an economic benefit of recycling that shows in the great city of Mashhad. The amount of energy derived from burning materials will reach to 21224050GJ in 1391.

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Citation: Mokhtar Karami, Majid Ebrahimi and Javad Dawoudian, 2018. "Assessment of benefits environmental-economic waste recycling in Mashhad During 2013-2015", *International Journal of Current Research*, 10, (01), 64190-64193.

INTRODUCTION

Amount of waste produced depends on many different factors and parameters, some of which are: the population size of the area under study, socio - economic factors - cultural, rainfall, etc. (Shahroodi and Javadi, 2007). Due to increasing population and rising living standards, the technologies of solid waste from industrial and human activities are increasing. The last time due to the devastating impact of solid waste on the environment was not known, solid waste management were not given much importance and also the lack of technology, and personnel of national resources to prevent the Solid Waste Management for it (Beretclin and Celer, 2003). Global status of municipal solid waste management: Municipal solid waste contains many different compounds that require the proper management of all classes of storage, collection, disposal and burial. Municipal waste management reasons focused on different countries and the international community, especially developed countries, and some of the factors include:

- Release of municipal waste in the environment, causing severe and irreversible environmental pollution in groundwater flow (air and soil).

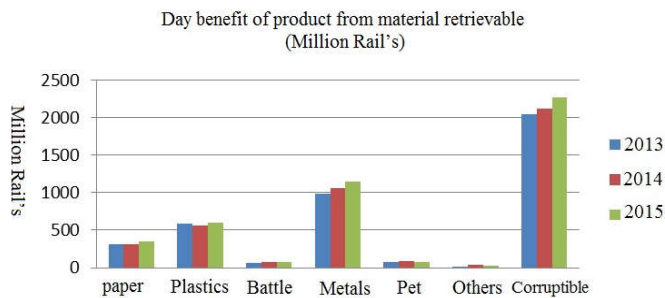
- Municipal solid waste is one of the major contributors to greenhouse gas emissions that lead to global warming, pose a significant negative impact.
- It does not accept any compromise in the high cost of waste management.
- Part of the waste is recycled. This means that reusing them will save valuable energy and raw materials.
- Producing energy from waste is cleaner than energy from fossil sources.
- The production of energy from waste, all or a portion cost back with waste management.

For solid waste management system in a region of the principles, technical design and implementation of programs related to the maintenance, collection, transportation, final disposal and reclamation projects such as compost fertilizer sources, energy from waste, biogas production, recycling and reuse, the need for accurate determination of physical and chemical characteristics the amount of waste produced in the region. In terms of diversification, diversification of production and characterization of municipal solid waste components, it is very difficult to consider as a basis for scientific management activities on the environment and public health provision which is considered necessary (Diaz et al., 1993). In Iran, despite the numerous progressions in the years after the Islamic Revolution over 4,000 million rails has arisen in order to collect and transport 50 tons of waste in urban and rural areas of which

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**Graph 3. Day benefit of product from material retrievable (Million Rail's) in Mashhad city in period of 3 years (2013-2015)**

**Table 1. Day benefit of product from material retrievable (Million Rail's)**

2015	2014	2013	Cost of each kg (Rial)	Type
345	312	313.5	1500	paper
600	557.5	587.5	2500	plastic
74.8	76	64	400	bottle
1150	1060	990	5000	material
79.2	88	78.4	800	per
29	32	18.5	500	others
2278	2125.5	2051.9		total

**Table 2. Day Energy of product from burn in Mashhad city (2013-2015)**

Type	Energy based on 1 ton material (GJ)	2013	2014	2015
Corruptible	4650	2929500	418500	423150
Paper	16500	3448500	10725000	11550000
Plastic	32600	7661000	6780800	7498000
Bottle	4650	744000	1036950	1116000
Material	700	138600	133000	130900
Pet	2200	215600	466400	506000
Total	-	15137200	19560650	21224050

**Table 3. Reduced of cost economic and environmental product from retrievable of 100% of paper**

Year	Index	Tree (number)	Water (m <sup>3</sup> )	Space of land file (m <sup>3</sup> )	Oil (Gallon)
2013	day	3553	37620	627	96767
	year	1296845	13731300	228855	35319955
2014	day	3536	37440	624	96304
	year	1290640	13665600	227760	35150960
2015	day	3910	41400	690	106490
	year	1427150	15111000	251850	38868850

**Table 4. Reduced of cost economic and environmental product from retrievable of 100% of bottle**

Year	index	Oil (Gallon)	Carbonate sodium (kg)	Feldspar (kg)
2013	day	4800	31382.4	10944
	year	1752000	11454576	3994560
2014	day	5700	37266.6	12996
	year	2080500	13602309	4743540
2015	day	5610	36678.18	12790.8
	year	2047650	13387535.7	4668642

## DISCUSSION AND CONCLUSION

The results of qualitative and quantitative measurements of solid waste are shown in Figure 1. The economic value of the material (separation at source) was estimated in Figure 3. The average annual per capita waste per person was calculated to determine the statistical differences between the different

compositions of SPSS software was used (Table 2). Since reusing of 3989 grams per ton of recycled paper reduces the release of particulate matter, 2,782 grams of CO<sub>2</sub>, H<sub>2</sub>S is released into the atmosphere in order to reduce the discharge of approximately 15 grams of SO<sub>2</sub>, with 100% of recycled paper in Mashhad in daily 91 91 741 kilograms of particulate matter, 641 441 grams of CO<sub>2</sub>, 34.5 kg of H<sub>2</sub>S to the atmosphere. On the other hand, there were about 700 perishables in 1391 since the rate of about 350 to 400 tons of it is converted into compost.

## Conclusion

The results show an average of 1,656 tons of waste is produced in the city of Mashhad; the per capita waste production per person is 630 grams per day per capita national average (640 g) less. Based on the physical analysis of waste in Mashhad, for the years 89, 90, 91, 630,650, 700 putrescible materials, 209, 208, 230 Paper, 198, 212, 230 Metal, 235, 223, 240, plastics, 160, 190, 187 glass, 98, 110, 99 Pat is respectively. According to Table 1, the full recycling of solid waste daily amount of 2,278 million Rail's profit achieved in just 91 years – is This economic benefit of recycling in the city of Mashhad great show. According to Table 2, the amount of energy derived from burning material 91 can be obtained in about 21,224,050. To produce one ton of paper, 17 trees are cut. Thus, according to Table 3 with 100% recycled paper content in day 91 of the 3910 outage will prevent trees in Mashhad. In addition, the amount of recycled paper and 106,490 gallons per day of oil and 41,400 cubic meters of water will be saved. On the other hand, and according to Table 4 of 100% recycled glass in Mashhad, 5610 gallons of oil per day, 36,678 kg and 12,790 kg of sodium carbonate, feldspar storage and dissipation are preventing them.

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