



**MUNICIPAL SOLID WASTE MANAGEMENT
OVER FOUR SEASONS TO REDUCE MUNICIPAL SOLID WASTE
GENERATION IN AL-KHUMS CITY LIBYA OPEN DUMP SITE**

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GENERATION IN AL-KHUMS CITY LIBYA OPEN DUMP SITE**

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Birth in Al-Khums**

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ABBREVIATION

- IWM** : Integrated Waste Management
- MSW** : Municipal Solid Waste
- SCT** : Social Cognitive Theory
- SWM** : Solid Waste Management
- MSWM** : Municipal Solid Waste Management
- ISWM** : Integrated solid Waste Management

ABSTRACT

Municipal Solid Waste has become a crucial environmental issue in the developing countries within the blossoms of the national economy. In the developing countries, with cultural transitions and economic focused development, there are many uncounted non economical risks that actually happen such as waste problems. The government of Libya has established regulations to manage the environmental practices and procedure to protect the Libyan environment from the degradations of its quality. These regulations are implemented step by step by adopting scientific approaches to the MSW system consists of waste collections and waste transportations to the landfill.

This dissertation investigates the MSW related behaviors in Al Khums city, Libya, along with the impact of MSW regulations, harmful effects of MSW system and MSW behavior, impact of the seasons, and the governing acts to the impact of seasons on MSW.

The method of this dissertation has been assessed in five different types of environment and four seasons by qualitative questionnaires and calculated by SPSS, and Exeal program

The result shows that there is awareness on MSW in Al Khums city and the residents show good MSW related behavior for there are only few associative significance among conditional and behavioral variables was found. The regulations have degrees of impacts on shaping MSW related behavior in the society. The harmful effects of wastes were found in the workers who experienced impacts of waste. These workers, with their maximum intensity on their contacts with the waste, experienced impacts of waste to their health. Amount of waste also became problem in the households, schools, and restaurants environments. These problems could be handled by providing an MSW specific system and workers to these special environments. The impact of the seasons . It had been found that the seasons had impacts on the container problems and waste collections in households and schools. And these problems should be managed by providing specific recycling system and disposal system such as compostion and underground combustion machines to the area with highest amount of waste and hiring more MSW worker and raise their salary to achieve the best MSW performance.

Keywords : Environmental policy, Municipal Solid Waste, community behaviors, environmental conditions, seasons, Al Khums city

ABSTRAK

Municipal Solid Waste, atau sampah padat yang dikelola oleh pemerintah, telah menjadi isu lingkungan yang krusial di negara – negara berkembang dengan perkembangan perekonomian nasionalnya. Negara berkembang, dengan transisi kultural dan pembangunan yang berfokus pada ekonomi, terjadi banyak permasalahan non ekonomi yang tak terperhitungkan secara matang, seperti masalah sampah padat. Menyadari situasi ini, pemerintah Libya telah menetapkan regulasi untuk mengelola praktek dan prosedur yang berkaitan dengan lingkungan untuk melindungi Libya dari degradasi kualitas lingkungan. Regulasi – regulasi ini diimplementasikan secara bertahap dengan mengadopsi pendekatan ilmiah untuk system MSW yang terdiri dari pengumpulan dan transportasi sampah ke Tempat Pembuangan Akhir (TPA).

Disertasi ini menginvestigasi perilaku masyarakat terkait dengan MSW di Al Khums, salah satu kota di Libya, serta akibat yang ditimbulkan oleh regulasi yang terjadi terkait MSW, efek berbahaya yang ditimbulkan oleh system MSW, akibat yang ditimbulkan oleh musim pada MSW, dan hal-hal yang dapat dilakukan oleh pemerintah untuk mengatasi akibat yang ditimbulkan oleh musim pada MSW.

Metode dari disertasi ini telah diukur pada lima tipe lingkungan yang berbeda selama empat musim melalui kuesioner kualitatif serta dihitung menggunakan, SPSS, dan Exeal, hasilnya hanya sedikit variable perilaku dan kondisional yang secara signifikan berasosiasi.

