Gujranwala Waste Management Company (GWMC) A Case Study

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Introduction

Mr. Fayyaz was appointed as Commissioner Gujranwala Division on 22 June 2018 during caretaker setup. General elections were to be held on 25 July 2018 and the immediate focus of the District Administration was on conduct of elections in a peaceful and transparent manner. While driving to Gujranwala to assume charge as Commissioner, it was noticed by Mr. Fayyaz that the main roads were swarming with hillocks of garbage but he couldn't realize the enormity of the issue at that time. Just after assumption of the charge, it was brought into the notice of Commissioner Gujranwala that the social media was flooded with the pictures of heaps of garbage spread on the streets and major roads of Gujranwala city. People of the city staged demonstration in front of Commissioner office seeking immediate intervention in the affairs of Gujranwala Waste Management Company (GWMC), which had failed to collect and lift the garbage from the city. This issue was also brought to the notice of caretaker Chief Minister and direction was issued to the Commissioner to take immediate measures to remove the heaps of garbage and look into the affairs of GWMC.

Statement of the Problem

GWMC was established to introduce a more efficient waste collection and disposal system resulting into an integrated waste management in July, 2013. But GWMC could not gear up right from the beginning due to operational under capacity and politicization of the company. The situation got worse when company was subjected to accountability drive by NAB and Anti-Corruption Establishment, which rendered the company almost dysfunctional in 2018. Consequently, filling the streets and roads of the city with heaps of garbage. This situation warranted an in-depth study and analysis of not only the organizational and operational failures of the company but also the dilemma being faced by the company due to accountability paradigm.

It was also imperative to evolve a strategy to enable GWMC to develop an efficient and integrated waste management system on sustainable basis.

Key Research Questions

A. Why waste was not being collected and lifted by GWMC?

B. What was the dilemma being faced by GWMC which rendered the company dysfunctional?

C. How can GWMC be raised to ensure an efficient integrated waste management system on sustainable basis?

Situation Analysis

Heaps of Garbage: Warranting an Emergency Response

Mr. Fayyaz had a scheduled meeting at 9.00 am on June 22, 2018, regarding the preparation for General Elections to be held on July 25, 2018. Before start of the meeting Mr. Adnan SNA rushed to Mr. Fayyaz showing him the pictures loaded on social media of hillocks of garbage swarming in streets and roads of Gujranwala city. The meeting with Regional Election Commissioner, RPO and representatives of LEAs and Intelligence agencies started at 9.00 am. In middle of the meeting, security personnel sent-in a chit mentioning that a crowd had staged a procession in front of Commissioner Office chanting slogans against GWMC and asking for immediate intervention by Commissioner Office into the affairs of GWMC. Mr. Fayyaz concluded the meeting in rush and went outside to listen to the mob. The mob was highly charged and demanding for immediate closure of GWMC and entrusting the task of waste management back to Municipal Corporation. Mr. Fayyaz assured the mob that he would personally look into the matter to improve the situation within three days. The mob dispersed on assurance of the Commissioner. While having a dialogue with the mob a telephone call was received from Mr. Agha, Principal Secretary to the Chief Minister. By that time the said scenario had also been reported to the Chief Minister Office and Mr. Agha conveyed the instructions of the Chief Minister to remove garbage from streets and roads of the city and report within three days.

Responding to the situation Mr. Fayyaz immediately convened a meeting of GWMC in premises of the company.

Mr. Tariq, Deputy Commissioner Gujranwala was holding the charge of Chairman GWMC and a private member of the Board of Directors Mr. Khattana was running the affairs of GWMC as Managing Director. Mr. Khattana was a non-professional and at the outset of the meeting Mr. Fayyaz realized that the company was being run by non-professional persons and had been rendered dysfunctional by that time. All employees of GWMC including MD were blaming the accountability regime initiated by NAB and Anti-Corruption Establishment preventing them from running the day to day affairs of the Company. It was obvious that GWMC was not capable to achieve the target of removing garbage within three days as directed by the Chief Minister Office and commitment made by the Commissioner with public.

The company had stalled all procurement processes for the previous three months due to inquiries initiated by NAB and ACE and the suo-moto case regarding all public sector companies before the Chief Justice of Supreme Court of Pakistan. Mr. Fayyaz and Mr. Tariq were also apprised by the officials of the Company that it had been lifting 250-300 tons of garbage per day against the actual garbage generation of 860 tones/day (as per estimates of 2012-13) for last two months. It meant that a backlog of 36600-33600 tons of garbage was laying on streets and roads of the city as per those calculations. However, it did not mean that the same tonnage of garbage was lying in actual because when garbage was not being lifted, it was getting dispersed by wind polluting the environment and choking sewerage and other natural drainage channels. Keeping in view the operational and organizational capacity of the Company and huge heaps of garbage, it seemed impossible to remove the garbage within three days. Mr. Fayyaz and Mr. Tariq had an exclusive meeting to work out an emergency plan deviating from the routine operation of GWMC and decided to engage private sector to provide logistic support to company voluntarily in the form of provision of equipment and third-party labor. For this purpose, a series of meetings were held with the influential and philanthropic segment of the city. The private sector gave a very forthcoming response and offered their unconditional support.

