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SOLID WASTE STUDY

PRIVATE PROVISION OF SOLID WASTE MANAGEMENT SERVICES

MBABANE AND MANZINI

SWAZILAND

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EXECUTIVE SUMMARY

Background

The Mission and RHUDO have been working with the Town Councils of Mbabane and Manzini to finance the design and construction of municipal slaughter houses.

One condition of A.I.D.'s participation in this project is that the private sector be invited to manage the new facilities.

Building on the willingness of the local governments to explore the possibility of privatizing municipal services, RHUDO introduced both Town Councils to APRE/H's centrally-funded Private Provision of Social Services (PPSS) program for solid waste management. Each council expressed interest in participating in a PPSS feasibility study. As it happens, private contractors already provide collection and disposal services for the Matsapha Industrial Estate and the Town Councils are curious to learn whether privatization is feasible on the municipal level.

Project Objectives

The objectives of this Phase I feasibility study are threefold.

First, it is to assess the existing level of solid waste service delivery within the Mbabane-Manzini corridor.

Second, it is to provide recommendations to improve the efficiency, effectiveness, and environmental soundness of each municipality's current solid waste management practices.

Lastly, it is to identify opportunities and constraints for private sector participation in the provision of solid waste management services in both the regional and municipal public sectors.

Existing Conditions

The existing level of service in Mbabane-Manzini is neither efficient nor effective and lacks environmental soundness. Approximately 30 percent of the daily solid waste generated in each town is not collected. Both towns are plagued with open illegal dumping. Both towns lack sufficient funds to maintain their aged collection fleets and to purchase much needed additional collection vehicles.

Environmentally sound disposal of collected solid waste is lacking. Both towns are presently contaminating the environment - Mbabane the water and Manzini both air and water.

Recommendations to Improve Present System

Both towns need to replace their aged collection fleets and add new collection equipment. Both towns need to develop management support systems, preferably on computers. Both towns need to locate, study, design and develop environmentally sound landfills. Better yet, develop a joint or regional landfill.

Opportunities and/or Constraints for Privatization

Both towns should consider privatizing their commercial and industrial areas. This would save the towns operating funds, minimize purchase of additional equipment, allow for better level of service to residential areas, and create jobs in the private sector.

Both towns should work jointly and/or assist the private sector to locate, design, develop and operate a regional environmentally sound landfill between the two towns.

There do not appear to be any constraints to the privatization of solid waste collection and disposal in Swaziland. Privatization of these services already exists in both towns to some degree.

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I. **Evaluation of existing solid waste management practice within the Mbabane-Manzini Corridor**

MBABANE

Waste Generation and Composition

Approximately 70 percent of the solid waste produced in Mbabane is generated by residential areas. An estimated 20 percent is generated by commercial and business activities in and around the town center with the remaining 10 percent generated by the city's various industrial sites.¹

The urban area of Mbabane produces an estimated 110 cubic meters of solid waste per day. Approximately 81 cubic meters or some 74 percent of the total daily waste is collected by the town council's vehicles. The uncollected waste is mostly generated by the low-income unplanned settlements. These areas are difficult to service due to lack of roads. The waste in these areas is burned, dumped in a hole in the yard or dumped at illegal public dumping sites throughout the township.²

The composition of the waste deposited at the landfill appears to be of high paper, plastic and bimetal can

¹Urban Development Project for Provision of Infrastructure, Human Settlements Upgrading and Serviced Sites for Housing, Industrial Estate Expansion. Vol. #2 Mbabane. April 1990. DHV Consultants. The World Bank. p. 4.46.

²Ibid. P. 4.47.

content. The waste content in the unplanned settlements appears to be mostly kitchen and yard waste, while waste dumped in the illegal public sites appears to be high in construction materials and debris.

Collection

The waste collection system in Mbabane appears to be well supervised and efficient. The collection crews are adequate and average two loads per crew per day.

The main problem affecting collection is the age and lack of reliability of the collection vehicles. Four of the six compactor trucks are ten years or older. Maintenance costs and equipment downtime is high. There is no backup equipment when vehicles are down. This hurts the delivery of service.

The experimental container/tractor/trailer system being used to serve the informal settlements like Msunduzi appears to be working satisfactorily. Containers are put at strategic locations in the neighborhood, collected with the tractor-trailer and emptied every day or as necessary. However, it appears that more containers are needed.

