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unrwa west bank field operational solid waste management strategy

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About UNRWA

UNRWA IS A United Nations agency established by the General Assembly in 1949 and mandated to provide assistanace and protection to some 5 million registered Palestine refugees. Its mission is to help Palestine refugees in Jordan, Lebanon, Syria, West Bank amd the Gaza Strip achieve their full human development potential, pending a just and lasting solution to their plight. UNRWA services encompass education, health care, relief and social services, camp infastructure and improvement, protection and microfinance.

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unrwa west bank field operational solid waste management strategy november 2017

The strategy was developed in January - November 2017 by Cesvi and UNRWA, funded by UNRWA.

Cesvi, established in 1985, is a secular, independent association, working for global solidarity in 21 different countries with over € 18 million as total outlays for institutional activities during 2016. In the values which guide Cesvi, the moral principle of human solidarity and the ideal of social justice are transformed into humanitarian aid and development, reinforcing an affirmation of universal human rights.

Cesvi has worked in Palestine since 1994. Over the years, it has developed a strong expertise in WASH and management of environmental resources. Solid waste management (SWM) is the main sector of activities. Cesvi initiatives always pay attention to: capacity building to local actors and protection of vulnerable people.

UNRWA is a United Nations agency established by the General Assembly in 1949 and mandated to provide assistance and protection to nearly 6 million registered Palestine refugees. Its mission is to help Palestine refugees in Jordan, Lebanon, Syria, West Bank and the Gaza Strip achieve their full human development potential, pending a just and lasting solution to their plight. UNRWA services encompass education, health care, relief and social services, camp infrastructure and improvement, and microfinance.

DISCLAIMER: This report does not necessarily reflect the views of UNRWA or Cesvi. The report is the work of Cesvi and UNRWA funded by UNRWA, through the project "UNRWA Solid Waste Management Strategy in West Bank Field".

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acronyms and abbreviations

ASO	Area Sanitation Officer
CBO	Community Based Organisation
CIP	Camp Improvement Plan
CSC	Camp Service Committee
DORA	Department of Refugees Affairs
EP	Education Programme
ICIP	Infrastructure and Camp Improvement Programme
JCP	Job Creation Programme
JSC	Joint Service Councils
MTS	Medium Term Strategy
PA	Palestinian Authority
PCBS	Palestinian Central Bureau of Statistics
PLD	Procurement and Logistics Division
SF	Sanitation Foremen
SL	Sanitation Labourers
SWM	Solid Waste Management
WBFO	West Bank Field Office

executive summary

Environmental infrastructure and environmental health in UNRWA refugee camps in the West Bank are under the mandate of the Infrastructure and Camp Improvement Programme (ICIP), as defined in the UNRWA's Medium Term Strategy (MTS). Solid Waste Management (SWM) is part of ICIP mandate. The SWM Strategy – based on the Agency-wide SWM Framework – defines principles, priorities and actions for the UNRWA West Bank Field Office (WBFO) over the 2018-2023 period. This document was developed by the WBFO with the involvement of all the relevant departments and units, and the technical support and facilitation of Cesvi, an international NGO.

The Agency-wide SWM framework defines the objectives as to: a) meet minimum acceptable standards in collection and removal of domestic waste and street sweeping in refugee camps; b) reduce waste generation and encourage reuse and recycling; and c) increase cost efficiency in solid waste management. The Strategy adds three more objectives, namely: 1) implementation of an efficient and effective waste management system that is robust and sustainable under the prevailing political, technical and financial framework; 2) provision of socially acceptable and equitable SWM service; and 3) protection of public and occupational health and the environment.

To meet these objectives, the WBFO SWM Strategy, in line with the SWM framework, includes the following principles: 1) SWM is integrated with environmental health principles; 2) maintain high level quality of UNRWA's SWM service provision for households and commercial enterprises in the camps; 3) upgrade the hazardous and potentially hazardous medical waste management; 4) improve efficiency and effectiveness in all processes; 5) utilise manpower, machinery, and other available resources as best as possible; 6) build on participation of refugees; 7) enhance the synergy between UNRWA Programmes; 8) utilise synergies with hosting municipalities and other local authorities; 9) involve the private sector where feasible and 10) prepare emergency contingency plans for the camps.

As of 30 September 2017, there were more than 823,000 Palestine refugees registered with UNRWA[1] in the West Bank, including East Jerusalem, with 247,886 living in the 19 official refugee camps with an average population growth rate of 4 per cent. In 2016, UNRWA collected 46,611 tonnes of waste from the camps. In the West Bank, the Department of Refugee Affairs (DORA) is the authority responsible for all aspects of cooperation with Palestine refugees. Representatives of DORA in the camps are the camp service committees (CSCs) and the advisory committees. Therefore, these are the reference bodies for UNRWA. Other community based organisations (CBOs) are active in the camps and stakeholders for specific activities.

The current SWM system covers all the 19 camps in WB, with 5-6 days of collection and at least three of street sweeping per week. Unfortunately, several technical, economic and social aspects along the service chain – solid waste generation and composition, storage at source, collection and removal, and occupation health and safety for SWM operators - make the quality of the service limited, and refugees unsatisfied.

The following critical operational aspects will be strategically addressed during the next six years:

- **Non-authorised use of UNRWA's peripheral containers:** UNRWA will not provide solid waste removal service to users outside of the camps, with limited exceptions;
- **Analysis of municipal solid waste composition and generation:** UNRWA, in cooperation with environmental experts and research centres, will carry out solid waste composition and density analysis;

[1] UNRWA Q3 2017 Statistical Update on Registered Palestine Refugees.

