Environmental Fiscal Reform in Abbottabad

Solid Waste Management
ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>EFR</td>
<td>environmental fiscal reform</td>
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<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<tr>
<td>LGO</td>
<td>Local Government Ordinance</td>
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<td>TMA</td>
<td>town/tehsil municipal administration</td>
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The improper disposal of municipal waste has a serious and dangerous impact on a wide range of areas. Garbage thrown in the street or in open spaces creates a public health hazard, while waste dumped near rivers, lakes and streams contaminates the water supply. Rubbish that is burned in the open rather than disposed of properly creates pollution and releases toxic fumes into the environment. Non-biodegradable materials thrown into open drains wind up in the sewerage system, clogging pipelines and damaging infrastructure. The dangers of dumping untreated hospital and industrial waste are even greater, with the release of pathogens and toxic compounds posing a grave threat not just to human life but also to plants and animals. Garbage dumped in the countryside is not simply an eyesore; entire landscapes are ruined and unique habitats for flora and fauna are lost.

All of these problems are common in Abbottabad, where vast quantities of solid waste remain uncollected in the streets, along major roads, in empty plots of land, down hill slopes and in illegal dumps.

Challenges
The system of solid waste disposal in Abbottabad district is inefficient and ineffective. Garbage collection services are not available in the countryside, while in urban areas rubbish accumulates on roads and streets, in vacant plots, and on hillsides. The dire situation the district faces can be gauged from the fact that even with collection services operating at full capacity, an estimated 40% of the waste generated in urban areas remains uncollected each day. Add to this the fact that no collection services are available in rural areas, and it becomes clear that the problem of waste management poses a threat to both public health and the environment.

Municipal authorities are clearly struggling to cope, and face a number of challenges. Foremost among these is the chronic shortage of resources to hire staff and purchase equipment. Some issues arise from the unique location and topography of the district, while others are the result of social change, with a rapidly growing population and changing consumption patterns. Institutional and administrative loopholes exist as well, with responsibility for solid waste management falling upon municipal agencies in some areas and cantonment boards in others, and jurisdiction not clearly defined. The cumulative effect of these factors is that a large proportion of the garbage generated in the district is never collected.
As with most environmental issues and development concerns, it is always the poor who are the most severely affected. In the case of solid waste management, the poor suffer from the effects of living in squalid conditions. The threat of disease is ever present, robbing workers of their productivity and keeping children out of school. Chronic disease, repeated bouts of illness, lowered resistance and malaise are common in poor households, putting them under severe financial strain and depriving them of opportunities to improve their standard of living.

**Opportunities for reform**

Abbottabad’s solid waste management issues can be tackled both effectively and efficiently through local authorities and municipal agencies, whose operations can benefit significantly from environmental fiscal reform (EFR) in the sector.

EFR involves the introduction of user fees and taxes, as well as incentives for those engaged in garbage collection. A survey conducted for this study reveals that introducing waste collection fees is a viable option. Based on these assessments, a nominal charge of 35–50 rupees per month per household can be levied, raising more than 10 million rupees annually for the district administration. In devising a structure of user fees, the requirements of the poorest communities will need to be kept in mind, to ensure that they are not burdened financially.

Taxes to discourage certain practices can also prove beneficial. They can be applied, for example, to discourage the indiscriminate and illegal dumping of solid waste, as well as to penalise hospitals, other commercial establishments and industries from releasing untreated waste. Mechanisms for pollution charges exist in environmental protection laws, and similar penalties are also prescribed in provincial local government legislation. These mechanisms must be properly enforced.

Along with charges and taxes, incentives should be provided to those already involved in the collection of solid waste. This includes scrap dealers who purchase recyclable materials and reusable goods directly from households, as well as scavengers who wade through garbage dumps collecting anything that can be sold. These groups have long been an informal part of the domestic economy and serve an important purpose that should be recognised, regularised and rewarded. New types of programmes can be given consideration, such as ‘buying’ waste and recyclable materials from municipal workers. This can serve as a powerful incentive to improve the efficiency of overburdened municipal staff. Similarly, a coordinated system of garbage sorting and recycling can be developed, to reduce the burden on existing disposal sites and to generate additional revenues.

At the same time, measures are needed to restore the trust of communities in the local municipal agencies. Funds raised through user charges and taxes must be applied directly, and transparently, to improve services already provided and to extend services to areas not covered. When communities see their financial contributions being put to good use, resistance to the idea of paying for improved services is likely to decline dramatically. This form of involvement can create ownership among communities, and also help to make municipal agencies more accountable to the people.

While many of those who participated in the survey conducted for this study are acutely aware of the problems and risks created by the improper disposal of waste, this awareness is by no means universal. A successful EFR initiative will need to include an education and awareness-raising component, to ensure that sanitary means of garbage disposal are no longer thought to be optional.

Equity is a concern that cannot be ignored in any EFR initiative that is introduced. The poor are disadvantaged not only in terms of access to services but also in terms of bearing the brunt of adverse effects when service provision fails. Pro-poor strategies will need to be devised so that while revenues are raised to improve services, the poor are able to benefit without being burdened excessively.

Initial estimates suggest that earnings generated from user fees alone will be able to fund significant improvements in the existing system, as long as these funds are ploughed back into the sector. In this regard, structural reform of the fiscal system is a critical step, without which no EFR initiative has a chance of long-term success.

The most efficient way to manage solid waste is at the local level, with the involvement of communities. This is borne out by studies and success stories from around the world, and there is every reason to believe that such measures will prove to be effective in the Pakistan context.
INTRODUCTION

Around the world, population growth and rapid urbanisation have led to a massive rise in the amount of municipal solid waste that is generated. In urban and rural communities alike, changing lifestyles and consumption patterns, including the increased use of goods made from non-biodegradable materials, have added to the problem. The situation in Pakistan is no different. Estimates are that the country generates 50,000 tons of waste daily, while only 60% of this amount is disposed of by municipal authorities (IUCN 2004). The remainder accumulates in the environment, giving rise to a host of municipal and public health concerns.

