

AFRICA ENGINEERING CONFERENCE (AEC) 2017

PERSPECTIVE OF SOLID WASTE COLLECTION IN THE CITY OF KIGALI

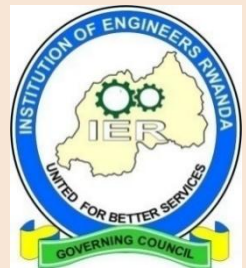
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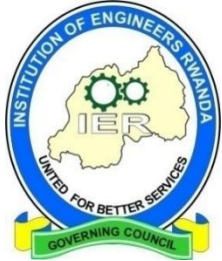
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ACKNOWLEDGEMENT



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AND CULTURAL ORGANISATION**

OBJECTIVES OF THE PAPER



- **To highlight the success in the privatization on the collections of the solid waste in the city of Kigali (CoK)**
- **To present the perspective in the collection method and transportation of solid waste in the city of Kigali.**
- **To present the area of improvement in the collection and transportation of solid waste**
- **Conclusion**

PRIVATIZATION IN THE COLLECTION OF SOLID WASTE IN CoK



- **The City of Kigali is one of the cleanest city in Africa**
- **The success on the achievement of cleanness is due to leadership and innovative way of privatization of the solid waste management (collection and transportation)**
- **Also the use of the community participation “Umuganda” for collection and removal of solid waste every end of the month**
- **The Collection and Transportation is fully provided by the private sector and the bill submitted directly to the household**