Under supervision of Mr. Fayyaz the action plan was worked out and the whole district administration was involved and dove-tailed with GWMC to ensure effective supervision and monitoring.

As per operational plan of GWMC, the city was divided into 10 zones and the required equipment and labor force was worked out.[1] Different philanthropists were informed about the required deficient equipment and labor force, zone- wise. It was never an easy task to engage private sector to support public sector for the job which is responsibility of the public sector. But District Administration wisely decided not to take any cash payment rather all the payments in lieu of equipment and labor force were made directly by the private sector to the vendors. With the support of private sector, District Administration managed to lift substantial garbage within three days as stop gap arrangement, which diffused the situation to great extent. This model of public-private partnership increased the waste disposal capacity of GWMC from 300 tons/day to 600 tons /day and total of 15486 tons of garbage was collected from July to December, 2018. Now the real challenge was to analyze and revamp GWMC to lift garbage on sustainable basis by addressing organizational, operational and political issues of the company along with dilemma faced by the company in the form of accountability regime.

Waste Generation Profile of the City

Mr. Fayyaz and Mr. Tariq made it a routine to convene a meeting every evening to review the issues of the company and needs of the city. It was important to keep in mind some basic features of the profile of the city and waste generation. Gujranwala was the fourth most populous metropolitan area of Pakistan and one of the fastest growing cities in the Punjab. Total area of the city was 65 square km with the population of 2.3 million. As per estimates, Per capita waste generation ranged from 0.45 kg/capita for urban UCs and 0.37 kg/capita for peri urban UCs. The waste generation amounted to 860 tons/day as per estimates of 2012. The collection efficiency ranged from 65% to 70% only, leaving the balance unattended, out of which 10% of the uncollected waste was being burnt openly in the streets and 20 % of it was being illegally dumped in open plots.[2]

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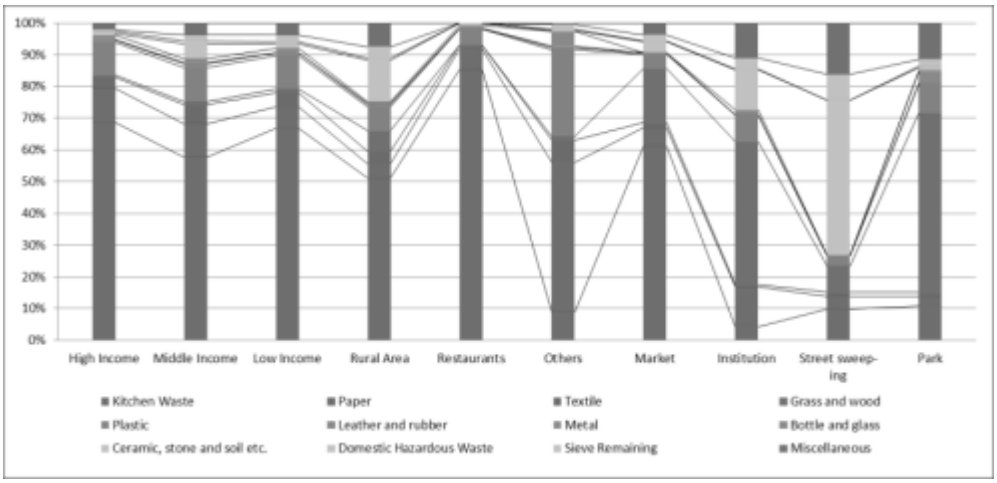
[1] Interview with Manager Operations GWMC

[2] Situation Analysis Report of Gujranwala City by Urban Unit 2012

Waste of Gujranwala city was composed of highest percentage of kitchen waste from households (58-69%), restaurants (85%) and markets (61%) followed by paper (4-11%) and plastics (5-11%). The ratio of organic waste was quite high at 70% to 98%. The ratio of recyclable material such as paper, plastic, metal and glass from households varied from 4% to 6%, and its average was around 3.7%, which is illustrated in **Figure 1** below:[3]

Figure 1: Physical Composition of Waste (Average)



Source: WACS Report 2014

Need for Establishing GWMC

The daily waste collection was never more than 40% of the total under the Solid Waste Management Department of City District Government Gujranwala (CDGG), meaning thereby that the waste collection amounted to 270 tons/day against 860 tons/day generated in Jan 2013,[4] leaving rest of the waste unattended. Due to inadequate physical, human and infrastructure resources including vehicle/equipment, non-allocation of appropriate budget and finances, CDGG was not able to provide the services in 64 Union Councils (UCs) of the City. Almost 30 % of SWM vehicles and equipment remained out of order most of the time. Waste was being disposed at Chianwali dumping site and due to poor management, the site had reached its closure before expected time. Only 1604 sanitary workers were working under SWM department without any technical expertise.

