PART II

Final Report of Stage II

of the Project for Technical Assistance in Solid Waste Management in Palestine

- A Technical Cooperation between Ministry of Local Government (MoLG) of Palestine and Japan International Cooperation Agency (JICA) -

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Updated Version (31st July 2019)

July 2019

Project Team of Ministry of Local Government (MoLG), Palestine
and
Expert Team of Japan International Cooperation Agency (JICA)

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The Opening of the First National Day on Solid Waste Management (Ramallah, 25th February 2019)
(from left rightward, Mr. Takeshi Okubo, Ambassador of Japan to Palestine; Dr. Rami Waleed Kamel Hamdallah, Prime Minister of Palestine; Dr. Hussein Abdallah al-Araj, Minister of Local Government, Palestine, and Mr. Toshiya Abe, Chief Representative of JICA Palestine)

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Foreword

The Development of a national solid waste management system in Palestine is the objective of the Japanese support provided to the solid waste management sector. In this regard Japan has continued its technical and financial support in cooperation with the Palestinian Ministry of Local Government since 1997.

The Japanese aid has included the transfer of Japanese experience and knowledge in the field of solid waste management, and the financing of solid waste infrastructure development. The Project "Technical Assistance in Solid Waste Management in Palestine" (2015-2019) has been developed and under implementation with this framework.

We in the Ministry of Local Government highly appreciating the role of Japan through JICA in the progress we have achieved in the development of the solid waste management sector.

31st July 2019

Muhammad Hasan Jabareen
Project Director
Deputy Minister
Ministry of Local Government
Chairman of the National Team for Solid Waste Management

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Abbreviations

CA	Chief Advisor (of the Project)
C&D	Construction and Demolition
CD	Capacity Development
DJSC	Directorate of Joint Service Councils (of Ministry of Local Government)
EIA	Environmental Impact Assessment
EQA	Environmental Quality Authority
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IEE	Initial Environmental Evaluation
JDCF	Japan Debt Cancellation Fund
JICA	Japan International Cooperation Agency
JSC	Joint Service Council
JCC	Joint Coordination Committee of the Project
JET	JICA Expert Team (of the Project)
KRM	Khan Yunis, Rafah, and Middle area (in Gaza Strip)
LET	Local Expert Team (of the Project)
LGU	Local Government Unit
MDLF	Municipal Development and Lending Fund
M/M	Minutes of Meeting
MoA	Ministry of Agriculture
MoEHE	Ministry of Education and Higher Education
MoH	Ministry of Health
MoLG	Ministry of Local Government
MoNE	Ministry of National Economy
MOU	Memorandum of Understanding
NGO	Non-Governmental Organization
NIS	Israeli new shekel
NTSWM	National Team (Committee) for Solid Waste Management
O/M	Operation and Maintenance
OVI	Objectively Verifiable Indicator
PA	Palestinian Authority
PC	Project Coordinator (of the Project)
PDM	Project Design Matrix
PD	Project Director (of the Project)
PM	Project Manager (of the Project)
PO	Plan of Operation
PPP	Public Private Partnership

ROJ	Representative Office of Government of Japan in Palestine
R/D	Record of Discussion
SWM	Solid Waste Management
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-Habitat	United Nations Human Settlements Programme
UNOCHA	United Nation's Office for the Coordination of Humanitarian Affairs
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
WHO	World Health Organization

Preface

According to the Law, the Palestinian Local Government Units are mandated to the provide solid waste services for its communities, MoLG adopted the Joint Councils approach to jointly manage the service through multiple LGUs for solid waste management.

Among the 13 JSCs for SWM in West Bank- Palestine, 5 where less capable than the others to manage the SWM service, MoLG designated Directorate for supervising the sector and the JSCs and the National Committee where targeted in this phase of the project to improve the solid waste management and JSCs.

Looking back 3 years ago and comparing the performance of National Team, MoLG-DJSCs and the targeted 5 JSCs of solid waste management, we find great positive difference as a result of this project through achieving the 4 output and related activities.

Still the sector in general need more support, the project 2nd phase - one year extension is a major contribution in solving part of the problems that was originally assessed before the 1st phase, even so the increasing generated waste quantities due to increase in population and change life style and the low awareness of all stake holders about the solid waste issues remains urgent, especially the there is a positive change in the human resources capacities and institutionalization of the sector interested agencies and providers but this was not accompanied by a development in collection and disposal capacities, where huge efforts is needed in collection, transportation and disposal from one hand and in education, public awareness and waste reduction policies and practices.

Truly, we in MoLG would like to thank Japan Government, JICA, especially the Project Advisor and the working teams, the Japanese and Palestinian experts supporting friends who are devoting their experience, efforts and funds for helping the Palestinian people to make their life better through supporting improving solid waste system in Palestine.

31st July 2019

Suleiman Abu Muferreh
Project Manager
Director General, Directorate of Joint Service Councils
Ministry of Local Government

I. Introduction

Present Final Report summarizes the activities implemented by the MoLG-JICA Technical Cooperation Project for Technical Assistance in Solid Waste Management in Palestine in Stage II from 1st July 2018 to 31st July 2019. In this Report, achievement marked in the period are described with the analyses of promotional and inhibiting factors. This Report is prepared based on the agreement in the Record of Discussion (R/D) signed between Palestinian and Japanese side, September 2014.

I-1. Project Background

In West Bank and Gaza Strip, about 1,442,480 tons of waste are generated per year (averaged generation rate is 0.91 kg/capita/day in West Bank, 0.7 kg/capita/day in Gaza Strip; 2018) which is increasing year by year (see Annexes 8 and 9; Data Book version 2). Collected wastes are transported to the designated sanitary landfills, namely, Al Finjan Jenin (Operating), Bethlehem (Operating) and Ramallah (under planning based on the National Strategy for Solid Waste Management in the Palestinian Territory (2010-2014)). The waste collection and transportation services were previously provided by Local Government Units (LGUs) such as municipality or village council, because the Palestinian Local Government Law (1997) assigned that each LGU was basically responsible for SWM.

However, the number of LGUs in West Bank was too large (381 units in 2018 but 432 units in 2015) and most LGUs were very small in scale which could not conduct SWM service alone in sustainable manner. According to the Law, therefore, it also allowed LGUs to organize a Joint Service Council (JSC) for conducting SWM service effectively and efficiently. Thus, in West Bank, 12 JSCs have been established for covering over all West Bank to provide waste collection, transportation, and disposal services, where two is JSCs in Jerusalem Governorate was newly organized under the support of the Project. In Gaza Strip also, two JSCs, Northern and Southern Gaza JSCs, have been established. The focal point was the enhancement of JSC's capacity for implementing SWM service.

Collected wastes are planned to be transported to three designated sanitary landfills, namely, Zahrat Al Finjan Landfill conducted by Jenin JSC (Operating), Al Menya Landfill operated by Hebron-Bethlehem Higher JSC (Operating) and Ramoun Landfill by Ramallah-Al Bireh JSC (under planning) across the individual JSCs in West Bank, and three controlled landfills, namely, Johr Al Deek Landfill operated by Gaza municipality, Dier Al Balah Landfill operated by KRM JSC and Sofa (Al Fukhary) Landfill by JSC in Khan Yunis, Rafah and Middle area (KRM) in Gaza Strip. In order to establish efficient transportation from the individual JSC to designated landfill, waste transfer stations are required which will be operated and maintained by JSC.

So far, various efforts have been carried out by Palestinian Authority and local governments with a number of technical supports by external donors (see **Figure I-1**). For proper waste collection, transport, and landfilling, General Directorate of Joint Service Councils (DJSC) in the Ministry of Local Government (MoLG) is in the position to support, supervise and coordinate the JSCs activities. However, there is a significant gap among JSCs' capacity.

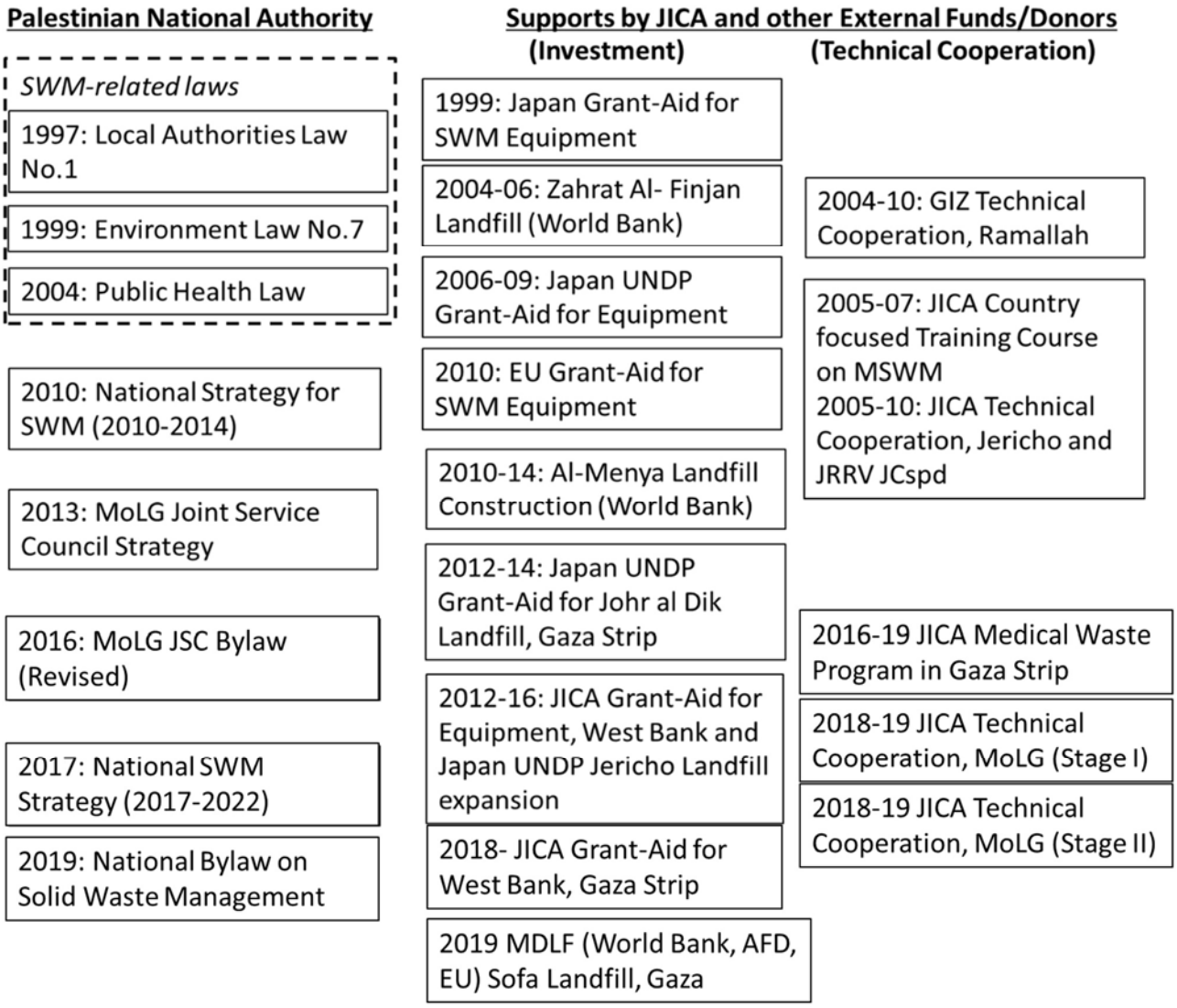

Figure I-1: Development of solid waste management in Palestine since late 1990s. The efforts by the Palestinian National Authority, mainly for institutional setup and reform, are shown in left column, while investment projects and technical cooperation projects are shown in middle and right columns. In addition to these interventions, from late March 2018, a preparatory study was initiated for new Grant Aid project by JICA.

In the JICA Preparatory Survey for the Grant Aid Project "Capacity Enhancement on Solid Waste Management in the West Bank in Palestine (2012)", based on the capacity assessment study for all existing JSCs in the West Bank, only five JSCs could be selected for target JSCs of the Grant Aid. Other JSCs could not be selected because of insufficient capacity. It was also recognized that enhancement of MoLG's capacity is necessary in order to promote JSCs activities in SWM, otherwise the significant gap among JSCs' capacity cannot be solved. Under this situation, the Ministry of Local Government requested a new technical cooperation project for the need of capacity development of MoLG in order to realize a sound environmental solid waste management system by JSCs equally over the Palestine.

MoLG requested the Government of Japan to carry out a technical cooperation project to improve the SWM capacity of less capable five JSCs, namely, Tubas, Qalqilya, Nablus, Northeast and Southeast (NE+SE) Jerusalem, and North & Northwest (N+NW) Jerusalem JSCs, and to enhance the SWM in the entire West Bank area (see **Figure I-2**). Upon this request JICA agreed on to formulate new technical cooperation project entitled "Project for Technical Assistance in SWM in Palestine" (hereinafter referred as "the Project"), and the official agreement, Record of Discussion (R/D), was signed on September 22, 2014 accordingly, between Mr. Nayef Abu Khalaf, Minister of MoLG, Dr. Shukry Bishara, Minister of MoPAD, and Mr. Izumi Tanaka, Chief Representative of JICA.

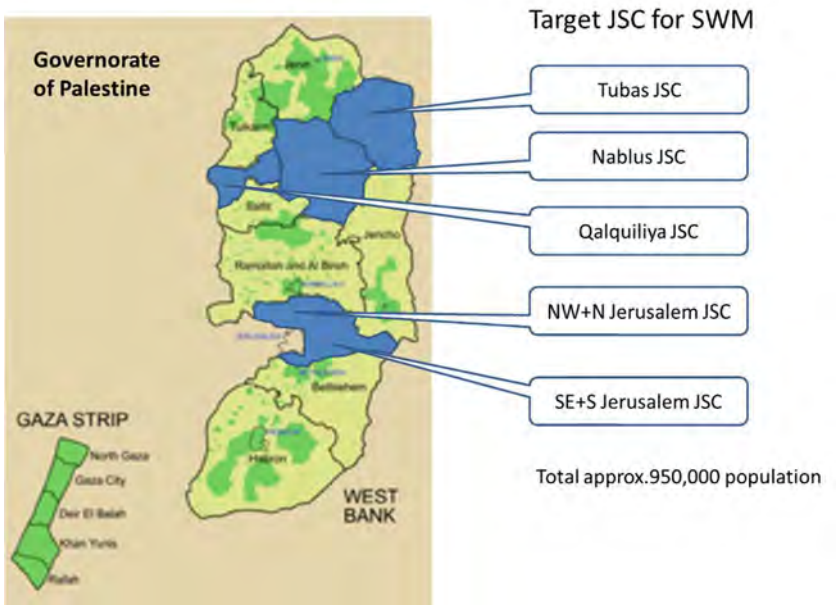

Figure I-2: Targeted Areas of Stage I and Stage II in West Bank; five JSCs in West bank, Palestine. Green parts are Areas A and B, but other part showing yellow color is Area C.

Prior to starting the Project, a series of discussions were held through participatory workshops and identified the problem to be solved by the Project. The Project (Stage I) started from January 2015 as a three-year technical cooperation project. As the Project Stage I terminated on March 31, 2018; the project period for Stage I was three years and two months. The Project Progress Report No.1 (PR1) was prepared in November 2015, as the summary of the first-year activities. It was accepted by the 2nd Joint Coordination Committee (JCC-2) of the Project at 25 November 2015. The Project Progress Report No.2 (PR2) was published at 31 January 2017, which was submitted to the 4th Joint Coordination Committee (JCC-4).

On 29th March 2018, as a result of discussion at 5th JCC of the Project, JICA and MoLG agreed to extend duration of the Project because it was found that the formulation and monitoring of the detailed action plan of the policy intervention of the National Strategy for SWM in Palestine (2017-2022) was necessary for securing the implementation of the strategy based on the result of the terminal evaluation of the Project from November to December 2017. The extended Project was started from July 2018 the end of July 2019 as a Project (Stage II). The detailed plan of the Project (Stage II) was confirmed at the 7th JCC of the Project which was held at 17th July 2018. The Project Progress Report No.5 (PR5) was prepared in January 2019, as the summary of the anterior half of the

Project (Stage II) activities. It was accepted by the 8th Joint Coordination Committee (JCC-8) of the Project at 5th March 2019.

It is noted that, there are JSC-based solid waste management similar to the West Bank in Gaza Strip. The two JSCs, namely Gaza and North Gaza JSC and Khan Yunis, Rafah and Middle area (KRM) JSCs, are conducting solid waste management in Gaza Strip, where individual LGUs are responsible to collect and transport solid waste, and only KRM-JSCs are responsible to transferring the waste and landfill management. The sanitary landfills have been constructed in south (Al Fukhary Landfill), middle (Dier El Balah Landfill) and north (Johr Al Deek Landfill). The landfills in south and north were improved under the technical assistance of UNDP with Japanese government fund. The new sanitary landfill (Sofa Landfill) was constructed under the technical assistance of the World Bank and will be functional soon.

The scope of Project (Stage I) does not cover these Gaza JSCs, but activities of technical cooperation program on medical waste management in Gaza Strip were covered by the Project (Stage II) (**Figure I-3**).

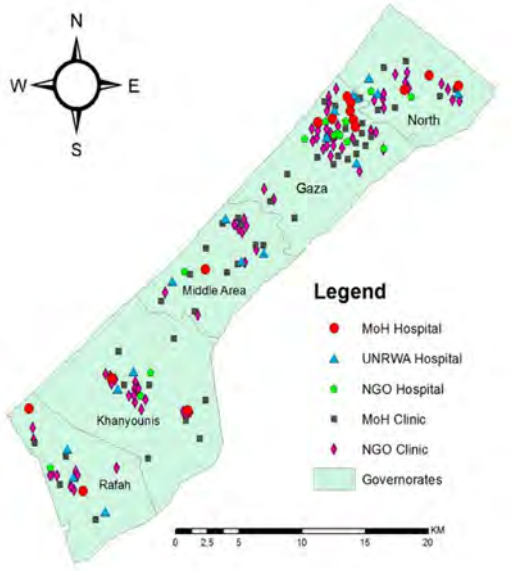

Figure I-3: Targeted area (Rafah, Khan Yunis, and Middle Governorate) and medical institutes, for the technical cooperation on medical waste management in Gaza Strip, conducted by the Project (Stage II). Source: JICA (2016) Final Report on the survey of medical solid waste in Gaza, Palestine.

I-2. Project Outline

The Project was implemented based on the Project Design Matrix. The Project Purpose, to be achieved by the end of the Project, and the Overall Goal, to be achieved until 2022, are defined as **Table I-1**:

Table I-1: Structure of the Project

Overall Goal: Sound environmental and social solid waste management service is delivered over Palestine in sustainable manner.
Project Purpose: Sustainable solid waste management system is established by JSCs equally over the West Bank area Palestine under the well-prepared policy, plan, institution, support and coordination made by MoLG.
Output 1: MoLG's capacity for instruction, support and coordination to JSCs is enhanced through implementing activities with targeted 5 JSCs in SWM. **Output 2:** MoLG's capacity for preparing standards, regulations and guidelines in solid waste management is enhanced. **Output 3:** MoLG's capacity for preparing national policies and plans in solid waste management is enhanced. **Output 4:** MoLG's management capacity at organizational level is enhanced.

Each achievement level is measured by objectively verifiable indicators (OVIs). In order to achieve the Project Purpose and Overall Goal, the four outputs (**Table I-1**) and eleven activity packages were planned.

The Project design was originally defined by the R/D signed on 22 September 2014, as the PDM (ver. 0) and PO. During the Project (Stage I), the project design and structure were updated and confirmed as PDM (ver. 1) by the 1st JCC on 3rd April 2015. However, the PDM (ver.2) was again reviewed by JCC-3 (November 2016), and new activities were added with new OVIs, which was PDM (ver.3). Modified outline is shown in **Figure 1-4**. Furthermore, some OVIs, especially OVIs of the Overall Goal were updated and confirmed as PDM (ver. 4) by the 6th JCC on 29th March 2018.

During the Project (Stage II), some activities and OVIs were updated based on the plan of the Project (Stage II) and confirmed as PDM (ver. 5) by the 7th JCC on 17th July 2019, and two OVIs were updated based on the 5th Project Monitoring Report and confirmed as PDM (ver. 5.1) by the 8th JCC on 5th March 2019. (**Annex 12**)

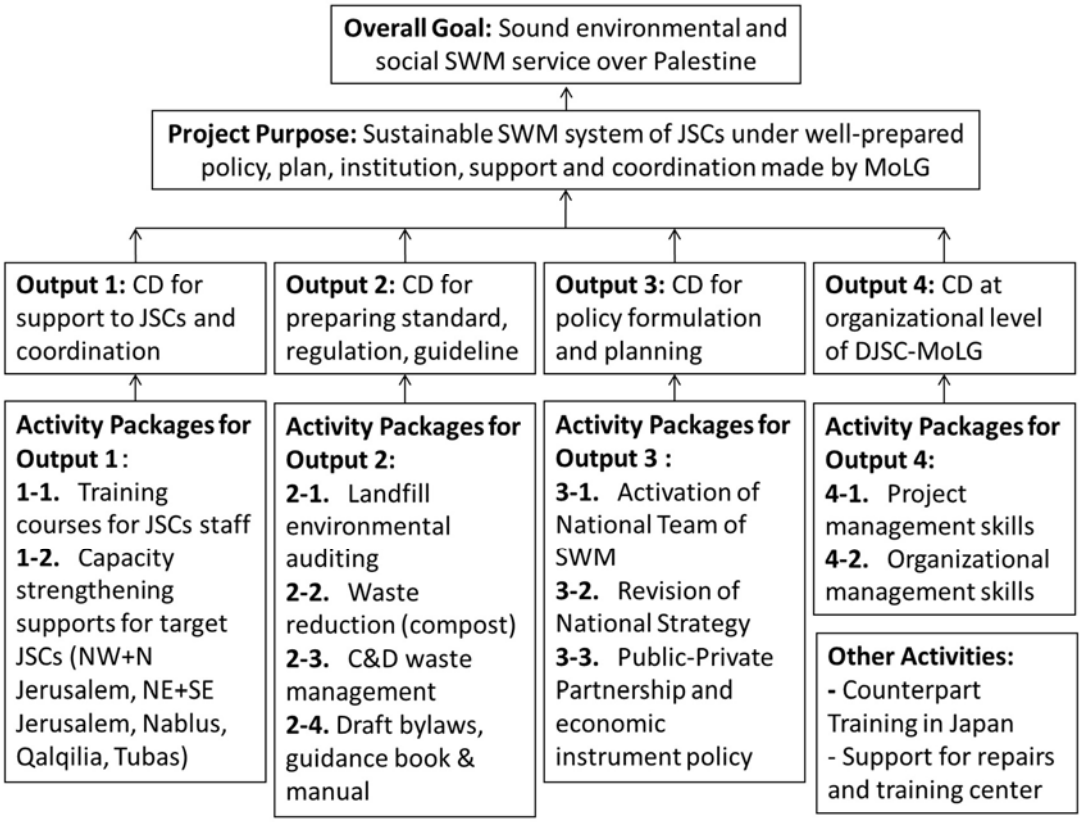

Figure I-4: Outline of the project design according to the Project Design Matrix version 3.1, which was used by the Project (Stage I) and Project (Stage II).

Both MoLG and JICA contributed to the Project (Stage II) through assigning Project members; 11 Palestinian members and 2 Japanese experts. The task distribution and management system in the Project (Stage II) is shown in **Figure I-5**.

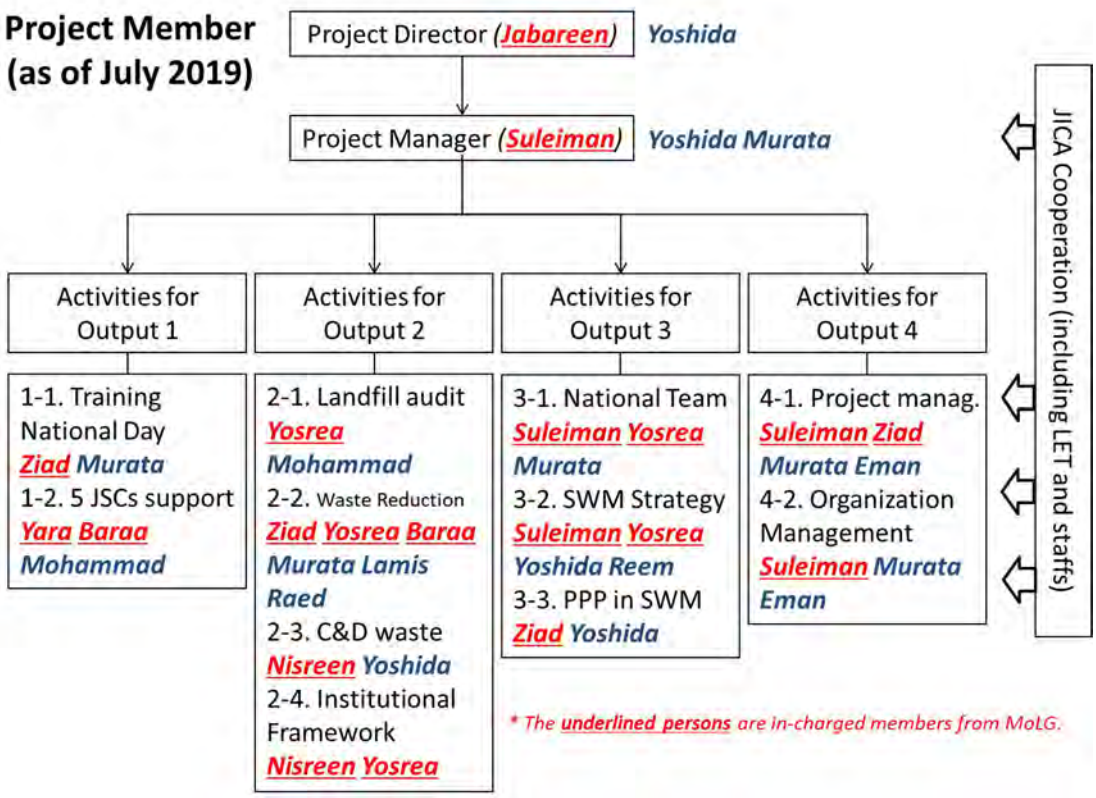

Figure I-5: Task distribution among the Project members in the final stage of the Project.

I-3. Implementation of the Project

Inputs for the Project implementation are classified into two parts, human resource and materials. The human resource inputs, Project members and organization of project implementation body both Palestinian and Japanese sides, are summarized as follow:

I-3-1. Palestinian Project Members

The Palestinian side assigned the following personnel as the Project Members who are the counterparts of JICA experts (see **Table I-2**):

Table I-2: List of Palestinian Project Members (Counterpart to JICA Expert Team) in 2018-19.

MoLG Core Members of the Project

- Muhammad Hasan Jabareen	Project Director (PD)	Deputy Minister of MoLG
- Suleiman Abu Muferreh	Project Manager (PM)	Director General of MoLG
- Hilal Sinono (2018)	Engineer	DJSC-MoLG
- Ziad Tawafsheh	Institutional Expert	DJSC-MoLG
- Nisreen Hammad	Environmental Engineer	DJSC-MoLG

- Yosrea Ramadan	Solid waste Specialist	DJSC-MoLG
- Yara Khalil	Assistant Coordinator	DJSC-MoLG
- Baraa Hamdallah (2019)	Civil Engineer	DJSC-MoLG

Target JSCs Members (Cooperating Members)

Mostafa Hameed	Executive Direct r of N+NW Jerusalem JSC
Ateid Afaneh	Executive Director of Qalquilya JSC
Saed Rabee'	Executive Manager of NE+SE Jerusalem JSC
Nidal Mansour (2018)	Executive Manager of Nablus JSC
Saad Abu Zant (2019)	Executive Manager of Nablus JSC
Basel Bani Oudeh	Executive Manager of Tubas JSC

In addition to above-mentioned Project Members, MoLG branch directors in Jerusalem, Qalquilya, Nablus, and Tubas Governorates, are assigned as cooperators of the Project.

I-3-2. JICA Expert Team, Local Expert Team and Project Staffs

The JICA side assigned the following Japanese Experts. In addition to them, JICA side contracted Local staffs as follows:

JICA Expert Team (JET)

- Mitsuo Yoshida	Chief Advisor / Expert in Solid Waste Management Policy and Plan (responsible for overall JICA Project activities and in particular responsible to the activities of Outputs 3 and 4), JICA
- Takaaki Murata	Project Coordinator / Expert in Solid Waste Management (responsible for coordination of overall JICA activities of the Project, especially Output 1, 2 and 4 / representative of the Chief Advisor during his absence)

Project Staffs

- Eman Makhlouf	Assistant Project Coordinator
- Raed Hassounh	Project Driver / Operation Assistant
- Mohammed Barghouthi	Solid Waste Management Expert (from August 2018)
- Lamis Qdemat	Public Awareness Expert (from September 2018)
- Reem Abukmeil	Gaza Program Coordinator (from August 2018)

I-3-3. Inputs

Inputs of equipment and materials from both Palestinian and JICA sides of Project (Stage II) are as follows:

(1) Inputs from Palestine side

Operation costs and salaries related to Palestinian project members are covered by Palestinian side budget. Project offices and furniture are provided in 3rd floor of the MoLG building by Palestinian side. Utilities including

electricity, water, telephone line and internet are also borne by Palestinian side. Total cost for the inputs in the Project (Stage II) from Palestinian side was around 110 thousand USD.

(2) Inputs from JICA side

The Project supported various items for DJSC-MoLG and 5 JSCs to make their office equipped enough to function efficiently and provide necessary services as JSC. During the Project (Stage I), office equipment and digital devices were provided as an office set up. Even though those items have been used in appropriate manner and good condition, at the Project (Stage II) additional items were input to DJSC-MoLG upon their needs and request. Also, safety gears such as protective gloves, masks, shoes and wears, etc. for workers, were provided to the 13 JSCs in West Bank (**Table I-3**).

Operation costs related to JICA experts are covered by JICA sides. Salary for four local staffs (Assistant Project Coordinator, Solid Waste Management Expert, Public Awareness Expert and Project Driver/Operation Assistant) are borne by JICA side. The cost for Project (Stage II) is about 400 thousand USD and total cost is about 4.4 million USD for the Project (Stage I and Stages II).

Table I-3: List of equipment provided by JICA

No	Item	No	Unit Price (ILS)	Total Price (ILS)	Total Price (JPY)	Location	Frequency of Use*1	Condition *2
Japanese Fiscal Year 2018								
1	Office Printer	1	5,570	5,570	170,533	Project Office	A	A
2	Laptop	4	4,750	19,000	581,712	Project Office	A	A
3	First Aid Kits (for wall)	15	175	2,625	80,368	Project Office and 13 JSCs	C	A
4	First Aid Kits (bag)	15	160	2,400	73,479	Project Office and 13 JSCs	C	A
5	Safety gear (Gloves)	500	3	1,500	45,925	13 JSCs	A	A
6	Safety gear (Vests)	500	9	4,500	137,774	13 JSCs	A	A
7	Safety gear (Dust Masks with Filters)	3,000	2	6,000	183,698	13 JSCs	A	A
8	Safety gear (Shoes)	300	100	30,000	918,492	13 JSCs	A	A
Japanese Fiscal Year 2019								
1	Winter wear	195	150	29,250	882,119	13 JSCs	C	A
Total costs of procurement of equipment					**3,074,100**			

Note*1: A-Frequently (almost every day), B-Sometimes (1-3 a week), C-Use concentrated on particular period, D-rarely (1-3 times a year), E-No use due to particular reasons

Note *2: A-Always possible to use with sufficient maintenance, B-Almost no problem in use, C-Possible to use if repaired, D-Difficult to use

I-4. External Conditions

Assumed external conditions for the Project in the beginning stage are described in the "Important Assumptions" and "Preconditions" in PDM (versions 5.1) as follows:

(1) Important Assumptions at Project Purpose level:
1-1) Political, social and economic situation in Palestine is not deteriorated.
1-2) Designated three Sanitary Landfill system is fully established through the open of Ramallah (Ramoun) Sanitary Landfill.
(2) Important Assumption at Outputs level:
2-1) Policy of MoLG supporting JSCs doesn't change.
2-2) No interruption occurs for the operation of designated Sanitary Landfills by Israel.
(3) Preconditions:
3-1) MoLG is politically stabilized and ownership of the project doesn't change.
3-2) Framework of solid waste management (Responsibility of local authorities) doesn't change.
3-3) Security condition in Palestine doesn't change.
3-4) Two JSCs in Jerusalem are officially established.
3-5) Subcontractors are available in Palestine.

The following issues about external conditions of the Project were occurred during the period:

i) The siting issue of planned Ramoun Sanitary Landfill[1] has been suspended due to opposition of local people and Israeli settlers.

ii) Transportation between Ramallah and other West Bank cities including target JSCs area became rather difficult due to road closing or interruption by check posts of Israeli troop in Area C (**Figure I-6**). Some of JSCs' members could not attend meeting held in Ramallah due to the inter-cities transportation problem.

iii) Smooth operation of the Project office in MoLG was sometimes difficult due to disturbances from Israeli caused by conflictions between Palestine and Israeli.

iv) Policy & administration level communication between West Bank and Gaza Strip is still hard due to geographical distance, interruption by Israel, as well as political reason, which causes difficulty to prepare the national strategy in solid waste management for exact nation-wide scale. However, during the Project (Stage II), DJSC-MoLG has continued communication to two Gaza JSCs, especially for the National Campaign on waste reduction all over the Palestine.

v) C&D Waste Management Bylaw is now under the preparation by MoLG.

[1] Construction of the Ramoun Landfill is planned to be supported by German ODA fund, KfW.

Figure I-6: Area A, B, and C in West Bank, Palestine (UNOCHA,2011),

II. Project Activities

The Project was designed four outputs, **Output 1:** MoLG's capacity for instruction, support and coordination to JSCs is enhanced through implementing activities with targeted 5 JSCs in SWM, **Output 2:** MoLG's capacity for preparing standards, regulations and guidelines in solid waste management is enhanced, **Output 3:** MoLG's capacity for preparing national policies and plans in solid waste management is enhanced, and **Output 4:** MoLG's management capacity at organizational level is enhanced. Stage I Project activities related to each output are reported as follows:

II-1. Activities related to Output 1

According to the PDM ver.3.1, Output 1 is defined as "MoLG's capacity for instruction, support and coordination to JSCs is enhanced through implementing activities with targeted 5 JSCs in SWM". The following two activity packages 1-1 and 1-2, have been implemented during the Project (Stage II).

II-1-1. Activity Package 1-1: Capacity Strengthening Support to Target JSCs

(1) 4th SWM Training Program for JSCs staffs

The Project (DJSC and JICA) had held the SWM training program for JSCs staff every year, at Al-Menya (Bethlehem) in 2015 and 2016, and at Ramallah in 2017 during the Project Stage I. Each course covers all the topics related to SWM and organizational/institutional works by JSC. During the Project Stage II, the DJSC held the fourth SWM training program for JSCs staff in cooperation with JICA for four days. The first day was held on 24th February, 2019 in the Grand Park Hotel in Ramallah as a part of the event on 1st National Day on SWM, and on 26th, 27th, and 28th February, 2019 at the Environmental Training Center, which was newly constructed in 2018 in Al-Minya Sanitary Landfill under the financial support by the Project.

This training program targeted all JSCs staffs for SWM working in West Bank, including all Executive Directors and other staffs. The purpose of this program aims at enhancing the institutional capacity and technical capacity of each JSC. Contents and lecturers (or facilitators) are described in the following **Table II-1**.

Table II-1: Contents of fourth SWM Training Program

	February 2019	**Contents**	**Lecturer/Facilitator**
1	24th	Procurement System in MoLG	Lecturer: Mr. Moayad Shehada (MoLG)
2	26th	Occupational Safety	Facilitator: Mr. Ziad Tawafsheh (MoLG)
3	27th	Operation of Transfer Station	Facilitator: Mr. Ziad Tawafsheh (MoLG)
4	28th	Public Awareness Activities by JSCs	Facilitator: Mr. Suleiman Abu Muferreh (MoLG)

At the first day (24th February), Mr. Moayad Shehada (MoLG) delivered a lecture on procurement system in MoLG and then discussed current issues on the subject each other. From the second day (26th February) to the fourth day (28th February), the DJSC newly adopted an active learning method, in which each JSC shared case studies and issues on SWM with other JSCs and then all participants discussed these issues with each other to find the solution, which is facilitated by DJSC staff. Especially in the fourth day (28th February), each JSC shared their public awareness plans for 2019 and finally the DJSC and all JSCs agreed to implement the JSCs' public awareness plan during 2019 in accordance with the National Campaign on waste reduction and cleanness.

Annual training courses are very effective in sharing knowledge and experiences on SWM among JSCs. Especially an active learning method which the DJSC adopted in 2019 is very effective not only for sharing them but also finding the solution for issues on SWM.

(2) 1st National Day on Solid Waste Management

The 1st National Day on Solid Waste Management in Palestine conference "1st NDSWMP" was held on Monday, 25th February 2019 at the Grand Park Hotel in Ramallah. It was the first step towards mitigating and minimizing waste generation, spreading awareness with all current potentials, and shedding lights on the current updated situation of Solid Waste Management dilemma in Palestine.

In addition to the plenary opening and closing sessions, the conference held four parallel-running sessions including different topics regarding Solid Waste Management issue as mentioned in the following **Table II-2**. The conference was diverse, bold, and modern all at the same time, and it was both academic and awareness aiming as well. It pulled out all the concerning aspects and issues which made it a unique and distinct one to be attended by more than 300 attendees with a vast range of disciplines. The mission of the conference was highlighting the alarming increment of solid generation affair in Palestine to lead for new permanent solutions and decision-making process to cope with the crucial challenging causes.

Table II-2: Agenda of 1st National Day on Solid Waste Management in Palestine, 2019

Time	Agenda
11:30-11:40	[Session I]: Plenary Session
	Opening Speech Dr. Hussein Al-Araj, Minister of MoLG
11:40-12:10	Speeches Mr. Takeshi Okubo, Ambassador, Representative of Japan Mr. Toshiya Abe, Chief Representative of JICA Palestine Office Dr. Rami Hamdallah, Prime Minister of Palestine
12:10-12:30	Tea Break
12:30-14:00	[Session II]: Technical Session
	[Session A] Waste Collection, Transportation and Disposal Moderator: Mr. Suleiman Abu Muferreh, Director General of DJSC-MoLG Speaker 1: Mr. Ahmad Sukar, Executive Director of Hebron and Bethlehem Higher JSC/ Al-Minya Landfill Speaker 2: Dr. Abd Al Haleem Khader, Al Najah University Speaker 3: Mr. Mohammad Said, Jenin JSC/ Zahret Al-Finjan Landfill
	[Session B] 3Rs and Awareness Moderator: Mr. Muhammad Jabareen, Deputy Minister of MoLG Speaker 1: Mr. Muhammad Jabareen, Deputy Minister of MoLG Speaker 2: Mr. Iyad Aburdeineh, Executive Director of Bethlehem JSC Speaker 3: Mr Munjid Blaibleh, Information Systems Unit of the MoLG

	[Session C] Investment and PPP Moderator: Mr. Mohieddin Al Arda, Economic Development Unit of MoLG Speaker 1: Mr. Azem Besharah, Palestine Investment Fund/ Massader Speaker 2: Mr. Munif Treish, Chairman of Ramallah and A-Bireh JSC Speaker 3: Mr. Zeiad Fadel, MoNE Speaker 4: Mr. Abed Aljabar Abu-Halawah, Executive Director of Jericho JSC
	[Session D] Hazardous and Medical Waste Management Moderator: Mr. Ibrahim Atiya, Environmental Health Department of MoH Speaker 1: Mr. Mohammoud Othman, MoH Speaker 2: Mr. Murad Al Madani and Mr. Yaser Abu Shanab, EQA Speaker 3: Dr. Issam Alkhateeb, Birzeit University)
	[Session III] Closing Session
14:00-14:30	Reporting from each Moderator of Session II Speaker: Each Moderator
14:30-14:45	Technical Remarks Dr. Mitsuo Yoshida, Chief Advisor of JICA SWM Project Mr. Suleiman Abu Muferreh, Director General of DJSC-MoLG
14:45-15:00	Conference Declaration and Closing Remarks Mr. Muhammad Hassan Jabareen, Deputy Minister of MoLG

(3) Construction and Utilization of SWM Training and Awareness Center in Al-Menya Landfill

The SWM Training and Awareness Center in Al-Menya Landfill was officially inaugurated on 26 March 2018. It was conducted by MoLG, JICA, and Hebron-Bethlehem Higher Council, for continuous organization of JSC Staff training and public awareness raising activities using facilities in Al-Menya Landfill. JICA financially supported to equip furniture and construction material, and Hebron-Bethlehem Higher Council provided the land for building and construction of basement, designing, and frame of the building.

The Center was officially inaugurated on 26 March 2018, and an Opening Seminar Program was held. After that, the Center has been utilized for the following events so far, and the Center is under the management of MoLG in cooperation with Hebron-Bethlehem Higher Council for SWM (**Table II-3** and **Figure II-1**).

Table II-3: List of Utilization of the SWM Training and Awareness Center after inaugurated

Date	Content
26th March 2018	Opening Seminar Program, held by the JICA Project
4th September 2018	13 JSCs meeting, held by MoLG
26th-28th February 2019	4th SWM Training Program for JSCs staff, held by MoLG
11th April 2019	Field visit by the boy's school awareness, held by the JICA project
5th May 2019	Field visit by the girl's school awareness, held by the JICA project

13 JSC meeting on September 2018

SWM Training Program on February 2019

Awareness for students on April 2019

Awareness for students on May 2019

Figure II-1: Photos of events in the SWM Training and Awareness Center

II-1-2. Activity Package 1-2: Instruction, Support and Coordination for Target JSCs

(1) JSC Annual Plan and Financial Plan for 2017-2018

1. Introduction

Proper carefully well-coordinated planned financial plan is a process of meeting and being ready for any expected and unexpected actions, which makes a secure mindset aligned with tracking any change.

In general, the report analyzes the financial plans data for 13 JSCs-West Bank, to figure out many indicators, such as the capability of the JSCs to carry out their tasks to high standards, and also to see if they are able to take up some necessary environmental projects to improve the performance especially in waste reduction.

As a part of developing the JSC's status for a successful management, the following objectives were investigated:

- The current financial status of the JSCs, where are they now, what do they need, and the capability for such improvements or developments.
- Investigating the commitment of the JSCs to their thought-out plans, and how far they are from their plans.
- Reasonability of the deviation scale in plans, and weakness point.
- The main causes that really stand behind either success or failure in any aspect of the financial process.

II. General Comments and Outcomes

1. The LGUs should be committed in paying for the JSCs.
2. The lack of finance resources is the main obstacle that the JSC's are suffering from, and so solid waste management projects or activities are being affected by this parameter as seen in the financial plans for all JSCs.
3. Most of the expenditures were on waste collection, transportation and salaries, while the safe disposal of waste hasn't given attention. And the operation process in the landfills should be properly managed, especially controlling the soil covering, gas ventilation/collecting units, and leachate collecting/treatment units at landfill locations. Moreover, odors around landfills should be controlled, where local people are complaining, but little measures have been taken due to a lack of financial resource.
4. All of the JSC's budgets are very limited and finite to implement development projects to reduce waste or to escalate to higher levels for any other projects; they can barely stay over the scale!
5. There is no clear base to decrease costs in order to guarantee financial sustainability. On the contrary it is noticed that the salary for some JSCs increases as well as the operation costs without a clear evidence in revenues.
6. The potentials for increasing income are very limited and mainly depending on a subsidy from MoLG or others, otherwise most of the JSC's will have deficits.
7. The huge debts of the JSCs made it difficult to carry on services fulfilling good standards or even continuing the situation as it is.
8. It seems that it is very hard for JSCs to carry out any waste reduction projects like source separation, composting, or recycling. Any intention or will for these kinds of projects without external financial support is considered as a non-realistic plan.
9. Quality of achievements, preconditions and recommendations for a successful planning and acting, towards a better civic engagement, comprehensive featured SWM goals achieving, and risks confronting are required.

Report on analysis of JSC annual plan and financial plan for 2017-2018 is shown in Annex 1. The financial balance tables of JSCs in West Bank in 2017 and 2018 are summarized in the following **Tables II-4 and 5**:

Table II-4: Financial balance of JSCs in West Bank in 2017 (unit: NIS).

2017			
JSC	**Total Revenues**	**Total Expenditures**	**Sum (Revenues-Expenditures)**
HJSC of Hebron and Bethlehem (Al-Minya)	20,805,488	18,884,520	+1,920,968
Bethlehem	6,681,444	6,032,913	+648,531
Hebron	13,638,618	13,500,041	+138,577
Jenin	22,373,174	19,723,141	+2,650,033
Jericho	2,571,175	2,334,027	+237,148
N&NW Jerusalem	1,277,579	1,210,627	+66,952
Nablus	4,747,029	4,124,741	+622,288
NE&SE Jerusalem	5,918,400	5,838,500	+79,900

Qalqilya	2,588,608	2,834,526	-245,918
Ramallah	800,610,000	511,223	+800,098,777
Salfeet	2,349,670	2,219,811	+129,859
Tubas	2,189,050	2,139,363	+49,687
Tulkarem	5,439,757	5,537,909	-98,152

Table II-5: Financial balance of JSCs in West Bank in 2018 (unit: NIS).

2018			
JSC	**Total Revenues**	**Total Expenditures**	**Sum (Revenues-Expenditures)**
HJSC of Hebron and Bethlehem (Al-Minya)	22,061,751	16,042,897	+6,018,854
Bethlehem	7,585,969	7,015,530	+570,439
Hebron	12,410,865	11,469,810	+941,055
Jenin	22,963,021	22,921,588	+41,433
Jericho	4,512,819	2,060,046	+2,452,773
N&NW Jerusalem	1,874,769	1,676,394	+198,375
Nablus	4,069,810	4,753,873	-684,063
NE&SE Jerusalem	4,658,400	4,219,000	+439,400
Qalqilya	4,670,780	4,899,305	-228,525
Ramallah	503,724	561,342	-57,618
Salfeet	2,517,433	2,642,370	-124,937
Tubas	2,378,526	2,376,800	-1,726
Tulkarem	5,515,574	5,487,710	+27,864

(2) 13 JSCs Meeting

1. Introduction

Since Joint Service Councils for Solid Waste Management in Palestine (JSC) are considered as the main backbone for a sustainable Solid Waste Management, as it plays a vital role in implementing the strategies and mechanism of SWM among communities, LGUs, and the other society components. A wide platform for the JSCs in West Bank which is called "13 JSCs Meeting" was allocated to take a place every month.

This report summarizes the 13 JSCs Meeting and Agendas as shown in **Table II-6** below. It is a common meeting regularly held every month for the 13 JSCs. The main objectives of the meeting are briefed as follows:

- Recapping on the current ongoing SWM issues.
- Monitoring the multitasking list which the JSCs are responsible for.
- Keeping in touch from the inside situation of SWM issue in all times, to overcome the discontinuity of the Project stages.
- Involvement of all the JSCs (13) in West Bank, not only the (5) previously selected ones.

- Following up with the Pilot Project Activities.
- Discussing the main challenging issues, and preparing for the upcoming different activities

Table II-6: 13 JSCs meetings Agendas

	Date	Agenda (main issues discussed)
1st	10th July 2018	1. Introduction of JICA Project (Stage II) including the Pilot Project on Central composting and Public Awareness
2nd	6th August 2018	1. Progress of 13 JSC regarding: · Central composting possibility · Public awareness plan · Ongoing projects · Plans and reports for (2017,2018) · General financial and administrative status of the councils. 2. The by law should be submitted within two weeks for all JSCs with copies of the notes adjusted and not adjusted.
3rd	4th September 2018	1. Confirmation of the 2nd MM with checking the progress on the agreed points in the previous meeting. 2. Central Composting Experiment. 3. Waste separation in the transfer stations. 4. The preparation of the document comparing the financial situation (incomes and expenses) between 2017 and 2018. 5. Public awareness activities. 6. Next meeting. 7. Site visit to Al-Minya Sanitary Landfill and Hebron transfer station.
4th 5th	3rd October 2018 6th November 2018	1. Pilot Project activities: · Central Composting activities in the JSCs. · Awareness Activities. 2. Emergency situation for waste reduction including: · Separation and for what Selling or storing, giving numbers, and emergency plan without using random dumps. 3. Completing submission required documents: · Financial reports · Internal By-Law · Plans and other reports · Data book · Next training course (Subjects, Participants, and target)
6th	19th December 2018	1. Pilot Project activities: · Central Composting activities in the JSCs. · Awareness Activities. 2. Waste reduction plans (Each JSC) 3. Completing submission required documents: · Plans and reports for 2017, 2018(Ramallah, Jenin, Tulkarem, Jericho) · Work plan and budget of 2019. · Data book · Next training course (Subjects, Participants, and target audience.
7th	4th March 2019	1. Pilot Project activities: · Central Composting activities in the JSCs. · Awareness Activities, National Campaign Invitations. 2. Presentation and Discussion on Waste reduction in JSC (Dr. Mitsuo Yoshida) 3. Completing submission required documents · Annual reports 4. Data book

		5. Others
8th	5th May 2019	1. Pilot Project activities: · Updates on Central Composting activities/ Al-Minya · Awareness Activities, National Campaign, and Achievements 2. Completing submission required documents 3. Data book 4. Distribution of (Safety Shoes, First Aid Kit and Tools) for all the JSCs
9th	25th June 2019	1. Pilot Project activities: · Central Composting activities / Al-Minya. · Confirmation of the JSC's Public Awareness Activities, National Campaign dates (Hebron, Bethlehem, Nablus), and who is next for July activities. 2. Environmental Auditing checklist in transfer stations. • Frequent internal auditing / monitoring in transfer stations. 3. The current status of reopened random dumpsites in some of the governorates. 4. Selection of the controlled dumpsites in (Salfit, Nablus, Ramallah) areas. 5. The preparations and organization of the "World Cleanliness Day 2019" activities, which was suggested by Mr. Iyad Aburdeineh. 6. Upgrades on SWM Data book.
10th	30th July 2019	

2. Main crucial discussion issues:

I. Pilot Project activities:

- **Central Compost**

A budget was allocated for implementing a central compost experiment, and all of the JSCs were asked to submit their proposal. Many proposals were received from the JSCs who had the ability and capability to conduct a central compost project (Jericho, Ramallah and Al-Bireh, North and North West Jerusalem, the Higher Joint Service Council of Hebron and Bethlehem HJSC), the HJSC of Hebron and Bethlehem was the one which was highly selected since they had a previous experience in the field, in addition to the basic requested infrastructure for conducting such pilot project. Unfortunately, the pilot project couldn't be implemented due to many limitations such as the limited available budget, and time.