Disposal

The present disposal site is a temporary site located off the Usuta road next to an abattoir. The site is being operated very well. The site is controlled by a spotter who directs dumping traffic and the size of the dumping face. The landfill equipment consists of a caterpillar D5 with rippers and an Agrico compactor. The waste is being compacted and covered daily. However, the site is running out of space and out of cover material and its projected life is short.

The disposal site in Mahwala which was closed due to citizens protests is still a good site with 2 or 3 years of landfill left. If certain steps are taken to clean up this site, gain control of dumping face and some good public relations with the neighborhood, the site can be salvaged for use (more will be discussed on this issue under recommendations.)

The Kelly farm landfill site study was reviewed by this consultant. The site is adequate but a good design and operational plan needs to be developed as soon as possible to prepare the site and make it environmentally sound.

Budget

The estimated public cleaning costs for 80/89 was E386,591 - or E 25 - per capita annually (for the planned town area only). Revenue from refuse collection tariffs is only E39,400 per year.³ This leaves a large annual deficit that has to be subsidized from other revenue sources. Staff indicates that the deficit is getting larger every year. This is the main reason why the town council cannot purchase, replace or maintain collection and disposal equipment.

Administration and Managerial

The staff, town engineer, chief health inspector and supervisors appear to be very capable. They get good production out of their employees and out of the old equipment.

It appears that they lack adequate information systems and computers to manage the waste collection services. A customer inventory system has to be established with an updated listing with full address, type of business, organization, payments, number of bins, etc. This is a must in order to do adequate planning, budgeting, fee structures, growth projections and service delivery projects, etc.

³Ibid. P. 4.51.

Also landfill records need to be established as to numbers of loads per vehicle per day, times, area, type of vehicle, estimated volumes per vehicle, etc. This data base is very essential for planning, operations and budgeting or to privatize collection.

Legal

One of the major problems facing Mbabane is illegal dumping, especially by small construction contractors. The municipality's health inspectors have no real power to cite and fine violators. Those fines that are allowed are so small that violators are not discouraged from illegal dumping. The municipal needs to revise and strengthen its enforcement laws.

There is also a big problem with the legal authority and the process to increase waste collection tariffs. The Prime Minister's office has to be petitioned and the process takes a long time to receive approval. Mbabane petitioned for a rate increase two years ago and the increase has not yet been approved. This has resulted in approximately E80,000 per year in lost revenues.

In order to change the system to allow to charge tariffs based on customer categories, the Building and Housing Act has to be changed.

II. Recommended options to improve current delivery of solid waste management services.

MBABANE

Collection

1. Replace the four old Hino trucks as soon as possible. As a minimum, replace one 18 cubic meter truck a year for the next four years.

2. Expand the communal container/tractor trailer system to other unplanned areas. Purchase at least three additional containers annually for the next four years. As soon as possible design and implement an educational and public relations program in the unplanned areas currently served by the communal system to show residents how, when and for what results the system is intended. This program should include participation of the chairpersons and other key people in each of the six zones comprising the unplanned areas.

3. Also, as soon as possible, assign one or two labors to travel with the tractor operator to clean up the areas where the containers are

located. This encourages the residents to keep the area and neighborhood clean.

4. Design and begin to establish an inventory of all waste collection accounts by name, address, type of business or organization, number of bins, etc. for budgeting, planning, financial projects, etc. This program should be put into a computer and designed to be updated periodically.

The data or program can be designed or put together by senior high school students or college student volunteers who might want to do work on community projects for school credits.

5. Design and put in operation a formal city-wide paper recycling program. Meet with the paper manufacturing company and work jointly in setting city-wide paper recycling programs. Ask them to provide recycle bins for all offices, banks, schools, shopping centers, etc. Council only needs to pass by-laws to formalize it. Get paper company to do public relations programs.

6. Explore other recycling opportunities. At the Menzine landfill scavengers were collecting cardboard and plastic.

This means that they are recycling plastics as well as paper. There is a plastics manufacturing plant at Matsapha. Talk to them about plastics recycling and ask them to work with you on setting a recycling program like the paper mill has done.

I am inquiring if the bimetal cans can be recycled from my team in Botswana which is assisting in setting up similar programs there.

Recycling not only helps the environment and saves landfill space, it also helps create jobs in the private sector.