[3] WACS Report 2014

[4] WACS Report 2014

The City District Government Gujranwala desired to improve the system of Solid Waste Management in the City but found its available organizational and operational capacity inadequate to achieve intended results to protect public health and environment through Sustainable Integrated Solid Waste Management System. The Chief Minister of Punjab allowed formation and incorporation of GWMC to effectively manage, regulate and control solid waste in Gujranwala city by implementing the principles of Integrated Solid Waste Management (ISWM) which was a dire need of the time for saving public health, land, economic resources and environment of the city. GWMC was established in July 2013 as a Public Sector Company registered under section 42 of Companies Ordinance 1984 and became operational in January, 2014 for providing services in 73 union councils of the city. GWMC started its operation at enhanced collection rate of 65%-70% of the total waste generated by addition of fleet and manpower.[5]

Functions and Responsibilities of GWMC

In order to find out the issues confronted by GWMC and work out sustainable strategy to run the company to achieve its objectives, it was important to study the mandate of the Company when it was established. During this process, it transpired that Company was established with wide range of functions and responsibilities. Following were the major functions and responsibilities of GWMC:[6]

1. Managing, controlling and monitoring existing procedures, processes, actions, activities, facilities, operations, schemes, plans, programs and assets of the CDGG directly or indirectly related to generation, collection, separation, storage, reuse, recycling, transportation, transfer, reduction, treatment and disposal of Solid Waste.

2. Managing, controlling, using, maintaining machinery, equipment, tools, plants, vehicles, lands, buildings, structures and other moveable and immoveable assets owned, managed or controlled by the CDGG for solid waste management, except those assets which the GWMC and CDGG mutually agree to be retained by the CDGG.

[5] Services and Assets Management Agreement Between CDGG and GWMC 2014

[6] Ibid

1. Expansion, increase, enhancement and improvement in existing organizational capability for solid waste management; introduction of new schemes, plans, programs, operations, activities, actions, procedures, processes for solid waste management, making and executing decisions to downsize or discontinue schemes, plans, programs, operations, activities, actions, operations, procedures, processes for solid waste management.

2. Managing, controlling and supervising persons engaged by the CDGG in connection with solid waste management and whose services are placed, at the disposal of the GWMC, repatriating such persons to the CDGG, incurring employee-related expenditures out of money received for the purpose and exercising other powers and functions in respect thereof.

3. Taking all such steps as are deemed necessary and expedient by the GWMC for effective management of solid waste in order to safeguard public health, ensure that waste is reduced, collected, stored, transported, recycled, reused or disposed of, in an environmentally sound manner.

4. Promoting public awareness of importance of waste reduction, resource recovery and comprehensive and efficient solid waste management

Organizational and Operational Capacity of GWMC

The next important step was to have a detailed stock taking of the organizational and operational capacity of the company to identify the gaps. Following tables give the detail of organizational, operational and financial status of the Company.

Table-1: Organizational Capacity-2018 [7]

Sr. No.	Item	Sanctioned (MC Gujranwala)	Existing	Third Party Labor	Total Available	Total Required	Gap
01	Field Staff (Sanitary Workers, Supervisors, Drivers etc.)	1829	1555	500	2055	3100	1045

Source: Interview with CFO GWMC

[7] Services and assets management agreement between CDGG and GWMC

Table-2: Operational Capacity-2018

Vehicles & Equipment Status-2018

Sr. No.	Item	Available	Operational (Average)	Total Required	Gap
01	Arm Roll Trucks	26	15	48	22
02	Tractor Trolleys/ Mini Tippers	84	65	153	69
03	Dumpers	00	00	05	05
04	Excavator	00	00	02	02
05	Containers	150	90	275	185
06	Transfer Stations	00	00	04	04