- **Public Awareness Activities**

a. Schools activities

b. Governmental public awareness campaigns with JSCs

II. The submission of the required documents

In order to follow up and cover most of the issues, as well as preparing analysis or contents, many documents were needed to be submitted by all of the JSCs, which are the Annual plans, Budgets, Financial plans, Public awareness plans, and Environmental Auditing checklists. Forms were developed and sent to all of the JSCs by mails, then they were contacted by mail, phone, and within the meeting to clarify and confirm the provided data.

- Annual Plans for 2019 and Annual Reports for 2018.
- Public Awareness Plans for (2018, 2019).
- Financial Plans for (2018, 2019).

- Applying transfer stations auditing checklists which was prepared by MoLG, in cooperation with EQA.
- Lists for existing and reopened random dumpsites in each governorate.
- Controlled dumpsites in Nablus, Salfit, and Ramallah selected lists.
    - Ramallah: Deir Debwan (East, Area B), Sinijl (North, Area B), Beni Zaid (Northwest, Area B), Qebia (Southwest, Area C), Deir Bzei (Central, Area B)
    - Nablus: Aqraba (Area B)
    - Salfet: Deir Lstia (Area B)

Table II-7: Check list on submission of report and plans by JSCs in West Bank

Name of the JSC for solid waste management	Financial report 2018	Financial plan 2019	Awareness plan	Organization structure	Training of employees	Development plan
Jericho	✓	✓	✓	✓	✓	✓
Hebron	✓	✓	✓	✓	✓	✓
Ramallah &Al-Bireh	✓	✓	✓	✓	✓	✓
Bethlehem	✓	✓	✓	✓	✓	✓
Tubas	✓	✓	✓	✓	✓	✓
Nablus	✓	✓	✓	✓	✓	✓
Jenin	✓	✓	✓	✓	✓	✓
Salfet	✓	✓	✓	✓	✓	✓
N+NW of Jerusalem	✓	✓	✓	✓	✓	✓
NE+SE of Jerusalem	✓	✓	✓	✓	✓	✓
Qalqilya	*	*	*	✓	*	✓
Tulkarem	✓	✓	✓	✓	✓	✓

* Submitted on 19th July 2019

III. SWM Data Book

The Data Book is a reference book where the information regarding SWM is mostly found there. The 15 JSCs were asked to fill a questionnaire which includes details regarding the JSCs.

IV. Environmental Auditing and monitoring in Landfills

All of the JSCs had been informed that the Environmental Auditing guidelines were applied to all sanitary landfills. New auditing checklists for transfer stations auditing were developed, and now they are ready to be applied on the currently operated transfer stations. MoLG will circulate these checklists to all of the JSCs towards helping them in monitoring the operation process of transfer stations.

V. Feedbacks on the conducted public awareness activities, and preparations for the upcoming JSC's public awareness campaigns till the end of 2019.

3. Outputs

- 13 JSCs meeting is the main platform that keeps eyes wide opened regarding the current challenges in the SWM field, so holding this meeting is very important.
- Civic engagement and LGUs cooperation are vital key roles in achieving success of the Project's goals, and this could not be done by JSC alone.
- Recapping, following up, updating, and continuing the JSCs activities.

(3) SWM Databook (2nd version)

In 2017, the 1st version of SWM Data Book was issued and represented all relevant data of JSC that are responsible for SWM in West Bank only, after the Project (Stage II) started in 2018, the project plan included updating the issued SWM Data Book and upgrading the information to cover Gaza strip as well. The new version of 13 JSCs Databook has been developed and published based on the updated data presented in SWM Data Book of 2017 with regard to Municipal Solid Waste, and include new items about medical waste from MoH, and waste recycling in West Bank. This publication is considered as a very important document since it serves as a basis for planning of SWM in respective JSCs and comparing the status of 13 JSCs, in addition to help MoLG or any other stakeholders in measuring indicators of SDGs (SDG No.11 and 12), and provide the national team of developing an environmental information system for the whole west bank and through EQA.

The aim of the SWM Data Book is to provide a clear picture about municipal solid waste that managed by the JSCs in West Bank and Gaza Strip, which can be considered as a guidance for all interested parties. Additionally, available data about medical waste has been presented as well as waste recycling activities in West Bank. The Data Book was issued in both Arabic and English languages. To develop the data book, one methodology was used by the working team and included a questionnaire which was prepared and sent to each targeted JSC to collect all required data, face to face interviews with MoH, as well as site visit to the Palestinian Union of Plastic in Hebron.

After receiving the filled questionnaires, the JSCs were contacted to verify the accuracy of the filled data. All of the JSCs who are responsible for the solid waste collection in the West Bank's governorates (12 JSC) and (2 JSC) in Gaza Strip, and the higher JSC in Hebron and Bethlehem Governorate were contacted to get the required data. The reference year for the collected data is 2019.

The Data Book consists of five chapters as follows:

1. The first chapter provides a background about the current status of SWM in West Bank, waste generation and fraction, existing transfer stations in West Bank and Gaza, and sanitary landfills in West Bank and the responsibility of the JSCs in SWM, and random dumpsite and Medical waste management in Westbank and Gaza.
2. The second chapter describes the methodology used for data collection and for the production of the Data Book.
3. The third chapter presents the data of the 14 JSCs who are responsible for the collection of solid waste in the West Bank and Gaza. The presented data for each JSC includes population and served area, solid Waste quantities, collection system, disposal system, cost of SWM, tariff system and institutional data.

4. The fourth chapter provides comparisons between the 14 JSCs in terms of service coverage, amount of collected waste, vehicles capacity, workers' performance, transferred quantities, disposal system, cost and tariff system and some institutional data.
5. Chapter five includes conclusion and recommendations.

The Data Book enables planners and decision makers to develop their plans and make decisions depending on real facts. Moreover, it facilitates the evaluation processes conducted by the related stakeholders, including the comparisons between the different JSCs, especially the efficiency of service provision considering all dependent factors. The Data Book version 2 in English is show in **Annex 10**, and in Arabic in **Annex 11**.

II-2. Activities related to Output 2

The narrative summary of Output 2 is indicated as “MoLG's capacity for preparing standards, regulations and guidelines in solid waste management is enhanced” in PDM ver. 5. The following four activity packages, 2-1, 2-2, 2-3, and 2-4, were implemented in Project Stage I:

II-2-1. Activity Package 2-1: Environmental Auditing for Landfill

Action Plan of Environmental Auditing and its implementation

During the Project (Stage II), MoLG has developed an action plan of environmental auditing (**Figure II-2**), which includes many activities based on what has been implemented during the Project (Stage I); the activities includes:

1. Revision of the Auditing checklists developed during the Project (Stage I)
2. Expansion of the auditing process to cover transfer stations and controlled dumping sites
3. Developing Environmental Auditing instructions
4. Applying Environmental Auditing on Landfills and transfer stations
5. Developing closing dumpsites checklists.

Activity	Detalis	10-18	11-18	12-18	1-19	2-19	3-19	4-19	5-19
Revision of the Auditing checklists	Acomprehensive revision will be made for the auditing checklists included in the manual, in order to be modified based on the palestinian context								
Expansion of the auditing process	A separate checklist of auditing on Waste transfer Stations (construction and operation) in Palestine will be prepared and annexed to the current auditing manual								
Environmental Auditing instructions	Instructions will be prepared and issued by MoLG and EQA to all Landfill and transfer stations operators								
Applying Environmental Auditing in Landfill	Environmental auditing proces will be conducted for zahret alfinjan, alminyeh, Jericho and the current Controlled Dumpsites								
Applying Environmental Auditing in waste transfer stations	Environmental auditing proces will be conducted forBeit Anan Controlled Dumpsites, Jerusalem and Qalqilyea, nablus , tulkarem, tubas,Waste Transfer stations								
closing dumpsites checklist	the closing dumpsite gidelines prepared by MoH will be reviewed and simplified if needed in cooperation with MoH								

Figure II-2: Action Plan of Environmental Auditing of Landfills and Dumpsites in West Bank (2018-19)

Activity (1) Revision of the Auditing checklists developed during the Project (Stage I)

During the first quarter of 2019, the auditing team composed of MoLG-DJSC, EQA, and local experts reviewed the developed auditing guidelines in order to check its full applicability on the current situation of the existing landfills in Palestine, the revision process completed through conducting site visits to the three existing landfills (Zahrat Al Finjan, Al Menya, and Jericho), and they recommend to keep the auditing checklists items as it is without deleting any item even if the related facility is not available in any of the visited sites at the moment.

Activity (2) Expansion of the Auditing Process to cover Controlled Dumping Sites and Transfer Stations

According to the action plan, MoLG proposed to cover the controlled dumping sites in auditing process, but since the issue of controlled dumpsites still under discussion and negotiation with SWM National Team, recently MoLG has listed specific criteria of constructing these sites, Environmental Quality Authority (EQA) still wanted to make further discussion on this issue. So, the auditing team decided not to make any auditing during this project stage.

Regarding transfer stations in Palestine which are considered as very important facilities in solid waste management system from many aspects. Keeping such facilities working properly is considered a significant key in succeeding the SWM system at any Governorate, consequently MoLG in cooperation with JICA decided to develop an auditing checklist toward monitoring of these station to assess its functionality, based on the environmental auditing checklists of Landfills. Developed lists are the comprehensive list (**Annex 2a**) and short list (**Annex 2b**).

Activity (3): Developing Environmental Auditing instructions

Since the developed auditing lists are very detailed and comprehensive lists, and the guidelines confirm the frequency of auditing process, accordingly EQA proposed to summarize these long checklists into short instruction lists that include the most important checking items which need more frequent monitoring.

Activity (4): Applying Environmental Auditing on Landfills and Transfer Stations

The project conducted site survey to the three sanitary landfills in West Bank (Zahrat Al Finjan, Al Menya, and Jericho; **Annex 3**). According to the auditing team reports on the current status of the targeted landfills, following issues can be highlighted as the most critical issues which need immediate actions from the government:

1. Capacity of the landfills are limited and unable to receive more waste quantities in the near future if no extension works take place.
2. The received huge waste quantities make the landfills operators unable to offer the requested soil quantities for daily cover and consequently odor and insects' problems significantly appeared.
3. Leachate management facilities are not operated efficiently due to operators limited resources.
4. Waste littering is not managed well in all landfills.
5. Chemical analysis is not performed frequently.

The Auditing team recommends the following action toward solving the problems in the sites:

1. More efforts should be given to the sanitary landfills at different levels, as all of them are suffering from limited remaining space due to the increasing amount of received waste, huge produced leachate quantities, which inhibit the operators ability to maintain the requested soil for daily covering as well as limited capacity of the available leachate collection ponds, and consequently many other problems appear like waste dispersion, odor and insects.
2. The auditing has been conducted based on the site visits, face to face interviews with operators and the available results of chemical analysis provided by the operators. More chemical check and analysis should be conducted by the auditing team but this require some apparatus to be available in the Ministry of Local Government or EQA. Or it should be consider to collaborate with research laboratory in universities for such analytical works.
3. Available waste management facilities in the landfills must be utilized as sorting lines in both landfills; Zahrat Al Finjan and Al Menya, as well as the pilot project of waste to energy in Jericho controlled landfill.
4. Dumping waste in landfill should not be considered as the final solution, we should search for other efficient and feasible alternatives.

Regarding Environmental Auditing on transfer stations, the auditing team developed an auditing checklist specified for transfer stations based on environmental auditing guidelines and transfer stations operational manual developed through the Project (Stage I).

Following checklist were kept and modified to be more consistent with transfer station design and purpose:

1. Basic Infrastructure and Fundamental facility required for MSW transfer station
2. Management of waste acceptance and transfer
3. Management of working environment
4. Littering and Vector
5. Management of Surface Water and odor

Qalqilya and Ramallah transfer stations were visited by the auditing team, and auditing checklists were applied, the situation in both station was satisfactory in general, with some exceptional comments raised by the auditing team as shown in the **Annexes 4a, 4b, 4c, 4d** (environmental auditing reports of transfer stations). The main recommendations of the auditing team can be summarized in following points:

1. Environmental Impact Assessment study should be conducted to any transfer station before being constructed.
2. Operational manual should be developed to all transfer station in order to maintain its work properly
3. All transfer stations should include a closed system of waste collection and transfer in order to avoid any odor, waste dispersion, and insects' problems.
4. All transfer station should include leachate collection pond to collect leachate and to transfer it properly to the closet treatment plant. Installment of waste quantity weighing system is very important.

Activity (5): Developing Closing Dumpsites Checklists.

Regarding this activity, nothing was done due to time constrain, and the auditing team was satisfied at this stage to refer to the closing dumpsites guidelines which was developed by Ministry of Health (MoH), So we recommend here to put more efforts and time for such issue in future.

Gas Collection System at Al Menya Landfill

Excavation works for construction of new leachate collection pond at Zahrat Alfinjan

Construction of Pilot Anaerobic Digestion System at Jericho Landfill

Ramallah Waste Transfer Station

Qalqilyea Waste Transfer Station

Figure II-3: Environmental Auditing of Landfills and Transfer Stations.

II-2-2. Activity Package 2-2: Pilot Project on waste source reduction

In Palestine, the increasing waste is critical issue and reducing the amount of waste that is transferred to the landfill is necessary. As mentioned on the National Strategy for Solid Waste Management in Palestine (2017-2022), the public awareness is essential to maximize the citizen's ownership of the SWM process, and it is important to enhance the environmental issues in public and school. MoLG decided a national goal of 2019 to promote waste reduction and cleanliness as a National Campaign "Year of Waste Reduction and Cleanliness", and MoLG and JICA planned and implemented the National campaign events and a pilot project on school awareness on solid waste issues, especially waste separation and 3Rs (Reduce, Reuse and Recycle). These activities also aim to implement the intervention of the policy No.16 and 17 of the National Strategy on public awareness.

(1) Governmental Public Awareness

On 16th, April, 2019, The Ministry of Local Government and JICA, in cooperation with the Environmental Police, Traffic Police, Al-Bireh Municipality, launched the national campaign "2019, the year of cleanliness and waste reduction", to maintain cleanliness and raise community awareness regarding solid waste issue at Al-Bireh Cultural Center. The partners for the event were the National Team on Solid Waste Management, Ramallah and Al-Bireh JSC, 'Inash Alusra' Students Association, and Al-Bireh Municipality.

(2) JSC-based Public Awareness

Among the activities of the pilot project for public awareness of solid waste, where the high level of public awareness is the key to success in reducing the amount of the generated waste. These activities come within the framework of the National Awareness Campaign which was previously mentioned by MoLG. Regarding this, the JSCs planned to be a part of the National Awareness Campaign by addressing an activity to be conducted within the cooperation between the JSCs, MoLG and JICA till the end of 2019. **Table II-8** below describes each JSC contribution in the National Awareness Campaign.

Table II-8: List of JSC-based Public Awareness during 2019

Name of JSC	Content of Activity	Month
Already Implemented		
South Gaza (KRM)	Street and community Public Awareness Campaign at the main crossing points and shops and school awareness	27th, 28th and 29th April
N+NW Jerusalem	Workshop on occupational safety issues for JSC workers	22nd May
NE+SE Jerusalem	Clean-up activity in the towns of Hizma and Jaba in Jerusalem	1st June
Nablus (1)	Workshop on waste separation methods for the student at the summer camp in Nablus municipality	27th June
Bethlehem	Street and community Public Awareness Campaign at the main crossing points and bus stations	1st July
Nablus (2)	Street and community Public Awareness Campaign at the main crossing points	16th July
Tulkarem (1)	Street and community Public Awareness Campaign at the main crossing points	17th July
Plan		

Hebron	Raising awareness of institutions in the field of hygiene	July
Tubas	Awareness leaflet on the proper use of containers	July
Higher	3Rs and reduction of household waste (cardboard)	August
Jenin	Program for targeting LGUs and awareness workshops about 3Rs	August
Tulkarem (2)	Awareness for JSC staff and health departments staff	August
Qalqiliya	Educating students about reducing waste production	September
Jericho	Awareness on agricultural waste	October
Salfit	Raising public awareness among General Authorities about SWM and Tariff	November
North Gaza	Implementing environmental and health training	December

(3) Pilot Project on School Awareness

The project conducted a pilot project in public awareness at school during the period between Feb and May,2019. Before the pilot project had been put into implementation, the current situation of environmental education on solid waste issue in Palestinian schools has been assessed, considering the coverage percentage of SWM issues in education curriculum, and the presence of environmental clubs at schools. This assessment found that the issues of solid waste was not deeply covered in the curriculum, and not all schools have a specific relevant activities such as environmental clubs, and health & environmental coordinators. Accordingly, the Project decided to concentrate its activities toward raising the awareness level on solid waste issues among students, through source separation and waste reduction and introduction of the concept of 3Rs (Reduce, Reuse and Recycle) .

Two schools were targeted in this Project, they are located in Ramallah governorate, one for girls and the other for boys. In order to investigate the relation between students age, gender, knowledge about SWM among students. The second and eighth grades were selected in both schools, and assessment questionnaire were distributed between students in order to measure their knowledge level about SWM before implementing the pilot project. The results of assessment questionnaire will be compared later with the results of the same questionnaire after the project being implemented.

Wide variety and combinations of awareness activities were conducted:

- Presentations about Solid Waste and concepts on solid waste management, landfill, and clean worker. All presentations were supported by video show to give the student idea about how waste is managed practically.
- Interactive lectures about 3Rs concept.
- Practical training for the students about waste separation such as “Separation Card Game” [1]
- Practical workshop for the students in which they learned how to reuse waste.
- Making a mathematic educational tool from plastic bottles caps.
- Field training on how to produce compost from organic waste at school’s gardens.
- Field visit to Al Menya sanitary landfill where students learned about SWM facilities, waste sorting, waste composting, and landfilling process

After implementing the awareness activities, a questionnaire (End-line survey) were distributed to students in order to measure the change in their knowledge level about the SWM issues, and then a final event was conducted in each school to appreciate their efficient participation in such project.

The Final Report on Awareness Raising Pilot Project is shown in **Annex 5**.

II-2-3. Activity Package 2-3: Standard for Construction and Demolition (C&D) Waste Management

During the Project (Stage II), MoLG has developed an Action Plan of C&D Waste Management (**Table II-9**), which includes the dissemination of the C&D waste management guidance manual and the promotion of approval of C&D Waste Management Bylaw.

Table II-9: Action plan for enacting the C&D Waste Management Bylaw

S/N	Item	start date	end date
1	Review and follow up with legal department		30/9/2018
2	Approval from the Minister	1/10/2018	7/10/2018
3	printing C&D waste material bylaw	8/10/2018	21/10/2018
4	Workshop for the Contractor Union and Private Sector to inform them about the bylaw		7/11/2018
5	Preparing an official letter from the Minister to JSCs and Municipalities to determine their readiness to apply the C&D waste bylaw	8/11/2018	18/11/2018
6	Distribution of the C&D waste bylaw to all stockholders	8/11/2018	14/11/2018
7	Circulation to the stockholders to control and apply the C&D bylaw	15/11/2018	
Actions required from the Palestinian Government are as follows: 1- Establishing infrastructure to implement the bylaw - providing land, infrastructure: streets, water, electricity, communications 2- Encouraging investment in the Construction and Demolition waste materials sector 3- Conduct awareness campaigns to implement the C&D waste bylaw 4- Also conduct awareness campaigns for citizens to reuse the recycled material of C&D waste 5- Encourage and incentives for reuse C&D waste material, also using the recycled material. 6- It is expected to get the approval of the bylaw from the Minister of MOLG during August 2019. the delay in getting the approval since APLA was late in sending their comments and feedback.			

The draft Construction and Demolition (C&D) Waste Management Bylaw was developed and in this stage two main members (the Contractor Union and the Association of Palestinian Local Authorities (APLA)[2]) were engaged, because they will be our partners in the application process of the bylaw. Two main meetings were held during the last period from December 2018 to May 2019. The APLA formed a committee consist of small and large Local Governmental Authorities to discuss the Bylaw materials, and in order to develop a fair bylaw, taking into

[2] LGUs form the backbone of public administration in Palestine and play an essential role for public service and governance. The core institutional structure supporting the LGUs at the central level includes MoLG and its Directorates of governorates (11 in West Bank and 5 in Gaza), the Association of Palestinian Local Authorities (APLA), and Municipal Development and Lending Fund (MDLF). (APLA (2019) "Strategic Plan 2019-2022")

consideration the many factors like the authorization of LGUs, type of works, the site, the fines, the boundaries of the master plans, etc.

II-2-4. Activity Package 2-4: Institutional framework on Solid Waste Management

(1) C&D waste management Bylaw

As mentioned at II-2-3, the draft Construction and Demolition (C&D) waste management Bylaw was not approved yet, it is expected to be approved by MoLG after reflecting the comments from APLA, in August 2019.

(2) Solid Waste Management Bylaw

The JSC Bylaw (2006) was revised after a long discussion since 2010, and Revised JSC Bylaw was enacted in January 2016 after a discussion in the JSC staff training course of the Project (Stage I), which defined its legal status and function more clearly. The practical execution of the revised JSC Bylaw (2016) was closely depends on the procedures developed by the Project regarding the supports and coordination with JSCs; e.g. Basic, Annual, Financial, and Development Plans.

As for the SWM Bylaw, the first draft was sent to the Cabinet during the first quarter of 2018, after being reviewed by the National Team in cooperation with the Technical Committee since November 2017 under the support of the Project, and then three revisions were conducted by the Cabinet. All comments received from all stakeholders through the Cabinet were reviewed and elaborated to the original manuscript prepared by MoLG. The formal approval was received in March 2019 and the approved version was published at Alwaqae'e Journal and MoLG's website.

SWM bylaw was prepared in Arabic language but the project translated it to English toward facilitate and help donors to refer to it in their interventions in the sector in Palestine (**Annexes 8 and 9**).

II-3. Activities Related to Output 3

Output 3 is defined as "MoLG's capacity for preparing national policies and plans in solid waste management is enhanced" by PDM. The activities in Project (Stage II) are as follows:

II-3-1. Activity Package 3-1: National Team for SWM

After finalizing the National Strategy on SWM (2017-2022) during 2018, and being approved and published, the Technical Committee decided to draw an action plan of all activities listed in the strategy, where each of this team members was asked to formulate its action plan to be consistent with their own national plan and strategies, the first national team meeting during the Project (Stage II) which numbered (12) from the beginning of the Project (Stage I) had been held in September 2018, the technical team during this meeting discussed many issues related to ; the SWM emergency plan prepared by MoLG until end of 2018, to agree on monitoring plan to follow up the SWM strategy activities, to update the situation of ongoing project (transfer stations, Beit Anan Controlled dumpsite, expansion works in Zahrat Al Finjan landfill), discussion of technical Assistance Project (Stage II) activities, update the situation of C&D bylaw.

II-3-2. Activity Package 3-2: National Strategy for SWM

(1) Detailed Action Plan of the National Strategy for MoLG and its implementation

During the Project (Stage I), the National Team for SWM formulated National Strategy (2017-2022) after the Technical Committee of the National Team for SWM reviewed previous National Strategy (2010-2014) drafted revised National Strategy.

The National Strategy (2017-2022) is approved by the Cabinet in August 2017, and the Launching Public Seminar of the national Strategy was organized in December 2017. The National Strategy is composed of 8 strategic objectives and 19 strategic policies. It also consists of 95 interventions (**Figure II-4**). On the basis of the interventions, formulation of detailed action plan by relevant authority is required (**Figure II-5**). These policy interventions will be implemented by ten organizations as shown in **Table II-10**, where MoLG is responsible for total 61 interventions.

During the Project (Stage II), MoLG prepared their own detailed action plan of their interventions listed in the National Strategy and started implementing this action plan based on the priorities. Also, EQA, MoH and MoNE prepared their own detailed action plan. On the other hand, MoA did not prepare any plan since they don't have any direct intervention highlighted in the National Strategy. MoLG had shared the progress and achievements of their detailed action plan with the National Team members at the National Team meeting on 12th September 2018 and 21st July 2019 during which the team discussed many issues related to SWM sector such as construction of controlled landfill, MoLG plan for conducting a National SWM awareness campaign in the entire West Bank, and so on.

Due to a delay of preparation of the Detailed Action Plans, monitoring of achievement level by the National Team was delayed, and planned Monitoring Report(s) have not yet prepared except oral reporting in the National Team meeting on 21st July 2019.

Figure II-4: Outline of the National Strategy of Solid Waste Management (2017-2022). Source: Presentation of the National Strategy Seminar in the Project (Stage I)

Figure II-5: Structure of the National Strategy. Source: Presentation of the National Strategy Seminar in the Project (Stage I)

Table II-10: Responsible organization for implementing the interventions of National Strategy. Source: Presentation of the National Strategy Seminar in the Project (Stage I)

Policy No.	National Team	MoLG	EQA	MoE (MoEHE)	MoH	MoNE	MoA	Energy Authority	Each Institute	Cabinet	Service Providers
1	1	5	3						1		
2	2									2	
3	1	11	2	1							
4		3									
5	1	5	1	3							
6	1	7	3			2					
7	1	1			1						
8		2	2					2			
9		3									
10		4									1
11	1	6	4								
12		2	1		2						
13	1	2									
14		2				1					
15	1	2	2	1					1		
16				6							
17		1		4							
18		2									
19		3	2		1				2		
	10	61	20	15	4	3	0	2	4	2	1

(2) Pilot Project on "Program for Establishing a System of Medical Waste Management in the Gaza Strip"

(I) Background

The situation of medical waste in Gaza is facing alarming technical, environmental, social and financial challenges that have led to the lack of proper onsite and offsite management; threatening further deterioration to the environment and wellbeing. Therefore, in the absence of programs that promote the appropriate manners of medical waste handling, proper cleanup and disposal; the related health and environment risks released by health care institutions will greatly expand as the health care services in Gaza expands.

Due to this crucial situation of the medical waste sector in Gaza, JICA commissioned a detailed assessment study of this sector in 2016. The study revealed that most of governmental and NGOs hospitals and clinics conduct separation process only for sharps and dispose all the other infectious medical wastes with normal waste in municipal containers and then dispose them to municipal landfill. While, study showed that UNRWA clinics and only other two (2) hospitals have three-bin system separation; where sharps are stored in safety boxes, infectious waste in yellow

bags and normal waste in black bags. After separation of wastes, study revealed that most of the medical centers do not have adequate storage for medical wastes. It was mentioned that the majority of centers store safety boxes inside the center or in open area in the backyards. However, study mentioned that UNRWA and few centers store under the stairs or at closed containers. The medical waste from the majority of medical centers is disposed to street municipal containers. While municipalities and JSCs are in charge of collection and transportation of domestic waste. In addition, due to existing situation (no separation process of infectious waste), they collect the infectious waste with domestic municipal wastes to final disposal sites.

MoH has only one (1) specific vehicle that collects safety boxes from its hospitals to incinerators, while the other medical centers including MoH clinics use their normal cars to transport safety boxes to incinerators. The study also investigated the existing incinerators in Gaza. It was revealed that there are two old incinerators with a capacity of less than 250 kg/day respectively under the operation of MoH. They are utilized mainly to incinerate safety boxes from all medical centers in Gaza. The study also investigated the existing Autoclave under the operation of MoH with a capacity of 50 kg/30 minutes that has not been operated properly due to technical and logistical constrains.

Dumping site in North Gaza. Medical waste is together dumped here without any treatment

Old incinerator for medical waste treatment, Shifa Hospital, Gaza

Autoclave for infectious waste treatment

Figure II-6: Pictures of the technical cooperation program on medical waste management in Gaza Strip.

The assessment study came to conclude that Gaza is served by 182 medical centers producing around 7,161 kg/day of medical wastes (by outpatients and inpatients); 1,068 kg/day of which is infectious excluding pathological waste from this amount. While the study revealed that, it is not clear in Gaza which entity is responsible for collection, treatment, transport and disposal of infectious medical waste. Despite the fact that in the year of 2012, the Palestinian Ministries cabinet issued the Palestinian law of medical waste management identifying the responsibilities of medical centers in intra-hospital management and off-site (outside hospital) management of medical waste.

Thus, the study came to recommend that a specific entity or entities in Gaza would have to be established to be responsible for the off-site collection, transportation, treatment and final disposal. Study suggested that the mandate of Joint Service Council (JSC) could be extended to undertake such responsibility of the suggested entity. The capacity of staff of responsible entity should be enhanced for being able to manage respective components

required for an appropriate medical waste management. For that reason, the study came with the following recommended urgent actions:

(i) Intra management in all medical institutions have to segregate based on the three-bin system (Safety boxes for sharps, yellow bags for all infectious waste and black bags for normal waste) similar to UNRWA and NGO clinics use such system.

(ii) Existing JSC might possibly be licensed and then contracted to handle the outside management. They will be responsible for secondary collection, transportation, treatment and disposal of medical waste[3].

(II) Project Context and Activities

JICA together with Local Authorities, launched a "Program for establishing a system of Health Care Waste Management in southern Gaza" in 2017 to functionalize the system of medical waste management in Southern Gaza. The strategy of the program is to:

(i) Separate the medical wastes into three categories: infectious, sharps and non-infectious;

(ii) Transfer the infectious wastes and sharps from intra hospital for the treatment facility using Autoclave; and

(iii) Final safe disposal in sanitary landfills.

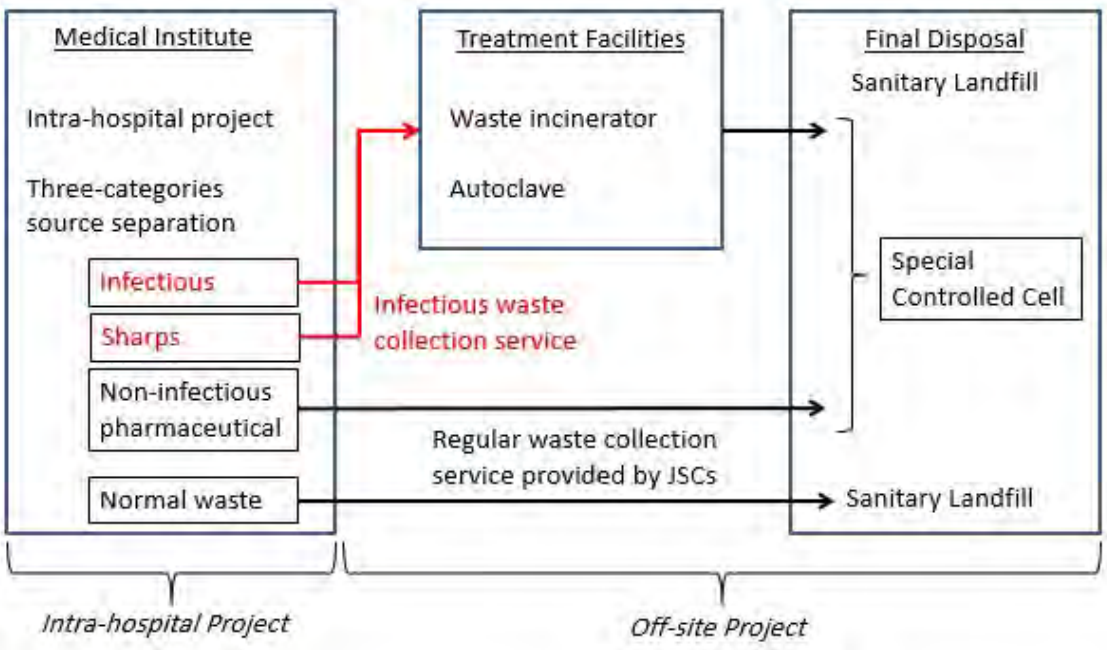

Figure II-7: JICA proposal to establishing a management system including source separation, separated collection & transportation, and proper treatment

The response was being coordinated by JICA, to support the Joint Service Council for Solid Waste Management in Khan Younis, Rafah and Middle Area (JSC KRM) to be the responsible entity for the off-site

[3] Two Joint Service Councils are in Gaza Strip with a view of providing efficient waste management services for the member municipalities. South Joint Service Council serves the municipalities of Khan Younis, Rafah and Middle Area (17 in total) comprising approximately 64% of Gaza Strip's total geographic area inhabited by 46% of the total Gaza Strip's population, according the 2016 Palestinian Central Bureau of Statistics (PCBS) projections. While, North Joint Service Council is newly established to serve the municipalities of North Gaza and Gaza Governorate (8 in total).

collection, transportation, treatment and final disposal. The proposal was being supported by MoH, the Ministry of Local Government (MoLG), the Environment Quality Authority (EQA), and the UNRWA. For that purpose, JICA supported the main following activities:

(i) Development of medical waste management manual and materials;

(ii) Procurement of consumables necessary to enhance the three categories separation;

(iii) Construction of Autoclave facility in JSC south;

(iv) Relocate the Autoclave from MoH to the JSC south,

(v) Rehabilitate of Al Shifa Hospital incinerator; and

(vi) Training on intra-hospital and offsite management.

The main objective of the proposed program is to provide a response to the urgent and immediate needs to reduce environmental and health risks of improper treatment of medical wastes in Gaza. This goal will be achieved through develop a mechanisms of intra-hospital management and off-site management of medical waste to functionalize the mechanism.

Figure II-7: Medical waste management manual and printing materials in Gaza

Figure II-8: Construction of Autoclave Housing in Gaza

Figure II-9: Relocation of Autoclave Machine from MoH to Treatment Facility in Gaza

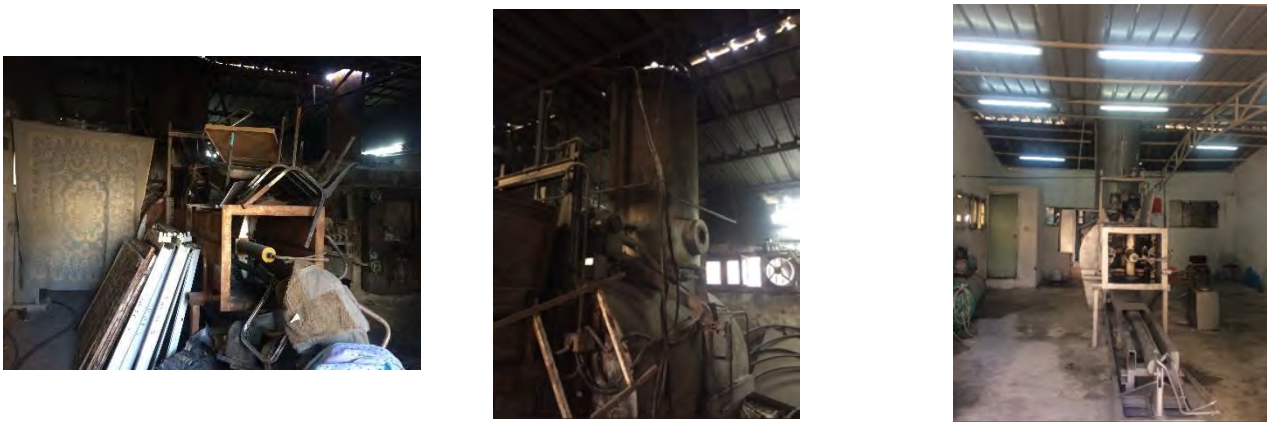

Figure II-10: Rehabilitation of Al Shifa Hospital Incinerator in Gaza (Before and After)

Figure II-11: Training on Medical Waste Management in Gaza

(III) Project Outputs

Three Service Contracts signed between JSC and UNRWA on 29 July 2018, the JSC and MoH in Gaza on 14 January 2019, JSC and MSF-France on 26 May 2019. The service launched targeting 13 UNRWA primary health care clinics, 27 Governmental clinics in Middle and South Gaza in addition to two departments of Al Shifa hospital (lab and hemodialysis) and 5 health centers of MSF in Gaza.

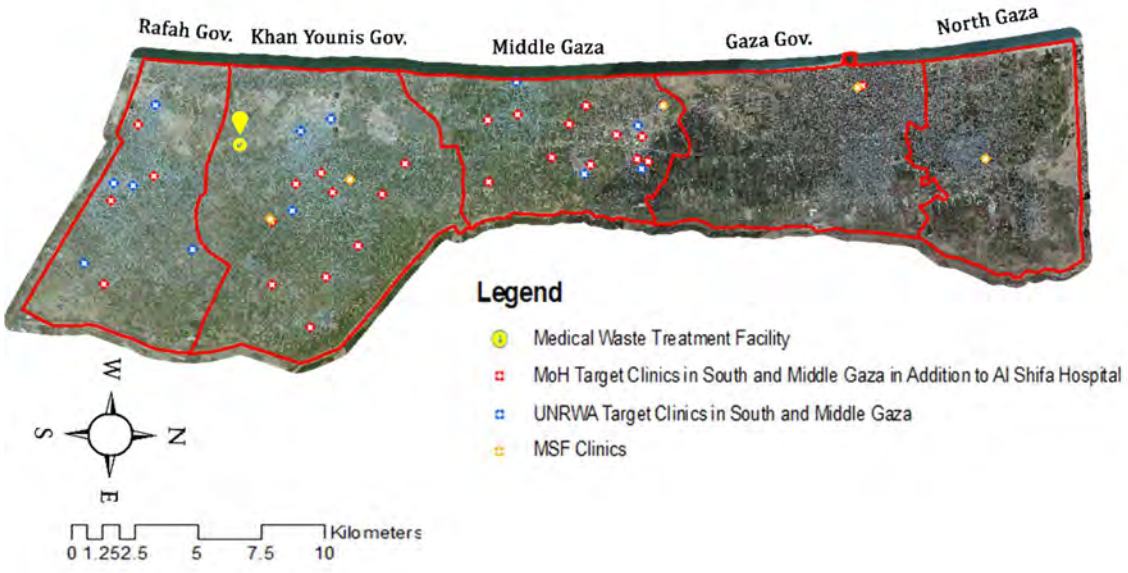

Figure II-12: Target Health Centers in Gaza

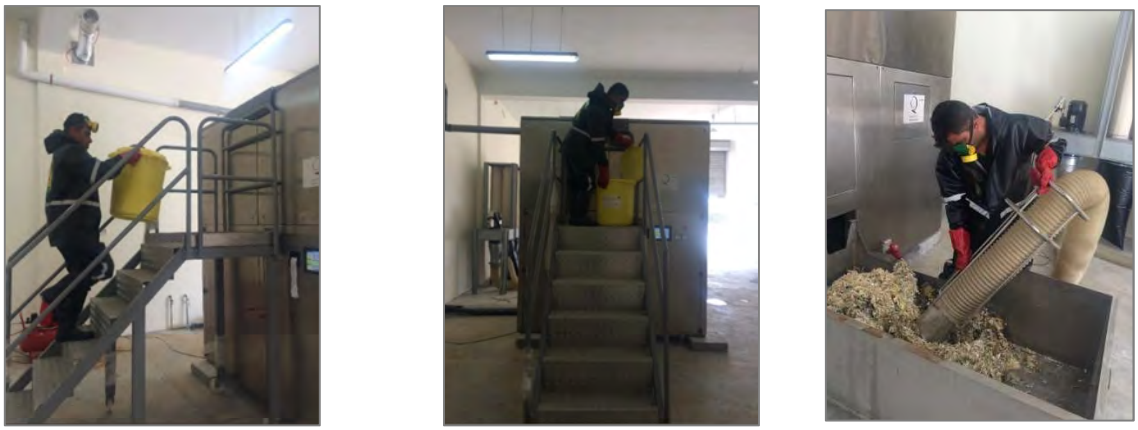

Figure II-13: Treatment Process using Autoclave in Gaza

The average production of infectious and sharps from target places is 900kg/month, 580kg/month, and 1,326 kg/month from UNRWA, MoH and MSF clinics respectively. Whereas the average generation from the lab and hemodialysis departments of Al Shifa hospital is 4,220 kg/month.

Figure II-14: Infectious waste collection process in Gaza

The infectious wastes and sharps then collected and transported to the treatment facility using Autoclave (**Figures II-13 and 14**). The treated wastes were then safely disposed in landfill of Deir Al Balah, middle Gaza. The system of intra hospital and offsite management was successfully established in South Gaza. However, the major challenge of the project is the tariff for a financially sustainable operation and management in which MoH and UNRWA can pay for. The high tariff resulted from the high O&M costs related to machine's shredder part. Therefore, as an emergency measure to sustain the established system (intra and offsite management), an exclusive and safe dumping without treatment introduced until upgrading the Autoclave. For that emergency, target wastes collected and transported to landfill in Deir Al Balah into a specified cell taking into account the utmost safety measures. This procedure is to be followed until upgrading the existing Autoclave machine, which is scheduled to be restarted by July 2019.

(IV) Recommendations

There are new trainees, and graduates who are practicing medical services and have very limited experience in the segregation of wastes. In this regard, it is recommended to train the staff periodically with the help of the clinic departments. It is also recommended to keep the monitoring and evaluation visits. As well as, both UNRWA, MoH and JSC shall provide instruction to their staff in terms of safety training to cleaners to prevent accident and injury.

As well as, it is recommended that JSC shall continuously share information in its original way such as by monthly reports to inform the activities of JSC medical waste management to counterparties or by posting on SNS pages. JSC shall keep the record of the manifest form for the audits by formal authorities. Report items should at least include basic information of transporting quantities, name of producers, treatment procedure, and final disposal site.

The Final Report of the medical waste management program in Gaza Strip was attached as **Annex 6**.

II-3-3. Activity Package 3-3: Public Private Partnership in SWM

During the Project (Stage I), the Project carried out the questionnaire survey on Public-Private-Partnership (PPP) in SWM for 12 JSCs and undertook the detailed study on PPP in SWM. And, based on the study, the Project organized the workshop on PPP in SWM to share the result of the study. Furthermore, MoLG organized the National Team for Local Economic Development (LED), where economic instruments for promoting PPP are investigating.

During the Project (Stage II), the Project has monitored the activities on PPP in SWM in Palestine, for example the Waste-to-Energy (landfill gas recovery) Project in Zahrat Al Fenjan Landfill, which is partnership with Palestinian private company (Massader). On the other hand, the annual Local Economic Development (LED) Forum has been postponed since the Minister of Local Government was changed on March 2019.

It is recommended to continue the monitoring of PPP initiatives, and MoLG and relevant ministries should consider a reform of legal system on public-private partnership in particular private investment to public service sector.

II-4. Activities related to Output 4

Output 4 is defined as “MoLG's management capacity at organizational level is enhanced.” by PDM. The activities in Project (Stage II) is as follows:

II-4-1. Activity Package 4-1: Project Management

(1) Core-Group Meeting

The Project has weekly held the Core Group meeting to confirm the progress of overall activities and to discuss the issues and countermeasures, in which the project members of DJSC-MoLG, JICA experts, and other Project staffs participated. During the Project (Stage II), the Project has organized the Core Group meetings 35 times (from 124th to 158th, as of 31 July 2019). All the Minutes of Meeting are shared with the project members through e-mail.

The Core-group are held on a weekly basis in principle, which ensures achieving short-term goals to attain the Project goals. The Project conducted totally 123 Core-group meetings during the Project (Stage I) and totally 35 Core-group meetings during the Project (Stage II). In order to conduct effective meetings, an agenda of meeting should be prepared well, meeting time should be controlled by a moderator (one hour would be ideal) and the Project members should be cooperative for gathering on scheduled time. Moreover, without doubt, minutes of meeting should be prepared and shared as we did during the Project (Stage I) and Project (Stage II).

(2) Joint Coordination Committee meetings

The Project established Joint Coordination Committee (JCC) which is chaired by the Project Director/ Deputy Minister of Local Government and consists of DJSC staff, national staff employed by the Project, Japanese experts and JICA Palestine Office in accordance with the R/D.

JCC has been functioning as an official coordination meeting between Palestinian side and Japanese side and also an important platform where project members share and recognize current situation of the Project, progress made from the last JCC meeting, actions to be taken in coming months and so on. In the JCC meeting, the Project Manager and MoLG staff report project progress, and then discussion is held including exchanging frank opinions and comment among participants. At the end of each meeting, a Minutes of Meeting is signed by Project Director and Chief Representative of JICA Palestine Office.

During the Stage II, the Project has held the JCC meetings 3 times (**Table II-10**).

Table II-10: Joint Coordination Committee meeting

JCC meeting	Date
7th JCC meeting (Plan of Stage II)	17th July 2018
8th JCC meeting (Project Monitoring)	5th March 2019
9th JCC meeting (Completion of Stage II)	25th July 2019

II-4-2. Activity Package 4-2: Organizational Capacity

(1) Newsletter

The Project had published 11 issues of newsletter "JSC Today" during the Project (Stage I) and 2 issues during the Project (Stage II). The main purpose of issuing newsletters is to share progress and outcomes of project activities with various concerned parties. The publications were distributed to not only 13 JSCs but also related ministries, MoLG branch offices, donors, website, and so on.

Table II-11: List of Newsletter

Newsletter	Published Month/Year and Main Topics
12th Newsletter	February 2019 (Introduction of Project (Stage II))
13th Newsletter	July 2019 (Result of Project (Stage II))

(2) Thematic Working Group Meeting on Solid Waste Management Sector

The Aid Coordination Meeting (ACM) in SWM sector is organized in January 2018, which will be periodically organized for donors' coordination. The meeting was chaired by deputy Minister of MoLG, and JICA Chief Representative co-chaired. The 1st Aid Coordination Meeting was held on 30th January 2018 chaired by Mr. Mohammad Hasan Jabareen, Deputy Minister and co-chaired by Ms. Yuko Mitsui, Chief Representative of JICA Palestine Office, and relevant ministries and many donors attended. Since 2nd Aid Coordination Meeting, the meeting has been organized as a Thematic Working Group (TWG) meeting on Solid Waste Management sector, regularly.

From 1st TWG meeting (2nd Aid Coordination Meeting) to 3rd TWG meeting, donors had shared current and planned activities in Palestine and MoLG and JICA had prepared the donor map on solid waste management in Palestine based on the information from donors, accordingly. The donor map is based on main interventions of the National Strategy.

Since 4th TWG meeting, MoLG and JICA have set a main discussion theme of each meeting and invited relevant stakeholders to the meeting to promote fruitful discussion. At the 4th and 5th TWG meeting respectively, the main discussion theme was set "PPP and Promotion of Investment" and "Promotion of Recycling" (**Table II-12**).

In order to conduct fruitful meetings and make donors and concerned people actively involved in meetings, MoLG and JICA Palestine Office, as a chair and co-chair, need to keep close communication with donors and make their effort to lead discussion in the Solid Waste Management sector and coordinate donors and concerned partners to well response to the National Strategy.

Table II-12: List of Aid Coordination Meeting and Thematic Working Group meetings

		Date	Contents of meeting
1	1st Aid Coordination Meeting	31st January 2018	・ Introduction of the National Strategy for SWM ・ Sharing the Challenge on SWM in Palestine
2	1st TWG Meeting	7th May 2018	・ Sharing current and planned activities in Palestine by donors ・ Preparing donor mapping by MoLG and JICA
3	2nd TWG Meeting	12th July 2018	
4	3rd TWG Meeting	8th November 2018	
5	4th TWG Meeting	4th March 2019	・ Discussion on PPP and Promotion of Investment
6	5th TWG Meeting	22nd July 2019	・ Discussion on Promotion of Recycling

III. Project Purpose and Overall Goal

The Project Purpose was defined as "Sustainable solid waste management system is established by JSCs equally over the West Bank area Palestine under the well-prepared policy, plan, institution, support and coordination made by MoLG" and the Overall Goal was defined as "Sound environmental and social solid waste management service is delivered over Palestine in sustainable manner." The level of achievement is assessed based on OVIs (objectively verifiable indicators) defined by PDM ver.5.1.

III-1. Achievement of Project Purpose

(1) Evaluation based on OVIs

The Project Purpose has been satisfactorily achieved based on the assessment of seven OVIs:

OVI P-1: Total number of LGUs in participating (getting service) 5 targeted JSCs increases from 54 LGUs (c. 274,000 population) in January 2015 to more than 95 LGUs (c. 650,598 population) in 2018.

The OVI P-1 has been achieved. As shown in the **Figure III-1**, the number of LGUs participating in five target JSCs has increased from 54 in January 2015 to 96 in July 2019, which exceeded the target value (95).