Hal ini berarti bahwa masyarakat Al Khums, khususnya di lingkungan sekolah dan kampus menunjukkan kesadaran sebagai basis perilaku baik mereka terkait dengan MSW. Regulasi Lingkungan Nasional yang menghasilkan MSW yang sudah ada juga membentuk perilaku masyarakat. Efek berbahaya dari sampah padat yang terjadi karena kurangnya container sampah dan kondisi container yang buruk terefleksi pada para pekerja yang bersentuhan langsung secara intens dengan sampah. Jumlah sampah yang sangat besar juga menjadi masalah pada lingkungan sekolah, rumah tangga, dan restoran. Masalah – masalah ini bisa ditanggulangi dengan menyediakan system MSW yang disertai dengan tambahan pekerja dan fasilitas khususnya container dan system daur ulang sampah seperti pyrolysis, atau system disposal seperti mesin combustion. Pekerja juga dapat ditingkatkan kinerjanya dengan diadakannya system insentif baik dalam bentuk kenaikan gaji maupun tunjangan kesehatan.

Kata kunci : Kebijakan Lingkungan, Municipal Solid Waste, perilaku masyarakat, kondisi lingkungan, sampah padat, musim, Al Khums, Libya

SUMMARY

Since the 1970s waste has become an increasing and major issue in Libya, mainly due to lifestyle changes and people throwing away more and more. More efficient manufacturing practices have produced cheaper household appliances and tools, so it is often cheaper to buy a new product rather than to fix a broken one. It increased the amount of waste rapidly. Organic solid wastes from kitchen are produced every day. To manage this type of waste, people keep chickens, but, now, most pets are fed on packaged pet food rather than family scraps. This behavior makes the amount of waste worsen. For the other types of solid waste, the communities have efforts to handle the solid waste by incinerating their waste on their backyards, but air pollution is inevitable in this process. These exploding waste problems makes the government decided to control the waste by establishing control upon solid waste by means of applying municipality, thus, the solid waste became municipal solid waste (MSW).

MSW is normally disposed in an open dump in many Libyan cities and towns, which is not the proper way of disposal because such crude dumps pose environmental hazards causing ecological imbalances with respect to land, water and air pollution. Municipal solid waste management (MSWM) is one of the major environmental problems of Libyan cities. Improper management of municipal solid waste (MSW) causes hazards to inhabitants. Various studies reveal that about 90% of MSW is disposed of unscientifically in open dumps and open landfills, creating problems to public health and the environment.

The community and people activities, companies, restaurants, shops, schools, offices, and or anything, generate waste in the city without any treatment or plan from the country or from solid waste management in the city before putting in the open landfill so will be put as the biggest problem environment in open landfill. Because open landfill in the city is open dumping site, so it brings many rats, animals and insects. The problem comes from the community activities then go to the container in the city after that the driver truck takes the big box to put in open landfills, because landfill's problem from the kind of waste that come from community activities. This problem impacts on the environment, people, and farmers around the open landfill.

This research is aimed at giving answers to the following questions: 1. How is the community behavior dealt with the waste in Al-Khums City? 2. How is the impact of Libyan National Environmental regulation to fix the waste problem in Al-khums city? 3. How are the harmful effects of municipal solid waste from their characteristics needed, and sources in Al-Khums City? 4. What is the most important cause for collection and transport of solid waste management problems in Al-Khums City? 5. How is the effect of season in municipal solid waste in Al-Khums City? 6. How to govern climatic (season) factor in solid waste management in Al-Khums City?

This study aims to find the impact of solid waste management and community behavior in Al-Khums City in consideration of the seasonal changing and separation organic and inorganic waste to the level of accumulation of waste

in open landfill of waste in Al-Khums City, and determining the quality and quantity of solid waste (accumulation) in Al-Khums City.

Municipal solid waste (MSW) varies, but typically includes waste arising from private households to that collected by or on behalf of local authorities from source. MSW therefore includes a proportion of commercial and non-hazardous industrial waste. Depending on the country, the definition can include some or all of: 1) Household wastes (collected waste, waste collected for recycling and composting, and waste deposited by householders at household waste disposal sites); 2) Bulky wastes derived from households; 3) Street sweepings and litter; 4) Parks and garden wastes; 5) Wastes from institutions, commercial establishments and offices.

Solid waste management (SWM) is an important environmental health service, and is an integral part of basic urban services. In the early days, disposal did not pose difficulty as habitations were sparse and land was plentiful. Disposal became problematic with the rise of towns and cities where large numbers of people started to congregate in relatively small areas in pursuit of livelihoods. On one hand, the density of population increased in these centers of congregation and therefore wastes generated per unit area also increased. On the other hand, available land for disposal of waste decreased in proportion. SWM thus emerged as an essential, specialized sector for keeping cities healthy and livable (Ahmed & Ali ; 2004).

