Potential for waste segregation at source in Tirana

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EXECUTIVE SUMMARY

In this study the willingness of citizens to segregate waste at source is determined, within the context of the waste management system in the Albanian capital city of Tirana. In order to achieve the objective of the study, a survey is held in three neighbourhoods of Tirana, selected on the basis of income and house prices as the main criteria. In addition, the waste management system of Tirana is analysed by application of the concept of Integrated Sustainable Waste Management, which distinguishes three dimensions: (a) stakeholders (public and private); (b) sustainability aspects (legal framework for solid waste management, institutional arrangements, financial aspect of services, environmental impact, social and cultural aspects of citizens' attitudes and involvement); (c) technological (service) elements (waste collection and transport, recycling, incineration, and disposal).
In the survey, the respondents cited waste collection as often as access and quality of drinking water, and reliability of electricity supply, as the most problematic among the communal services they receive. In all three neighbourhoods residents considered the Municipality as the most responsible for the current situation regarding management of solid waste. Concerning citizens' waste management habits, most of furniture, appliances and clothes are given away to those who may still use them, whereas practically all kitchen waste, paper and glass are thrown into the communal containers.
More than 90% of the respondents in all three neighbourhoods stated that they would be willing to segregate waste at source if this would be officially introduced and supported by the Municipality. Concerning the conditions under which the waste segregation programme would succeed, about one third of the respondents in each of the three neighbourhoods cited convenience as the most significant motivational factor, one third required information, explanations and instructions, and one third required the evidence that the government and other stakeholders are making genuine efforts to protect the environment. Respondents cited placement of bins/containers as definitely the most important action that the Municipality could take to motivate citizens. As for the obstacles to waste segregation, respondents in all three neighbourhoods most often cited the lack of space at home (in 30-37% of cases, depending on the neighbourhood). Interestingly, 24-30% of respondents in the three neighbourhoods stated that there is no obstacle to their segregation of waste at home. About 50% of the respondents within high- and middle-income groups were willing to pay for the additional service of collection of segregated waste. This percentage was lower (36%) in the low-income neighbourhood.
The results also include an overview of all pertinent legislation, financial framework of solid waste services in the City and environmental impact of Sharra dump site.

It can be concluded that the citizens of Tirana are willing to segregate waste at source, provided that the activity is convenient, they are well informed, and activities of other stakeholders are visible to them. Very encouraging results of this study precipitated into an Action Plan that was submitted to the Municipal authorities in Tirana, for gradual introduction of waste segregation at source by the citizens, institutions and commerce in the City. The first steps proposed by the Plan comprise raising environmental awareness and educating the public about waste segregation; waste characterisation for better performance monitoring; as well as inclusion of NGOs and informal sector in the SWM system.

INTRODUCTION

While the total population of the country has actually decreased, the population of the Albanian capital city of Tirana has increased by more than 40% in the period 1989-2001. According to the 2001 census data by the Albanian Institute of Statistics, Tirana has over 340,000 residing inhabitants (INSTAT, 2002). (Data available from other sources, such as the Civil State Office, cite 480,000 inhabitants, but this number includes people living abroad as well). Since the city is growing rapidly, numerous environmental problems are evident. Solid waste is one of these problems. Ever overloaded containers provide unpleasant sights in the city. More significantly, solid waste is a source of major pollution in the city and its surroundings, due to inadequate waste collection and unresolved issue of final disposal. Moreover, mismanagement of solid waste has been identified as one of the three main factors contributing to the alarming levels of air pollution in the city (European Environment and Health Committee, 2005).

Furthermore, discarded products and waste materials potentially still have some economic value if reused or returned to the technological cycle. Waste segregation of waste at source is one of the main prerequisites for successful and economically feasible recycling activities. Central governments in many countries have issued laws establishing the priority to recycle waste materials while local governments around the world have initiated programmes to introduce and encourage recycling activities and educate the public about good practices in waste segregation at source (e.g., EC, 2005; U.S. EPA, 2006; NERC, 2002; Hannequart, 2004; Kinsella and Gertman, 2007). Along these lines, notwithstanding the importance of adverse impacts of inadequate solid waste management practices on the public health and the environment, we undertook to examine the issue of the citizens' willingness to segregate their waste at home in the Albanian capital city of Tirana, within the context of the existing solid waste management (SWM) system. For the latter, the SWM system of Tirana was analysed so as to outline the entire framework within which segregated waste would be collected and further processed, and to identify potential for improvement and future development (Gjoka, 2005).