Number of JSC Participating LGUs

* Coverage includes another governorate.

Service Coverage (Number of LGU)	Jan.2015			Nov.2016			Nov.2017			Dec.2018 (now)			Jul 2019		
	Total LGU	Served LGU	Coverage%	Total LGU	Served LGU	Coverage %	Total LGU	Served LGU	Coverage %	Total LGU	Served LGU	Coverage %	Total LGU	Served LGU	Coverage %
Tubas	9	9	100.0 %	9	9	100.0%	9	12	133.3%	10	12*	133.3%	10	12*	133.3%
Qalqiliya	29	29	100.0 %	29	29	100.0%	30	29	96.7%	25	24	97.1%	25	24	97.1%
Nablus	58	16	27.6%	58	20	34.5%	58	21	36.2%	57	32	57.9%	57	32	57.9%
NE+SE Jerusalem	12	0	0.0%	12	6	50.0%	12	12	100.0%	12	12	100%	12	12	100%
N+NW Jerusalem	16	0	0.0%	16	3	18.8%	16	2	12.5%	16	16	100%	16	16	100%
Average (for 5 JSCs)	124	54	43.5%	124	67	54.0%	125	76	60.8%	120	96	80.0%	120	96	80.0%
Jenin	-	-	-	-	-	-	93	91	97.8%	69	70*	101.4%	69	75*	108,7%
Tulkarem	-	-	-	-	-	-	27	22	81.5%	30	26	86.6%	30	27	90.0%
Salfit	-	-	-	-	-	-	19	19	100%	18	19*	105.5%	18	19*	105.5%
Jericho	-	-	-	-	-	-	17	14	82.4%	8	17*	212.5%	8	15*	187.5%
Ramallah	-	-	-	-	-	-	68	0	0%	70	36	51.4%	70	50*	71.4%
Bethlehem	-	-	-	-	-	-	36	28	77.8%	36	30	83.3%	36	29	80.6%
Hebron	-	-	-	-	-	-	24	17	70.8%	52	31*	59.6%	52	32*	61.5%
North Gaza	-	-	-	-	-	-	-	-	-	8	2	25.0%	8	2	25.0%
South Gaza	-	-	-	-	-	-	-	-	-	17	8	47.1%	17	8	47.1%
Average (for 14 JSCs)	-	-	-	-	-	-	-	-	-	428	335	78.3%	428	353	82.5%

JSC service coverage was improved from 43.5% (2015) to 80.0% (2019).

Figure III-1: JSC's Waste collection service coverage (Number of LGUs) in targeted JSCs. Service coverage more than 100% means that the service covers for the other governorate LGUs.

OVI P-2: SWM service by JSCs is implemented all the Governorate of West Bank under detailed regulations of new JSC Bylaw and SWM Bylaw prepared by MoLG and relevant authorities.

The JSC Bylaw came into effect in January 2016 and the SWM Bylaw was approved by the Cabinet on March 2019. All 12 JSCs are implementing SWM service in accordance with these Bylaws including regulations. The OVI P-2 has been achieved.

OVI P-3: National Strategy for SWM (2017-2022) and its Action Plan are finalized by the National Team and submitted to the Cabinet.

The National Strategy (2017-2022) including Interventions (= Action Plan) has been approved by the Cabinet. The OVI P-3 has been completely achieved. The DJSC have disseminated the information of the National Strategy for SWM (2017-2022). According to each Intervention, detailed plan was already formulated by MoLG, MoNE, MoH and EQA and should be formulated by other relevant authorities.

OVI P-4: JSC support actions by MoLG in the Action Plan is implemented for all JSCs based on the National Strategy for SWM (2017-2022).

JSC support actions by MoLG-DJSC is executing according to the Interventions in the Strategic Objective Policies 2, 4, 5, 6, 7, 8, 9, 10, 14, 15, and 19 defined by the National Strategy (2017-2022). Some of the Interventions in the National Strategy are too broad, so that formulation of detailed action plan is required. And also, MoLG has carried out the SWM Training Program for JSCs with JICA 4 times since 2015 and promoted to construct some transfer station of JSCs and controlled dumpsites.

OVI P-5: Annual monitoring report on SWM service by JSCs in West Bank is compiled from 2017 (2016FY reports) by MoLG based on JSC annual reports submitted by all JSCs.

All 12 JSCs have already submitted their Development Plan, Annual Report 2017, Financial Report 2017, and Annual Plan 2018. The MoLG-DJSC have compiled them and going to feed back the result of analysis to each JSC. On the other hand, regarding all 12 JSCs' Annual Report 2018 and Annual Plan 2019, only Qalquilya JSC submitted the annual plan and other reports in a delayed time (as of 18th July 2019).

OVI P-6: West Bank 12 JSCs meeting is organized by MoLG-DJSC at least twice a year for supporting, coordinating, and monitoring.

The MoLG-DJSC has organized various meeting 13 times for 12 JSCs in West Bank since the beginning of the Project during the Project (Stage I) and 10 times for 13 JSCs in West Bank during the Project (Stage II). The OVI P-6 has been achieved.

OVI P-7: "Guidance Book for JSC in SWM" is distributed to all JSCs and utilized by themselves for improving the JSC activities.

During the Project (Stage I), the Project has developed the following two types Guidance Manual: 1) Administrative Guidance Manual and 2) Technical Guidance Manuals. In addition to these, a financial manual has

been developed by World Bank project. These three manuals were distributed to all JSCs, utilized in training/workshop/seminar, and applied for improving the JSC activities.

(2) Summary of Achievements

Six of seven OVIs for the Project Purpose have been achieved, however only OVI P-5 has not achieved because only Qalquilya JSC hasn't submitted the JSCs' Annual Report 2018 and Annual Plan 2019. It should be noted that the five target JSCs have greatly enhanced their organizational and institutional capacity to provide waste collection/transportation services through the Project (Stage I) and the Project (Stage II) and other aid schemes, which contributed to the achievement of the OVIs P-1 and P-2. Both NE+SE and N+NW Jerusalem JSCs have started the waste collection services from January 2016, who were previously could provide no SWM service. The MoLG-DJSC has also improved their comprehensive capacities, which particularly brought about the achievement of the OVIs P-5, P-6, and P-7. It is worth noting that the National Strategy came into effect in August 2017, which is expected to serve as the basis of SWM in Palestine. Given the above, the substantial purpose of establishing the SWM system by JSCs has been almost achieved.

Table III-1: Achievement level of each output and Project Purpose according to the evaluation of OVIs

	Stage I						Stage II
Achievement level (averaged) of Expected Outputs by OVIs	**Nov. 2015**	**Nov. 2016**	**Aug. 2017**	**Nov. 2017**	**Jan. 2018**	**Mar. 2018**	**Jul 2019**
Target Level (according to period)	**33%**	**66%**	**86%**	**90%**	**94%**	**100%**	**100%**
Output 1: MOLG's capacity for instruction, support and coordination to JSCs is enhanced through implementing activities with targeted 5 JSCs in SWM.	**39%**	**70%**	**88%**	**96%**	**100 %**	**100%**	**100%**
Output 2: MoLG's capacity for preparing standards, regulations and guidelines in solid waste management is enhanced.	**33%**	**53%**	**88%**	**94%**	**95%**	**100% +α**	**100%**
Output 3: MoLG's capacity for preparing national policies and plans in solid waste management is enhanced.	**40%**	**82%**	**100%**	**100 %**	**100 %**	**100%**	**93%**
Output 4: MoLG's management capacity at organizational level is enhanced.	**24%**	**45%**	**90%**	**92.5 %**	**95%**	**100% +α**	**100%**
Project Purpose: Sustainable solid waste management system is established by JSCs equally over the West Bank	**34%**	**63%**	**86%**	**92%**	**97%**	**99%**	**100% -**

Remarks: Due to a modification of OVIs between Stage I and Stage II, the achievement level of Output 3 is lowered in comparing with previous levels, which is related to monitoring activities of the National Strategy by National Team for SWM.

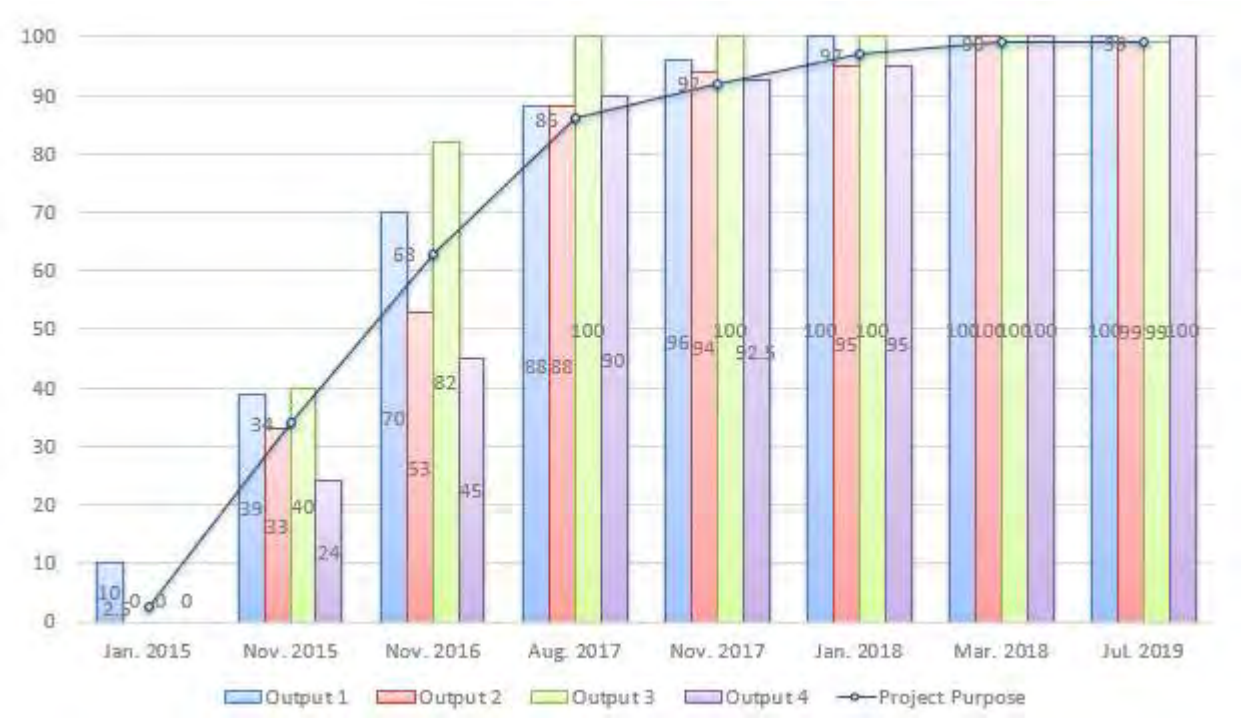

Figure III-2: Project Achievement (%) according to OVIs. The Project Purpose can be achieved by the end of Project.

III-2. Towards Overall Goal

The narrative summary of Overall Goal is "Sound environmental and social solid waste management service is delivered over Palestine in sustainable manner." For evaluating the achievement of Overall Goal, PDM set the following five OVIs, tentatively:

OVI G-1: Percentage of received materials in generated waste: 30%.

If MoLG's activities regarding waste reduction are continued after the Project, for example, MoLG promote recycling on composting, and MoLG promote to recycle C&D waste based on the guideline and the Bylaw, the OVI G-1 can be achieved.

OVI G-2: Percentage of transferring organic waste into low quality compost for the purposes of coverage: 15%

If MoLG and JSCs activities regarding composting are continued after the Project, for example, MoLG promote composting based on the result of the Pilot Project, and some composting facilities in Al-Menya, Jericho, etc. continue to work, the OVI G-2 can be achieved.

OVI G-3: Waste collection service coverage of residential area: 100%

OVI G-4: Waste collection service coverage provided by JSCs: 100%

If MoLG continue to support to develop technical and financial capacity of all JSCs in West Bank and Gaza Strip after the Project (Stage II) and coming JICA Grant Aid Project and other Donors Project to provide any collection vehicles and equipment are implemented effectively, the OVI G-3 and G-4 can be achieved.

OVI G-5: Household source-separation of solid waste: 20%

If MoLG decide a direction for household source-separation through the Pilot Project on public awareness of the Project (Stage II), the OVI G-5 can be achieved.

OVI G-6: Coverage of sanitary or controlled landfills: 100%

If MoLG's activities regarding sanitary landfill and controlled dumpsite are continued after the Project, for example, MoLG promote to construct sanitary landfills, controlled dumpsites and transfer stations, etc., the OVI G-6 can be achieved.

OVI G-7: All random (open) dumpsites in West Bank and Gaza Strip are safely closed or rehabilitated.

If MoLG's activities regarding JSCs are continued after the Project, for example, JICA Grant Aid Project and other Donors Project are implemented effectively, and/or MoLG promote to construct sanitary landfills, controlled dumpsites and transfer stations, etc., the OVI G-7 can be achieved.

OVI G-8: SWM Data Book is reviewed and revised once every three years at least.

If MoLG's activities regarding JSCs are continued after the Project, for example, MoLG continue to collect data from all JSCs, and review and revise regularly, and also MoLG prepare SWM Databook based on the collected data regularly, the OVI G-8 can be achieved.

III-3. Assessment by Five Evaluation Criteria

At the end of the Project (Stage II), self-assessment by five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact and Sustainability) was carried out through discussion among all members of the Project. The results of the five evaluation criteria are as follows:

(1) Relevance: High

- Necessity of the Project

– It was urgent for MoLG to take the lead in developing the National Strategy for SWM (2017-2022) to strengthen the legal and policy framework for SWM. MoLG also needed to enhance its overall capacity to implement the National Strategy for SWM. Improving the SWM capacity of less capable five JSCs became important to establish the SWM system and provide SWM services by JSCs equally over West Bank. Thus, the Project meets the urgent needs of MoLG and the five JSCs to improve their capacity to establish the SWM system in West Bank.

- Appropriateness of strategies and approaches of the Project

– The Project has held both Core Group meetings and the LET and the five JSCs meetings weekly. These regular meetings were relevant from the point of the view of institutionalizing the regular monitoring and follow-up mechanism into the DJSC.

– The Project has deployed the four Executive Directors of non-target JSCs (Local Expert Team; LET) who are the pioneers of SWM in the respective areas as the LET based on the recommendations of MoLG.

- Consistency of the policies of the Palestinian National Authority and the Government of Japan

– The Project is consistent with the National Development Plans (2009-2013 and 2014-2016) which emphasize to ensure the national SWM system, serving all communities across the country and ensuring the protection of environment and public health.

– According to Japan's Country Assistance Policy for the Palestinian National Authority (2012) and the Official Development Assistance Rolling Plan of Japan for the Palestinian National Authority (2016), "Reinforcement of governmental administrative capacity" is one of the three priority areas for assistance.

(2) Effectiveness: Moderately high

- Achievement of the Project Purpose and contribution of Outputs

– All four Outputs have been almost fully achieved, which have contributed to the attainment of the Project Purpose.

– The Project Purpose has been almost achieved because the seven OVIs have been almost fully achieved. However, one OVI (P-5) is not fully achieved by all targeted JSCs. due to insufficient capacity at the end of the Project. It means four targeted JSCs out of five have been fully developed their capacity but remaining one has still a challenge for capacity development.

- Effects generated by the Project and Factors that promoted the effectiveness of the Project

– The most significant effects of the Project include: (1) improvement of organizational and institutional capacity of the five JSCs; (2) enhancement of the comprehensive capacity of MoLG-DJSC for SWM; and (3) strengthening of the policy framework for SWM through formulation of the National Strategy for SWM (2017-2022).

– The Project has also brought about following various effects: (1) improving the planning capacity of the five JSCs for SWM; (2) enhancing the awareness of members of BD and GA as well as citizen regarding JSC and SWM; (3) improving and expanding JSCs service coverage of SWM; (4) promoting the communication and sharing the experiences, issues and countermeasures of SWM between the DJSC and the JSCs as well as among the JSCs themselves; (5) active participation of JSCs in the MoLG's planning of policy and strategy of SWM; (6) improving the capacity of the DSJC to provide guidance to and coordinate with the JSCs and other relevant organizations; (7) strengthening the legislative and institutional capacities of the MoLG-DJSC through developing bylaws, guidelines, data book, and manuals; and (8) activating the National Team for SWM.

(3) Efficiency: Moderately high

- Planned inputs and coordinated activities

- Although there were international political uncertainties with Israel and existing challenges in Palestine, most of the inputs from both the Palestinian and the Japanese sides were provided as scheduled, which contributed a lot for Project achievements.
- Coordinated activities with external projects, such as Japan Grassroots Fund project for equipment provisions and Japan Debt Cancellation Fund project for constructing transfer stations generate synergy effects.
- Well-coordinated inputs through Grant Aid project accelerated overall technical capacities of JSCs.

• Preventing factors for the effectiveness

- In contrast, the six preventing factors were considered to reduce the efficiency of the Project to some extent. They included: (1) Unclear TOR and insufficient capacity of local sub-contractor of Japanese consultant team for implementing Pilot Projects, (2) five-month absence of Project Coordinator, (3) frequent change of Executive Directors in Qalqiliya, NW&N Jerusalem, and NE&SE Jerusalem, (4) unexpected long term of Palestinian official process for approval of the National Strategy, Bylaws, and documents, (5) delay of Pilot Project and undistributed barrels for composting, and (6) difficulty of consensus building with local community for siting SWM facilities.

• External preventing factors from Israeli occupation

- In addition to above mentioned six preventing factors, a significant difficulty arose from current situation with Israel, Area C issue and Israeli settlement that was illegal from the view of international law. It resulted in a cancellation of construction of sanitary landfill, complex siting issue for constructing SWM facilities, which reduce the efficiency of the Project.

(4) Impact: Many positive impacts

• Prospect of achievement of the Overall Goal

- Establishment of well-organized network among JSCs in West Bank and partly with Gaza Strip is an institutional framework for promoting a sound SWM over Palestine.

• Ripple effects and positive impacts

- MoLG-DJSC in coordination with the LET has focused on the formulation of a Basic, Annual, Financial Plans and the approval procedures for these plans in the five target JSCs under the Project, which became an authorized procedure for all JSCs through the administrative guidance book prepared by the Project.
- Collaboration of MoLG-DJSC with other departments of MoLG and external ministries such as EQA, Ministry of Education, Ministry of Energy, etc. has been improved through implementing Project activities.
- Various ripple effects can be observed at the level of targeted 5 JSCs based on improved awareness on solid waste management.

(5) Sustainability: Medium

• Policy aspect: High

- MoLG-DJSC has demonstrated a policy commitment with a sense of ownership to aim for establishing the SWM system by JSCs equally over West Bank and Gaza. PA supports the policy and now Premier Ministry is conducting a study for investment of waste reduction facilities.

• Institutional aspect: Moderately high

- The Project has strived to institutionalize regular meetings in the MoLG-DJSC by holding the Core Group meetings, and the LET and five JSCs meetings weekly. Monthly 12 JSCs meeting is also regulerized. These meetings are likely to be sustained.

• Organizational aspect: Moderately low

- The lack of human resource in the MoLG-DJSC has been a big concern among the Project stakeholders since the beginning of the Project and even before the commencement of the Project. The workload of MoLG-DJSC staff members has significantly increased. They have been responsible for not only the SWM sector but also other sectors such as JSC for water and JSC for development plan and other donor-supported projects.
- Considering the above, it is fair to say that the organizational framework of the DJSC is still vulnerable although their overall capacity to guide JSCs, coordinate stakeholders, formulate legal documents and manage a project has been highly improved. This significantly affected the overall sustainability of the Project.

• Financial aspect: Moderately low

- The five JSCs have gradually improved the financial system by calculating the operation cost and fees more carefully in the Project and strived to recover the operational costs of SWM. However, so far the initial investment and its financing have not been considered strictly.
- Public-private partnership is an issue for the investment; however some legal/institutional reform are required for realizing it.

• Technical aspect: Moderately high

- The five target JSCs have improved the organizational and institutional capacity to manage JSC and SWM through various activities in the Project. Even after the completion of the Project, they are most likely to keep applying their knowledge and know-how of SWM obtained by the Project because particularly planning practices have been gradually institutionalized to provide services for SWM as per the JSC Bylaw (2016). On the other hand, most of the JSCs pointed out that they need to gain more knowledge and know-how of SWM including promotion of 3R, improvement of the financial management, and promotion of PPP at the local level and others.

Table III-3: Result of the self-assessment in accordance with the Five Evaluation Criteria

	Self-Assessment
Relevance	High
Effectiveness	Moderately high
Efficiency	Moderately high
Impact	Many positive impacts
Sustainability	Medium

IV. Conclusions

The following seven challenges are identified for ensuring the sustainability of JSC-based SWM in Palestine:

(1) Continuous awareness raising on waste reduction should be implemented in schools, public, and JSC-based activities
(2) Actions of National Strategy (2017-2022) are still in the beginning stage; it should be monitored based on the detailed action plans under the supervision of the National Team for SWM.
(3) "Administrative Guidance Manual" published in February 2018 should be updated under the new legal frame of SWM Bylaw.
(4) JSC's Waste collection and transportation network has been established over West Bank and southern part of Gaza Strip. However, waste reduction and 3R policy is still at early stage. It is necessary to establish a comprehensive policy and institution for effective waste reduction.
(5) In-depth analysis on the state of solid waste management in Palestine should be done based on the Data Book Version 2.0.
(6) MoLG-DJSC continue periodical internal meeting as well as meeting with all JSCs. Public-private partnership policy is still at an early stage. Necessary legal/institutional reform are required.
(7) It is very necessary to construct a sanitary landfill in the central area of West Bank, and in emergency case, it is recommended to construct tentative controlled dumpsites. Random open dumpsites in the area shall be closed very soon.

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Annex 1

Final Report-Financial Plans Analysis (2017, 2018) for the 13 Joint Service Councils (JSCs)

I. Introduction

Proper carefully well-coordinated planned financial plan is a process of meeting and being ready for any expected and unexpected actions, which makes a secure mindset aligned with tracking any change.

The following report was prepared based on the Financial Template that was circulated to all of the 13 JSCs. Annex(A) includes Table(1): the Financial Template and the financial forms for the 13 JSCs in the years (2017, 2018), while Annex(B) includes Table(2): Financial Comparison Sheet (2017,2018) for the 13 JSCs, and Table(3): JSCs categories expenditures percents. The provided information is based on our general understanding and analysis of the basic parameters (Revenues, expenditures) regarding the JSCs financial burdens, the previous and current Data Book.

In general, the report analyzes the financial plans data for 13 JSCs-West Bank, to figure out many indicators, such as the capability of the JSCs to carry out their tasks to high standards, and also to see if they are able to take up some necessary environmental projects to improve the performance especially in waste reduction.

As a part of developing the JSC's status for a successful management, the following objectives were investigated:

- The current financial status of the JSCs, where are they now, what do they need, and the capability for such improvements or developments.
- Investigating the commitment of the JSCs to their thought out plans, and how far they are from their plans.
- Reasonability of the deviation scale in plans, and weakness point.
- The main causes that really stand behind either success or failure in any aspect of the financial process.

II. Financial Analysis for each JSC

The data were collected from 13 JSC, after that the analysis was separately conducted for the 13 JSCs Financial Plans. The main parameters that were analyzed are the expenditures and revenues for each JSC. The following section provides a brief analysis for all of them.

Note that: (+) means the actual is more, and (-) means the actual is less.

1. Nablus

Nablus JSC serves (32) LGUs with a total population of (204,245). It provides collecting + transfer services, and the JSC is seeking to serve all the LGUs in Nablus governorate (58) with a population of (388,319).

a. Revenues

- **Service Revenues**

According to the financial form, the actual service revenues in 2017 increased from (3,788,191 NIS) to be (4,069,110 NIS) in 2018. It shows that the collection rate is good somehow, and the JSC is planning to expand the service and to include more LGUs.

- **Actual Total Revenues**

The Actual Total Revenues in 2018 were (4,069,810 NIS) which is less than they were in 2017 (4,747,029 NIS), due to the subsidies they got in 2017, while in 2018 they did not get any subsidy.

$$\text{Service revenues}_{(2017)} - \text{service revenues}_{(2018)} = (-280{,}919 \text{ NIS})$$

$$\text{Total revenues}_{(2017)} - \text{Total revenues}_{(2018)} = (677{,}219 \text{ NIS})$$

b. Expenditures

- **Salaries**

According to the salaries, the JSC has (47) worker, and (8) administrative staff. The salaries in 2018 were (881,930 NIS) with a deviation between the planned and actual values = (-8.8%), but in 2017 they were higher (948,533 NIS) with a deviation = (16%).

- **Operation & Maintenance**

The JSC has (5) vehicles and all of them are in a bad condition. In 2017 the actual value exceeded the planned one due to sudden issues; moreover the actual value in 2018 was higher than the one in 2017.

- **Fuel**

There was a rise in the fuel expenditures in 2018 than in 2017.

Fuel cost $_{(2018)}$ = 17.4 Nis/Ton

- **Landfill Fees**

According to the landfill fees the values increased in 2018 more than 2017. The deviation was about (-28%) in 2017, and in 2018 the deviation was (-7.2%) which reflects the same concepts mentioned before.

- **Actual Total Expenditures**

  According to the actual total revenues in 2017(4,747,029 NIS), they were higher than the total expenditures which were (4,124,741 NIS) with a difference of (622,288 NIS). This of course doesn't reflect profits, but it's due to the subsidy from MoLG and GGP grant (847,650+111,188) = (958,838 NIS), which means there is a deficit of (336,550 NIS), conversely in 2018 the expenditures were more than the revenues.

  According to Table (3) in Annex (B), the highest percentages of the expenditures were:
  [2017] → Salary = 23%
  [2018] → Transportation = 22%

  - Deficit without subsidy$_{(2017)}$ = 336,550 NIS
  - Revenues – Expenditures $_{(2017)}$ = 622,288 NIS.
  - Revenues – Expenditures $_{(2018)}$ = - 684,063 NIS.
  - Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = -629,132 NIS

2. Jericho

Jericho JSC serves (17) LGUs with a total population of (50,729). It provides collecting services only.

a. Revenues

- **Service Revenues**

  There is a difference in the actual service revenues between 2017 (2,236,319.39 NIS) and in 2018 (2,225,669 NIS). And giving a look at the actual service revenues for both years, it indicates that the JSC is facing fees collection problem, and the debts on the Industrial Agricultural Area are not received yet.

- **Actual Total Revenues**

  In 2018 they were (4,512,819 NIS) which is more than they were in 2017 (2,571,175.39 NIS), basically this might show some progress.

  Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (10,650.39 NIS)

Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (-1,941,643.61 NIS)

b. Expenditures

- **Salaries**

The JSC has (24) worker, and (15) administrative staff. The number of employees was increased in 2018, so the salaries went up from (1,155,564.19 NIS) in 2017 to be more in 2018 (1,167,800 NIS).

- **Operation & Maintenance + Fuel**

The JSC has (13) vehicle, (1) is not working, and the rest are in acceptable condition. In 2017 the actual value exceeded the planned one due to some damages in the bulldozer's chain, moreover the actual value in 2017 was higher than the one in 2018, because there was a rise in fuel prices.

Fuel cost $_{(2018)}$ =22.6 Nis/Ton

- **Actual Total Expenditures**

In 2017 the total revenues were (2,571,175.39 NIS) while the total expenditures were less (2,334,027.02 NIS) with a difference about (237,148.37 NIS). And this is mainly resulted due to the subsidy from MoLG in 2017. But in 2018 the situation was contrary.

According to Table (3) in Annex (B), the highest percentages of the expenditures were:

[2017] → Salary = 50%

[2018] → Salary = 57%

- Deficit without subsidy$_{(2017)}$ = -49,914.63 NIS
- Revenues – Expenditures $_{(2017)}$ = 237,148.37 NIS.
- Revenues – Expenditures $_{(2018)}$ = 2,452,773 NIS.
- Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = 273,981.02 NIS

3. Bethlehem

The JSC serves (28) LGUs with a total population of (169,093). It provides collecting services only.

a. Revenues

- **Actual Service Revenues**

A progress is shown between 2016 (5,481,603 NIS) and 2017 (6,372,744 NIS) maybe because more LGUs are included to be served. Also in 2018 the value were increased to be (6,987,670 NIS) with a deviation (5.3%) which is a good indicator.

- **Actual Total Revenues**

  In 2018 were (7,585,969 NIS) which is more than they were in 2017 (6,681,444 NIS), due to the subsidy from MoLG and the actual service revenues.

  Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (-614,926 NIS)

  Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (-904,525 NIS)

b. Expenditures

- **Salaries**

  The JSC has (54) worker, and (6) administrative staff. The deviation between the planned and actual in 2018 was (7.4) and they were more than the salaries in 2017.

- **Operation & Maintenance**

  The JSC has (25) vehicle and most of them are in good conditions. Both in 2017 and 2018 the actual value exceeded the planned one; moreover the actual values in 2018 increased more than they were in 2017.

- **Fuel**

  Expenditures in 2018 were more than in 2017.

  Fuel cost (2018) =35.78 Nis/Ton

- **Landfill fees**

  It looks that they are not paid any money, and it shows that maybe the LGUs are paying directly to the landfill, and this is questionable!

- **Actual Total Expenditures**

  According to the actual total revenues in 2017 (6,681,444 NIS) were more than expenditures (6,032,913 NIS) mainly because of subsidy from MoLG, and the same concept goes for 2018. Moreover the total expenditures in 2018 are way more than in 2017.

  According to Table (3) in Annex (B), the highest percentages of the expenditures were:

  [2017] → Salary = 40%

[2018] → Salary = 38%

- Deficit without subsidy $_{(2018)}$ = -27,860NIS
- Revenues – Expenditures $_{(2017)}$ = 648,531 NIS.
- Revenues – Expenditures $_{(2018)}$ = 570,439 NIS.
- Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = -982,617 NIS.

4. Jenin

The JSC serves (75) LGUs with a total population of (287,238). It provides collecting + transfer services, it is also on charge of the landfill itself.

a. Revenues

- **Actual Service Revenues**

For 2018 were better than both 2016 and 2017. The actual value exceeded the planned one with reasonable deviations, and that's a good indication of the income from the landfill itself.

- **Actual Total Revenues**

In 2018 (22,963,021 NIS) which is better than in both 2016 (19,145,080 NIS) and 2017 (22,373,174 NIS), maybe due to the subsidy from MoLG and the extra income from the landfill.

Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (-637,447 NIS)

Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (-589,847 NIS)

b. Expenditures

- **Salaries**

The JSC has (110) worker, and (15) administrative. The salaries in 2018 were (10,942,835 NIS), but in 2017 they were less (9,450,115NIS) which made a bit high deviation of (12%).

- **Operation & Maintenance**

In 2017 the deviation value was good (-11%), but in 2018 it went too high (21%) due to sudden issues, moreover the actual value in 2018 was higher than the one in 2017.

- **Fuel**

The expenditures in 2016 & 2017 were less than in 2018 which had a high deviation about (15%). The JSC has (33) vehicle, and most of them are overused which affects the quality and cost of collecting process.

Fuel cost (2018) =31 Nis/Ton

- **Actual Total Expenditures**

The actual total revenues in 2017(22,373,174 NIS) were higher than the actual total expenditures (19,723,141 NIS), and less than the actual total revenues in 2018 (22,963,021 NIS). Also the total expenditures in 2018 (22,921,588 NIS) are higher than them in 2017 (19,723,141).

-A progress in Revenues is shown in years 2016+2016+2018, where the revenues were more than the expenditures.

According to Table (3) in Annex (B), the highest percentages of the expenditures were:

[2017] → Salary = 48%

[2018] → Salary = 48%

- Deficit without subsidy $_{(2018)}$ = -1,183,064 NIS
- Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = -3,198,447 NIS
- Revenues – Expenditures $_{(2017)}$ = 2,650,033 NIS.
- Revenues – Expenditures $_{(2018)}$ = 41,433 NIS.

5. North East –South East Jerusalem

It serves (12) LGUs with a total population of (117,874). It provides collecting + transfer services.

a. Revenues

- **Actual Service Revenues**

The deviation for both 2017 and 2018 = (0%), which means that the planned = actual for both years, and this is definitely not reasonable and not clear. In 2017 the actual service revenues were (5,918,400 NIS) better than in 2018 (4,658,400 NIS), and this is due to reduction in waste amounts , and the land filling costs dropped down from (50.5 NIS/Ton) to be (38 NIS/Ton) in 2018.

- **Actual Total Revenues**

In 2017, the actual total revenues = the actual service revenues = (5,918,400 NIS), the same comment goes for 2018, which means that the plan was made in retrospective effect.

Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (1,260,000 NIS)

Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (1,260,000 NIS)

b. Expenditures

- **Salaries**

The JSC has (51) worker, and (6) administrative staff. The salaries in 2018 increased (1,731,600 NIS) with a deviation (-14%) which is a good indication for less expenditures than the planned due to new workers for the new car and guards, but in 2017 they were less (1,428,000 NIS) and the deviation was (0%).

- **Operation & Maintenance**

In 2018 the actual value (380,000 NIS) is less than the planned one (492,000 NIS) with a good positive deviation of (-23%), and it is also less than the actual one in 2017 (384,000 NIS). But the deviation in 2017 is calculated to be (0%). which means that the planned one is just as equal as the actual one, and this reflects that they need to put new plans without depending on a retrospective one.

- **Fuel**

The JSC has (17) trucks, most of them are in bad conditions and 1 of them is out of service. Looking at the fuel expenditures a deviation of (-27%) can be found in 2018, but the actual value in 2017 = the actual one in 2018 = (648,000 NIS) because of the car that was serving Al-Aizareya and then shifted to serve Al-Ram. Moreover the deviation in 2017 = (0%) which says the same concept as mentioned above.

Fuel cost (2018) = 6.48 Nis/Ton

- **Landfill Fees**

The landfill fees in 2017 were more than them in 2018 due to many reasons; the landfilling cost was reduced to be (38 NIS/Ton), the waste amounts were minimized due to separation of paper which reduced landfilling process. Moreover the deviation was (0%) in both 2017 & 2018.

- **Actual Total Expenditures**

Actual total revenues in 2017(5,918,400 NIS) were more than the actual total expenditures (5,838,500 NIS), the same condition is for 2018. And In 2017 (5,838,500 NIS) they were more than 2018 (4,219,000 NIS).

According to Table (3) in Annex (B), the highest percentages of the expenditures were:

[2017] → Landfill = 37%

[2018] → Salary = 41%

- Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = 1,619,500 NIS
- Revenues – Expenditures $_{(2017)}$ = 79,900 NIS.
- Revenues – Expenditures $_{(2018)}$ = 439,400 NIS.

6. Tulkarem

The JSC serves (27) LGUs with a total population of (151,677), the city is partly served but all the waste is transferred by the JSC. It provides collecting + transfer services.

a. Revenues

- **Service Revenues**

For 2018 was (5,278,240NIS) with a positive deviation (1.1%), which is more than the one in 2017 (4,678,634 NIS) and this means that there is a progress in rate of collecting fees. The JSC is trying to achieve some progress as shown when comparing the planned in 2017 & 2018.

- **Actual Total Revenues**

In 2018 were (5,515,574NIS) which is more than they were in 2017 (5,439,757 NIS).

Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (-559,606 NIS)

Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (-75,817 NIS)

b. Expenditures

- **Salaries**

The JSC has (30) worker, and (10) administrative staff. The salaries in 2018 were (1,801,109 NIS) which made a reasonable deviation = (4.8%), but in 2017 they were less (1,695,963 NIS).

- **Operation & Maintenance**

The JSC has (10) vehicle and most of them are in bad conditions. In 2017 the actual value exceeded the planned one due to sudden issues; moreover the actual value in 2017 was higher than the one in 2018.

- **Fuel**

The expenditures dropped down from 2017 (1,076,466 NIS) to be (1,053,521 NIS) in 2018.

Fuel cost (2018) = 27 Nis/Ton

- **Landfill Fees**

  The values in 2018 were higher (1,464,726 NIS) than in 2017 (1,396,550 NIS).

- **Actual Total Expenditures**

  The actual total revenues in 2017 were (5,439,757 NIS), which is less than the total expenditures (5,537,909 NIS). Meanwhile in 2018, the total revenues (5,515,574 NIS) were more than the total expenditures (5,487,711NIS). Also the total expenditures in 2017 were more than the ones in 2018.

  According to Table (3) in Annex (B), the highest percentages of the expenditures were:
  [2017] → Salary = 31%
  [2018] → Salary = 33%

  - Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = 50,198 NIS
  - Deficit without subsidy$_{(2017)}$ = -613,582 NIS
  - Revenues – Expenditures $_{(2017)}$ = -98,152 NIS.
  - Revenues – Expenditures $_{(2018)}$ = 27,863.17 NIS.

7. Salfit

The JSC serves (19) LGUs with a total population of (79,000). It provides collecting services only.

a. Revenues

- **Service Revenues**

  According to the financial form, the actual service revenues in 2017 increased from (1,854,511.08 NIS) to be (2,165,016.21 NIS) in 2018. (Dumping and waste disposal is done in random dumpsites, and waste is not transferred to any sanitary landfill).

- **Actual Total Revenues**

  The Actual Total Revenues in 2018 were (2,517,433.21 NIS) which is more than they were in 2017 (2,349,670.58 NIS)

  Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (-310,505.13 NIS)

  Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (-167,762.63 NIS)

b. Expenditures

- **Salaries**

  According to the salaries, the JSC has (26) worker, and (4) administrative staff. The salaries in 2017 were (794,099 NIS), but in 2018 they were (837,198.21NIS).

- **Operation & Maintenance**

  The JSC has (8) vehicles and most of them are in good condition. In 2017 the actual value exceeded the planned one due to sudden issues; moreover the actual value in 2018 was higher than the one in 2017.

- **Fuel**

  The expenditures in 2018 were more than in 2017.

  Fuel cost (2018) = 13 Nis/Ton

- **Actual Total Expenditures**

  According to the actual total revenues in 2017(2,349,670.58NIS), they were higher than the total expenditures which were (2,219,811.95NIS) it's due to the subsidy from MoLG, which means there is a deficit of (NIS), conversely in 2018 the expenditures were more than the revenues. Also the total expenditures in 2018 were more than the ones in 2017.

  According to Table (3) in Annex (B), the highest percentages of the expenditures were:

  [2017] → Salary = 36%

  [2018] → Salary = 32%

  - Total expenditures (2017) – Total expenditures (2018) = -422,558.22 NIS
  - Deficit without subsidy(2017) = -189,621.37 NIS
  - Revenues – Expenditures (2017) = 129,858.63 NIS.
  - Revenues – Expenditures (2018) = -124,937 NIS.

8. Tubas

The JSC serves (12) LGUs with a total population of (54,302). It provides collecting + transfer services.

a. Revenues

- **Service Revenues**

In 2017 = in 2018 = (1,858,662 NIS) and that's not reasonable. There is a progress from 2016→2017 which denotes that the LGUs are more committed in paying the fees, due to the 10 NIS rise in the fees per ton. Meanwhile the deviation in 2018 was (0.74%) which is feasible, but the planned service revenues in 2018 (1,844,976 NIS) are less than they were in 2017 (1,929,919 NIS) and this might happened because Al-Bathan wasn't served any more in 2018, it is used to produce 40 ton/month, also the JSC was responsible for landfilling costs, but a new agreement is recently signed with Zahret Al-Finjan landfill so that the costs were all on Zahret Al-Finjan.

- **Actual Total Revenues**

  In 2018 were (1,877,262 NIS) which is less than they were in 2017 (2,189,050 NIS), maybe due to the subsidy from MoLG they got in 2017 with (291,010 NIS), while in 2018 they did not get any subsidy.

  $$\text{Service revenues}_{(2017)} - \text{service revenues}_{(2018)} = (0 \text{ NIS})$$

  $$\text{Total revenues}_{(2017)} - \text{Total revenues}_{(2018)} = (311{,}788 \text{ NIS})$$

- **Other Revenues**

  In 2017 the actual value of other revenues is (39,378 NIS) and the planned value is (2000 NIS) which makes a deviation of about (1,869%), and it is very high and not practical at all.

b. Expenditures

- **Salaries**

  The JSC has (12) worker, and (2) administrative staff. The salaries in 2018 were less (380,206 NIS) due to less number of workers, which made the deviation = (-15.11%), but in 2017 they were higher (546,436 NIS) which made the deviation high (15%).

- **Operation & Maintenance**

  The JSC has (4) vehicles, (3) are in bad condition. In 2017 the actual value exceeded the planned one due to sudden servicing and repairs that were spent on the transportation vehicle to Zahret Al-Finjan, moreover the actual value in 2017 (673,167 NIS) was higher than the one in 2018 (442,829 NIS).

- **Fuel**

  There was a drop in the expenditures of 2018 than in 2017, on the other hand the actual value in 2017 was more than the planned one.

  - Fuel cost (2018) = 31 Nis/Ton

- **Landfill Fees**

  The deviation was about (-54%) in 2017, and in 2018 the deviation was (-16.79%) which is due to the new agreement in Zahret AlFinjan. And in 2017 the values were a bit higher than in 2018.

- **Actual Total Expenditures**

  The actual total revenues in 2017 (2,189,050 NIS) were more than the total expenditures (2,139,363 NIS), the same action is in 2018. Moreover both the revenues and the expenditures in 2017 were better than them in 2018, and that is caused by the subsidy from MoLG (291,010 NIS).

  According to Table (3) in Annex (B), the highest percentages of the expenditures were:
  [2017] → Operation = 31%
  [2018] → Operation = 31%

  - Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = 690,116 NIS
  - Deficit without subsidy$_{(2017)}$ = -241,323 NIS
  - Revenues – Expenditures $_{(2017)}$ = 49,687 NIS.
  - Revenues – Expenditures $_{(2018)}$ = 428,015 NIS.

9. North – North West Jerusalem

This JSC is a new one, it serves (16) LGUs with a total population of (49,459).

a. Revenues

- **Service Revenues**

  Although the deviation in 2018 was a bad indicating one about (-20%) with a value of (1,494,169 NIS), but they were higher than in 2017 (1,017,759 NIS), and that gives a good hint regarding a newly established JSC, because a progress can be clearly noticed as seen above. The JSC was planning to expand the served range of the LGUs.

- **Actual Total Revenues**

  In 2018 were (1,874,769 NIS) which is more than they were in 2017 (1,277,579 NIS), due to the subsidy from MoLG (380,600 NIS)

  Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (476,410 NIS)

  Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (-597,190 NIS)

b. Expenditures

- **Salaries**

  The JSC has (27) worker, and (4) administrative. The salaries in 2018 were (639,565NIS) which made the deviation = (-9%), but in 2017 they were higher (650,651 NIS) which made the deviation a bit high (7%), due to more workers.

- **Operation & Maintenance**

  The JSC has (10) vehicles, and only (3) of them are in good condition. In 2017 the planned value exceeded the actual with a good deviation of (-37%), meanwhile in 2018 the deviation was only (-3%) due to the usage of depreciated collecting vehicles where there service years are over 15 years, moreover the actual value in 2018 was higher than the one in 2017.

- **Fuel**

  There was a rise in the fuel expenditures in 2018 than in 2017.

  Fuel cost (2018) = 15.11 Nis/Ton

- **Actual Total Expenditures**

  The actual total revenues in 2017 (1,277,579 NIS) were more than the total expenditures (1,210,627 NIS). This of course means that there could be a deficit of (66,952 NIS) without subsidy. Also In 2018 the actual total revenues (1,874,769NIS) were more than the expenditures (1,676,390 NIS). Moreover the expenditures in 2018 were higher than them in 2017.

  According to Table (3) in Annex (B), the highest percentages of the expenditures were:

  [2017] → Salary = 50%

  [2018] → Operation = 41%

  - Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = (-465,767NIS)
  - Deficit without subsidy$_{(2017)}$ = -90,048 NIS
  - Revenues – Expenditures $_{(2017)}$ = 66,952 NIS.
  - Revenues – Expenditures $_{(2018)}$ = 198,375 NIS.

- **The landfill is about to reach its maximum capacity, and the situation is not stable.**

10. Hebron

This JSC serves (32) LGUs with a total population of (690,435). It provides collecting + transfer services.

a. Revenues

- **Actual Service Revenues**

  In 2018 they were (12,410,865 NIS) with a good indicating positive deviation of (12.6%), on the other hand in 2017 they were (12,986,918 NIS) with a deviation (10.1). The drop is about (576,053.6 NIS) from 2017→2018 is actually not a bad indicator. Moreover in 2017 the actual revenues that were achieved are better than the planned ones as well.

- **Actual Total Revenues**

  In 2018 were the same as the service revenues (12,410,865 NIS) because no subsidy is found, and those are less than in 2017 (13,638,618.6 NIS) with a difference of (1,227,753.6 NIS), this is mainly due to subsidy from MoLG in 2017.

$$\text{Service revenues}_{(2017)} - \text{service revenues}_{(2018)} = (576{,}053.6 \text{ NIS})$$

$$\text{Total revenues}_{(2017)} - \text{Total revenues}_{(2018)} = (1{,}227{,}753.6 \text{ NIS})$$

b. Expenditures

- **Salaries**

  The JSC has (81) worker, and (10) administrative. The salaries in 2018 were (2,687,100NIS) which made less expenditures with a deviation of (-5%), but in 2017 they were higher due to more workers (2,785,424 NIS), and also the deviation was somehow reasonable (-6.4%).

- **Operation & Maintenance**

  The JSC has (27) vehicle, half are in bad condition and the rest are good. In 2017 the actual value was (7,148,570.9 NIS) less than the planned with a deviation of (-3.1%), meanwhile in 2018 the actual was (4,896,127 NIS) and the deviation was high (-18.3%), moreover the actual value in 2017 was higher than the one in 2018.

- **Fuel**

  The expenditures in 2018 were higher with a deviation of (1.8) than in 2017.

  Fuel cost (2018) =31.76 Nis/Ton

- **Actual Total Expenditures**

Actual total revenues in 2017 (13,638,618.6 NIS) were more than the total expenditures (13,500,041.5 NIS). Also In 2018 the actual total revenues (12,410,865 NIS) were more than the expenditures (11,469,810NIS). Moreover the expenditures in 2017 were higher than them in 2018.

According to Table (3) in Annex (B), the highest percentages of the expenditures were:

[2017] → Operation = 53%

[2018] → Operation = 43%

- Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = 2,030,231.5 NIS
- Deficit without subsidy$_{(2017)}$ = - 513,122.9 NIS
- Revenues – Expenditures $_{(2017)}$ = 138,577.1 NIS.
- Revenues – Expenditures $_{(2018)}$ = 941,055 NIS.

11. Ramallah

This JSC has officially started providing services on 1/1/2019. It serves (60) LGUs with a total population of (326,721). It provides collecting + transfer services.

a. Revenues

- **Actual Service Revenues**

  In 2017 & no data were found, because the officially started providing services on 1/1/2019.

- **Actual Total Revenues**

  In 2017 there were nothing except the subsidy from MoLG which equals (800,610 NIS), the total revenues in 2018 were less (503,724 NIS) because no subsidy is found.

  Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (296,886 NIS)

b. Expenditures

- **Salaries**

  The JSC has (63) worker, and (6) administrative staff. The salaries in 2018 were (342,696 NIS) due to the increasing number of workers, which made a high deviation of (16.6%), but in 2017 they were less (329,520 NIS) which made the deviation bit more reasonable and okay (4%).

- **Operation & Maintenance**

  The JSC has (17) vehicle, most of them are in a very good condition. In 2017 the actual value was (168,806 NIS) more than the planned with a deviation of (9%), meanwhile in 2018 the actual was

(203,982 NIS) and the deviation was okay (1%), moreover the actual value in 2018 was higher than the one in 2017.

- **Fuel**

The expenditures in 2018 were (14,664 NIS) with an acceptable deviation of (9), and they are more than in 2017 (12,898 NIS) with a high deviation of (16%), and that's maybe because the increased number of vehicles in 2018.

Fuel cost (2018) = 20 Nis/Ton

- **Actual Total Expenditures**

Actual total revenues in 2017 (800,610 NIS) were more than the total expenditures (511,223 NIS), but in 2018 the actual total revenues (503,724 NIS) were less than the expenditures (561,342 NIS). Moreover the expenditures in 2017 were less than them in 2018.

According to Table (3) in Annex (B), the highest percentages of the expenditures were:

[2017] → Salary = 64%

[2018] → Salary = 61%

- Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = (- 50,119 NIS)
- Deficit without subsidy$_{(2017)}$ = - 511,223 NIS
- Revenues – Expenditures $_{(2017)}$ = 289,387 NIS.
- Revenues – Expenditures $_{(2018)}$ = - 50,119 NIS.

12. Qalqilya

The JSC serves (24) LGUs with a total population of (114,167). It provides collecting + transfer services.

a. Revenues

- **Service Revenues**

According to the financial form, the actual service revenues in 2017 increased from (2,588,608 NIS) to be (2,878,780 NIS) in 2018. Starting form 1/2/2019 the situation became a bit better than it was since the fees were based per ton. The revenues increased as soon as the transfer cost = 105 Nis, and collecting cost= 118 Nis.

- **Actual Total Revenues**

The Actual Total Revenues in 2018 were (4,670,780 NIS) which is more than they were in 2017 (2,588,608 NIS), due to the subsidy from JICA they got in 2018 with (1,792,000 NIS).

$$\text{Service revenues}_{(2017)} - \text{Service revenues}_{(2018)} = (-290{,}172 \text{ NIS})$$

$$\text{Total revenues}_{(2017)} - \text{Total revenues}_{(2018)} = (-2{,}082{,}172 \text{ NIS})$$

b. Expenditures

- **Salaries**

According to the salaries, the JSC has (48) worker, and (8) administrative staff. The salaries in 2018 were (497,863 NIS) which made the deviation= (-6.2%), but in 2017 they were higher (518,314 NIS) which made the deviation= (5%).