- **Household/commercial waste storage:** UNRWA will distribute containers for the collection of household and commercial waste; the SFs will assess the conditions of the distributed containers and seek the cooperation of local private enterprises to provide maintenance and substitutions;

- **Streets littering:** UNRWA will distribute containers for the collection of pedestrians' waste; the SFs will assess the conditions of the distributed containers and seek the cooperation of local private enterprises to provide maintenance and substitutions;

- **Manual carts features:** UNRWA, in cooperation with research centres, will explore the possibilities of improving the manual carts to better adapt them to the different terrain;

- **Mechanisation of waste collection:** mechanised waste collection system will be applied in all the camps and adapted to their topography (terrain, population density, streets practicability);

- **Waste collection points:** the camps' peripheral containers will be clustered at "camp disposal areas";

- **Human Resources Management:** based on the specific SWM plans, an optimal work schedule will be developed for SLs and JCP workers by the SFs, in coordination with the ASO; ICIP will assess the number of SLs needed by developing a SWM plan for each camp; the SFs will be given vehicles or mopeds for the supervision inside the camps; UNRWA will regularly provide protective clothing as described in the Strategy, while the SFs make sure that the waste management operators wear protective clothing for the full duration of their duty; the residents will be made aware of the role of the sanitation workers, the communication channels with UNRWA staff and the waste disposal modalities; the physical efforts requested from the SLs will be decreased through an introduction of mechanised waste collection system and improvement of manual carts;

- **Cooperation with external stakeholders for solid waste removal:** UNRWA will assess the advantage of continuing the collaboration with public authorities for SWM removal for Nablus and Jericho camps;

- **Informal waste accumulations:** awareness raising will be carried out in order to inform and educate camp residents on the public health risks associated with such practices; camps cleaning campaigns will be done minimum twice a year, with an increase to four times per year in the most problematic camps, until a positive change in the residents' behaviour is proven;

- **Storage of UNRWA's SWM vehicles and equipment:** the SWM vehicles and equipment will be stored in officially authorised locations designated by the CSO in coordination with the SF; the ASO will identify the best locations for the storage of waste compactors;

- **Construction and demolition waste, pruning waste and bulky waste management:** UNRWA will not collect and/or remove any type of special waste such as construction and demolition waste, pruning waste and bulky waste, and will fully delegate the removal service to other stakeholders;

- **Medical waste management:** UNRWA will seek safe and environment-friendly hazardous medical waste collection and disposal options for UNRWA health centres in the camps.

On the value chain side, UNRWA will promote and facilitate waste prevention, recovery and recycling activities, but will not take over the direct management and implementation of such activities.

A Monitoring and Evaluation (M&E) Plan will be developed, with outputs monitored through semi-annual, annual and technical reports for performance analysis and budget management. UNRWA will develop a dedicated database that will be accessible and updated by all relevant departments. The database will be daily filled by the SFs and truck drivers with new ICTs, such tablets, smart phones and laptops.

Data collection and analysis will be coordinated by ASOs in collaboration with other UNRWA departments. After the six-year period of the strategy implementation, a final evaluation will assess the impact of the strategy, the sustainability of the results and the achievement of the objectives. Special attention will be dedicated on the monitoring of: extra running costs; medical waste management; camp's regular expenditures; workers management; and awareness activities/ refugees' participation, The basic indicators suggested are related to: public health, environmental performance, service implementation, personnel management, inclusivity and participation, and budget.

Training or technical updates will be delivered to the ASOs, the SFs, the SLs, the JCP workers and the drivers. SWM operators will receive training on data collection and management, health and safety, and SWM operations.

Communication with camp residents and relevant stakeholders will be improved. In particular, UNRWA will: i) meet representatives of refugees every six months to discuss and evaluate SWM services; ii) distribute flyers and posters in camps about SWM good practices; iii) improve communication techniques by using web sites and including camps' institutions in the communication management, and iv) will carry out a survey to measure the level of residents' satisfaction.

Limited education, awareness and participation of refugees are well-known problems. ICIP, in cooperation with camps institutions, will target households and commercial activities with long-lasting awareness campaigns. Finally, ICIP, in coordination with the education programme, will implement SWM education programmes for school-age children in UNRWA schools.

ICIP will be ready to provide SWM services during emergencies. ICIP will prepare emergency contingency plans for each camp in coordination with relevant Palestinian documents; and will define a specific budget for emergency situations. Furthermore, ICIP will establish systematic collaboration with other UNRWA departments. Finally, UNRWA will establish partnerships and collaborations with external stakeholders – including universities and public authorities – and camp institutions to improve SWM services and residents' involvement in programmes.

The Strategy considers fundraising as an ongoing process, while the steps will be implemented during the 2018-2023 period. The first months of 2018 will be dedicated to define a list of priorities for camps and interventions, and develop a lessons learnt report and guidelines for the drafting and implementation of SWM plans in camps. These documents will be regularly revised during the following years. Camps will be assessed in groups of 4-5, and the related plan designed and then implemented.

For a complete implementation of the Strategy, about USD 3 million should be invested in the improvement of working conditions, camps' equipment and waste transportation vehicles (capital costs). The overall running costs of the service – based on the current expenditures and considering the maintenance of new material and equipment and disposal fees – should be about USD 3.5 million per year. Further, about USD 0.5 million per year are required for emergency, awareness and education, communication, and regular waste generation and composition analysis.

introduction

1.1 Background

As of 30 September 2017, there were more than 823,000 Palestine refugees registered with UNRWA in the West Bank, including East Jerusalem. By 2021, this number is expected to increase to more than 900,000 as a result of population growth. Representing approximately 27 per cent of the total Palestinian population in the West Bank, Palestine refugees remain one of the poorest segments of Palestinian society. In the absence of a just and durable solution, almost one-third of Palestine refugees continue to live in the 19 West Bank camps, which over 67 years of existence have become areas of concentrated poverty. Others are living outside including unofficial camps, villages and cities near the camps. UNRWA provides Solid Waste Management (SWM) service to all official camps, which is a part of the activities of the Infrastructure and Camp Improvement Programme of the West Bank Field Office (WBFO).