METHODOLOGY

In order to achieve the research objectives, the appropriate methodology was designed for the study.

Literature review

At the start, an extensive literature review was carried out with the purpose of establishing a theoretical framework for the analysis of the critical issues related to the study objectives. Furthermore, literature on waste segregation at source, recycling and citizen participation was examined. Subsequently, literature on local Albanian situation available from the Internet was consulted. During the field research in Tirana, additional documents were obtained.

On the basis of the literature found, field data collection was carried out by several means, by individual interviews, through a survey, and by field visits and observations.

Interviews

Individual interviews were conducted with relevant stakeholders, including resource persons in various institutions involved in solid waste management in the city, representatives of private companies, and

the informal sector active in recycling activities. The interviews with resource persons from the public sector had a purpose of establishing the current situation regarding institutional framework and division of responsibilities as well as to identify possible problems and potential for improvement. The interviews with the latter group, which also included waste pickers at the dump site, had a purpose of identifying existing recycling activities that take place between waste generation and final disposal. The interviews were structured along the dimensions of Integrated Sustainable Waste Management (ISWM), thus preparing them for the analysis as explained below.

Survey

A survey was conducted in three different neighbourhoods in Tirana. The main criterion for selection of these sample neighbourhoods was income of the residents. In that fashion, the following categories were selected: high-income, medium-income and low-income. In order to identify locations of the representative sample neighbourhoods, price of houses was taken as the indicator of income. The selected high-income neighbourhood is a newly built area with prices above 700 EUR per square metre. In the selected medium-income neighbourhood houses are older than 10 years and cost around 300 EUR per square metre. The selected low-income neighbourhood is at the periphery where houses are in a poor physical condition. The category of very poor people who live in informal settlements was not included in the study for two reasons. Due to their poverty, they are not expected to generate significant amounts of waste, as they probably reuse almost everything. In addition, as they live in illegal settlements, they may be distrustful towards any form of enquiries into their living habits.

The total number of respondents was determined based on the statistical recommendations from literature (Rea and Parker, 1997). In each of the three selected neighbourhoods, 100 households were included in the survey.

The questionnaire used in the survey had been developed, tested for effectiveness and clarity, adjusted accordingly, and finally translated to Albanian by the first author.

Five students of the final year of their study at Tirana University carried out the survey. Prior to the survey, they had been trained in the survey technique to be uniformly followed by all of them and they had familiarised themselves with the questionnaire and the objectives of the study.

Field observations

Field visits took place in order to verify the statements of the respondents regarding waste collection services. In addition, Sharra dump site was visited to talk to the waste pickers who work there.

Data analysis

The responses to the survey questionnaire were analysed and plotted in suitable graphs.

In addition, the waste management system of Tirana was analysed by applying the concept of Integrated Sustainable Waste Management (Van de Klundert *et al*., 2001) , which distinguishes three dimensions: (a) stakeholders (public and private); (b) sustainability aspects (legal framework for solid waste management, institutional arrangements, financial aspect of services, environmental impact, socio-cultural aspects); (c) technological (service) elements (waste collection, resource recovery in the form of recycling, transport, treatment by incineration, and disposal).

RESULTS – SOLID WASTE MANAGEMENT SYSTEM IN TIRANA

Stakeholders

The stakeholders identified in the solid waste management system in Tirana include: Ministry of Environment, Ministry of Territory Adjustment and Tourism, Ministry of Health, municipal authorities, two private providers of waste collection and transportation services, a number of private companies active or interested in recycling of various of waste materials, one environmental NGO, informal waste pickers, itinerant buyers of used products, and, last but not the least, citizens.