- **Operation & Maintenance**

The JSC has (12) vehicles and all of them are in good condition. In 2017 the actual value exceeded the planned one due to sudden issues; moreover the actual value in 2017 was higher than the one in 2018.

- **Fuel**

There was a drop in the fuel expenditures in 2018 than in 2017, and that's because the costs in 2017 were higher than in 2018.

Fuel cost (2018) = 20 Nis/Ton

- **Landfill Fees**

According to the landfill fees the deviation was about (-28%) in 2017, and in 2018 the deviation was (-8.9%) which reflects the same concepts mentioned before.

- **Actual Total Expenditures**

Actual total revenues in 2017 (2,588,608 NIS) were less than the total expenditures (2,834,526NIS), also in 2018 the actual total revenues (4,670,780 NIS) were less than the expenditures (4,899,305 NIS). Moreover the expenditures in 2017 were less than them in 2018.

According to Table (3) in Annex (B), the highest percentages of the expenditures were:

[2017] → Landfill = 33%

[2018] → Transportation = 52%

- Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = (- 2,064,779 NIS)
- Deficit without subsidy$_{(2018)}$ = - 1,563,475 NIS
- Revenues – Expenditures $_{(2017)}$ = -245,918 NIS.
- Revenues – Expenditures $_{(2018)}$ = - 228,525 NIS.

13. HJSC of Hebron and Bethlehem (Al Minya)

The JSC serves (64) LGUs with a total population of (1,011,369)

a. Revenues

- **Service Revenues**

  According to the financial form, the actual service revenues in 2017 increased from (16,256,408 NIS) to be (19,902,089 NIS) in 2018, which reflects progress due to better commitment from the LGUs.

- **Actual Total Revenues**

  The Actual Total Revenues in 2018 were (22,061,751 NIS) which is more than they were in 2017 (20,805,488 NIS), due to the subsidies from MoLG, World Bank, and Italian council which they got in 2018 with a total of (2,129,862 NIS).

Service revenues $_{(2017)}$ – service revenues $_{(2018)}$ = (-3,645,681 NIS)

Total revenues $_{(2017)}$ – Total revenues $_{(2018)}$ = (-1,256,263 NIS)

Expenditures:

- **Salaries**

  According to the salaries, the JSC has (11) worker, and (7) administrative staff. The salaries in 2018 were higher (4,321,805 NIS) than they were in 2017 (3,297,497 NIS).

- **Operation & Maintenance**

  The JSC has (5) vehicles and all of them are in a bad condition. In 2018 the actual value dropped than the one in 2017; which is a good indicator.

- **Fuel**

  The fuel expenditures in 2018 were higher than in 2017.

Fuel cost (2018) = 20 Nis/Ton

- **Actual Total Expenditures**

  Actual total revenues in 2017 (20,805,488 NIS) were more than the total expenditures (18,884,520 NIS), the same situation was in 2018, the actual total revenues (22,061,751 NIS) were more than the expenditures (16,042,897 NIS). Moreover the expenditures in 2017 were more than them in 2018.

  According to Table (3) in Annex (B), the highest percentages of the expenditures were:

  [2017] → Operation = 56%

  [2018] → Operation = 38%

  - Total expenditures $_{(2017)}$ – Total expenditures $_{(2018)}$ = 2,841,623 NIS
  - Deficit without subsidy$_{(2017)}$ = - 6,393,359 NIS
  - Deficit without subsidy$_{(2018)}$ = 3,888,992 NIS
  - Revenues – Expenditures $_{(2017)}$ = 1,920,968 NIS.
  - Revenues – Expenditures (2018) = 6,018,854 NIS.

III. General Comments and outcomes:

1. The LGUs should be committed in paying for the JSCs.
2. The lack of finance resources is the main obstacle that the JSC's are suffering from, and so solid waste management projects or activities are being affected by this parameter as seen in the financial plans for all JSCs.
3. Most of the expenditures were on waste collection, transportation and salaries, while the safe disposal of waste hasn't given attention. And the operation process in the landfills should be properly managed, especially controlling the soil covering, gas collecting units, and leachate collecting at landfill locations. Moreover the situation might be worse if a central composting project is carried out at these locations due to the annoying harming odors.
4. All of the JSC's budgets are very limited and finite to implement development projects to reduce waste or to escalate to higher levels for any other projects; they can barely stay over the scale!
5. There is no clear base to decrease costs in order to guarantee financial sustainability. On the contrary it is noticed that the salary for some JSCs increases as well as the operation costs without a clear evidence in revenues.
6. The potentials for increasing income is very limited and mainly depending on subsidy from MoLG or others, otherwise most of the JSC's will have deficits.

7. The huge debts of the JSCs made it difficult to carry on services fulfilling good standards or even continuing the situation as it is.
8. It seems that it is impossible for JSCs to carry out any waste reduction projects like real separation, composting, or recycling. Moreover, any intention or will for these kinds of projects without external financial support is only a time consuming strategy.
9. Quality of achievements, preconditions and recommendations for a successful planning and acting, towards a better civic engagement, comprehensive featured SWM goals achieving and risks confronting.

Annex: Financial data of each JSC

Financial data of Al-Minya JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	312,500	0	-100	350,000	312,500	-11
	Subsidy from GPOBA - World Bank grant	4,262,916	4,262,916	0	302,682	302,682	0
	Subsidy from Italian council grant PMSP	209,475	209,475	0	1,514,680	1,514,680	0
	Container grant from GGP	0	0	0	0	0	0
	Service & Operation Revenues	16,500,350	16,256,408	-1	19,950,500	19,902,089	0
	Other Revenues	77,500	76,689	-1	35,000	29,800	-11
Revenues	Total	21,362,741	20,805,488	-103	22,152,862	22,061,751	0
	Salary	3,368,530	3,297,497	-2	4,313,500	4,312,805	0
	Operation & Maintenance	10,600,500	10,535,280	-1	6,100,500	6,094,015	0
	Fuel	1,950,600	1,909,611	-2	3,800,600	3,799,805	0
	Landfill fee	0	0	0	0	0	0
	Transfer station (to private company)	0	0	0	0	0	0
	Other	3,250,350	3,142,132	-3	1,895,000	1,836,272	-3
Expenditures	Total	19,169,980	18,884,520	-8	16,109,600	16,042,897	-3

Financial data of Bethlehem JSC (Revenues & Expenditures)								
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation	Actual 2016
Revenues	Subsidy from MoLG	300,000	308,700	2.9	300,000	598,299	99.433	308,000
	Service Revenues	5,750,000	6,372,744	10.8303304	6,635,000	6,987,670	5.315297664	5,481,603
	Other Revenues (Aid from JICA for maintenance)	0	0	0	0	0	0	
	Total	6,050,000	6,681,444	10.4370909	6,935,000	7,585,969	104.7482977	5,789,603
Expenditures	Salary	2,385,792	2,430,668	1.88096867	2,493,000	2,679,385	7.476333734	2,074,511
	Operation & Maintenance	1,379,600	1,812,930	31.4098289	1,895,200	2,172,764	14.64563107	1,568,904
	Fuel	1,620,000	1,789,315	10.4515432	1,815,000	2,163,381	19.19454545	1,484,857
	Other		---	0			0	
	Total	5,385,392	6,032,913	43.7423408	6,203,200	7,015,530	41.31651026	5,128,272

Financial data of Hebron JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	770,574.0	651,700.0	-15.4	770,574.0	0.0	-100.0
	Service Revenues	11,797,560.0	12,986,918.6	10.1	11,024,040.0	12,410,865.0	12.6
Revenues	Total	12,568,134.0	13,638,618.6	-5.3	11,794,614.0	12,410,865.0	-87.4
	Salary	2,974,409.0	2,785,424.0	-6.4	2,827,433.0	2,687,100.0	-5.0
	Operation & Maintenance	7,374,372.0	7,148,570.9	-3.1	5,991,546.0	4,896,127.0	-18.3
	Fuel	3,253,610.0	3,566,046.6	9.6	3,817,200.0	3,886,583.0	1.8
	Other	0.0	-	0.0	0.0	0.0	0.0
Expenditures	Total	13,602,391.0	13,500,041.5	0.2	12,636,179.0	11,469,810.0	-21.4

Financial data for Jenin JSC (Revenues & Expenditures)								
	Items	Actual 2016	Planned 2017	Actual 2017	Deviation%	Planned 2018	Actual 2018	Deviation%
Revenues	Subsidy from MoLG	0	0	737,940	0	400,000	1,224,497	206
	Service Revenues	18,393,764	18,271,564	20,740,755	14	21,222,701	21,378,202	1
	Other Revenues	751,316	1,475,000	894,479	-39	420,000	360,322	-14
	Total	19,145,080	19,746,564	22,373,174	-26	22,042,701	22,963,021	4
Expenditures	Salary	8,486,221	8,446,484	9,450,115	12	9,909,555	10,942,835	10
	Operation & Maintenance	1,664,050	1,880,000	1,674,059	-11	1,780,000	2,151,796	21
	Fuel	4,623,634	4,650,000	4,884,328	5	4,860,000	5,608,088	15
	Other	2,850,386	4,574,331	3,714,639	-19	5,280,331	4,218,869	-20
	Total	17,624,291	19,550,815	19,723,141	-13	21,829,886	22,921,588	5

Financial data of Jericho JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
Revenues	Subsidy from MoLG	165000	287,090	73.99393939	140000	0	-100
	Service Revenues	2362307	2,236,319.39	-5.333244578	115,000	2,225,669	1835.364
	Other Revenues	100000	47,766	-52.234	2,334,730	2,287,150	-2.03792
	Total	2627307	2,571,175.39	16.42669482	2589730	4512819	1733.326
Expenditures	Salary	1150541	1,155,564.19	0.436593742	1171313	1,167,800	-0.29992
	Operation & Maintenance	282655	375,321	32.78413614	260292	296,666	13.97431
	Fuel	326499	413,043.20	26.50672743	474084	462,810	-2.37806
	Other	422950	390,098.63	-7.767199433	158,872	132,770	-16.4296
	Total	2182645	2,334,027.02	51.96025788	2,064,561	2,060,046	-5.13325

Financial data of North&North West Jerusalem JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	Planned 31/09/2018	Actual 31/09/2018	Deviation
Revenues	Subsidy from MoLG	157,000	157,000	0	167,000	380600	128
	Service Revenues	1,162,000	1,017,759	-12	1,862,253	1,494,169	-20
	Other Revenues (Aid from JICA for maintenance)	145,000	102,820	-29	0	0	0
	Total	1,464,000	1,277,579	-42	2,029,253	1,874,769	108
Expenditures	Salary	610,800	650,651	7	702,072	639,565	-9
	Operation & Maintenance	561,731	352,655	-37	702,252	683,959	-3
	Fuel	256,054	270,176	6	316,584	289,897	-8
	Other	45,300	39,987	-12	61,847	62,973	2
	Total	1,473,885	1,210,627	-37	1,782,755	1,676,394	-18

Financial data of Nablus JSC (Revenues & Expenditures)								
	Items	Actual 2016	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
Revenues	Subsidy from MoLG	0	384160	847,650	120.65025	0	0	0
	Container grant from GGP	0	0	111,188	0	0	0	0
	Service Revenues	3229151	5505000	3,788,191	-31.1863579	4381780	4069110	-7.135684585
	Other Revenues	255762	0	0	0	0	700	0
	Total	3484913	5889160	4,747,029	89.463892	4381780	4069810	-38.23893486
Expenditures	Salary	865154	1127900	948,533	-15.9027396	967920	881930	-8.883998678
	Operation & Maintenance	467793	500000	527,114	5.4228	550000	859149	56.20890909
	Fuel	592723	650000	613,488	-5.61723077	600000	627282	4.547
	Landfill fee	566542	1055400	755,453	-28.4202198	926915	859889	-7.231083756
	Transfer station (to private company)	145143	337728	168,023	-50.249017	269648	186202	-30.94627069
	Transportation to landfill site	689705	1372020	912,064	-33.5240011	1146004	1063136	-7.231039333
	Other	112222	395006	200,066	-49.3511491	478255	276285	-42.23060919
	Total	3439282	5438054	4,124,741	-177.641557	4938742	4753873	-311.4742011

Financial data of NE&SE Jerusalem JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	0	0	0	840,490	0	-100
	Service Revenues	5,918,400	5,918,400	0	4,658,400	4,658,400	0
	Other Revenues	0	0	0	0	0	0
Revenues	Total	5918400	5,918,400	0	5,498,890	4658400	-100
	Salary	1,428,000	1,428,000	0	2,007,600	1,731,600	-14
	Operation & Maintenance	384,000	384,000	0	492,000	380,000	-23
	Fuel	648,000	648,000	0	888,000	648,000	-27
	Transferring (T/S (to Al Menya	1,080,000	1,000,000	80,000	1,008,000	0	-100
	Landfill fee	2,181,000	2,181,000	0	1,260,000	1,260,000	0
	Other	200,000	197,500	2500	200,000	199,400	0
Expenditures	Total	5,921,000	5,838,500	82,500	5,855,600	4,219,000	-164

Financial data of Qalqilya JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	0	0	0	0	0	0
	Subsidy from JICA	0	0	0	0	1,792,000	0
	Service Revenues	2,538,036	2,588,608	2	4,165,000	2,878,780	-30.881633
	Other Revenues	0	0	0	0	0	0
Revenues	Total	2,538,036	2,588,608	2	4,165,000	4670780	-30.881633
	Salary	491,880	518,314	5	531,120	497,863	-6.2616734
	Operation & Maintenance	119,954	442,478	269	420,000	400,835	-4.5630952
	Fuel	467,000	297,742	-36	1,142,450	270,602	-76.313887
	Landfill fee	1,325,000	935,896	-29	1,325,000	1,206,731	-8.9259623
	Transfer station (to private company)	200,000	108,009	-46	0	0	0
	Transportation to landfill site	1,000,000	757,598	-24	1,050,000	2,523,274	140.31181
	Other	0	0	0	0	0	0
Expenditures	Total	3,603,834	2,834,526	138	4,468,570	4,899,305	44.2471918

Financial data of Ramallah JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	800,610.00	800,610.00	-	-	-	-
	Container grant from GGP	-	-	-	-	-	-
	Service Revenues	-	-	-	-	-	-
	Other Revenues (Yearly Contributions)	306,125	-	(100)	689,476	503,724	(27)
Revenues	Total	306,125	-	(100)	689,476	503,724	(27)
	Salary	316,830	329,520	4	326,028	342,696	5
	Operation & Maintenance	154,899	168,806	9	202,342	203,982	1
	Fuel	11,100	12,898	16	13,500	14,664	9
	Landfill fee	-	-	-	-	-	-
	Transfer station (to private company)	-	-	-	-	-	-
	Transportation to landfill site	-	-	-	-	-	-
	Other	-	-	-	-	-	-
Expenditures	Total	482,829	511,223	29	541,870	561,342	15

Financial data of Salfeet JSC (Revenues & Expenditures)							
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	326000	319480	-2	329480	87019	-73.588989
	Container grant from GGP	0	0	0		0	0
	Service Revenues	1608120	1,854,511.08	15.32168495	2010840	2165016.21	7.66725398
	Other Revenues	241964	495,159.50	104.6418062	215324	265398	23.2551875
Revenues	Total	2176084	2,349,670.58	117.9634912	2555644	2517433.21	-42.666547
	Salary	695404	794,099	12.4285511	834867.84	837198.21	0.27913041
	Operation & Maintenance	315000	400,451	21.33869063	370000	623539	68.5240541
	Fuel	456000	509,418	10.48608412	571900	652131.64	14.0289631
	Landfill fee			0			0
	Transfer station (to private company)	0	0	0	0	0	0
	Transportation to landfill site	0	0	0	0	0	0
	Other	634777	515,843.95	-23.05601335	613540.16	529501.32	-13.697366
Expenditures	Total	2101181	2,219,811.95	5.344189178	2390308	2642370.17	10.5451753

Financial data in Tubas JSC (Revenues & Expenditures)								
	Items	Actual 2016	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	0	160000	291,010	82	155000	0	-100
	Service Revenues	1685750	1929919	1,858,662	-4	1844976	1858662	0.741798
	Other Revenues	6284	2000	39,378	1,869	0	18600	0
Revenues	Total	1692034	2091919	2,189,050	1,947	1999976	1877262	-99.2582
	Salary	482484	477038	546,436	15	447904	380206	-15.1144
	Operation & Maintenanc	492440	519180	673,167	30	530895	442829	-16.5882
	Fuel	364053	310000	556,675	80	423200	297641	-29.669
	Landfill Fee	481924	669095	310,443	-54	357776	297677	-16.7979
	Other	41754	48840	52,642	8	64380	30894	-52.013
Expenditures	Total	1862655	2024153	2,139,363	78	1824155	1449247	-130.183

Financial data of Tulkarem JSC							
	Items	Planned 2017	Actual 2017	Deviation	Planned 2018	Actual 2018	Deviation
	Subsidy from MoLG	120000	515430	329.525	250000	0	-100
	Service Revenues	5077167	4678634	-7.849515291	5220788	5278240	1.100446906
	Other Revenues	129834	245693	89.23625553	160000	237334	48.33375
Revenues	Total	5327001	5439757	410.9117402	5630788	5515574	-50.56580309
	Salary	1569455	1695963	8.060632513	1717302	1801109	4.880155034
	Operation and Maintenance	563622	637717	13.14622211	677093	581619.5	-14.10050023
	Fuel	1027705	1076466	4.744649486	1080000	1053521	-2.451759259
	Landfill cost	1518000	1,396,550	-8.000658762	1442678	1464726	1.528268955
	Managerial cost	646628	731,213	13.0809368	722413	586735.3	-18.78118196
Expenditures	Total	5325410	5,537,909	31.03178215	5639486	5487710.8	-28.92501745

2017	Nablus		Jericho		Bethlehem		Jenin		NE&SE		Tulkarem		Tubas		N & NW		Hebron		Ramallah		Salfeet		Qalqilya		Al-Minya	
	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio	Total	Ratio
	4,124,741		2,334,027		6,032,913		19,723,141		5,838,500		5,537,909		2,139,363		1,313,469		13,500,042		511,223		2,219,812		2,834,526		18,884,520	
Salary	948,533	23	1,155,564	50	2,430,668	40	9,450,115	48	1,428,000	24	1,695,963	31	546,436	26	650,651	50	2,785,424	21	329,520	64	794,099	36	518,314	18	3,297,497	17
Operation	527,114	13	375,321	16	1,812,930	30	1,674,059	8	384,000	7	637,717	12	673,167	31	352,655	27	7,148,571	53	168,806	33	400,451	18	216,967	8	10,535,280	56
Fuel	613,488	15	413,043	18	1,789,315	30	4,884,328	25	648,000	11	1,076,466	19	556,675	26	270,176	21	3,566,047	26	12,898	3	509,418	23	297,742	11	1,909,611	10
Landfill	755,453	18	0	0	0	0	0	0	2,181,000	37	1,396,550	25	310,443	15	0	0	0	0	0	0	0	0	935,896	33	0	0
Transfer station	168,023	4	0	0	0	0	0	0	1,000,000	17	0	0	0	0	0	0	0	0	0	0	0	0	108,009	4	0	0
Transportation	912,064	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	757,598	27	0	0
other	200,066	5	390,099	17	0	0	3,714,639	19	197,500	3	731,213	13	52,642	2	39,987	3	0	0	0	0	515,844	23	0	0	3,142,132	17
2018																										
	4,753,873		2,060,046		7,015,530		22,921,588		4,219,000		5,487,711		1,449,247		1,676,394		11,469,810		561,342		2,642,370		4,899,305		16,042,897	
Salary	881,930	19	1,167,800	57	2,679,385	38	10,942,835	48	1,731,600	41	1,801,109	33	380,206	26	639,565	38	2,687,100	23	342,696	61	837,198	32	497,863	10	4,312,805	27
Operation	859,149	18	296,666	14	2,172,764	31	2,151,796	9	380,000	9	581,620	11	442,829	31	683,959	41	4,896,127	43	203,982	36	623,539	24	400,835	8	6,094,015	38
Fuel	627,282	13	462,810	22	2,163,381	31	5,608,088	24	648,000	15	1,053,521	19	297,641	21	289,897	17	3,886,583	34	14,664	3	652,132	25	270,602	6	3,799,805	24
Landfill	859,889	18	132,770	6	0	0	0	0	1,260,000	30	1,464,726	27	297,677	21	0	0	0	0	0	0	0	0	1,206,731	25	0	0
Transfer station	186,202	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	1,063,136	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,523,274	52	0	0
other	276,285	6	0	0	0	0	4,218,869	18	199,400	5	586,735	11	30,894	2	62,973	4	0	0	0	0	529,501	20	0	0	1,836,272	11

Category %	Nablus		Jericho		Bethlehem		Jenin		NE&SE		Tulkarem		Tubas		N&NW		Hebron		Ramallah		Salfeet		Qalqilya		JSC (Al-Miny	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Salary	23	19	50	57	40	38	48	48	24	41	31	33	26	26	50	38	21	23	64	61	36	32	18	10	17	27
Operation	13	18	16	14	30	31	8	9	7	9	12	11	31	31	27	41	53	43	33	36	18	24	8	8	56	38
Fuel	15	13	18	22	30	31	25	24	11	15	19	19	26	21	21	17	26	34	3	3	23	25	11	6	10	24
Landfill	18	18	0	6	0	0	0	0	37	30	25	27	15	21	0	0	0	0	0	0	0	0	33	25	0	0
Transfer station	4	4	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
Transportation	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	52	0	0
other	5	6	17	0	0	0	19	18	3	5	13	11	2	2	3	4	0	0	0	0	23	20	0	0	17	11
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note : Yellow indicates the highest value Blue indicates lowest vaue

Table(3): JSCs categories expenditures percents

4.1 قائمة التحقق

الصنف	الحالة /الوصف	محقق	غير محقق	غير قابل للتطبيق	لم يتم تفقده	ملاحظات
المتطلبات العامة لتصميم و إنشاء مكبات النفايات الصلبة الصحية	السياج · ارتفاع السياج · بنية غير قابلة للتسلق · يحيط المنطقة بالكامل باستثناء المدخل · يمنع دخول الحيوانات · باطون مسلح لارتفاع معين تحت السياج					
	لوحة إرشادية تشير إلى وجود مكب صحي في المنطقة ·التركيب ·المعلومات المتضمنة فيها					
	طريق الوصول إلى الموقع · عرض الطريق · ظروف التعبيد و حالة الغبار و رش المياه · توقيع الدخول · اشارات المرور					
	نظام التوزين ·تركيب جسر التوزين ·تدابير الموظفين عند قبول الشحنة ·الايصال أو الفاتورة					
	أخذ الزلازل بعين الاعتبار خلال مرحلة التصميم					
	طريق داخل مكب النفايات ·الإنشاء ·الجودة (قوة التحمل، الحد من إثارة الغبار) ·اللافتات واشارات المرور					
	مرفق لغسيل العجلات · التركيب					
	مكتب					
	مستودع					
	ساحة خاصّة لتخزين تربة التغطية جودة التربة المخزنة					
	ساحة تفتيش ومنطقة حجز النفايات ·توافر هذا المرفق ·الموقع/والحالة ·سعة التخزين المؤقت ·وجود غطاء – للايام الماطرة					

المتطلبات الأساسية للبنية التحتية لمكبات النفايات الصلبة الصحية	نظام منع التسرب (بطانة) ·التركيب ·الامتثال مع المعايير						
	منشأ ساند للنفايات التركيب الشدة (مقاومة الانهيارات) خالي من الصدأ والتشققات هل هذا شامل كل أنواع الاجسام الساندة (باطون، حديد، صخر، مزيج من الباطون والصخر)						
	نظام جمع وتصريف العصارة .التركيب .الامتثال مع المعايير-حجم الانابيب						
	نظام تهوية/تجميع للغازات التركيب الامتثال مع المعاييرحجم الانابيب						
	جمع وتصريف مياه الأمطار · خندق لتحويل مسار المنبع · خنادق تصريف محيطية · خندق تصريف على الخلية المغلقة · خندق تصريف في القسم غير المستخدم · خندق لتجميع وتصريف مياه الامطار بعد اكتمال الطاقة الاستيعابية للمكب · خزان لمياه الأمطار						
	منشأة لمعالجة العصارة بركة تخزين العصارة · السعة · بطانة القاعدة · تركيب السياج						
	شبكة لإعادة دوران العصارة (غير مطلوبة بالضرورة، تعتمد على هيكلية الموقع) · التركيب · الامتثال مع المعاير · عاملة/ غير معطلة						
	منشأة لمعالجة العصارة (لا يشترط توافرها هنا)						
	منشأة مراقبة						
	بئر لمراقبة العصارة (حفرة داخل المكب)						
	أنبوب/ بئرلمراقبة الغازات المنبعثة من المكب (حفرة داخل المكب)						
	بئر لمراقبة المياه الجوفية						
ملاحظات عامة							

ملاحظات أخرى/يتوجب اتخاذ إجراءات(فورية) بخصوص:
ملاحظات المسؤول عن تشغيل الموقع التاريخ.....
تم أخذ عينات: نعم/لا اذا نعم منطقة أخذ العينات
تم التقاط صور: نعم/لا اذا نعم المناطق التي تم تصويرها

4.2 قائمة التحقق

التصنيف	الحالة/ الوصف	محقق	غير محقق	غير قابل للتطبيق	لم يتم تفحصه	ملاحظات
إدارة قبول النفايات	وضع معايير قبول النفايات: · تعريف واضح للنفايات المحظورة · رفض النفايات ذات المحتوى عالي الرطوبة · بروتوكول واضح حول الاسبست · إجراءات بشأن النفايات القابلة للتعفن · إجراءات بشأن النفايات الضخمة					
	تفتيش النفايات عند القبول · وضع قوانين للتفتيش البصري · أخذ عينات وتحليل للنفايات					
	الإجراءات المتخذة بخصوص النفايات المخالفة للمعايير · وجود إجراءات صارمة وقطعية					
	قياس كمية النفايات					
	تفتيش/تحليل دوري · عمل تحليل دوري للمكونات					
	تسجيل البيانات ورفع التقارير					
عملية طمر النفايات	نقل النفايات ودحلها · سير صحيح لأعمال الدحل · انشاء خلايا جيدة التخطيط · تقليل مساحة مسطح الطمر لحده الأدنى · العناية بالمرافق الأخرى					
	تطبيق مواد التغطية · تغطية يومية · تغطية متوسطة · تغطية نهائية					
	مسح لكامل الكمية · إجراء مسح دوري					
	التأكد من استقرار الانحدار · مسح ميداني سيراً على الأقدام وصيانة دوريتين					

	مراقبة مستوى الهبوط في المكب					
ملاحظات عامة:						
ملاحظات أخرى/يتوجب اتخاذ إجراءات (فورية) بخصوصها:						
ملاحظات المسؤول عن تشغيل الموقع وتقيمه:						
تم أخذ عينات: نعم/لا اماكن أخذ العينات						
تم أخذ صور : نعم/لا اماكن أخذ الصور						

5.3 قائمة التحقق

التصنيف	الحالة/الوصف	محقق	غير محقق	غير قابل للتطبيق	لم يتم فحصه	ملاحظة
كمية العصارة	هل تم التنبؤ بكمية العصارة أم لا؟ -بشكل يومي، أسبوعي، شهري، سنوي؟ - هل كانت المنهجية مناسبة ؟ -ما هو نوع البيانات المستخدمة لذلك؟					
	هل اجري قياس لكمية للعصارة؟ · كمية العصار في البركة · كمية العصارة المتدفقة إلى البركة · كمية العصارة المعاد دورانها هل يوجد بيانات مرضية حول: · كمية المياه المتولدة من هطول الأمطار · كمية تبخر المياه · تقديركمية العصارة المخزنة في الموقع					
	هل تم تسجيل البيانات التي تم قياسها بشكل صحيح؟					
ارتفاع العصارة	هل يتم قياس علو العصارة في البطانة؟ · بشكل متكرر · بشكل منهجي					
	هل تم تسجيل بيانات علو العصارة؟					
	هل المستوى الهيدروليكي للعصارة في البطانة أقل من 30سم					
نوعية العصارة	ه يتم اجراء تحليل للعصارة الخام ؟ ·بشكل متكرر ·للعناصر الواجب تحليل					
	هل يتم عمل تصريف مباشر للعصارة الخام للخارج؟ · النطاق والامتداد · المدة الزمنية · الأثر					

في حال طرح العصارة بعد معالجتها، هل يتم تحليل نوعية مياه دفق الصرف الصحي ؟ · بشكل متكرر · ما هي العناصر التي يتم تحليلها						
في حال تصريف العصارة بعد معالجتها، هل تمتثل الكمية هل تتوافق نوعية العصارة مع المعايير؟?						
ملاحظات عامة:						
مشاهدات أخرى/ إجراءات (فورية) يجب اتخاذها:						
ملاحظات المسؤول عن تشغل الموقع وتوقيعه:						
هل تم أخذ عينات: نعم/لا						
هل تم التقاط صور: نعم/لا						

5.4 قائمة التحقق

الصنف	الحالة/الوصف	محقق	غير محقق	غير قابل للتطبيق	لم يتم فحصه	الملاحظات
حكم بضغط الغاز	تركيب منافذ للغاز/ نظام تجميع للغاز لإدارة غازات المكب					
	وضع انبعاث الغازات المتسربة من سطح المكب: · مدارة بشكل جيد(انبعاث أقل)= محقق · لا يتم التحكم به= غير محقق					
الغازات السامة و العاملين	هل تتم مراقبة كبريتيد الهيدروجين أو أي غاز سام في مكان العمل بشكل منتظم؟					
	هل تم اطلاع العاملين حول مخاطر كبريتيد الهيدروجين؟					
	هل تم التحكم بمكان العمل حتى لا تتراكم الغازات السامة؟					
	هل تم استبعاد النفايات المحتوية على الكبريتات مثل ألواح الجبس من النفايات المقبولة؟					
التحكم بالغازات السامّة/القابلة للانفجار	هل تم تنفيذ المراقبة الدورية؟					
	مستوى الميثان في أعلى الموقع					
	مستوى كبريتيد الهيدروجين في أعلى المواقع					
ملاحظات عامة:						
مشاهدات أخرى/ يتوجب اتخاذ إجراءات(فورية) بخصوص:						

ملاحظات مشغل الموقع وتوقيعه:
هل تم أخذ عينات: نعم/لا
هل تم التقاط صور فوتوغرافية: نعم /لا

7.5 قائمة التحقق

المنشآت والمرافق الواجب التحقق منها	محقق	غير محقق	غير قابل للتطبيق	لم يتم التأكد منها	ملاحظات
هل تم وبشكل صحيح إجراء الفحص الروتيني (1-7) للمنشأ الساند للنفايات (في حالة السد الخرساني؟					
هل تم وبشكل صحيح إجراء الفحص الروتيني (1-12) لنظام المنشأ الساند للنفايات(في حالة السد ذي الحشوة بالترابية) ؟					
هل تم وبشكل صحيح إجراء الفحص الروتيني (أ-1-ج-3) لنظام منع لتسرب(نظام التبطين)؟					
هل تم وبشكل صحيح إجراء الفحص الروتيني (أ-1 حتى ج-3) لنظام إدارة العصارة؟					
هل تم إجراء الفحص الروتيني (1-5) لنظام تجميع وتصريف مياه الأمطار؟					
هل تم وبشكل صحيح إجراء الفحص الروتيني (1 إلى 2) لنظام جمع الغاز ؟					
هل تم إجراء الفحص الروتيني للمنشآت المتبقية بشكل مناسب؟ (أ-1 إلى هـ -2)؟					
ملاحظات عامة:					
مشاهدات أخرى/(مستعجلة) يتوجب اتخاذ إجراءات(فورية) بخصوص:					
ملاحظات مشغل الموقع					
هل تم أخذ عينات: نعم/ لا					
هل تم التقاط صور فوتوغرافية: نعم/ لا					

3.6 قائمة التحقق

التصنيف	الحـالة /الوصف	مُحقق	غير مُحقق	غير قابل للتطبيق	لم تتم معاينته	ملاحظـات
إدارة بيئة العمل	الامتثال مع القانون واللوائح المتعلقة بالصحة والسلامة المهنية					
	توفير معدات وقاية للعاملين وتفعيل استخدامها					
	تأكيد وجود غازات سامة في بيئة العمل					
	وضع قواعد تتعلق ببيئة العمل					
	تركيب معدات صحية					
	وجود إرشادات حول المواد الخطرة والكيماوية المستخدمة في الموقع					
	توفير تدريب حول الإسعافات الأولية وإنقاذ الأرواح، والخ.					
	إجراء فحوصات طبية دورية للعمال					
نظام الاستجابة في الطوارئ	إعداد قائمة عناوين بجهات الاتصال في حالات الطوارئ					
	إعداد الية تحضير حتى الاتصال في حالات الطوارئ					
	تدريب العمال حول الاستجابة في حالات الطوارئ					
	وجود خطط لمنع تكرار الحادثة					
	تدريب العمال على استخدام طفايات الحريق اليدوية					
ملاحظات عامة:						
مشاهدات أخرى/إجراءات (فورية) يتوجب اتخاذها:						
ملاحظات المسئول عن تشغيل الموقع:						
هل تم أخذ عينات: نعم/ لا						
هل تم التقاط صور : نعم/ لا						

3.7 قائمة التحقق

التصنيف	الحالة/الوصف	مُحقق	غير مُحقق	غير قابل للتطبيق	لم تتم معاينته	ملاحظات
تتطاير النفايات وإلقائها على الأرض	يتم السيطرة على النفايات المتطايرة بشكل مناسب					
	يتم وضع الغطاء الترابي على الفور لمنع تطاير وتبعثر النفايات					
	تم اتخاذ بعض التدابير (مثل؛ تركيب شبك لالتقاط النفايات المتطايرة، والخ)					
	هنالك موظف معين خصيصاً للتفتيش عن وتنظيف النفايات المتبعثرة في محيط الموقع.					
الناقلات	هل تسببت الناقلات بأي مشكلات خطيرة؟ (يمكن الاستعانة بتقاريرطبية محفوظة لدى ادارة المكب عن هذه الحالات)					
	هل تم أخذ التدابير اللازمة للقضاء على الحشرات و القوارض حسب ما جاء به دليل تشغيل المكبات					
	هنالك العديد من الطيور في الخارج					
	الذباب والبعوض يغزوان المكان بكثافة					
	يتم وضع تغطية ترابية يومياً بشكل صحيح.					
	تم إزالة المستنقعات والبرك المائية في الموقع					
	تم اتخاذ بعض الإجراءات للتخلص من الطيور/الحيوانات.					
ملاحظات عامة:						
مشاهدات اخرى/تدابير (فورية) يجب اتخاذها:						
ملاحظات المسؤول عن تشغيل الموقع:						
تم أخذ عينات : نعم/لا						
تم التقاط صور: نعم/لا						

6.8 قائمة التحقق

التصنيف	الحالة /الوصف	مُحقق	غير مُحقق	غير قابل للتطبيق	لم تم معاينته	ملاحظات
غازات المكبات	هل يتم مراقبة غاز الميثان؟ · عدد المرات/التكرارات · المنهجية · الاحتفاظ بالبيانات					
	لم يتم الابلاغ عن أي تراكيز غير عادية للميثان					
التسرب	هل يتم مراقبة المياه الجوفية؟ · عدد المرات/التكرارات · المنهجية · العناصر التي يتم تحليلها					
	لم يتم الابلاغ عن أي تراكيز غير عادية في المياه الجوفية.					
المياه السطحية	هل يتم مراقبة المياه السطحية؟ · عدد المرات/التكرارات · المنهجية · العناصر التي يتم تحليلها					
	هل يتم مراقبة الوادي (الترسب)؟ · عدد المرات/التكرارات · المنهجية · العناصر التي يتم تحليلها					
	لم يتم الابلاغ عن أي تراكيز غير عادية في المياه السطحية/سوائل الصرف.					
	لم يتم ملاحظة أي حالة غير طبيعية للترسبات في الوادي.					
الهواء	· لا يوجد حالياً أي عناصر يتم مراقبتها					
الرائحة	هل يوجد شكاوى من السكان؟ · يتم تسجيل الشكوى؟ · هل يتم اتخاذ اجراءات بشأنها؟					
	هل تم إجراء مراقبة للروائح؟ · التكرار · المنهجية					
	هل تم تسجيل بيانات المراقبة والرصد؟					
	هل يوجد على حدود الموقع مواد ذات رائحة تتجاوز المعايير المصح بها؟ ؟					
	أم هل يمتثل مؤشر الروائح مع المعايير؟					

ملاحظات عامة:
مشاهدات اخرى/تدابير (فورية) يجب اتخاذها بشأن:
ملاحظات المسئول عن تشغيل الموقع وتوقيعه:
تم أخذ عينات: نعم/لا
تم التقاط صور: نعم/لا

Annex 2b

قواعد تشغيل المكبات الصحية للنفايات الصلبة في فلسطين

تموز - 2019

المكتب بالمحافظة:			
فريق التفتيش:			
اسم المكتب/ الموقع:		احداثيات المكتب:	
تاريخ الموافقة البيئية:		سبب الزيارة:	
تاريخ الزيارة:		وقت الزيارة:	
الشخص المدلي بالمعلومات:			

الرجاء تعبئة الخانات التالية

تصنيف	الوصف/ الحالة	متحقق	غير متحقق	غير قابل للتطبيق	لم يتحقق وجوده	الملاحظات
	يوجد سياج على شكل كامل و غير تالف حول المكتب					
	يوجد لوحة إرشادية تشير إلى وجود مكتب صحي في المنطقة					
	طريق الوصول إلى الموقع معبد و حالة الطريق جيدة					
	يوجد نظام للتوزين وجسر التوزين تم تركيبه يتم اصدار ايصال أو فاتورة بعد التوزين					
	الطريق داخل مكب النفايات معبد وفي حالة جيدة					
	يوجد موقع لغسيل العجلات و يتم استخدامه					
	يتم تفتيش النفايات عند القبول وفق الاجراءات المتبعة					
	يتم تسجيل البيانات وتوقيع التقارير					
	ساحة تفتيش ومنطقة حجز النفايات متوفرة و ذات سعة تخزين مناسبة.					

					يوجد نظام لجمع وتصريف العصارة ويعمل بكفاءة ويتم مراقبة مستويات العصارة
					خندق تجميع وتصريف مياه الامطار بعيدا عن العصارة الناتجة من ضغط النفايات في الموقع تم بشكل صحيح وكافي
					يتم التخلص من العصارة بشكل سليم بيئيا
					يتم مراقبة المياه الجوفية
					نظام التهوية الخاص للحد من انتشار الروائح فعال ويتم مراقبة الروائح
					يوجد نظام لجمع الغاز
					يتم مراقبة الغازات المنبعثة من المكب
					يتم الاستفادة من الغاز الذي يتم جمعه
					يتم اطلاع العاملين حول مخاطر الغازات السامة؟
					يتم قياس مستوى التلوث في الموقع

					يوجد كمية كافية من التربة موجودة في الساحة المخصصة لتخزين تربة التغطية نوعية التربة المخزنة مطابقة للمواصفات
					يتم عمل التغطية بشكل يومي وبكميات مناسبة
					التأكد من استقرار الانحدار مسح ميداني سيراً على الأقدام
					حجم بركة العصارة يتناسب مع كمية العصارة الناتجة و خاصة في فصل الشتاء
					يتم تحليل العصارة وتسجيل البيانات التي يتم قياسها بشكل صحيح؟
					يتم الامتثال مع القانون واللوائح المتعلقة بالصحة والسلامة المهنية
					تتوفر معدات وقاية للعاملين ويتم استخدامها
					وجود إرشادات حول المواد الخطرة والكيماوية المستخدمة في الموقع
					توفير تدريب حول الإسعافات الأولية وإنقاذ الأرواح والخ.
					يتم اجراء فحوصات طبية دورية للعمال
					يوجد قائمة عناوين بجهات الاتصال والية الاتصال في حالات الطوارئ
					تم تدريب العمال حول الاستجابة في حالات الطوارئ لاستخدام طفايات الحريق اليدوية

	يتم السيطرة على النفايات الخطيرة بشكل مناسب ويتم اتخاذ بعض التدابير (مثل تركيب شبك التقاط النفايات الخطيرة)					
	هناك موظف معين خصيصاً للتفتيش عن وتنظيف النفايات المتخلفة في محيط الموقع.					
	هل تسببت النفايات بأي مشكلات خطيرة؟ (يمكن الاستعانة بتقارير محفوظة لدى ادارة المكتب عن هذه الحالات)					
	تم أخذ التدابير اللازمة للقضاء على الحشرات والقوارض حسب ما جاء به دليل تشغيل المكبات					
	هناك العديد من الطيور في الخارج و الذباب والبعوض يغزو المكان بكثافة ويتم اتخاذ بعض الإجراءات لإبعاد الطيور/الحيوانات.					
	هل يوجد شكاوى من السكان؟ • يتم تسجيل الشكوى؟ • هل يتم اتخاذ اجراءات بشأنها؟					
	هل تتم تسجيل بيانات المراقبة والرصد؟					

ملاحظات عامة:

ملاحظات المسؤول عن تشغيل الموقع وتوقيعه:

Annex 3

Auditing report on Zahrat Al Finjan landfill

Date of visit: Nov 14, 2018

Auditing Team:

1.

1. Eng. Yosrea Ramadan (Ministry of Local Government)
2. Eng. Hilal Snono (Ministry of Local Government)
3. Eng. Mohammad Bargouthi (JICA)
4. Majed Alsare' (HJSC of Hebron and Bethlehem)
5. Eng. Ruba Erman and Mr. Talib Hmeid (EQA)

- Person responded: Mr. Mohammad Al Sadi (Jenin JSC)
- Audit Report prepared by (Eng. Yosrea Ramadan (Ministry of Local Government)

Purpose

In order to confirm the applicability of the Guideline on the Environmental auditing of the landfill in Palestine which was created in 2017 under combined effort of MoLG (Ministry of Local government),EQA, LET (Local Expert) of several JSCs (Joint Service Council) in Palestine, and JICA (Japan International Cooperation Agency), auditing of the Zahrat Al Finjan Landfill in Jenin district was after confirmation of all listed items in the auditing checklists by the auditing responsible team (above mentioned).

Methodology

The auditing was conducted as the form of the interview with face to face and a site visit to the facilities in the landfill, checking the status of these facilities and its compliance and functionality. The auditing team asked each item in the checklists in the guideline and requested to the responder of the site to explain details on each item, all support documents were requested from eng. Mohamed Alsa'di.

Results

Concrete results are summarized in the following tables of checklist. Comments from auditing Team and responder are also included.

Overall comment

1) Fundamental requirement of the landfill structure

   Most of the structures and equipments are designed and constructed so as to comply with the international standards. what was noticed during the visit is the collapse in the retaining wall at the entrance of the Landfill, since during winter 2018 this wall (gabions) in the western part of the landfill was collapsed and displaced due to weather conditions and increase in the amount of dumped waste, which resulted in closing the road there and overturning the waste on the road (as illustrated in pictures

1,2,3). The Operator tried many solutions to overcome such sudden collapse like using boulders, but it was ineffective, and consequently the operator decides to make a full design to check all slopes stability, and to make the final cover for the landfill cell in order to start gas extraction.

Regarding Leachate Management facility, unfortunately this issue become more annoyable day by day, as the leachate quantities increased, existing leachate pond is almost full, no concrete treatment solution is conducted toward treating leachate as the currently used method (evaporation from pond and landfill surface through re-circulation) are not effective any more. Recently MDLF conducted a feasibility study toward selecting a treatment technology, the study concluded that, resulting of the current leachate management and storage condition, and regardless the necessary preliminary measures starting, the future leachate management shall be divided in two successive periods.

The first period (phase 1) will aim to a complete treatment and elimination of the current highly saline and contaminated leachate stock accumulated in lagoons. When this first step is completed, if coupled with here-above mentioned preliminary measures, leachate collected from waste cells and stored in lagoons should be significantly less saline and concentrated. Otherwise, the total leachate quantity stored in lagoons should be significantly reduced.

The second period (phase 2) will aim to create and operate a final leachate management and treatment system designed for permanent and stable landfill operating conditions. Accordingly, the most feasible technology and the more efficient treatment line, able to meet the performance requirements for treated effluent either for discharge or re-use is the combined treatment line coupling a 1st step membrane bioreactor (MBR) and a 2nd step reverse osmosis (RO). Either during step 1 and step 2, RO process shall be coupled to an adequate concentrates treatment process (vacuum evapo concentration requiring biogas re-use and heat recovery system, or forces natural evaporation).

During phase 2, biological process shall be coupled with an adequate sludge management system (for example sludge dehydration constructed wetlands).

Regarding the leachate quantity and the site capacity to hold it, unfortunately the unexpected amount of waste that drastically exceeds the planned value, the site cannot keep up the management of leachate with only one pond because of the moisture derived by the waste. Consequently, by med of September 2018, the operator started operating a new cell with capacity of (500-600) thousands cubic meter, 1.5 mm HDPE and Geotextile was used for lining, regarding the new leachate pond, the capacity will be (around 600,000 m3) and it is planned to serve (1.5 year) more details are annexed in (Annex (I))

2) Landfill operation

As for the waste acceptance procedure, measurement of the waste mass, inspection of the load, correspondence to the unacceptable waste, etc are performed by satisfactory manner. Since composition analysis has been seldom conducted, periodical execution of it was recommended by the Japanese expert since last auditing in March,2017, but unfortunately nothing was conducted since that time on this regard.

In terms of waste filling operation, there are several problems. First, we have visited the new cell, working area there, it is reasonable. But regarding the daily cover soil it is sufficient. Every nuisance issue is caused by this work,

waste is not spread and compacted properly before being covered by soil. Third, quality of cover soil seems to be not suitable, as the used one is resulted from excavation work in the site, and the operator said that they are going to supply suitable clay for the final cover before starting in gas extraction and treatment, as the requested Soil material should have more suitable quality (i.e. high moisture holding capacity, high adsorption capacity, finer particle size, etc.) to mitigate odor .

Additionally, there seems to be financial constraints to bring suitable soil with requested quantities. If cover soil having suitable quality was acquired sufficiently and it is implemented properly, current nuisance problems would be drastically solved.

3) Leachate management

Estimation of leachate quantity was conducted by using meteorological data and site characteristics. Analysis of leachate quality is also done periodically.

In reference to the last audit report prepared by Japanese Expert in 2017, the situation of leachate treatment was miserable, as leachate quantity wasn't controlled properly and discharged to the surrounding environment, especially during winter. From that time there are some countermeasure were taken in order to get out of this situation, so construction of new leachate collection pond is ongoing (see pic), in addition to the recommendations which has been raised by MDLF based on the feasibility study prepared by (NGOs), until actual solution being on the ground, quantities of leachate are increased day by day, leachate still discharged to the surrounding environment.

4) Landfill gas management

No countermeasures for preventing gas explosion were taken since 2017, in addition to the fact that the pressure increased inside landfill cell and need to be monitored properly, in addition to the importance of having a framework on gas detection at working place, especially enclosed space. The operator confirmed that a new feasibility study on gas collection and transferring to energy is ongoing as the consultant already visited the site and collected all required data for the study.

5) Inspection and maintenance

No new actions had been taken since 2017 audit took place, as Necessary inspections and maintenances on the structures and equipment are performed appropriately, but nothing documented. Consequently, the Japanese expert has recommended to prepare an inspection and monitoring manual but nothing has made in this regard.

6) Safety

Although necessary measures concerning safety are adopted with little problem, the detection system concerning gas is insufficient. I would like to recommend the introduction of a gas detection system to prevent accidents related to explosion and life of workers.

7) Littering and vector

The scattering of waste has occurred, it spreads to not only the inside of the premises and the fence but also out of the premises. This is due to insufficient covered soil. There is room for improvement.

As for the vector, vermin, and birds, insufficient soil covering allows also them proliferate. As for pests, it is dealt with by using insecticide in the summer, but it is necessary to tackle the cause of the occurrence, specially with such damaged fence, it is so easy for any external animal like dogs to enter, or any other external unauthorized person to enter the cell, making rehabilitation of the current fence or installing a new one is highly recommended

8) Monitoring

As reported in the last audit report, various efforts made for trying to grasp the impact to the environment from the site as much as possible can be inferred. Various monitoring for gas including odor, leachate, surface water, and groundwater has been conducted voluntarily. If it allows to comment, these monitoring should be better done on a regular basis. And as for the gas monitoring, toxic or explosive gas should be focused on, it can be monitored by simple handheld detector, and regarding the monitoring of surface water in wadi during storm event, it can be highly evaluated. In order to monitor the odor, there is simple olfactory method which can be performed by site personnel. Adoption of such simple method is recommendable.

