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Informal sector waste recycling

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Informal sector waste recycling

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Introduction

The problems of solid waste management, and their solutions, are different in developing countries as compared to the developed world. The options available vary with the prevailing socio-economic and political atmosphere. In developed countries systems of collection and disposal are quite efficient and so effort is concentrated on aspects such as recycling, environmentally acceptable disposal methods, landfill gas utilisation and source separation. On the other hand, in most of the large urban centres of developing countries there are inadequacies even in the collection and transportation of waste, there are very few environmentally controlled disposal sites, and often the official efforts to develop recycling have been futile. The causes of these shortcomings can often be traced to the nature of the waste, financial constraints, problems of inadequate infrastructure, high rates of population growth, and the lack of public and political awareness. It is clear that there is a need for tailor-made and appropriate solutions to the problems of solid waste management in developing countries.

It is important to study current practices which have evolved independently of the official refuse management practices and which are helpful to the existing official systems. One such system operating in most of the large cities of developing countries is informal sector solid waste recycling (ISSWR). Such systems usually exist in parallel to the private formal and official sectors; however the objectives of both the sectors are different. These informal systems are usually unorganised, unaccepted by, and unknown to the official sectors. There are a few situations where informal systems have been studied and accepted by the government sector; one such example is the acceptance of informal systems of housing (squatter settlements) when government has failed to fulfil the housing needs of the poor in developing countries. At present, the informal sector is playing a vital role in addressing the economic needs of urban poor.

ISSWR is supplementing the service provided by the municipal sector and reducing the quantities of waste that are a burden on the environment. This paper is based on data collected in Karachi, Pakistan as a part of a postgraduate research project. It discusses various options for improvement which are also applicable to other developing countries. It also reviews the existing role of the informal sector in solid waste recycling which provides

major assistance to the government sector in terms of reductions in quantities, employment and provision of cheap raw materials.

There are also hazards attached with this activity which are discussed. An in-depth understanding of the present will be of great help in formulating possible options for improving the future.

The existing system

Karachi is a typical case of a large city in a developing country. It is the largest city of Pakistan with an area of 1800 sq km and population of 8 to 9 million (KDA, 1989). Rapid rural to urban migration, coupled with increased activity of commerce and trade, has created tremendous civic problems including inadequate solid waste management. The existing system is managed by Karachi Municipal Corporation (KMC) but in spite of great efforts by KMC the system is inadequate and inefficient. The total daily generated domestic waste is 5000 tons and KMC is unable to collect even 50% of this waste (NESPAC, 1992). There are no planned landfill sites and open burning is quite common. The expenditures are increasing at an alarming rate; the yearly expenditure in 1990-91 was Rs 275 million (£7.0 million) and this has increased to Rs 400 million (£10.0 million) in the year 1992-93 (KMC 1991 to 1993). Orthodox engineering solutions call for improved vehicle designs, better containers, house to house collection etc., but all these efforts would need huge expenditures whereas existing income from taxes is very low. Under the present circumstances it is important to study economically possible solutions and improve existing self supporting practices beneficial to waste management and the environment.

One such system is the chain of private informal and formal elements involved in separation, sale, purchase, reprocessing, reuse and recycling of solid waste. (NTCS 1992).

The informal sector

Under the present complex socio-economic environment in developing countries it is difficult to isolate and define any informal sectors. Similarly Informal Sector Solid Waste Recycling (ISSWR) comprises different unofficial, private and informal elements. The complete chain of this system is shown in Figure 1. The domestic waste generated is first reduced by housewives, who separate the

resaleable components such as bottles, cans, plastics, bread, etc for resale. These components are stored until sold to the itinerant street collectors. The separated quantities vary with the income groups in the range of 1 to 2 kg/family/day. This practice is common among 85% of the families in the city. The figure for the weight recycled also includes heavier materials such as glass and iron scrap.