7. Ask large companies or corporations to participate in helping to promote environmental programs like recycling and litter control. International companies like Coca-Cola, Kentucky Fried Chicken, banks and breweries will donate staff assistance, sponsorship, and

promote programs at no cost to the municipality. They will provide public relations, staff members, and things like litter containers and recycling boxes for you if you ask them and work with them. They will especially work with school and community programs.

Disposal

1. As soon as possible, clean up and cover all the exposed garbage at the Mahwala landfill site. This site can be salvaged and developed into a well operated landfill which should not disturb the neighborhood if a good public relations program is developed; the neighborhood is kept informed and asked for input; and a good work/operational plan is developed and adhered to.
 - a. Inform the people about the need to use the site due to lack of other sites and the time that will be required to design and develop the Kelly site.

- b. Clean up the entire area around the Mahwalala site including the roadways leading up to the site. This will require extensive hand labor to pick up all the debris that was left on the roads by the waste collection trucks and others using the site.
- c. Cover all exposed garbage that was dumped on the site.
- d. Fence the site if possible to gain control of area (keeps illegal dumpers and scavengers out).
- e. Place a watchman on site 24 hours.
- f. Develop a system of disposal using the trench method. Cover garbage every day.
- g. Dedicate and keep a bulldozer or compactor on site on a permanent basis.

- h. Keep a spotter on site during operating hours. The spotter at the present Usuta road site is doing an excellent job of keeping the dumping area small and compact. (He has established good control of landfill.)

- i. Designate an area separate from the solid waste for dirt and rock. (This can be used for cover during periods of rain when digging is not possible. Stockpile this material for cover material.)

- j. Develop a plan and implement it to handclean the roadway(s) that go to the landfill site. Clean these everyday if you have to, but keep the road(s) clean. This is one of the major reasons people were upset. The debris that flies off or falls from the garbage trucks litters the roads and their property.

- k. Run a water truck with a spray and spray the roadway to keep the dust down if dust is a problem. Spray as many times per day as necessary when collector trucks are generating or the landfill is open.
1. Make sure you follow the plan. Once you fail to adhere to the plan, people are going to get angry and your problems will begin again.
2. As soon as possible, begin design and development of the Kelly site. A landfill site has to be planned, designed and developed. This takes time. The Mahwalala site will only provide 2-3 years of landfill space at the most and the Usuta Road site is almost used up.
3. At the present temporary site on Usuta Road, set up a separate area from the solid waste for dirt and construction debris (dirt, rocks, concrete) to use as cover material. The more cover material you have on the site, the longer you can use it.

4. Work with the parks department and expand their composting operation. Using the waste from the pounds, the abattoir and markets.

Composting is the best way to reduce volume at the landfill and to reuse good natural resources.

**III. Evaluation of Existing Solid Waste Management Practices
within Mbabane-Manzini Corridor.**

MANZINI

Waste Generation and Composition

Approximately 70 percent of the solid waste produced in Manzini is generated by residential areas. An estimated 20 percent is generated by commercial and business activities in and around the town center with the remaining 10 percent generated by the city's various industrial sites.¹

The urban area of Manzini produces an estimated 104 cubic meter of solid waste per day. Approximately 70 cubic meters or some 67 percent of the total daily waste is collected by the town council's vehicles. The uncontrolled waste is mostly generated by the low-income unplanned settlements. These areas are difficult to service due to lack of good roads. The waste in these areas is burnt, dumped in a hole in the yard, or dumped at illegal public dumping sites throughout the township.²

¹Urban Development Project for Provision of Infrastructure, Human Settlement Upgrading and Serviced Sites for Housing, Industrial Estate Expansion. Vol. #3 Manzini. April 1990. D.H.V. Consultants. The World Bank, Washington, D.C., p. 4.12.

²Ibid.

The composition of the waste deposited at the landfill appears to be of high paper, plastic, and bi-metal content. The waste content in the unplanned settlements appears to be mostly kitchen and yard waste, while waste dumped in the illegal public sites appears to be high in construction materials and debris.

Collection

The waste collection systems in Manzini appear to be well supervised and efficient. Collection routes are well defined into two city zones and the townships. The crews are hardworking, well-coordinated, and efficient. They average a good two loads per day, five days per week.