Source: Interview with Manager Operations GWMC

Table-3: Details of Funds Available

Sr No	Description	Total	FY 2013-14 (5 month)	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
			Rupees in Million					
Funds Received:								
1	CDGG/MCG	1,638.78	190.7	436.983	486.18	524.9	-	-
2	GoP (Grant in aid)	1,840.26	120.6	355.5	356.115	-	504	504
3	GOP (Loan)	1,728.00	-	-	-	633	420	675
4	Loan for LFS Project	-	-	-	-	-	150	-
5	International Donors – JICA	0.095	-	0.095	-	-	-	-
6	Tender Fee	1.04	0.028	0.244	0.267	0.211	0.091	0.2
7	Profit Received	57.006		3.235	6.049	6.317	13.996	27.409
8	Other Income	0.61	0	-	-	-	0.51	0.1
9	Own Sources (Income from cleaning services)	9.804		0.473	3.958	4.381	0.992	-
	TOTAL	**5,275.60**	**311.4**	**796.53**	**852.569**	**1,168.81**	**1,089.59**	**1,206.71**
Expenditures Incurred:								
1	Capex - *Procurement of physical assets*	387.261	29.83	67.531	98.507	3.982	173.052	14.357
2	Human Resource - *SWM Staff*	2,166.62	136.4	352.175	378.973	449.108	427.339	422.621
3	Human Resource - *Third party labor*	808.735	4.129	116.066	219.728	133.62	234.592	100.6
5	POL - *Operational vehicles*	535.827	26.48	78.471	96.693	94.028	104.606	135.554
4	R&M - *Operational*	249.162	15.26	69.972	54.916	25.334	26.225	57.456

	vehicles							
6	Stores and spares - *Cost of other store*	35.892	2.474	7.397	13.536	2.133	5.366	4.986
7	Other Operating Expenses	60.179	1.949	6.108	3.655	13.784	9.109	25.574
8	One Time Cleaning/ Rental Machinery	137.896	-	31.287	63.687	10.826	18.791	13.305
9	Head Office Expenses	118.004	12.58	29.176	25.654	17.135	17.251	16.21
10	Human Resource - GWMC *Staff*	271.453	3.198	34.139	76.371	69.08	51.452	37.213
	TOTAL	**4,771.03**	**232.3**	**792.322**	**1,031.72**	**819.03**	**1,067.78**	**827.877**

Source: Interview with CFO GWMC

The above tables conspicuously reflected that the organizational and operational strength of the Company did not match with the requirements of the Company needed to operate at optimum level and establish a sustainable integrated solid waste management system. GWMC was operating at a population to worker ratio of 1352:1 against the international standard of 800:1. It was also observed that GWMC was collecting waste at the cost of PKR 3500/ton (USD 29/ton approximately). This waste disposal cost was one of the lowest in Pakistan and in international perspective as well.

It also transpired during analysis of organizational capacity and issues of the Company that MPA of the ruling party was appointed as a chairperson of the Company in its inception phase, which was in contravention of the provisions of Companies Ordinance 1984 and Corporate Governance Rules 2013. It was also observed that the chairperson and Board members were appointed merely on the basis of political affiliation without giving any consideration to the professional expertise. Such political dynamics never allowed the Company to get out of the crisis and take off properly right from the beginning.

Landfill Site

There was no landfill site present in Gujranwala city for the proper disposal of solid waste which was polluting the whole environment and having hazardous impact on health of the citizens. Earlier city waste was being dumped at Chianwali dumping site on main GT Road for the last seven or eight years; hence there was not enough capacity to continue dumping there. In the absence of a sanitary landfill site, Gondlanwala (temporary official dumpsite) with area of 4.7 acres was being used for disposal of

solid waste. The site was being utilized by GWMC until the new sanitary landfill facilities become operational. Waste disposal at this site started in March 2014 for disposal of domestic waste from 64 urban union councils in Gujranwala City.

Accountability Regime

1. National Accountability Bureau (NAB) started investigation of overall procurement activities performed by GWMC including fixed assets and other assets/ routine expenses. It rendered the Company dysfunctional as the employees lost confidence and the procurement process was stalled even for the routine activities like tendering of third-party labor. Moreover, the employees of the company were more engaged in attending the office of NAB than looking into the routine affairs of the Company. This scenario led the Company towards complete fiasco.

2. Anti-Corruption Establishment, Gujranwala

- Anti-Corruption Establishment (ACE) registered FIR regarding Procurement of Mechanical Sweepers & One Time Cleaning Activity without conducting an inquiry.
- Another FIR had been registered regarding Hiring of third-party labor, again without conducting an inquiry
- Third FIR was registered regarding some expenses incurred from petty cash at GWMC Workshop for Repair and maintenance of vehicles.

The common feature of all FIRs registered by ACE was that all were registered without detailed inquiry, which was a pre-requisite before registration of FIR

3. Suo Moto Case before Chief Justice of Supreme Court of Pakistan

Chief Justice of Supreme Court of Pakistan took a Suo Moto Notice against 56 public sector companies which were established by the government of Punjab. Legal status of the public sector companies was being questioned during the proceedings of the case which rendered the employees disgruntled due to uncertainty about the future of the company.