The Directorate of City Cleansing of the Tirana Municipality has the direct responsibility for solid waste management in the City.

Waste collection and transportation services in the City are provided two private companies, 'Bruci' and 'Ecoacqua', and by the Municipal Cleansing Enterprise.
At the time of this research, the most significant stakeholders focusing on recycling included 'Hermes Apollon' (recycling of paper since 2000) and 'Ecoplast' (recycling of plastic since 1995). Other companies were interested in recycling as well; some of them were interested in starting a recycling business whereas others were end-users interested in purchasing recycled materials. Recent endeavours to encourage and support recycling business in the country include a review of the existing recycling activities, which was commissioned by the IFC/PEP-SE of the World Bank Group (Dobi, 2005).
Informal sector is quite active in waste picking for recycling. They work in the city, where they pick recyclable materials from communal containers, as well as at the dump site. It should be emphasised that waste pickers working at the Sharra dump site actually live there, in unsanitary conditions and in polluted environment. (More details are provided in the section on Waste disposal below.) In addition to waste pickers, informal itinerant collectors/buyers acquire glass bottles and jars, furniture and electric appliances, and clothes directly from the citizens. Finally, some informal activities of manufacturing plastic bags and melting aluminium were identified as well.
According to the statistical bulletins available, there are almost 400 NGOs in Tirana, 30 or so of which are active in environmental field. Only one of them – the Environmental Centre for Development, Education and Networking (EDEN) – is involved in issues related to solid waste management. EDEN was established in 2003 with the support provided by the East European branch of the Dutch organisation Milieukontakt. EDEN assists the Tirana Municipality in various activities concerning environmental protection, including preparation of environmental strategies and waste management action plans, raising public awareness on waste-related issues and promoting recycling.
Regarding citizens as an important stakeholder in SWM system, it should be noted that the recent development of Tirana has resulted in significant changes in the social and economic structure of the city such that two distinct groups with very different demographic characteristics can be identified. One group consists of more educated urban residents of several generations, mainly concentrated around the centre of Tirana, whereas other group comprises much less educated recent migrants from the undeveloped regions of northern Albania, who inhabit periphery of the city, often in illegal settlements. According to 2001 census data (INSTAT, 2002), Tirana has some 90,000 households.
Various foreign donor agencies are important stakeholders in the solid waste management system in Tirana. These include WHO, USAID, IFC (World Bank Group), Italian Government and others.

Sustainability aspects
Institutional, legal, financial and environmental aspects were examined. There is a lot of activity, with support of foreign organisations, to address each of these aspects and improve the current situation. Some of the existing legislation is not conducive to integrated sustainable waste management. There is some overlap and lack of clarity regarding responsibilities and authorities of relevant institutions. The financial aspect is being addressed by the Municipality with USAID support, as current fees are very low, even for Albanian standards.

System elements
Waste characterisation
Before elaborating on the system elements such as waste collection, recycling and disposal, the data available on waste amounts and composition are presented. There are two main sources of such data: information from 2001-2002 on composition of waste in communal containers by the Institute of Public Health; and annual reports of the Tirana Municipality containing information on waste amounts disposed off at Sharra dump site.
According to the 2001-2002 study by the Institute of Public Health (2002), organic waste constitutes almost 60% of municipal waste, followed by plastic (10%), paper (9%) and metals (6%).

Based on the annual report of the Tirana Municipality for 2004, an average of 875 tonnes of waste are disposed off at Sharra dump site every day. This amount includes municipal waste from households, offices and markets (590 t/day), as well as industrial waste (185 t/day) and construction and demolition waste and other inert material (100 t/day). The fraction of construction and demolition waste and other similar inorganic materials was much larger in previous years, especially in 2001, when an extensive action was undertaken by the authorities to demolish illegal settlements, which resulted in exceptionally large amounts of such waste materials.

