ISSN (Online): 2305-0225
Issue 2(2), January. 2014, pp. 60-63

Monitoring the urban solid wastes, opportunities and threats (Case study: Aras trade and industrial free zone)

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***Abstract*—** Keeping Natural environment and all God gifts for human being which exists in vast amount on the earth is one of the fundamental principles for saving human and all creature life on earth. One important part of this duty is controlling the solid wastes which have an important role in the new era of sciences based on economic health. This article will attempt to illustrate the importance of the problem, recognition and classification of the waste, collection, transportation and excretion of them. Based on the surveys have been done so far, generally the holding of the wastes are done in non- standard and insanitary methods and include many variety ways which have made big problems in the urban regions. Based on the surveys in a particular region in Aras free region, there are a few households which put their wastes in plastic bags and then put them in special dust bins. The rest of them put their wastes in inappropriate plastic bags with various colours or keep directly them in unsanitary containers such as tins, cartons, empty buckets and inappropriate bins and so on.

***Keywords*—** municipal solid waste, vermicompost, Aras free trade and industrial zone**.**

I. INTRODUCTION

The development of the cities and the irregular increase in the population, the change in consumption patterns of societies and extreme increase of the wastes and also having no scientific and proper management methods in production, municipal waste disposal has made many struggles for urban communities. From sanitation engineering point of view, the disposal of wastes is not a common problem and in fact it is an environmental problem, because the insanitary disposal of wastes may cause contagious deceases and environment pollution and so on. this study is firstly characterised by its originality. the research committed to hydrological aspect of municipal solid waste is indeed very limited to date.[1],[2],[3],[4]. In the UK, a number of studies have looked at the association between social characteristics and residence in the vicinity of waste sites and found that solid waste and other polluting facilities were far more likely to be located in more deprived areas[5],[6]. There has been some suggestion that fortnightly collections of waste may be responsible for an increase in the rat population [7] but, while rats and other vermin may be on the increase, this is felt to be multi factorial and not simply related to waste collection frequencies[8]. Health issues have been associated with every step of the handling, treatment and disposal of waste [9]. daily increase in the amount of wastes and the variety of wastes make the collection and disposal of them much more complicated. Today the traditional methods of collection and disposal of wastes are not so useful and can not forbid environmental pollutions made by chemical, biological and radioactive and so on. The legislation for management of wastes despite having some defects, can be a proper action in the management of the wastes in country. The following actions might be necessary in better management of the solid wastes in urban areas:

Changing the consumption patterns of people through cultural education and required legislations.

Using the expertize with background in management of wastes and health issues.(solid waste materials)

Making efforts to build biocompost and vermicompost instead of combined compost by making compost systems and separating hazardous wastes from the source. While most source separation of household waste should not cause any health hazard to householders it has been suggested that domestic recycling of kitchen waste may pose a hazard [10].

Equipping vehicles for collection and transportation of

Manuscript received October xx, 20xx: Revised version received March xx, 20xx.

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ISSN (Online): 2305-0225
Issue 2(2), January. 2014, pp. 60-63

wastes and using modern, healthier and technological systems.

Finding the appropriate places for disposal of wastes based on hygienic, preparation and storage criterions and complete implementation of disposal definitions in these positions.

Doing research in order to find appropriate waste disposal systems correspondent to each special geographical region in every area.

Solid waste materials:

Solid wastes are referred to all materials which have remained of human and animal activities and usually are solid and are thrown out as unwillingly or as they can not be used any more. The components of urban solid wastes are as follows:

Food wastes:

It is referred to the perishable part of the garbage which come from plant wastes, producing and cooking and storage of the foods. The amount of the perishable food wastes in Iranian urban wastes is reported between 35 and 75 percent.

Recycles:

It is referred incorruptible segment of the garbage except ash. The recycles can be divided in to two groups of flammable and inflammable recycles.

Ash:

Ash is referred to the remnants of burning coal, wood and other flammable materials which are used for industrial, cooking and heating purposes.

Residues left from demolition and construction:

They are referred to the wastes remained from the demolition of buildings, fixing the residential, trade and industrial buildings or other building activities.

Special wastes:

They are referred to the wastes collected from streets, the tree leafs, the animal's dead bodies and wastes of the transportation vehicles.

The area of study:

The town of Jolfa which is in the north west of east Azerbaijan, geographically located between 47 degree and 17 minutes to 46 degrees in north longitude and between 38 degrees and 39 minutes to 39 degrees and 2 minutes east latitude. In political divisions Jolfa is divided to two parts of central and Siahrood part and 5 districts of west Dismar, Nojemehr Ersi,Daran and Shoja. Based on the surveys of 2005 the number of the villages of Jolfa with residents is 73219.(table 1)

Table. 1 political divisions

city	The number of village residents	Count the empty village
Jolfa-Hadishahr	28	14
Siahrood	27	4
Total	55	15

II. METHODS AND TOOLS:

In this part, summary of production, storage, collection, transportation, composting and disposal of wastes will be discussed.

