

Private Sector Participation in Solid Waste Management in Kathmandu

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1.1 Overview of Kathmandu

Kathmandu Valley, which provides the physical setting for Kathmandu Metropolitan City (KMC), is situated between the latitudes 27° 32' 13" and 27° 49' 10" north and longitudes 85° 11' 31" and 85° 31' 38" east. It covers an area of about 667 sq. km and its mean elevation is about 1350m. above sea level. The valley is bowl shaped with rivers draining towards the center of the basin. The rivers merge into the Bagmati River, which drains out through the Chovar Gorge located at the southwest corner of the valley.

Kathmandu is the capital and commercial hub of the country. It is connected with other countries with only International Airport and two major highways connect with India and China. Since it is the capital of the country all the embassies are concentrated in the Valley, and particularly in Kathmandu City. But in recent years due to development in transportations, major industries have moved to the secondary cities.

The Kathmandu Valley politically divided into the three districts of Kathmandu, Lalitpur, and Bhaktapur. In addition to these three cities, there are 110 Village District Committees (VDC) within the Valley. KMC is located in the Kathmandu District and covers an area of about 50.8 sq. km..

Kathmandu Valley the prime city of the country comprising 24.1% of the national urban population and 70.4% of the valley's total urban population in 1991. KMC's population grew from 235,160 in 1981 to 421,258 in 1991, registering an annual growth rate of 6%. At present it is estimated that of KMC's population will be approximately 725,000. Kathmandu is the largest city in Nepal with a population of approximately 725,000, which includes the cities of Lalitpur, Bhaktapur, Thimi, and Kirtipur, as well as several villages, has population of 1.5 million.

1.2 Introduction to KMC

Mayor and deputy mayor are elected directly by people every four-year.

KMC consisted of 35 wards and each ward elects one-ward chairperson and four members every four year. Mayor, deputy mayor, 35 ward chairpersons, and 140 members form a KMC Board.

Please see the attached Organization Structure.

Kathmandu Metropolitan City (KMC) consists of twelve departments including Environment Department, which is the largest of all. This department is divided into three sections; Solid Waste Management section, Mechanical Section, and Urban Environment Section. Overall KMC's Environment Department is responsible for managing the solid waste produced in Kathmandu. Between 1980 and 1993, there existed a major project, funded by the German Government, which was responsible for waste management. KMC has 2,200 staff of which approximately 1400 are engaged in waste management.

1.3 Financial Structure

| Year | Total Exp. | Exp. SWM | Income (Gov.) | Income Others (Int. Donors) | Income (SWM services) |
|------|---------------------------|---------------------------|---------------------------|-----------------------------|------------------------|
| 2000 | App. US\$ 6,500,000 | App. US\$ 2,000,000 | App. US\$ 3,100,000 | App. US\$ 3,400,000 | App. US\$ 72,000 |
| 2001 | App. US\$ 5,200,000 | App. US\$ 2,000,000 | App. US\$ 3,100,000 | App. US\$ 2,100,000 | App. US\$ 72,000 |

2. Solid Waste Management in Kathmandu

2.1 Kathmandu's Garbage

A study done in 2000 by Kathmandu Valley Mapping Program (KVMP) concluded that Kathmandu residents produce 1 liter (0.3 kg) of garbage per person per day and average loose density of garbage was found to be 0.225 ton/m³. However, previous studies estimated that the density of garbage varies from 0.25 – 0.48 ton/m³. In this study the density of garbage is kept 0.255 ton/m³ for simplicity. This means that within Kathmandu City, the waste generation is about 650 m³/day. In addition to this, it is also estimated that 30% (approximately 300 m³/day) extra waste is also generated from daytime population, waste from neighboring cities & villages and, commercial districts. Generally waste production rate in cities of the developing world is about 0.5 kg per person per day. The neighboring city of Lalitpur generates approximately 130 cubic meters of waste per day.