Health and environment
In many parts of the country, including Abbottabad, the system of solid waste disposal is inefficient and ineffective. Garbage accumulates on roads and streets, in vacant plots, and on hillsides. While many households and neighbourhood communities burn their rubbish out in the open, they are not the only ones who resort to this unsafe and unhealthy practice. In the absence of landfill sites, and without alternative means of waste disposal, municipal authorities in many areas are forced to set fires in garbage dumps to reduce the volume of accumulated waste.

The effects of improper waste disposal are felt not just in the environment but also in the health of the population. Air, water and land pollution are serious concerns in and of themselves, but also have a devastating impact on public health and on the livelihoods of many communities, especially those who are the poorest and most disadvantaged.

Waste dumped in the vicinity of rivers, lakes and streams contaminates the water supply, with decaying organic matter becoming a breeding ground for disease. Increased carbon and other emissions as a result of burning garbage in the open cause toxic compounds to be released into the air, and exacerbate global warming.

Where solid waste is dumped in the landscape, areas that serve as habitats for wild flora and fauna are lost. This destroys biodiversity, disturbs the ecological balance and encourages the spread of alien invasive species. Non-biodegradable materials such as polythene and plastic accumulate in waterways and on open land, not only defacing the countryside but also wreaking serious ecological damage. Human well-being is affected in many ways. Contaminated surface and groundwater cause a wide range of chronic and sometimes fatal diseases. Stray animals and pests that are attracted to garbage can also be carriers of lethal diseases such as rabies. Sewerage lines become clogged with plastics and polythene, disrupting municipal services that are already struggling to cope and creating further risks to public health. Meanwhile, broken glass, rusted tins, needles and other sharp objects found in waste dumps also pose a serious threat, especially for children playing barefoot in and around dump sites.

Poverty
Like many other environmental problems, it is the poor who suffer the most as a result of improper solid waste disposal. Municipal waste collection services are rarely if ever available in shanty towns and slums, putting the residents of such neighbourhoods at far greater risk of the health hazards associated with improper solid waste management.

Repeated bouts of disease and chronic health affect productivity and potential, robbing workers of income and keeping children out of school. Medical costs can financially cripple poor families, while chronic illness compromises the growth and development of children. Loss of resistance as a result of repeated illness also increases susceptibility to other diseases. A vicious cycle is set in motion, with low-income households becoming trapped in poverty.

For the poor, however, solid waste is also a source of livelihood. Plastic, metal, paper, rags and other such materials are collected and sold or exchanged. While some households rely entirely on scavenging as a source of income, others use it to supplement earnings. Garbage collection also serves as a buffer during times of unemployment. By regularly remaining in close contact with garbage, however, scavengers are also the most
vulnerable to the risk of disease and injury.

**Pro-poor environmental fiscal reform**

Environmental fiscal reform (EFR) in the solid waste management sector involves the introduction of user charges and taxes to supplement government transfers. Solid waste is seen as a negative environmental externality, the cost of which is borne by society as a whole. Fiscal instruments employed to address this issue aim to ‘internalise’ the costs of waste collection and disposal. Since equity concerns are of primary importance, it is necessary also to explore ways in which to minimise the financial burden on poor households.

This study aims to explore options for pro-poor EFR in Abbottabad. It serves as a preliminary evaluation, investigating ground realities, examining the institutional context and assessing household perceptions. It is hoped that the findings of this report will form the basis for further investigation and lay the groundwork for EFR implementation in the district.

At the solid waste disposal site at Salhad, accumulated garbage is often burned in the open. © IUCN Pakistan
SOLID WASTE MANAGEMENT IN ABBOTTABAD

At the time of the 1998 census, Abbottabad district was home to a population of 881,000 (GoP 1999). With an average annual growth rate of 1.82%, the district’s current population is estimated at a little over 1 million. Close to 18% of the population lives in urban areas, while the remainder of the district’s residents make their home in the countryside. Urban centres in the district are densely populated, in part because flat land is scarce in this mountainous terrain. But recent years have also witnessed increasing migration, putting additional pressure on both land and municipal services, including solid waste management.

According to the results of a survey carried out as part of this study, an estimated 368 tons of waste is generated daily in the district, 69.6 tons of which is produced in urban areas (Table 1). Per capita waste generation is estimated at 0.35 kg per day overall, with a slightly higher rate in urban areas.

Prior to 2001, the provincial public health engineering department was responsible for solid waste management, along with local development authorities, and water and sanitation agencies. Following the promulgation of the Local Government Ordinance (LGO) of 2001, which introduced a process of devolution, town/tehsil municipal administrations (TMAs) were established and made responsible for a number of public services, including solid waste collection, within their areas of jurisdiction. Their powers do not extend to military installations and cantonments, where cantonment boards are responsible for solid waste management.

In Abbottabad district, waste collection services are only available in urban areas. While a few influential families residing on the outskirts of large towns make use of municipal workers to carry away their household waste, the bulk of the district’s rural residents are forced to find their own means of garbage disposal. Usually, this involves dumping in open spaces. Even in urban areas, however, dumping is the only available method of waste disposal. Some garbage is burned, either by communities themselves or by municipal workers, but a large proportion of the waste that is generated is never collected.

Waste collection services

There are two urban areas in the district, Abbottabad and Havelian, each of which is served by a TMA. In Abbottabad city, solid waste collected by municipal workers is transported to a garbage dump at Salhad, located on the Abbottabad-Havelian road just outside the city limits of Abbottabad, at a distance of approximately 3 km from the city centre. There is no separate dump for Havelian tehsil, where garbage collected by municipal workers is dumped on the banks of the River Dor and left there with no further treatment.