The itinerant street collectors move from one street to another pushing their four wheeled carts and purchasing materials from houses. There are 16000 street collectors in Karachi each purchasing about 20 - 30 kg of separated waste daily. In this way a total of 500 tons of waste is separated by housewives daily. The most common material sold to street collectors is ferrous metal, followed by bread in low income areas and paper in high income areas. These components are then sold by street collectors to the middle dealers, whose shops are easily accessible in residential areas. The middle dealers are those who purchase all the materials from street collectors and also provide them with their push carts, and other services such as loans, protection from Police, etc. There are 800 middle dealers scattered throughout Karachi. After some processing, the waste goes through a stream of main dealers, finally reaching formal and informal recycling industries.

After the housewives have separated the recyclable material, the waste enters the municipal waste management stream, but it continues to be separated at various levels, reducing the quantities at each stage.

In the municipal system the waste is first conveyed by sweepers from the house to the collection points, with some sorting taking place during this process. They have limited time to sort through the refuse, and usually have offers to clean houses which are better paid. Thus they separate about 200 tons of resaleable components daily. The waste is collected by sweepers at collection points for municipal vehicles to come. During that period the transfer points are invaded by scavengers for whom sorting is a full time occupation. There are about 20,000 scavengers in Karachi and they are able to separate about 1000 tons of resaleable components daily. The type of materials separated by scavengers are different from those separated at the household level; it is more than 80% paper. The quality is also poor because it has been mixed with wet materials and consequently its value is low. Scavengers sell their collected waste to their group leaders, and it ultimately reaches the main dealers and recycling industries.

There are various end uses of such separated wastes. For example paper is converted into paper board, aluminium cans are smelted to pure aluminium metal, plastic is converted into shoes, slippers etc and ferrous metals are melted and re-rolled at large foundries.

ISSWR makes significant contributions to the economy of Karachi:

- i. Quantities of waste are reduced by at least 10% in collection and 30% in transportation.
- ii. Provision of full-time employment to at least 40,000 people.
- iii. Supplementing the income of at least 1 million families.
- iv. Supply of cheap raw materials to large and small industries.

There are also hazards attributed to this activity. For example, hazards are associated with the trade in empty chemical drums, the recovery of lead metal from used automobile batteries and its smelting, the separation of infected items from hospital waste, and the poor working conditions in small recycling industries.

Very little effort has so far been made to study and understand ISSWR. Municipal officers and the public have little awareness about it. They receive complaints about scavengers since they scatter and incinerate waste during collection. It appears that they do not believe that street collectors and scavengers really do contribute significantly to reducing the quantity of solid waste. (RAHAT ALI KHAN, 1993). The municipal officers support the concept of recycling, but their plans are at the level of installing compost plants, generating energy from waste, manufacturing fuels from waste etc.

ISSWR is currently very well established, but any over-ambitious plan by municipal authorities towards formal municipal recycling, such as the introduction of closed containers, the establishment of transfer-cum-sorting stations etc, may disturb the delicate balance of the existing set-up and imperil the vast efforts at recycling which are being undertaken by the informal sector.

It is now very important that municipal authorities in developing countries should seriously consider how to increase the benefit derived from the extensive activities of ISSWR. The sector may be upgraded and supported by government agencies for improved solid waste management.

Conclusions and recommendations

On the basis of the above discussion the following general conclusions may be drawn:

1. There is an immediate need to study the extent and potential of ISSWR in developing countries and observe whether it can be improved and upgraded to increase recycling and reduce waste quantities.
2. The hazards due to ISSWR are quite similar to any formal activity. There is a need to broaden the scope of existing legislation to include ISSWR and their honest and effective implementation is necessary to control such hazards.

3. Municipal authorities may start pilot projects to integrate ISSWR with the formal system of waste management. Similar experiments have been undertaken in other cities of developing countries, notably in Cairo, Jakarta and Manila. It is worthwhile to study the success and failure points of such systems before planning pilot projects in other cities.
4. There is a need to launch awareness programmes for public and municipal officers about the role, activities, potential and hazards of ISSWR.
5. Careful and stepwise interventions for ISSWR are envisaged at different levels. These plans should not change the informal nature of the system and the implementing agency should act merely as a catalyst for some activities
6. Under long term plans, tax subsidies and other benefits may be extended to formal and informal sector waste recycling industries as their role is crucial in creating a market demand for recycled materials.

