

Analysis of Ecological Problems in one of the Cities of Isfahan Named *Segzi* with the Focus on the Executive Solutions

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ABSTRACT: One of the most important issues that city managers are faced with is the issue of waste management. Solid waste management is generation, collection, sorting, recycling, compost and land filling of the waste. This process isn't qualified and efficient enough in all cities in Iran. This can lead to lots of problems and issues itself. In this research, the case of one of the cities located in Isfahan named " *Segzi*" is studied that is located in the desert and eastern region of Isfahan. The pollution in this area has been increased subject to the weather conditions such as winds associated with dust. Old plaster and brick kilns, also increase the contamination of the area. This research was based on practical objectives and had a case-descriptive nature. So the objective of the article was the detection of ecological issues of the city of *Segzi* and presentation of solution and suggestions in order to improve the area status using the SWOT analysis method.

Keywords: Waste, Recycling, The City *Segzi*, Contamination, SWOT Analysis Method

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INTRODUCTION

Increased municipal waste and garbage is caused by expanding the settlements and population growth that leads to lots of environmental issues and the lack of good management on it can cause lot of problems. In the recent decades, the contamination and loss of gifted and natural resources, has made the experts to replace the waste disposal programs with solid waste recycling programs (Ghasemali Emrani, 1995).

Segzi is a city in the central region of Isfahan with 134 Hectares and the population of more than 4698 people and *segzi* desert is one of the most critical deserts in Iran that causes the contamination of the next and neighbour cities. Waste burial or landfill sites have always been one of the basic problems of the authorities of municipal services. Sanitary and environmental risks of the waste disposal need to be managed and controlled specifically, because this is very close to people daily lives. With the population growth, this management gets more complicated. The most critical phase in solid waste management system is the collection of sorted and not sorted waste. Considering the problems of waste disposal in the cities, systematic locating is very important. Just digging a hole, putting the waste in it and covering it with the soil is not a sanitary Land filling. A sanitary land filling of waste consists of industrial, mineral and other stages.

Also air pollution means the presence of unwanted materials in the air to the extent that causes harmful effects. Unwanted materials can affect the people, plants, materials, and constituents of global environment and create undesirable scenes with misting the weather and production of unpleasant odours.

Statement of Problem

Lots of cities in the world are faced with population growth and increased consumption that are signs of technologic improvements. From 1960s onwards, ecological models in the cities and specially in the large cities have been changed immensely. These changes not only have affected space location changes of the cities, but also have changed the infrastructure services in the cities. Analysing the current status of wastes in the cities stresses on the necessity for good planning and management in this context and urban managers are looking for optimal solution for problems and issues of urban management include of municipal waste management. The city of *segzi* is located in the east of Isfahan that has some problems regarding to ecological issues of municipal waste disposal. The desert of *segzi* causes the blowing of dust from sand dunes and also with the accumulation of waste in these areas and blowing the wind toward neighbour cities, the contamination causes some illnesses. These problems persuaded the researcher of this study to analyse the ecological issues of this area and the quality of waste disposal in this city and find the solutions in this context.

MATERIAL AND METHODS

In this research, the strategies and programs of the managers of *segzi* for solid waste recycling was analysed. And the strength and weaknesses (Internal factors) and opportunities and threats (external factors) of the system of solid waste recycling in the area were analysed based on Strength and weaknesses and opportunities and threats (SWOT) method. Then the strategies that were harmonized the current status of the study were evaluated

and using the results of SWOT, effective guidelines for increasing the strengths and opportunities and decreasing the weaknesses and threats of waste disposal system in *Segzi* were presented.

Research questions

- 1-How is solid waste disposal done in *Segzi* now?
- 2-Considering the type of waste generation in *Segzi*, how necessary is the construction of facilities and firms for waste sorting and recycling?

Research Hypothesis

1-It looks like that municipal waste disposal in the city of *Segzi* located in Isfahan is done by a nonstandard, traditional, inappropriate method.

2-Considering the type of waste generation in the city of *Segzi*, it looks like that the construction of facilities and firms for waste sorting and recycling is necessary.