Performance Review of GWMC

GWMC started operations in 2014 and despite all odds and teething problems, it took a decent start in comparison with CDGG, but due to lack of support from government, lack of operational autonomy, uncertainty syndrome and undesired accountability regime rendered the company dysfunctional. With support and confidence given by district administration the company started getting back to its normal functioning.

Table-4

Performance Review

Indicators	GWMC
Collection Efficiency	GWMC regained waste collection rate of 60 -70%. The reasons behind this increase were: Addition of 44 mini dumpers and 3 mini tippers with compaction arm into the collection fleet New hand carts were introduced into the system Regular performance monitoring review by the LG &C D Department /CDGG Daily attendance monitoring Operationalizing the help line for redressing the complaints Procurement of 10 tractor trolleys. **One time cleaning activity,** 788 points were located and 112860 tons of waste lifted from almost 400 plots Addition of400 skips of 0.8m^3 capacity and 10 garbage compactors of 7m^3 capacity.
Street Washing & Sweeping	1 road washer and 2 mechanical sweepers were procured by GWM for mechanical operations. Specific fraction of roads was being washed on routine basis.
Up gradation of Workshop	Partial up gradation of the inherited workshop. Previously only 60 % of the fleet was operational. However, with up gradation 98% SWI fleet made operational. Cost saving through engine oil change, local repair and maintenance. Sorting and storage of scrap Improvement in service station of workshop Proper record keeping of newly purchased and replaced parts of vehicles
MIS	GWMC domain name registered as *gwmc.com.pk* Vehicle tracking and management system for 100 vehicles installe Toll free telephone service activated to facilitate citizens for complaintregistration (0800-11155 and 1139) GWMC Facebook page created and updated Installation of security & surveillance system for mechanical workshop & office premises
Hiring of Staff	Recruitment of experts of different areas including Company Secretary, HR, Administration, Finance, Operations, Procurement, Workshop, Landfill site and Communication. Hiring of sanitary workers and drivers through third party labor Deployment of staff on roads. Procurement of android system of attendance for field staff along with monitoring. Procurement & execution of IRIS & Payroll system for making & maintaining transparency & accuracy Developed a mechanized system for employee database: getting th complete information of employees (Permanent, Contractual, Daily Wager & third-party labor employees) Regularization of contractual employees

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Dumping/Disposal	Re-activation of Gondlanwala dump site. Chianwali dump site closed with heap management. Weighbridge installed at Gondlanwala dump site. Maintaining record of tonnage Proper soil cover over waste along with compaction. Office construction at Gondlanwala disposal site. Fumigation and daily cover on daily basis Chianwali complete boundary wall construction RFID system installed.
Planning for new landfill Site	The new landfill site of 62.5 Acres land at Baklurewali identified after addressing the grievances of public and reference forwarded for land acquisition. The EIA of the proposed site was conducted No Objection Certificate for construction of the landfill site was initiated. PC 1 was prepared and submitted for further processing.
Education and Awareness	Periodic awareness campaigns of cleanliness celebrated with joint venture of GCCI involving schools, colleges, communities, influential personalities Awareness Campaign on Eid ul-Azha along with provision of shopping bags. 14th August celebration with a Program on FM Radio and shopping bags distribution. Awareness campaign in Sanitation Week Awareness in schools, colleges etc. Awareness in hospitals Awareness camps in different locations for general public Door to door awareness campaign Ramadan camps

Source: Interview with Chairperson GWMC

Integrated Solid Waste Management

The emergency situation was controlled with involvement of district administration and engagement of the private sector. But these efforts resulted in restoration of the erstwhile performance level of GWMC with waste disposal rate of 60-70% of the total waste generated.

. The next point to ponder was that GWMC was established to develop an integrated solid waste management system on sustainable basis. Therefore, it was imperative to develop an understanding of integrated solid waste management system to be introduced in the city. This endeavor provoked Mr. Fayyaz to undertake an exercise of research to gain basic knowledge of sustainable integrated solid waste management system. During this exercise, it transpired that a strategic waste disposal mechanism emphasized on the waste reduction at the first step, then the waste reuse and later waste recycle.[8] It also emphasized the need of waste-to-energy (WTE) mechanisms, proper waste collection, scientific disposal and all the steps were linked with each other which helped in the efficient waste collection and disposal. Technological advancements were being made to create the waste recycling system more efficient. Installation of modified and new technologies in this field ensured the progress in the source segregation programs and placement of bins at primary source collection was the first step for this purpose.[9]

