Legal, Economic and Managerial Aspects of Solid Waste Management

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Abstract: Solid waste management involves the activities associated with generation, storage, collection, transport, processing and disposal of solid waste, which is environmentally compatible adopting principles of economy, aesthetics, energy and conservation. It consists of planning, organization, administration, financial, legal and engineering aspects. Suitable legislation and regulations provide an effective working system for taxation and its realization. The policy and legislative framework forms the backbone of any implementation system. The solid waste management in India is covered under various regulations. It is covered through various national as well as state level regulations. Every municipal authority comes under the municipal solid waste (Management and Handling) Rules, 2000 (MSW Rules). Local bodies in the country are governed by various laws enacted by their state legislatures. The solid waste management can improved by modernizing the solid waste management system by the urban local bodies and ensuring public participation by providing adequate legislative support. A policy framework is necessary to guide the urban local bodies in the country for managing the solid waste scientifically and cost effectively. While considering solid waste management economically funding of solid waste operations is similar to funding of other utilities, such as water and sewerage services. As solid waste facilities are most often long term investments, the time value of money is important, and engineering economics plays a major role in deciding the kind of facility to be constructed.

Keywords: Solid Waste Management, Urban Local Bodies, Performance disclosure, Liability Laws

1. INTRODUCTION

Solid wastes are being produced since the beginning of civilization. Over the years, there has been a continuous migration of people from rural and semi-urban areas to towns and cities. The proportion of population residing in urban areas has increased from 10.84% in 1901 to 25.70% in 1991. The uncontrolled growth urban areas has left many Indian cities deficient in infrastructural services such as water supply, sewerage and municipal solid waste management.

Solid Waste Management is a part of public health and sanitation. Solid Waste Management is one of the most neglected aspects of India's environment. The management activity being of a local nature, the Urban Local Body undertakes the task of solid waste service delivery, with its own staff, equipment and funds. Satisfactory performance of any public utility depends on institutional infrastructure with required manpower and equipment, adequate financial inputs, legislative powers and public response.

2. LEGAL ASPECTS OF SOLID WASTE MANAGEMENT

Solid Waste Management systems adopted in Indian cities are highly inefficient, outdated and lacking public participation. Overall public apathy is observed in the matter of handling and disposal of Municipal waste. A system of throwing garbage on the streets by citizens and local bodies collecting the waste from the streets and disposing it of in the most unhygienic manner is in vogue. These systems can be corrected by taking concerted measures involving the public at large through their active participation in the process, and by the process, and by the local bodies performing their duties effectively. According to the Indian constitution, public health and sanitation falls within the preview of the State laws. Collection and disposal of Solid Waste is of local nature and is entrusted to local civic authorities. The Municipal laws lay down detailed list of obligatory and discretionary duties. Public health and sanitation is listed among obligatory duties and hence the civic authorities are required to make adequate provision.

Local laws also need to provide for punishment on the spot to those who do not adhere to the directions given for maintaining appropriate. Solid Waste Management systems in the urban areas, giving adequate power to the local authorities to punish the offenders. Most of the Municipal byelaws deal with administrative aspects and the processing and disposal aspects are seldom dealt with. Local civic authorities in Indian States like U.P, Punjab, Bihar, Tamil-nadu, West Bengal, are governed by old Statutes passed in 1920,1922 & 1932 respectively which deal with collection and carting away of the waste. Developments taking place in other areas as well as urban complexes do not get reflected in the laws to satisfy modern urban living conditions. Similar situation exists in many other developing countries.

3. GENERAL PROVISIONS OF THE LAW

The law should specify and define the terms used. The law should also specify the categories of wastes which should be collected and carted away by civic authorities and those for which the producer should be responsible. The manner in necessary for it should be clearly specified. Detailed provisions should made regarding the industries and the types of wastes which can be accepted by civic authorities and the manner of its collection and processing laid down. The laws should also lay down charges to be levied and recovered from individual households, industries,

market places, etc. The penalties to be imposed in case of violations of the regulations and the method of recovery of such dues should also be laid down.

4. ECONOMIC ASPECTS OF SOLID WASTE MANAGEMENT

Solid Waste Management is a part of public health and sanitation and according to the Indian construction falls within the purview of the state list. Since this activity is nonexclusive, unrivalled & essential the responsibility for providing the services lies within public domain. The activity being of local nature is entrusted to the municipal government. Public attention to solid waste and recycling has increased dramatically over the past decade.

To carry out this essential activity an annual provision for the recurring and capital expenditure is made in the municipal budget. The municipal budget is based on the total income from Central and State Government. The provision of funds for solid waste management is commonly observed to be made on adhoc basis and is not related to the requirement. Solid Waste Management receives a comparatively inadequate share out of the total municipal budget as the municipal agencies assign low priority to this work resulting in poor services.

The solid Waste Management activities would be governed by the norms of Public Finance – namely the Principles of Maximum Social Advantage. In principle the burden of tax for financing Solid Waste Management should fall the least on the lower income groups and progressively on the middle and higher income classes. It does not required a justification in terms of “positive returns on investment” or “minimum profits”. An investment however needs to be justified on the grounds of being “the least cost technologically feasible option” for achieving the required degree of efficiency.

Economists have developed models to help policy makers choose the efficient mix of policy levels to regulate Solid Waste & recycling. Economists have also employed different kinds of data to estimate the factors that contribute to the generation of Solid Waste, recycling and to estimate the effectiveness of many of the policy options employed. Economists have also estimated the relationship between education and household garbage totals. Educated households could be more aware of recycling opportunities. It was found that increase in the size of ousehold decreases the per-capita quantity of garbage disposed.