1.2 UNRWA's Environmental Health Approach

In response to UNRWA's Medium Term Strategy (MTS) Strategic Outcome 5, "Refugees are able to meet their basic human needs of food, shelter and environmental health", UNRWA Strategy for Infrastructure and Camp Improvement (2016-2021) declared environmental infrastructure and environmental health a part of the core functions of the Infrastructure and Camp Improvement Programme (ICIP) in all of UNRWA's fields of operations. Consequently, UNRWA developed an Agency-wide Solid Waste Management (SWM) Framework to guide the Fields in developing Operational SWM Strategies and Camp SWM Plans. These will enable UNRWA to implement specific and cost effective SWM solutions and to create an environment for more collaboration with hosting municipalities and the Joint Services Councils (JSC).

1.3 Objectives

1.3.1 Objectives defined by the SWM Framework:

(a) UNRWA aims to ensure that residents of Palestine refugee camps have access to solid waste services that meet minimum acceptable standards such as:
- o collection and removal of domestic waste
- o street sweeping

(b) UNRWA aims to reduce waste generation and encourage reuse and recycling.
(c) UNRWA aims to increase its cost efficiency in SWM.

In line with the log-frame for ICIP Strategic Outcome 3: Core function "Environmental Infrastructure and Environmental Health", Output 4 (Annex 4 - UNRWA SWM Framework), the indicators to measure the performance of the SWM services are:

A1	Waste collection rate achieved (%)
A2	Frequency of street sweeping (no. per week)
B	Amount of waste reduction through recycling (%)
C	Specific SWM costs (USD/camp inhabitant).

For monitoring, the Standard Indicator Template of UNRWA "Common Monitoring Matrix" is to be used (Annex 5 UNRWA SWM Framework).

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2 UNRWA Q3 2017 Statistical Update on Registered Refugees.

Based on this framework, WBFO formulated the West Bank Field Operational SWM Strategy, which will subsequently guide the development of individual Camp SWM Plans. The SWM Framework is closely linked to the UNRWA Infrastructure and Camp Improvement Strategy and complements the core function of ICIP "environmental infrastructure and environmental health". Moreover, it draws on the enabling functions for operational effectiveness (such as human capacity development, monitoring & evaluation, management information systems, institutional inter-linkages, strategic partnerships/ fundraising). The SWM Framework guides the development of Operational SWM Strategies on the field level, which relate to the Strategic Response Plans. On the local level, Camp SWM Plans are to be developed in line with Camp Improvement Plans.

1.3.2 Additional Objectives

Facing changing framework conditions, there is a permanent need to adapt the SWM practice to the current situation. To offer effective, efficient and sustainable SWM services, the following additional objectives shall be met:

- **Objective 1:** Implementation of an efficient and effective waste management system that is robust and sustainable under the prevailing political, technical and financial framework.
- **Objective 2:** Provision of socially acceptable and equitable SWM service.
- **Objective 3:** Protection of public and occupational health and the environment.

1.4 West Bank SWM Strategy Adopted Principles

The key function of SWM is the daily collection, removal and final disposal of the domestic waste generated in the camps. This is essential for sanitation and public health and consumes about 60 per cent of Environmental Health Unit's financial resources.

To meet these objectives, West Bank Field Operational SWM Strategy, in line with the Agency SWM Framework, was developed based on the following principles:

- SWM is integrated with environmental health principles (promoting, interlinking, supporting and coordinating)
- Maintain high level quality of UNRWA's SWM service provision for households and commercial enterprises in the camps
- Upgrade the hazardous and potentially hazardous medical waste management
- Improve efficiency and effectiveness in all processes
- Utilise manpower, machinery, and other available resources as best as possible
- Build on participation of refugees
- Enhance the synergy between UNRWA Programmes
- Utilise synergies with hosting municipalities and other local authorities
- Involve the private sector where feasible
- Prepare emergency contingency plans for the camps

According to the Camp Improvement Plan (CIP) approach, it is an integral part of the strategy to enhance the participation of refugees in all SWM activities. All measures are coordinated with the Department of Refugees Affairs (DORA) and, as necessary, with the hosting authorities.

geographic, political and institutional framework

2.1 Political Framework

All activities in and around Palestinian refugee camps have to consider the specific political status of Palestine refugees in their host countries according to the UN General Assembly Resolution 194 of 1948. UNRWA defines a Palestine Refugee (also referred to as a "registered refugee" or "registered Palestine refugee") as "any person whose normal place of residence was Palestine during the period between 1 June, 1946 and 15 May, 1948 and who lost both home and means of livelihood as a result of the 1948 conflict". Palestine Refugees, and descendants of Palestine refugee males including legally adopted children, are eligible to register for UNRWA services. They include:

- Refugees from 1948
- Displaced from 1967
- Refugees from 1948 then displaced again in 1967

The majority of Palestine refugees in the West Bank hold Palestinian Authority (PA) identification documents and/or part of refugees hold Jordanian passports. While part of Palestine refugees living in areas around Jerusalem (e.g. Shu'fat and Kalandia camps) hold Jerusalem identifications and/or Jordanian passports refugees from 1948 are generally registered with UNRWA while displaced persons from 1967 have documents from DORA showing that they were displaced in 1967 but entitled to receive UNRWA services.