It was also learnt that Integrated Solid Waste Management was a combined working of the systems which included primary collection, secondary collection, treatment, reuse, waste to energy systems and effective disposal of the waste. All these systems were interlinked effectively for the proper management.[10] Better understanding towards the recycling could be achieved through consistent effort on environmentally sound practices and proper education which would overcome the existing negative behaviors and habits. For this purpose, the provision of recycling bins in the communities could help to shape the habits of individuals positively. There should had been massive awareness among the masses that waste actually held value and should not had been simply discarded.[11]

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[8] JICA Basic Study on SWM 2008

[9] Oteng-Ababio M (2011) Missing links in solid waste management in the Greater Accra Metropolitan Area in Ghana. *GeoJournal* 76(5): 551-560

[10] Samo S., Mukwana K. C., Sohu A. A. (2017). Potential of Solid Waste and Agricultural Biomass as Energy Source and Effect on Environment in Pakistan. *Handbook of Climate Change Mitigation and Adaptation,* pp. 1-54.

[11] Ramachandra T V, Kulkami G, Aithaal B H and Hun S S (2018) GHG emissions with the mismanagement of municipal solid waste: case study of Bangalore, India. *International Journal of Environment and Waste Management 20(4)*:346

Comparative Analysis

In order to improve the solid waste management system in Gujranwala, it was also deemed necessary to have a comparative analysis with other major cities of Pakistan with special focus on Lahore. It was observed that in most of the cities, the solid waste was being managed through traditional open disposal/dumping. However, Lahore had a controlled dumping and sanitary landfilling. Lahore is the second largest city of Pakistan as well as the capital of the province of Punjab with approximately 11.5 million population.[12] With the increasing population the waste generation in Lahore was also increasing on the daily basis. At that time, Lahore was producing more than 6500 Tons of Municipal Solid Waste on daily basis which was being collected, transported and disposed through several different methods. This entire operation was outsourced. The city of Lahore consisted of 9 Towns managed by Waste Management Organization in Lahore for the municipal solid waste whereas waste from Cantonment areas and private societies was being collected and transported by themselves but was dumped at sanitary landfill site namely Lakhodair managed by LWMC.

Previously Lahore had 4 disposal sites namely; Mehmood Booti, Tibba, Sundar and Sagian. At these sites Mehmood Booti was the only approved disposal site.

Being a major city, Gujranwala was striving hard to cater to the waste with the effective collection and transportation but unfortunately Gujranwala did not have an effective waste collection and transportation system like Lahore and Rawalpindi. Gujranwala still had an old system of waste collection and transportation with no landfill. In fact, Rawalpindi had the same situation but its waste collection was efficient. In Gujranwala, the waste management services could not be outsourced fully and operations were being managed through a mix of outsourcing and GWMC's own operations.

It was also observed that Refuse Derived Fuel (RDF) was an inorganic waste which had a calorific value that helped in industries for the production of heat and hence being used as a fuel for the industrial processes. LWMC entered into a collaboration with DG Cement under which thousands of tons of solid waste was being transferred to DG Cement plant where it was segregated for organic and inorganic waste.

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[12] Masood H B and Jelani S (2016) Health Risk in the Sanitary workers of UC-13, Ravi Town, Lahore, Pakistan. *1st National Conference of Environmental Engineering and Management: Mehran University of Engineering and Technology.*

Inorganic waste was used in the formation of RDF and organic waste sent back to the sanitary landfill site for the disposal. This helped in the increase of life of landfill site and reduction of emissions of Green House Gases (GHGs).[13]

It also transpired that Compost could be used for agricultural purposes. Thousands of Tons of solid waste was being transferred to LWMC compost plant where sorting was done and organic waste was separated from inorganic waste and then used in the formation of compost, whereas inorganic waste sent back to the landfill site. This also served as an environment friendly approach which helped in increase of life for landfill site and reduction of emissions. LWMC also had a biogas plant which used cow dung to produce biogas. This is a good environment friendly technique as cow dung can't be disposed in the sanitary landfill.[14]

Unfortunately, Gujranwala lacked such innovative techniques to deal with the waste. These techniques were considered to cater the waste and to increase the lifetime of sanitary landfill. It also transpired that the waste category of Gujranwala was of such unique nature that it increased the cost of new innovative projects for installation and routine operations as well as maintenance. Municipal solid waste of Gujranwala had almost every type of waste as a municipal solid waste. Gujranwala's municipal waste consisted of cow dung, water due to rains, construction and demolition waste, etc.[15]

In Lahore, Sanitary Landfill was not made for the disposal of Construction and Demolition waste and for the disposal of cow dung. Lahore was greatly facing this problem. Most of the construction and demolition waste was being used at the landfill site for the formation of temporary roads and ramps at landfill for unloading of waste. Similarly, some of the cow dung was being used for the formation of compost whereas most of this was being dumped. With these unique features, LWMC could be regarded as a role model for the waste management in other cities like Gujranwala. Besides the proper disposal, LWMC also aimed to promote public awareness involving corporate sector, door to door collection, etc. for the disposal of solid waste. The waste characterization study was done in 2011 by ISTAC and study found that municipal waste of Lahore consisted of 70% of Biodegradables.

