

[Short Communication]

## Effect of cash subsidy on the quantity of domestic waste (Case study: Rasht, North of Iran)

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### ABSTRACT

Releasing prices and performing cash subsidy payment to all applicants with a different income level create differences in the method of household function and different services of organizations including waste and recycling management organization. The purpose of this study was to determine the effect of cash subsidy payment on the quantity of domestic waste in Rasht (Guilan province, Iran). The waste mass was determined by counting garbage vehicles. After determining the amount of waste mass, statistical analyses were done before and after "cash subsidy payment policy" performance. The obtained results showed that there is a significant difference between the amount of wastes materials in different periods of time ( $p < 0.05$ ). Therefore, the most amounts of wastes materials were produced in the first half of 2010 (with 15718 number of ply) while the least amounts were observed in the first half of 2008 (with 10055 cases). There was a significant difference between both halves of years in terms of waste production. But, the analyses of data obtained from 2008 through 2010 showed that the growth of producing waste materials in Rasht from November to December has been reduced by the beginning of cash payment of subsidy, so that it was grown 1.06% from November- through December, -8.16% in December, -14.62% from January- through February, -18.38 from February- through March, showing 24.49% in average growth in comparison to months prior to performing this policy. So the quantity of produced wastes in Rasht has been reduced after releasing the prices and paying cash subsidy. This situation caused by some reasons such as decreasing purchase power, and also citizens tendency to purchase more qualitative products and also complete use and saving food (70% of household wastes).

**Keywords:** Cash subsidy; releasing of prices; Rasht waste management; domestic waste

### INTRODUCTION

Social support policy in the form of welfare condition, subsidy policy and etc. were considered by governments from 1970 with the formation of humans axially reflections.

Most countries were paid subsidies in general realms but in 1980s following the debits crisis and global recession, the emphasis on development strategies altered to the improvement of economical management in which most countries took action in the framework of the aforesaid procedures to amend and correct the subsidies schedule.

In Iran, the performing targeted subsidies was initiated on 18th December 2010.

Alterations in management and economical politics are severe and affect way of living of any families in each country (Abdoli et al., 2010).

Implementation of targeted subsidies (as subsidies payment) was carried out to all candidates' households. Noteworthy, this type of subsidies is different from the targeted subsidies. So that in the present study, we did not intend to discuss about what the right or wrong way of implementation is. Since waste management is an important issue, only the changes (due to cash payment of

subsidies) on the volume of solid waste produced were examined before and after policy changes in Rasht.

Solid wastes include all the waste materials resulting by the procured activities on cities. They comprise variety regarding the production source and physical and chemical properties as well (Russell, 2008).

The following cases are considered so effective on the quantity of their ingredients:

Economic factors, urban texture, earth efficiency, cultural factors, surface scale density and social habits (Jafarzadeh aghifard et al, 2009).

Six elements form the framework of a management system of urban waste materials including production, holding in place, accumulation, transportation, process and discharge (Abdoli, 1993).

The management of the aforesaid elements is charged by municipalities.

According to article 7 regarding the waste management, approved on 20/6/2004 it is specified that the management of wastes is charged by municipalities (Saed and Tila, 2008).

The antiquity of municipalities in Iran in some provinces backdates to

1290 and there was no tangible transformation on urban areas in defiance of agedness and ancientness of the aforesaid organizations because of the plurality of responsibilities and regarding as unimportant of some basic actions e.g. urban neatness on the preservation of sanitation and etc (Jafarzadehaghifard et al., 2009).

Rasht ( $49^{\circ} 36' E$ ,  $37^{\circ} 18' N$ ) has an area of 136 square kilometres. The wastes of the city are transmitted to Saravan Burial Centre located at Saravan altitudes, the south-west of Rasht, 15 kilometres away from Qazvin-Rasht Highway.

The area has been considered to be used for burying wastes without environmental meta-analysis. It has the capacity for burying more than 500 ton waste materials.

The area lacks any accumulation system, latex refining and Methane gas accumulation.

Saravan waste latex enters Anzali Wetland through Zarjoub and Pirbazar Rivers (Guilan Science & Technical Park, 2010b).



**Fig. 1.** Various regions limits considered for waste collecting by Rasht municipality (Guilan Science & Technical Park, 2010a).

## MATERIALS AND METHODS

In this study bascules locating at the entrance of Saravan Burial Center were used to measure the weight of wastes and the ply of vehicles was used to measure the volume of wastes respectively.

The amount of wastes in Rasht was determined both before and after subsidy payment. Because of the non-homogeneity of the data, log out of data was prepared.

The means comparisons were tested by One-Way Analysis of Variance (ANOVA) after homogeneity control by Levene test. A Kolomogorov-Smirnov

test was used in order to identify data normality. Tukey's test was used to determine the significance of differences among treatments at 0.05% level. Statistical analysis was performed by SPSS software, version 13 (Chicago, Illinois, USA).