In the West Bank, DORA is the authority responsible for all aspects of coordination with Palestine refugees. Representatives of DORA in the camps are the camp service committees (CSCs) and the advisory committees. UNRWA's service provision, and in this respect the SWM service, has to be coordinated with DORA and its bodies in the camps.

2.2 Distribution of the Camps in the West Bank

UNRWA provides SWM services to 19 Palestinian refugee camps in the West Bank. These 19 camps are grouped into three areas as below:

Table 2.1 Distribution of Palestine refugee camps in the West Bank

Location	Camps
Hebron Area (5 camps)	Aida camp, Arroub camp, Beit Jibrin camp, Dheisheh camp, Fawwar camp
Jerusalem Area (7 camps)	Am'ari camp, Aqbat Jabr camp, Deir 'Ammar camp, Ein el-Sultan camp, Jalazone camp, Shu'fat camp, Kalandia camp
Nablus Area (7 camps)	Askar camp, Balata camp, Camp No.1, Far'a camp, Jenin camp Nur Shams camp, Tulkarm camp

The following figure shows the locations of Palestine refugee camps across the West Bank:

Figure 2.1 Location of the official Palestinian refugee camps in West Bank (Source: West Bank Atlas 2016)

General Camp Structure

Current camp structure developed from the original layout they were established. While the tents changed over time to wooden or corrugated steel structures, and then to the single and some multi-storey brick and concrete buildings of today, the positions of streets and alleys in the camps remained almost the same. Since the roads were narrow from camp inception, these growing shelters steadily consumed more space, further narrowing the width of the streets.

Topography for the camps varies depending on the location of the camp. While some camps are located in almost flat terrain (e.g. Aqbat Jabr camp), others are hilly with steep streets and alleys (e.g. Arroub camp). Also, the majority of the camps have irregularly designed structures that distinguish them from surrounding municipal areas. The narrow streets and lack of space for any additional installation or activity is one of the most important challenges of SWM in the camps.

2.3 Institutional Setup in Solid Waste Management

SWM is a part of sanitation, which is a part of environmental health. Not all position names reflect this structure at present, as for example waste collection workers are called sanitation labourers, and the field sanitary engineer and the senior sanitarian should be renamed as field environmental health engineer and environmental health supervisor. Therefore, there is a need to systematise the titles to reflect the institutional setup.

The important functions of waste management in the West Bank Field include:

- Policy and planning
- Cleaning service delivery (waste collection, street cleaning and vector control)
- Procurement (limited by OD10 regulations)
- Repair and maintenance
- Communication, participation and awareness
- Human resource management
- Financial management.

These functions are taken care of by the WBFO and by UNRWA staff in each areas and camps.

In line with the Agency's SWM Framework, SWM (part of environmental health) in the West Bank Field Office (WBFO) is a component of the Infrastructure and Camp Improvement Programme (ICIP). The chief field of ICIP (CICIP), the deputy chief field of ICIP (DCICIP), the field sanitary engineer (FSE) and the senior sanitarian are located at the WBFO in Jerusalem.

The actual waste management services are aligned to the three Area offices. SWM in each area is managed by the area sanitation officer (ASO) who reports directly to the chief area officer, the senior sanitarian and the field sanitary engineer. The areas take care of the organisation and supervision of the day-to-day cleaning activities in the camps. The staffs for implementing SWM services in the camps (foremen-B and sanitation labourers) are attached to the respective camps while the drivers of the SWM vehicles are under the management of area offices.

To improve the collaboration within ICIP, Jordan FO proposed to modify the structure. WBFO will evaluate the advantages of adopting the proposed structure, taking into consideration the structural differences (i.e. drivers in the Jordan Field are hired by ICIP while in the West Bank Field, they are hired by PLD).

The current ICIP structure, as well as the new structure proposed by the Jordan Field Office (JFO), are presented in Annex I – ICIP Structures.

population and waste generation

SWM planning aims to serve the population in the camps. The following table gives UNRWA figures of registered Palestine refugees in the official camps in the West Bank from 2012 to 2016, the average growth rate for this period and the waste collected from the camps in 2016.

[3] The procurement framework is grounded in Article 5.2 (d) of the Financial Regulations and Organisation Directive 10 (OD 10) of UNRWA.

[4] Quarterly Statistical Bulletin, UNRWA HQ-Q4 /respective year.

Table 3.1 Registered Palestine refugees and waste generation in Palestine refugee camps