The main problem affecting the collection systems is the lack of backup equipment. If one of the system's two trucks is down for maintenance or repairs, the whole system collapses. The third vehicle used for collection is a tractor. This is used in the townships and it is 11 years old. The only backup are two 1967 tractors for which parts are difficult to find.

Manzini needs to implement the container/tractor-trailer system being used in Mbabane to provide collection service to the unplanned areas. This type service could extend

collection service to almost everyone in the township of Manzini.

Disposal

The present disposal site in Manzini is an open dump-site which is periodically set on fire by scavengers. During my visit it burned for two consecutive days. The smoke blanketed the valley below and created tremendous health and environmental problems for the town.

Manzini has no dedicated landfill equipment to cover refuse daily. As resources permit, cover material is trucked in by street maintenance crews and a small D4 bulldozer is used to spread the garbage and cover it.

There are no controls at the site. Dumping is allowed anywhere. Scavengers collect cardboard and plastics. Good clean dirt and other cover material is dumped haphazardly along with the refuse so that it cannot be used beneficially.

The dump is next to a cemetery, a golf course, and a nice residential area. Needless to say, it is an eyesore as well as a health and environmental menace to the entire town below.

This consultant reviewed a possible site on private property in the Elwandle area. This appears to be a good site. There is sufficient land, good clay, and, with a proper design and development plan, this area would make a good landfill site for about 15-25 years.

My suggestion is to explore this site seriously for a new landfill. Design a good, environmentally sound plan and develop this site as soon as possible.

The old site (present open dump) should be cleaned, covered, terraced, and developed into a recreational park.

Budget

The estimated public cleaning cost for 88/89 was E 337,000 or E 20 per capita annually (for the planned town area only). Revenues from refuse collection tariffs is only E 131,000 per year.³ This leaves a large annual deficit that has to be subsidized from other revenue sources. Staff indicates that the deficit is getting larger every year. This is the main reason why the town council cannot purchase, replace, or maintain collection and disposal equipment.

³Ibid. p.4.46

Administrative and Managerial

The city clerk to the council, town engineer, chief health inspector, assistant chief health inspector, and supervisor all appear to be very capable administrators and managers. They get good productivity from their employees and out of the old equipment that they manage.

They lack adequate support systems like computers to enable them to develop a good data base for their areas of responsibility. They need to establish an updated listing with full address, type of business, organization, payments, number of bins, etc. This is a basic must in order to do adequate planning, budgeting, fee structures, growth projections, and service delivery projects, or to privatize collection.

Also, landfill records need to be established as to number of loads per vehicle per day/month, times of day, areas of collection, type vehicles, estimated volumes per vehicle, etc. This data base is very essential for planning, operations, and budgeting.

Legal

Several meetings were held with the Manzini City Clerk to the Council (an attorney) discussing legal issues.

The major legal issues facing the cities are the lack of enforcement and lack of ordinances on illegal dumping and other health and environmental issues.

At the present time the state police are responsible for enforcement, consequently their priorities are not municipal issues. What is needed is some local autonomy to give police powers on municipal legal issues to the municipalities if any local enforcement is going to occur.

Present laws do not prohibit privatization of solid waste collection or disposal services, and there is already precedent set in that Matsapha is serviced by a private collector and the landfill is quasi-private. The paper mill company is also collecting (recycled) paper with a private collection truck in both Mbabane and Manzini.

IV. Recommended Options to Improve Current Delivery of Solid Waste Management Services.

MANZINI

Collection

1. Purchase a third compactor collection truck. This is desperately needed as a backup in order not to disrupt service when one of the two collection trucks is down for maintenance and repairs.

2. Implement the communal container/tractor-trailer system in the unplanned areas of the town. The implementation of this system would virtually provide total collection of solid waste in Manzini.

3. Design and begin to establish an inventory of all waste collection accounts by name, address, type of business or organization, number of bins, etc. This will help create a much needed data base for budgeting, planning, financial, and growth projections, etc.

The program should be put in a computer and designed to be updated periodically.

The data and/or the program can be designed and put together by using college or high school student volunteers who might want to do work on community projects for school credit.

4. Design and put into operation a formal city-wide paper recycling program. Meet with paper manufacturing company and work jointly in setting up a formal city-wide paper recycling program. Ask paper company to provide recycling bins for all offices, banks, schools, shopping centers, etc., in return for paper. They

should also provide all the public relations for the project. Town council only needs to pass by-laws to make program official and formal.