Having understood the enormous potential of economic value associated with recycling and reuse of Solid Waste, the question arises as to why so much of Solid Waste are generated and land-filled. From the stand point of environmental economics, like other environmental resources, waste treatment is frequently subject to market failures, and hence making corrective economic

instruments necessary for the mentioned reasons. First, the consumption waste treatment at appropriate levels creates positive benefits to other people. Second, waste treatment is to a large extent a public good because of non-exclusivity in consumption. Finally, the high infrastructure requirements imply that the fixed cost are high, which discourages participation by many suppliers. As Solid Waste become a more important issue to policy makers, intellectual attention from economist increased. Many economic papers are devoted to Solid Waste Management. But the other option is devoted to prescribing the efficient policy approach. Most models support the use of some form of a "deposit-refund" system. The deposit or advanced disposal fee could be applied at either the point of production or at purchase level. The refund or subsidy to recycling could be given to households that recycle or to firms that purchase recycled materials. Other economic models support a tax on virgin material or a direct tax on the households disposal choices. Advanced disposal fees exits only for some products in some countries. Deposit-refund systems have been implemented only for beverage containers. Many jurisdictions already have implicit deposit refund systems on all goods, to the extent that they impose a general sales tax on all purchase and use some of the money to pay for free curbside-recycling collection. The economic analysis of solid waste management points out that there will be overproduction of waste in a market system if external costs from the waste is not reflected in the prices of the products initially produced and consumed in the market. The market fails to allocate resources efficiently because prices fail to reflect full social cost. That is, the proper costs of landfill, incineration and composting are not reflected in end-product prices in the market place. This results in a further bias against most reuse and recycling activities.

Several different types of economic instruments specifically designed in order to correct market failures in the management of Solid Waste. All of these instruments can be grouped into three main categories: revenue raising, revenue providing and non-revenue instruments. These instruments are summarized below.

Table-1: Types of Economic Instruments

Revenue generating instrument	Revenue providing instrument	Non-revenue –instrument
Charges Taxes Subsidy reduction	Subsidies Grants Tax credits Development rights and property rights Host community incentives	Product and production change incentives Trade-off arrangement Procurement policies Deposit-refund systems Take –back system

	Funds	Product stewardship Performance disclosure Liability law Performance bonds

5. PRESENT FINANCIAL PROVISION

Municipal agencies have to manage various civic services. The number of activities managed by these agencies increase with the size of city. It is observed that smaller towns where the main activity is Solid Waste Management spend up to 70% of their budget on solid waste management. Metropolitan cities on other hand, due to wider resources base and responsibility of provision of larger number of services spend only around 10% of their budget on Solid Waste Management. A majority of urban centers however spend 5-40% of their budget on the same This is approximately Rs.50-250 per capita per year. A large proportion of this expenditure is incurred on salaries and only a limited amount is spent on Operation & Maintenance (O&M) and development works. Presently a large proportion of the total expenditure is incurred on collection, a bit lesser on transportation & a meager amount on disposal. In Municipal Corporation of Delhi 70-85 % of the total expenditure on solid waste management is spent on collection,26.45% on transportation and only 2.7% on disposal. When the system is properly designed, the proportion will be 75% of the total expenditure on collection, 21.4% on transfer & transportation and 7.6% on disposal. In absolute terms the present cost/per tone in Delhi are Rs. 642/tone for collection, RS,240/tone for transportation and Rs.24.5/tone for disposal. The figures for another metropolitan city i.e Greater Bombay, in 1992-93 are Rs. 632/tone,Rs.211/tone and Rs.73.2/tone for collection, transportation and disposal respectively.

6. MANAGERIAL ASPECTS OF SOLID WASTE MANAGEMENT:

It is observed that in the flow of materials in our society, we do not consume materials, we merely use them and ultimately return them often in an altered state to the environment. The production of useful goods for eventual use by those people called consumers requires an input of materials. These materials originate from one of three sources: raw materials, Scrap materials and materials recovered after the product has been used. The resulting processed goods are sold to the users of the products, who, in turn, have three options after use: to dispose of this material, to collect the material for energy production or recycle it back in to the industrial sector or to reuse the material for the same or a different purpose without remanufacture. A high rate of raw material extraction can eventually lead to a problem in the depletion of natural resources. The Solid Waste Managerial principles for achieving reduced material use and waste generation are known as the four R's:

1 .Reduction 2.Reuse 3.Recycling 4.Recovry

1. Reduction: Waste reduction can be achieved in three basic ways: (1) reducing the amount of material used per product without sacrificing the utility of that product,(2) increasing the lifetime of a product, and/or (3) eliminating the need for the product.

2. Reuse: Reuse is an integral part of society. Many of our products are reused without much thought given to ethical considerations. For example, paper bags obtained in the supermarket are often used to pack refuse for transport from the house to the trash can or to haul recyclables to the curb for pickup.

3. Recycling: The process of recycling requires that the owner of the waste material first separate out the useful fraction so that it can be collected separately from the rest of the solid waste. Many of the components of Municipal solid waste can be recycled for manufacturing and subsequent use, the most important being paper, steel, aluminum, plastic, glass, and yard waste. Taking into accounts transportation and processing charges, it still appears that the economics for curbside recycling and materials recovery facilities in metropolitan areas are quite favorable.

4. Recovery: Recovery is defined as the process in which the refuse is collected without prior separation, and the desired materials are separated at a central facility. The recovery of materials, although it seems attractive, is still a marginal option. The most difficult problem faced by engineers designing such facilities is the availability of firm markets for recovered product. Occasionally, the markets are quite volatile, and secondary material prices can fluctuate widely.

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