Every day, urban areas in the district generate close to 70 tons of garbage (Table 1), of which the TMAs manage to collect only about 42 tons. Around 30 tons of waste is removed from Abbottabad TMA daily. In neighbourhoods where primary collection services are available, TMA workers go door to door or collect

<table>
<thead>
<tr>
<th>Table 1: Waste generated in Abbottabad</th>
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<tbody>
<tr>
<td>Current projected population</td>
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<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Average household size</td>
</tr>
<tr>
<td>Per capita waste (kg/day)</td>
</tr>
<tr>
<td>Household waste (kg/household/day)</td>
</tr>
<tr>
<td>Total waste (tons/day)</td>
</tr>
<tr>
<td>Total waste generation per month (tons)</td>
</tr>
<tr>
<td>Total waste per year (tons)</td>
</tr>
</tbody>
</table>

garbage from neighbourhood bins and carry it to 24 designated secondary collection points. From there, the waste is transported to Salhad by three tractors and two multi-loader trucks, making four trips daily. Of the 24 collection points in Abbottabad city, 13 are open dumps, while large containers have been placed at the remaining 11 collection points. In Havelian, the TMA has the capacity to collect 12 tons of waste per day. There is only one designated collection point in Havelian, and one tractor with a trolley that makes four trips daily.

An urban population of approximately 188,868 (Table 1) is currently served by 199 waste management workers (Table 2) and just six garbage removal vehicles (Table 3). Equipment in use is outdated and in a state of disrepair, and there has been no investment in new equipment since 2001.

Scavengers and scrap dealers (kabaris) play an important, if informal, role in this system, collecting reusable materials from garbage dumps or purchasing such items directly from households. Theirs is a significant contribution to waste management in the district. Metals, plastics, rags and shoes are among the items most frequently recycled.

### Table 2: Solid waste management staff in Abbottabad and Havelian

<table>
<thead>
<tr>
<th>Post</th>
<th>TMA Abbottabad</th>
<th>TMA Havelian</th>
</tr>
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<tbody>
<tr>
<td>Sanitary worker</td>
<td>86</td>
<td>87</td>
</tr>
<tr>
<td>Nullah cleaners</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Trolley loaders</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Dump workers</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Drivers</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Chief sanitary inspector</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Assistant sanitary inspector</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Supervisors</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>151</td>
</tr>
</tbody>
</table>


### Table 3: Municipal waste collection equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>TMA Abbottabad</th>
<th>TMA Havelian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-loader trucks</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Tractor trolleys</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Skip containers</td>
<td>12</td>
<td>11</td>
</tr>
</tbody>
</table>


### Budget

Following the introduction of devolution, the 2001 annual budget for solid waste services in Abbottabad tehsil was 6.1 million rupees. Of this amount, 87% was used to pay the salaries of waste collection workers. In the same period, the annual budget for waste collection in Havelian was 1.3 million rupees, of which 92% was spent on salaries (Haye 2001). During the period 2007–08 the combined solid waste management budget for the two tehsils was 15 million rupees, with 12 million allocated to Abbottabad and 3 million to Havelian (TMA 2008). When adjusted for inflation over the same period, this does not amount to a significant increase in real allocations.

### Administrative arrangements

Under the devolution plan, TMAs have the potential to emerge as a robust and effective part of the administrative structure. The process of decentralisation is incomplete, however, and uncertainties exist with regard to administrative authority. The powers and functions of the provincial public health engineering department have not been fully devolved to local authorities, creating a jurisdictional vacuum in some cases. Fiscal powers have also not been properly decentralised, leaving TMAs with responsibilities for service provision but insufficient authority to make financial decisions and inadequate funding from higher tiers of government. For example, under the LGO of 2001, TMAs are meant to provide municipal services in rural areas. But TMAs are unable to do so largely as a result of financial and capacity constraints (GoP 2005a).

Jurisdictional overlaps are also created under existing administrative arrangements. There are several agencies and local authorities involved in various aspects of solid waste management. The district government, which is the parent department of the TMAs, has responsibilities defined in the LGO that include preparing a development vision for the district, allocating funds, proposing revenue sources, and monitoring the activities of TMAs. On the ground, however, the role of the district administration remains unclear, with little or no coordination between the relevant offices.

At the federal level, the environment ministry deals with matters that have an impact on waste management services, such as the formulation of...
national policy. Its regulatory and policy work at the national level is supported by the Pakistan Environmental Protection Agency (EPA), with regard to environmental monitoring and regulation. Federal policy is implemented by provincial governments, supported by provincial EPAs. The Planning Commission at the federal level, and provincial planning and development departments, also have a stake in various aspects related to the provision of municipal services, particularly with respect to the formulation of development plans and the allocation of resources for projects.

Policy and regulations
Matters related to environmental protection generally, and solid waste management in particular, are covered by a number of policy documents. These include the National Conservation Strategy of 1992 and the National Environmental Action Plan of 2001 (GoP 2005a).

The country’s first National Environment Policy was approved in 2005. Although its main purpose is to ensure that environmental concerns are incorporated into development planning, the policy contains a section on waste management, calling for the prevention and reduction of pollution caused by liquid and solid waste (GoP 2005c). Specific objectives in this regard include the following:

- strict enforcement of National Environmental Quality Standards;
- cleaner production centres and cleaner production techniques;
- reduction, recycling and reuse of municipal and industrial waste;
- rules and regulations for the management of municipal, industrial, hazardous and hospital waste;
- strategies for the integrated management of municipal, industrial, hazardous and hospital waste at the national, provincial and local levels; and
- financial and other incentives (reduction or elimination of tariffs, low-interest loans, awards) for technology upgrades, adoption of cleaner technology, implementation of pollution control measures and compliance with environmental standards.

Similarly, under the Medium Term Development Framework for the period 2005–10, the government has committed to expand the coverage of
waste management services across the country:

Current sanitation and sewerage facilities at around 42% of the population (urban 65%, rural 30%) will be extended to serve an additional 3 million households, thus covering 50% of the total population (urban 75%, rural 35%) by 2010, along with the development of waste water treatment units, recycling provisions and conservation measures in urban centres (GoP 2005b).