The data analyzed here are gathered through a certain method. The sources of data are the community, the staff management of solid waste, and the open landfill. The data is taken from this entire phenomenon in the city in each season (spring in April, summer in June, autumn in October, and winter in January). In this study, the researcher uses three methods. They are observation, questionnaire and interview.

Having been gathered, the data are analyzed to interpret the result of the study by means of the following steps: 1) reporting the whole process of observation to find out the kind of solid waste and the place of solid waste in the city and for each season in Al-Khums City; 2) analyzing the questionnaire by SPSS and Ms. Excel to find quantity and quality of solid waste, and the rate of solid waste in the city, and community behavior; 3) analyzing the questionnaire to the staff and the worker of solid waste management to find how to deal with the system collection of waste, to the community; 4) reporting the interview with the staff of solid waste management.

Since all the analysis on questionnaires will be done in SPSS and Microsoft Excel program. SPSS Statistics 22.0 will be used for conversion of data entry from answers questions questionnaires to numbers or letters, to facilitate the process of data entry and calculation and total responses on variables questionnaire via command compute variable, possible to found the average rate data, application orders task and for the achievement of the objectives of study (frequencies, chart builder). And Excel is mainly used in processing tables and to render them into diagrams of frequency distribution.

There are two regional MSW management offices in Al-Khums City with managerial staffs who work as an organizational structure in each office. These offices provide the MSW collection and transportation system, the collectors, the equipments and the infrastructures such as temporary waste disposal containers in every districts. MSW related behaviors of respondents in five different environments in al-Khums city in four seasons are tendentially good. There are constant behaviors such as sorting willingness, left over treatment in households; placing waste in the right place, care about waste, keep clean the place, waste separation, in schools; placing waste in the right place, care about waste, no leftover, in offices; placing waste in the right place in shops; placing waste in the right place, care about waste, no leftover, in restaurants.

In Al-Khums, Libyan National Environmental Regulations are projected into a Municipal Solid Waste system consists of two managerial structures governing staffs, workers or collectors, infrastructures, and a regional landfill. Although there is no management plan socialized into the society, the decision of the government to acquire solid waste into municipal solid waste is a huge step into the best environment management that can be managed by a national government. By the time of the existence of MSW, the habit of producing cleanliness of the area by means of providing efforts on coordinating the solid waste is embodied in each person in the society.

The existence of the existing MSW as empirical experiences of the society in a range of time formed perceptions on the existence waste management system

which then triggered the society to provide suggestions that are exactly related to the happening MSW system without knowing and learning the system.

Harmful effects from the MSW to the environment were absorbed by qualitative questionnaires to the workers who collect the waste in varied periods who are the persons with the most intense encounters with the solid waste. These persons experience the highest health risks by their minimum distance to the solid waste that can be decomposing and producing odors during the varied collection periods. Kitchen waste is the waste type which is mostly found in al-Khums households. This type of waste is always decomposing and producing chemical agents that cause corrosion to containers. The workers who collect and transport the solid waste are the agents who experience solid waste in maximum intensity.

The qualitative questionnaire had been spread, calculated, and projected into percentage, workers' experiences on impacts of waste to their health reflected the impact of waste to humans' health on its worst intensity of contacts with the waste. These percentages show that the waste had impacts to general human health since the impacts were felt by the workers without medical diagnosis or laboratory screening. The management should budget the equipments immediately to solve the current problems, related to workers' health and scattered waste in neighborhoods.

Municipal Solid Waste is a decision by the government of a country to manage its solid wastes through systemic facilitations that should be spread to the society. The decision of the government to acquire any condition of any existence

related to the matter of solid wastes creates consequences. Municipality then brings the government to the necessity to provide a full looping management system for the solid waste. This system must be initiated and performed by the government with participations on giving suggestions from the communities and workers.

The workers will collect the waste every day, transfer the waste into the temporary waste containers. Organic waste will be directly recycled with compostion procedure and animal food processing system. Non organic waste will be transferred to the recycling factories, and the recycled products will be transferred to the warehouses and shops to be sold to the communities with cheaper price as the reward for the communities. Seasons will be managed through this looping system for this system can minimize the time of the existence of solid waste and the container problems such as odors, permanently staining, and insects or rodents in the waste temporary disposal.