PRIVATIZATION IN THE COLLECTION OF SOLID WASTE IN CoK

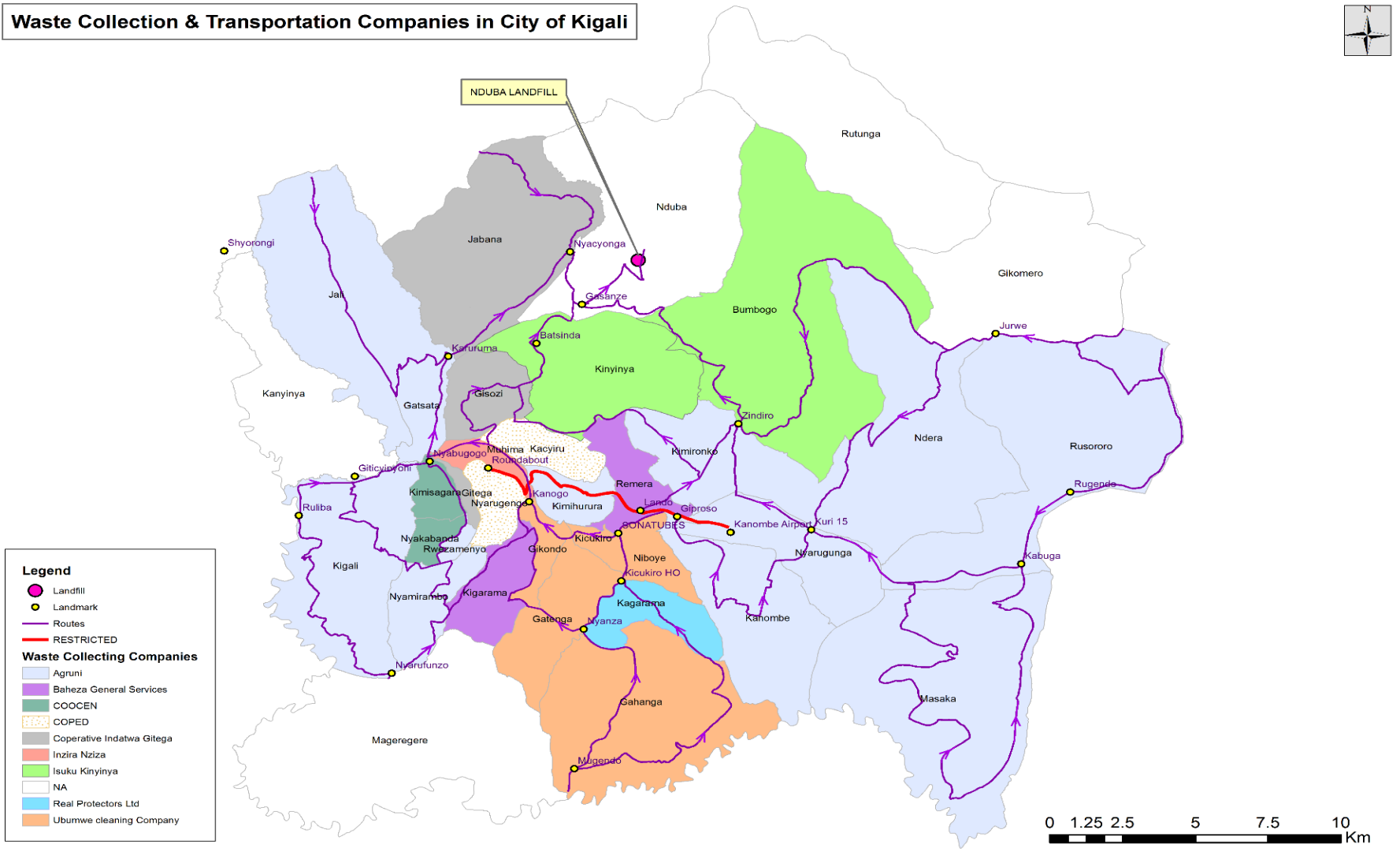


- The Government municipal by-laws of prohibiting the dumping of household waste outside individual private property and the shortcomings of the CoK to provide the service alone, has triggered involvement of private sector in solid waste collection
- The implementation of the privatization has been initiated by designating zones for specific private company operation.
- The allocated zones as per district namely Nyarugenge, Kicukiro, and Gasabo, and districts are divided into sectors and sectors into cells up to villages levels.

PRIVATIZATION IN THE COLLECTION OF SOLID WASTE IN CoK



Waste Collection & Transportation Companies in City of Kigali



PRIVATIZATION IN THE COLLECTION OF SOLID WASTE IN CoK



- The management on the Privatization service are done as follows;
 - Rwanda Utilities Regulatory Agency (RURA) provide licence to private companies (Over 18 Companies and Communities Association have been licensed in CoK)
 - The CoK manages contracted private firms that collect solid waste and liquid waste and transport it to Nduba Landfill
 - The Ministry and Agency (REMA) responsible for govern waste management and environmental laws provide regulations and guidelines

COLLECTION AND TRANSPORTATION OF SOLID WASTE IN COK



- The solid waste generated on daily basis in the CoK is totalling to 350 tonnes which is collected and transported to the dumping site (landfill) in Nbuba located about 20 km from city centre
- In some areas, organic waste and plastic bottles are brought to transfer areas to be sorted and recycled into compost and briquettes or for reuse of bottles
- However, the recycling of solid waste is still at lower scale of 2% of the total collected waste

COLLECTION AND TRANSPORTATION OF SOLID WASTE IN COK



- Different Collection methods of solid waste do exist but in the CoK the common method is building to building collections
- That means collection of bags of garbage are picked outside/adjacent to buildings, along the streets



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COLLECTION AND TRANSPORTATION OF SOLID WASTE IN COK



- Transportation of collected solid waste is done using a variety of vehicles by picking bags along the streets
- Typical vehicle used for household waste collection are End-Loader Refuse Collector Bins, and Mini tipper truck



CHALLENGES ON TRANSPORTATION



- The challenges on transportation in **household** waste collection include the following;
 - Frequency of removal (scheduling) which does not match the waste generation
 - Inappropriate types and size of the collection vehicles,
 - Lack of trip monitoring of vehicle movement and weight of waste in transportation vehicles,

All these challenges resulting into gaps in households satisfaction hence impact on cost recovery

BUT the most favourable option is to reduce the amount of waste produced, reuse materials or compost waste at the location where it is produced

CHALLENGES ON TRANSPORTATION



- The challenges on **road network** include the following;
 - The use of open trucks and overloading of vehicles
 - Transportation of waste materials increases the number of polluting vehicles on city roads by creating air and noise pollution, congestion and safety relating to road transport.
 - While proper scheduling and appropriate routing would reduce the number of vehicles and congestion on the road network,

AREAS FOR IMPROVEMENT IN COLLECTION AND TRANSPORTATION



- **The areas for improvement includes;**
 - **Identification of the needs, defining the constraints and setting goals is key areas on citizen perspective on waste collection**
 - **Characterization of waste generation is key area by knowing who you serve and the nature of the waste generated**
 - **Transportation vehicle types and size, proper vehicle maintenance strategy, proper planning and supervision is an areas which is associated with quality, quantity and customer convenience issues,**

The convenience of the service to the customer influence the cost recovery from user charges which brings financial stability of the service providers

AREAS FOR IMPROVEMENT IN COLLECTION AND TRANSPORTATION



- **Scheduling and routing is the key step to better planning collection and transportation of waste therefore;**
 - ✓ **A service route map is a useful management tool**
 - ✓ **The Assessment of time taken for the collection and transport of waste materials are useful indicator for evaluating efficiency**