A number of legal instruments at the federal and provincial level govern waste management issues directly or indirectly. The Pakistan Environmental Protection Act of 1997 regulates various forms of pollution including the improper discharge of waste. National Environmental Quality Standards, issued in 1993 and subsequently amended, regulate the discharge of municipal and liquid industrial effluent, and cover a wide range of toxic or harmful substances including smoke, particulate matter, carbon monoxide, arsenic, lead and mercury, but do not take into account pollution caused by the improper disposal of ordinary municipal waste. Rules have been framed under the 1997 Act to deal with hospital waste, along with draft rules related to the management of hazardous substances.

At the provincial level, the LGO of 2001 provides for the delivery of basic public services. Under this law, TMAs are responsible for the collection and disposal of solid, liquid, industrial and hospital waste. TMAs may also propose to the tehsil council the introduction of a variety of user fees, taxes, fines and penalties. If approved, TMAs then have the authority to impose these levies. This mechanism can serve to empower TMAs, allowing them to generate resources locally.

### Initiatives to improve waste management

A number of projects have been launched in the past to improve waste management in the district, but have failed to make a significant or sustainable impact. Public-sector investment in high-profile projects has not been backed by funding and proper management to ensure long-term viability. For example, an incinerator was installed in 2002 at the Ayub Medical College and Hospital Complex, with a capacity of approximately 600 kg per day. This incinerator stopped functioning in 2006 and has since remained in that state. Similarly, the waste water treatment plant installed in the 1970s at Jougni, Kakul, has been non-functional for many years (IUCN 2004).

More recently, the provincial government provided a grant of 23.8 million rupees to the Abbottabad district administration for the installation of a composing facility in the vicinity of the Salhad dump. This plant, with a capacity of 150 tons per day, is to be built and operated by a private firm, Waste Busters. Construction of the project is near completion. Once operational, the district government will play a monitoring role.
In order to explore the possibility of introducing EFR in the solid waste management sector, it is important first to assess community perceptions regarding the standard of services currently available, and to gauge the willingness of Abbottabad’s residents to pay for improved services. Since EFR measures cannot be introduced in isolation, it is also necessary to take into account other factors such as current practices and awareness.

For the purpose of this study, a survey was conducted in selected urban and rural areas of the district. A total of 455 households, consisting of 2,779 family members in total, and residing in eight union councils (3 rural, 5 urban) participated in the survey. Data was collected in December 2007 and January 2008. Although waste management is an matter of concern across the district, the problem is particularly severe in urban areas. The first phase of EFR will also focus primarily on urban areas. For this reason, greater weight was given to the urban households in the survey, which comprised 62% of the sample.

The results of the survey provide a preliminary assessment of household attitudes, preferences and potential demand (willingness to pay) for improved waste disposal services. A simple contingent valuation method was used to determine willingness to pay. Elementary econometric analysis was carried out to provide initial estimates. The findings presented in this chapter are primarily qualitative. They are intended to generate a hypothesis and provide direction for more detailed and statistically robust research.

## Waste disposal

In urban areas, only 12% of households in the sample are served by door-to-door garbage collection services, while 59% dump their waste in open spaces or on the street and 12% deposit garbage just outside the house (Figure 1). Door-to-door collection services are not available in rural areas, where 67% of households leave their garbage in empty plots of land, 19% use designated dumps and 11% leave garbage just outside the home.

As such, it is not surprising that 68% of urban households and 44% in rural areas state that sewerage lines in their localities are clogged. Another serious concern related to the accumulation of garbage in public areas is the risk to children, with more than one third of households reporting that their children play in or around garbage dumps (35% urban, 39% rural).

### Composition of household waste

Inquiries regarding the composition of household waste reveal that in both urban and rural households, about 46% of garbage consists of organic kitchen waste (Figure 2). Urban households generate more inorganic waste (43%) compared to rural families (25%). In rural areas, however, a significant portion of household waste consists of ‘dust’, which for the purpose of the survey was defined as soil and sand particles.

### Use of plastic bags

An important concern in solid waste management is related to the use of ordinary plastic bags which are non-biodegradable. The survey revealed that 83% of urban households dispose...
of their waste in plastic bags, compared to 36% of households in the rural sample (Figure 3). The size of plastic bags varies, with rural households using smaller bags, with a capacity of 1–2 kg, compared to bags that can hold 2–5 kg, which are used in urban areas. On average, households in the sample use one plastic bag a day.

**Access to public waste bins**

Only 15% of the urban sample and 2% of the rural sample have access to waste bins in public areas. But many respondents claim that even in localities where bins have been placed, garbage is often dumped around them rather than deposited inside. This makes the work of municipal workers more difficult, is an eyesore in the neighbourhood, and poses a risk to the health and safety of area residents, especially children.

**TMA garbage collection**

TMA workers are meant to pick up garbage from various locations and carry it to designated collection points. Only 47% of urban households in the survey report that TMA workers collect garbage in their areas. In localities where street cleaning and garbage collection services are available, they are performed once every few days. Some households report paying TMA workers separately to ensure that their neighbourhoods are kept clean.

The survey also reveals that 3% of the rural sample benefits from TMA garbage collection, although the TMAs themselves only operate in urban areas. This anomaly can be explained by the fact that certain influential individuals residing on the outskirts of large towns make unofficial use of TMA services.

**Effectiveness of municipal services**

It is interesting to note that 80% of respondents believe that waste collected by TMA workers does not reach the designated dump site but is disposed of inappropriately. Survey participants were also asked whether officials were effectively overseeing the functioning of municipal services. Overall, 85.6% of respondents think that official supervision is ineffective. Many respondents have acted on their concerns, with 46% complaining directly to the TMA and 28% raising the issue with other local government officials, while 9% have undertaken clean-up activities themselves.

**Poverty**

Among the households who participated in the survey, 12% in urban areas and 21.4% in rural areas are classified as ‘poor’. There is no significant difference between the way in which poor and non-poor households dispose of their household waste (Figure 4). Preliminary investigations suggest that poor households tend to leave garbage in their own neighbourhoods, while the non-poor tend to use dumps that are further away from their homes. Poorer households are also less likely to have access to municipal collection services in their localities.