By the range of time of the existence of Municipal Solid Waste and the local cultures of Al-Khums community, the community of Al-Khums, as the non-governmental actors in the governance map of Al-Khums, showed awareness as the foundation of their Municipal Solid Waste related behaviours, and these behaviours that of the society in Al-Khums keep the cleanliness of the area by means of controlling the solid waste appropriately.

The scientific city of this research which lies in the empirical facts is an important aspect that should be underlined in regards of Libyan National

Environmental Regulations that suggest scientific approach for any environmental research. National Environmental Regulation of Libya had also been projected into an organizational structure that had been split into two official managerial structure who manage two systematic municipal solid waste team of workers. The teams already work and control the flows of municipal solid waste in Al-Khums. There are also harmful effects that of municipal solid waste system onward in Al-Khums. Humans' health is the most aspect that can be affected by inappropriate municipal solid waste by means of the reactions of the chemical condition that of decomposing organic waste and metal contained waste. Leftovers are the second causes of municipal solid waste problems that had been a disturbance for the cleanliness of the area. Although the community shows awareness on their leftover treatments and not leaving any leftover in the waste generators, the varied types of waste have still become problems.

The only type of waste that can be re-used by the community is kitchen waste which was the waste with the highest amount. Meanwhile there are also papers, textiles, rubbers, metals, plastics, and glasses as the other uncontrollable types of solid waste for the absence of the recycling system in the community. The main problem of waste handling in Al-Khums is the lack of containers. It is indicated by the percentage of those respondents who never experience the existence of any container around them. If it is impossible for the government to increase the quantity of containers, it is thus the waste management workers the main problem of waste management in the City. The problem of the lack of the container put the quantity of workers as the most important aspect of MSW

problems in Al-Khums that produced the varied waste collection range from once a week, twice in a week, three times in a week, and once in every day. The workers' additions will make every day collection to be possible to be done.

Seasons had some effects on the municipal solid waste situations in the environment of households and in the environment of schools. In the environment of households, seasons had impacts on the condition of the container related problems such as odors, insects or rodents, failure to unload, and permanently staining. Seasons had impacts also on the condition of containers which are significantly associated to seasons. Seasonal changes make worsen the condition of containers, and the absence of containers affects the street cleanliness especially in summer, which is the season with the highest amount of waste. The municipality of solid waste brought the government to the obligation for performing researches and development.

RINGKASAN

Sejak tahun 1970-an, sampah menjadi masalah yang semakin besar di Libya, karena terjadinya perubahan gaya hidup, karena orang semakin banyak membuang sampah. Praktik manufaktur yang semakin efisien menghasilkan peralatan rumah tangga yang semakin murah, sehingga orang lebih suka membeli barang baru daripada memperbaiki yang rusak. Kebiasaan semacam itu membuat sampah semakin menggunung. Sampah padat organik dari dapur dihasilkan orang tiap hari. Untuk menangani sampah itu, orang memelihara ayam, tetapi sekarang sebagian besar binatang piaraan diberi makan makanan kemasan dan bukannya sisa makanan keluarga. Perilaku itu membuat jumlah sampah semakin besar. Untuk beberapa jenis lain sampah padat, masyarakat mengelolanya dengan membakar sampah itu di halaman. Tetapi jelas bahwa itu menyebabkan polusi udara. Persoalan semakin banyaknya sampah itu membuat pemerintah bertindak mengendalikan sampah dengan mengendalikan sampah padat dengan menerapkan pengelolaan sampah oleh pemerintah, sehingga sampah padat yang dikelola oleh munisipal (municipal solid pemerintah, MSW).

MSW biasanya dibuang di tempat pembuangan akhir yang ada di banyak tempat di kota besar maupun kota kecil di Libya. Padahal cara penanganan sampah semacam itu tidak baik karena tumpukan sampah itu menyebabkan ketidakseimbangan ekologi karena menimbulkan pencemaran tanah, air dan udara. Manajemen MSW (MSWM) adalah salah satu dari masalah lingkungan serius yang terjadi di kota-kota di Libya. MSWM yang tidak bagus membahayakan penduduk. Beberapa penelitian menunjukkan bahwa 90 % MSW

dibuang secara tidak ilmiah di tempat pembuangan terbuka dan tempat pembuangan akhir, sehingga terjadi masalah terhadap kesehatan masyarakat dan terhadap lingkungan.