AREAS FOR IMPROVEMENT IN COLLECTION AND TRANSPORTATION



✓ The model for the estimating efficiency (time taken for the collection and transporting waste) is as follows; *(need to be tested in Rwanda)*

➤ $Y = a + b + (2n-1) c + n (d) + e + f$

Y = total transportation time,

a = garage to route time,

b = actual time collecting waste,

n = number of trips to disposal site,

c = time to drive fully loaded truck to disposal facility and return to the collection area;

d = time to unload solid waste from the vehicle;

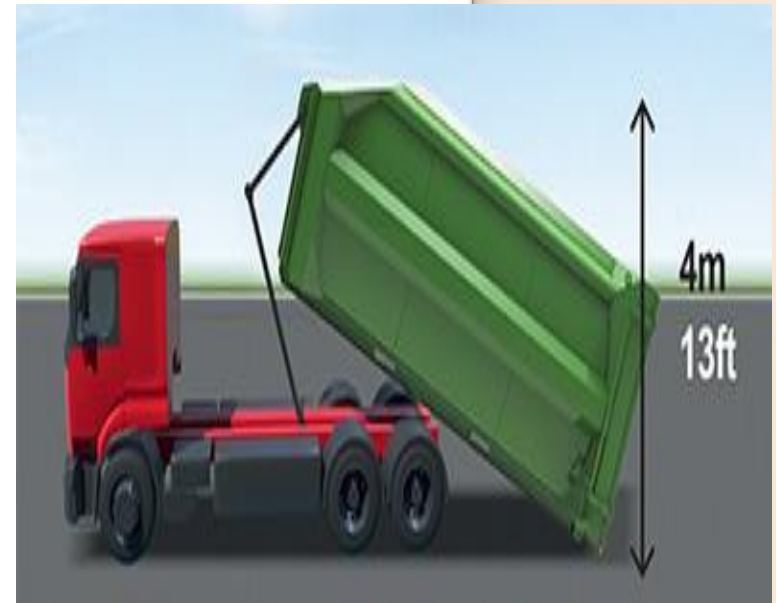
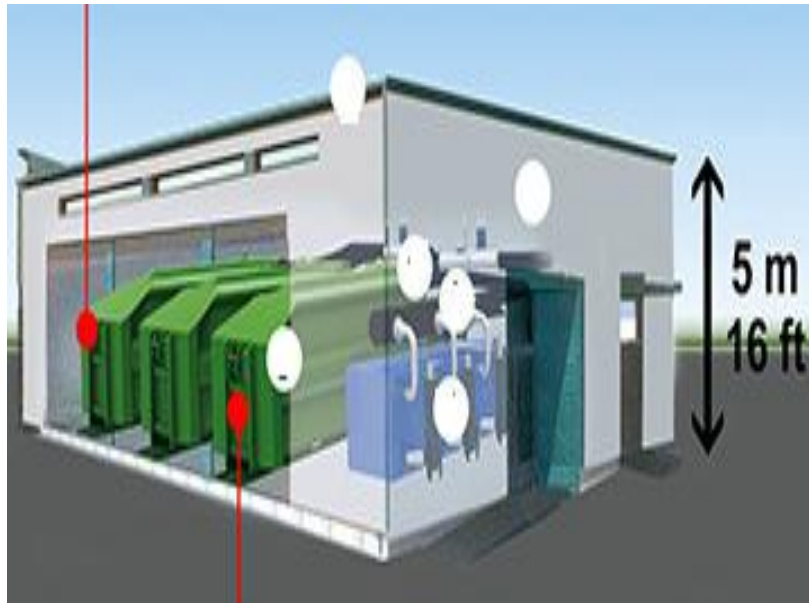
e = time to drive to garage at the end of the trip;

f = off route time, usually a fraction of Y

AREAS FOR IMPROVEMENT IN COLLECTION AND TRANSPORTATION



- The reduction of the collection time will result into reduction in costs, Therefore, the service providers should assess the appropriate collection method by introducing the standard transfer stations in most residential areas



CONCLUSION



- **The privatization of the collection and transportation of solid waste have been a success in the CoK**
- **The Service provider should improve on the services to meet the customers satisfaction to bring financial stability of the service providers**
- **In order to minimise environmental impact the most favourable options shall be to sensitize population to reduce, reuse and recycle waste at the location where it is produced**
- **More research is required for effective waste management systems**

MANY THANKS