Kathmandu's waste is mainly organic in nature. Although the organic content may vary depending on the location of waste generation and the season, in general two thirds of the waste is organic. The rest of the waste consists of paper, plastic, glass, inert materials (dirt, bricks, stones etc.) and various other components. The table below presents the results of a recent waste characterization study.

| S. No. | Description | % Weight Basis |
|--------|---------------|----------------|
| 1 | Organic | 69.84 |
| 2 | Paper | 8.5 |
| 3 | Rubber | 0.54 |
| 4 | Leather | 0.12 |
| 5 | Wood | 0.73 |
| 6 | Plastic | 9.17 |
| 7 | Bone | 0.23 |
| 8 | Textile | 3.02 |
| 9 | Ferrous Metal | 0.87 |
| 10 | Aluminum | 0.05 |
| 11 | Glass | 2.5 |
| 12 | Others | 4.33 |
| | Total | 100.00 |

Source: KMC/KVMP 2000

The main source of waste in Kathmandu is domestic waste. The city has only a few industries and most of the industries recycle their waste. The main industry is the carpet industry.

The main source of hazardous waste is medical waste from hospitals and nursing homes. Recent study conducted by Environment & Public Health Organization (ENPHO) estimates that there are 2347 beds in government and 1558 beds in private hospitals and nursing homes, which generate about 1189 kg of infectious waste per day. Most of the medical waste is discarded along with normal municipal waste.

KMC is in the process of establishing a medical waste management system for Kathmandu. KMC has completed a survey of current practice of waste management in 45 health care institutes and presented its results in a workshop. KMC has also recently drafted medical waste management guidelines and an Environmental Impact Assessment Study of the proposed medical waste management system is under way. In near future, KMC wants to establish all needed infrastructure like treatment plant, management plan, and purchase collection vehicles and it will be contract out to a private party to operate.

2.2 KMC's Waste Management System

Each of the 35 wards in Kathmandu is assigned 20 to 30 sweepers. The sweepers sweep the streets and collect the garbage dumped by residents in certain locations. The garbage is loaded on to a tractor or tipper and brought to a transfer station. Garbage is also collected from 4 and 6 m³ containers, which are

placed in different locations and at major sources of waste.

At the transfer station the garbage is unloaded on to a platform and some of the recyclable materials in the waste stream is removed. The rest of the garbage is put in compactors and sent to the landfill site.

At present, due to lack of proper landfill site, KMC is dumping its collected waste at Bulkhu. KMC, along with the central government, is in the process of searching for a new landfill site.

KMC currently collects approximately 600-650 m³ of waste per day. Of this, a small portion is recycled, while most of the waste is landfilled.

Summery Information on KMC's Waste Management System:

| | |
|--|-------------------------|
| Average Waste Generation: | 1.0 liter/per/day |
| Estimated population of KMC: | 725,000 |
| Estimated Waste Generation from KMC: | 725 m ³ /day |
| Street waste generation (assumed 10% of hh): | 73 m ³ /day |
| Commercial waste (assumed 10% of hh): | 73 m ³ /day |
| Waste from neighboring cities & village: | 73 m ³ /day |

| | |
|-------------------------------|------------------------------|
| Total Waste Generation | 944 m³/day |
| Waste Collected by KMC: | 650 m ³ /day |
| Waste Collected (in ton): | 200 ton/day |
| Collected Efficiency: | 70% |

| | |
|----------------------------|----------------|
| Total no. SWM staffs: | 1400 |
| Total no. of SWM vehicles: | 100 |
| Actual Expenditure (2000): | 14,000,000 NRS |