Across the country, scavenging serves as a source of income for many of the poorest segments of the population.
Meanwhile, scrap dealers have long been part of the informal economy, purchasing recyclable materials (mainly metals, plastics, glass and paper) directly from households. This is also true in Abbottabad, where 90% of the urban sample and 76% of rural households report that scavenging is common in their areas. Similarly, 80% of urban households and 76% in rural areas say scrap dealers visit their localities regularly.

**Awareness**

Of the 455 households surveyed, 78% are aware of general issues related to the mismanagement of solid waste, with roughly similar results in urban (80.5%) and rural (73.4%) areas. But there is a marked difference in the degree of awareness among poor and non-poor households, with poorer families far less aware overall than their more prosperous counterparts (Figure 5). Only 9.9% of poor respondents are aware of these issues, compared to 67.9% of the non-poor. Importantly, the survey also reveals that the majority of respondents (86.4%) are aware of the health risks, including vulnerability to disease, that arise as a result of improper waste management.

Respondents were asked to rank the awareness of others in their own neighbourhood. Overall, 19.1% of respondents are of the opinion that awareness is good, while 5.8% think it is very good. But 44.4% believe that others possess only an average understanding of the issues. Meanwhile, 19.8% feel awareness is poor and 10.9% think that others have no awareness at all.

While awareness of the environmental impact of solid waste management is not universal, there is a basic understanding that improper waste management leads to environmental degradation. Overall, more than one third of respondents consider inadequate solid waste management to be responsible for environmental degradation (Table 4). A small percentage of respondents also see the link between improper waste disposal and drinking water contamination.

In both urban and rural areas, respondents are of the view that television (64.4%) and newspapers (21.8%) are the best way to increase awareness (Table 5). It is worth noting that only 8.3% of respondents believe that schools and educational institutions can serve this purpose.

**Willingness to pay**

Most survey respondents are willing to pay for improved waste collection services. Different groups within the sample are willing to pay amounts ranging from 10 rupees to 200 rupees a month. Willingness to pay also varies according to area, with urban residents in general showing a higher positive response. But factors such as income and education also come into play, with the expected result that better educated and higher-income households are more willing to pay for improved services. In general, willingness to pay declines as the amount of the proposed charge increases. Mean willingness to pay was found to be 34.49 rupees per month.
per household. For the purposes of this report, two proposed fees (50 rupees and 100 rupees) were tested.

**Proposed monthly fee of 50 rupees**

Of those surveyed, 62% overall are willing to pay a monthly fee of 50 rupees for improved services. Disaggregated by area, this amounts to 81.5% of urban households and 28% of those residing in rural areas (Figure 6). This differences owes in part to the fact that urban households are in general better off than rural families. Urban households also tend to be better informed. But more alternatives for waste disposal are available to those residing in rural areas, a factor that also influences spending decisions.

Income is a key determinant of willingness to pay, and this is evident when survey results are disaggregated by income. Some 65.87% of the non-poor but just 40% of the poor are willing to pay a fee of 50 rupees (Figure 7). Although this is not surprising, it is encouraging that even among the poor, nearly half are willing to pay. This could form the basis for devising a tariff regime where, for example, poorer households pay a lower fee.

### Table 4: Perceptions regarding the causes of environmental degradation (%)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Rural</th>
<th>Urban</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid waste, traffic, poultry farms, dogs</td>
<td>26.19</td>
<td>44.20</td>
<td>37.72</td>
</tr>
<tr>
<td>Deforestation, air pollution</td>
<td>15.08</td>
<td>15.62</td>
<td>15.43</td>
</tr>
<tr>
<td>Residents, visitors</td>
<td>10.32</td>
<td>5.35</td>
<td>7.14</td>
</tr>
<tr>
<td>Communities</td>
<td>9.52</td>
<td>6.70</td>
<td>7.71</td>
</tr>
<tr>
<td>Improper waste management,</td>
<td>0.79</td>
<td>8.93</td>
<td>6.00</td>
</tr>
<tr>
<td>contaminated drinking water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improper drainage</td>
<td>3.17</td>
<td>6.25</td>
<td>5.14</td>
</tr>
<tr>
<td>Don’t know</td>
<td>34.93</td>
<td>12.95</td>
<td>20.86</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

### Table 5: Means to improve awareness (%)

<table>
<thead>
<tr>
<th>Area</th>
<th>Television</th>
<th>Newspapers</th>
<th>Radio</th>
<th>Educational institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>73.8</td>
<td>11.3</td>
<td>4.2</td>
<td>10.1</td>
</tr>
<tr>
<td>Urban</td>
<td>58.7</td>
<td>28.3</td>
<td>5.1</td>
<td>7.2</td>
</tr>
<tr>
<td>Overall</td>
<td>64.4</td>
<td>21.8</td>
<td>4.7</td>
<td>8.3</td>
</tr>
</tbody>
</table>

**Proposed monthly fee of 100 rupees**

With 71% of the sample responding to this question, 44% of respondents are willing to pay a monthly fee of 100 rupees for improved services. This consists of 48.8% of urban households and 32.1% of those residing in rural areas (Figure 8). While the reluctance to pay a higher fee is understandable, it is worth noting that nearly half of all those who responded are willing to pay more for better service.

When these responses are disaggregated by income group, it appears that 48.76% of non-poor households in the sample are willing to pay 100 rupees (Figure 9).

### Determinants of willingness to pay

Willingness to pay for improved services is determined by a number of factors, the most significant of which is income. The education levels of respondents is also a contributing factor. Location is the third key determinant, with survey findings revealing that urban households are more willing to pay than their rural counterparts. This may be in part because urban areas are congested and residents here rely more heavily on municipal services. But demonstration effects may also be a contributing
factor, with the absence of systematic waste management in the countryside leaving rural residents with no first-hand experience of the importance of such services.

Awareness of public health issues is another factor that affects willingness to pay. Household size is also implicated, since it appears that larger households are less willing to pay. This could be because in general larger families tend to have less disposable income, but other factors may be involved as well, such as the availability of more members in the household to perform domestic chores such as garbage disposal.