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[13] Masood H B and Jelani S (2015) Increase of aluminum particles in the environment due to chemtrails during the period of autumn 2012 to summer 2015 within Lahore, Pakistan. *International Journal of Engineering Research and General Science.* 3(5): 846-851.

[14] Ibid

[15] Integrated Solid Waste Management Master Plan for Gujranwala City, 2015

Major Barriers to Integrated Solid Waste Management

It was also learnt that GWMC, like many other waste management organizations of Pakistan, had not been able to develop an integrated solid waste management system because it was facing three main barriers including social barriers, administrative barriers and technical/financial barriers.

Social Barriers

The municipal waste generators were also responsible for inefficient solid waste management. Since the source of waste generation were humans, the solution could be found by altering their behaviors.[16] The involvement of communities, their actions and responses towards the waste management system had a strong impact upon the waste management system.[17] In Gujranwala, like many other developing countries, the culture of the communities and their attitude towards the waste management were correlated. The lack of awareness and sense of responsibility regarding the littering and open dumps was an important factor needed to be analyzed to have a rigth perspective on how to tackle the waste management issues.[18]

In case of Gujranwala, waste had surely been recognized as an emerging problem but it did not abstain people from their negative behaviors.[19] Due to public apathy solid waste segregation could not be carried out by households. This scenario compromised the quality of the recyclable materials. The inadequate knowledge about the significance of the solid waste management systems hindered the efficiency of the system even more since the actions of people were firmly influenced by what they know and believe. This attitudinal gap that persisted was strongly influenced by the lack of awareness, education, social values and the absence of sense of responsibility.[20]

Administrative/Procedural Barriers

GWMC used to follow PPRA Rule for procurement. It was a long cumbersome procedure for procurement of new innovative techniques. Despite following PPRA, all transactions were being questioned by the accountability institutions, which had resulted into a very low level of motivation, rather the company employees in a state of denial trying to shy away from their responsibilities.

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[16] Milea A (2009) Waste as a social dilemma: Issues of social and environmental justice and the role of residents in municipal solid waste management, Delhi, India. Master's thesis, Lund University. Lund, Sweden.

[17] Zhu D, Asnani P U, Zurbrügg C, Anapolsky, Sebastian, and Shyamala M. (2008). Improving municipal solid waste management in India: A sourcebook for policy makers and practitioners. Washington, DC: World Bank. 08

[18] Roser M and Ortiz-Ospina E (2013) World Population Growth. Available at: https://ourworldindata.org/world-population-growth (accessed 29-11-2019)

[19] Moore S A (2012) Garbage matters: Concepts in new geographies of waste. Progress in Human Geography 36(6): 780-799.

[20] Milea A (2009) Waste as a social dilemma: Issues of social and environmental justice and the role of residents in municipal solid waste management, Delhi, India. Master's thesis, Lund University. Lund, Sweden.

The Board of GWMCs was also not exercising any financial autonomy as it was dependent on financial grants given by the provincial government.

Technical/Financial Barriers

Waste was emerging as a valuable commodity but its potential could be harnessed by technological innovations which had heavy initial cost. Although this heavy initial cost had a viable and quick return but GWMC was not in a position to make this initial investment to gain long term benefits.[21]

Conclusion

1. GWMC was not given enough resources in terms of its organizational and operational capacity to lift the garbage at 100% capacity.
2. Despite being a company GWMC was not functioning in autonomous mode as per the mandate of company.
3. Engagement of private sector in waste management on voluntary basis was not a long-term solution. It gave an immediate relief but was not sustainable on long term basis.
4. In absence of scientifically developed landfill site, it was not possible to dispose of waste in an environment friendly manner.
5. Accountability regime had stalled the initiative of company even to run the routine affairs, albeit going for some innovative solution by engaging private sector to use the waste as a valuable commercial commodity.
6. No long-term solution on sustainable basis for integrated solid waste management system in big cities like Gujranwala was possible unless it was developed on scientific basis by treating waste as a valuable commodity.

Lessons Learnt

1. Key posts of GWMC organogram were vacant. It was significantly understaffed in the management, unskilled and skilled labor categories. Such under-staffed organizations could never deliver waste management services efficiently.
2. GWMC Board was not manned by professionals, rather all the appointments were made on political grounds which further incapacitated the Company. Competent, professional and independent Board of Directors is the foundation stone for success of any company.
3. GWMC was unable to operate efficiently due to old operational vehicles. Funds available for purchase of equipment/vehicles could not be utilized due to probes being conducted by NAB and ACE. Such situations render the organization dysfunctional.