Camp	Palestine refugees (UNRWA)					Average Population Growth	Collected Waste in 2016 (t)
	2012	**2013**	**2014**	**2015**	**2016**		
Aida	5,196	5,500	5,730	5,914	6,157	4.30%	805
Am'ari	11,465	12,196	12,696	13,073	13,378	3.90%	1,295
Aqbat Jabr	7,266	7,800	8,157	8,444	8,697	4.60%	4,231
Arroub	11,354	12,000	12,499	12,899	13,365	4.20%	2,161
Askar	17,319	18,400	19,310	19,771	20,229	4.00%	4,645
Balata	25,456	26,800	27,330	27,799	28,440	2.80%	6,515
Beit Jibrin	2,282	2,400	2,511	2,582	2,662	3.90%	260
Camp No.1	7,220	7,600	7,887	8,034	8,243	3.40%	1,810
Deir 'Ammar	2,557	2,700	2,828	2,969	3,033	4.40%	820
Dheisheh	14,098	14,900	15,519	15,999	16,476	4.00%	2,620
Ein el-Sultan	2,187	2,432	2,533	2,650	2,735	5.80%	2,273
Far'a	8,247	8,700	9,015	9,226	9,486	3.60%	1,668
Fawwar	8,815	9,400	9,678	10,115	10,486	4.40%	1,996
Jalazone	12,304	13,000	13,485	13,892	14,238	3.70%	2,113
Jenin	17,562	19,069	19,539	20,309	20,767	4.30%	2,751
Kalandia	12,033	12,700	13,166	13,574	14,000	3.90%	2,190
Nur Shams	10,032	10,800	11,243	11,564	11,779	4.10%	1,543
Shu'fat	12,013	12,663	13,004	13,409	14,167	4.20%	3,832
Tulkarm	20,126	21,600	22,430	23,252	23,919	4.40%	3,083
Total*	**207,532**	**220,660**	**228,560**	**235,475**	**242,257**	4.00%	**46,611**

These numbers represent registered refugees as per referenced source only. According to the MTS (2016-2021), Palestine refugees demographic projections shall take into account the distinction between registered and served refugees which represent the total number of refugees eligible to receive UNRWA services (i.e. those who have the right to do so as registered Palestine refugees versus the actual numbers that do). Registering as a Palestine refugee is a voluntary process and as a result, registration may be done immediately after birth, delayed by a few years or it may never happen.

Furthermore, the information of registered refugees is not automatically updated. This means that emigration figures are difficult to estimate as information on refugees' place of residence (in camp, outside camp, in another Field, or out of the region altogether) may be outdated. In addition, data on older refugees show a high proportion of refugees over 100 years old, with the oldest refugee reaching 131 years of age, indicating under-registration of refugee deaths. Due to the voluntary registration process, births and children under five are also usually under-registered. While these cases may not affect significantly the overall refugee population, the adjustments are clearly outlined and informed.

Taking the year 2016 as an example, the following additional refugees were served while they were not officially registered refugees:

Married to Non-Refugee	Number
Registered MNR*	55,503
Refugee women married to Non-Refugee husband	41,603
Married Daughters still in their parents registration card	13,900

** Without MNR family members Source: RRIS, December 2016*

Non-Refugee Wives	Number
Non-Refugee wives	54,391

Source: RRIS, December 2016

strategic elements of solid waste management

UNRWA's SWM service in the 19 refugee camps comprises of the following core activities:

- Daily household waste collection (five days per week or six in case of emergencies)
  Street sweeping at least three times per week in all the camps' areas

To ensure efficient and economically and environmentally sustainable solid waste management service in the refugee camps, the strategy will address the following elements:

- Technical layout
- Improvement of working conditions for SWM operators in the camps
- Human resources management
- Waste prevention, recovery and recycling
- Monitoring and evaluation plan
- Trainings for solid waste management operators
- Communication with camp residents
- Education, awareness and participation of refugees
- Emergency preparedness for solid waste management
- Institutional interlinkages
- Cooperation with external partners

UNRWA aims to design and implement SWM plans for all official refugee camps. The plans will be designed based on the requirements and limitations described in the SWM strategy.

4.1 Technical Layout

Waste collection is performed manually by SLs within an operational framework that has been defined since the establishment of the Agency. SLs were initially appointed with a rate of 2.5 per 1,000 residents and later decreased to 1.4/1.5 and 1.1/1.0 every 1,000 residents. They collect solid waste with wheel barrows and bring it to collection points or waste disposal areas. However, the topography of the camps, population density, waste generation rate and waste composition gradually changed. To ensure sufficient waste removal service, the manpower required is particularly high. This situation is exacerbated by the high level of dependency that camp residents have on UNRWA's solid waste removal services, which are taken for granted. Refugees generally demonstrate little respect for waste disposal modalities in camps. Enforcement of best practices is also limited by UNRWA's mandate and inadequate cooperation from camp institutions and public authorities.

Waste collection points are usually difficult to manage. In most cases, waste containers are located at the camp borders and are subjected to non-authorised waste disposal by those who live outside. Nonetheless, waste collection points are used as dumping areas for irregular waste and are frequently set on fire by residents or other individuals who associate the waste fumes released from the waste containers as a potential source of diseases or by camp children for fun. The consequences of such practices include increased expenses for UNRWA, possible damages to the compactor trucks and negative environmental and health impacts.

Solid waste disposal modalities and costs depend on the characteristics and distance from waste management facilities.

The three areas (Nablus, Jerusalem and Hebron) have different waste disposal capabilities. The Hebron area has the best facilities, including a sanitary landfill and a seperate medical waste treatment facility. The Nablus area has a sanitary landfill but no medical waste treatment or disposal facilities. Finally the Jerusalem area has private facilities (Ramallah and Eisariya transfer stations) and no medical waste treatments.

Waste disposal is particularly onerous for UNRWA. The amount of waste to be managed significantly increases each year due to the growth of the refugee population. All the waste currently collected is disposed in landfills. Also dumping fees tend to rise due to increasing cost of final disposal. Therefore, the cost of waste disposal for UNRWA is affected by the increase of both the quantity of waste to dispose and dumping fees (Annex II – Tipping fee analysis). Measures should be taken in order to control the budget and ensure safe solid waste disposal.