Study area

The city of Isfahan is located in south of Tehran and is 425 (km) far from it. With the cabinet approval in May 12, 1995, geographical districts of *segzi*; *Mazrahe shoor* and *residential complex of railway station* that were considered vicinities of *Koohpaye* district of the city of Isfahan, were integrated together and were named the city of *Segzi*. The area of *segzi* is more than 134 hectares. The distance of the city of *segzi* to the center of province: *Segzi* is 35 (km) far from Isfahan and in the east of it. It is located next to *Isfahan- Naieen* road on the sidelines of Iran's central desert (*Lute desert*).

It is 1530- 1560 (meters) above sea level. According to the latest statistics and census of population and housing in 2006. *Segzi* has the population of over 4397 people including 2258 men and 2139 women. It also has 1217 families.

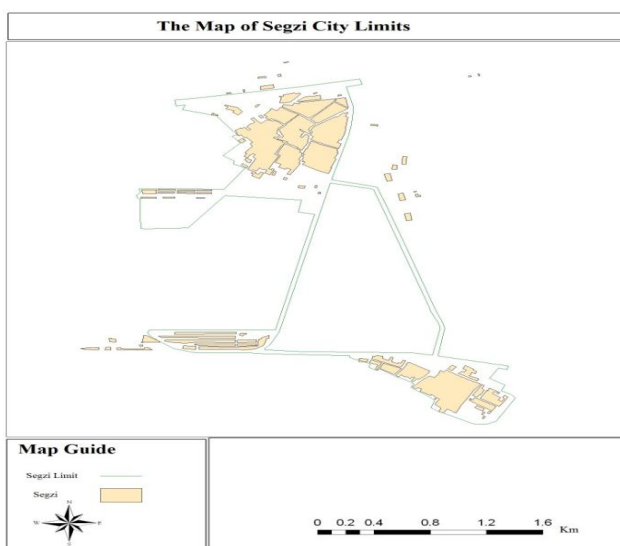


Figure 1. Map of city of *Segzi* limits (Isfahan Department of Environment).

Segzi or *sejzi* desert is a human made desert that is one of the critical deserts in the center of Iran that causes the contamination of the cities in the neighborhood. This desert that has exposed the area of over 40,000 hectares to the shifting sands and billion dollar damages of dust and

contamination, years ago was a flourishing canebrake and meadow. (www.fa.wikipedia.org).



Figure 2. Aerial image of city limits of *segzi* (Source: Google earth.)

Table 1. the introduction of city limits and area

city	desired area	Distance from the major city	Area (Hectares)	population
Isfahan	<i>Segzi</i>	35km	134	4397

(Source. www.fa.wikipedia.org)

General concepts

Waste: 1-Solid unwanted materials (wastes) include all wastes from human and animal activities that are usually solid, unusable and useless (Ghotb Abadi, 2002); 2-Wastes include all activities that are done in the cities and villages and have diversity of generation sources and various physical and chemical properties; 3-Citizens call the materials that generate themselves in various states of liquid, solid and gas, waste (all solid materials that are considered unwanted, useless and not worth of keeping by majority of people or the owners are called solid wastes) (Center of urban studies and planning, 2001); 4-Wastes (garbage) are solid, liquid and gas materials that are generated out of human activities, directly or indirectly, except for excrement. These materials are considered wastes by the people who generate them (organization of Tehran municipality's recycling and conversion materials, 2003).

Waste disposal from all the wastes discarded by urban community to all the wastes that are generated by agricultural. Activities include detection, preparation and utilization of the location of waste burial. Hereon the direction of a good place for waste burial is very important (Zareh, 2010).

Solid waste

Solid wastes include all wastes generated from human and animal activities that are always solid and aren't usable by the people who have generated them at the time, in the shape, status and amount that have been generated, economically and in times of sanitary issues (*Saieednia* et al., 2004). In other words, solid wastes are materials that are not liquid and are useless and worthless for the owners. Solid wastes include household, commercial and street wastes.