Masyarakat dan aktivitas orang, perusahaan, restoran, toko, sekolah, kantor dan lain-lain menghasilkan sampah di kota tanpa mengelolanya atau tanpa perencanaan dari negara atau dari manajemen sampah padat di kota itu sebelum sampah itu dibuang di tempat pembuangan akhir. Sehingga, sampah itu pun menjadi masalah lingkungan terbesar di tempat pembuangan akhir terbuka. Karena tempat pembuangan sampah di kota memang terbuka, maka tikus, binatang dan serangga pun berkumpul di situ. Masalahnya berawal dari aktivitas masyarakat, kemudian pada kontainer sampah, dan sampah pun diangkut truk untuk dibuang di tempat pembuangan akhir. Masalah di tempat pembuangan akhir berasal dari aktivitas masyarakat. Masalah itu berdampak pada lingkungan, orang, dan petani di sekitar tempat pembuangan akhir.

Penelitian ini ditujukan untuk memberi jawaban bagi pertanyaan berikut:

1. Bagaimana perilaku masyarakat terkait dengan sampah di kota Al-Khums?
2. Bagaimana pengaruh regulasi Lingkungan Nasional Libya dalam mengatasi masalah sampah di kota Al Khums?
3. Bagaimana dampak bahaya sampah padat munisipal dari sifat yang dibutuhkan, dan sumber di kota Al Khums?
4. Apakah penyebab terpenting untuk pengumpulan dan pengangkutan masalah manajemen sampah padat di Al-Khums?
5. Bagaimana dampak musim dalam sampah padat munisipal di kota Al Khums?
6. Bagaimana mengelola faktor iklim dalam manajemen sampah padat di Al-Khums?

Penelitian ini ditujukan untuk menemukan dampak manajemen sampah padat dan perilaku masyarakat di Al-Khums terkait dengan perubahan musim dan pemisahan sampah organik dan non organik hingga tingkat pengumpulan sampah di tempat pembuangan sampah akhir di kota Al-Khums, dan untuk mengetahui kualitas dan kuantitas tumpukan sampah padat di Al-Khums.

Definisi MSW bermacam-macam, tetapi semua definisi biasanya mencakup sampah yang muncul dari rumah tangga hingga sampah yang dikumpulkan oleh pemerintah setempat dari sumber. Karena itu, MSW mencakup juga sampah komersial dan sampah yang tidak berbahaya. Tergantung negara, definisi itu bisa meliputi satu atau semua dari: 1) sampah rumah tangga (sampah terkumpul, sampah dikumpulkan untuk daur ulang dan kompos, dan sampah yang ditumpuk oleh rumah tangga di tempat pembuangan sampah rumah tangga); 2) tempat penumpukan sampah dari beberapa rumah tangga; 3) Sampah jalanan; 4) sampah taman dan kebun; 5) sampah dari beberapa lembaga komersial dan kantor.

Manajemen sampah padat (*SWM solid waste management*) adalah sebuah layanan kesehatan lingkungan yang penting dan merupakan bagian integral dari layanan perkotaan dasar. Pada jaman dulu, sampah tidak menjadi masalah karena penduduk jarang dan lahan masih sangat luas. Sampah menjadi masalah ketika banyak kota tumbuh, dan banyak orang bermukim area sempit untuk mencari penghidupan. Di satu sisi, kepadatan penduduk meningkat di daerah padat penduduk, dan sehingga sampah yang dihasilkan pun meningkat. Di lain sisi, lahan yang digunakan untuk membuah sampah pun semakin berkurang. SWM pun

menjadi sektor penting khusus untuk menjaga agar kota tetap sehat dan bisa ditinggali (Ahmed & Ali; 2004).

Data yang dianalisis di sini dikumpulkan dengan metode tertentu. Sumber datanya adalah masyarakat, staf manajemen sampah padat, dan tempat pembuangan akhir. Data diambil dari keseluruhan fenomena di kota itu tiap musim (musim semi pada April, musim panas pada Juni, musim gugur pada Oktober, musim dingin pada Januari). Dalam penelitian ini peneliti menggunakan tiga metode: observasi, kuesioner, dan wawancara.