[21] Integrated Solid Waste Management Master Plan for Gujranwala City, 2015

4. Without public awareness, an integrated waste management system could not be put in place because it starts from reduction of the waste. Similarly, for the purpose of recycle and reuse segregated waste is required starting from the household.

Recommendations

On the basis of detailed analysis of the situation and keeping in view the constraints and challenges being faced by GWMC and lessons learnt, the following broad-based recommendation were postulated:

A. Effective and efficient Organizational set up of GWMC should be ensured with further capacity building to operate at optimum level:

- The vacant posts should be immediately filled after meeting all codal formalities
- Employees should be imparted on-job training.
- Additional staff required to operate the Company at optimum level should be worked out for future recruitment.
- Board of the Company should be revamped by nominating professional individuals who can make valuable contribution in running the affairs of the company in a professional manner.
- The tendering process for third party labor should be expedited as per procedural formalities in a transparent manner.

B. Effective and efficient operational set up of GWMC should be ensured with further capacity building to operate at optimum level:

- Workshop should be revamped to make all the vehicles operational and maintenance inventory of all the vehicles should be properly organized.
- The funds available for purchase of new vehicles should be utilized immediately after meeting all procedural formalities and in a transparent manner to avoid any accountability paradigm.
- Additional number of required vehicles and equipment should be worked out to enhance the operational capacity of the Company.
- Suitable locations for Secondary points/transfer stations should be identified to avoid unplanned dispersal of waste. Segregation bins should also be placed at primary points for recycling purpose.

C. Sustainable Integrated Waste Management System should be established:

- The process of land acquisition for scientifically developed landfill site should be expedited.
- Consultancy services should be hired to prepare a master plan of landfill site on scientific basis.
- Consultancy services should be hired to prepare a feasibility study for recycling of the waste and waste-to-energy strategy.
- Public awareness campaign should be made a regular feature of the Company to reduce the generation of the waste and educate the public for segregation and proper disposal of the waste at primary level.
- A revenue generation plan should be worked out by levying the conservancy charges and anti-littering fines.

Bibliography

Integrated Solid Waste Management Master Plan for Gujranwala City, 2015

Interview with Manager Operations GWMC

JICA Basic Study on SWM 2008

Masood H B and Jelani S (2015) Increase of aluminum particles in the environment due to chemtrails during the period of autumn 2012 to summer 2015 within Lahore, Pakistan. *International Journal of Engineering Research and General Science.* 3(5): 846-851.

Masood H B and Jelani S (2016) Health Risk in the Sanitary workers of UC-13, Ravi Town, Lahore, Pakistan. *1st National Conference of Environmental Engineering and Management: Mehran University of Engineering and Technology.*

Milea A (2009) Waste as a social dilemma: Issues of social and environmental justice and the role of residents in municipal solid waste management, Delhi, India. Master's thesis, Lund University. Lund, Sweden.

Milea A (2009) Waste as a social dilemma: Issues of social and environmental justice and the role of residents in municipal solid waste management, Delhi, India. Master's thesis, Lund University. Lund, Sweden.

Moore S A (2012) Garbage matters: Concepts in new geographies of waste. *Progress in Human Geography* 36(6): 780-799.

Oteng-Ababio M (2011) Missing links in solid waste management in the Greater Accra Metropolitan Area in Ghana. *GeoJournal* 76(5): 551-560

Ramachandra T V, Kulkami G, Aithaal B H and Hun S S (2018) GHG emissions with the mismanagement of municipal solid waste: case study of Bangalore, India. *International Journal of Environment and Waste Management* 20(4):346

Roser M and Ortiz-Ospina E (2013) World Population Growth. Available at*:* https://ourworldindata.org/world-population-growth *(*accessed 23-07-2018*)*

Samo S., Mukwana K. C., Sohu A. A. (2017). Potential of Solid Waste and Agricultural Biomass as Energy Source and Effect on Environment in Pakistan. *Handbook of Climate Change Mitigation and Adaptation,* pp. 1-54.

Services and assets management agreement between CDGG and GWMC

Services and Assets Management Agreement Between CDGG and GWMC 2014

Situation Analysis Report of Gujranwala City by Urban Unit 2012

WACS Report 2014

Zhu D, Asnani P U , Zurbrügg C, Anapolsky, Sebastian, and Shyamala M. (2008). Improving municipal solid waste management in India : A sourcebook for policy makers and practitioners. Washington, DC: World Bank. 08