In developing countries, wastes include different amounts of solid wastes of small industries, human excrement and animal corpse (Martin Medina, 2003).

Garbage: The lack of accurate and exact rules about collection, disposal and recycling the waste in the country causes the burial of 38000 tons of garbage every day that almost 76 percent of it is convertible materials to fertilizers and include tones of plastic and paper that are buried around the cities and in addition to health dangers cause big economic damages. According to a general calculation, our fellow Iranians bear a budget of around 80 billion Rials a year for waste collection and disposal (Emrani, 1995).

Waste management: A systematic regulations set in order to control the generation, storage, collection, transfer, processing and disposal of waste, is called waste management. This method of management include all administrative, financial, engineering and designing elements and considers the most efficient basis of public health, biology, economy, protection of resources and ecological, protection of resources and ecological considerations. The wastes that can be detoxified are;

Mineral toxic wastes: The wastes that have chromate and potassium cyanide and have been generated by metal plating are the wastes that can be detoxified by oxidation using hypo chloride.

Organic toxic wastes: Pesticides that contain chlorine can be destroyed by chlorine disinfection processes. Some of these processes are based on reaction to organo-metallic Na compounds (Mouler, 1993).

Waste sorting: Waste sorting means dividing the solid wastes to similar groups like metal, glass, paper and food products, also grouping the materials to special groups like colorless glass bottles and colored glass bottles. Sorting can be done by hands at home by separating the paper, glass and ...or at big recycling firms by workers.

Recycling: Recycling is one of the most important methods for solving the problem of solid waste.

Recycling means allowing a material to pass through a system, that makes the material usable again. Recycling decreases the amount of consumable materials required for production of products and consumption of energy and it also causes savings in raw material consumption (Mortazayi, 2002).

Air pollution: Air is one of the vital elements required by human and animals. An ordinary person who weighs 68.5 kg needs 12kg of air for resting, 45kg for style works and 69kg for heavy works. This amount is 15-20times more than the food every person needs daily.

Importance and extent of air pollution: The air has become one of the most challenging ecological issues in most countries in the world. The basic problem refers specially in big cities to engine vehicles. Although in some urban areas, Carbon dioxide, Carbon mono oxide

emissions have been severely decreased, half of urban population in the world, more than 990 million people, still are exposed to emissions of sulphur dioxide and also over 1 million people are exposed to emissions of excessive suspended particles in the air.

Air pollution results: Air pollution has very had effects on human health. It's easy to evaluate the short term effects of air pollutants on human health, it is done in the laboratories and with high concentrations of pollutants, But, It's not an easy task to evaluate the effects of air pollutants on human health in real terms, namely long term effects and low concentration of air pollutants. The visibility effects of air pollutants on human health are generally known to public.

Ecological issues of "Segzi": One of the most important issues that municipal service managers are faced with is the problem of the storage of the wastes in transfer stations. According to the studies, the bad effects of this problem lead to lots of serious financial, Social and ecological issues of the cities. One of the basic problems in the desired area (Segzi) is the existence of traditional plaster kilns-around 12 traditional kilns- that were mainly established in the city currently named *Khorasgan*, in the past (60s). Those kilns were later transferred to the area because of the pollution. In comparison to the number of brick kilns and the existence of sand mines in the area, the plaster kilns have a tiny effect on the quality of the weather in Isfahan, but, considering their short distance to Isfahan, under the special atmospheric conditions can increase the air pollution in Isfahan.

SWOT analysis method: This method is a term which is used for detection of internal strengths and weaknesses and external opportunities and threats that a system is faced with. This method provides a reasonable frame to lead the system debates and guidelines systematically and at the end chooses the guidelines for the system.