The data from the former source may be inaccurate as they do not specify how much materials are recovered from communal containers by waste pickers before they are transported to the dump site. Furthermore, these data may be somewhat outdated as there have been some recycling initiatives by private companies in the more recent period. The data from the latter source are imprecise as there is no weighing bridge at the dump site, and waste materials recovered for recycling and waste that ends up at places other than Sharra dump site are not included.

Some 940 kg of specific (hazardous) hospital waste are generated every day (ECAT, 2001).

Waste collection services

Waste is collected in communal containers of 1100 litres. Households, shops and small businesses throw their waste into the containers. Two private companies provide waste collection services in the Western and the Eastern half of the city. The remaining peripheral parts where new and illegal settlements are situated, mostly at the North side of the City, receive service from the Municipal Cleaning Enterprise. Municipal Enterprise is also responsible for removal of construction and demolition waste and other bulky waste deposited next to containers in the City. It can be stated that the two private companies provide services of higher quality than the Municipal Enterprise, as they have better vehicles and more containers (2500 containers in the areas served by private companies v. 175 containers in the area served by the Municipal Enterprise), and because the parts of the city contracted to private companies have better roads and thus are easier accessible to collection vehicles.

Containers are usually overloaded, often due to large amounts of packaging materials from shops and businesses. In the peripheral parts, citizens often set waste to fire, both in containers and around them, and also remove parts of the containers such as wheels for their personal needs.

The Municipality puts constant effort to improve the waste collection system in the City. In addition to purchasing new collection vehicles, the Municipality is making plans to enlarge the contracting area of one of the two private companies so as to include some of the peripheral areas under their services.

Industrial waste is the responsibility of the manufacturing industries themselves. Large manufacturing companies either remove the waste they generate themselves, or contract private companies to do that for them. Small manufacturing companies either transport their waste to the dump site themselves or deposit it in the communal containers.

Hazardous hospital waste is also tackled separately, by the hospitals themselves, as described below.

Recycling

Waste segregation and recycling are rather new concepts in Tirana. In co-operation with 'Hermes Apollon' and 'Ecoplast' recycling companies, Municipality has recently taken initiatives to facilitate separate collection services and encourage segregation at source by waste generators. In order to raise awareness of its staff and enable collection of larger amounts of materials for recycling, in one project Municipality introduced containers for segregation of paper and plastic waste at its premises. This pilot project is to be extended to other institutions in the city as well. Another project concerns paper and cardboard packaging waste from businesses. With participation of volunteer students, businesses were educated about volume reduction and proper storage of waste, which is then collected by the recycling company at designated hours. With active support by the Municipality and Environmental Inspectorate, this initiative immediately resulted in improvement of the street image in the project area as containers were not that full and overloaded, as illustrated in Figure 1.

Figure 1. Cardboard from businesses ready for collection by the recycling company

As said earlier, informal waste pickers and itinerant collectors/buyers significantly contribute to reuse and recycling. The waste pickers interviewed stated that they engage in waste picking from containers or at the dump site because that is their only possibility to ensure income. Their favourite materials include: aluminium cans, which command prices of 80-100 ALL/kg (Dobi, 2005); glass bottles and jars of Albanian make, which are sold at 4-12 ALL per piece for packaging of domestic wines, beers, and other food products (Dobi, 2005); and finally, paper and plastic.

Waste disposal and incineration / burning

At present there is only one disposal site for waste from Tirana, at a location about 7 km South-West from the City centre, near the village of Sharra. The site has been in operation for about 15 years and functions as an uncontrolled open dump with constant open fires and deep burning.

Figure 2. Young waste pickers at work

Figure 3. Dwellings of waste pickers at the dump site

All kinds of waste generated in the City, including industrial and hospital waste have been indiscriminately dumped and burned at this site. The site pollutes air by methane emissions, odours and heavy smoke from burning. The smoke probably contains heavy metals and other hazardous substances such as dioxins and furans. In addition, leachate generated in the waste mount pollutes local Sharra stream and the Erzenit River. Therefore, Sharra waste dump site was identified by the UNEP experts as one of the five environmental 'hot spots' in the country (UNEP, 2000). With financial support provided by foreign donors, the Municipality has commissioned some remediation activities in order to upgrade the operation practices and reduce pollution at the Sharra dump site.