Summary

In this landfill, there are several serious problems occurring as will be highlighted below:

1. The first problem according to the last auditing report, is the amount of leachate exceeds the planned value, making it impossible to manage. The clear cause is that daily amount of waste carried in far exceeds the predicted value at the design stage, and the increase of the leachate quantity is caused by the moisture derived from the waste. Because of the large amount of waste, covering of it by soil becomes insufficient so that eventually it allows rainwater to infiltrate to the waste layer, especially in winter. This rainwater intrusion also contributes to the increase of leachate further. At the time of designing, it was estimated that only a single pond is needed and furthermore it was judged that the leachate can be managed by evaporation. This judgment in design unfortunately resulted in the current condition in which a part of leachate overflows the site,

   so, the operator and in order to overcome such problem, he prepared a design to construct a new leachate pond, and he already start working in construction, this pond capacity will be (15000m3) and supposed to be put into operation by (April 2019), but the leakage from old leachate pond need to be evaluated and mitigated in order to keep the surrounding environment from any future pollution.

   The second problem also comes from received huge amount of waste. Since waste of about 3 times the planned amount is carried in everyday, the landfill working face has to be widened, and sufficient covered soil can not be implemented for such wide working face properly. As a result, the problem of nuisance on the surface becomes extremely serious. Odor also comes from this situation.

Thorough covering is the most fundamental exercise of sanitary landfill. Besides, limestone collected from the surrounding ground is used as covering material at present. But it can hardly expect the reduction effect of odor. Thus, it is desirable to adopt soil covering that is more likely to have a deodorizing effect. However, additional costs will also be incurred for the introduction of such alternative coverings, the operator currently is using tree branches to reduce odor, as shown in the attached picture, this scenario was effective but we couldn't depend on as long term, and as mentioned before an odor reduction substance are sprayed to the leachate pond as 130Ldaily solution. according to operator, they said that a feasibility study is conducted by MDLF in order to select the most appropriate treatment technology, as based on this study recommendation, the most appropriate technology is as mentioned previously in the summary. As it is difficult to reduce the amount of waste to be delivered, a financial support for the implementation of soil covering and leachate treatment should be provided sufficiently, at this landfill, unexpected situations different from the design stage are occurring, so it is normal that the site becomes to be struggling to respond it. Since the essential cause is overwhelming quantity of daily waste, generators (i.e. general public) should also be responsible together for this situation and should pay a reasonable cost.

There are another opportunity for the operator to reduce the quantity of dumped waste through operating the separation line which all of its required infrastructure components were installed in the site, but it was stopped and the operator justified this as "such imitation was coming as a partnership with the private sector, as the private sector is responsible for managing the production line. And after the operating process reached the result of lack of financial feasibility of the project and the lack of local factories and markets for receiving the recyclable materials, the project stopped".

1) Checklist (Fundamental requirement of landfill)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Basic infrastructure	Fence ·The height of the fence. ·Unclimbable structure ·Enclose the territory completely		✓			Height of the fence is 2m. It is not completely surrounding the site boundary. In some areas fence was damaged and need to be replaced.
	Site notice board ·Installation ·Information provided	✓				
	Site access road ·Width of the road ·Pavement and dust condition ·Visitor signature ·Access sign		✓			The access road width is not enough less than (10m). It is paved by asphalt. But no measures were taken toward mitigate the dust problems., there is no procedure for documenting any visitor's data.
	Weighing system ·Installation of the weighbridge ·The staff's arrangement at acceptance	✓				Installed. Three staffs are allocated. Three shifts system is employed. All the data measured by the weigh bridge is recorded electronically and documented properly.
	Road inside the landfill ·Construction ·Quality (strength, dust prevention)		✓			There are peripheral road and delivery way comprised of coarse pebbles inside the site, the internal roads unfortunately not properly strengthened or paved, even not clean the waste is scattered in all directions, which make movement unsafe and difficult
	Wheel washing facility ·Installation		✓			Installed, but what was seen there is improper method used of cleaning the ditch used for collecting the washing water.
	Office	✓				There are three-storied office buildings.
	Warehouse	✓				Exists.
	Stockyard for cover soil ·Quantity of the soil stocked		✓			Depending on the season, location of the stockyard changes. Current yard has 100m^2 of the area, regarding the soil quantity it is not enough, even the quality is not as per required in the specification.
	Inspection yard and quarantine place ·Existence ·Location/Condition ·Capacity for temporary storage ·Availability of waste covering system	✓				Inspection of the waste is conducted at the tipping face. This location was selected in terms of the easiness of inspection because all the waste carried in is dumped at the tipping yard, regarding covering the quarantined waste, it is not provided for the place.
Fundamental facility required for MSW landfill	Leakage prevention system (Liner) ·Installation ·In conformity to standards	✓				The liner comprised of clay and geomembrane was installed. The specification of the liner complies with the international standards based on the design documents, for the new cell, the same type of membrane is used.
	Waste retaining structure ·Installation ·Robustness (not collapse) ·No erosion and cracks ·		✓			There are some embankments inside landfill. They are already covered by waste. The used retaining structures (gabions) were recently collapsed, due to different reasons; heavy rainfall, huge dumped waste quantity among the immediate mitigation measures taken to overcome this problem is closing the road in front of transportation, in addition to stop working in the collapsed area, the operator already started seeking for a feasible solution.

	Leachate collection and removal system (LCRS) ·Installation		✓			Installed. There are several cells in this landfill. Leachate collection pipes are installed in each cell as passing through completely the cell, but due to bad situation there, the LCRS is not working properly, leachate is seeping from different points to the surrounding areas, especially in the area where retaining wall is collapsed.
	Gas collection/ventilation system ·Installation ·			✓		Not installed. According to the design and plan of this landfill, gas collection system would be installed after the implementation of the final cover.
	Storm water collection and drainage ·Upstream diversion ditch ·Peripheral drain ditch ·Drainage ditch on the closed cell ·Drainage ditch in unused section ·Storm-water reservoir	✓				There are several storm water drainage ditches. The primal one is located at the side of the access road. Besides, temporary ditches to remove rainwater are installed inside the site. <The problem is separation of the storm water from leachate is insufficient, especially, ditches inside the site. In these ditches, leachate mixed with storm water flow. Because of the current site structure and the progression of cell construction, complete diversion of storm water seems to be difficult. However, if the soil cover is installed more properly, their diversion may become possible, additionally the storm water diversion ditch was not working properly, it is filled with waste, stones which make water drainage difficult>
	Leachate Management facility					
	Leachate storage pond ·Capacity ·Bottom lining ·Installation of the fence		✓			There are several leachate ponds. Based on the design, only one pond was necessary. However, waste exceeding its designed quantity has been delivered to the site and its results in the generation of leachate that is far over the estimated value. Thus, the site needed to construct new leachate ponds one after another. Some ponds have impermeable sheet as its liner. In winter, the capacity of the pond is still less. As consequences, uncontrolled discharge of the leachate (overflow of the leachate from the site) occurs. Construction of new leachate collection pond is ongoing; the capacity will be (15000m3) and it is expected to be put into operation on (April 2019.) the size of the new constructed pond must be enough to store the leachate quantity produced by new constructed cell.
	Leachate recirculation network (Not necessarily required depending on the site structure) ·Installation ·Functioning			✓		Leachate treatment system in ZF landfill is through recirculation system by pumping the leachate to leachate pond then to working face of the cell, or by using equipment tank to pull the leachate and spread it above the waste. However, after the experiment and the inefficiency of the recirculation system, The Leachate recirculation is performed by using tanker truck. At some location (upper area of site), re-circulation is conducted by using pump and hosepipe from 2nd leachate pond. Since they are not complete system, this inquiry is inappropriate to this site.
	Leachate treatment facility (Not necessarily required here)			✓		Leachate treatment system isn't installed in this site, yet, a feasibility study for installing a treatment technology in the site is prepared through MDLF and the study recommended the most appropriate technology as explained in the text before.
	Monitoring facility					

	Leachate monitoring well (borehole inside landfill)			✓		No leachate monitoring well is installed as they considered the nearest ground water well (Arrabah) as monitoring well. Additionally, one manhole is installed at the edge of the site. It was installed to inspect leachate leakage by collecting groundwater passing below the liner. Thus, since this manhole is useful to detect leachate leakage, periodical monitoring is recommendable.
	Landfill gas monitoring well/pipe (borehole inside landfill)			✓		No gas monitoring well is installed. Installation of the gas collection system is planned after final cover is implemented.
	Groundwater monitoring well			✓		There is no groundwater monitoring well specifically intended for this site. However, there is a domestic well at the vicinity of the site. The depth of the well is approximately 300m. Since the depth of the well is too deep, it seems to be inappropriate for monitoring of this site.

Overall comment

Overall, the fundamental structures required for the sanitary landfill are installed in this site. This is because the site was designed and constructed based on the international standards. Thus, in terms of basic structure, the site does not have any problem.

However, with regard to leachate management, the current condition is regarded as insufficient. The capacity of the pond is obviously short. As mentioned above, it is the design issue. In the design phase, current situation was not expected (i.e., in actual, daily amount of waste keeps exceeding the planned quantity). The moisture in waste is the significant source of the leachate. Thus, the increase of waste beyond estimation causes huge amount of leachate generation that naturally surpass the originally designed pond capacity. Thought the site personnel are trying to handle it and are making additional ponds to prevent the overflow of leachate from the site, it seems to reach the critical limit of their effort.

Essentially, the quantity of the leachate exceeds the capacity of which the landfill control, its discharge to the outside is inevitable. When considering the discharge, leachate treatment becomes mandatory. So, this landfill seems to enter the phase in which the installation of the leachate treatment facility is must, on this regard and based on what has been seen in the site, the operator tried to tackle the problem of odor caused by leachate by using tree branches to mitigate odor problem, we felt a real reduction in bad odor there, but from the auditing team perspectives this measure is efficient from one hand , but will increase the waste quantity from other hand

Other observation / (Immediate) Action is Required on;

As mentioned above, leachate treatment must be considered as soon as possible. And discharge of only treated leachate should be allowed but not allowed for raw leachate specially in the area where the retaining wall was collapsed, a solution to mitigate the slope problems in the retaining structures in the landfill is highly recommended.

Site Operator's Comments:

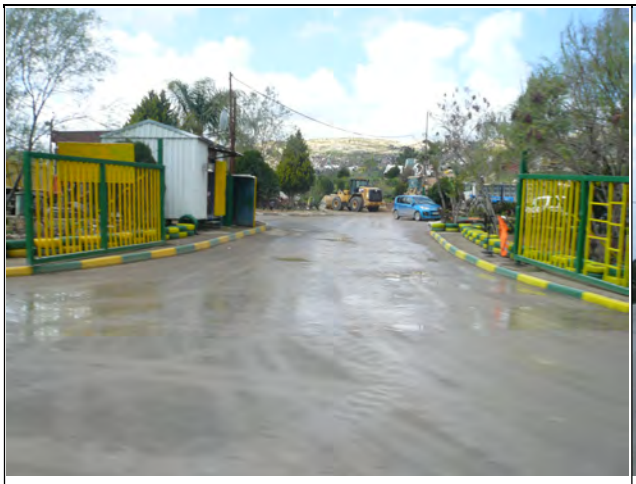
The operator also thinks that the issue of leachate is serious. Although they are tackling the issue by creating several ponds. They also think that this issue is caused by the design and significant change of the daily waste quantity that was not expected when the landfill was constructed. They are thinking that they want to treat the leachate in some efficient way and want to reduce the amount of the leachate stored in the site.

The problem becomes especially serious in winter because there is much rainfall during winter. In summer, the generation of leachate decreases and they can control it somehow.

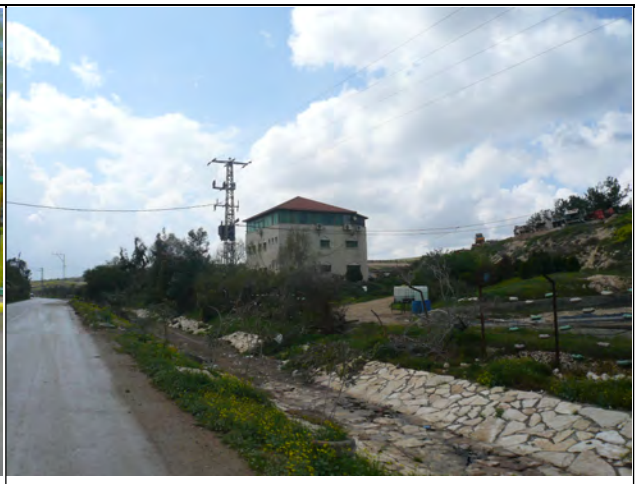
Besides, the operator also commented on the gas collection system. They are going to install the energy recovery system from the landfill gas and its feasibility study was already performed. After two or three years, the landfill reaches to its full capacity so then , they will install the gas collection and recovery system along with the implementation of final cover.

Samples Taken: Yes/No

Photographs Taken: Yes/No



Gate-2017



Office -2017

Weighing system and staff -2017

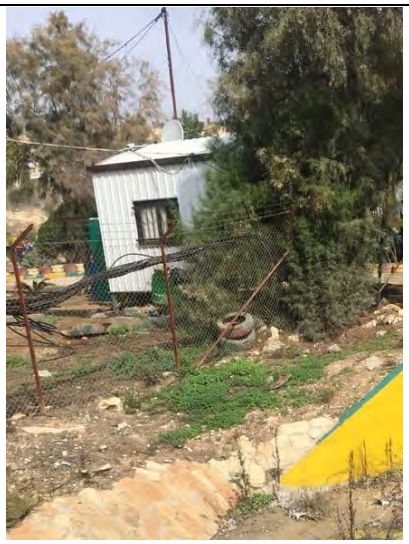
Vehicle washing-2017

Fence-2017

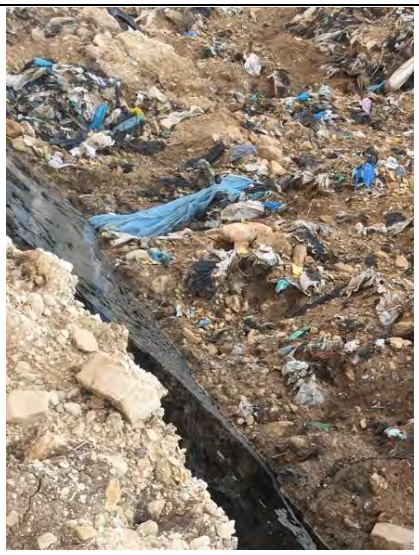
Site notice board -2017

Warehouse -2017

Leachate pond-2017



Storm Water Drainage ditch filled with -2018



Leachate Overflow to outside -2018

Retaining Wall -2018

waste overturning behind the retaining wall-2018

Weighing Bridge -2018

Dust improperly controlled-2018

Internal road (Improperly paved and not clean)-2018

Data documentation of receiving waste -2018

2) Checklist (Management of landfill operation)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of waste acceptance	Setting up waste acceptance criteria · Clear definition of prohibited waste · Refuse of waste with high moisture content · Clear protocol on asbestos · Measure for bulky wastes	✓				Although there are not documented acceptance criteria, acceptable waste in this site is limited to the domestic waste generated from the area covered by Jenin JSC. In general, the waste from slaughter house, hazardous wastes (e.g. asbestos), and bulky waste isn't accepted in this site. The inspection is done at the tipping face in landfill where the waste carrying vehicles unload their waste. If it contains unacceptable waste, the disposal of the waste is refused and the carrier is ordered to bring it back to the source, Giving the responsible body in EQA full picture about such procedure.
	Waste inspection at acceptance · Enactment of visual inspection · Sampling and analysis of waste	✓				Inspection is performed for every vehicle carrying in the waste. The procedure is visual inspection. Sampling and analysis are not performed since the acceptable waste is limited to the domestic waste (the characteristics are not so different.)
	Measure for the waste not comply with criteria · Existence of decisive procedure	✓				There are no clear criteria. But if the waste is regarded as not acceptable by visual inspection, it is rejected.
	Waste quantity measurement	✓				Done appropriately.
	Inspection/Periodical analysis · Execution of periodical composition analysis		✓			Occasionally, waste composition is analyzed. It was conducted in 1998, 2009, 2011, 2013, and 2017. Periodical analysis on waste composition is recommendable.
	Data recording and reporting	✓				All the data on waste quantity is appropriately recorded and it has been submitted to the regulatory authority (MoLG) for creation of waste statistics.
Waste filling operation	Waste emplacement and compaction · Proper compaction work · Well planned cell creation · Minimization of working face · Care on the other facilities		✓			The working face is reasonable in the new cell. And waste is covered and compacted but the cover still not in compliance with standards due to lack in soil quantities in the site. Though compaction is performed, it is difficult to judge whether the procedure is appropriate or not because daily amount of the waste is too much. Root of whole problem is too much waste delivery which exceeds the capacity of the site. As consequence, the new cell with capacity of (500-600) thousands cubic meter might not serve as planned (18 months), but the operator said that they are going to construct a new cell after this one filled. .

	Implementation of cover material · Daily cover · Intermediate cover · Final cover		✓			Daily cover is insufficient. The reason is the same with above (waste quantity beyond the designed amount). Due to the definite shortage of the soil, the waste is exposed at the surface in various places. If the daily quantity of waste was normal as designed, enough daily cover was implemented. The site personnel told that in winter the implementation work of soil cover becomes difficult because of the rain. It affects trafficability of heavy equipment severely. The quality of the cover soil seems to have also problem. In this site, crushed lime stone is used as daily cover soil. However, this material does not have enough moisture holding capacity, adsorption capacity, and not suitable for microorganism to proliferate. (add picture from the site)
	Survey of completed amount · Conduct periodical survey	✓	✓			Depending on the progress of filling operation, the survey was performed. Up to now, three times of the survey was conducted within ten years. When conducting the survey, it is ordered to the professional land surveyor. Since the frequency of the survey is less, both satisfactory and unsatisfactory were checked.
	Confirmation of slope stability · Periodical walk-over survey and maintenance	✓				Yearly, the stability of slope is confirmed. Besides, erosion of the slope is also confirmed.
	Monitoring of settlement	✓				It is confirmed visually.

Overall comment

The procedure of waste acceptance seems to be not a problem. Though strict inspection is better for proper landfill management, real execution of it is known to be quite difficult. Thus, the procedure adopted in this site is acceptable.

As for the waste filling procedure, obviously there are serious problem. Namely, there are issues on the waste placement and implementation of daily cover soil. As mentioned earlier, the root of these problems is the quantity of received waste which exceeds planned value and the new constructed cell might not receive such huge quantities. These issues have to be considered by not only landfill operator but also by the generator of the wastes. Concretely, in order to manage these tremendous amount of waste, financial support must be indispensable to improve the current situation.

Regarding the separation line, as I mentioned previously the operator can take this as opportunity to reduce waste amount, but since the owner of this separation line is a private company who decide to terminate this project due to financial and marketing challenges..

Other observation / (Immediate) Action is Required on;

Immediate action on the implementation of daily cover soil and on the selection of this cover seems to be necessary specially for the new constructed cell, in order to overcome the problems faced during operating the old cell.

Site Operator's Comments:

The operator commented that there is no significant issue on the operation.

Samples Taken: Yes/No

Photographs Taken: Yes/No

 Construction works in new leachate pond (2018)	Covering waste by soil (2018)

3) Checklist (Leachate management)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Leachate quantity	Is the prediction of leachate quantity conducted or not? · Daily, weekly, monthly, yearly? · Is the methodology appropriate? · What sort of data is used for it?	✓				
	Is measurement of leachate conducted? · Amount of leachate in the pond · Quantity of leachate flowing in the pond · Quantity of leachate re-circulated Are there satisfactory data on · Quantity of water getting in by rainfall · Quantity of water evaporating Estimation of leachate stored in the site	✓				
	Are these measured data recorded properly?		✓			
Leachate head (optional)	Is the leachate head on the liner measured? · Frequency · Methodology					(This check item is optional)
	Is the data on leachate head recorded?					(This check item is optional)
	Is the hydraulic head of the leachate on the liner less than 30cm					(This check item is optional)
Leachate quality	Is analysis of raw leachate conducted? · Frequency · Items of analysis	✓				When necessary, leachate and other water samples are sampled and send to the laboratory. The items for analysis vary but cover almost important items.
	Does the direct discharge of raw leachate to outside occur? · Extent · Duration · Impact		✓			Direct discharge of leachate is happening. This is because the capacity of leachate ponds is not enought. Excess leachate overflows from the pond and flows into the nearby Wadi, especially at rainfall event. And around the old cell, specially at the point where the retaining wall collapsed. The leachate can be confirmed in Wadi even at almost several hundred meters away from the site. Since increase of leachate occurs in winter (in rainy season), the duration of discharge is thought to be limited within the period of rainfall event. Up to now, its impact never assessed. As shown in guideline, sediment of wadi should better be analyzed periodically to identify the range of its impact, in the same context, many samples were taken recently (November 2018) from the leachate pond, COD was analyzed and, in most samples, the concentration ranged between 4890mg/l to 14840 mg/l.

	If the leachate is discharged after treatment, Is the quality of effluent analyzed? · frequency · analyzed item			✓		In this landfill, there is no leachate treatment process.
	If the leachate is discharged after treatment, Doe the quality complies with the standards?			✓		In this landfill, there is no leachate treatment process. As mentioned before, a feasibility study is prepared through MDLF to propose a feasible treatment technology.

Overall comment

The basic strategy of leachate management in this landfill was to evaporate it from the pond and by re-circulation. This strategy was planned because the estimated amount of leachate generation was less than what is now actually generated.
However, indeed the amount of leachate exceeds the controllable capacity prepared in the site, and overflow events seem to be occurred sometime up to now. The occurrence of it is clearly identified at downstream "wadi".
At present, it is undoubted evidence implying that this landfill must have leachate treatment facility because strategy relying on the evaporation cannot control the quantity of the generated leachate.
it was recommended by Japanese expert that the operator should increase of the number of ponds that have lining system, in order to hall the uncontrolled discharge of leachate as soon as possible, accordingly a new leachate pond is under construction with a full capacity of 15000m^3.

Other observation / (Immediate) Action is Required on;

What is most important is to stop the uncontrolled discharge to outside the landfill, and to follow the issue of treating leachate as soon as possible.

Site Operator's Comments:

They are seeking optimum method to treat the leachate. As since the last auditing on in March 2017, the operator tried to test a treatment of leachate using chemicals (pictures) proposed by external company , but unfortunately the method failed to, treat the leachate and then , the operator now is waiting to find a financial support in order to finance the implementation of treatment technology proposed by the consulting firms through MDLF, the results of this study already mentioned in this report.

Samples Taken: Yes/No

Photographs Taken: Yes/No

Construction on Leachate Pond (2018)

Trees Branches added to leachate pond to reduce odour(2018)

4) Checklist (Landfill gas management)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Control of gas pressure	Installation of gas vents/gas collection system for landfill gas management			✓		The landfill gas management is planned after entire cell construction is completed. Thus, during filling operation no gas wells are installed.
	Condition of fugitive gas emission from the surface Well managed (less release) =satisfactory Un controlled=Unsatisfactory			✓		The same with above, the gas control will be done after the completion of entire cell construction and installation of top cap. Hence, at present, no measure is done for fugitive gas emission.
Toxic gas for workers	Is the monitoring of hydrogen sulfide or other toxic gas performed at the working face, regularly?		✓			The monitoring is not performed regularly. There is one mobile gas detector in site. Hence, if necessary, they can conduct monitoring.
	Are the workers informed about the risk of hydrogen sulfide?	✓				Not all the worker is informed. But some of them are informed about no precautions signs were noticed in the site)
	Is the working face controlled so as to not accumulate toxic gases?	✓				The working face in this landfill is in general flat. Hence, accumulation of toxic gas is not expected at the working face.
	Is the waste containing sulfate such as gypsum board excluded from the acceptable waste?	✓				Waste containing sulfate such as gypsum board is designated as an unacceptable waste.
Explosive/Toxic gas control	Is the regular monitoring executed?	✓				Yes, only external based on the guidelines issued.
	The level of methane at highest location. (ppm)					
	The level of hydrogen sulfide at highest location (ppm)					

Overall comment

In this landfill, gas collection and energy recovery from the gas is planned after the completion of entire cell. So, during the filling operation, no gas management is performed.

Based on the onsite survey by auditor, fugitive gas emissions from the landfill surface are identified at many places.

As the operator considering, to concentrate gas recovery after completion of cell construction is understandable. However, there are many landfill sites at where gas collection system is installed during operation phase. Especially, installation of horizontal gas trenches other than it directly located below the top cover is only possible during the filling operation.

In addition, to prevent the increase of gas pressure inside the landfill, it seems better to have gas vents (manhole). Constructed during the filling process in the new constructed cell as done in Jericho landfill.

Other observation / (Immediate) Action is Required on;

None

Site Operator's Comments:

The gas collection and recovery system will be installed after the completion of entire cell. It isn't far future, and probably two or three years later, they will be installed. Already its feasibility study was completed. After the installation of it, every monitoring regarding gas will become possible.

Samples Taken: Yes/No

Photographs Taken: Yes/No

5) Checklist (Routine inspection and maintenance)

Items for confirmation	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Is the routine inspection (1-7) of the waste retaining structure (in case of concrete dam) conducted appropriately?			✓		This landfill doesn't have concrete dam.
Is the routine inspection (1-12) of the waste retaining structure (in case of earthfill dam) conducted appropriately?	✓				Inspection is performed routinely.
Is the routine inspection (A-1 to C-3) of the leakage prevention system (lining system) conducted appropriately?	✓				Inspection is performed routinely.
Is the routine inspection (A-1 to C-3) of the leachate management system conducted appropriately?	✓				Inspection is performed routinely.
Is the routine inspection (1 to 5) of the storm water collection and drainage system conducted appropriately?	✓				Inspection is performed routinely.
Is the routine inspection (1 to 2) of the gas collection system conducted appropriately?			✓		This landfill doesn't have gas collection system, yet.
Is the routine inspection (A-1 to E-2) of the other remaining facilities conducted appropriately?	✓				Inspection is performed routinely.

Overall comment

It seems that routine inspections are performed appropriately.
However, if commenting some, its procedure should be better to be documented clearly, as for the recent collapse in the retaining wall, the collapse happened suddenly (nothing was noticed on the wall before the collapse) but even so, the operator should take some measures toward preventing any post problems (preventive maintenance), until rehabilitation of such wall take place.
on this regard, the Japanese expert recommended to create a routine inspection manual, but since that time, nothing done either by the operator or by Molg. And EQA

Other observation / (Immediate) Action is Required on;

The current situation due to the collapse in the retaining wall caused a noticeable damage in the site, a quick action needs to be taken, in the same time inspection of the other segments of the retaining structure need to conducted as soon as possible.
As for the operator, the quick action they are going to take is to add a big stone (boulders) in order to prevent current collapsed wall from additional displacement, and they are going to design a new retaining wall to be constructed in the site.

None

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes No

Tables for check items (written again for checklist)

Waste retaining structure

Concrete dam

ID	Inspection item	Frequency	Methodology
1	Seepage of leachate	daily	visually
2	Cracks and chipping of concrete	Daily	Visually
3	out of alignment	Daily	Visually
4	Corrosion of reinforcing	Daily	Visually
5	Buckling	Daily	Visually
6	Settlement	Monthly	Subsidence meter/Survey
7	Slippage	4 times per year	Survey

Earth fill dam

ID	Inspection item	Frequency	Methodology
1	Plant (incl. Weeds and grass) growth	Weekly	Visually
2	Accumulation/deposition of soil	Weekly	Visually
3	Seepage of leachate from slope	Weekly	Visually
4	Cracks	Weekly	Visually
5	Expansion of structure	Weekly	Visually
6	Settlement	Twice/year	Subsidence meter/Survey
7	Erosion of slope	Weekly	Visually
8	Slope failure	Weekly	Visually
9	Scouring	Weekly	Visually
10	Buckling of the slope	Weekly	Visually
11	Subsidence of foundation	Twice/year	Subsidence meter/Survey
12	Collapse of foundation	Weekly	Visually

Leakage prevention system (lining system)

ID	Inspection item	Frequency	Methodology
A	When the liner is exposed		
A-1	Deposition of waste and earth and sand on the liner	Daily	Visually
A-2	Crack and fracture	Daily	Visually
A-3	Holes and depression	Daily	Visually
A-4	Stripping, failure (on slope)	Daily	Visually
A-5	Deterioration	Daily	Visually
A-6	Buckling, swelling	Daily	Visually
A-7	Dissolution	Daily	Visually
B	After cover soil is implemented		
B-1	Propagation of crack and depression	Daily	Visually
B-2	Springing of groundwater, gas extravasation	Daily	Visually
B-3	Lifting of cover soil	Daily	Visually
B-4	Stripping, failure (on slope)	Daily	Visually
C	other symptoms related to leachate leakage		
C-1	Leachate quantity and quality	Refer to section 3.	Refer to section 3.
C-2	Groundwater quantity and quality in monitoring well	Refer to section 8.3.	Refer to section 8.3
C-3	Depression and failure of landfill surface	Daily	Visually

Leachate management system (including leachate collection and removal system, storage pond, recirculation system, and treatment facility)

ID	Inspection item	Frequency	Methodology
A	Leachate collection and removal system (incl. Re-circulation system)		
A-1	Crack/collapse/smash of the pipe	Weekly	Visually/Sewer Pipe Camera
A-2	Clogging/incrustation/scaling of the pipe	Weekly	Visually/Sewer Pipe Camera
A-3	Leakage at the joint part of the pipe network	Weekly	Visually/Sewer Pipe Camera
A-4	Wash out of protective sand/soil	Weekly	Visually (only before it covered)

A-5	Blocking in valve system	Weekly	Visually/Sewer Pipe Camera
B	Leachate storage pond		
B-1	Integrity of lining (hole, collapse, breakage, etc.)	Daily	Visually
B-2	Level of leachate (within controlled level)	Daily (optional)	Visually (optional)
B-3	Deposition in pond (amount of sediments)	Daily	Visually
B-4	Form/Bubble (abnormal forming)	Daily	Visually
C	Leachate treatment system (***if installed***)		
C-1	Proper operation mode (by checking operation parameters; temperature, pH, DO, MLSS, SVI, Turbidity, odor, etc.)	Daily	Checking of each parameter by measurement apparatus.
C-2	Quantity of leachate	Daily	Recorded data
C-3	Quality of treated leachate	Daily	Refer to section 3

Storm water collection and drainage

ID	Inspection item	Frequency	Methodology
1	Collapse/damage/deterioration of each drainage ditch/culvert	Monthly	Walk over survey and visual inspection
2	Deposition of earth and soil in ditches	Monthly	Walk over survey and visual inspection
3	Clogging/blocking	Monthly	Walk over survey and visual inspection
4	Occurrence of leakage and spring water	Monthly	Walk over survey and visual inspection
5	Growth of plant/weed/grass	Monthly	Walk over survey and visual inspection

Gas collection system

ID	Inspection item	Frequency	Methodology
1	Collapse of gas vents/gas well/gas pipes	Weekly	Visually
2	Clogging of the vents/well/pipe	Weekly	Visually

Other facilities

ID	Inspection item	Frequency	Methodology
A	Weighing facility		
A-1	Function of weight bridge	Daily	Manual check of function
A-2	Data recording system	Daily	Manual check of function
A-3	Checking on mechanical part (Loosening of bolt, deformation of materials, etc.)	Daily	Manual check of function
A-4	Calibration of the weigh bridge	Twice / year	Calibration agency
B	Vehicle washing facility		
B-1	Function of washing facility	Daily	Manual check of function
B-2	Deposition of mud/soil	Daily	Manual check of function
B-3	Water supply	Daily	Manual check of function
C	Road		
C-1	Waste scattering	Weekly	Visually
C-2	Hole, depression, cracks	Weekly	Visually
C-3	Failure of road shoulder	Weekly	Visually
C-3	Dust	Weekly	Visually
D	Fence		
D-1	Breakage failure of fence	occasionally	Visually
D-2	Catching the waste on the fence	occasionally	Visually
E	Gate and notice board		
E-1	Normal function of the gate	occasionally	Manual check of function
E-2	Condition of the notice board	occasionally	Visually

6) Checklist (Safety)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of working environment	Compliance with law and regulation related to the industrial health and safety	✓				
	Supply protective equipments to the workers and enforcement of their use	✓				Depending on worker, sometimes it is difficult to order to wear safety clothes because of religious grounds.
	Confirmation of dangerous gas at working area		✓			Not performed.
	Setting up the rules on the working environment	✓				
	Installation of sanitation equipment	✓				Almost all necessary sanitary equipment for workers are provided.
	Instruction on hazards of the chemical agent used in the site			✓		Hazardous chemicals are not used in the site in general. Occasionally, in summer, some kinds of insecticide is used to clean up the insect. But it is done by only skilled professionals.
	Training of first aid lifesaving, etc.	✓				
	Regular health check of workers	✓				Labors are subjected to their health check, yearly.
System for emergency response	Preparation of contact address list on the emergency event	✓				
	Preparation of the procedure of contact contents		✓			This is not regarded as important, now.
	Training of workers for emergency response	✓				
	Plans for prevent reoccurrence of the accident	✓				It isn't documented clearly, but training for the emergency is conducted based on the experience and such experience is helpful to prevent reoccurrence.

Overall comment
To protect labors and to prevent accidents, various measure are implemented.
However, toxic gas monitoring seems to be better implemented in order to prevent lethal accident.
In addition, response on emergency should be better to be documented.

Other observation / (Immediate) Action is Required on;

None

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes/No

7) Checklist (Littering and Vector)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Littering	·Littering is properly controlled.		✓			The operator answered that collection of litter around the site and cleaning of the perimeter fence is performed but not on regular basis, it depends on the situation, so they do it when needed.. However, litter is easily found around the site. which means that operator need to make cleaning activity more frequently.
	·Cover soil is promptly placed to prevent littering		✓			At this site, inadequate daily soil cover is thought to be most significant problem. So, unsatisfactory is marked.
	Some measure (e.g. litter screen, etc.) is taken.			✓		Only perimeter fence works for preventing littering. There are no additional measures.
	There is special employee for inspection and cleaning of the litter at the peripheral of the site.			✓		Inspection and cleaning are done by site workers. Thus there is no special employee for this task.
Vector	Are there serious vector issue happening?	✓				There is serious vector issue actually in summer. However, by using insecticide the issue is mitigated.
	There are a lot of birds out there.		✓			Actually, the control of birds is difficult issue in any landfill site. If daily cover is implemented perfectly, the issue will be mitigated more or less, during the site visit no birds were seen, since it is the migration time of such type of birds.
	Flies and mosquitoes are heavily infested.	✓				Same as above. To prevent the heavy infestation, insecticide is used in summer.
	Daily soil cover is placed properly.		✓			The daily soil cover is insufficient. But this is because the quantity is not affordable as mentioned earlier.
	Water pool in the site is eliminated.	✓				By constructing storm water ditches inside the site, formation of water pool is tried to be prevented as much as possible, but as mentioned before cleaning and maintenance of the storm water ditches should be conducted more often.
	Some measure to get rid of the birds/animals is taken.		✓			Nothing specially.

Overall comment

Most effective measure for these nuisance issues (vector/vermin/birds/dogs) is an appropriate implementation of daily soil cover because it can block their access to the waste. So, strict execution of daily cover is highly recommendable in this site too. If all the waste, which is exposed to the atmosphere, can be covered completely by soil, all this issue will be solved.

Other observation / (Immediate) Action is Required on;

Though it is understandable that satisfactory implementation of daily cover is difficult, to make an effort to make the site closer to the condition with perfect covering is recommendable.

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes No

8) Checklist (Environmental monitoring)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Landfill gas	Is the monitoring of methane performed? · Frequency · Methodology · Data keeping		✓			No measurement is done at present.
	No abnormal methane concentration is reported.			✓		No measurement.
Leakage	Is groundwater monitoring performed? · Frequency · Methodology · Analyzed items	✓				The groundwater monitoring is performed by PWA (Palestine Water Authority), on regular basis. Methodology and items are determined by PWA. Most of the items considered to be important are included. There is no original monitoring well owned by the site. So, its monitoring is not done.
	No abnormal concentration in groundwater is reported	✓				No abnormal concentration was reported from PWA.
Surface water	Is the monitoring of surface water performed? · Frequency · Methodology · Analyzed items		✓			In order to examine the impact of leachate discharge from the site, samples from water in wadi requested to be taken and analyzed, till the moment no action is taken.
	Is the monitoring of wadi (sediment) performed? · Frequency · Methodology · Analyzed items		✓			No monitoring was performed. (But this item is the proposal by the author of the guideline and is not in common in the general monitoring of the landfill.)
	No abnormal concentration in surface water/effluent is reported			✓		No analysis was performed.
	No abnormal condition on the sediment in wadi is identified			✓		No analysis was performed.
Air	·"*Currently no monitoring item*"					
Odor	Are there complaints from residents? · The complaint is recorded? · Measures for them are taken?	✓				There are complaints from residents. The complaints are recorded. And in order to respond immediately, residents are requested to contact to the landfill as soon as possible when they sense odor.
	Is the monitoring of odor conducted? · Frequency · Methodology		✓			As for the air collected at the landfill surface, occasionally, analyses were conducted. But they are not for odor.
	Is the monitoring data recorded?		✓			There is no data recorded.
	Does any odor substance exceed the criteria at the boundary?			✓		Since it is not measured, this inquiry is inappropriate.
	Or does odor index satisfy the criteria?			✓		Since it is not measured, this inquiry is inappropriate
Overall comment						

Gas: This monitoring should be done for safety aspect not the understanding of the methane emission from the site. Thus, it was recommended since the last audit to install simple gas detector at the office building or warehouse at where the gas migration from the site is doubtful.
Groundwater: Since the PWA conduct monitoring the domestic well nearby and its depth is very deep, to detect leachate leakage is thought to be difficult from the results. For the detection of leachate leakage, manhole installed at the edge of the site is thought to be effective and its periodical monitoring is recommendable.
Surface water: The site performed the analysis of the water taken by wadi when storm water event occurred by their own decision. This original monitoring can be highly evaluated. When there is a water in wadi, to conduct sampling and analyzing it is highly recommendable to confirm whether there is the evidence of discharge from the site or due other sources.
Wadi sediment: This monitoring was proposed in the guideline. However, this is not commonly done in many landfills. The reason why this was proposed is that there is no proper environmental target to identify discharge from the landfill under the condition of arid/ semi arid climate (like Palestine) at where perennial surface water doesn't exist. Hence, this is not mandatory. When it is necessary to probe the occurrence of the emission from the landfill, this investigation will be helpful.
Odor: Since odor is regarded as serious issue in this landfill, some monitoring should be done. The air collected at the surface was performed in the past. However, it was the survey on air quality but not the odor survey. Hence, survey method especially on the odor should be selected and applied. The odor monitoring must be related to the human olfactory. If air sampling and chemical analysis are performed, specific odorous substances should be focused on. If complex procedure is difficult to implement, simple procedure, in which assessor walks over the site boundary and record what he feels, is also applicable, as explained before , the odor problem was mitigated using tree branches, and frankly during our site visit the odor was not noticeable like before which indicate the effectiveness of this approach to reduce odor, additionally the operator said that odor reduction substances were sprayed to the leachate pond 130L/day., no details about this substances were provided by operator.

Other observation / (Immediate) Action is Required on;

None

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: : Yes No

Auditing Report on Jericho landfill

Date of visit: 3rd of Dec, 2018

Auditing Team:

6. Eng. Yosrea Ramadan (Ministry of Local Government)
7. Eng. Hilal Snono (Ministry of Local Government)
8. Eng. Mohammad Bargouthi (JICA)
9. Majed Alsare' (HJSC of Hebron and Bethlehem)
10. Eng. Ruba Erman and Mr. Talib Hmeid (EQA)
11. Person responded: Eng. Abd Al- Jabbar Abu halaweh (Jericho -JSC)

- Audit Report prepared by (Eng. Yosrea Ramadan -Ministry of Local Government) and reviewed in cooperation with EQA.

Purpose

To use the Environmental auditing guidelines developed through project of technical assistance in SWM in Palestine in 2017. The last visit to Jericho for auditing purpose took place in March 2016, a short report describes generally the situation in Jericho and focused on main problems and issues. In this report more, concentration will be given to the landfill facilities individually, as will be discussed in the following auditing checklist.

Methodology

The auditing was conducted as the form of the interview face to face with site operator after a site visit to the facilities in the landfill had been conducted, checking the status of these facilities and its compliance and functionality. The auditing team asked each item in the checklists in the guideline and requested to the responder of the site to explain details on each item, support documents were requested from Eng. Abd Aljabbar to confirm the situation of the landfill.

Results

Concrete results are summarized in the following tables of checklist. Comments from auditing Team and responder are also included.

Overall Comment

9) Fundamental requirement of the landfill structure

Most of the structures and equipments are designed and constructed so as to comply with the international standards. The general picture which has been taken by the auditing team during the site visit was that the site is mismanaged, since most of working facilities seem to be out of order on that time, but during the discussion meeting followed the site visit, all issues were clarified and justified by the Operator.

Regarding Leachate Management facility, it was installed appropriately, no treatment facility is in the

site, the leachate issue is not that much critical in Jericho landfill as leachate quantity is limited and no significant impact is occurred.

10) Landfill operation

As for the waste acceptance procedure, measurement of the waste mass, inspection of the load, correspondence to the unacceptable waste, etc are performed by satisfactory manner. Regarding the composition of the received waste, currently a study about waste composition and its calorific value is under preparation. About waste filling operation, daily soil cover is done but not as per standard with respect to quantity and frequency, the operator justified this status as a prevention measure, they applied in order to save the space for receiving more waste and to decrease the space occupied by added soil cover as much as possible since the current cell is expected to be filled by mid of 2019. In the same place, every nuisance issue is caused by this work.

11) Landfill gas management

No countermeasures for preventing gas explosion were taken since last auditing visit conducted, the gases were easily smelled at the entrance of the landfill, some smoke seen in the surface of old cell, which I think is a critical issue which need to be mitigated. Gas collection manhole/ piped should be inspected and maintained more frequently. In the same context, recently the operator installed a pilot biogas production unit, as will be detailed later in this report, the expected output of this pilot project is generation of electricity from biogas (CH4) by using 1kv electricity generator. The total volume of the bio digester is 8 m^3, and the estimated biogas production is about 3-4 m^3/day. The daily feeding of the bio digester consists of 100 L of organic waste mixed with 100 L of water. The generated electricity will be used for operating the control room, which will be started by mid of February 2019.

12) Inspection and maintenance

No new actions had been taken since last audit visit took place when Dr. Tojo was here, as necessary inspections and maintenances on the structures and equipment are performed appropriately, and documented in the reports of the technical department.

13) Safety

Although necessary measures concerning safety are adopted with little problem, I would like to recommend here, as other sanitary landfills in Palestine, they need to introduce gas detection system to prevent accidents related to explosion and life of workers.

14) Littering and vector

The scattering of waste has occurred, it spreads to not only the inside of the premises and the fence but also out of the premises. This is due to insufficient covering soil. The operator here needs to make littering more frequently.

As for the vector, vermin, and birds, insufficient soil is making the landfill workface an attractive area for the vectors, same for pests, it is dealt with by using insecticide in the summer, but it is necessary to

tackle the cause of the occurrence, especially with such things resulted from the damaged segments from the surrounding fence, it is so easy for any external animal like dogs to enter, maintenance of the current fence is highly recommended here as confirmed in the related auditing checklist in this report.

15) Monitoring

As reported in the last audit report, various efforts made for trying to grasp the impact to the environment from the site as much as possible can be inferred, monitoring on the landfill facilities should be better done on a regular basis and frequency in order to put preventive measures that maintain these facilities working properly.

Summary

In this landfill, there are several serious problems occurring as will be highlighted below:

1. Daily cover soil is not enough as per standard, consequently many associated problems occurred, although operator justified this from prevention aspects, but as Auditor I think to add soil cover as per standards, is most important than decreasing the quantity in order to keep the landfill working longer, since many environmental problems can be occurred, and will make the situation more expensive and complicated to be solved, although the received waste quantity is relatively small .
2. Regarding slaughterhouses waste, more restrictions have been developed by the operator on the waste accepted to be dumped in the landfill, but application of these restriction need to be monitored more often, as shown in the photo below, the slaughter houses waste were left as it is in the cell, even not covered which make the site more attractive for dogs which were notice in the site.

3. The operator has to be supplied with monitoring devices/ apparatus that make him able to monitor the process in the landfill properly.

4. More efforts needed to be paid toward operating the separation and recycling facility in the site, since the separation would contribute significantly in reducing the waste quantity dumped in the landfill and consequently making the landfill lifespan longer.

1) Checklist (Fundamental requirement of landfill)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Basic infrastructure	Fence · The height of the fence. · Unclimbable structure · Enclose the territory completely		✓			Height of the fence is 2m. completely surrounding the site boundary. In some areas fence was damaged and need to be maintained. (see Pic 1)
	Site notice board · Installation · Information provided		✓			The notice board installed
	Site access road · Width of the road · Pavement and dust condition · Access sign		✓			The access road width is not enough less than (10m). It is paved by asphalt. But no sufficient measures were taken toward mitigate the dust problems (see pic 2).
	Weighing system · Installation of the weighbridge · The staff's arrangement at acceptance area	✓				Installed, and all the data measured by the weigh bridge is recorded electronically and documented properly (see pic 3).
	Road inside the landfill · Construction · Quality (strength, dust prevention)		✓			The internal roads unfortunately not properly strengthened or paved, even not clean the waste is scattered in all directions, which make movement of working staff unsafe and difficult.
	Wheel washing facility · Installation			✓		Not Installed
	Office	✓				There is an administrative office there.
	Warehouse			✓		Existed in the plastic recycling facility.
	Stockyard for cover soil · Quantity of the soil stocked	✓				the stockyard is there but no soil found there during the visit time.
	Inspection yard and quarantine place · Existence · Location/Condition · Capacity for temporary storage			✓		Not exist, but regarding the waste vehicle which not listed under the JSC responsibility, it has to be inspected at the entrance.
Fundamental facility required for MSW landfill	Leakage prevention system (Liner) · Installation · In conformity to standards	✓				The liner comprised of clay and geomembrane was installed. The specification of the liner complies with the international standards based on the design documents, for the new cell, the same type of membrane is used.
	Waste retaining structure · Installation · Robustness (not collapse) · No erosion and cracks ·			✓		No retaining wall exist in the landfill site except the one beside the wadi there, but unfortunately big and long cracks are found there in the back of this wall.
	Leachate collection and removal system (LCRS) · Installation	✓				Installed in old and in the new cell as well. in this landfill. Leachate collection pipes are installed in each cell as passing through completely the cell.
	Gas collection/ventilation system · Installation	✓				Installed in both cells. But unfortunately, in some areas it is not managed properly as some gas ventilation pipes were collapsed and the gas collection manhole is surrounded and filled with waste. see pic 4

	·Upstream diversion ditch ·Peripheral drain ditch ·Drainage ditch on the closed cell ·Drainage ditch in unused section ·Storm-water reservoir			✓		There is no Storm water collection, as the region is arid, rainwater is so small, only drainage channels are constructed in the site.
	Leachate Management facility					
	Leachate storage pond ·Capacity ·Bottom lining ·Installation of the fence	✓				The leachate collection pond is constructed in the site, with a capacity of (1400 m3), due to weather conditions the collected leachate quantity is limited, but the pond was not cleaned properly, and waste are accumulated in. see pic 5
	Leachate recirculation network (Not necessarily required depending on the site structure) ·Installation ·Functioning			✓		Not exist
	Leachate treatment facility (Not necessarily required here)			✓		Not exist
	Monitoring facility					
	Leachate monitoring well (borehole inside landfill)			✓		
	Landfill gas monitoring well/pipe (borehole inside landfill)	✓				There are many gas removal manholes installed in the site (new cell).
	Groundwater monitoring well			✓		Groundwater monitoring well are located around the site, put the pollution in these wells is due to wastewater discharged to these well from the city.

Overall comment

Overall, the fundamental structures required for the sanitary landfill are installed in this site, but not all of it as the landfill is considered as controlled landfill. However, with regard to leachate management, the collection pipes were installed as well as leachate collection pond, but due to weather condition in Jericho as most of year is dry and hot, no significant amount of collected leachate can be noticed in the site. leachate treatment facility is not installed in the site, since leachate is not considered as priority issue. Regarding gas collection and removal system, it was installed, but during the site visit a smoke was noticed which indicate that an internal fire is there, in addition to other indication here that the final soil cover is not enough in the old cell, and in the new cell as well, so the waste were scattered everywhere in the site (internal road, entrance, main road leading to the site), the operator justified the reason behind as they are not adding cover soil as standards since this will decrease the available space in the cell which is very close to the full capacity, so by decreasing the soil quantity, the saved space can be used for dumped waste.
New facility was seen during the site visit, which the operator had installed in order to implement a pilot project on biogas production using (anerobic digester), the operator explain about the process he is going to install and what the expected outputs as above details. See pic 6

Other observation / (Immediate) Action is Required on;
Generally, the work in the site is not going completely as it must be, it is worse than situation in 2016, the new cell seems to be full very soon, so as an immediate solutions and measures need to be taken.

Site Operator's Comments: the design of the landfill site was prepared according to international standards. Fukuka method (semi aerobic) landfill theory was adopted in Jericho landfill site. In this system landfill gas is collected and removed, where oxygen enters between waste layers leading to a semi aerobic environment condition.