Table 2. SWOT analysis method

External factor	(S) Strengths	(W) weaknesses
(O) Opportunities	Strategies which are based on the utilization of the strengths to exploit the opportunities	The strategies which are based on the destruction of weaknesses to exploit The opportunities
(T) Threats	Strategies which are based on the utilization of the strengths in order to fight the threats	The strategies which are based on the destruction of weaknesses in order to fight the threats

Table 3. Strategic Analysis of social and cultural factors of Segzi ecological issues

Internal factors	Factors
1) The possibility of education and training of the people for recycling 2) The growth of the population that is covered by municipal services and necessity for recycling programs 3) The possibility of collaboration of the citizens for recycling 4) Role of schools and local media in recycling and waste management	Strengths (S)
1) Lack of educational programs about the management of recyclable materials and wet or dry wastes 2) Lack of public participation in recycling 3) dissatisfaction of citizens about the efficiency of municipalities 4) Poor performance of schools and local media on recycling and waste management	Weaknesses (W)

1) To emphasize the importance of waste issues by the citizens 2) the existence of ecological organizations in the city 3) To stress the social programs, and waste management programs 4) approval of people of dry and wet waste sorting programs	Opportunities (O)
1) Socio cultural differences between the people in the city 2) dissatisfaction of the public of municipality performance on recycling and waste management	Threats

Table 4. Strategic analysis of economic factors of “Segzi” ecological issues

Internal Factors	Factors
1) To start the mechanized collection of the wastes 2) To provide the mechanized vehicles and equipment for collection of wastes and recyclable materials 3) Providing durable sources of income for the management of wastes 4) The emphasis on the economic advantages of recycling	Strength (S)
1) Lack of planning on decrease of wastes 2) Lack of durable sources of income for waste management 3) growth of waste collection costs, because of the lack of planning in this context	Weakness (W)
1) Investors desire to participate in recycling programs 2) Creating Job opportunities with recycling programs 3) The possibility to use the recyclable materials 4) Performing the recycling and waste disposal programs	Opportunities (O)
1) Changing the consumption pattern of people 2) Lack of investments on infrastructures and establishments 3) Not using the durable and recyclable goods 4) Lack of a known market for selling the recyclable materials	Threats (T)

Table 5. Strategic analysis of physical –environmental factors of “Segzi” ecological issues

Internal factors	Factors
1) Healthy sorting of wastes 2) doing ecological researches to suggest good places for waste burial 3) To distance the waste burial sites from birds stations.	Strengths (S)
1) Nonstandard burial of municipal wastes and contaminating the environment. 2) Outdoors waste burning which results in contamination 3) Casting the wastes around the burial site 4) threatening the birds because of being close to waste burial sites	Weaknesses (W)
1) Planning for removal of contaminators 2) Using suitable urban sites for waste management services 3) Supporting the ecological organizations for protection of the birds	Opportunities (O)
1) The density of urban population 2) Contaminated environment because of the lack of the lack of a good waste management 3) Creating ugly scenes in waste burial sites.	Threats (T)

Table 6. Strategic analysis of management factors of “Segzi” ecological issues

Internal factors	Factors
1) Having a centralized intensive management for recycling 2) The possibility of providing Functional waste management programs 3) Creation of supportive and responsible elements for waste management 4) Existence of experts of waste management	Strengths (S)
1) Lack of a centralized intensive waste and recycling management 2) Not organized and not official itinerant units for recycling 3) Lack of intensive and durable approval of people for municipal waste collection 4) Lack of approval for researches about recycling 5) Lack of experts in this context	Weakness (W)
1) Changing the functional instructions for recycling 2) The possibility of performing waste and recycling programs 3) Cooperation with organizations and administrations in solid municipal waste management	Opportunities (O)
1) low attention of ecological authorities to waste management 2) persistence on traditional and centralized management 3) Lack of coordination between various parts recycling system	Threats (T)

The Evaluations of Segzi in SWOT method leads the managers to increase the strengths and opportunities and decrease the weaknesses and threats and consider all 4 strategies (Internal growth strategy (SO), external growth strategy (WO), strategic guideline (ST), Strategic defense (WT)) and merge the internal and external factors and choose the best strategy.