Table 1. Total Expenditure in SWM

| SN: | Headings | Street Sweeping (Ward Level) Rs./Year | Street Sweeping (Central) Rs./Year | Collection Rs./Year | Transfer Station Rs./Year | Transportation Rs./Year | Landfill Site Rs./Year | Total Rs./Year |
|-----|--------------------------------|---------------------------------------|------------------------------------|---------------------|---------------------------|-------------------------|------------------------|--------------------|
| 1 | Salary | 38,823,600 | 3,192,000 | 7,240,800 | 427,200 | 643,223 | 396,000 | 50,722,823 |
| 2 | Allowances | 10,459,780 | 857,600 | 1,884,040 | 112,160 | 164,966 | 102,600 | 13,581,146 |
| 3 | Provident Fund | 3,882,360 | 319,200 | 724,080 | 42,720 | 64,322 | 39,600 | 5,072,282 |
| 4 | Overtime | 12,811,788 | 1,053,360 | 2,812,152 | 163,008 | 82,820 | 160,056 | 17,083,184 |
| 5 | Administrative Cost | 1,319,551 | 108,443 | 652,583 | 223,298 | 267,246 | 94,289 | 2,665,409 |
| 6 | Depreciation | 1,000,800 | 57,000 | 4,967,382 | 354,880 | 1,523,848 | 1,129,880 | 9,033,789 |
| 7 | Maintenance Cost | 280,000 | 8,000 | 4,523,382 | 354,880 | 1,523,848 | 2,259,759 | 8,949,869 |
| 8 | Interest | | | 6,785,072 | 532,320 | 3,366,083 | 3,389,639 | 14,073,115 |
| 9 | Fuel | | | 3,692,224 | 705,024 | 2,190,118 | 2,410,560 | 8,997,926 |
| 10 | Others (Materials) | 6,720,000 | 4,272,000 | | | | | 10,992,000 |
| | Total | 75,297,879 | 9,867,603 | 33,281,714 | 2,915,490 | 9,826,474 | 9,982,382 | 141,171,542 |
| | In US \$ | 1,107,322 | 145,112 | 489,437 | 42,875 | 144,507 | 146,800 | 2,076,052 |
| | % of Total Expenditures | 53 | 7 | 24 | 2 | 7 | 7 | 100 |

3.1 Problems:

Following are the major problems faced by KMC in SWM.

- Inefficient collection system-Multiple handling of Waste
- Attitude *throw & forget*
- Daily collection (street Sweeping)
- Less willing to pay
- Political Intervention
- Inappropriate technology
- Inflexible system
- Inappropriate collection vehicles
- Inadequate trained manpower
- No appropriate laws & policies

3.2 Private Sector Participation (PSP):

The main goal of KMC is to *establish an integrated solid waste management system, which is efficient, cost effective, and environmentally sound by the year 2002 with maximum involvement of local communities as well as the private sector.* To address the problems, KMC has been launching Private Sector Participation to achieve following outcomes:

- Efficient collection system
- Efficient transfer and scrap recovery
- Maximum recycling & composting
- Sanitary landfilling
- Special waste management
- Appropriate policy and law
- Public education and participation
- Professional management and monitoring

Involving the private sector in waste management services usually results in an efficient and professional SWM system. The private sector is usually best at providing efficiency and technical expertise, while the public sector, which is directly responsible to the people, is best at doing the jobs of monitoring and enforcement. Therefore, a suitable combination of the best attributes that the private and the public sector have to offer will be necessary to provide an efficient waste management system.

Although efficiency and investment are two of the main causes that are often cited for involving the private sector, the bottom line is that the goal that KMC has set for itself cannot be achieved by KMC alone. Therefore, there is no option but to involve the private sector in SWM.

KMC, therefore, is committed to involve the private sector in SWM services to make it more efficient and cost-effective. However, because privatization of waste management is a new, often mis-understood and sometimes controversial process for Nepal, the privatization process has been carefully planned so as to maximize the use of KMC's existing manpower and equipment, and minimize risks and potentials for failures.

Effective private sector participation (PSP) in waste management requires:

1. Political commitment
2. Confidence of all stakeholders
3. Option suited to local conditions
4. Enabling environment
5. KMC capable to plan and monitor the process
6. Fair & transparent process

In the past, a few attempts to involve the private sector had failed because the process was not well planned and not every body understood it. In 1996, an American company called Americore Environmental Services, and a Canadian firm, IER, had submitted unsolicited proposals for managing

Kathmandu's waste. As solid waste management was a major problem in the city, the municipality readily signed letter of intents with these companies, whereby the companies would manage all of Kathmandu's waste. However, the municipal sweepers immediately opposed the plan because of the fear of the loss of their jobs. As a result the project could not move ahead and KMC only ended up hiring more sweepers to satisfy the sweeper community. Therefore in 1997, when KMC was formulating its new SWM strategy, the process of PSP was also planned accordingly and the pre-requisites for PSP mentioned above were first addressed.