Samples Taken: Yes/No

Photographs Taken: Yes/No

Photo (1) – damaged increment in the fence surrounding the landfill

Photo (2) -Dust in the site caused by vehicle movement

Photo (3) – data record for received waste

Photo (4) - gas ventilation

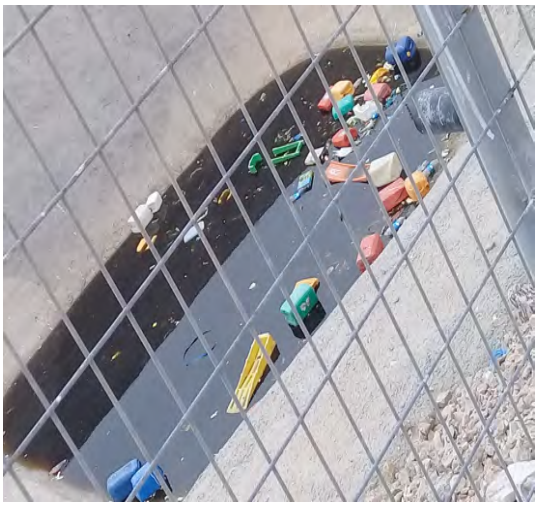


Photo (5)- waste accumulated in the leachate collection pond

Photo (6) – construction of pilot Anaerobic Digestion system

Photo (7)- Access Internal Road in the landfill

Photo (8)- Cracks in the retaining wall

2) Checklist (Management of landfill operation)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of waste acceptance	Setting up waste acceptance criteria · Clear definition of prohibited waste · Refuse of waste with high moisture content · Clear protocol on asbestos · Measure for bulky wastes			✓		There is a mechanism for waste acceptance procedure in the landfill as clarified in the operation manual, but they didn't apply it since the accepted waste there is only municipal waste.
	Waste inspection at acceptance · Enactment of visual inspection · Sampling and analysis of waste			✓		Only visually
	Measure for the waste not comply with criteria · Existence of decisive procedure			✓		
	Waste quantity measurement	✓				Done appropriately.
	Inspection/Periodical analysis · Execution of periodical composition analysis			✓		There is an ongoing study for waste amount and composition, the primer results will be listed
	Data recording and reporting	✓				All the data on waste quantity is appropriately recorded and it has been submitted to the regulatory authority (MoLG) for creation of waste statistics.
Waste filling operation	Waste emplacement and compaction · Proper compaction work · Well planned cell creation · Minimization of working face · Care on the other facilities		✓			The working face is large, the operator is trying to minimize it, but due to the space that soil might take when added as standards, they add soil in small quantities to save the space for more waste. A lot of vermin, birds and nuisance were noticed there. Regarding other facilities, in general the care is not sufficient.
	Implementation of cover material · Daily cover · Intermediate cover · Final cover		✓			Daily cover is insufficient. Due to the definite shortage of the soil, as the operator planned to take use of all available space in the cell which is very limited and is no expected expansion for this cell in the future. That's why waste is exposed at the surface in various places, consequently This environment making the cell attractive for birds, dogs, vermin, etc.
	Survey of completed amount · Conduct periodical survey				✓	
	Confirmation of slope stability · Periodical walk-over survey and maintenance		✓			The stability of slope is not confirmed in the old cell but this situation was for 5 years till now and no collapse happened, however preventive measures need to be taken here, according to the Operator comments, he said that there is a plan to rehabilitate this cell during 2019.
	Monitoring of settlement				✓	

Overall comment

Regarding acceptance Mechanism, it is provided in the operation manual, however this issue must be well handled even the accepted waste to be dumped there is only municipal but still there some illegal waste is entering the landfill as well as other waste type which need to be pre-treated before being dumped like slaughterhouse waste. As for the waste filling procedure, obviously there are serious problem. Namely, there are issues on the waste placement and implementation of daily cover soil. The cover is not sufficient and the waste is spread everywhere, causing an attractive area for vermin, birds and dogs, and this has been justified by the operator as above mentioned.

Other observation / (Immediate) Action is Required on; Immediate action on the implementation of daily cover soil and soil stability.
Site Operator's Comments: As mentioned in the justifications above, we have limited space which we need to utilize efficiently for waste dumping until finding out a solution for the future of the landfill site. We are doing our best to keep the landfill site in proper situation.
Samples Taken: Yes/No
Photographs Taken: Yes/No

Exposed Working Face

Soil Cover not Well Performed

3) Checklist (Leachate management)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Leachate quantity	Is the prediction of leachate quantity conducted or not? · Daily, weekly, monthly, yearly? · Is the methodology appropriate? · What sort of data is used for it?	✓				
	Is measurement of leachate conducted? · Amount of leachate in the pond · Quantity of leachate flowing in the pond · Quantity of leachate re-circulated Are there satisfactory data on · Quantity of water getting in by rainfall · Quantity of water evaporating Estimation of leachate stored in the site			✓		
	Are these measured data recorded properly?			✓		
Leachate head (optional)	Is the leachate head on the liner measured? · Frequency · Methodology					(This check item is optional)
	Is the data on leachate head recorded?					(This check item is optional)
	Is the hydraulic head of the leachate on the liner less than 30cm					(This check item is optional)
Leachate quality	Is analysis of raw leachate conducted? · Frequency · Items of analysis	✓				Since the leachate quantity is very small, and there is no critical problems caused by, that why no need to make any analysis.
	Does the direct discharge of raw leachate to outside occur? · Extent · Duration · Impact			✓		
	If the leachate is discharged after treatment, Is the quality of effluent analyzed? · frequency · analyzed item			✓		In this landfill, there is no leachate treatment process since the accumulated leachate quantity is very small.
	If the leachate is discharged after treatment, Doe the quality complies with the standards?			✓		In this landfill, there is no leachate treatment process, since the accumulated leachate quantity is very small.

Overall comment

The leachate is not a critical issue in Jericho as the weather condition there is dry most of the year, and the evaporation is significant, but here I recommend the operator to consciously keep cleaning the leachate pond from waste that accumulated in.

Other observation / (Immediate) Action is Required on; No immediate action needs to be taken on this regard.
Site Operator's Comments: the leachate pond is cleaned periodically.
Samples Taken: Yes/No
Photographs Taken: Yes/No
 Leachate pond in the landfill site

4) Checklist (Landfill gas management)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Control of gas pressure	Installation of gas vents/gas collection system for landfill gas management	✓				The gas collection and removal system is installed for the new cell properly, but the alignment of some of these collection pipes was not appropriate.
	Condition of fugitive gas emission from the surface Well managed (less release) =satisfactory Un controlled=Unsatisfactory	✓				The top cap is done for the old cell but not appropriately, and at present, no measure is done for fugitive gas emission.
Toxic gas for workers	Is the monitoring of hydrogen sulfide or other toxic gas performed at the working face, regularly?		✓			The monitoring is not performed since they don't have the requested monitoring equipment's.
	Are the workers informed about the risk of hydrogen sulfide?	✓				all the workers are informed.
	Is the working face controlled so as to not accumulate toxic gases?		✓			The working face in this landfill is sloped, and the cover is not done properly as mentioned before, due to the using the maximum space allowed in the site.
	Is the waste containing sulfate such as gypsum board excluded from the acceptable waste?				✓	
Explosive/Toxic gas control	Is the regular monitoring executed?	✓				Yes, only external based on the guidelines issued.
	The level of methane at highest location. (ppm)					
	The level of hydrogen sulfide at highest location (ppm)					

Overall comment

In this landfill, gas collection system is installed, but the gas monitoring manholes are collapsed in some points, and filled with waste, in the old cell, there is gas vents, but it seems that it is not working properly, as a result some smoke were noticed which means an internal fire is happening.

Regarding the gases which easily can be smelled at the main entrance near weighing bridge, the operator is looking for a solution in the future in order to control these gases which.

Other observation / (Immediate) Action is Required on;

None

Site Operator's Comments: the smoke was due to a fire at the top of the landfill site and not due to landfill gases. This situation was solved. Maintenance of the landfill removal pipes and manholes is done before extension of the gas removal pipes. Although this issue will be taken into consideration and will be solved soon.

Samples Taken: Yes/No

Photographs Taken: Yes/No

Gas Collection System in the new and old cells

5) Checklist (Routine inspection and maintenance)

Items for confirmation	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Is the routine inspection (1-7) of the waste retaining structure (in case of concrete dam) conducted appropriately?			✓		This landfill doesn't have concrete dam.
Is the routine inspection (1-12) of the waste retaining structure (in case of earth fill dam) conducted appropriately?			✓		This landfill doesn't have any dam.
Is the routine inspection (A-1 to C-3) of the leakage prevention system (lining system) conducted appropriately?	✓				Inspection is performed routinely.
Is the routine inspection (A-1 to C-3) of the leachate management system conducted appropriately?	✓				Inspection is performed routinely.
Is the routine inspection (1 to 5) of the storm water collection and drainage system conducted appropriately?			✓		Drainage system is installed, but there is no associated problem since the rainfall quantity is limited.
Is the routine inspection (1 to 2) of the gas collection system conducted appropriately?			✓		
Is the routine inspection (A-1 to E-2) of the other remaining facilities conducted appropriately?	✓				Inspection is performed routinely.

Overall comment

It seems that routine inspections are performed appropriately for some facilities, and not for all, that's why when we visited the general view of the landfill reflects that a problem in the overall inspection, monitoring and operation is occurred.

Other observation / (Immediate) Action is Required on;

More efforts are needed for achieving better management, inspection and monitoring in the landfill, at financial aspects and technical aspects.

None

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes/No

Tables for check items (written again for checklist)

Waste retaining structure

Concrete dam

ID	Inspection item	Frequency	Methodology
1	Seepage of leachate	daily	visually
2	Cracks and chipping of concrete	Daily	Visually
3	out of alignment	Daily	Visually
4	Corrosion of reinforcing	Daily	Visually
5	Buckling	Daily	Visually
6	Settlement	Monthly	Subsidence meter/Survey
7	Slippage	4 times per year	Survey

Earth fill dam

ID	Inspection item	Frequency	Methodology
1	Plant (incl. Weeds and grass) growth	Weekly	Visually
2	Accumulation/deposition of soil	Weekly	Visually
3	Seepage of leachate from slope	Weekly	Visually
4	Cracks	Weekly	Visually
5	Expansion of structure	Weekly	Visually
6	Settlement	Twice/year	Subsidence meter/Survey
7	Erosion of slope	Weekly	Visually
8	Slope failure	Weekly	Visually
9	Scouring	Weekly	Visually
10	Buckling of the slope	Weekly	Visually
11	Subsidence of foundation	Twice/year	Subsidence meter/Survey
12	Collapse of foundation	Weekly	Visually

Leakage prevention system (lining system)

ID	Inspection item	Frequency	Methodology
A	When the liner is exposed		
A-1	Deposition of waste and earth and sand on the liner	Daily	Visually
A-2	Crack and fracture	Daily	Visually
A-3	Holes and depression	Daily	Visually
A-4	Stripping, failure (on slope)	Daily	Visually
A-5	Deterioration	Daily	Visually
A-6	Buckling, swelling	Daily	Visually
A-7	Dissolution	Daily	Visually
B	After cover soil is implemented		
B-1	Propagation of crack and depression	Daily	Visually
B-2	Springing of groundwater, gas extravasation	Daily	Visually
B-3	Lifting of cover soil	Daily	Visually
B-4	Stripping, failure (on slope)	Daily	Visually
C	other symptoms related to leachate leakage		
C-1	Leachate quantity and quality	Refer to section 3.	Refer to section 3.
C-2	Groundwater quantity and quality in monitoring well	Refer to section 8.3.	Refer to section 8.3
C-3	Depression and failure of landfill surface	Daily	Visually

Leachate management system (including leachate collection and removal system, storage pond, recirculation system, and treatment facility)

ID	Inspection item	Frequency	Methodology
A	Leachate collection and removal system (incl. Re-circulation system)		
A-1	Crack/collapse/smash of the pipe	Weekly	Visually/Sewer Pipe Camera
A-2	Clogging/incrustation/scaling of the pipe	Weekly	Visually/Sewer Pipe Camera
A-3	Leakage at the joint part of the pipe network	Weekly	Visually/Sewer Pipe Camera
A-4	Wash out of protective sand/soil	Weekly	Visually (only before it covered)

A-5	Blocking in valve system	Weekly	Visually/Sewer Pipe Camera
B	Leachate storage pond		
B-1	Integrity of lining (hole, collapse, breakage, etc.)	Daily	Visually
B-2	Level of leachate (within controlled level)	Daily (optional)	Visually (optional)
B-3	Deposition in pond (amount of sediments)	Daily	Visually
B-4	Form/Bubble (abnormal forming)	Daily	Visually
C	Leachate treatment system (***if installed***)		
C-1	Proper operation mode (by checking operation parameters; temperature, pH, DO, MLSS, SVI, Turbidity, odor, etc.)	Daily	Checking of each parameter by measurement apparatus.
C-2	Quantity of leachate	Daily	Recorded data
C-3	Quality of treated leachate	Daily	Refer to section 3

Storm water collection and drainage

ID	Inspection item	Frequency	Methodology
1	Collapse/damage/deterioration of each drainage ditch/culvert	Monthly	Walk over survey and visual inspection
2	Deposition of earth and soil in ditches	Monthly	Walk over survey and visual inspection
3	Clogging/blocking	Monthly	Walk over survey and visual inspection
4	Occurrence of leakage and spring water	Monthly	Walk over survey and visual inspection
5	Growth of plant/weed/grass	Monthly	Walk over survey and visual inspection

Gas collection system

ID	Inspection item	Frequency	Methodology
1	Collapse of gas vents/gas well/gas pipes	Weekly	Visually
2	Clogging of the vents/well/pipe	Weekly	Visually

Other facilities

ID	Inspection item	Frequency	Methodology
A	Weighing facility		
A-1	Function of weight bridge	Daily	Manual check of function
A-2	Data recording system	Daily	Manual check of function
A-3	Checking on mechanical part (Loosening of bolt, deformation of materials, etc.)	Daily	Manual check of function
A-4	Calibration of the weigh bridge	Twice / year	Calibration agency
B	Vehicle washing facility		
B-1	Function of washing facility	Daily	Manual check of function
B-2	Deposition of mud/soil	Daily	Manual check of function
B-3	Water supply	Daily	Manual check of function
C	Road		
C-1	Waste scattering	Weekly	Visually
C-2	Hole, depression, cracks	Weekly	Visually
C-3	Failure of road shoulder	Weekly	Visually
C-3	Dust	Weekly	Visually
D	Fence		
D-1	Breakage failure of fence	occasionally	Visually
D-2	Catching the waste on the fence	occasionally	Visually
E	Gate and notice board		
E-1	Normal function of the gate	occasionally	Manual check of function
E-2	Condition of the notice board	occasionally	Visually

6) Checklist (Safety)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of working environment	Compliance with law and regulation related to the industrial health and safety	✓				
	Supply protective equipments to the workers and enforcement of their use	✓				Depending on worker, sometimes it is difficult to order to wear safety clothes because of religious grounds.
	Confirmation of dangerous gas at working area		✓			Not performed, as the operator doesn't have the requested equipment.
	Setting up the rules on the working environment	✓				As detailed in the operation manual and the working procedure instructions.
	Installation of sanitation equipment	✓				Installed in the separation facility.
	Instruction on hazards of the chemical agent used in the site			✓		Hazardous chemicals are not used in the site in general.
	Training of first aid lifesaving, etc.	✓				
	Regular health check of workers	✓				Labors are subjected to routine check as provided by the ministry of health.
System for emergency response	Preparation of contact address list on the emergency event	✓				
	Preparation of the procedure of contact contents	✓				The contact procedure is applied.
	Training of workers for emergency response	✓				
	Plans for prevent reoccurrence of the accident	✓				It isn't documented clearly, but training for the emergency is conducted based on the experience and such experience is helpful to prevent reoccurrence.

Overall comment

To protect labors and to prevent accidents, various measures are implemented.
However, toxic gas monitoring seems to be better implemented in order to prevent lethal accident.
In addition, response on emergency should be better to be documented.

Other observation / (Immediate) Action is Required on;

None

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes/No

7) Checklist (Littering and Vector)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Littering	Littering is properly controlled.		✓			waste was spread around the landfill; no collection of this waste is implemented from time to time.
	·Cover soil is promptly placed to prevent littering		✓			At this site, inadequate daily soil cover is thought to be most significant problem. So, unsatisfactory is marked, but the reason behind this issue is as clarified before in this report.
	Some measure (e.g. litter screen, etc.) is taken.			✓		Only perimeter fence works for preventing littering. Even this measure is not working properly, the fence was broken in different points and need to be maintained.
	There is special employee for inspection and cleaning of the litter at the peripheral of the site.			✓		Inspection and cleaning are done by site workers.
Vector	Are there serious vector issue happening?	✓				There is serious vector issue actually in summer. However, by using insecticide the issue is mitigated.
	There are a lot of birds out there.	✓				Actually, the control of birds is difficult issue in any landfill site. If daily cover is implemented perfectly, the issue will be mitigated more or less.
	Flies and mosquitoes are heavily infested.	✓				Same as above. To prevent the heavy infestation, insecticide is used in summer.
	Daily soil cover is placed properly.		✓			The daily soil cover is insufficient, as explained before.
	Water pool in the site is eliminated.			✓		
	Some measure to get rid of the birds/animals is taken.		✓			Nothing specially.

Overall comment

Most effective measure for these nuisance issues (vector/vermin/birds/dogs) is an appropriate implementation of daily soil cover because it can block their access to the waste. So, strict execution of daily cover is highly recommendable in this site too. If all the waste, which is exposed to the atmosphere, can be covered completely by soil, all these issues will be solved.

Other observation / (Immediate) Action is Required on;

Though it is understandable that satisfactory implementation of daily cover is difficult, to make an effort to make the site closer to the condition with perfect covering is recommendable, as justified by the operator, they would like to do soil cover as it must be , but unfortunately they couldn't in order to save more space for the waste.

Site Operator's Comments: more attention will be given for scattered waste cleaning.

None

Samples Taken: Yes/No

Photographs Taken: Yes No

Waste Scattered around the Landfill site

8) Checklist (Environmental monitoring)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Landfill gas	Is the monitoring of methane performed? · Frequency · Methodology · Data keeping		✓			No measurement is done at present.
	No abnormal methane concentration is reported.			✓		No measurement.
Leakage	Is groundwater monitoring performed? · Frequency · Methodology · Analyzed items			✓		There was some lab analysis conducted by the Operator between 2006 and 2008, but the pollution found was due to wastewater discharged to the region by the city, and not from the landfill since the leachate quantity is limited and there is no leakage, additionally PWA is conducting regular analysis, so we can refer to anytime.
	No abnormal concentration in groundwater is reported	✓				As clarified in the previous items, the pollution found in the nearby ground water wells was due to wastewater discharged near the site and not from leachate resulted from the landfill.
Surface water	Is the monitoring of surface water performed? · Frequency · Methodology · Analyzed items			✓		There is no surface water in the site
	Is the monitoring of wadi (sediment) performed? · Frequency · Methodology · Analyzed items			✓		
	No abnormal concentration in surface water/effluent is reported			✓		No analysis was performed.
	No abnormal condition on the sediment in wadi is identified			✓		No analysis was performed.
Air	·"*Currently no monitoring item*"					
Odor	Are there complaints from residents? · The complaint is recorded? · Measures for them are taken?			✓		The landfill is far from the residential area
	Is the monitoring of odor conducted? · Frequency · Methodology			✓		The monitoring took place when the Japanese expert was here in 2016, but nothing after as the needed equipment is not affordable.
	Is the monitoring data recorded?			✓		There is no data recorded.
	Does any odor substance exceed the criteria at the boundary?			✓		Since it is not measured, this inquiry is inappropriate.
	Or does odor index satisfy the criteria?			✓		Since it is not measured, this inquiry is inappropriate
Overall comment						

Gas: regarding this issue, inspection and monitoring should be done for safety aspects, and mitigation measures need to be taken especially at the entrance area. Monitoring gas well/manholes should be inspected and maintained from time to time.

Groundwater: as mentioned before, there is a groundwater wells in the surrounding areas, pollution was noticed there but the reason behind was confirmed by PWA that, discharge of wastewater is causing this pollution and not the leachate from the landfill, as the leachate quantity is limited and no leakage is recorded.

Surface water: no analysis is done for this item as no surface water resources are in the site.

Wadi sediment: This monitoring was proposed in the guideline. However, this is not commonly done in the landfill, specially at Jericho, no monitoring apparatus is affordable in JSC.

Odor: during our site visit we smell odor easily, consequently some monitoring should be done, previously a simple procedure, in which assessor walks over the site boundary and record what he feels has been conducted at the time when the Japanese expert was here, so I think this is the simple method is applicable in this landfill, but unfortunately no apparatus is affordable for the JSC to do so.

Other observation / (Immediate) Action is Required on;
Overall management, inspection and monitoring should be enhanced, so checking the working situation of landfill and auditing is not enough, in my opinion more support should be provided to the landfill's Operator at different levels.

None

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes/No

Auditing Report on Alminyeh landfill

Date of audit: 17th of Feb, 2019

Auditing Team:

12. Eng. Yosrea Ramadan (Ministry of Local Government)
13. Eng. Mohammad Bargouthi (JICA)
14. Majed Alsare' (HJSC of Hebron and Bethlehem)
15. Eng. Ruba Erman (EQA)
16. Mr. Talib Hmeid (EQA)
17. Person responded: Eng. Majed alsare' (Higher-JSC of Hebron and Bethlehem)

- Audit Report prepared by (Eng. Yosrea Ramadan -Ministry of Local Government) and reviewed in cooperation with EQA.

Purpose

To use the Environmental auditing guidelines developed through project of technical assistance in SWM in Palestine in 2017. The last visit to Alminyeh for auditing purpose took place in March 2017, a short report describes generally the situation in Alminyeh and focused on main problems and issues. In this report more, concentration will be given to the landfill facilities individually, as will be discussed in the following auditing checklist.

Methodology

The auditing was conducted as the form of the interview face to face with site operator after a site visit to the facilities in the landfill had been conducted, checking the status of these facilities and its compliance and functionality. The auditing team asked each item in the checklists in the guideline and requested to the responder of the site to explain details on each item, support documents were requested from Eng. Alsare' to confirm the situation of the landfill.

Results

Concrete results are summarized in the following tables of checklist. Comments from auditing Team and responder are also included.

Overall Comment

16) Fundamental requirement of the landfill structure

Based on the site visit, all basic fundamental structural facilities were installed properly in the site, where as other facilities still not constructed due to limited financial resources, such as leachate treatment facilities, which the auditing team strongly recommends to construct treatment facility as soon as possible.

17) Landfill operation

The operation is properly managed in the site, no odor was smelled, waste separation line was not working in that time, but they said that they are going to restart operating this line when the recently provided trommel put into operation.

Waste daily covering is applied properly, but huge amount of leachate is generated and divert to the leachate pond, leachate seepage was noticed in the site as well as fire, the fire was not resulted from the landfill itself, many workers used to fire cartoon there in scattered points around the site.

18) Landfill gas management

This item was well managed in the site, as a comprehensive gas collection system was installed in the site. Only the last step in utilizing the collected CH4 still not working because of limited financial resources, the HJSC in cooperation with MoLG prepared a proposal for utilizing collected CH4 to produce energy and are looking for a financial aid to cover it.

19) Inspection and maintenance

Inspection and maintenance are frequently made for the structures in the site but still there is a gab, which the operator justified, for example, the plastic bags attached to the landfill fence were due to the weather conditions where the wind blown during the three days before the auditing visit. Also, the burning of the plastic bags is carried out by the workers as individual behavior and not instructed by the landfill manager.

20) Safety

Safety measures were taken in the site properly.

21) Littering and vector

Littering is not practiced well in the site, the frequency of littering process is not enough, waste was scattered along the whole fence as well as on the sides of the site entrance, as illustrated in the attached pictures.

22) Monitoring

The operator has set monitoring plan, in order to facilitate and clarify the items to be monitored and the monitoring frequency. However, most of the plan instructions were applied, but this process of course depend on the HJSC capacities.

Summary

The general situation of the landfill according to the site visit can be described as satisfactory except following issues which need more attention from the Operators and more development and support from the government.

1. More focus should be given to the environmental monitoring plan and to try as much as they can as operator to follow this plan and the included monitoring frequency.

2. More attention needs to be given to the inspection process for waste received to the site, and to make a clear protocol for accepting waste, and to focus on the importance of making composition analysis more frequently, in order to search for the reducing and recycling opportunities.

3. The waste sorting line and composting represent an excellent opportunity for investment in the site, during visit the sorting line was off, and recently they re-operate it, in order to sort the organic waste to be diverted to the composting line, but unfortunately the process failed and the sorting stopped again due to financial and technical issues, here we can see that more efforts need to be inserted at different level for this process since it is very important and has a strong significant impact in reducing the waste quantities, which disposed in the landfill, and consequently reduce the leachate quantity.

4. Financial support is requested since There is a high opportunity to utilize the collected gas from the landfill as all required works for gas collection are installed, but the collected gas is not utilized because of limited financial resources.

5. Leachate treatment system is highly requested to be installed in the site, since there is a huge produced quantity of leachate with high organic load.

6. More attention is requested toward littering issue, even there is a specific hired staff for this task, a lot of waste were dispersed along the surrounding fence and we believe if an appropriate implementation of daily soil cover is there, it can avoid waste dispersion.

7. More safety measured need to be installed in the site, in specific what is relevant to the waste burning in the site as We notice in the site that many points where fired as the workers there used to make such fire, such action must be stopped as soon as possible in order to keep the site safe from any unexpected explosion specially in the point close to the gas pipes.

1) Checklist (Fundamental requirement of landfill)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Basic infrastructure	Fence · The height of the fence. · Unclimbable structure · Enclose the territory completely	√				
	Site notice board · Installation · Information provided	√				The signboard is there, and all requested information included
	Site access road · Width of the road · Pavement and dust condition · Access sign	√				All these items were properly installed
	Weighing system · Installation of the weighbridge · The staff's arrangement at acceptance	√				Properly managed and data well recorded and documented, see pic 1
	Road inside the landfill · Construction · Quality (strength, dust prevention)	√				
	Wheel washing facility · Installation			√		
	Office	√				
	Warehouse	√				
	Stockyard for cover soil · Quantity of the soil stocked	√				They used to keep extra soil quantity in the location of dumping cell
	Inspection yard and quarantine place · Existence · Location/Condition · Capacity for temporary storage		√			No specific yard but it can be managed inside the active cell.
Fundamental facility required for MSW landfill	Leakage prevention system (Liner) · Installation · In conformity to standards	√				
	Waste retaining structure · Installation · Robustness (not collapse) · No erosion and cracks			√		
	Leachate collection and removal system (LCRS) · Installation	√				
	Gas collection/ventilation system · Installation	√				Gas is collected but not utilized to energy, because of limited financial resources. see pic 2

	·Upstream diversion ditch ·Peripheral drain ditch ·Drainage ditch on the closed cell ·Drainage ditch in unused section ·Storm-water reservoir					
	Leachate Management facility					
	Leachate storage pond ·Capacity ·Bottom lining ·Installation of the fence	√				The leachate pond mostly full
	Leachate recirculation network (Not necessarily required depending on the site structure) ·Installation ·Functioning		√			due to odor emission problem, the operator is operating the system during summer only as the wind direction is prohibit the odor dispersion.
	Leachate treatment facility (Not necessarily required here)			√		
	Monitoring facility					
	Leachate monitoring well (borehole inside landfill)		√			Found but not working since it is damaged by the community.
	Landfill gas monitoring well/pipe (borehole inside landfill)			√		
	Groundwater monitoring well		√			Installed but not working

Overall comment

The general situation of the landfill with reference to the most mentioned items in this checklist can be described as satisfied.

Other observation / (Immediate) Action is Required on: more focus should be given to the environmental monitoring plan and to try as much as they can as operator to follow this plan and the included monitoring frequency.

Site Operator's Comments:

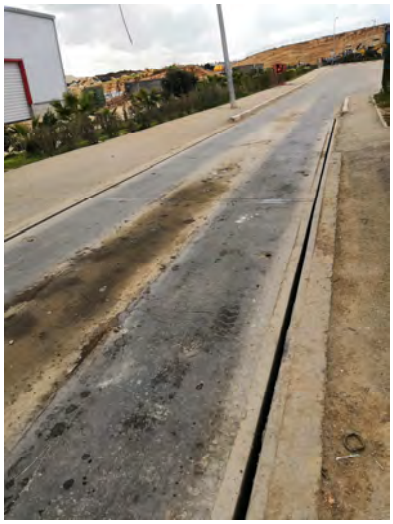
Samples Taken: Yes/No

Photographs Taken: Yes/No

Fire in the site

Access road

Weighing system



Gas collection	Leachate pond
	

2) Checklist (Management of landfill operation)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of waste acceptance	Setting up waste acceptance criteria · Clear definition of prohibited waste · Refuse of waste with high moisture content · Clear protocol on asbestos · Measure for bulky wastes	√				It is clear in the operation manual.
	Waste inspection at acceptance · Enactment of visual inspection · Sampling and analysis of waste	√				Most of received waste is inspected visually.
	Measure for the waste not comply with criteria · Existence of decisive procedure	√				It is clear in the operation manual
	Waste quantity measurement	√				
	Inspection/Periodical analysis · Execution of periodical composition analysis	√				It is clear in the operation manual
	Data recording and reporting	√				
Waste filling operation	Waste emplacement and compaction · Proper compaction work · Well planned cell creation · Minimization of working face · Care on the other facilities	√				
	Implementation of cover material · Daily cover · Intermediate cover · Final cover	√				
	Survey of completed amount · Conduct periodical survey	√				They used to make this survey one time each 6 months till 2017, but after that nothing done.
	Confirmation of slope stability · Periodical walk-over survey and maintenance	√				
	Monitoring of settlement	√				There is no monitoring because the operation still in the same cell.

Overall comment

What can be highlighted here is to give more attention to the inspection process for waste received to the site, and to make a clear protocol for accepting waste in the site, and to focus on the importance of making composition analysis more frequently, in order to search for the reducing and recycling opportunities.

Other observation / (Immediate) Action is Required on;

Site Operator's Comments:

Samples Taken: Yes/No	
Photographs Taken: Yes/No	
Working face 	Soil kept for cover 

3) Checklist (Leachate management)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Leachate quantity	Is the prediction of leachate quantity conducted or not? · Daily, weekly, monthly, yearly? · Is the methodology appropriate? · What sort of data is used for it?			√		
	Is measurement of leachate conducted? · Amount of leachate in the pond · Quantity of leachate flowing in the pond · Quantity of leachate re-circulated Are there satisfactory data on? · Quantity of water getting in by rainfall · Quantity of water evaporating Estimation of leachate stored in the site	√				
	Are these measured data recorded properly?	√				
Leachate head (optional)	Is the leachate head on the liner measured? · Frequency · Methodology					(This check item is optional)
	Is the data on leachate head recorded?					(This check item is optional)
	Is the hydraulic head of the leachate on the liner less than 30cm					(This check item is optional)
Leachate quality	Is analysis of raw leachate conducted? · Frequency · Items of analysis	√				
	Does the direct discharge of raw leachate to outside occur? · Extent · Duration · Impact	√				
	If the leachate is discharged after treatment, Is the quality of effluent analyzed? · frequency · analyzed item			√		
	If the leachate is discharged after treatment, Doe the quality complies with the standards?			√		

Overall comment

The leachate ponds there are mostly full, where the concentration of this leachate is very high with organic content, as documented in the chemical analysis made by the HJSC, the operator had constructed simple pretreatment unit (sedimentation tank and aeration tank) it succeeded in reducing the organic load by slight percentage. When we visited the site, this unit was not working. See Annex "A" for analysis results.

Other observation / (Immediate) Action is Required on;

During the visit we passed by the separation station and composting, the separation line was off, but they said that they are going to restart it in order to make compost by using the recently received trommel. What we need to emphasize on here is to give more attention to the waste separation and composting there, since it is very important and has a strong significant impact in reducing the waste quantities, which disposed in the landfill, and consequently reduce the leachate quantity.

Site Operator's Comments:

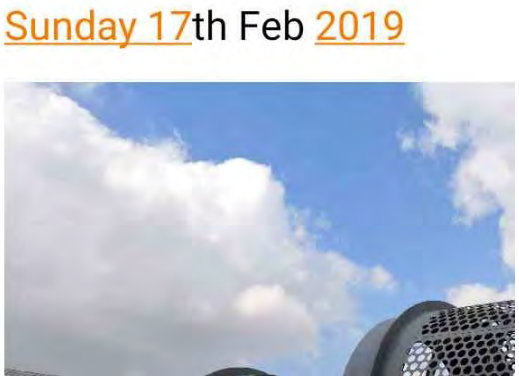
Samples Taken: Yes/No

Photographs Taken: Yes/No

Leachate pond

Old compost accumulated in the site

Trommel for waste sorting



Carton separated in the site

4) Checklist (Landfill gas management)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Control of gas pressure	Installation of gas vents/gas collection system for landfill gas management	√				
	Condition of fugitive gas emission from the surface Well managed (less release) =satisfactory Un controlled=Unsatisfactory	√				
Toxic gas for workers	Is the monitoring of hydrogen sulfide or other toxic gas performed at the working face, regularly?			√		
	Are the workers informed about the risk of hydrogen sulfide?	√				
	Is the working face controlled so as to not accumulate toxic gases?	√				
	Is the waste containing sulfate such as gypsum board excluded from the acceptable waste?	√				
Explosive/Toxic gas control	Is the regular monitoring executed?	√				
	The level of methane at highest location. (ppm)					
	The level of hydrogen sulfide at highest location (ppm)					

Overall comment

Regarding gas collection system, it was installed properly, we passed by gas collection pipes as shown in the pictures below, collection of gases is applied but this collected gas is not utilized because of limited financial resources, that's why it is released to the air.

Other observation / (Immediate) Action is Required on;

None

Site Operator's Comments:

Samples Taken: Yes/No

Photographs Taken: Yes/No

Gas Collection System in the new and old cells

5) Checklist (Routine inspection and maintenance)

Items for confirmation	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Is the routine inspection (1-7) of the waste retaining structure (in case of concrete dam) conducted appropriately?			√		
Is the routine inspection (1-12) of the waste retaining structure (in case of earth fill dam) conducted appropriately?			√		
Is the routine inspection (A-1 to C-3) of the leakage prevention system (lining system) conducted appropriately?	√				
Is the routine inspection (A-1 to C-3) of the leachate management system conducted appropriately?	√				
Is the routine inspection (1 to 5) of the storm water collection and drainage system conducted appropriately?			√		
Is the routine inspection (1 to 2) of the gas collection system conducted appropriately?	√				
Is the routine inspection (A-1 to E-2) of the other remaining facilities conducted appropriately?					
Overall comment Overall situation was satisfactory, but more attention need to be geared toward the application of the environmental management plan.					
Other observation / (Immediate) Action is Required on; Leachate was noticed in different points in the landfill far from the leachate collection pond, but the operator justified this because of rainfall collected in that points and diverted through open canals away from the cell to the leachate pond.					
Site Operator's Comments: None					
Samples Taken: Yes/No					
Photographs Taken: Yes/No					

Tables for check items (written again for checklist)

Waste retaining structure

Concrete dam

ID	Inspection item	Frequency	Methodology
1	Seepage of leachate	daily	Visually
2	Cracks and chipping of concrete	Daily	Visually
3	out of alignment	Daily	Visually
4	Corrosion of reinforcing	Daily	Visually
5	Buckling	Daily	Visually
6	Settlement	Monthly	Subsidence meter/Survey
7	Slippage	4 times per year	Survey

Earth fill dam

ID	Inspection item	Frequency	Methodology
1	Plant (incl. Weeds and grass) growth	Weekly	Visually
2	Accumulation/deposition of soil	Weekly	Visually
3	Seepage of leachate from slope	Weekly	Visually
4	Cracks	Weekly	Visually
5	Expansion of structure	Weekly	Visually
6	Settlement	Twice/year	Subsidence meter/Survey
7	Erosion of slope	Weekly	Visually
8	Slope failure	Weekly	Visually
9	Scouring	Weekly	Visually
10	Buckling of the slope	Weekly	Visually
11	Subsidence of foundation	Twice/year	Subsidence meter/Survey
12	Collapse of foundation	Weekly	Visually

Leakage prevention system (lining system)

ID	Inspection item	Frequency	Methodology
A	When the liner is exposed		
A-1	Deposition of waste and earth and sand on the liner	Daily	Visually
A-2	Crack and fracture	Daily	Visually
A-3	Holes and depression	Daily	Visually
A-4	Stripping, failure (on slope)	Daily	Visually
A-5	Deterioration	Daily	Visually
A-6	Buckling, swelling	Daily	Visually
A-7	Dissolution	Daily	Visually
B	After cover soil is implemented		
B-1	Propagation of crack and depression	Daily	Visually
B-2	Springing of groundwater, gas extravasation	Daily	Visually
B-3	Lifting of cover soil	Daily	Visually
B-4	Stripping, failure (on slope)	Daily	Visually
C	other symptoms related to leachate leakage		
C-1	Leachate quantity and quality	Refer to section 3.	Refer to section 3.
C-2	Groundwater quantity and quality in monitoring well	Refer to section 8.3.	Refer to section 8.3
C-3	Depression and failure of landfill surface	Daily	Visually

Leachate management system (including leachate collection and removal system, storage pond, recirculation system, and treatment facility)

ID	Inspection item	Frequency	Methodology
A	Leachate collection and removal system (incl. Re-circulation system)		
A-1	Crack/collapse/smash of the pipe	Weekly	Visually/Sewer Pipe Camera
A-2	Clogging/incrustation/scaling of the pipe	Weekly	Visually/Sewer Pipe Camera
A-3	Leakage at the joint part of the pipe network	Weekly	Visually/Sewer Pipe Camera
A-4	Wash out of protective sand/soil	Weekly	Visually (only before it covered)

A-5	Blocking in valve system	Weekly	Visually/Sewer Pipe Camera
B	Leachate storage pond		
B-1	Integrity of lining (hole, collapse, breakage, etc.)	Daily	Visually
B-2	Level of leachate (within controlled level)	Daily (optional)	Visually (optional)
B-3	Deposition in pond (amount of sediments)	Daily	Visually
B-4	Form/Bubble (abnormal forming)	Daily	Visually
C	Leachate treatment system (***if installed***)		
C-1	Proper operation mode (by checking operation parameters; temperature, pH, DO, MLSS, SVI, Turbidity, odor, etc.)	Daily	Checking of each parameter by measurement apparatus.
C-2	Quantity of leachate	Daily	Recorded data
C-3	Quality of treated leachate	Daily	Refer to section 3

Storm water collection and drainage

ID	Inspection item	Frequency	Methodology
1	Collapse/damage/deterioration of each drainage ditch/culvert	Monthly	Walk over survey and visual inspection
2	Deposition of earth and soil in ditches	Monthly	Walk over survey and visual inspection
3	Clogging/blocking	Monthly	Walk over survey and visual inspection
4	Occurrence of leakage and spring water	Monthly	Walk over survey and visual inspection
5	Growth of plant/weed/grass	Monthly	Walk over survey and visual inspection

Gas collection system

ID	Inspection item	Frequency	Methodology
1	Collapse of gas vents/gas well/gas pipes	Weekly	Visually
2	Clogging of the vents/well/pipe	Weekly	Visually

Other facilities

ID	Inspection item	Frequency	Methodology
A	Weighing facility		
A-1	Function of weight bridge	Daily	Manual check of function
A-2	Data recording system	Daily	Manual check of function
A-3	Checking on mechanical part (Loosening of bolt, deformation of materials, etc.)	Daily	Manual check of function
A-4	Calibration of the weigh bridge	Twice / year	Calibration agency
B	Vehicle washing facility		
B-1	Function of washing facility	Daily	Manual check of function
B-2	Deposition of mud/soil	Daily	Manual check of function
B-3	Water supply	Daily	Manual check of function
C	Road		
C-1	Waste scattering	Weekly	Visually
C-2	Hole, depression, cracks	Weekly	Visually
C-3	Failure of road shoulder	Weekly	Visually
C-3	Dust	Weekly	Visually
D	Fence		
D-1	Breakage failure of fence	occasionally	Visually
D-2	Catching the waste on the fence	occasionally	Visually
E	Gate and notice board		
E-1	Normal function of the gate	occasionally	Manual check of function
E-2	Condition of the notice board	occasionally	Visually

6) Checklist (Safety)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of working environment	Compliance with law and regulation related to the industrial health and safety	√				
	Supply protective equipments to the workers and enforcement of their use	√				
	Confirmation of dangerous gas at working area	√				
	Setting up the rules on the working environment	√				
	Installation of sanitation equipment	√				
	Instruction on hazards of the chemical agent used in the site			√		
	Training of first aid lifesaving, etc.	√				
	Regular health check of workers	√				
System for emergency response	Preparation of contact address list on the emergency event		√			
	Preparation of the procedure of contact contents	√				
	Training of workers for emergency response	√				
	Plans for prevent reoccurrence of the accident	√				

Overall comment
Other observation / (Immediate) Action is Required on; None
Site Operator's Comments: None
Samples Taken: Yes/No
Photographs Taken: Yes/No

7) Checklist (Littering and Vector)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Littering	Littering is properly controlled.		√			
	Cover soil is promptly placed to prevent littering	√				
	Some measure (e.g. litter screen, etc.) is taken.		√			
	There is special employee for inspection and cleaning of the litter at the peripheral of the site.		√			According to Operator there are a group of employees for litter collection, 3 permanents on daily basis and sometimes when the wind is strongly blown, they use part of the sorting workers to collect littering, but during the visit we saw a lot of waste spread around the fence.
Vector	Are there serious vector issue happening?		√			
	There are a lot of birds out there.	√				
	Flies and mosquitoes are heavily infested.	√				
	Daily soil cover is placed properly.	√				
	Water pool in the site is eliminated.		√			
	Some measure to get rid of the birds/animals is taken.			√		As no availability of birds in the site.

Overall comment

Most effective measure for these nuisance issues (vector/vermin/birds/dogs) can be achieved if an appropriate implementation of daily soil cover is there. Because it can block their access to the waste. Although the soil cover is properly implemented, waste is scattered along the fence and making the view very bad as well as harming the animal fed there, which indicates that no daily littering applied.

Other observation / (Immediate) Action is Required on;

We notice in the site that many points where fired as the workers there used to make such fire, I think such action must be stopped as soon as possible in order to keep the site safe from any unexpected explosion specially in the point close to the gas pipes.

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes No
Fire in the site

8) Checklist (Environmental monitoring)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Landfill gas	Is the monitoring of methane performed? · Frequency · Methodology · Data keeping			√		
	No abnormal methane concentration is reported.			√		
Leakage	Is groundwater monitoring performed? · Frequency · Methodology · Analyzed items			√		The available groundwater wells are not used since it is damaged by the community.
	No abnormal concentration in groundwater is reported			√		
Surface water	Is the monitoring of surface water performed? · Frequency · Methodology · Analyzed items			√		
	Is the monitoring of wadi (sediment) performed? · Frequency · Methodology · Analyzed items			√		
	No abnormal concentration in surface water/effluent is reported			√		
	No abnormal condition on the sediment in wadi is identified			√		
Air	·"*Currently no monitoring item*"					
Odor	Are there complaints from residents? · The complaint is recorded? · Measures for them are taken?	√				
	Is the monitoring of odor conducted? · Frequency · Methodology	√				
	Is the monitoring data recorded?	√				
	Does any odor substance exceed the criteria at the boundary?	√				depends on Weather conditions
	Or does odor index satisfy the criteria?	√				

Overall comment

Gas.

Regarding gas management, in the site gas collection system was installed properly, we passed by gas collection pipes as shown in the pictures below, collection of gases is applied but this collected gas is not utilized because of limited financial resources, that's why it is released to the air, more efforts need to be given here to this issue through communicating with

donors and attract their attention to invest in utilizing such gases to produce energy.

Groundwater:

There are no significant comments can be highlighted here since the ground water in the vicinity of landfill are not used by community.

Leachate management:

Regarding this issue we think that it is very important to search for a feasible treatment method, since huge quantity of leachate is generated as the received waste quantity is increased day by day. The treatment methods proposed by MDLF were applicable but very expensive. If the operator decides to treat the leachate using these methods, they should continue looking for external funds to cover the construction cost.

Waste composting

It is very important to look again toward separating waste and recycle what can be recycled (plastic and organic fraction), since this will significantly reduce the dumped waste and consequently reduce the generated leachate quantities.

Other observation / (Immediate) Action is Required on:

More security measured need to be set in the site, and to put a mechanism and procedure on how to solve and reply to community claims on the landfill, if there is any related problem appears like odor, seepage of leachate,etc.

None

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes/No

Annex (A): results of Leachate Analysis.

		AL MINYA LANDFILL LEACHATE				
Parameters	**unit**	**Pond near inlet 1 (20/05/17) ANTEA**	**Pond near inlet 2 (20/05/17) ANTEA**	**Aeration tank - 12/03/2016**	**Pond far from inlet - 12/03/2016**	**Pond near inlet - 12/03/2016**
pH		**7,68**	**7,60**	8,85	8,05	8,04
Conductivity	mS/cm	**53,60**	**52,80**	30,70	37,30	34,60
COD	mg/l	**38 400,00**	**38 700,00**	10 700,00	20 867,00	21 885,00
BOD5	mg/l	**13 800,00**	**13 400,00**	2 910,00	10 770,00	9 660,00
TSS	mg/l	**933,00**	**613,00**	1 385,00	187,00	287,00
NH4	mg/l	**2 820,00**	**3 030,00**	1 847,00	2 175,00	2 291,00
NO3	mg/l	**<0,21**	**<0,21**	<DL	<DL	<DL
NTK	mg/l	**3 250,00**	**3 120,00**	2 295,84	2 599,21	2 615,20
TDS	mg/l	**<1,69**	**<1,69**	6,15	10,70	10,47
Chloride Cl	mg/l	**23 100,00**	**22 500,00**	18 000,00	20 930,00	21 210,00
Fluoride	mg/l	**5 300,00**	**5 180,00**	4 018,35	4 093,01	4 789,34
SO4	mg/l			<DL	<DL	<DL
FOG	mg/l	**13,50**	**11,40**	<DL	<DL	<DL
PO4	mg/l	**7,60**	**7,20**	124,00	226,00	144,00
Phenol	mg/l	**<10**	**<10**			
MBAS	mg/l	**55,00**	**11,50**			
SAR	meq/L	**28,70**	**28,80**			
HCO3	mg/l	**<0,2**	**<0,2**			
Ca	mg/l	**484,00**	**499,00**	12,50	195,10	189,70
Na	mg/l	**3 300,00**	**3 380,00**	2 617,00	2 745,00	2 671,00
K	mg/l			1 842,50	1 943,00	1 897,00
Mg	mg/l	**296,00**	**302,00**	270,00	281,65	275,30
Zn	mg/l			1,37	4,50	2,93
Cd	mg/l	**<0,005**	**<0,005**	<DL	<DL	<DL
Pb	mg/l	**<0,01**	**<0,01**	0,13	<DL	<DL
Cr	mg/l	**0,80**	**0,81**	0,54	0,66	0,64
Ni	mg/l	**0,36**	**0,38**	0,35	0,34	0,35
Cu	mg/l	**0,05**	**0,05**	0,09	0,06	0,06
Mn	mg/l	**1,64**	**1,65**	0,05	0,50	0,48
Fe	mg/l	**18,60**	**19,40**	9,21	13,34	13,10
Al	mg/l	**0,79**	**0,98**	0,44	0,90	0,93
Co	mg/l			0,08	0,07	0,07
B	mg/l	**4,14**	**4,13**	4,67	4,58	4,48
Ag	mg/l			0,18	0,03	0,03
Ba	mg/l			<DL	0,15	0,15
Be	mg/l			<DL	<DL	<DL
Li	mg/l			0,79	0,82	0,79
Sr	mg/l			0,07	1,35	1,31
Mo	mg/l			0,10	<DL	<DL
Hg	mg/l	**<0,01**	**<0,01**			

Annex 4a

1) Checklist (Fundamental requirement of Transfer stations)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Basic infrastructure	Fence ·The height of the fence. ·Unclimbable structure ·Enclose the territory completely ·Not allowing animals entry. ·A specific height of Reinforced Concrete is existed under the fence.					
	Site notice board ·Installation ·Information provided					
	Site access road ·Width of the road ·Pavement and dust condition ·Visitor signature ·Access sign					
	Weighing system ·Installation of the weighbridge ·The staff's arrangement at acceptance ·Bills issuing					
	Installation of proper infrastructure for the internal roads to facilitate the waste vehicle movement					
	Wheel washing facility ·Installation					
	Offices					
	Inspection yard to confirm the accepted waste specification with agreed criteria of accepting waste in the station					
Fundamental facility required for MSW Transfer Station	Leakage prevention system composed of impermeable material (lining system)					
	Leachate collection and removal system (LCRS) ·Installation of Leachate storage pond ·Capacity ·Installation of the fence ·Disposal plan of collected Leachate to be transferred to the nearest sanitary landfill or treatment plant					
	Ventilation system to restrict odors diffusion. ·Use of closed containers ·The area where the waste is emptied should be closed ·Closed Leachate ponds					

	Stormwater collection and drainage system composed of channels to divert the storm water away from the site					
	Waste separation facility · What is the separated waste? · Is separation manual/mechanical? · Is the facility closed? · Procedures to prevent odors diffusion . Plan for reusing separated materials					
	Waste recycling facility · Recycling used process . Procedures to reduce the negative environmental impacts due to waste separation and recycling at the transfer station site.					
Overall comment						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						
Photographs Taken: Yes/No						

Table 2.2 Sample of forms of accepted waste records (Monthly Forms)

Year: ***/ Month : ** Monthly Forms No ( )

Accepted waste Monthly Records

Date	Quantity		Volume		Number of Rejection	Comments
	Daily (Ton)	Accumulated (Ton)	Daily (m^3)	Accumulated (m^3)		

Authorized Signature

Table 2.3 Sample of forms of accepted waste records (Monthly Forms)

Date: **/**/****Daily records No ( )
Inspector: ……

Acceptance Inspection Report

Date and Time	/**/** **:*****	
Waste Transfer party	ناقل النفايات	
Identity Card	رقم هوية ناقل النفايات	
Waste resource	مصدر النفايات	
Visual inspection results	□ Warning You are warned for the reason below. If you received any identical notice, then your waste will be rejected □ Reject Your waste is rejected to be received in this transfer station for the reason mentioned below.	
	1	
	2	
	3	
Waste quantity		
Reason justifications (photocopy,,,,,etc)		
Inspector signature		

2) Checklist (Management of waste acceptance)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of waste acceptance	Setting up waste acceptance criteria · Clear definition of prohibited waste · Procedural mechanism to deal with waste that not comply with accepted waste specifications in the transfer stations · Clear protocol on asbestos					
	Waste inspection at acceptance · Enactment of visual inspection · Sampling and analysis of waste					
	Measure for the waste not comply with criteria · Existence of decisive procedure					
	Waste quantity measurement					
	Data recording and reporting					
Waste filling operation	Waste emplacement to the final destinations during 24 hours from delivery time.					
	Vehicles covering · Waste is transferred by covered transferring vehicles to prevent waste dispersion · Existence of decisive procedure to prevent leachate leakage from the cars within transferring process					
Overall comment						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						
Photographs Taken: Yes/No						

3) Checklist (Management of working environment)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of working environment	Compliance with law and regulation related to the occupational health and safety					
	Supply protective equipment to the workers and enforcement of their use					
	Confirmation of poisonous gas at working area					
	Setting up rules on the working environment					
	Installation of sanitation facility					
	Instruction on hazardous material and chemical material used in the site					
	Training of first aid and lifesaving procedures, etc.					
	Conducting a regular health check of workers					
System for emergency response	Preparation of communication system and prepare a contact address list for the emergency cases.					
	Training of workers for emergency response					
	Plans for prevent reoccurrence of the accident					
	Training of workers for using manual fire extinguishers					
Overall comment						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						
Photographs Taken: Yes/No						

4) Checklist (Littering and Vector)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Littering	· Littering is properly controlled.					
	Some measures were taken (e.g. waste screen, etc.)					
	There is a special employee for inspection and cleaning of the litter at the peripheral of the site.					
Vector	Are there serious vector issue happening? (medical reports archived by the station administrative department may be used for this issue)					
	Flies and insects are heavily infested according to the transfer station operational plan.					
	Water pool in the site is eliminated.					
	Some measure to get rid of the birds/animals is taken.					
Overall comment						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						
Photographs Taken: Yes No						

5) Checklist (Environmental monitoring of surface water, air, and odors)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Surface water	Is the monitoring of surface water performed? · Frequency of applied monitoring process · Methodology · Analyzed items					
	Applying measures to prevent surface water pollution					
	No abnormal concentration in surface water/effluent is reported					
	No abnormal condition on the sediment in wadi is identified					
Air	Is there any current items that is frequently monitored?					
Odor	Are there complaints from residents? · The complaint is recorded? · Measures for them are taken?					
	Is the monitoring of odor conducted? · Frequency · Methodology					
	Is the monitoring data recorded?					
	Does any odor substance exceed the allowed concentratio at the boundary?					
Overall comment Surface water: Odor:						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						
Photographs Taken: : Yes/No						

Annex 4b

Environmental Auditing Report / Qalqilya transfer station

Prepared by

General Directorate of Joint Service Councils

–

Ministry of Local Government

July, 2019

Background:

Qalqilya transfer station is located at the entrance of the city opposite to Al-Sabi' Nurseries, the location includes parking and mechanical workshops which located away from residential areas and. It was constructed on an area of 2 donums over a land which is owned by Qalqilya municipality, with a fund from Japan Government through the Ministry of Local Government. Qalqilya Joint Service Council for solid waste management was supported with (1,792,000 NIS), in order to construct the transfer station which costed around 1,000,000 NIS. Also a truck for waste transferring was supplied by VOLVO with a cost more than 700,000 NIS. The transfer station was constructed by Al-Amjad Al-Arabiyyah Contracting Company during 4 months, in addition to 3 large transferring containers with a capacity of 35 m^3 within the same grant by a cost of almost 80,000 NIS.