As mentioned earlier on the tables, opportunities and strengths of desired area (Segzi) should be considered and using these opportunities, growth strategies of the area will be suggested and using the opportunities in the area waste management in “Segzi” will be improved. The results of SWOT analysis model for the case of segzi are:

- 1- Improvement of authorities' supervision on cleaning the roads and streets of Segzi.
- 2- Educating and training the residents of "Segzi" for sorting of wet and dry recyclable wastes.
- 3- Turning the useless lands in to parks
- 4- Improvement of department of environment and municipality focus on the quality of waste collection in the city
- 5- Persuading the educated people in the area to develop researches and projects about recycling
- 6- Keeping the birds away from the waste burial sites
- 7- Further consideration of department of environment and municipality for the improvement of quality of the city.



Figure 3. The wastes in Segzi(Source:SCRIVENERS)



Figure 4. Recycling the wastes (Source: SCRIVENERS)



Figure 5. Recycling the wastes (Source: SCRIVENERS)

RESULTS AND DISCUSSION

Response for the questions

First question – How is the solid wastes disposed now in "Segzi"? This question relates to the first hypothesis. Waste burial in "Segzi" is done with the traditional method of digging trenches in the ground and putting the wastes in it and burning them. This burning of the wastes outdoors, causes the contamination of the environment and air pollution. This traditional method can be changed by waste sorting and using the mechanized methods.

Second question: Considering the type of waste generation in Segzi, How necessary is the establishment of facilities and firms for waste sorting and recycling?

This question is related to the second hypothesis of the research. According to the studies in "Segzi", 2 tons of wastes are transferred to the town everyday and there isn't any place for the temporary storage of them and they are buried in a traditional way and the burial sites aren't insulated properly. In addition to it, because Segzi is located in the desert and although it is cold, the raining level is very low, construction of firms and facilities for sorting and recycling seems verve necessary in the area.

Testing the hypothesis

First hypothesis: Considering the waste management in Segzi, it seems that waste burial and disposal is done in a nonstandard, traditional, inappropriate way. According to the studies, waste burial in this area is done with trench method. In this method some trenches are digged in the ground and the wastes are burned in them, that increases the air pollution of the area. Considering the data provided by SWOT method, It can be said that "providing the mechanized equipment and vehicles for the collection and recycling and improvement of waste burial statues can decrease the pollution of the air which is caused by burning the wastes outdoors.

Second hypothesis: Considering the type of waste generation in Segzi, it seems that construction of the firms and facilities for recycling and waste sorting is necessary. As mentioned earlier separating the recyclable wastes and amount of selling them, shows the level of knowledge of people about recycling. According to the department of environment analysis 2 tons of wastes is generated every day in "Segzi" that 50% of it is dry and 50% of it is wet waste. The result of SWOT method helps the sorting and efficiency of recycling and waste disposal programs in the city.

CONCLUSIONS

According to the studies 2 tons of wastes are generated every day in "Segzi" and there isn't any place for temporary storage of them. The wastes are buried in a traditional way and the burial sites aren't insulated properly. Segzi is located in the desert and although it is cold, the raining level is very low there. A restricted evaluation of evaluation of surface and underground water in "Segzi" shows that they don't have a serious problem in terms of contaminations.

Considering the social, economic and ecological status of the city, compound methods of waste burning, compost, paper, plastic or metal recycling and healthy and standard burial of the 15 kilns, out of 16 plaster kilns that are existed in the area, are 100-1300 meters far from the closest village. The new units that are not far enough from the villages shouldn't get permission to be constructed. Also the loading of the wastes in "Segzi" should be speeded, so the contamination is not casted in the city.

Guidelines and proposals

- 1-For bidding the issuance of license for new plaster and brick kilns in “Segzi”
- 2- Preventing the storage of the wastes on the ground in all stages of collection, transferring and disposal.
- 3-Economizing the various stages in Segzi waste management.
- 4-Using the refined effluents of urban wastewater refineries located in the east and north of Isfahan.
- 5- Using all of the facilities in the country to provide the required machinery and equipment for recycling.
- 6-Providing the required facilities for sorting of the wastes by families.
- 7- Persuading the citizens to sort the wastes.
- 8- Transforming the traditional waste disposal and brick production methods in to new ways.
- 9- Decreasing the effect of contaminators on the city and developing desert eliminating programs.

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