Production:

Based on the area research and the population and size of the divided regions it needs to make samples from the origins of waste (all the sources of wastes) productions.

The amount of waste production:

The daily waste production in many cities of Iran is about 700 gram, but in this research, the city of Marand which is considered as a city close to Aras free region in terms of culture, economic and weather futures has production of 480 gram.

Table. 2 The amount of municipal solid waste daily production of Aras Free Zone

population	Residents	Expatriate employed person	Average of tourists during the day
daily production of waste (ton)	4.2	5	7.95
Waste production (Kg)	4212	5000	7950

Opportunities:

Most of the wastes produced belong physically to plant materials which are perishable and can be composted. The surveys yield that the trade and industrial wastes are also compostable in the study area.

Threats:

Lack of citizen's awareness of the ways to reduce the waste productions, the orientation of the residents to higher consumption of diverse and new kind of productions including foods or other materials increase the total wastes.

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Storage:

Most of the citizens or families which live in the cities and are served by municipals, store their wastes in the plastic bags.

Opportunities:

The existence of suitable cultural and social backgrounds, in order to improve the participation of citizens in this issue.

Threats:

Lack of waste separation and combining the wet and dry wastes together

Lack of waste containers in various regions of cities

The leaking of water taps in the pathways

The inappropriate using of storage containers such as tins, cartons and so on.

Collection and transportation:

The collection of wastes is done by special cars and garbage carrier trucks.

Opportunities:

Covering all the research area with the garbage collection system.

Threats:

Lack of the citizen's awareness towards the issue of waste

The lack of information in this regard

Non- cooperation by citizens, organizations and schools, especially in the separation from the origin

Lack of coordination between Aras free zone and municipal of Jolfa

Process and compost:

In the current time, there are no activities associated with separation and compost of the wastes and citizens sell some of their wastes to badgers to obtain money by their choice.

Opportunities:

The advent of necessary economic facilities for citizens and buyers

The existence of necessary cultural and social backgrounds.

Threats:

No financial and cultural supports from the private section.

The lack of information in this issue

Using the Traditional methods for compost and process of wastes

No recycling plants in the area.

Burial:

At the current time the wastes are buried in a region close to Jolfa.in this method, the garbage are collected daily and buried in that region and then surface is covered by soil.

Opportunities:

The buried place is located close to the cities.

The possibility of choosing one place as joint place to bury all the wastes of the surrounding towns of Aras free Region.

Threats:

The Lack of sanitary in burying the wastes and burying them in mixed form which are combined form of recyclable and non- recyclable wastes

The Lack of infrastructure in the current landfill waste

Throwing Parts of the wastes near the burial position

III. CONCLUSION:

Based on the surveys have been done so far, generally the holding of the wastes are done in non- standard and insanitary methods and include many diversity ways which have made big problems.

The problems which can be mentioned in the current time are as follows:

The leaking of water taps in the pathways.

The easy access of rodents and some animals which eat from garbage to the wastes.

The lack of appropriate waste container.

The lack of proper washing of the waste tanks

The analysis of the current situation of collecting, transporting, recycling and processing of the wastes:

Collection and transportation:

The collection system in the area of study is the method of collecting in the street kerbs.

The collection is done by the waste carrier trucks.

The wastes are collected by hands and put in the containers by workers.

Separating from the origin:

According to the research results, there are no regular plan to separate the wastes from the origin and household wastes

Processing wastes:

At current time there is no processing plan on the wastes of the study area.

Landfill:

The wastes in the study area currently are buried without research on the places of landfill and considering the environmental issues.

In Aras free zone there is no separation or processing of wastes from origin and after collection and transportation of the wastes. They are carried to the landfill and buried there. On the other hand by considering the rate of population growth, the amount of waste production in the next 10 years will increase. The amount of the produced waste has explained (1):

$$P85=P75(1+r)10 \qquad (1)$$

Hence the population growth rate is 0.1 percent and the

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population can be predicted in the following 10 years(2).

$$P95=2276=23000 \qquad (2)$$

By considering the amount of waste producing per day, the amount of production can be calculated per year. (450 kg/m3)

As the waste volume is decreased to 20 percent of its initial volume at the time of disposal, any garbage with 450 kg will be converted to 0.2 cubic meters.

Annual waste production =5840ton

Volume of the Annual waste production =12978 m3

Annual buried waste=2596m3

It can be seen that the amount of waste production has been increased in the last 10 years, and the selection of the right place based on the area required for the produced waste in the region, will cost more due to the lack of intention to the collection of the wastes.

Studies shows that the majority of the physical waste produced is related to organic wastes which can be composted and the residues which are few amounts can be buried. Besides that the studies show that vermicompost can be so effective by producing the richest bio-organic fertilizer and agricultural conditions. Due to the cultural and social characteristics of the region, the actions to reduce the wastes might yield effective results.

ACKNOWLEDGMENT

The authors acknowledge the invaluable cooperation and support from the Deputy and staff of Aras Trade and Industrial Free Zone for facilitating the issue of this project. for facilitating the issue of this project.

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