Most determinants of willingness to pay are consistent with expectations. What is interesting to note, however, is that health issues, particularly the incidence of disease within a household, even in the case of water- and hygiene-related ailments, do not affect willingness to pay. This suggests that the links between health and proper waste disposal are not widely understood or accepted.

But willingness to pay is also determined by external factors, such as faith in the success and sustainability of public-sector initiatives, awareness of decisions taken at the official level, and community cohesion.

**Price elasticity**

Initial estimates from the survey results show that if charges are doubled, demand is halved. This indicates that higher charges for solid waste management services are not feasible, at least in the short term. It is likely, however, that this trend will shift over time, as communities experience the benefits of improved services. Eventually, therefore, it may be possible to recover the full cost of waste management from users. In the interim, subsidy instruments will need to be considered.
Options for waste disposal

According to 93% of respondents, there are no community organisations or non-government agencies in the district that focus on solid waste management. Meanwhile, 79% of the sample has never been consulted on the issue. It appears that women have been excluded as well, with the survey revealing that just 9% of women in rural areas and 4% in urban areas have been involved in waste management initiatives. When asked whether they would participate in voluntary initiatives, 69% of urban respondents and 54% in rural areas respond in the positive. These findings highlight the gap that exists in community participation and mobilisation, particularly in the case of women, who have an important role to play in determining household behaviour. Given the large proportion of positive responses to the idea of participation, this is one area that deserves immediate attention.

Respondents were also asked whether the private sector should be involved in waste management. The survey reveals that 49% of rural respondents and 62% in urban areas support the idea of private-sector involvement in conjunction with the TMA (Table 6). Meanwhile, 24.7% of rural residents and 45.5% in urban areas think that solid waste management services should be fully privatised.

Table 6: Perceptions regarding the privatisation of solid waste management services (%)

<table>
<thead>
<tr>
<th>Location</th>
<th>Public-private partnership</th>
<th>Full privatisation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rural</td>
<td>49</td>
<td>50.6</td>
</tr>
<tr>
<td>Urban</td>
<td>62</td>
<td>38</td>
</tr>
<tr>
<td>Overall</td>
<td>55.5</td>
<td>44.3</td>
</tr>
</tbody>
</table>
The dire situation the district faces with respect to solid waste management can be gauged from the fact that even with collection services operating at full capacity, an estimated 40% of the waste generated daily in Abbottabad and Havelian tehsils is not collected. Add to this the fact that collection services are not available in rural areas, and it becomes clear that the problems of waste management pose a grave threat to both public health and the environment.

Municipal authorities are clearly struggling to cope, and face a number of challenges. Foremost among these is the chronic shortage of resources to hire staff and purchase equipment. Some issues arise from the unique location and topography of the district. Since Abbottabad is situated in largely mountainous terrain, many of its urban settlements are cramped and congested, with steep and narrow streets. Garbage cannot be collected from such localities because collection vehicles currently in use are too large to pass through these areas. Other challenges come as a result of social change, with a rapidly growing population, changing consumption patterns, and the increased use of disposable goods and heavily packaged products.

Fiscal deficits
Budget constraints are a chronic issue and municipal authorities face persistent shortfalls. An estimated 87% of the total waste management budget in the Abbottabad tehsil and 92% in Havelian tehsil goes to pay salaries. There is little or no funding available for the maintenance of existing facilities and equipment, or to develop and expand services.

Sanitation workers are poorly paid and provided with the most rudimentary equipment. No effort has been made to introduce health and safety procedures. The last time that new equipment was purchased for workers was in 1998. Collection vehicles are not properly maintained and collection trucks currently in use are too large to pass through narrow streets. Infrastructure, including office buildings, garages and storage facilities, is another area that has long been neglected.

Even relatively simple measures, such as the installation of waste bins in public places, cannot be carried out because sufficient funds are not available. Some 250 waste bins were installed by a non-government organisation in 1998, of which only 100 are still in use today. The remainder were damaged or stolen and never replaced.

The importance of adequate funding is nowhere more obvious than in Abbottabad itself, where cantonment areas face no such issues with respect to garbage collection. Solid waste management services provided by the Cantonment Board operate efficiently in part because sufficient funding is available. What is perhaps ironic is that garbage collected from cantonment areas is also deposited at the Salhad dump but no fees are paid by the cantonment authorities for the use of this site.

Funding is also needed to improve the waste management capacity of municipal agencies. The Salhad dump cannot continue to hold all the waste generated in Abbottabad, and scientific landfill sites need to be developed. The River Dor, where garbage from Havelian is deposited, is by no means an appropriate location for waste disposal and needs to be cleaned up, with alternative dump sites identified.

Besides the development of scientific landfills, investment is also needed for other types of waste processing. Foremost among these are composting and recycling facilities, which will not only reduce the volume of waste requiring disposal but will also help to create jobs and generate much-needed funds that can be reinvested in the sector. At the same time, measures are required to handle hazardous and toxic waste.

Governance and institutional constraints
Solid waste management in the district is impeded by institutional constraints. The work of various district-level agencies is often uncoordinated. Supervision and management functions are also neglected, with no system in place to carry out regular inspections.

Jurisdiction issues compound the problem. While responsibility for solid
waste collection is divided between municipal agencies and the Cantonment Board, this arrangement is not clearly defined. As a result, some areas of the district are not served by either agency.

Projects implemented in the past have lacked long-term vision. Planning and coordination are required, along with an integrated approach to tackle various aspects of solid waste management simultaneously. In this connection, the absence of data on garbage collection and disposal impedes effective planning.

Solid waste management has so far been carried out primarily in the public sector and this too requires reassessment. No systematic effort has been made to encourage the involvement of the private sector, or to promote community-based initiatives.

Regulation is also an issue, with funding and capacity constraints hindering the enforcement of laws aimed at controlling the illegal dumping of garbage and the indiscriminate disposal of hazardous substances.

