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Municipal Solid Waste Management, a Step towards Sustainable Development Case Study: Zanjan City

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Extended abstract

1- Introduction

During the past two decades, municipal solid waste (MSW) management has become one of the major concerns. In municipal solid waste management, different ways of disposal exists. Hence, collection and proper disposal of waste in order to reduce health risks and damage to flora and fauna and the environment is very important. Although buriae is the best and most common method for disposal of solid wastes. But lack or loss of traditional waste disposal sites, environmental control monitoring solid waste disposal, increasment of its size and weight,especially in industrialized countries and major cities, have a significant contribution in increasing services and disposal costs.

Because waste disposal services vary from economical aspect, hence, recycling waste and increasingly becomes cost-effective. The fact that urban waste management system of Iran has critical and undesirable conditions. Cannot be ignored. In Zanjan city municipal waste is not separated because there is no seperate transportation vehicles, there is no knowledge a boul physical properties of the waste produced in this city. Therefore determining the potential for recycling or disposal methods and machinery required for management is related to with is data. Lack of awareness of social obligations and urbanization, especially about health matter and environmental protection and the misconception of most citizens of waste

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management as getting rid of it personally of waste from the, lead to lack of success of the implementation of solid waste management programs. Therefore, a study in Zanjan about the understanding of solid waste physical components, capabilities and potential of each of the recyclable components, and also the necessity of public participation of practitioners and citizens in cleaning the city become necessary.

2- Theoretical bases

The purpose of this study is show municipal solid waste situation in terms of production, per capita, physical composition and various methods of disposal in Zanjan. Using weighted analysis and field studies - cases of solid waste were collected in the period of the autumn of 2008 to the summer of 2009 through the truck-load sampling based on random cluster sampling. As such, in the middle of each season, the weight of each garbage truck has been measured for seven days and each day, the load of just one truck were separated manually for determining the physical components of the waste constituents. So that the solid waste was analyzed. Generalizing the findings to other days of each season, information relating to municipal solid waste of each season was gaind. Also in this study, Zanjan's citizen participation in the implementation of waste separation at source has been investigated. Public surveys wereconducted by classifying the city into four clusters and completing 400 questionnaires through interview method by 0.4 percent of households living ineach clusters.

3– Discussion

Results show that citizens of Zanjan produce about 270 tones of solid waste daily. Per capita 0.77 kg per capita this is 0.13 kg higher than the average per capita (0.64 kg) in Iran. The the maximum rate of 25623 tons of solid waste was produced in the autumn, i.e. 284.7 tons per day and the lowest rate of 24142.8 tons was produced in the spring , i.e. 259.6 tons per day. Also, by comparing values obtained for the density of solid waste in different seasons, it is found that the highest density was related to the autumn, which is averaged around 238.6 kg per cubic meter and lowest density of solid waste is in the spring with the average of about 219.2 kg per cubic meter. The high density of solid waste in the autumn can be due to the high amount of organic matter in the season with high humidity such as fruit and vegetable skins which compose the highest percentage of solid waste. Also in Zanjan city, hospital waste production rate is 3.3 tons and industrial waste is 2.5 tons per year. On the whole, 98531.5 tons of solid waste is produced annually in Zanjan. The results show that sepreration at source is more desirable, effiuient and plactical then separation at other stages due to the ease of separation requiring minimal time and cost, less contamination and destruction of recyclable materials. In this study citizen participation in recycling programs was also studied and evaluated and the results. Hopefully shows the positive view of citizens for cooperation in urban waste management in Zanjan in the future.

4- Conclusion

Based on the research about 73 percent of Zanjan waste is organic waste, so, there is a high potential for composting industry. On the other hand, the share of total dry waste production is growing slowly, that necessitates the use of recycling. Although the separation of recyclable can be done in transfer stations materials, in the central processing station or landfill occur but separation of recyclable materials in the production stage (in source separation). Is more desirable, effiuient and plactical then separation at other stages due to the ease of separation requiring minimal time and cost, less contamination and destruction of recyclable materials? Considerable value of source sepretion of dry waste and separation of dry waste from the total waste produced the need for producing energy material from waste as well as the need for proper and healthy and doing this burial along with other countries, prescribe appropriate strategy and implementation plan for Zanjan city. Accordingly, two strategies, of solid waste separation at source and increasing processed waste strategy has been proposed.

5– Suggestions

According to the results and discussion of the research for municipal solid waste management in Zanjan city two strategies of separation and isolation of solid wastes produced in the source and increasing processed waste are recommended. Separation of wet and dry wastes can be done in two ways: separation during production or separation of waste from source and separation with processing waste during collection, transport, storage, burial or composting. To perform source separation hardware and software features are required. Success in this regard, needs multilateral cooperation of the executive team of solid waste management, people, official and commercial units operating in Zanjan city. In the other word, implementing such a plan demands legal requirements, proper planning, proper funding and its classification, hardware, software and structural requirements and private sector participation. And also to increases the processed waste, residual waste after the stage of separation at source, includs dry energic and mixed waste, processing units (including composting and energy production) and maximization of recycling minimization of burial of recyclable materials. Implementing this strategy, with participation of producers of this material (people) can become a successful activity. New health promotion movement needs the cooperation of all sectors of society and without their active participation it cannot be done or achievement of the objectives is very difficall. Therefore, solving today's problems of collecting, transportation and disposal of municipal solid waste, is not possible without people's cooperation with the authorities.