The technical aspects that UNRWA addresses are:

- solid waste generation and composition in the camps
- solid waste storage at source
- solid waste collection and removal system
- occupational health and safety for SWM operators

4.1.1 Solid waste generation and composition in the camps

1) Non-authorised use of UNRWA's peripheral containers

Description of the problem

UNRWA SWM service is particularly affected by the non-authorised use of UNRWA's containers by outside residents (individuals or commercial entities). This fact negatively affects not only the quality of UNRWA services (decreased space in the containers for the waste from the camps), but also the budget allocated to solid waste transportation and disposal.

General strategic actions

- UNRWA will not provide solid waste removal service to users outside of the camps, with limited exceptions

Specific actions

Discussions with public institutions (governorates, municipalities, joint service councils) will be held to improve the public solid waste collection in the bordering areas. If an UNRWA school is outside the borders or camp residents are attending governmental schools outside, UNRWA will provide solid waste removal from the containers placed in the immediate proximity of such installations.

Every five years UNRWA's camp service officer (CSO), in coordination with public institutions and the popular committees, will estimate the number of external users. The estimations could be carried out through the following operations:

- A census of the number of households and commercial activities in the proximity of the camps;
- An estimation based on the solid waste generation values per camp residents per day derived from the trucks' weighing statistics.

The result will be written by the CSO as a report and shared with the participating institutions.

2) Analysis of municipal solid waste composition and generation

Description of the problem

UNRWA never carried out any waste generation and composition analysis. The per capita solid waste generation is assumed based on local statistics and on the experience of UNRWA's area sanitation officers. It is assumed that solid waste density from the scientific literature would apply. These two parameters are particularly important to estimate the solid waste generation in the camps and the quantities of disposed waste when only volumetric estimations are possible due to the absence of weighing bridge at the disposal facilities. UNRWA schools have been included in the healthy canteen programme, an initiative that aims to provide students with healthier food and is expected to change the composition of the waste generated and, possibly, to decrease it.

General strategic actions

- UNRWA, in cooperation with environmental experts and research centres, will carry out solid waste composition and density analysis.

Specific actions

The PCBS census (repeated every 10 years) will be used as the official data of camp residents. Household, commercial and UNRWA installations' solid waste generation and composition analysis will be carried out separately every five years. UNRWA will sign agreements with external environmental experts or research centres who will propose the methodology. This will be supervised by ICIP, in coordination with the education programme and the health programme.

4.1.2 Solid waste storage at source

1) Household/commercial waste storage

Description of the problem

In some cases, residents use waste bins to store their waste outside their houses, while in most cases, they pile up waste bags along the streets. However, waste bags are usually not well closed and they attract animals, release odours and contribute to generating litter. Moreover, residents are used to taking out their waste at any time of the day, without considering the collection time. Even when waste bins are used, they are usually not well sized for the amount of waste generated and are often damaged and misused. The type of containers used is not uniform and some are difficult to be emptied by sanitation labourers. In a limited number of cases, refugees accepted to share one waste container with family members or neighbours, establishing community bins waste collection system.

Similarly, commercial activities usually lack proper waste storage. Cardboard waste, in particular, is accumulated in large quantities outside the shops. In most cases, municipal-like solid waste is mixed with cardboard and piled in plastic bags. When containers are used, they are family-sized and insufficient for commercial waste.

General strategic actions

- UNRWA will distribute containers for the collection of household and commercial waste.
- The SFs will assess the conditions of the distributed containers and seek the cooperation of local private enterprises to provide maintenance and substitutions.

Specific actions

UNRWA will collect municipal solid waste through a hybrid waste collection system: door-to-door and community bins. The door-to-door collection will be performed on narrow streets or in areas with particularly difficult terrains, where vehicles cannot access. Residents will be invited to store their waste in plastic bins that they purchased. SLs will collect the waste in these areas using manual carts, which will have their current blue barrels swapped with 240 litre wheeled bins that can be lifted and emptied mechanically by vehicles with such capability. The community bins will be placed on wide streets, at junctions and on narrow streets within 50 metres of the main roads, where they would not interfere with the traffic and pedestrians. Since they are community bins, they should serve more than one building. Thus, size and placement should be chosen accordingly. Each will be anchored or placed inside metallic containers to prevent uninvited removal. Moreover, they will have unique numeric codes (first figure: area number; second figure: serial number of the bin), the UN logo and messages or drawings of good waste disposal practices. The numeric codes will assist UNRWA with identifying critical areas, where containers are frequently removed or damaged, that need to be targeted with improved awareness raising and communication. SLs will move the bins to the main roads, where they will be emptied by the vehicles.

Specific rules on disposal and collection methods and recycling opportunities for butchery and bread waste will be provided in each camp.

Waste storage at schools will also be upgraded. All 4 m^3 containers will be replaced with smaller containers that could facilitate waste segregation if recycling programmes are to be implemented. Staff will be responsible for transporting the waste to the camp's disposal area or coordinating with SLs for collection.

2) Streets littering

Description of the problem

Waste littering is a frequent problem in the camps. It is generally generated by pedestrians who lack environmental awareness or do not find suitable bins for the disposal of their waste. Waste littering in the camps is the major cause of clogging of drainages.

General strategic actions

- UNRWA will distribute containers for the collection of pedestrians' waste.
- SFs will assess the conditions of the distributed containers and seek the cooperation of local private enterprises to provide maintenance and substitutions.

Specific actions

One or two bins for the collection of waste generated by pedestrians, depending on the number of users, will be installed in each commercial, institutional and communal areas. Such containers will be of the same type for all the camps, with the UN logo and messages or drawings of good practices for solid waste disposal. They will be emptied by SLs.

Common specific actions

UNRWA will seek the cooperation of the community based organisations (CBOs) or local enterprises (i.e. camp artisans) for the maintenance and substitution of containers and to provide a storage area to stock spare waste bins (household/commercial and public bins) for immediate substitutions. When the strategy is operational, ICIP will create a contingency plan for frequent theft and damage to bins.