5. Explore other recycling opportunities. At landfill, scavengers were collecting cardboard and plastic. This means that someone is recycling plastic as well as paper.

There is a plastics manufacturing plant at Matsapha. Talk to them about plastics recycling and ask them to work with you on setting up a recycling program like the paper mill has done.

I am inquiring if the bi-metal cans can be recycled from my team in Botswana which at present is assisting the government there with a similar program.

I will also inquire about recycling glass for you.

Recycling not only helps the environment and saves landfill space, it also creates jobs in the private sector and saves the town council funds for waste its vehicles do not have to collect or bury.

6. Ask large companies or corporations to participate in helping to promote environmental programs like recycling and litter control.

International companies like Coca Cola, Kentucky Fried Chicken, banks, and breweries will donate staff assistance and sponsorships, and promote programs at no cost to the town council.

In a lot of countries they provide staff members to the public relations programs, donate and/or place litter containers and recycling bins in the town if the town council asks them, and work with them in joint efforts. They will especially work with communities and school programs addressing environmental issues.

Disposal

1. Purchase, lease, or borrow a bulldozer to clean up present disposal site and to provide daily cover.
2. Provide a permanent landfill spotter who knows how to control dumping space at landfill. (Ask Mbabane to help you on this, if needed.) This will keep the dumping area under control, which will in turn require less work by the bulldozer and less daily cover.

Make sure that the spotter separates the clean dirt and construction debris from the other solid waste material. This will provide some daily cover material and eliminates unnecessary haul by the town's trucks.

3. Design, develop, and implement a closure plan for the existing site as soon as possible. You need to design a planned and controlled terracing operational plan to maximize the life of the site and make the land useful for a public recreational area or park.
4. As soon as possible, locate, purchase, or lease a future landfill site. Begin design and development as soon as possible. The present landfill does not have much life left, especially if a well-designed plan is not developed for the portion that remains and the reclaiming of the areas used.
5. Immediately, set up a composting operation at the town pound or other suitable town property. Use the waste from the pound, the abattoir, the market place, grass cuttings, and sawdust from Matsapha.

Use the plan I designed for you and gave you instruction on as a basis to design and develop what is appropriate for Manzini.

Work with parks and other town organizations to promote the use and benefits of compost.

V. Identify Opportunities and Constraints for Privatization in Mbabane and Manzini.

1. As soon as possible develop an updated waste collection customer inventory list by category or type of business, organization, number of bins, address, etc.

From this can be developed an equitable rate structure to charge collection services by volume and times of service per week. It also helps you in monitoring collection services if you privatize.

2. Once the above list is established, this consultant's recommendation is to put out a Request for Proposals to franchise all commercial and industrial accounts to the private sector (privatize).

This would eliminate about 30 percent of the waste collection service that each of the two town councils would have to provide, cut down on town council equipment needs and personnel, create jobs in the private sector, and save the towns money in operational costs.

There are already seeds of private collection in Swaziland. The paper recycling company is already collecting paper from private areas, and there is a private collector providing service to Matsapha. The legal structure is already in place and operating.

3. Find a location between Mbabane and Manzini and jointly develop a regional landfill. With the amount of solid waste being generated by the two cities (110 and 104 cubic meters), one landfill would be more economical and efficient for both cities.

In addition, the valley in between the two cities appears to have terrain better suited to landfilling. There are a large number of natural depressions and areas for daily cover and clay for lining the landfill.

The area is downhill for both cities when the trucks are loaded and uphill when the trucks are empty, therefore there would be very little added fuel costs.

The landfill should be privatized or a private owner should be encouraged to develop a private landfill in this area. This would eliminate the need for the two cities to have to duplicate personnel and the purchase and maintenance of landfill equipment.

The cities would probably have to pay a tipping fee to the landfill operator, but this could be controlled to some degree by contract negotiations and/or other agreements or trade-offs.

4. Privatize recycling and composting. This could be part of the agreement with private landfill owner/operator. Raw materials for recycling and composting could be exchanged with landfill operator for lower tipping fees.

5. In my conversations with various city officials, there are no legal constraints which prohibit privatization. In fact, in some areas such as the operation/development of a private landfill, it appears that it would be easier for a private landowner or firm to develop a site than for the municipalities due to tribal land restrictions.