Setelah dikumpulkan, data pun dianalisis untuk mensfirkan hasil dari penelitian dengan langkah-langkah berikut: 1) keseluruhan proses observasi dilaporkan untuk mengetahui jenis sampah padat dan tempat pembuangan sampah padat di Al Khums dan untuk tiap musimnya; 2) kuesioner dianalisis dengan SPSS dan Ms. Excel untuk mengetahui kuantitas dan kualitas sampah, dan tingkat sampah padat di kota itu dan, untuk mengetahui perilaku masyarakat; 3) data kuesioner dari staf dan pekerja manajemen sampah padat dan dari masyarakat dianalisis untuk mengetahui bagaimana mereka mengurus pengumpulan sampah; 4) wawancara dengan staf manajemen sampah padat dilaporkan.

Data kuesioner dianalisis dengan SPSS dan Ms Excel. SPSS Statistics 22.0 digunakan untuk mengkonversi masukan data dari jawaban kuesioner ke angka atau huruf, untuk mempermudah proses entri data dan penghitungan dan jawaban total pada variabel-variabel kuesioner lewat varibel command compute, sehingga data rata-rata bisa didapatkan, lewat perintah aplikasi dan untuk

mendapatkan tujuan penelitian (frekuensi, alat pembuat diagram). Excel utamanya digunakan untuk memproses tabel dan untuk mengubah tabel menjadi diagram distribusi frekuensi.

Ada dua kantor manajemen MSW regional di Al-Khums, dengan staf managerialnya masing-masing yang bekerja sebagai sebuah struktur organisasi di tiap kantor itu. Kantor-kantor itu mengurus pengumpulan dan pengangkutan MSW, mengurus pekerja pengumpul, peralatan dan infrastruktur seperti misalnya kontainer sampah sementara di tiap distrik. Perilaku responden terkait MSW di lima lingkungan di Al-Khums di empat musim pun cenderung baik. Ada perilaku yang tetap seperti misalnya kemauan untuk memilah sampah, memanfaatkan sisa makanan di lingkungan rumah tangga; membuang sampah pada tempatnya, peduli sampah, berusaha menjaga kebersihan, pemilahan sampah di sekolah; membuang sampah pada tempatnya, peduli sampah, tidak membuat sampah, di lingkungan kantor; membuang sampah pada tempatnya di lingkungan toko; membuang sampah pada tempatnya, peduli sampah, tidak membuat sampah, di lingkungan restoran.

Di Al-Khums, Regulasi Lingkungan Nasional Libya di proyeksikan ke dalam sebuah sistem MSW yang terdiri dari dua struktur managerial yang mengatur staf, pekerja atau pengumpul, infrastruktur dan tempat pembuangan akhir regional. Meskipun tidak ada perencanaan manajemen yang disosialisasikan ke masyarakat, tetapi keputusan pemerintah untuk menganggap sampah padat sebagai sampah yang harus diurus pemerintah adalah sebuah langkah besar untuk masuk dalam manajemen lingkungan terbaik yang bisa dilakukan pemerintah

nasional. Sejak adanya MSW, kebiasaan untuk menjaga kebersihan di tempat itu dengan usaha koordinasi sampah padat pun tertanam dalam tiap orang di masyarakat.

Keberadaan MSW sebagai pengalaman empiris masyarakat selama beberapa waktu pun membentuk persepsi tentang adanya sistem manajemen sampah yang kemudian membuat masyarakat memberikan beberapa saran yang sangat terkait dengan keberadaan sistem MSW tanpa mengetahui atau belajara tentang sistem itu.

Dampak berbahaya MSW terhadap lingkungan pun diambil dengan kuestioner kualitatif yang disebarkan di kalangan para pekerja yang mengumpulkan sampah. Mereka adalah orang-orang yang paling banyak bersentuhan dengan sampah padat. Mereka mengalami bahaya kesehatan terbesar karena mereka sangat dekat dengan sampah padat yang membusuk dan menghasilkan bau tak sedap selama pengumpulannya. Sampah organik adalah sampah yang paling banyak ditemukan lingkungan rumah tangga Al-Khums. Sampah jenis itu selalu membusuk dan menghasilkan zat kimia yang menyebabkan karat pada kontainer. Para pekerja yang mengumpulkan dan mengangkut sampah padat adalah orang-orang yang mengalami sampah padat paling banyak.