Nearby sites of Peze-Helmes and Peze e Vogel were used in the past and may be posing significant risks to public health and the environment as well.

The alarming problem of hazardous hospital waste has been receiving considerable attention by Ministry of Health, Ministry of Environment, hospitals themselves and foreign agencies including Italian Government and the WHO. The Tirana University Hospital Centre and Obstetric- Gynaecologic Hospital have their waste incinerated in a new incinerator donated by the Italian Government. The Institute for Therapy of Pneumonia burns its waste in an incinerator of a low standard, where untreated particulate matter and smoke are emitted into atmosphere just one metre above the roof. As the incinerator often has technological defects and is thus out of function, the waste ends up at the Sharra dump site. The worst situation is probably with the hazardous waste from the Military Hospital, part of which gets burned in open burning outside the city, and part gets buried, both at undisclosed locations.

RESULTS – SURVEY ON POTENTIAL FOR WASTE SEGREGATION AT SOURCE

The results presented in this chapter are based on 287 responses, as 13 responses were not valid.
The questionnaire distinguished the following parts:

- demographic characteristics (household size, education, gender, involvement in environmental issues),
- evaluation of communal services (water, sanitation, waste, electricity),
- waste management habits,
- potential for waste segregation.

The demographic characteristics of the three neighbourhoods are very much in accordance with the general social and economic situation in the City, as described above. The differences in education levels are particularly pronounced between neighbourhoods, as presented in Table 1 below. Only high-income respondents are involved in environmental issues to a significant degree.

Table 1. Education level in the three neighbourhoods under study

Neighbourhood	Primary school or lower	Secondary school	University or higher
High-income	2%	27	71%
Medium-income	5%	42%	52%
Low-income	33%	50%	17%

Evaluation of communal services including solid waste collection

From a list of communal services, the respondents in medium- and low-income neighbourhoods were equally divided on the most important problems: solid waste issues, access and quality of drinking water, and reliability of their electricity supply. In the high-income neighbourhood, electricity supply was not problematic and, thus, more respondents pointed solid waste issues as the most important one.

Several questions were asked about the solid waste collection services. Responses were different in the three neighbourhoods under study, as illustrated in Figure 4. Residents of the low-income neighbourhood were least satisfied with the services: as many as 70% of the respondents evaluated the services bad or very bad. This was confirmed by their responses about the frequency of waste collection – only 23% said their waste is collected daily, whereas 21% said that their waste is collected only sporadically or never. Respondents in all three neighbourhoods were very disturbed by the presence of litter and piles of waste around the communal containers.
Regarding the stakeholders identified as responsible for the current situation with mismanagement of solid waste, respondents in all three neighbourhoods gave very similar answers. Some 54% respondents hold the Municipality and the Ministry of Environment responsible. Around 30% of respondents place responsibility with citizens themselves. At that, they repeatedly made comments about passive attitude and uncivilized behaviour of (other) citizens. The trust of citizens in NGOs is practically non-existent as only four respondents mentioned NGOs as a stakeholder with any significant role and responsibility.

This could be due to the fact that (environmental) NGOs are not yet well rooted in Albanian society and their activities are not yet visible and known to the larger public. As explained before, there is only one NGO in Tirana that is active in the field of solid waste management.