Keywords: Municipal Solid Waste, Waste Management, Recycling, Sustainable Development, Zanjan city.

Refrences

Abdoli, M.A. (2000); Disposal Management and Recycling of Municipal Solid Waste in Iran, Municipalities Organization Press, Tehran.

Abdoli, M.A. (2001); Recycling and Disposal of Municipal Solid Waste; Developing Appropriate Methods and Providing Health Bury Manure Compost, Municipalities Organization Press, Tehran.

Blowers, A. (1994); Planning for Sustainable Environment: A Report by the Town Country Planning Association.

Burnley SJ, Ellis JC, Flowerdew R, Poll AJ, Prosser H. (2007); Assessing the Composition of Municipal Solid Waste in Wales. Resources, Conservation and Recycling.

Caevel, B. Buekens, A. (2000); Material recycling. In: Nat et al. (eds.) Sustainable Managment in Southern Black Sea Region, Kluwer. Aca. Pub.

Center of Iran Statistical (2006); Population and Housing Census of Zanjan City.

Clark, M. (1992); A Sustainable Economy, Earthscan, London.

Daivid, F.R. (2005); Strategic Managment, Translated by Ali Parsaeyan and Seyed Mohammad Erabi, 6th Publicashed, Pubished by Center for Cultural Recerch.

Dehghani, M.H. Dehghanifard, E. Azam, K. Asghri, A. Baneshi, M.M. (2009); A Quantitative and Qualitative Investigation of Tehran Solid Waste Recycling Potential, Knowledge & Health; 4(1):40-44.

ENG, R. Williams, A. (2006); Environmental Planning for Sustainable Urban Development, Exhibition at Chaguaramas, pp 2-6, October, http:/www.bvsde.paho.org.

Hassanvand, M.S. Nabizadeh, R. Heidari, M. (2008); Municipal Solid Waste Analysis in Iran, J. Health & Environ, Vol. 1, N0. Iran.

HICPAC (Centers for Disease Control and Prevention. Healthcare Infection Control Practices Advisory Committee). (2001); Draft Guideline for Environmental Infection Control in Healthcare Facilities.

Hosseinzadeh Dalir, K. (2001); Regional Planning, Samt Press, Tehran.

Kaseva, M.E. Mbuligwe, S.E. Kassenga, G. (2002); Recycling Inorganic Domestic Solid Wastes: Results from a Pilot Study in Dares Salaam City, Tanzania. Resources, Conservation and Recycling.

Ludwing, C. Hellweg, S. Stucki, S. (2003); Municipal Solid Waste Management. Springer-Verlag Berlin Heidelberg, New York.

Magrinho, A. Didelet, F. Semiao, V. (2006); Municipal Solid Waste Disposal in Portugal. Waste Management.

Metin, E. Erozturk, A. Neyim, C. (2003); Solid Waste Management Practices and Review of Recovery and Recycling Operations in Turkey. Waste Management.

MOR, S. Ravindra, K. Dahiya, R.P. Chandra, A. (2006); Leachate characterization and assessment of groundwater pollution near municipal solid waste landfill site. Environment Monitoring and Assessment.

Office of Biomass Energy, New Energy Organization of Iran (2005); Plan the

Production of Energy from Urban Wastes in Iran.

Papoli Yazdi, M.H. Vousoqi, F. (2004); Organized Solid Waste Recycling Industries in the City of Mashhad Necessity Recycling, Quarterly of Geography and Development, No. 3, Zahedan.

Raghimi, M. Shahpasandzadeh, M. Yaghmaei, F. Qlipour, M. (2006); Investigation of Physical Analysis of Household Sold Wastes with Aspect of Recycling the Attitude to it (Case Study: Gorgan City), J.agric.sci. Natur. Resour, vol. 13(3), july-Aug

Recycling and Commutation of Materials Organization of Zanjan Municipal, (2009); Statistics Relating to Municipal Solid Waste Position Zanjan, Zanjan Municipal.

Saeidnia, A. (2003); Municipal Green Book, Volume 7, Municipal Solid Waste, Municipalities Organization Press, Second Print, Tehran.

Sajjadi, S.A. (2003); Solid Waste Management and Human Resources, Municipals Quarterly, No. 7.

Tchobanoglus, G. Theisen, H. Vigil, S.A. (1993); Integrated Solid Waste Management, Engineering Principles and Management Issues. McGraw-Hill for Mainland China Edition: McGraw-Hill Companies Inc.

UN. (1998); Conference on Environment and Development, Agenda 21, translated by Hamid Taravati and Sayed Amir Ayafat, Published by Environmental Conservation Organization with UNDP.

Yuan, H. Wang, L. Su, F. (2006); Urban Solid Waste Management in Chongqing: Challenges and Opportunities. Waste Management.

Ziyari, K. (2009); Urban Land Use Planning, Tehran University Press, 7th printing (Frist Printing in Tehran University).