Dari kuestioner kualitative yang sudah disebar, dihitung dan diproyeksikan menjadi persentase, terlihat bahwa pengalaman pekerja pengelolaan sampah atas dampak sampah terhadap kesehatan mereka pun memperlihatkan dampak sampah

terhadap kesehatan manusia paling banyak bersentuhan dengan sampah. Persentase itu menunjukkan bahwa sampah menimbulkan dampak buruk bagi kesehatan manusia umumnya, karena dampak itu dirasakan oleh para pekerja tanpa diagnosis kedokteran ataupun pemeriksaan laboratorium. Manajemen harus menganggarkan pengadaan perlengkapan kesehatan untuk memecahkan persoalan yang terkait dengan kesehatan pekerja pengelola sampah dan sampah berserakan di kampung-kampung.

MSW adalah keputusan yang dibuat oleh pemerintah sebuah negara untuk mengelola sampah padatnya lewat fasilitasi sistemik yang harus disebarluaskan di masyarakat. Keputusan pemerintah untuk menggolongkan sesuatu ke dalam sampah padat pun menimbulkan konsekuensi. Munisipalitas pun membuat pemerintah harus menyediakan sebuah sistem manajemen yang melingkar penuh untuk mengelola sampah padat. Sistem itu harus dimunculkan dan dijalankan oleh pemerintah, sementara masyarakat dan pekerja berpartisipasi dengan memberikan saran-saran yang bermanfaat.

Para pekerja sampah mengumpulkan sampah tiap hari, mengangkutnya ke kontainer sementara. Sampah organik langsung didaurulang dengan prosedur kompos dan sistem pembuatan makanan hewan. Sampah non organik diangkut ke pabrik daur ulang, dan produk daur ulang pun diangkut ke gudang dan tempat penjualan untuk dijual ke masyarakat dengan harga murah sebagai imbalan bagi masyarakat. Musim dikelola dengan sistem lingkaran ini, karena sistem ini bisa memperkecil umur keberadaan sampah padat dan masalah kontainer seperti bau tidak sedap, karat, serangga dan tikus di tempat pembuangan sampah sementara.

Setelah beberapa masa adanya MSW dan budaya setempat penduduk Al-Khums, maka terlihat bahwa masyarakat Al-Khums sebagai aktor non governmental dari peta governance pun memiliki kesadaran sebagai dasar dari perilaku mereka yang terkait dengan MSW. Perilaku itu membuat masyarakat Al-Khums bisa menjaga kebersihan dengan mengelola sampah padat dengan tepat.

Keilmiahan penelitian ini terletak pada fakta empiris. Keilmiahan itu adalah salah satu aspek penting yang harus digarisbawahi dalam kaitannya dengan regulasi lingkungan nasional Libya yang mengharuskan digunakannya pendekatan ilmiah dalam penelitian lingkungan. Regulasi itu juga diwujudkan dalam sebuah struktur organisasi yang dipisah menjadi dua struktur manajerial resmi yang mengurus dua tim pekerja MSW sistemik. Dua tim itu sudah bekerja dan mengendalikan aliran MSW di Al Khums. Ada juga beberapa dampak berbahaya MSW di Al Khums. Kesehatan manusia adalah aspek yang paling terkena dampak pengelolaan sampah padat yang buruk karena terjadinya reaksi kimia yang membusukkan sampah organik dan sampah logam. Makanan sisa adalah penyebab besar kedua masalah sampah padat, karena sisa makanan itu membuat lingkungan menjadi kotor. Meskipun masyarakat memiliki kesadaran untuk mengelola sisa makanan mereka, dan tidak meninggalkan sisa, tetapi beberapa jenis sampah masih menjadi masalah.

Satu-satunya jenis sampah yang bisa digunakan oleh masyarakat adalah sampah dapur, yang merupakan sampah yang paling banyak dihasilkan. Sementara ada juga sampah yang berupa kertas, kain, karet, logam, plastik, dan kaca. Semua jenis sampah itu juga tidak bisa dikendalikan karena tidak adanya

sistem daur ulang di masyarakat. Masalah utama penanganan sampah di Al Khums adalah kurangnya kontainer. Hal itu terlihat pada persentase responden yang tidak pernah mengalami adanya kontainer di sekitar mereka. Jika memang pemerintah tidak bisa menambah jumlah kontainer, maka para pekerja manajemen sampah pun menjadi masalah utama pengelolaan sampah di kota itu. Kurangnya kontainer membuat jumlah pekerja pengelola sampah menjadi aspek paling penting dari masalah MSW di Al Khums. Para pekerja itu mengumpulkan sampah sekali, dua kali, tiga kali, seminggu, dan sekali sehari. Penambahan pekerja membuat pengumpulan sampah tiap hari menjadi mungkin dilakukan.