KMC's strategy for waste management involves the following guiding principles:

Plan the process but don't wait for the perfect plan: In the PSP process, KMC first worked on preparing strategic plan and building the confidence of all stakeholders (KMC Board, KMC administration, KMC's sweepers, Private companies, and the general public). While planning the process of PSP is important, it was also realized that KMC should not wait for the perfect plan because Nepal has no experience of a municipality working with the private sector in waste management and there is a need to learn by doing. The plan therefore has room for trial and error and improvements as process moves ahead.

Phase wise implementation to build confidence: In order to slowly build the confidence of all stakeholders, KMC is implementing PSP in phases, instead of giving all the responsibilities to one company all at once. Incremental involvement of the private sector will allow both the private sector and KMC to slowly learn the process and gain confidence.

Try different approaches: There are several ways to involve the private sector in SWM such as contracting, franchise system and management contract. KMC is in the process of trying these different processes and seeing which one fits best for the conditions in Kathmandu.

The bottom line is that there is a need to be firm with the vision but flexible with the process. The vision is that by the year 2002, Kathmandu will have an efficient SWM system with maximum participation from the private sector. The process of achieving this will be by building the confidence of all stakeholders as KMC tries different approaches to PSP in a phased manner and continuously builds on the lesson learned from these experiences. The status of some of KMC's efforts to involve the private sector in waste management is outlined in the sections below.

West Sector Project

The city of Kathmandu has been divided into five sectors for the purpose of waste management. West sector is located west of the Bishnumati River and consists of recent expansions. The sector mainly consists of residential areas such as Kuleshwor, it is estimated that the sector has an approximately 12,000 households.

The West Sector was chosen for introducing door-to-door collection for the following reasons:

In November 1998, KMC signed a five-year agreement with Silt Environmental Services to implement door-to-door waste collection in wards 13, 14, and 15. The main objectives of the project were as follows:

1. Introduce private sector participation in waste management to make the system more efficient.
2. Initiate door-to-door collection of waste in order to avoid dumping of waste on the streets.
3. Introduce source separated waste collection system to promote recycling.
4. Introduce alternate day waste collection system to reduce cost.
5. Encourage citizen to participate in Kathmandu's waste management system and pay for waste management services.
6. Generate revenue to recover part of the cost of waste collection.

Silt started its services in mid February 1999.

3.3 SILT & KMC

This program has been only partially successful because out of 12,000 potential members, only 4,000 have been getting the services and paying the fee. Problem faced by SILT is briefly described below:

- Regular Street sweeping activity is conducted by KMC. So, people are not interested in paying because every morning streets are swept and cleaned by KMC staffs.
- There is not major financial benefit for KMC because it carried out regular cleaning activity.
- Inadequate technical knowledge in waste management (SILT)

3.4 Private Sector Participation (Door to door collection, Sweeping, & Transportation)

Pilot Project Ward 1 & 24

In mid 2002, KMC announced that it was interested in contracting out waste management services (door-to-door collection, street sweeping, and waster transfer) of Central Sector (wards 1, 5, 11, 32, 33, & 34) to private sector(s). The concept of contracting out of six wards at one time has to be abandoned because of opposition by sweepers. After continuous negotiations with sweepers' union, instead of privatizing six wards to one private company, only two wards (ward 1 & 24) have been awarded the contract to two different companies. Following major steps have included in this PSP:

- After PSP, the sweepers were assured that there would be no layoffs
- KMC's sweepers would be assigned to other location or will utilize them as gardeners
- 30% of total sweepers would remain in the same wards for tasks like cleaning of sewer, for monitoring private sector, and fixing streetlights.
- Private sector would not get any subsidy from KMC and fee should be equal or less than KMC's tariff rate.
- For six months, KMC would provide a vehicle to collect street waste but the private party would be responsible to transfer waste collected from door to door services.
- Technical and Management trainings would be provided to private parties
- Waste would be collected daily not every other day & waste separation will not be encouraged for time being.

After launching this program, KMC closely monitored the progress made by private sectors. It has been one year now and KMC feels that these two private companies are in profit and willing to continue the services.