Health and environment

Inadequate collection services and illegal dumping have a serious effect on human health as well as the environment. Plastics and other non-biodegradable materials accumulate in the landscape and have a devastating impact on the ecology. Waste dumped on the banks of rivers and streams contaminates water sources. The burning of garbage creates further hazards by increasing the level of air pollution and allowing the release of toxic compounds.

Unregulated dumps attract vermin and stray animals, many of which could be carriers of disease. Domestic animals such as cattle and goats are allowed to feed in garbage dumps, and may ingest pathogens that can be passed on to humans in meat and milk.

Children who play in vacant lots where garbage is dumped are at risk of sustaining serious injury and also become more vulnerable to disease. Hazardous untreated waste from hospitals and industrial operations further increases this risk.

Unregulated dumping plays havoc with municipal infrastructure, blocking drainage lines and leading to sewage overflows. These pools of stagnant sewage become a breeding ground for disease vectors and pathogens.

Inequity

Across the country, there is marked inequity in the provision of basic services. While garbage collection in prosperous urban neighbourhoods can be as high as 90% (GoP 2005a), less well-off areas and slums have little or no access to such services. Designated collection points and garbage bins are also more widely available in prosperous areas. Poorer communities, such as those residing in the vicinity of waste dumps, face additional risks to health and safety.

There is also a divide between urban and rural areas, with waste collection services focusing almost exclusively on urban centres. There is a dangerous misconception here, that rural areas do not require garbage collection services because open spaces exist where waste can be dumped conveniently. Although organic waste can certainly be disposed of by composting, non-biodegradable materials remain in the countryside, with serious long-term effects on the ecosystem.

Lifestyles and consumer preferences

As in other parts of the country, the lifestyle of Abbottabad’s residents has changed. Across the district, consumption patterns have shifted, with the increasing use of goods made from non-biodegradable materials and greater reliance on disposable products. This has not only increased the volume of waste generated but has also dramatically altered its composition.

Awareness and civic responsibility

Many residents of the district do not see the serious, long-term harm that is caused by dumping garbage in public places. Waste is left in the street, in drains, on open plots of land and on hillsides. Even in neighbourhoods where bins have been placed, rubbish is often dumped around these containers rather than inside them.

Besides the public health hazard that is created, this type of indiscriminate dumping also increases collection costs. It is estimated, for example, that the collection of garbage thrown in the street costs municipal authorities up to three times as much as collecting rubbish from designated dumps (Cointreau-Levine 1994). Although detailed studies of this sort have not been conducted in Abbottabad, the situation in the district is likely to be similar. This is all the more troubling, considering the serious budget shortfalls that already exist in the waste management sector.
It is now widely accepted that solid waste management is most effective when it is handled at the local level with the involvement of local communities (Memon 2002, NIUA 1999, UN 1992, UNESCAP 2002). Countries such as Brazil, Malaysia and Nepal also report success in establishing partnerships with the private sector (Bartone et al. 1991, Manandhar 2002). Similarly, there is evidence to suggest that at-source management, including management at the household level, is of the utmost importance (Varkkey 2002). These are lessons that should be kept in mind while developing an improved system of solid waste management for Abbottabad.

**Fiscal reform**

Fiscal reform involves the introduction of user fees and taxes, as well as incentives for those engaged in collection. The survey conducted as part of this study reveals that charging households a nominal fee for garbage collection is a viable option. At the same time, workers involved in the collection of solid waste need to be provided with incentives to improve efficiency. These steps should be bolstered by penalties to discourage the improper disposal of waste. But since the introduction of taxes is likely to be a controversial issue, it is suggested that this step is taken as part of the second phase of reform, once EFR principles are better understood and changes on the ground have made communities more amenable to the idea of environmental levies.

**User charges**

The survey conducted for this study shows that households are willing to pay a small monthly fee for improved services. In keeping with survey results, a fee of 35–50 rupees per household can be charged. By levying a monthly fee of just 35 rupees on urban non-poor households, the TMAs will be able to generate close to a million rupees each month (Table 7). If commercial operations are charged a fee as well, monthly earnings for the TMAs are likely to increase significantly.

How this fee will be levied, and who will be expected to pay, are matters that need to be carefully considered. For example, there will be many households that live in neighbourhoods where solid waste disposal issues are severe but who cannot afford to pay a collection fee. Care must also be taken to ensure that collection costs do not eat into or exceed the funds generated through the new charges. To reduce transaction costs, waste collection charges may be included in other utility bills, such as water or electricity.

**Incentives for municipal workers**

Providing incentives for municipal workers is important to improve efficiency and boost morale. One such method is to ‘buy back’ waste from collectors, where municipal workers deposit sorted waste at designated collection points in exchange for a cash reward.

**Incentives for scavengers and scrap dealers**

Scrap dealers and scavengers have long been a part of the informal economy and play an important role in solid waste management. Formalising their contribution through loans and licences, and training in health and safety, should form part of the EFR initiatives introduced in the district. Children working as scavengers deserve special consideration, particularly with respect to education, health and safety.

**Private sector participation**

Private sector involvement in waste collection has the potential to improve the working of the sector. Loans and
subsidies should be made available to encourage private sector activities such as the establishment of composting plants and recycling facilities. In the first phase of EFR, it is important that firms with prior experience and an established record are approached. Once such initiatives are under way and operating successfully, newcomers can be encouraged to enter the sector. Private sector operators can even be involved in primary collection.

Scavengers and scrap dealers can also be drawn into an integrated waste management programme that includes private sector operators. For example, scavengers could be engaged systematically towards the end of the collection cycle, to sort and separate waste. Similarly, as garbage enters intermediate collection points, scrap dealers can be offered the opportunity to remove recyclable and reusable items and materials.

**Incentives for households**
Households can also be provided with incentives to alter the way in which they handle domestic waste. Waste reduction and separation can be encouraged through monetary incentives such as fee exemptions, discounts and deposit refunds, and through status-building measures such as awards and appreciation certificates, or membership in supervisory committees.