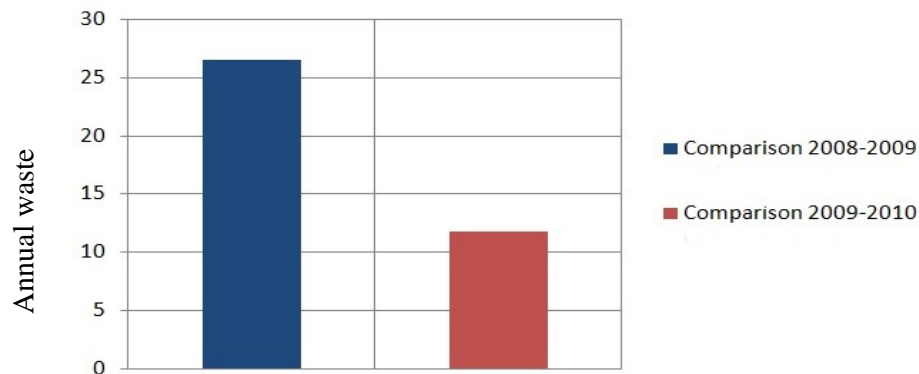
## RESULTS

In this study we measured the whole volume of produced wastes as well as the statistical values relating to the years 2008, 2009 and 2010. The obtained results are presented in Table 1 and Fig. 1 regarding the waste weight and the number of vehicles carrying wastes.

**Table1:** The number of waste collecting vehicles traffic in Rasht in years 2008, 2009, 2010 and comparison of produced waste growth (%). Note: the number of waste collecting vehicles ply is expressed as number per month.

Months	Increasing rate (%) between 2010 and 2009	Increasing rate (%) between 2010 and 2008	Increasing rate (%) between 2009 and 2008	2010	2009	2008
March- April	29.56	198.69	130.53	2739	2114	917
April- May	24.60	50.61	20.88	2705	2171	1796
May- June	30.06	57.57	21.16	2778	2136	1763
June- July	29.01	44.32	11.87	2797	2168	1938
July- August	24.36	27.34	2.39	2394	1925	1880
August- Sep	18.32	33.50	12.83	2351	1987	1761
Sep- Oct	20.32	144.06	102.85	2487	2067	1019
Oct- Nov	19.53	24.55	4.19	2466	2093	1980
Nov- Dec	1.06	40.01	38.54	2285	2261	1632
Dec- Jan	-8.16	16.08	26.39	2173	2366	1872
Jan- Feb	-14.62	15.66	35.46	2068	2422	1788
Feb- March	-18.38	-10.02	10.24	2083	2552	2315
Total	11.79	41.94	26.96	29326	26232	20661

## Annual Total Of Variation Percent



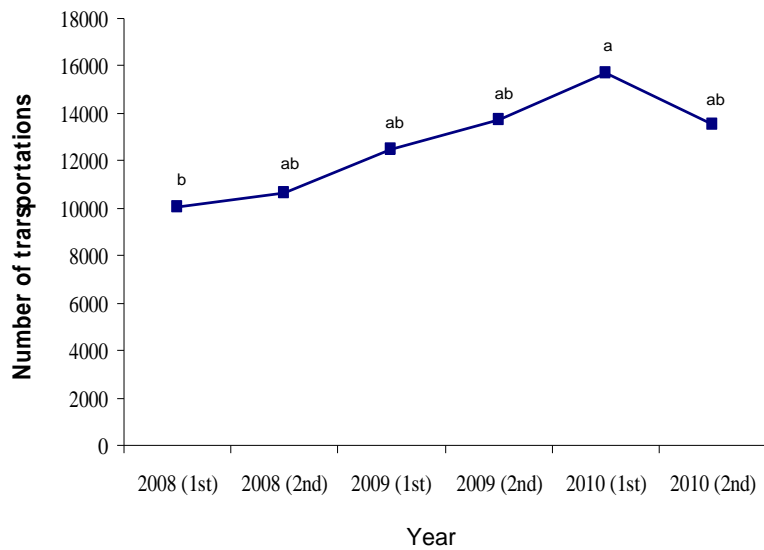
**Fig. 2.** Comparison the annual waste changes (%) in 2008, 2009 and 2010.

To compare and determine the effects of cash subsidy payment before and after policy implementation, with respect to

implementation time (the second half of 2010), the statistical distribution of produced wastes are presented in Fig. 2.

**Table 2:** comparison of produced waste in first & second halves of 2008,2009 and2010 in various regions of Rasht according to the traffic number of waste transport vehicles.

Name	First half of 2008	Second half of 2008	First half of 2009	Second half of 2009	First half of 2010	Second half of 2010
First section of municipality	2200	2595	3375	3712	4497	3437
Second section of municipality	2810	2614	3226	3514	4230	3190
Third section of municipality	2513	2937	2517	3930	4626	3512
Compost	2532	2469	2383	2571	2365	3423
Total	10055	10615	12501	13731	15718	13562



**Fig. 3.** Comparison of waste amounts in first and second half of 2008, 2009 and 2010. Different letters show significant different among the number of transportations in each time ( $p < 0.05$ ).

The results of transportation number are presented in Fig. 3. Results showed that the highest significance rate of transportation was observed in the 1st half of 2010 and the lowest in the first half of the 2008 ( $P < 0.05$ ).