During the process KMC provided following services to the private sectors:

- Technical & Management trainings were provided to private sectors including NGOs who have been involving in waste management services.
- Meeting were held to share their views and difficulties among the these groups
- KMC constantly monitored and assist in planning
- KMC launched awareness programs to general public in these two wards to build confidences among the people
- KMC became a mediator between ward representatives and these companies to build confidence stakeholders
- KMC provided one vehicle to each company to collect waste only from streets for six month.
- KMC transferred 70% of its staffs to new locations and planning on providing gardening training

3.5 Problem occurred during the PSP & way it has been handled

Table 1: Problems & Way it has been addressed:

| Problems | Addressed |
|---|--|
| Opposition by sweepers | <input type="checkbox"/> Meeting were held among sweepers in the presence of ward representatives and assured that their jobs were secured and would be relocated <input type="checkbox"/> 30% of sincere sweepers were kept in the same ward as a reward <input type="checkbox"/> Ward representatives were briefed on its (PSP) importance and requested not to politicalized |
| No confidence among private sectors to start program in the beginning without KMC's financial assistances | <input type="checkbox"/> Private sectors were briefed on financial cost benefits and profit they can make if carefully launched <input type="checkbox"/> Assured these private sectors that KMC will contract out all its waste collection services including door to door collection, street sweeping, and waste transportation activities to the private sectors in future. <input type="checkbox"/> Assured private sectors that they are here to stay and it long term profit |
| No confidence among Stakeholders | <input type="checkbox"/> Public meetings were held and assured that people will get better service and wards will be cleaner than before <input type="checkbox"/> Assured people & ward officials that if they were not satisfied with private sectors' performance KMC will step in immediately <input type="checkbox"/> Assured that the fee will be within or below the tariff rate set by KMC (\$0.70/hh/mo) <input type="checkbox"/> Briefed general public regarding KMC's financial situation and fee they pay will be utilize in improving environment of KMC |
| Inadequate technical information & management skill in private sectors | <input type="checkbox"/> Provided technical and management trainings <input type="checkbox"/> KMC's technical staffs were made available all the time for them to discuss & share |

Following out comes have been gathered after completing one year:

- These private companies are willing to continue the activities carried out by them
- They are showing interest to expand their activities to another wards
- App. 50% of people surveyed expressed that the service provided by private sectors is better and the ward is cleaner than before
- The membership increased app. 40% as soon as KMC pulled all resources (waste collection vehicle) out from those wards
- So far ten applications have filed in KMC by different private companies to contract out new wards

Benefits:

| General public | Private Sector | KMC |
|---|--|--|
| They are more concern than before because they paying service fee | Good profit | Better Katmandu |
| They feel proud because they are doing something for environment | Long term profit | Less management burden |
| The area is more cleaner than before | No major competition | Cost saving. KMC spends app. US\$25,000 for street sweeping and additional US\$7,000 for transportation annually per ward. So total cost saving is app. US\$22,000 per year/ward |
| They do not have to worry about waste anymore | Fairly small capital investments | More efficient and effective services |
| Door to door collection services | Good relationship with local representative & general public | No waste in street |

4. Conclusion & Recommendations

One of the KMC's goals is to keep Kathmandu Clean. This can only be achieved by involving private sectors and communities in solid waste management services. PSP program launched by KMC is partially successful and heading towards right direction but KMC must continuously build confidence among stakeholders.

4.1 Lesson Learned:

After few years of PSP experiences, KMC believes PSP can be effective tool to provide efficient and cost effective waste management services to general public. Following lessons were learned from the program:

- Confidence in PSP program
- Careful Planning & try different approaches
- Learning confidence among stakeholders
- Build confidence among stakeholders
- Make sure that there is no political interventions
- Transparent process

4.2 Recommendations:

- Human Resources Development. KMC's staffs have to be trained in PSP program
- Technically and Management trainings should be provided to private sectors on regular basis
- KMC's must regularly monitor the process, working system, effectiveness, and gather consent of satisfaction from general public
- KMC should make sure that there is always competitions among the private sectors so that it will be cost effectives and provide quality services to public
- This a ongoing process, mistakes will be made but continue the process
- In future, KMC should change its role from providing services to public to managing PSP
- International Agencies can train staffs of KMC and private sectors

Kathmandu Metropolitan Office