**Investment**
Revenues generated through fiscal reform must be invested in upgrading waste collection services. This includes the repair of equipment and vehicles, as well as the purchase of new equipment and vehicles. Funds should also be allocated to train and properly equip municipal workers. Appropriate sites for waste disposal and sanitary landfills need to be identified. For the medium and long term, investment in composting plants and recycling facilities is critically important.

**Integrated waste management**
Changing lifestyles and consumer choices have increased the volume and changed the composition of domestic waste generated in the district. This means that the manner in which solid waste is handled must also change. Integrated management is required, with recycling and composting playing an important part in the overall waste disposal cycle (Figure 10). The first step in an integrated waste management system is to reduce the volume of waste at the source. Households are encouraged to reduce the amount of waste generated, and to separate organic and non-organic rubbish prior to disposal. Once waste is transported to the dump, it is sorted. Organic waste is transported to composting facilities, while inorganic materials are further separated into recyclable and non-recyclable materials. Reusable materials go to recycling plants and only non-recyclable materials remain to be disposed of in landfills or by other means. Care is taken to ensure that this is done in an environmentally friendly manner. In this way, integrated waste management not only reduces the overall volume of solid waste, but also generates additional revenues and protects the environment.

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**Figure 10: Integrated solid waste management (basic model)**

![Figure 10: Integrated solid waste management (basic model)](image-url)

Once basic processes for integrated waste management become well entrenched, an advanced model may be adopted (Figure 11). Under such a system, all waste is transported to a single facility. Here, it is separated into four categories: compostable, recyclable, waste-to-energy and residual waste. This process produces recycled materials, organic fertiliser and energy, all of which will generate additional revenues. Steps are taken to ensure that discharges and emissions are properly handled, creating a waste disposal system that has minimal adverse effects on the environment.

**Institutions and governance**

Efficient institutional mechanisms are a prerequisite for the implementation of EFR. Improved supervision and coordination among various offices is also necessary. In addition, space must be created for the involvement of non-government agencies as well as the private sector. A collaborative institutional mechanism is required, with well-defined roles for various stakeholders, from the federal government to neighbourhood communities.

Solid waste management is an issue that can be handled efficiently and effectively at the local level, with the participation of local communities. As such, the role of the federal government should be to provide broad guidelines, and direct intervention should be avoided. Similarly, the Ministry of Environment should assume a visionary and supervisory role, taking responsibility for activities that cannot be handled locally, such as nation-wide awareness campaigns. The Ministry can also assist solid waste management agencies by establishing a national research and development programme, to keep abreast of the latest scientific techniques and international trends in waste management, and to apply these to the Pakistan context.

The provincial government has an important role to play, mediating between federal and local authorities. Development priorities and environmental challenges vary from province to province, and the provincial government can help to ensure that federal policy is flexible enough to accommodate these differing needs. The province can also assist local agencies with training and capacity building.

The local government, however, should be the focal point for setting priorities and designing projects. This is because the local administration is best able to determine the needs of communities. User fees and charges should be decided by local government agencies, based on income levels and...
development needs that will differ from district to district. Municipal committees should be the executing agencies for all public-sector waste management projects.

Local agencies should be authorised to levy taxes on polluters, and to impose penalties for the illegal dumping of waste. They should also be permitted to require polluters to pay compensation for environmental damage. Many of these mechanisms already exist, either at the federal or provincial level, while the LGO also allows local governments to levy certain fees and impose some penalties. The system needs to be rationalised, with roles and responsibilities clearly defined, and checks and balances built in, so that local agencies may be empowered financially. At the same time, local governments can encourage the entry of private sector operators in key sectors, such as waste management, while themselves playing a facilitative and supervisory role.

To perform their tasks efficiently and effectively, local government officials need to be fully informed of their powers and responsibilities under the LGO of 2001. They also require training in administrative skills and financial management. Similarly, TMA performance will improve if staff members are provided specialised on-the-job training.

There is an important role here for communities as well, with community groups serving as watchdog organisations to ensure that municipal agencies are fulfilling their responsibilities. Meanwhile, Citizen Community Boards, as provided for under the LGO, can receive government assistance to develop their own projects to tackle specific issues at the neighbourhood level.

**Awareness**

Although many of the most serious problems associated with waste management arise as a result of financial shortfalls and institutional constraints, the importance of public awareness cannot be underestimated. Armed with knowledge concerning the effects of poor waste management, communities can not only change their own behaviour but can also bring pressure to bear on public representatives to improve the operation of municipal agencies.

Public health is a key concern, with the knock-on effects of chronic illness felt in areas as diverse as education and employment. But the environmental threats associated with improper waste
management are also critically important and perhaps more difficult to communicate effectively, particularly among poorly educated segments of the population.

No EFR initiative in the solid waste management sector can hope to achieve success if communities fail to understand the risks of poor management and the benefits of improved service. In this connection, user fees proposed as part of the first phase of EFR are likely to generate some resistance, at least initially. Their importance in helping to improve the quality of municipal services will need to be included in awareness-raising initiatives.

Once communities begin to see first hand the benefits of improved waste management, resistance to other EFR measures is likely to decline. Campaigns to promote recycling, and to encourage at-source reduction and separation of waste, can be introduced at this stage.

Results of the survey conducted as part of this study show that few respondents think schools play an important role in creating awareness. This demonstrates a failure on the part of these institutions to educate young people in matters related to civic responsibility and public health. Schools and colleges will need to be included in awareness and education programmes.

**Equity**
The provision of basic services in this country is marked by inequity, and the waste management sector is no exception. While prosperous neighbourhoods are kept clean, low-income areas and urban slums are overrun by garbage. EFR provides an opportunity to rectify this imbalance by generating resources that can be reinvested in the sector to provide waste management services to a larger proportion of the population.

Traditionally, waste management has been considered an urban problem, with the result that rural areas are not included in waste management programmes. Properly designed EFR measures will allow this inequity to be addressed as well, so that the different needs of rural areas can also be accommodated.
REFERENCES


Cover and back cover photograph: Scavengers in Abbottabad searching for reusable materials. © PIDE