## DISCUSSION

The present study accomplished based on the statistical measures in 2008, 2009 and 2010 in Rasht show that the amount of wastes have increased over time because of population increase, migration and also increasing the number of factories.

The comparison between the production of urban waste process and population increase in Isfahan city showed that waste production is more rapid than population increase (Emamiheidari et al., 2011). Data relating to Isfahan solid urban waste gathered in 2007 and 2008 verify the case (General Model of Esfahan Waste, 2008). The obtained results showed that there is a significant difference between the volume of wastes in different mid years ( $p = 0.05$ ). The most and the least number of ply occurred based on the following order:

15718 ply in the first half of 2010 and 10055 ones in the first half of 2008.

The comparison between two halves of the same year showed that there was no important difference between them but Table 1 shows that the growth rate of the waste in Rasht has initiated by Nov-Dec after cash subsidy payment, in which the following rate is considered:

Nov-Dec=1.06, Dec-Jan=-8.16, Jan- Feb=-14.62, Feb- March=-18.38.

The aforesaid figures show that the quantity of wastes has been decreased after cash payment of subsidies and cost coverings, but the same measure is 24.49% before policies enforcement. The reasons of which are the following:

Drop in citizens' purchasing power, complete utilization and economizing resources especially foodstuffs which constitute up to 70% of each family income and citizens trends to purchase high quality productions.

It can be concluded that the produced wastes have risen to the amount of 5.57% and 9.84% in the second halves of years in

comparison to the first halves in 2008 and 2009, but it has been increased in the second half of 2010, after cash payment of subsidies to 13.72%.

Table 1 shows that this decline is not related to the months Sep- Oct and Oct-Nov but it is initiated from Nov- Dec. So the growth rate of the wastes has been decreased. Thus, the waste mass has decreased after cash subsidy payment.

It is not possible to compare the present data with other reports regarding the non-accessibility of the impressions of subsidy payments to date. According to the report of Islamic Parliament's Research Center in 2010 there is a special way or a combination of several ways for every nation to targeted subsidy. For example most oil-exporting countries compose inward energy bearers less than the global price, so subsidies increase states direct expenditures and budget deficit. Low prices encourage inefficiency about utilization and more usage but in most oil-importing countries the states took action in direct control in quantities and way of distribution but private sectors import oil products and distribute them in which there is a price ceiling and the government compensates the loss arising by these prices.

Therefore, policy makers in each country are obliged to choose appropriate ways to subsidy targeting proportionate to their conditions and its verification to the experiences of other countries. In Iran the subsidy are paid to every family with determined amount, so we can scrutinize the merits and demerits of the pursued policy in future. In this study we scrutinized the effects of cash payment of subsidy on waste production in city of Rasht but the wastes produced in rural areas of the city have not been evaluated, yet.

There is no possibility to generalize the aforesaid results to rural wastes regarding the level of expectations, utilization, revenues and the differences between urban and rural life style.

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## تاثیر پرداخت یارانه نقدی بر کمیت زباله خانگی در شهر رشت

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### چکیده

آزادسازی قیمت ها و اجرایی نمودن پرداخت یارانه نقدی به کلیه افراد متقاضی با تغییر در سطح درآمد تغییراتی در نحوه عملکرد خانوار و سازمان های مختلف خدمات دهنده من جمله سازمان مدیریت پسماند و بازیافت بوجود آورده است. هدف از این مطالعه تعیین تاثیر پرداخت یارانه نقدی بر کمیت زباله خانگی در شهر رشت است. برای دستیابی به این مهم از روش توزین وسایل نقلیه حمل زباله بوسیله باسکول نصب شده در ورودی مرکز دفن سراوان و برای تعیین حجم زباله از تعداد تردد و ظرفیت وسایل نقلیه استفاده شده است. در گام بعد با در نظر گرفتن میزان زباله تولیدی در قبل و بعد از اجرای سیاست، مقایسه های آماری انجام شد و تحلیل لازم انجام گرفت. تحلیل های انجام شده بر روی آمارهای ۶ ماهه سال های ۸۷، ۸۸ و ۸۹ نشان می دهد که رشد زباله تولیدی در شهر رشت از آذر ماه ۸۹ با آغاز پرداخت نقدی یارانه، کاهش داشته است؛ به طوری که در آذر ماه ۱/۰۶ درصد، در دی ماه ۸/۱۶- درصد، در بهمن ماه ۱۴/۶۲- درصد و در اسفند ماه به ۱۸/۳۸- درصد رشد رسیده است، اما همین مقایسه در ماه های قبل از اجرای سیاست نشاندهنده رشد با میانگین ۲۴/۴۹ درصد می باشد. بنابراین این مطالعه نشان می دهد که با گذشت زمان و اجرای آزادسازی قیمت ها و پرداخت نقدی یارانه، کمیت زباله تولیدی کاهش یافته، این امر می تواند دلایل مختلفی داشته باشد که از آن جمله می توان به کاهش قدرت خرید، روی آوردن شهروندان به خرید محصولات با کیفیت تر و استفاده کامل و صرفه جویی در مواد غذایی (بالغ بر ۷۰ درصد زباله های تولیدی خانوار) اشاره نمود.

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