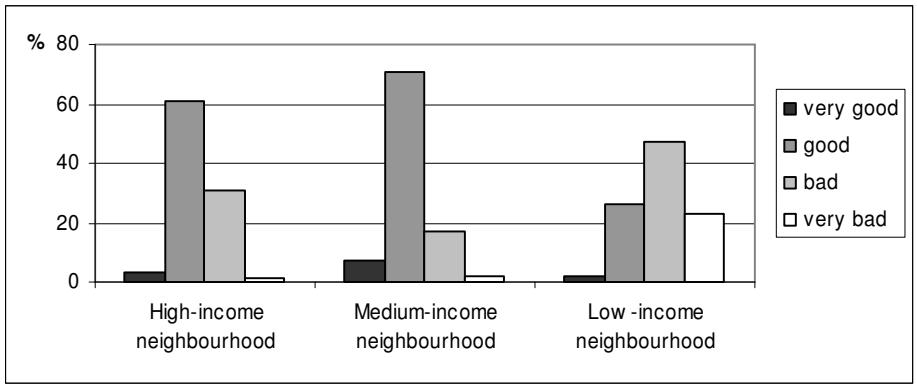

Figure 4. Evaluation of the waste collection service by the citizens

Segregation of waste at source

In order to evaluate the potential for waste segregation at source, firstly the existing waste management habits were ascertained. In all three neighbourhoods, most old clothes, furniture and appliances are given away. In the low-income neighbourhood, more of these items end up in the waste containers, probably because the items are in such a bad condition that they cannot be reused, or because the itinerant buyers/collectors come less frequently (for the same reason). From the responses it is clear that most of the food rests, kitchen waste, paper and glass are thrown into communal containers, while all these materials have high recycling potential. The responses are presented in Figures 5 and 6 below.

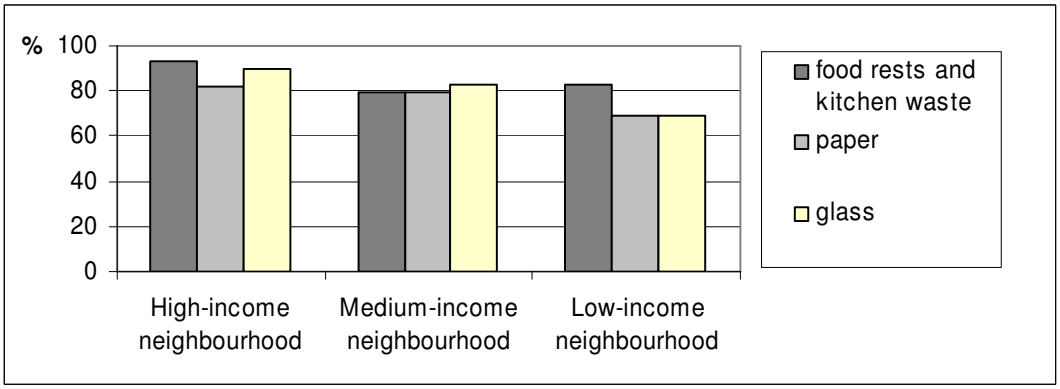

Figure 5. Waste thrown away into communal containers

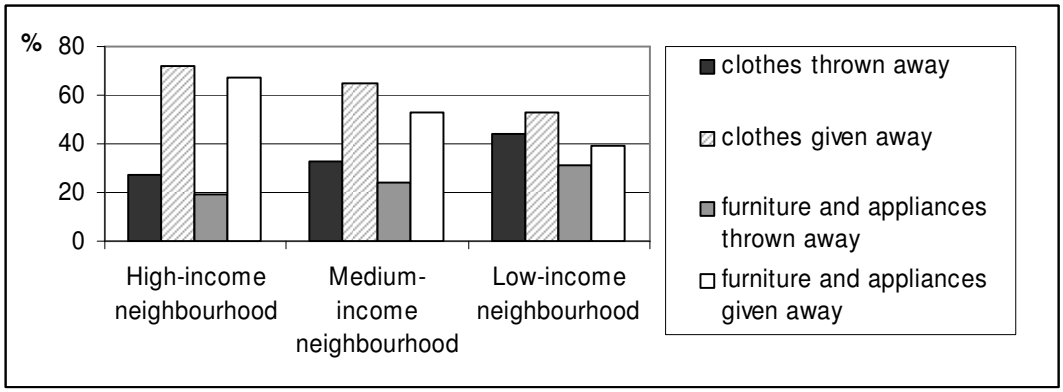

Figure 6. Waste management of old clothes, furniture and appliances

It is very interesting that 94% of all the responses (with little variation among three neighbourhoods) were positive to the question whether they would be willing to segregate waste at source, if the municipality would implement the initiative. Of course, such result does not imply that this level of waste segregation would be reached, as several factors influence citizens' behaviour in this regard. They are identified in the subsequent questions.