Once a year, SFs will draft a report on the conditions of the distributed bins (household, commercial and public), the types of maintenance and the attitude of residents toward such containers. This annual report will be submitted to the ASO.

4.1.3 Solid waste collection and removal systems

1) Manual carts features

Description of the problem

Solid waste collection in the West Bank refugee camps is achieved mainly through a door-to-door collection system using manual push carts. This is currently not effective and efficient because the population density and the waste generation increased significantly. Due to the shelter construction and occupation of free spaces, streets are narrower and the movement of manual carts is difficult. Furthermore, SLs often modify the manual carts so they can carry up to two to three times the initial capacity, thereby overloading them. This has negative consequences for their physical health and increases the risk of accidents through losing control of the cart. In addition, the carts do not have brakes by default and their wheels are not suitable for the terrain.

General strategic actions

- UNRWA, in cooperation with research centres, will explore the possibilities of improving the manual carts to better adapt them to the different terrains.

Specific strategic actions

UNRWA will seek the collaboration with research centres or universities to improve the manual carts and adapt them to the different terrains, topographies and waste collection necessities. In the meantime, SLs will not be allowed to modify the structure of manual carts and to overload them above the initial capacity without a written authorisation from the SF. All the existing manual carts will be equipped with a braking system.

2) Mechanisation of waste collection

Description of the problem

Waste collection is performed manually in all the camps with manual carts. In a few cases, waste collection is performed with tractors or compactors but waste is always loaded manually by SLs even though full containers can be heavy and difficult to lift. Also, SLs may have to travel long distances to reach the peripheral containers, so emptying the carts can be very time consuming. Finally, manual waste collection exposes SLs to risks from the hazardous waste, odours and insects. Therefore, the current waste collection system is generally not efficient.

General strategic actions

- Mechanised waste collection system will be applied in all the camps and adapted to their topography (terrain, population density, streets accessibility).

Specific actions

All the camps will be equipped with solid waste collection vehicles. Capacity and numbers of the vehicles will be determined based on the average daily waste generation and the expected waste reduction from waste prevention and recycling programmes. The type of vehicles (i.e. compactors, semi-compactors and non-compacting trucks) will be selected depending on the itinerary to be followed (if waste has to be transported to a transfer station outside the camp, semi compactors or compactors would be preferable to speed up the waste transfer operations; if waste has to be transported to waste collection points inside the camp, lower speed and lower payload vehicles can be used). All vehicles will be equipped with a proper leachate collection and bins lifting system.

Figure 4.1 illustrates the proposed hybrid solid waste collection system (door-to-door and communal bins) and the involvement of mechanised vehicles.

ICIP, in coordination with the Procurement and Logistic Division (PLD), will assess the economic advantages and the feasibility of redistributing the existing fleet. Vehicles will be redistributed and potentially upgraded by considering the specific needs of the camps, the technical requirements listed above and the limitations connected with the Israeli vehicle regulations.

An analysis of the fleet management is presented in Annex III – Fleet Management, in which the current distribution of the vehicles, the costs and the retirement dates are reported.

3) Waste collection points

Description of the problem

The camps are equipped with solid waste collection points. Collection points can either be formed by metallic containers or random waste piles. Metallic containers are rarely protected from rain and often exposed to non-authorised users and acts of vandalism. Random waste piles are time consuming to remove, attract animals, and cause odours and leachate.

General strategic actions

- The camps' peripheral containers will be clustered at "camp disposal areas".

Specific actions

When space is available in the camps, all collection points will be clustered in one area, called "camp disposal area". The camp disposal areas should have the capacity to contain the solid waste generated in one day in the camp, be roofed and be accessible only to the authorised personnel. Where multiple camps are close to each other, they will also be clustered and the waste generated in the smaller camp will be transported to the larger one. Space saving solutions (such as static waste compactors) will be applied when possible. Depending on the technical characteristics of the designed disposal areas, ICIP will proceed with the procurement or redistribution of vehicles for the transportation of the accumulated waste to the waste disposal areas. When economically and environmentally convenient, and in case of space constraints in the camps, UNRWA will use transfer stations or waste disposal facilities in the proximity of the camps ran by municipalities or other public authorities instead.

4) Human Resources Management

Description of the problem

SWM operation at the refugee camps is conducted by SFs, SLs, drivers and JCP workers. SFs supervise SLs. SLs and drivers perform the actual sanitation operations. SLs' duties include waste collection and street sweeping, UNRWA sponsored cleaning campaigns, management of the sewerage network, support for rodents and insects control operations, and emergency response. In a few camps, one SL is dedicated to sewerage network management and pests control operations. In other camps, the SLs conduct these activities after the waste collection work. Drivers operate vehicles such as compactors to support SLs and JCP workers complement SLs' work on waste collection and street sweeping.