The transfer station receives waste from almost all over Qalqilya with a daily waste amount of 105 ton/day, where the whole waste amount is transferred through 2 transfer trucks over 4 loads to Zahret Al-Finjan landfill in Jenin, which is located 67 KM from the transfer station.

The table below shows the LGUs which Zahret Al-Finjan Landfill receives and takes the waste from.

#	**LGU Name**
1	Qalqilya Municipality
2	Azzoun Municipality
3	Hableh Municipality
4	Jayyous Municipality
5	Jeet Municipality
6	Immatin JSC – Fara'ta
7	Al-Fondoq JSC
8	Kofor Qaddoum JSC
9	JeinSafout JSC
10	Hajjah JSC
11	Kofor Laqif JSC
12	Al-Nabi Ilyas JSC
13	Assaleh JSC

14	Seer JSC
15	Falamyah JSC
16	Azzoun Atmeh JSC
17	Beit Ameen JSC
18	Al-Izab western JSC
19	Ras Attiyyah- Ras teerah JSC
20	Baqat Al-Hatab JSC

All of the vehicles that enter the transfer station including waste compactors, trucks are weighted using weighing bridge that is 9 meters long, and 3 copies of weighing records are printed for each vehicle.

The transfer station is operated through continuous cooperation and collaboration between Qalqilya JSC and Qaqilya Municipality, in addition to many employees directly from the JSC, and others from the Municipality side.

1) Checklist (Fundamental requirement of Transfer stations)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Basic infrastructure	Fence · The height of the fence. · Unclimbable structure · Enclose the territory completely · Not allowing animals entry. · A specific height of Reinforced Concrete is existed under the fence.		✓			Does not covering the whole area
	Site notice board · Installation · Information provided	✓				But with a bad quality, the provided information is not clear.
	Site access road · Width of the road · Pavement and dust condition · Visitor signature · Access sign	✓				
	Weighing system · Installation of the weighbridge · The staff's arrangement at acceptance · Bills issuing	✓				A copy of weight correspondence is attached.
	Installation of proper infrastructure for the internal roads to facilitate the waste vehicle movement	✓				
	Wheel washing facility · Installation			✓		Wheels are daily washed near the leachate pond.
	Offices					
	Inspection yard to confirm the accepted waste specification with agreed criteria of accepting waste in the station					
Fundamental facility required for MSW Transfer Station	Leakage prevention system composed of impermeable material (lining system)					No inspection is conducted for the cars, because they receive waste from trusted and verified sources.
	Leachate collection and removal system (LCRS) · Installation of Leachate storage pond · Capacity · Installation of the fence · Disposal plan of collected Leachate to be transferred to the nearest sanitary landfill or treatment plant	✓				
	Ventilation system to restrict odors diffusion. · Use of closed containers · The area where the waste is emptied should be closed · Closed Leachate ponds	✓				The fence is not surrounding the pond

	Stormwater collection and drainage system composed of channels to divert the storm water away from the site					
	Waste separation facility ·What is the separated waste? ·Is separation manual/mechanical? ·Is the facility closed? ·Procedures to prevent odors diffusion . Plan for reusing separated materials		✓			No implemented procedures to limit odors diffusion
	Waste recycling facility ·Recycling used process . Procedures to reduce the negative environmental impacts due to waste separation and recycling at the transfer station site.		✓			Storm water collection and drainage is done through the openings in the pavements as seen in the pictures

Overall comment

As for the transfer station, the basic operating fundamentals are existed, but the management of the transfer station needs to be more controlled and monitored, and the duration in which the waste stays at the site should be always checked and controlled to be less than 24 hours, as the environmental auditing team noticed leachate at different location at the site, which indicates the irregularity of waste emptying and transferring

Other observation / (Immediate) Action is Required on;

Site Operator's Comments:

Samples Taken: Yes/No

Photographs Taken: Yes/No

General Picture for the T.S site

Auditing Team at T.S site

Table 2.2 Sample of forms of accepted waste records (Monthly Forms)

Year: ***/ Month: ** Monthly Forms No (_____)

Accepted waste Monthly Records

Date	Quantity		Volume		Number of Rejection	Comments
	Daily (Ton)	Accumulated (Ton)	Daily (m^3)	Accumulated (m^3)		

Authorized Signature

Table 2.3 Sample of forms of accepted waste records (Monthly Forms)

Date: **/**/****Daily records No ( )
Inspector: …….

Acceptance Inspection Report

Date and Time	/**/** **:*****	
Waste Transfer party		
Identity Card of transfer party		
Waste resource		
Visual inspection results	□ Warning You are warned for the reason below. If you received any identical notice, then your waste will be rejected □ Reject Your waste is rejected to be received in this transfer station for the reason mentioned below.	
	1	
	2	
	3	
Waste quantity		
Reason justifications (photocopy,,,,,etc)		
Inspector signature		

2) Checklist (Management of waste acceptance)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of waste acceptance	Setting up waste acceptance criteria · Clear definition of prohibited waste · Procedural mechanism to deal with waste that not comply with accepted waste specifications in the transfer stations · Clear protocol on asbestos			✓		Waste is only received from specific regions which are listed in a list.
	Waste inspection at acceptance · Enactment of visual inspection · Sampling and analysis of waste			✓		
	Measure for the waste not comply with criteria · Existence of decisive procedure			✓		Waste in only received from the listed regions as mentioned before.
	Waste quantity measurement	✓				
	Data recording and reporting	✓				
Waste emplacement operation	Waste emplacement to the final destinations during 24 hours from delivery time.		✓			
	Vehicles covering · Waste is transferred by covered transferring vehicles to prevent waste dispersion · Existence of decisive procedure to prevent leachate leakage from the cars within transferring process	✓				
Overall comment Monitoring of waste staying period before being transferred, which should be less than 24 hours.						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/<u>No</u>						
Photographs Taken: <u>Yes</u>/No						

Waste Emptying Process into Bigger Containers

3) Checklist (Management of working environment)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of working environment	Compliance with law and regulation related to the occupational health and safety	✓				
	Supply protective equipment to the workers and enforcement of their use	✓				
	Confirmation of poisonous gas at working area			✓		
	Setting up rules on the working environment	✓				
	Installation of sanitation facility	✓				
	Instruction on hazardous material and chemical material used in the site	✓				
	Training of first aid and lifesaving procedures, etc.	✓				
	Conducting a regular health check of workers	✓				
System for emergency response	Preparation of communication system and prepare a contact address list for the emergency cases.	✓				
	Training of workers for emergency response	✓				
	Plans for prevent reoccurrence of the accident		✓			
	Training of workers for using manual fire extinguishers	✓				
Overall comment						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						

Photographs Taken: Yes/No

Waste Receiving Area in the Transfer Station

4) Checklist (Littering and Vector)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Littering	· Littering is properly controlled.	✓				
	Some measures were taken (e.g. waste screen, etc.)	✓				
	There is a special employee for inspection and cleaning of the litter at the peripheral of the site.	✓				
Vector	Are there serious vector issue happening? (medical reports archived by the station administrative department may be used for this issue)		✓			
	Flies and insects are heavily infested according to the transfer station operational plan.		✓			
	Water pool in the site is eliminated.			✓		
	Some measure to get rid of the birds/animals is taken.			✓		
Overall comment						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						

Photographs Taken: Yes/ No

The Fence Surrounding the Transfer Station Site

5) Checklist (Environmental monitoring of surface water, air, and odors)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Surface water	Is the monitoring of surface water performed? · Frequency of applied monitoring process · Methodology · Analyzed items			✓		
	Applying measures to prevent surface water pollution			✓		
	No abnormal concentration in surface water/effluent is reported			✓		
	No abnormal condition on the sediment in wadi is identified			✓		
Air	Is there any current items that is frequently monitored?			✓		
Odor	Are there complaints from residents? · The complaint is recorded? · Measures for them are taken?			✓		The transfer station location is far from residential areas.
	Is the monitoring of odor conducted? · Frequency · Methodology			✓		
	Is the monitoring data recorded?			✓		
	Does any odor substance exceed the allowed concentration at the boundary?			✓		

Overall comment
No odor was noticed there, the accumulated waste beside the site is due to the old waste quantities which already in the old location.

Other observation / (Immediate) Action is Required on;

Site Operator's Comments:

Samples Taken: Yes/No

Photographs Taken: : Yes/No

Recommendations:

- Following up with the operator of the transfer station to stick to the previously prepared operational plan.
- The continuous support for Qalqilya Joint Service Council should be provided, towards the development and extension of the transfer station.
- Efforts toward emptying the accumulated waste quantity from the old dumpsite beside the transfer station.

Annex 4c

Environmental Auditing Report / Ramallah Transfer Station

Prepared by

General Directorate of Joint Service Councils (Ministry of local Government) in cooperation with Environment Quality authority

June, 2019

Background

Ramallah transfer station is located in Betounia – the Industrial Area, at a height of 765 meters above sea level, and it is

supposed to serve a population of almost 60428 persons in each of Ramallah and Betounia, and 68390 persons in case of covering both Al-Amaari and Qaddoura Camps based on the Palestinian Central Bureau of Statistics for 2016. Moreover, this transfer station is expected to annually receive around 27740 tons of solid waste.
The site location is bordered with the previous landfill from the east, while from the south there is waste water refinery station which is linked to Ramallah, and the Industrial Area from the west.

The current transfer station is established over compacted reimbursement nearby the waste water refinery station, whereas solid waste is received from both Ramallah and Beitounia, and there the waste is accumulated and left bare, then it is filled and loaded into transferring covered cars to be moved to Zahret Al-Finjan landfill in Jenin city, where the landfill is operated by a private company.

Although the site capacity is limited and not adequate to accommodate the amount of solid waste from both regions, but it is considered as the best current available choice. However, a well-formed suitable operating plan is needs, including emergency plan to run and manage the transfer station properly.

What is important to mention, that is the site does not contain any environmental features that could be highly considered as important factors. Where there are no surface or ground water sources, even at the site or the surrounding. As for the biodiversity, there is no wild life can be seen except few birds at the nearby waste water refinery station, as well as for any special plants which cannot be found there, the same goes for the absence of historical or archaeological scenes.

Based on the current situation of the transfer station, and what was reported by Ramallah and Al-Bireh Joint Service Council, the site will be going through rehabilitation process as a study on the technical options that were conducted by a consultancy agency. And the option of using closed compacting bins was adapted due to its environmental, economic, and social aspects. So, a suitable design for the site was prepared in which it has three equipped Hook Lift with Trailers, in addition to storage area with services building aside, as well as a closed tank to collect the resulting leachate from waste squeezing and compacting process, in addition to many installed facilities and structures to facilitate the process. Also, part of the site will be allocated as a green landscape, and various trees are going to be planted in the perimeter of the site; a fence will enclose the whole area with setting up suitable locked gates to forbid people's entry except related authorized permitted ones.
Regarding the acceptance of solid waste, direct discharge and evacuation of loaded cars will be done into the compacting trailers till they are fulfilled, then the bins which are tightly closed are moved to Zahret Al-Finjan in Jenin.

On Tuesday, 10th, June, 2019. A site visit was conducted to the transfer station site with the Environmental Auditing teams from both EQA and MoLG, where the current status of the transfer station was investigated and inspected through applying the transfer stations environmental auditing checklists that were prepared by MoLG, in cooperation with the environmental auditing team.
The following attached checklists below, reflects the current situation of the transfer station, they also points out the future plans during the upcoming rehabilitation stage.

1) Checklist (Fundamental requirement of Transfer stations)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Basic infrastructure	Fence ·The height of the fence. ·Unclimbable structure ·Enclose the territory completely ·Not allowing animals entry. ·A specific height of Reinforced Concrete is existed under the fence.	✓				In the upcoming rehabilitation stage, a new fence with retaining walls are going to be constructed.
	Site notice board ·Installation ·Information provided		✓			
	Site access road ·Width of the road ·Pavement and dust condition ·Visitor signature ·Access sign		✓			
	Weighing system ·Installation of the weighbridge ·The staff's arrangement at acceptance ·Bills issuing	✓				Data measurement form related to the weight of the accepted waste charge is attached.
	Installation of proper infrastructure for the internal roads to facilitate the waste vehicle movement		✓			This issue is considered while designing the next rehabilitation phase.
	Wheel washing facility ·Installation	✓				
	Offices	✓				
	Inspection yard to confirm the accepted waste specification with agreed criteria of accepting waste in the station			✓		No Inspection procedures for defining the acceptable waste, and all the waste comes from Ramallah and Beitonia Municipalities.
Fundamental facility required for MSW Transfer Station	Leakage prevention system composed of impermeable material (lining system)		✓			This issue is considered while designing the next rehabilitation phase.
	Leachate collection and removal system (LCRS) ·Installation of Leachate storage pond ·Capacity ·Installation of the fence ·Disposal plan of collected Leachate to be transferred to the nearest sanitary landfill or treatment plant		✓			There is an old leachate pond is located at the end of the transfer station but it is not activated and filled with reimbursement, and it will be rehabilitated for leachate collection and so then to transfer to the nearby refining station.

	Ventilation system to restrict odors diffusion. ·Use of closed containers ·The area where the waste is emptied should be closed ·Closed Leachate ponds	✓				In the upcoming rehabilitation stage, a new fence with retaining walls are going to be constructed.
	Stormwater collection and drainage system composed of channels to divert the storm water away from the site		✓			
	Waste separation facility ·What is the separated waste? ·Is separation manual/mechanical? ·Is the facility closed? ·Procedures to prevent odors diffusion . Plan for reusing separated materials		✓			
	Waste recycling facility ·Recycling used process . Procedures to reduce the negative environmental impacts due to waste separation and recycling at the transfer station site.	✓				Data measurement form related to the weight of the accepted waste charge is attached.

Overall comment:

Overall, regarding the transfer station, the main fundamental requirements for transfer station operating are existed, but they need to be rehabilitated and this will be achieved within the next phase of rehabilitation

Other observation / (Immediate) Action is Required on;

According to waste acceptance process at the site, there is no criteria or specifications, and all waste that is received from the municipalities is accepted considering that it is all municipalities waste. But what is investigated while implementing the field visit that the transfer station also accepts medical waste with the acquaintance of the Ministry of Health, in addition to tainted Pharmaceuticals and chemicals with the acquaintance of Customs Control. And this really needs to be discussed with all of the related parties to set reasonable procedures and measures towards medical waste acceptance.

Site Operator's Comments:

There are no comments from the private company (Al-Forsan) which operates the transfer station, whereas it operates based on the agreement which is signed with the municipalities that accepts waste from.

Samples Taken: Yes/No

Photographs Taken: Yes/No

Table 2.2 Sample of forms of accepted waste records (Monthly Forms)

Year: ***/ Month : ** Monthly Forms No ( )

Accepted waste Monthly Records

Date	Quantity		Volume		Number of Rejection	Comments
	Daily (Ton)	Accumulated (Ton)	Daily (m^3)	Accumulated (m^3)		

Authorized Signature

Table 2.3 Sample of forms of accepted waste records (Monthly Forms)

Date: **/**/****Daily records No ( )
Inspector: …….

Acceptance Inspection Report

Date and Time	/**/** **:*****	
Waste Transfer party		
Identity Card		
Waste resource		
Visual inspection results	□ Warning You are warned for the reason below. If you received any identical notice, then your waste will be rejected □ Reject Your waste is rejected to be received in this transfer station for the reason mentioned below.	
	1	
	2	
	3	
Waste quantity		
Reason justifications (photocopy,,,,,etc)		
Inspector signature		

2) Checklist (Management of waste acceptance)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of waste acceptance	Setting up waste acceptance criteria · Clear definition of prohibited waste · Procedural mechanism to deal with waste that not comply with accepted waste specifications in the transfer stations · Clear protocol on asbestos			✓		The accepted transferred waste is only from the municipalities according to the agreement which is signed between the operator (the private company) and the municipalities.
	Waste inspection at acceptance · Enactment of visual inspection · Sampling and analysis of waste			✓		
	Measure for the waste not comply with criteria · Existence of decisive procedure			✓		
	Waste quantity measurement	✓				
	Data recording and reporting	✓				
Waste filling operation	Waste emplacement to the final destinations during 24 hours from delivery time.	✓				
	Vehicles covering · Waste is transferred by covered transferring vehicles to prevent waste dispersion · Existence of decisive procedure to prevent leachate leakage from the cars within transferring process	✓				The process which is conducted in the site is filling and loading the cars with waste using a bulldozer but not a compactor, so that there is no resulted leachate.

Overall comment

According to waste transfer, it is continuously implemented from the transfer station to Zahret Al-Finjan landfill. The period for the waste staying at the site is less than 24 hours. As mentioned, the waste is not compacted, it is only loaded and pressed using a bulldozer, and the transferring cars that are used to transfer waste from the site are well covered, thus it eliminates waste dispersal while transferring process.

Other observation / (Immediate) Action is Required on;
A clear well-formed protocol about waste acceptance criteria and procedures at the site is needed to be regulated, in order to avoid any expected problems due to accepting and transferring dangerous waste.

Site Operator's Comments:

None.

Samples Taken: Yes/No

Photographs Taken: Yes/No

3) Checklist (Management of working environment)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Management of working environment	Compliance with law and regulation related to the industrial health and safety	✓				
	Supply protective equipments to the workers and enforcement of their use		✓			
	Confirmation of dangerous gas at working area			✓		
	Setting up the rules on the working environment		✓			Only basic instructions are available, and during the transfer station rehabilitation period the lists and instructions will be all developed.
	Installation of sanitation equipment	✓				There is sanitary equipment at the site.
	Instruction on hazards of the chemical agent used in the site			✓		
	Training of first aid lifesaving, etc.	✓				
	Regular health check of workers	✓				A copy of correspondence between the JSC and the Ministry of Health for the purpose of laborers vaccination.
System for emergency response	Preparation of contact address list on the emergency event	✓				
	Training of workers for emergency response	✓				
	Plans for prevent reoccurrence of the accident			✓		
	Training of workers for using manual fire extinguishers	✓				

Overall comment

None.

Other observation / (Immediate) Action is Required on;

During the visit, there was seen some people who works specifically in metals collecting and separating process without dealing or taking any public health and safety measures. So this groups work needs to be managed and monitored under good conditions and frame work at the site, without harming the laborers and the surrounding environment.

Site Operator's Comments:

None

Samples Taken: Yes/No

Photographs Taken: Yes/No

4) Checklist (Littering and Vector)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Littering	·Littering is properly controlled.	✓				
	Some measures were taken (e.g. waste screen, etc.)	✓				
	There is a special employee for inspection and cleaning of the litter at the peripheral of the site.		✓			
Vector	Are there serious vector issue happening? (medical reports archived by the station administrative department may be used for this issue)				✓	
	Flies and insects are heavily infested according to the transfer station operational plan.	✓				
	Water pool in the site is eliminated.	✓				No birds are found, only street dogs.
	Some measure to get rid of the birds/animals is taken.	✓				
Overall comment						
Other observation / (Immediate) Action is Required on;						
Site Operator's Comments:						
Samples Taken: Yes/No						
Photographs Taken: Yes No						

5) Checklist (Environmental monitoring of surface water, air, and odors)

Category	Status	Satisfactory	Unsatisfactory	Inapplicable	Not-checked	Comment
Surface water	Is the monitoring of surface water performed? ·Frequency of applied monitoring process ·Methodology ·Analyzed items			✓		
	Applying measures to prevent surface water pollution			✓		
	No abnormal concentration in surface water/effluent is reported			✓		
	No abnormal condition on the sediment in wadi is identified			✓		
Air	Is there any current items that is frequently monitored?			✓		
Odor	Are there complaints from residents? ·The complaint is recorded? ·Measures for them are taken?			✓		
	Is the monitoring of odor conducted? ·Frequency ·Methodology			✓		
	Is the monitoring data recorded?			✓		
	Does any odor substance exceed the allowed concentration at the boundary?			✓		

Overall comment

None.

Other observation / (Immediate) Action is Required on;

None

Site Operator's Comments:

Regarding the odors, they appear instantly because there is no kept waste at the site, but only waste discharging and transferring in less than 24 hours.

Samples Taken: Yes/No

Photographs Taken: : Yes No

Annex 4d

تقرير التدقيق البيئي على محطة ترحيل رام الله

اعداد

وزارة الحكم المحلي -الإدارة العامة لمجالس الخدمات المشتركة بالتعاون مع سلطة جودة البيئة

حزيران، 2019

مقدمة حول المحطة :

تقع محطة ترحيل النفايات الصلبة في مدينة بيتونيا - المنطقة الصناعية على ارتفاع 765 متر فوق مستوى سطح البحر، ومن المتوقع أن يستفيد منها ما يقارب من 60428 شخص في كل من رام الله وبيتونيا و68390 شخص في حال شملت كلا المخيمين (الأمعري وقدورة)، حسب احصائيات الجهاز المركزي للإحصاء عام 2016 وعلاوة على ذلك، فإنه من المتوقع أن محطة النقل ستستقبل حوالي 27740 طن من النفايات الصلبة سنويا.
ويحد الموقع من الشرق مكب النفايات السابق ومن الجنوب محطة تنقية المياه العادمة التابعة لمدينة رام الله ومن الشمال والغرب المنطقة الصناعية.

تقوم محطة الترحيل الحالية على منطقة طمم مدموك بمحاذاة محطة تنقية المياه العادمة حيث يجري استقبال النفايات الصلبة من مدينتي رام الله وبيتونيا ويتم تكديس هذه النفايات في الموقع بشكل مكشوف ومن ثم يتم تحميلها في سيارات مغطاة و من ثم ترحيلها إلى مكب زهرة الفنجان في مدينة جنين حيث تدار المحطة الحالية من قبل شركة خاصة.
وعلى الرغم من أن سعة الموقع محدودة وليست كافية لاستيعاب النفايات الصلبة الواردة من المدينتين، لكنه يعد أفضل بديل متاح ، ومع ذلك ، فإنه يتطلب خطة عمل جيدة على ان تشمل خطة طوارئ لادارة المحطة بالشكل الصحيح.
والجدير بالذكر ان الموقع لا يشتمل على اي عناصر او ميزات بيئية يمكن اعتبارها هامة. حيث لا توجد مصادر للمياه السطحية أو الجوفية في الموقع أو حوله. اما من حيث التنوع الحيوي فلا يوجد حياة برية ملاحظه غير بعض الطيور في محطة معالجة المياه العادمة المجاورة كما انه لا يوجد اي نباتات ذات أهمية بيئية او نادرة في الموقع وحوله. كما لا توجد أي معالم أثرية أو تاريخية.

بناءا على الوضع الحالي للمحطة و على ما أفاد به المجلس المشترك لادارة النفايات الصلبة في رامالله و البيرة، فإنه سيتم العمل على تأهيل الموقع حيث أجريت دراسة للخيارات التقنية المعدة من قبل الجهة الاستشارية ، وقد تم اعتماد خيار الحاويات المغلقة الضاغطة كافضل خيار من النواحي البيئية، الاقتصادية والاجتماعية. و عليه تم عمل تصميم ملائم للموقع بحيث يشمل ثلاث مقطورات مجهزة لضغط النفايات مباشرة، مع وجود منطقة تخزين وأيضا مبنى للخدمات فضلا عن خزان مغلق لجمع العصارة الناتجة أثناء عملية عصر وضغط النفايات مع وجود كافة المرافق والمنشأت لتسهيل العملية. كما و سيتم أيضا تخصيص جزء منه كمساحة خضراء وسيتم زراعة اشجار حرجية واشجار زينة في محيط الموقع و ستكون هذه المنطقة مسيجة تماما مع وجود بوابات ملائمة ومقفلة لمنع دخول غير المصرح لهم . أما عن استقبال النفايات الصلبة فسيتم عن طريق تفريغ حمولة سيارات جمع النفايات الصلبة مباشرة في المقطورات الضاغطة، وبعد تعبئتها بالكامل يتم نقل الحاويات محكمة الاغلاق الى مكب زهرة الفنجان الموجود في جنين.

تم يوم الثلاثاء الموافق 10/ 2019/6 عمل زيارة إلى موقع المحطة بمشاركة أعضاء فريق التدقيق البيئي من سلطة جودة البيئة و وزارة الحكم المحلي، حيث تم تفقد و الإطلاع على وضع المحطة من كافة النواحي من خلال تطبيق قوائم التدقيق البيئي على محطات الترحيل و التي تم إعدادها من خلال الوزراة بالتعاون مع فريق التدقيق البيئي. القوائم الموجودة أدناه تعكس الوضع الحالي للمحطة كما و تشير إلى ما هو مخطط له مستقبلا من خلال مرحلة التاهيل القادمة.

قائمة التحقق (1) : المتطلبات العامة لتصميم و إنشاء محطات الترحيل

الصنف	الحالة /الوصف	محقق	غير محقق	غير قابل للتطبيق	لم يتم معاينته	ملاحظات
المتطلبات العامة لتصميم و إنشاء محطات الترحيل	حالةالسياج المحيط بالموقع · ارتفاع السياج · بنية غير قابلة للتسلق · يحيط المنطقة بالكامل باستثناء المدخل · يمنع دخول الحيوانات · يوجد باطون مسلح لارتفاع معين تحت السياج	X				اثناء مرحلة التاهيل القادمة سيتم انشاء سياج جديد مع جدران استنادية
	وجود لوحة إرشادية تشير إلى وجود محطة ترحيل نفايات في المنطقة		X			
	حالة الطريق الواصل إلى الموقع · عرض الطريق · ظروف التعبيد و حالة الغبار · توقيع الدخول · وجود اشارات المرور	X				
	حالة نظام التوزين ·تركيب جسر التوزين ·اجراءات قبول الشحنة ·إصدارالايصال أو الفاتورة	X				مرفق نموذج للبيانات ذات العلاقة بوزن الشحنة التي يتم استقبالها
	توفر البنية التحتية الأساسية للطرق الداخلية بحيث تسهل حركة السيارات في المحطة		X			تم اخذ هذه القضية بعين الاعتبار اثناء التصميم لمرحلة التأهيل القادمة
	وجود مرفق لغسيل العجلات	X				
	وجود مكتب اداري للمحطة	X				
	وجود ساحة تفتيش للتأكد من مطابقة النفايات المستلمة لمعايير النفايات المصرح بدخولها			X		لا يوجد أية اجراءات لتحديد من يتم قبوله في المحطة كل ما يأتي من خلال بلدية رام الله و بيتونيا يتم استقباله.
	نظام التبطين (الأرضية غير نفاذة تمنع تسرب العصارة الى الارض)		X			تم أخذه بعين الاعتبار في التصميم الجديد

منشآت الفرز و إعادة التدوير داخل محطات ترحيل النفايات الصلب	نظام جمع وتصريف العصارة . وجود بركة لتجميع العصارة دون تخزينها – السعة – السياج . وجود خطة للتخلص من العصارة التي تم تجميعها تم نقل العصارة إلى اقرب مكب نفايات صحي بشكل دائم .		X			يوجد بركة قديمة للعصارة تقع في نهاية المحطة و لكنها مملوءة بالردم و غير فعالة و سيتم في مرحلة التأهيل إعادة تأهيلها لتجمع العصارة و من ثم تحولها إلى محطة التنقية المجاورة .	
	نظام تهوية للحد من انتشار الروائح – استخدام الحاويات المغلقة – منطقة تفريغ النفايات مغلقة – برك التجميع للعصارة مغلقة		X			مستقبلا وبعد تأهيل المحطة سيتم نقل النفايات مباشرة من سيارات النقل الى سيارات التحميل الضاغطة و التي ستحتوي على صناديق لتجميع العصارة بشكل مباشرو بالتالي سيد هذا من وجود الروائح.	
	وجود قنوات لتجميع وتصريف مياه الامطار بعيدا عن العصارة الناتجة من ضغط النفايات في الموقع		X			ست اخذها بعين الاعتبار في التصميم مستقبلا	
	وجود منشأة فرز النفايات – ما هي المواد التي يتم فرزها – طريقة الفرز يدوي / ميكانيكي – هل المنشأة مغلقة – وجود اجراءات لمنع انتشار الروائح – وجود خطة لاعادة توزيع المواد المفروزة			X			
	وجود منشأة إعادة تدوير النفايات – طريقة التدوير المستخدمة – اجراءات الحد من الاثار السلبية على البيئة المحيطة نتيجة فرز و تدوير النفايات في موقع محطة الترحيل			X			

ملاحظات عامة

بالنسبة للمحطة فإن المتطلبات الاساسية لعملها موجودة و لكن بحاجة إلى إعادة تأهيل و هذا ما سيتم تحقيقه خلال المرحلة القادمة من التأهيل .

ملاحظات أخرى/يتوجب اتخاذ إجراءات(فورية) بخصوص: استقبال النفايات في المحطة لا يوجد عليه أية محددات فما ترسله البلديات تستقبله المحطة على إعتبار انه نفايات بلدية فقط و لكن ما عُلم خلال الزيارة إن المحطة تستقبل أيضا نفايات طبية بعلم وارة الصحة و كذلك أدوية و مواد كيماوية تالفة بعلو الضابطة الجمركية و هذا ما نعتقد انه بحاجة إلى دراسة و مناقشة مع الاطراف المعنية للتوصل إلى اجراءات سليمة بشأن استقبال النفايات الطبية .

ملاحظات المسؤول عن تشغيل الموقع

التاريخ.....

لا يوجد أية ملاحظات للشركة الخاصة (الفرسان) الي تقوم بتشغيل المحطة حيث أ، الشركة تقوم بالتشغل بناء على الاتفاقية المبرمة مع البلديات التي تسقبل منها.

تم أخذ عينات: نعم/لا اذا نعم منطقة أخذ العينات
لا

تم التقاط صور: نعم.

ملاحظة : بالنسبة للجدول أدناه فإن الشركة لديها نموذجا الخاص لتسجيل البيانات (مرفق نموذج)

جدول 2.2 مثال على نموذج تسجيل بيانات النفايات المقبولة (نموذج شهري)

سنة: ***/شهر:** سجل شهري رقم. .

سجل شهري للنفايات المقبولة

التاريخ	الكمية		الحجم		عدد مرات الرفض	ملاحظـــات
	يومي (طن)	تراكمي (طن)	يومي (م3)	تراكمي (م3)		

توقيع المسؤول

*بالنسبة لعملية التفت يش فلا يوجد لدى الشركة المشغلة أية بروتوكول واضح حول تفتيش النفايات المسقبلة على اعتبار انها نفايات بلدية فقط .

الجدول 3.2 مثال على سجل تفتيش القبول

التاريخ: **/**/****سجل يومي رقم.

المفتش:

تقرير حول تفتيش القبول

الوقت والتاريخ	**:** **/**/***
ناقل النفايات	
رقم هوية ناقل النفايات	
مصدر النفايات	
نتيجة المعاينة البصرية	☐ تحذير تم تحذيرك للسبب المذكور أدناه. في حال تلقيك تحذير مماثل مرة أخرى، عندها سيتم رفض استلام نفاياتكم. ☐ رفض

	لقد تم رفض إدخال نفاياتكم في هذا المكب للسبب المذكور أدناه	
السبب	1	وجود نفايات غير مقبولة ( )
	2	خصائص ومواصفات النفايات تختلف عن ما ذكر في العقد.
	3	غير ذلك
كمية النفايات		
إثباتات تدعم السبب (صورة، الخ)		

توقيع المفتش

قائمة التحقق (2): إدارة عملية قبول النفايات، تفريغها و نقلها

التصنيف	الحالة/ الوصف	محقق	غير محقق	غير قابل للتطبيق	لم يتم معاينته	ملاحظات
إدارة قبول النفايات	· يوجد تعريف واضح للنفايات المحظورة · وجود آلية للتعامل مع النفايات في حال عدم تطابقها مع مواصفات النفايات التي تستقبلها المحطة. · وجود بروتوكول واضح حول استقبال نفايات الاسبست			X		يتم استقبال النفايات البلدية فقد حسب ما هو مدرج في الاتفاقية بين المشغل و البلديات
	تفتيش النفايات عند القبول · خطة للتفتيش البصري · أخذ عينات وتحليل للنفايات			X		
	وجود إجراءات صارمة وقطعية للتعامل مع النفايات المخالفة للمعايير			X		
	قياس كمية النفايات	X				
	تسجيل البيانات ورفع التقارير	X				
عملية نقل و تفريغ النفايات	. عملية نقل النفايات إلى المكان النهائي للتخلص تتم خلال 24 ساعة من وصولها إلى المحطة.	X				
	- يتم نقل النفايات بسيارات مغطاة /مغلقة لمنع تطاير النفايات - وجود اجراءات لمنع تسرب العصارة من سيارات النفايات اثناء عملية الترحيل	X				ما يتم في الموقع هو تحميل النفايات في السيارات التي تذهب الى المكب باستعمال جرافة عادية وليس مكبس لذلك لا يوجد عصارة .

ملاحظات عامة:

بالنسبة لنقل النفايات فيتم بشكل مستمر من المحطة الى مكب زهرة الفنجان ، مدة مكوث النفايات في الموقع لا تتجاوز 24 ساعة ، لا يتم كبس النفايات و انما فقط تمحيل و ضغط باستعمال الجرافة ، السيارات التي يتم نقل النفايات فيها من المحطة يتم تغطيتها بشكل جيد مما يمنع تطايرها اثناء عملية النقل.

ملاحظات أخرى/يتوجب اتخاذ إجراءات (فورية) بخصوصها: يجب وضع بروتوكول واضح حول كيفية استقبال النفايات في الموقع. و ذلك لتجنب أية مشاكل متوقعة بسبب استقبال و نقل نفايات خطرة .

ملاحظات المسؤول عن تشغيل الموقع وتقيمه: لا يوجد

تم أخذ عينات: نعم/لا اماكن أخذ العينات : لا

تم أخذ صور : نعم/لا اماكن أخذ الصور : نعم

قائمة التحقق (3) : إدارة بيئة العمل

التصنيف	الحـالة /الوصف	مُحقق	غير مُحقق	غير قابل للتطبيق	لم تتم معاينته	ملاحظـات
إدارة بيئة العمل	الامتثال مع القانون واللوائح المتعلقة بالصحة والسلامة المهنية	X				
	توفير معدات وقاية للعاملين وتفعيل استخدامها		X			
	تأكيد وجود غازات سامة في بيئة العمل			X		
	وضع قواعد تتعلق ببيئة العمل		X			التعليمات الاساسية فقط المتوفرة، و سيتم العمل على تطوير قوائم و تعليمات العمل خلال مرحلة تأهيل المكب
	توفر وحدات/ مرافق صحية	X				يوجد وحدة صحية الموقع
	وجود إرشادات حول المواد الخطرة والكيماوية المستخدمة في الموقع			X		
	توفير تدريب حول الإسعافات الأولية وإنقاذ الأرواح، والخ.	X				
	إجراء فحوصات طبية دورية للعمال	X				مرفق صورة عن مراسلة اللمجلس المشترك لوزارة الصحة لتزويد الطعومات للعمال .
نظام الاستجابة في الطوارئ	إعداد آلية اتصال و قائمة عناوين بجهات الاتصال في حالات الطوارئ	X				
	تدريب العمال حول الاستجابة في حالات الطوارئ	X				
	وجود خطط لمنع تكرار الحوادث			X		
	تدريب العمال على استخدام طفايات الحريق اليدوية	X				
ملاحظات عامة: لا يوجد						
مشاهدات أخرى/إجراءات (فورية) يتوجب اتخاذها: شوهد في الموقع بعض الاشخاص و الذين يعملو على فرز المعادن و تجميعها بشكل خاص دون اتخاذ اية تدابير لصحة و السلامة العامة وهنا من لا بد من تنظيم هذا العمل بشكل سليم بحيث يبين دور هولاء المجموعات و ينظم عملهم في الموقع دون الحاق أية ضرر بالعمال و البيئة المحيطة .						
ملاحظات المسئول عن تشغيل الموقع: لا يوجد						
هل تم أخذ عينات: لا						
هل تم التقاط صور :لا						

قائمة التحقق (5) : إدارة عملية تطاير النفايات والناقلات

التصنيف	الحالة/الوصف	مُحقق	غير مُحقق	غير قابل للتطبيق	لم يتم معاينته	ملاحظات
تطاير النفايات وإلقائها على الأرض	يتم السيطرة على النفايات المتطايرة بشكل مناسب	X				
	تم اتخاذ بعض التدابير (مثل؛ تركيب شبك لالتقاط النفايات المتطايرة، والخ)	X				
	هنالك موظف معين خصيصاً للتفتيش عن وتنظيف النفايات المتبعثرة في محيط الموقع.		X			
الناقلات	هل تسببت الناقلات بأي مشكلات خطيرة؟(يمكن الاستعانة بتقاريرطبية محفوظة لدى ادارة المكب عن هذه الحالات)				X	
	هل تم أخذ التدابير اللازمة للقضاء على الحشرات و القوارض حسب خطة تشغيل محطة الترحيل .	X				
	وجود الطيور و البعوض في الموقع	X				لا يوجد طيور فقط بعض الكلاب الضالة
	تم إزالة المستنقعات والبرك المائية في الموقع.	X				
	تم اتخاذ بعض الإجراءات للحد من وجود الطيور/الحيوانات في الموقع.			X		لا يوجد طيور و الكلاب الموجودة قليلة ليست مقيمة في الموقع
ملاحظات عامة: لا يوجد						
مشاهدات اخرى/تدابير (فورية) يجب اتخاذها: لا يوجد						
ملاحظات المسؤول عن تشغيل الموقع: لا يوجد						
تم أخذ عينات : لا						

تم التقاط صور: نعم

قائمة التحقق (6) : إدارة المياه السطحية، الهواء و الروائح في الموقع

التصنيف	الحالة /الوصف	مُحقق	غير مُحقق	غير قابل للتطبيق	لم يتم معاينته	ملاحظات
المياه السطحية	مراقبة المياه السطحية؟ · عدد المرات/التكرارات لعملية المراقبة! · المنهجية · العناصر التي يتم تحليلها			X		
	اتخاذ اجراءات لمنع تلوث المياه السطحية			X		
	لم يتم الابلاغ عن أي تراكيز غير عادية في المياه السطحية.			X		
	لم يتم ملاحظة أي حالة غير طبيعية للترسبات في الوادي.			X		
الهواء	هل يوجد حالياً أي عناصر يتم مراقبتها بشكل دوري ؟			X		
الرائحة	هل يوجد شكاوى من السكان؟ · يتم تسجيل الشكوى؟ · هل يتم اتخاذ اجراءات بشأنها؟			X		
	هل تم إجراء مراقبة للروائح؟ · التكرار · المنهجية			X		
	هل تم تسجيل بيانات المراقبة والرصد؟			X		
	هل يوجد على حدود الموقع مواد ذات رائحة تتجاوز المعايير المصرح بها؟			X		
ملاحظات عامة: لا يوجد						
مشاهدات اخرى/تدابير (فورية) يجب اتخاذها : لا يوجد						
ملاحظات المسئول عن تشغيل الموقع وتوقيعه: بالنسبة للروائح فهي ظاهرة لحظية فقط حيت ان الموقع لا يتم فيه تخزين للنفايات و انما فقط تفريغ و نقل .						
تم أخذ عينات: لا						
تم التقاط صور: لا						

Al-Forsan Al-Thalatheh Co.
Al-Bireh Irsal Street
Jawwal- 0599263110

شركة الفرسان الثلاثة للتعهدات
البيرة شارع الارسال عمارة البزار التجارية
تلفاكس: 02-2964296

نسخة أصلية

بطاقة وزن

37714

رقم السيارة: 9043 اسم السائق: خضر عرموش

وزن الدخول:	14310.0 kg	وزن الخروج:	12815.0 kg
وقت الدخول:	11.07 AM	وقت الخروج:	11.12 AM
تاريخ الدخول:	11/06/2019	تاريخ الخروج:	11/06/2019
المرسل:	بلدية رام الله	المستلم:	شركة الفرسان الثلاثة
نوع البضاعة:	نفايات بلدية		

ملاحظات :

الوزن الصافي : 1495.0 kg

توقيع مراقب الميزان

توقيع مسؤول البلدية

حقوق الطبع محفوظة 2018 © شركة التقم لصناعة القبانات والموازين نيروخ إخوان- الخليل هاتف:02-2259830

Al-Forsan Al-Thalatheh Co.
Al-Bireh Irsal Street
Jawwal- 0599263110

شركة الفرسان الثلاثة للتعهدات
البيرة شارع الارسال عمارة البزار التجارية
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نسخة

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37714

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المرسل:	بلدية رام الله	المستلم:	شركة الفرسان الثلاثة
نوع البضاعة:	نفايات بلدية		

ملاحظات :

الوزن الصافي : 1495.0 kg

توقيع مراقب الميزان

توقيع مسؤول البلدية

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مجلس الخدمات المشترك
لإدارة النفـــايات الصلبـــة
محافظة رام الله والبيرة

التاريخ: **2019/06/11**

السيد مدير عام مديرية الصحة في محافظة رام الله والبيرة المحترم

الموضوع: تطعيم عمال سيارات جمع النفايات وسائقيها

بالإشارة الى الموضوع أعلاه، وبناءاً على توجيهاتكم لعمل الوقاية اللازمة لسائقي وعمال سيارات جمع النفايات ومن ضمنها اخذ الطعومات للقزاز والكبد الوبائي نرسل لكم لموظفين ادناه :

الاسم	الوظيفة	رقم الهوية
بطرس نزيه منصور شاهين	سائق	854757341
وسيم اكرم احمد حرفوش	عامل	860087089
مجدي محمد عارف سمور	سائق	967985995
ابراهيم بكر اسماعيل رياحي	عامل	901405928
محمد خليل محمد ابو رحمة	عامل	850934621
محمد جمال كامل ابو رداحة	سائق	854006285
احمد محمود احمد امطير	عامل	904007689
مهران صابر بدر كراكرة	عامل	852591015
هاني ناجح محمد رواشدة	سائق	852345149

لاخذ الفحوصات والطعومات اللازمة.

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Annex 5

Final Report of Pilot Project on Public Awareness

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1. Background of the Pilot Project

In Palestine, the increasing waste is critical issue and reducing the amount of waste that is transferred to the landfill is necessary. As mentioned on the National Strategy for Solid Waste Management in Palestine (2017-2022), the public awareness is essential to maximize the citizen's ownership of the SWM process, and it is important to enhance the environmental issues in public and school. MoLG decided a national goal of 2019 to promote waste reduction and cleanliness as a National Campaign "Year of Waste Reduction and Cleanliness", and MoLG and JICA planned and implemented the National campaign events and a pilot project on school awareness on solid waste issues, especially waste separation and 3Rs (Reduce, Reuse and Recycle). These activities also aim to implement the National Strategy on public awareness, mainly intervention No.1, 3, 4, 5, 8, 10 and 11 of the policy No.16 and 17. The strategic goal, policies and its interventions in the National Strategy is as follows.

Table 1: Interventions on Public Awareness on National Strategy for SWM (2017-2022)

Strategic goal (7): A more participating and aware community		
Policy No.15: Deepening environmental, community and institutional awareness on SWM issues and its impact		
Intervention	1.	Develop and implement awareness programs targeting community and LGUs in all aspects, and the impacts and practices of dealing with SW
	2.	Activate and enhance community awareness and participation regarding service providers and relevant governmental departments
	3.	Introduce the awareness and practices in all deferent aspects of SW in schools and kindergartens curricula, and collaborate with universities upon conducting special studies and researches on SW
	4.	Implement joint projects and campaigns with civil community organizations to familiarize the informal sector with the technical, health and environmental aspects of SW
	5.	Establish avenues for dialogue and participation between public, private, and non-governmental sectors
Policy No,16: Raising environmental awareness among students, developing their skills and orientations in the aspects of SW reduction and recycling		
Policy No.17: Providing students with equipment and tools to enable them to acquire the necessary knowledge and skills for SW recycling (e.g. recycling tools, compost barrels (composter))		
Intervention	1.	Implement programs and activities aiming at raising environmental awareness and level of knowledge of environmental issues related to SW (reduction reuse and recycling of wastes) in the classroom and non-classroom educational activities
	2.	Devote more attention to environmental and applicable researches in the field of SW
	3.	Include SWM concepts in the Palestinian curricula of schools and universities, in an integrated and regulated way
	4.	Enhance SWM culture among all the categories of school community through designed events and activities
	5.	Include environmental dimension in schools and universities events and activities
	6.	Encourage green building and adopt green school's policy
	7.	Adopt and support environmental activities and projects submitted by student in related to SW
	8.	Enhance partnership with relevant institutions
	9.	Prepare supporting guidelines and documentaries on SW
	10.	Establish environmental school clubs
	11.	Apply what have been learned at the school environment policy with regards to SWM

2. National Campaign

In 2018, MoLG decided a national goal of 2019 to promote waste reduction and cleanliness as a National Campaign "Year of Waste Reduction and Cleanliness". Based on the National Campaign, MoLG and JICA planned and implemented campaign events with JSCs and a pilot project on school awareness on solid waste issues, especially waste separation and 3Rs (Reduce, Reuse and Recycle).

For the National Campaign, MoLG designed the following campaign's logo and slogan "Reduce your waste, Improve your life" and also prepared T-shirt for the campaign activity and materials for public awareness such as sticker, magnet, form and car refresher.