Majority of about 65% of all respondents expressed their preference for communal containers for separate collection of segregated waste materials, rather than personal bins in their households. This is most probably due to lack of space at home.

About half the respondents in the high- and medium-income neighbourhoods were willing to pay some small amount for the additional service of separate collection of recyclable waste materials. This percentage was about lower (36%) in the low-income neighbourhood.

In all three neighbourhoods, convenience was identified as the most significant motivating factor, followed by adequate and sufficient information, explanations and instructions for segregation, and evidence that the authorities and other stakeholders contribute their fair share in efforts to protect the environment. Consistently to this response, in the subsequent question the respondents further elaborated that placement of separate containers/bins would constitute the most motivating action by the Municipality.

Finally, we wanted to learn about the major obstacles to introduction of waste segregation at the source, as perceived by the respondents. The responses are presented in Figure 7.

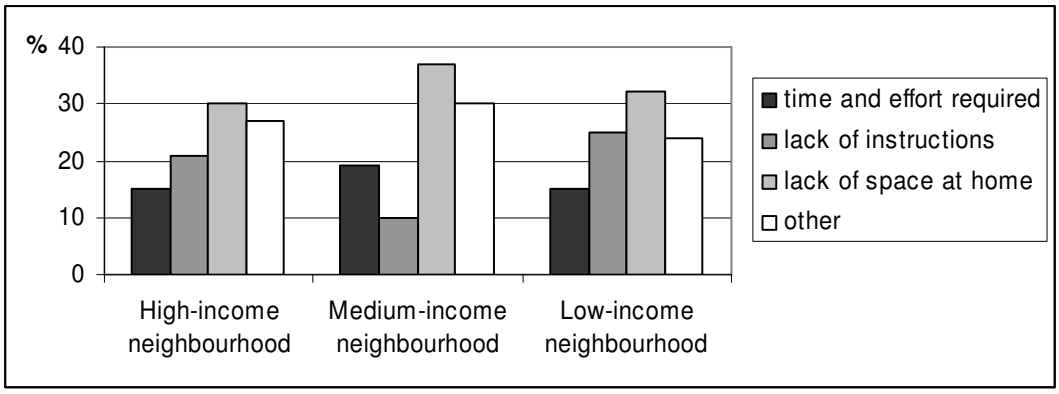

Figure 7. Major obstacles to waste segregation at source

These responses confirm that convenience in terms of space available for separate bins as well as adequate information and clear instructions are major issues. Figure 7 also discloses a somewhat unexpected result that more than one quarter of all respondents gave 'other' as their response. Upon further enquiry by the researchers, the respondents explained that they saw no obstacles to their waste segregation at source at all.

Preliminary action plan

On the basis of this study, a preliminary action plan was prepared so as to provide guidance on the introduction of waste segregation at source. The plan is based on three-tier approach that consists of the following phases:

- raising public awareness through campaigns, media coverage, and regular education,
- introduction of waste segregation in institutions (government and business offices, schools, sport centres) and commercial entities (shops, bars, cafés, fast food and other restaurants),
- introduction of waste segregation at household level, with involvement of government, NGOs and private recycling businesses.

CONCLUSIONS AND RECOMMENDATIONS

There are some business activities and interest in recycling in Tirana. Informal sector is engaged in waste picking in containers and at the dump site. The Municipal authorities are active and co-operate with private companies in waste collection and recycling. Waste segregation at source has a potential, as citizens are willing to participate, under the right conditions of convenience, sufficient information and visible participation of other stakeholders. Reliable data on waste generation are lacking.
More substantial and continuous efforts are required to raise environmental awareness and educate the public about the benefits and practices of waste segregation. A proper waste characterisation study would enable performance monitoring within the SWM system. More pronounced roles of NGOs and the existing informal sector could both contribute to the system.

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