References

KDA (1989), "Infrastructure Sector Profiles". Karachi Development Authority, Master Plan and Environmental Control Department.

KMC (1991 to 1993), "Municipal Committees Budgets". Karachi Municipal Corporation, Karachi.

NESPAK (1992), "Detailed Design and Preparation of Tender Documents for Solid Waste Management". Interim Report. Karachi Metropolitan Corporation, Karachi.

NTCS (1992), "Promotion of Waste Reuse and Recycling in Developing Countries". Final Report for United Nations Centre for Human Settlements, (Habitat), Nairobi.

RAHAT ALI KHAN (1993), "Personal Communications". Chief Engineer, Karachi Metropolitan Corporation, Karachi.

SANYAL, B. (1988), "The Urban Informal Sector Revisited", Third World Planning Review, Vol 10 No 1, Liverpool University Press.

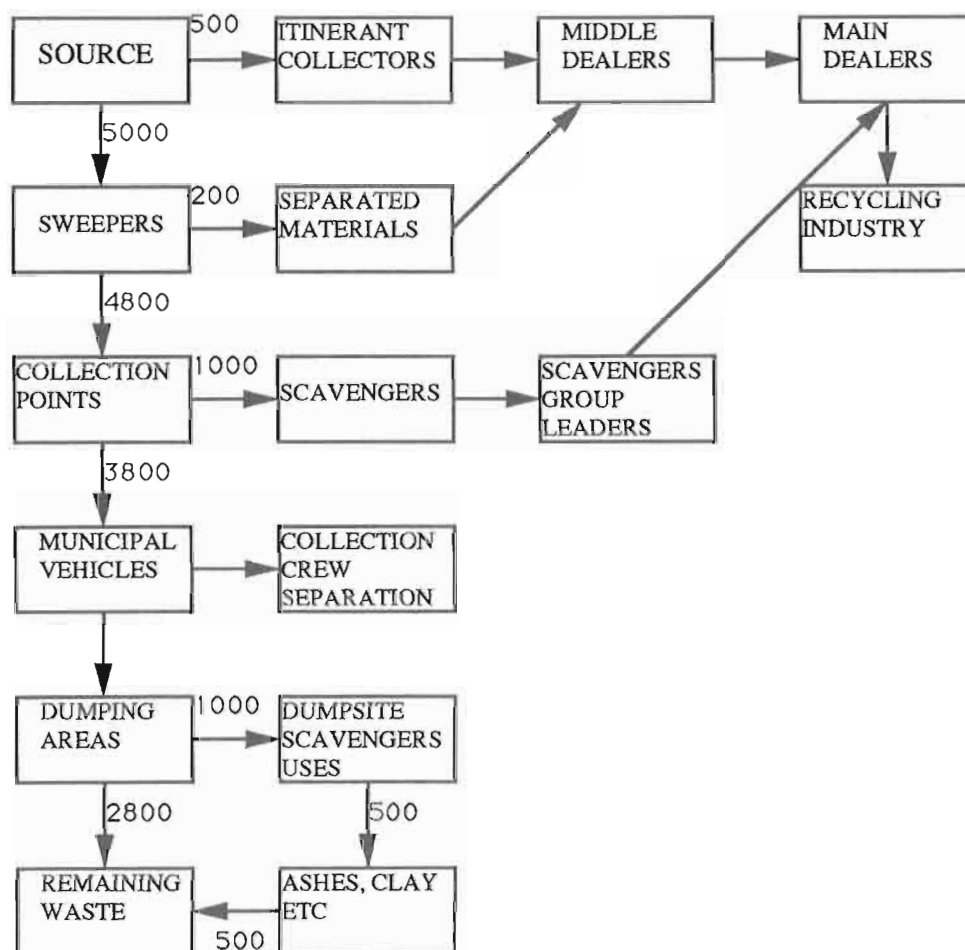


Figure 1. Flow chart of informal sector solid waste recycling in Karachi
(All quantities in tons/day)