Logo and slogan of the Campaign

T-shirt for the Campaign activity

Figure 1: Logo and T-shirt for National Campaign

2-1. National Day on Solid Waste Management in Palestine

The First National Day on Solid Waste Management in Palestine "1st NDSWMP" was held on Monday, 25th February 2019 at Grand Park Hotel in Ramallah by MoLG in cooperation with JICA. It was the first step towards mitigating and minimizing waste generation, spreading awareness with all current stakeholders, and shedding lights on the current updated situation of Solid Waste Management dilemma in Palestine.

In addition to the main opening and closing sessions, the conference held four sessions including different topics regarding Solid Waste Management issue as mentioned in the following **Table 2**. The conference was diverse, bold, and modern all at the same time, and it was both academic and awareness aiming as well. It pulled out all the concerning aspects and issues which made it a unique and distinct one to be attended by more than 300 attendees with a vast range of disciplines. The mission of the conference was highlighting the alarming increment of solid generation affair in Palestine to lead for new permanent solutions and decision-making process to cope with the crucial challenging causes.

Opening Speech of 1st National Day

One session of 1st National Day

Figure 2: Photo of 1st National Day on Solid Waste Management in Palestine

Table 2: Agenda of 1st National Day on Solid Waste Management in Palestine

11:00-11:30	Registration
	[Session I]: Plenary Session
11:30-11:40	Opening Speech: Dr. Hussein Al-Araj, Minister of MoLG
11:40-12:10	Speeches Speaker: Mr. Takeshi Okubo, Ambassador, Representative of Japan Mr. Toshiya Abe, Chief Representative of JICA Palestine Office Dr. Rami Hamdallah, Prime Minister of Palestine
12:10-12:30	Tea Break
12:30-14:00	[Session II]: Technical Session
	[Session A] Waste Collection, Transportation and Disposal Moderator: Mr. Suleiman Abu Muferreh (Director General of DJSC-MoLG) Speaker 1: Mr. Ahmad Sukar (Acting Executive Director of Hebron and Bethlehem Higher JSC/ Al-Minya Landfill)) Speaker 2: Dr. Abd Al Haleem Khader (Al Najah University) Speaker 3: Mr. Mohammad Sadi (Jenin JSC/ Zahret Al-Finjan Landfill)
	[Session B] 3Rs and Awareness Moderator: Mr. Muhammad Jabareen (Deputy Minister of MoLG) Speaker 1: Mr. Muhammad Jabareen (Deputy Minister of MoLG) Speaker 2: Mr. Iyad Aburdeineh (Executive Director of Bethlehem JSC) Speaker 3: Mr Munjid Blaibleh / Strategic Framework for E-Municipalities (Director of the Information Systems Unit at the MoLG)
	[Session C] Investment and PPP Moderator: Mr. Mohieddin Al Arda, Economic Development Unit of MoLG Speaker 1: Mr. Azem Besharah (Palestine Investment Fund/ Massader) Speaker 2: Mr. Munif Treish (Chairman of Ramallah and A-Bireh JSC) Speaker 3: Mr. Zeiad Fadel (MoNE) Speaker 4: Mr. Abed Aljabar Abu-Halawah (Executive Director of Jericho JSC)
	[Session D] Hazardous and Medical Waste Management Moderator: Mr. Ibrahim Atiya, Environmental Health Department of MoH Speaker 1: Mr. Mohammoud Othman (MoH) Speaker 2: Mr. Murad Al Madani and Mr. Yaser Abu Shanab (EQA) Speaker 3: Dr. Issam Alkhateeb (Birzeit University)
	[Session III] Closing Session
14:00-14:30	Reporting from each Moderator of Session II Speaker: Each Moderator
14:30-14:45	Technical Remarks Speaker: Dr. Mitsuo Yoshida, Chief Advisor of JICA SWM Project Mr. Suleiman Abu Muferreh, Director General of DJSC-MoLG
14:45-15:00	Conference Declaration and Closing Remarks Speaker: Mr. Muhammad Hassan Jabareen, Deputy Minister of MoLG

2-2. Launching event of National Campaign

On 16th April 2019, MoLG and JICA launched the National Campaign ”2019, the Year of and Waste Reduction and Cleanliness” at Al-Bireh Cultural Center in cooperation with the Environmental and Traffic Police, the Ramallah and Al-Bireh Governorate. This Campaign aim to maintain cleanliness of town and raise community awareness regarding solid waste issue for waste reduction. The partners for the event were the National Team for Solid Waste Management, the Ramallah and Al-Bireh JSC for SWM, the local Students Association, and the Al-Bireh Municipality.

Table 3: Agenda of launch of the National Campaign

Time	Activity	Detail
10:00-11:00	Speeches	・ Mr. Toshiya Abe, Chief Representative of JICA Palestine Office ・ Mr. Muhammad Jabareen, Deputy Minister of MoLG ・ Colonel Dr. Hassan Al-Jamal, Environmental and Traffic Police ・ Representative of Ramallah Governorate ・ Mr. Manif Tarish, Chairman of Ramallah JSC
11:00-13:00	Distribution of Awareness Materials	Moving to the centers in groups and starting distribution (Distribution of materials and publications to passengers and drivers of public and privacy vehicles located in or near the centers)

2-3. JSC-based Public Awareness Activity

Among the activities of the pilot project for public awareness of solid waste, where the high level of public awareness is the key to success in reducing the amount of the generated waste. These activities come within the framework of the National Awareness Campaign which was previously mentioned by MoLG. Regarding this, the JSCs planned to be a part of the National Awareness Campaign by addressing an activity to be conducted within the cooperation between the JSCs, MoLG and JICA till the end of 2019.

(1) Previous and Current Situation of JSC’s Public Awareness:

Before this JSC-based Public Awareness activity, the Project surveyed the previous JSC-based public awareness activity by using questionnaire (**Table 4**). The questionnaire has been distributed to all 15 JSCs for Solid Waste Management all over Palestine. This survey took a period of time from 29th October to 6th November 2018, and the 11 JSCs (Salfit JSC, Ramallah JSC, Nablus JSC, Jericho JSC, Hebron and Bethlehem higher JSC, Bethlehem JSC, Tubas JSC, North Gaza JSC, South Gaza JSC, Tulkarm JSC, N+NW Jerusalem JSC) responded the questionnaire. On the other hand, 4 JSCs (Qalqiliya JSC, Hebron JSC, Jenin JSC, NE+SE Jerusalem JSC) had not responded.

The Evaluation Sheet included several questions to understand the mechanisms used in the awareness activities, and to determine the reasons for the success and failure of these activities based on the analysis of the answers that will be explained. **Table 5** below provides a summary of the responses received from the JSCs.

Table 4: Details of Questionnaire

No	Questions
1	Is there a department, unit or specialized employee work on public awareness activities at your JSC (If yes, describe)?
2	Did your JSC conduct any previous public awareness activities? If yes, describe (Name / Objective / Donor / Partner / Brief description / Results)
3	Is there any ongoing or planed public awareness activities? If yes, describe (Name / Objective / Donor / Partner / Brief description / Expected Results)
4	Did your JSC evaluate the various implemented public awareness activities? If yes, what was the results? (If no, you have to evaluate it for the ongoing and planed activities.)
5	What is the lessoned learned from the public awareness activities, how to improve it for the future activities?
6	How did your JSC plan to disseminate these public awareness activities to other JSCs and community?

Table 5: Summary of the responses received from the JSCs

Name of JSC	[Question 1] Presence of Special Staffs	[Question 2] Previous Activity	[Question 3] Ongping Activity	[Question 4] Planned Activity	[Question 5] Evaluation
Tulkarm	Partly	Yes	No	Yes	Yes
N+NW Jerusalem	No	Yes	No	Yes	No
Bethlehem	Partly	Yes	Yes	Yes	No
North Gaza	No	Yes	Yes	Yes	Yes
South Gaza	Yes	Yes	Yes	Yes	Yes
Tubas	Partly	Yes	No	Yes	No
Hebron and Bethlehem Higher	Yes	Yes	No	Yes	No
Jericho	Partly	Yes	Yes	Yes	Yes
Nablus	No	Yes	No	No	Yes
Ramallah	Yes	Yes	Yes	Yes	No
Salfit	Partly	Yes	No	Yes	No

As a result of survey, most of JSCs that have been carrying out awareness activities were managed by their specialized officers. Currently, 5 JSCs are carrying awareness activities by specialized officer, except for North Gaza JSC, and 10 JSCs are planning to carry out awareness activities in the upcoming future. If any JSCs will carry out any future activities, a presence of a specialized officer is essential. Therefore, the allocation of a specialized officer or unit is recommended. Also, all of the JSCs had carried out awareness activities previously, however only 5 JSCs evaluated their activities and 6 JSCs didn't evaluate their activities. Therefore, it is not clear for the 6 JSCs that what kind of factors led to success or failure of the activities.

Moreover, the result shows that some of the JSCs do not conduct a currently Public awareness activities due to lack of financial resources, and the rest of the JSCs are conducting the activities with the donor's support. However, most of the JSCs are planning to do activities in the future. So that, the allocation of a budget is essential for implementing any activities.

(2) Each activity's plan by JSCs for 2019

During 4th SWM Training program on February 2019, each JSC planned their National Awareness Campaign event to be conducted in cooperation with MoLG till the end of 2019. **Table 6** below describes each JSC's conducted/planned activities in the National Awareness Campaign.

Table 6: JSC's activities at the National Awareness Campaign

JSC	Contents of Activity	Month
Already conducted		
South Gaza (KRM)	Street and community Public Awareness Campaign at the main crossing points and shops	25th, 27th to 29th April
N+NW Jerusalem	Workshop on occupational safety issues of waste collection workers	22nd May
NE+SE Jerusalem	Clean-up campaign in the towns of Hizma and Jaba	1st June
Nablus (1)	Workshop on waste separation methods for the student at the summer camp	27th June
Bethlehem	Street and community Public Awareness Campaign at the main crossing points and bus stations	1st July
Nablus (2)	Street and community Public Awareness Campaign at the main crossing points and bus stations	16th July
Tulkarem (1)	Street and community Public Awareness Campaign at the main crossing points and bus stations	17th July
Plan		
Hebron	Raising awareness of institutions in the field of hygiene	July
Tubas	Awareness leaflet on the proper use of containers	July
Higher	3Rs and reduction of household waste (cardboard)	August
Jenin	Program for targeting LGUs and awareness workshops about 3Rs	August
Tulkarem (2)	Awareness for JSC staff and health departments staff	August
Qalqiliya	Educating students about reducing waste production	September
All JSCs	World Clean-up Day campaign	September
Jericho	Awareness on agricultural waste	October
Salfit	Raising public awareness among General Authorities about SWM and Tariff	November
North Gaza	Implementing environmental and health training	December

Awareness material for kids by KRM JSC

Cap for Campaign event by Tulkarem JSC

Figure 3: Awareness goods by JSCs for National Campaign

2-4. National Campaign Tools:

(1) Materials

The following **Table 7** describes the details for all the materials that have been designed, printed out, and used at the National Day, launching event and JSCs public awareness campaigns.

Table 7: Materials for the National Campaign and Messages on them

	Messages
Stickers	• Waste separation makes reusing and recycling processes easier. • Waste separation is an environmental necessity, and economic profits. • Throwing waste in the appropriate place is a sense of cleanliness and culture moral. • Do you know that we are considered as one of the most waste producing countries compared to our incomes? • Did you pay this month's waste services fees for the municipality? • Do you know that more than 90% of collected waste is directly transferred to landfills? • No for the Artificial Chemical Compost, Yes for the Organic Compost. • Do you know that more than 50% of Household waste is organic waste, which could be turned into Organic Compost? • Let us cooperate together to reduce the landfilling waste amounts.
Magnets	• Do you know that more than 50% of Household waste is organic waste, which could be turned into Organic Compost? • Did you know that we are one of the most productive countries of waste compared to the level of income? • Reduce using plastic bags ...When you go for grocery, bring your bag with you.
Car fresheners	• Did you know that there is a fine for through the waste from the car window? According to Article 177 from 2005 the fee amount is 150 NIS • Cleanliness is faith, Keep your country clean. • Reduce using plastic bags ...When you go for grocery, bring your bag with you.
Foams	• Have you paid the municipal waste charges this month? • Did you know that we are one of the most productive countries of waste compared to the level of income? • Think before you print, Print on both sides. • Did you know that waste collecting and disposal for one ton costs almost 150 NIS? • Did you know that dumping waste in places other than the allocated amount increases the cost of collection?

	• We can avoid buying materials which end up being waste. • Let us cooperate together to reduce the land filling waste amounts. • Dumping waste in the inappropriate place increases collecting costs.

3. Pilot Project in School

3-1. Project Objectives

- Effectiveness of education on solid waste issue is verified in school.
- Possibility of source-separation in school is verified through environmental awareness (education) on solid waste issue.

3-2. Problem Analysis

Before the pilot project, the project surveyed the current situation of environmental education on solid waste issue in schools in Palestine. The project had a meeting with Palestinian Curriculum Development Center (PCDC) of the Ministry of Education (MoE; former Ministry of Education and Higher Education) to survey the current school policy and curriculum in school on environmental issue, especially solid waste issue and the non-classroom activity on environmental issue "Environmental Club".

3-2-1. School policy and curriculum on solid waste issue in school

MoE has developed their "School Environment Policy" which include solid waste management in school. The Intervention No.11 on Policy No.17 of the National Strategy is related to the School Environment Policy. The policy provides for not only a waste collection system in school, but also measurements on waste reduction and public health protection in school based on an appropriate waste management (including waste reuse and recycling). Regarding waste separation, the policy defines that (1) Waste produced by labs should be separated from all other waste, (2) All schools should be encourage to adopt waste recycling policies and make use of them as much as possible (by recycling organic waste to produce fertilizers that may be used in the school garden. To separate and classify solid waste, recycle beneficial materials such as paper.). The latest policy is developed in 2016, therefore MoE need to prepare new policy according to them.

And, MoE had developed the curriculum for mathematics and science in school in cooperation with JICA under the MoE-JICA Project "Palestine - Japan Education Cooperation for mathematics and science Curriculum Development" (PAJEC) during 2016-2018 and had added the solid waste issues to new curriculum and textbooks for science. In the additional contents, waste separation is included.

"School Environment Policy 2016" developed by MoE

Sample of a science textbook for 5th-grade student developed by the MoE-JICA Project

Figure 4: Photos of "School Environment Policy" and sample of "science textbook"

On the other hand, some schools in Palestine have activities on solid waste issue as special classroom or non-classroom activities. For example, the Faisal Al Husani Girl's school in Ramallah municipality has such activities as non-classroom activities. The students in the school made some goods by used papers (newspaper and copy paper) and/or used plastic (PET) bottles, etc.

Flowerpots made of used tires

Arts made of used papers

Figure 5: Photos of goods by used papers in school

3-2-2. Current situation of "Environmental Club"

Schools in Palestine have their own "Environmental Club". According to the School Environmental Policy (2016), "Environmental Club" is defined as "a group of volunteering students, teachers, supervisors, and members of the local community who practice environmental and health activities, which aim to promote situational health and environmental issues in schools and provide students with living skills". Based on MoE's statics, approximately 30% schools have own non-classroom educational activity as "Environmental club" all over Palestine (West Bank and Gaza Strip), and approximately 60 schools out of 180 schools in Ramallah and Al-Bireh Governorates has their own Environmental club. At the club, students, teachers and other members carry out many activities to learn the environmental issues including solid waste issues, for example, waste reusing, composting.

Table 8: The number of the "Environmental Club" in Palestine

	No. of School	No. of "Environmental club"
All over Palestine (West Bank and Gaza)	Around 3,000	Around 1,000
Ramallah Governorates	Around 180	Around 60

As a result of the Problem Analysis, some of schools in Palestine give a class on environmental issues including solid waste issue based on the school environment policy and curriculum, and also have some non-classroom activities and their own Environmental club's activities. However, these class and activity depend on a policy of each school. Therefore, some school has no non-classroom activity on solid waste issue.

3-3. Project Outline

For implementation of the Pilot Project, the Project selected target schools and students. The Project assessed their level of knowledge and experience on solid waste issue and their level of environmentally friendly attitude and behavior before the pilot project and set and implemented the activities of the project based on the result of the assessment.

After the all activities, the Project assessed their levels again and evaluated the effectiveness of the activities.

3-3-1. Details of Target schools

The Project selected two schools, boy's school and girl's school in Ramallah Governorates as a target school, based on a result of discussions with Ministry of Education and the Ramallah & Al-Bireh Governorates Joint Service Council (JSC) for Solid Waste Management.

The curriculum of both schools is same; however, their non-classroom activities were different. The boy's school has almost no activities related to solid waste issues including waste separation and has no environmental club. On the other hand, the girl's school has many activities related to that, for example, waste reusing activities, paper and organic waste separating activities, etc. and has their own environmental club. In addition, some activities are collaborated with a Palestinian NGO (Ommar El-Ard Recycling). Also, this girl's school won an "Sustainable school award" from the Ramallah municipality in 2018. Therefore, both schools have different level of environmental education on environmental issue.

Furthermore, the project selected 2 grade class in both schools (2nd grade and 8th grade) to compare the effectiveness of our awareness activities between different ages.

Table 9: The details of Target school in Ramallah and Al-Bireh Governorates

	Boy's school	**Girl's school**
Name of school	Dair Bzea school	Faisal Al Husani girl's school
Public/Private	Public school	Public school
Name of LGU	Dair Bzea village council	Ramallah municipality
No. of all students	218 (only for boys)	620
No. of students in target class (2nd-Grade)	17	22
No. of students in target class (8th-Grade)	20	47
Presence of "Environmental club"	No	Yes
Presence of current waste separation activity	No	not much
Reference	This school is for girls in morning and for boys in afternoon.	This school is only for girls.

Non-separated waste in Boy's school

Organic waste mixing box for composting in Girl's school (However, it hasn't used much.)

Scattered plastic wastes in Boy's school

"Sustainable School Award 2017-2018" of Girl's school

Figure 6: Photos of target schools

3-3-2. Assessment on current situation in both target schools

For survey on the current status of their level of the knowledge and experience and their attitude and behavior on solid waste issues, the project conducted the baseline assessment for the target students by questionnaires.

(1) Current status of level on knowledge and experience on solid waste issues

For this survey, the project assessed student's level on knowledge and experience on solid waste management by questionnaires. The questionnaire has two parts, (1) questions on knowledge and experience on solid waste management and 3Rs, and (2) questions on environmental awareness. The former consists of eleven questions about knowledges and experiences on solid waste issue, especially reuse and recycle. The latter consists of two questions about opinion and sense on 3Rs.

The following **Figure 7** is a result of assessment based on average level (positive answer) on knowledge and experience on solid waste issues by parts of the questionnaire. The contents of the parts of the questionnaire is as "**Table 10**". No.1 to No.6 are questions on knowledge and experience on solid waste management issue, and only No.7 is a question on environmental awareness.

Table 10: Main contents of Questionnaire

No	Question	Options of Answer
1	Do you know what solid waste is?	Yes/No
2	Have you ever heard about 3Rs (Reduce, Reuse and Recycle)?	Yes/No (If yes, where?)
3	Have you ever heard about the importance of reuse?	Yes/No
4	Do you know about recycling?	Yes/No
5	Have you ever heard about the importance of recycling?	Yes/No (If yes, do you agree recycle?)
6	If a 3Rs program was set up, would you be willing to separate materials into separate bags for collection purposes?	Yes/No/Don't know
7	Would you like to use paper or cotton bags instead of plastic bags if those paper or cotton bags available?	Yes/No (If yes, specify the reason? If no, specify the reason?)

Result of the assessment is as follows.

1. The level of knowledge and experience on solid waste issue of Boy's students is lower than that of Girl's students totally.
2. For Girl's students, the level of 8th-grade students is higher than that of 2nd-grade students.
3. For only No.6 (question on environmental awareness), the level of Boy's student is higher than that of Girl's students both grades.
4. For No.7 (question on environmental awareness), the level of environmental awareness of both schools is almost same.

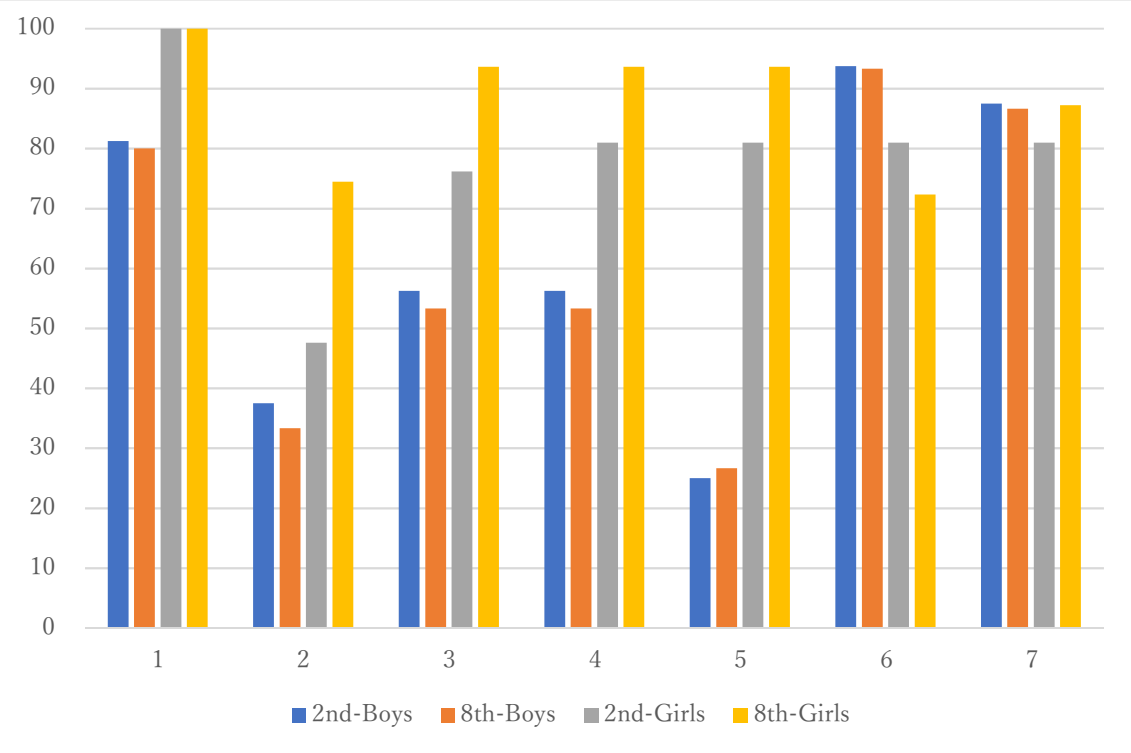

Figure 7: Result of assessment of level on knowledge and experience on solid waste issues before activities

(2) Current status of level of attitude and behavior on solid waste issues

For this survey, the project assessed level of attitude and behavior on solid waste issues by using "Two-phase decision-making model" (**Figure 8**), which is a general model of environmental conscious behavior that was developed by Yukio Hirose in 1994. This model shows that the decision-making process before an action is divided into two phases: first phase is up to the development of an environmentally friendly attitude, and second phase is up to the execution of an environmental conscious behavior. After the second phase, environmentally friendly action will be done.

This model has six factors for evaluation on level of attitude and behavior on solid waste issues. The first phase "environmentally friendly attitude" has three factors: (1) Recognition of Seriousness, (2) Recognition of Responsibility, (3) Recognition of Effectiveness. and the second phase "pro-environmental behavior" has three factors: (4) Evaluation of Benefit-cost, (5) Evaluation of Social norm (6) Evaluation of Feasibility. This is a concept of this model. The detailed explanation of each factor is shown at **Table 11**.

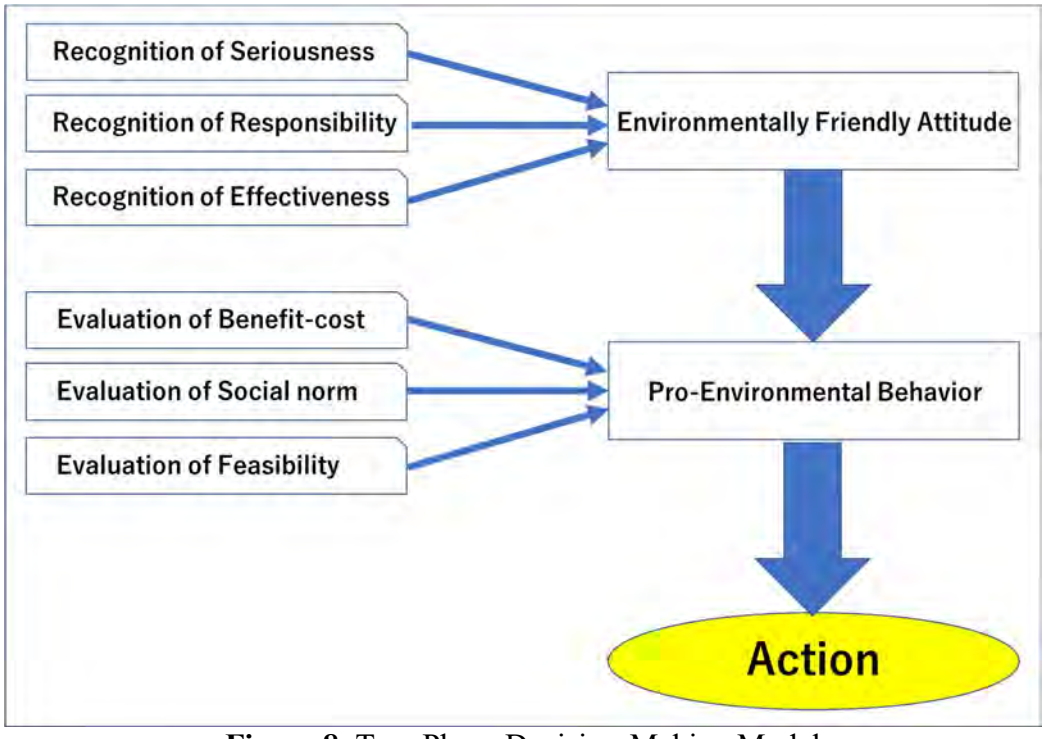

Figure 8: Two-Phase Decision-Making Model

Table 11: Detailed explanation of each factor

Factor	Explanation of the factor
Recognition of Seriousness	Recognition of seriousness of an environmental problem and the awareness of an environmental crisis to foresee the probability of such problem, in other words, a sense of crisis. The more one recognizes the seriousness of an environmental problem, the more he/she wants to take a contributive attitude to do something about that problem.
Recognition of Responsibility	Recognition of the locus of responsibility to know who or what is the cause for that particular environmental pollution or destruction, in other words, a sense of responsibility. For example, if one strongly feels responsible for the environmental pollution, he/she all the more tends to take an environmentally friendly attitude.
Recognition of Effectiveness	Recognition of validity of a countermeasure to solve the environmental problem, in other words, a sense of effectiveness. One will have a greater sense of effectiveness of a countermeasure when he/she can deem that the problem such as a local garbage problem is solvable by his/her efforts along with other people, than when one feels that the individual commitment to addressing the global warming has almost no effect.
Evaluation of Benefit-cost	One estimates how much his/her current convenience or comfort would be damaged by changing to the environmental conscious behavior. If one's benefit loss and cost increase are great when he/she changes to the environmental conscious behavior, he/she will refrain from behaving environmental consciously.
Evaluation of Social norm	Evaluation of social norm means to rate the behavior according to the norm and expectations of the reference group. One may behave environmental consciously by considering the influence from subjective norm, even though he/she does not have an environmentally friendly attitude.
Evaluation of Feasibility	In order to allow environmental conscious behavior to be carried out, credit must be given for one's knowledge and skills that are required for the behavior, or an external system and mechanism for the behavior to be taken must be considered as being in place.

Table 12: List of Questions on Questionnaire

Factor	Questions on Questionnaire
1. Recognition of Seriousness	(1) Do you think that inappropriate waste management will damage environment and your health? [Yes/ No/ I don't know/ Others]
	(2) Do you think that waste appropriate management is important? [Yes/ No/ I don't know/ Others]
2. Recognition of Responsibility	(3) Do you think the residents should cooperate with waste management? [Yes/ No/ I don't know/ Others]
3. Recognition of Effectiveness	(4) Do you think that waste management in your town can be improved more? (Do you think that your town can be cleaner?) [Yes/ No/ I don't know/ Others]
	(5) Do you think that 3R (reduce, reuse and recycle) of garbage is necessary in Palestine or your town? [Yes/ No/ I don't know/ Others]
4. Evaluation of Benefit-cost	(6) What do you think about disposing of garbage in the waste bin appropriately? [Bothersome/ Not bothersome/ Others]
5. Evaluation of Social norm	(7) What do you think about people collecting garbage and cleaning in your school and town? [Respectable/ Unrespectable/ Others]
6. Evaluation of Feasibility	(8) Do you know how to reduce, reuse or recycle of garbage? [Yes/ No/ I don't know]
	(9) Can you separate recyclable garbage with unrecyclable garbage? [Yes/ No (Not yet)/ I don't know]

Result of the survey is as follows.

The result shows that the level based on their grade was similar regardless of knowledge and experience.

1. For both 2nd-grade students, No. 1, No.2, No.4 and No5 are high, however No3 (Recognition of Effectiveness) and No.6 (Evaluation of Feasibility) are low.
2. For both 8th-grade students, No. 2, No.4 and No.5 are high, No.3 is relatively high, however No. 1 (Recognition of Seriousness) and No. 6 (Evaluation of Feasibility) are low.
3. For all factors, the levels of Boy's students are lower than that of Girl's students.

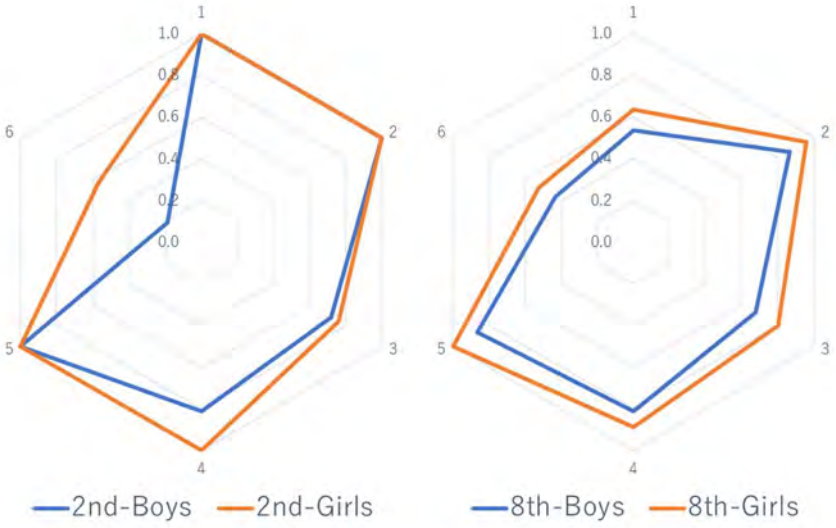

Figure 9: Result of assessment of level of attitude and behavior on solid waste issues before activities

3-4. Implementation of the Project

Based on current status of target student, the project planned the following activities for target schools and conducted the activities to aim to increase the awareness level on solid waste issues among students, most importantly the process of separating waste at source, the concept of 3Rs (Reduce, Reuse and Recycle) which in turn reduces the amount of waste that is transferred to the landfill, as a pilot project.

Main purpose of the school awareness activities are as follows. The detailed schedule of all activities is shown in **Table 13 and 14**.

(1) Enhance the students' knowledge on solid waste issue, especially 3Rs through lectures and workshops
(2) Enhance the students' understanding on solid waste management in Palestine through field visit to JSC and landfill
(3) Enhance the students' experience on solid waste management through trial waste separation and composting

For a trial waste separation of (3), the Project prepared four small waste bins for each target classroom and four big waste bins for each target school. Each waste bin is colored differently based on four type of waste (Blue color: Paper waste, Green color: Organic waste, Red color: Grass and Metal waste, Yellow color: Unrecyclable waste (other waste)). Target students use the waste bins (small) in classroom and also target and non-target students use the waste bins (big) in school yard.

During the activities in both schools, the project asked the teachers in both schools to join the activities and manage their students, because students in school usually can't concentrate to class. Therefore, their involvement to activities is strongly necessary for us to conduct all activities as planned.

For appropriate activities, the project had implemented the activities with MoE and the Ramallah & Al-Bireh JSC. And to implement the activities, the project prepared following materials.

Table 13: List of materials for activities

	Item	No.	Total Price (NIS)
1	Explanation board for trial waste separation	8	450
2	Waste bin (big) for waste trial waste separation for classroom	16	2240
3	Sticker for waste bin (big)	20	40
4	Waste bin (small) for waste trial waste separation for school	16	800
5	Sticker for waste bin (small)	20	20
6	Reusable water bottle for trial reusing	120	960
7	SNS panel	4	280
8	Sticker for awareness	1,500	70
9	Environmental coloring book for 2nd-Grade students (published by Ramallah & Al-Bireh JSC)	40	Provided from the JSC

Table 14: Activities at Boy's school

	Date	2nd Grade	8th Grade
1	3rd Feb	- Questionnaire (base-line survey) - Lecture ➢ Introduction of the awareness activity ➢ Introduction of Solid Waste and new concepts such :(Solid Waste, Landfill and Clean worker) ➢ The presentation is sported by video (*) showing about Solid Waste - Distribution of waste bin (big and small one) and explanation board to both the class and the school.	
2	10th Feb	- Interactive lecture about 3Rs ➢ The presentation is sported by video showing about Solid Waste Recycle for 8th grade and Song video about 3Rs for the 2nd grade ➢ Train the students about the separation by the "Separation Card Game" [1]	
3	17th Feb	- 1st Reuse workshop ➢ Making mixed teams from the 2nd and 8th grade and reuse the plastic bottles	
4	10th March	- Lecture about the importance of separation and waste reduction	
5	13th/17th March	- 2nd Reuse workshop ➢ Lecture about the importance of separation and waste reduction ➢ Spread the reusable water bottles among the students and an environmental coloring book ➢ Making mathematic educational tools from plastic bottles caps	- 2nd Reuse workshop ➢ Lecture about the importance of separation and waste reduction ➢ Spread the reusable water bottles among the students ➢ Making reusable art works from plastic bottles caps
6	31st March	- Introduction for Organic Compost and its function ➢ Presentation is sported by video showing about Organic Compost	
7	7th April	- Compost Workshop ➢ Making a piling compost model at the school garden with students	
8	10th April	- Fieldwork to Al-Menya sanitary landfill in Bethlehem and the Plastic Recycling Company in Hebron ➢ Lecture on the National Strategy from MoLG ➢ Lecture on Landfill management from the JSC ➢ Lecture on environmental illegal issue related to solid waste from Police ➢ Lecture on recycling process and importance of recycling form Recycling company	
9	7th May	- Questionnaire (End-line survey)	
10	29th May	- Final event of the school awareness activities ➢ Hand over the certificate	

Table 15: Activities at Girl's school

	Date	2nd Grade	8th Grade
1	5th Feb	- Questionnaire (base-line survey) ➢ Introduction of the awareness activity ➢ Introduction of Solid Waste and new concepts such :(Solid Waste, Landfill and Clean worker) ➢ The presentation is sported by video (*) showing about Solid Waste - Distribution of waste bin (big and small one) and explanation board to both the class and the school.	
2	12th Feb	- Interactive lecture about 3Rs ➢ The presentation is sported by video showing about Solid Waste Recycle for 8th grade and Song video about 3Rs for the 2nd grade ➢ Train the students about the separation by the "Separation Card Game" (*)	
3	19th Feb	- 1st Reuse workshop ➢ Making mixed teams from the 2nd and 8th grade and reuse the (plastic bottles, coke bottles, newspapers and cartoon rolls ➢ Quick overview about the school composter and its function	
4	5th March	- 2nd reuse workshop ➢ Review about the 3Rs concept in Arabic and English ➢ Reuse presentation examples ➢ Making mixed teams from the 2nd and 8th grade and reuse the (plastic bottles, coke bottles, newspapers and cartoon rolls ➢ Spread the reusable water bottles among the students and an environmental coloring book for the 2nd grade	
5	19th March	- 3rd reuse workshop ➢ Lecture about the importance of separation and waste reduction ➢ Making a punctuation (language writing) educational tool from plastic bottles caps	- 3rd reuse workshop ➢ Lecture about the importance of separation and waste reduction ➢ Making reusable art works from plastic bottles caps
6	2nd April	- Introduction for Organic Compost and its function ➢ The presentation is sported by video showing about Organic Compost	
7	9th April	- Compost Workshop ➢ Making a piling compost model at the school garden	
8	30th April	- Fieldwork to Al-Menya sanitary landfill in Bethlehem and the Plastic Recycling Company in Hebron ➢ Lecture on the National Strategy from MoLG ➢ Lecture on Landfill management from the JSC ➢ Lecture on environmental illegal issue related to solid waste from Police ➢ Lecture on recycling process and importance of recycling form Recycling company	
9	8th May	- Questionnaire (End-line survey)	
10	30th May	- Final event of the school awareness activities ➢ Hand over the certificate	

(*) URL:

1. 3Rs	https://www.youtube.com/watch?v=TjnNOCbuoCA
2. Recycle	https://www.youtube.com/watch?v=jJFe55Ab7tw
3. Compost (General)	https://www.youtube.com/watch?v=YTWuFQmQDq0
4. Compost for 2nd-Grade students	https://www.youtube.com/watch?v=SUCVPkvRdRw
5. Environmental Song (in Arabic)	https://www.youtube.com/watch?v=Mv6NAwRw7vk
6. Garbage truck Song (in English)	https://www.youtube.com/watch?v=lahwc-Lbbbk

(*) Separation Card Game

This game is for 10-20 players (students). The way to play this game is as follows.

1. Four boxes (waste boxes) of different waste types (Paper, Plastic, Organic and others, etc.) and as many cards as the number of the players are prepared. Picture of different waste is described on the card, based on waste type of the boxes.
2. Players are divided into two teams. The boxes and cards are put on the table.
3. Each team choose four students, and the chosen student hold the different waste boxes.
4. Each player (without chosen students) picks a card from the table and put it into its appropriate box based on waste type by judging by himself.
5. After all cards put into the boxes, it will be judged if the cards are put into appropriate box or not. The team who gets higher correct points regarding the correct number of cards in the boxes, will win.

Waste bins for trial waste separation

Explanation board for trial waste separation

Lecture on trial waste separation

Reuse workshop in Boy's school

Composting workshop

Fieldwork to Al-Menya Landfill

Figure 10: Photo of the school awareness activities

3-5. Result of the Project

1. All awareness activities were implemented as planned (owing to involvement of managers and teachers in both schools to all activities). Therefore, target interventions (No.1, 3, 4, 5, 8, 10 and 11 of the policy No.16 and 17) of the National Strategy were implemented in (only) target schools as a pilot project.

2. In the boy's school, an "Environmental club" was newly established to carry out the activities appropriately by their teachers. During the pilot project, the members of the club had promoted implementation of the activities.

3. Regarding the trial waste separation, both students separated waste into appropriate waste bin mostly.

4. Result of assessment of level of knowledge and experience on solid waste issues after activities is as follows. After awareness activities, the level was increased mostly. However, for only question No.6 "If a 3Rs program was set up, would you be willing to separate materials into separate bags for collection purposes?", the average of positive answer of 8th-grade boy's students was decreased strongly. In fact, answer "Yes" was decreased and answer "I don't know" was increased. In total consideration of the results of this result, it is assumed that they understand a difficulty of separation through awareness activities.

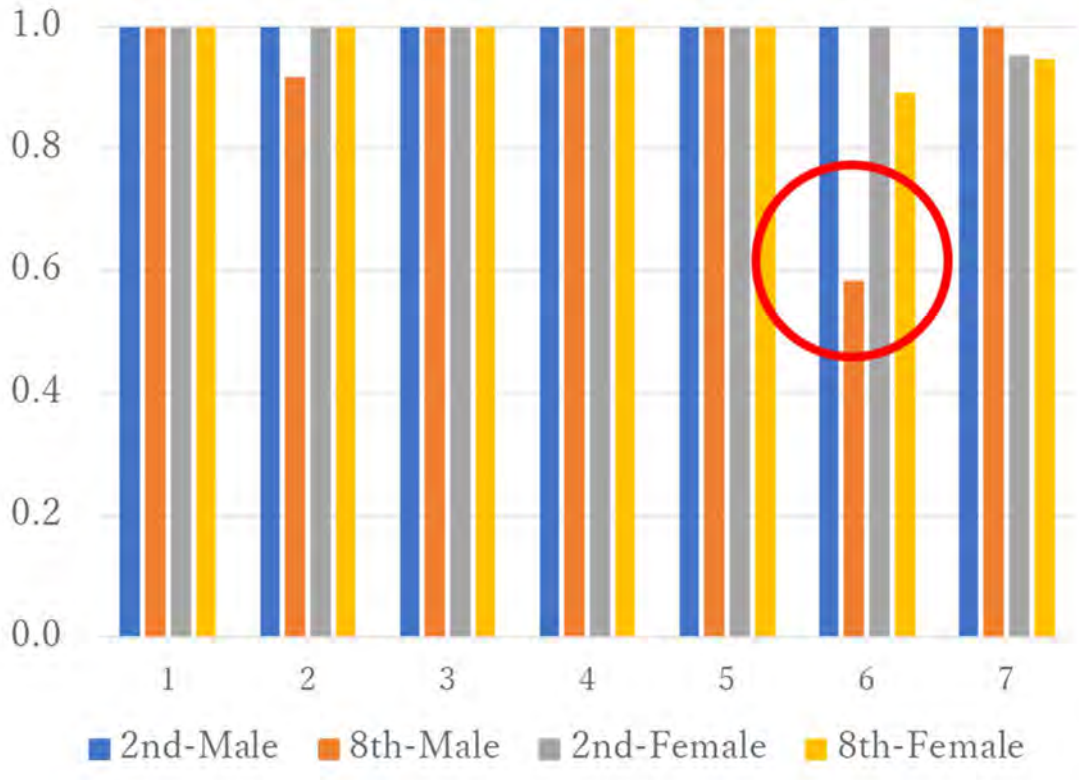

Figure 11: Result of assessment after activities

5. Result of assessment of level of attitude and behavior on solid waste issues after activities is as follows. All six factors of this "Two-phase decision-making model" was increased and awareness activities were effective. However, especially the factor No.6 (Evaluation of Feasibility) was still low. In fact, out of two questions of factor No. 6, the positive answer of one question "Can you separate recyclable garbage with unrecyclable waste?" was still low (few). It means that awareness activities for understanding of recyclable waste and unrecyclable waste was insufficient for them.

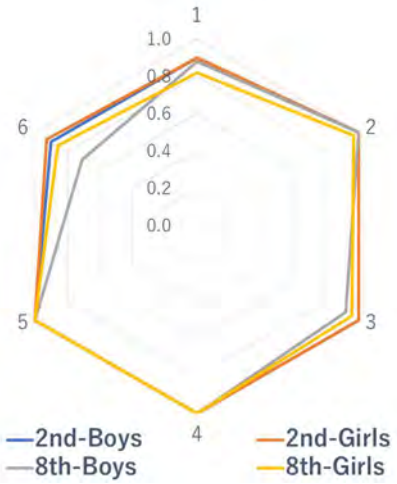

Figure 12: Result of assessment before activities (left) and after activities (right)

3-6. Conclusions and Recommendations

1. Activities of this Pilot Project were effective to enhance the student's knowledge and experience. Therefore, MoLG should conduct and continue awareness activity based on target student's knowledge and experience on SWM and their grade.

2. For appropriate implementation, involvement of manager and/or teachers to awareness activities is necessary to manage students, especially boy's students, because some students cann't concentrate to a lecture and workshop.

3. "Environmental club" was a key player for target boy's school in this pilot project. Therefore, the presence of the club is important to conduct and continue awareness activities appropriately.

4. As a result of the Problem Analysis, special class and activity on environment issues depend on a policy of each school (Some schools has no non-classroom activity on solid waste issue). MoLG need to promote environmental education in all school.

5. As a result of questionnaire after awareness activities, some 8th-grade boy's students feel difficulty in classification of recyclable waste and unrecyclable waste. Therefore, MoLG need to promote an understanding of the classification for students.

6. For implementing target interventions of the National Strategy, it is necessary for MoLG to expand awareness activities with MoE, JSCs and relevant organizations based on the result of this pilot project to other schools and area in Palestine.

Annex 1: Questionnaire (1)

SW- 3Rs - Workshop Questionnaire

The goal of this study is to gather preliminary information to assess the situation of Solid Waste Management in Palestine. The indirect objective of this study is to improve the understanding of the impact of solid waste management in Palestine and the importance of reduce, reuse and recycle (3Rs).

General Information **Sex:** **Age:**

Class:

Solid Waste Management

Please put √ in the appropriate box / boxes for your answer

1- Did you know what is solid waste?

- Yes ☐
- No ☐

2- What type of solid waste comes out from your household / School?

- Paper and cartoon ☐
- Plastic ☐
- Food ☐
- Cans ☐
- Glass ☐

3- In what type of container do you collect waste?

- Carton ☐
- Waste basket ☐
- Old bucket ☐
- Plastic bag ☐
- Cans ☐

4- Where do you usually put away collected waste?

- In the public bin ☐
- In the itinerant waste van ☐
- By the road or street side ☐
- On an open space / hole ☐

5- Do you ever hear about 3Rs (Reduce, Reuse and recycle)?

- Yes ☐
- No ☐

6- Do you reuse the following items? (Tick all those items which you reuse)

- a. Glass ☐
- b. Plastic bottles ☐
- c. Aluminum / Food cans ☐
- d. Paper/cardboard ☐
- e. Clothes ☐

7- Have you ever heard about the importance of reuse?

- Yes ☐
- No ☐

If yes, do you agree to reuse?

- Yes ☐
- No ☐

8- Do you know about recycling?

- Yes ☐
- No ☐

If yes, which of the following items you recycle? (Tick all those items which you recycle)

a. Kitchen compostable material (Fruit/vegetable) ☐
b. Plastic bottles ☐
c. Food cans ☐
d. Paper/cardboard ☐
e. Glass ☐
f. Plastic bags/plastic wrappers ☐
g. Others: ……

9- Have you ever heard about the importance of recycling?

- Yes ☐
- No ☐

If yes, do you agree to recycle?

- Yes ☐
- No ☐

10- What are some of the benefits to you of recycling/reusing and segregating (separating different types of waste)?

a. Cost effective ☐
b. Environmentally friendly ☐
c. Others: ……

11- If a 3Rs program was set up, would you be willing to separate materials into separate bags for collection purposes?

- Yes ☐
- No ☐
- Don't know ☐

Environmental Awareness

12- What is the proper method in your opinion?

a. Proper segregation of Waste ☐
b. Recycling of waste ☐
c. Reuse of waste ☐
d. Proper disposal of waste ☐
e. Others: ……

13- Would you like to use paper or cotton bags instead of plastic bags if those paper or cotton bags available?

- Yes ☐
- No ☐

If yes, specify the reason behind it?

a. Paper and cotton are cheaply available ☐

b. Environmentally friendly ☐

c. Plastic create problems ☐

d. Others: ……

If no, specify the reason behind it?

a. Not available ☐

b. Costly ☐

c. Not reliable ☐

d. Others: …….

Annex 2 Questionnaire (2)

1. How do you think about your town?
   - ☐ Very Clean
   - ☐ Clean
   - ☐ Bad
   - ☐ Very Bad
   - ☐ I don't know.
   - ☐ Others: ( )
2. Are you satisfied with waste management in your town?
   - ☐ Yes
   - ☐ No
   - ☐ I don't know.
   - ☐ Others: ( )
3. Do you think that waste management in your town is improving so far?
   - ☐ Yes
   - ☐ No
   - ☐ I don't know.
   - ☐ Others: ( )
4. Do you think that inappropriate waste management will damage environment and your health?
   - ☐ Yes
   - ☐ No
   - ☐ I don't know.
   - ☐ Others: ( )
5. Do you think that waste appropriate management is important?
   - ☐ Yes
   - ☐ No
   - ☐ I don't know.
   - ☐ Others: ( )
6. Who has responsibility of waste management in your town?
   - ☐ Palestinian Government (Ministry of Local Government, Environment Quality Authority, etc.)
   - ☐ Municipality
   - ☐ Joint Service Council for Waste Management
   - ☐ Residents
   - ☐ I don't know.

- ☐ Others: (　　)

7．Do you think the residents should cooperate with waste management?

- ☐ Yes
- ☐ No
- ☐ I don't know.
- ☐ Others: (　　)

8．Do you think that waste management in your town can be improved more?
(Do you think that your town can be more clean?)

- ☐ Yes
- ☐ No
- ☐ I don't know.
- ☐ Others: (　　)

9．Do you think that 3R (reduce, reuse and recycle) of garbage is necessary in Palestine or your town?

- ☐ Yes
- ☐ No
- ☐ I don't know.
- ☐ Others: (　　)

10．What do you think about disposing of garbage in the waste bin appropriately?

- ☐ Bothersome
- ☐ Not bothersome
- ☐ Others: (　　)

11．What do you think about people collecting garbage and cleaning in your school and town?

- ☐ Respectable
- ☐ Unrespectable
- ☐ Others: (　　)

12．Do you know how to reduce, reuse or recycle of garbage?

- ☐ Yes
- ☐ No
- ☐ I don't know

13．Can you separate recyclable garbage with unrecyclable garbage?

- ☐ Yes
- ☐ No (Not yet)
- ☐ I don't know.

[End]