The most challenging aspects of human resources management in SWM are:

a) The assessment performed in preparation of the strategy revealed that both camp institutions, such as popular committees, and ICIP considered the number of SLs insufficient. This is because the work of SLs is neither effective nor efficient: cleaning a small area may require several hours even though the result would only last for a short period because residents would start to throw away their waste soon after the cleaning.

b) Regarding the working hours, SLs work 42 hours per week and SFs, who supervise SLs, work 37.5 hours per week. As indicated in the Environmental Health's operational guidelines, the SFs should organise and supervise the SLs work until the end of their shift. However, due to the shorter working hours of the SFs, this cannot be properly implemented without working overtime.

c) JCP workers are hired under UNRWA's cash-for-work programme with the objective of providing food insecure households with a temporary employment opportunity. This programme is currently operational with humanitarian funding but its longevity cannot be guaranteed. Since JCP labourers receive a much lower wage for their work, they cannot be expected to work the same number of hours as the long-term SLs. ICIP cannot rely on JCP labourers in the long run either as funds for the programme are difficult to secure every year.

d) During the assessment, several deficiencies in the working conditions of SWM operators were also identified. These could affect the quality of the solid waste management services or expose the operators to health risks, both physical and psychological. The identified weaknesses are:

- SFs: travelling large distance on foot to monitor the cleaning operations; facing possible harassment by camp residents and Israeli security forces.
- SLs: receiving insufficient quantity and quality of protective gears; lacking awareness of the importance of wearing protective gear; lifting and pushing heavy bins, manual carts and other materials in difficult terrain; facing risks of injuries from hazardous materials in the waste and the waste thrown from balconies; experiencing harassment by camp residents and Israeli Security Forces; lacking changing and restrooms in the CSO offices; lacking rest spaces.
- JCP workers: the same as SLs.

e) In general, SFs and ASOs complained an abuse of sick leaves requests submitted by the labourers, which cannot be easily prevented, due to UNRWA's sick leave management system.

General strategic actions

- Based on each camp specific SWM plan, an optimal work schedule will be developed for SLs and JCP workers by SFs, in coordination with the ASO.
- ICIP will assess the number of SLs needed by developing a SWM plan for each camp.
- SFs will be given vehicles or mopeds for the supervision inside the camps.

- UNRWA will regularly provide protective clothing as described in the strategy, while SFs make sure that the waste management operators wear protective clothing for the full duration of their duty.
- The residents will be made aware of the role of the sanitation workers, the communication channels with UNRWA staff and the waste disposal modalities.
- The physical efforts requested from the SLs will be decreased through an introduction of mechanised waste collection system and improvement of manual carts.

Specific actions

In each camp, one SF will be assigned. SF will monitor SLs, draft reports requested in the SWM Strategy, cooperate with data collection and management, and coordinate with the Area Sanitation Officer for solid waste management operation and procurement of equipment. UNRWA will procure small vehicles (i.e. golf carts or mopeds) for SFs to improve their supervision where needed.

In the camps in which waste collection trucks will be procured, truck drivers will be hired as substitution of retired SLs. In case truck drivers are not readily available (i.e. Jerusalem area), SLs will be upgraded to the drivers if compensation measures can be guaranteed to prevent wage decrements. Therefore, no increase in the number of employees is expected in the camps and in general involved in solid waste management.

Based on each camp specific SWM plan, the SFs, in coordination with the ASO, will identify the best working schedule for the SLs, ensuring that they work 42 hours per week. The working schedule may depend on specific climatic conditions, particular needs expressed by the SLs or logistic needs of the solid waste management facilities. The working schedule of the labourers will also consider the working schedule of the drivers. The solution will ensure that the SLs can be properly supervised. The number of SLs to be employed in the camps will be assessed by analysing the results obtained through the implementation of the first pilot project. It is expected that the mechanisation of SWM will facilitate and accelerate the waste collection operations. A redistribution of the SLs' working schedule would help to understand a gap in the number of SLs needed.

The JCP workers are needed in the camps as they complement the work of the long-term SLs. A greater number of JCP workers and longer contract period would be appreciated in the camps for the fulfilment of the sanitation operations. The JCP workers are requested to work a flexible amount of hours per day depending on the work requirement of the camp, in close coordination with the SFs. Their work can be improved if the SFs, working closely with the JCP monitors, submit a monthly report on the number of hours they worked and their performance.

The SFs will train SLs and JCP workers on their occupational risks and the health and safety requirements. In addition, workers will be warned through official communications that they cannot start their daily duty if the provided clothing is not worn. The sanitation workers will be able to change to the protective clothing in the CSO office, which will be renovated to include changing rooms with adequate personal hygiene facilities and washing machines.

UNRWA will make its best efforts to ensure the privileges and immunities of UNRWA staff are protected. As a part of this measure, they will be clearly and immediately identifiable through a specific colour coding and the UN logo. The SFs and the SLs will wear orange vests and the JCP workers will wear yellow vests, however only UNRWA employees will have the UN logo on the front and back. As JCP labourers are not considered UN officials, they do not carry with them the privileges and immunities under the convention. The cotton vests will have pockets that workers can use to store their personal effects and the UN employee card, when provided. The same colour coding will also be used for rain coats.

To obtain a new protective item, the SLs will submit a request to the SF, who will assess the necessity. The SLs will be responsible for maintaining the conditions of the gears. The SFs can accept the request for replacement up to the maximum amount as indicated in table 4.1.

Table 4.1 Protective clothing to be distributed to Sanitation Labourers

Items	Number of items provided per year	Maximum number of replacements per year
Trousers	2	4
T-Shirt	2	4
Rain coat	1 (every 2 years) (LOGO)	1 (LOGO)
Leather shoes	1	2
Rubber boots	1	1 (LOGO)
Gloves	8	12
Hat	1 (LOGO)	2 (LOGO)
Cotton vest	2 (LOGO)	2 (LOGO)

JCP workers are exposed to similar risks as SLs and they should be provided with similar health and safety items. In addition to what is being currently distributed through JCP, ICIP will determine gaps in protective gear and vaccinations for JCP workers.

The ASOs will indicate to PLD the specific protective clothing that should be provided to the drivers.

Medical assistance is currently guaranteed to SFs and SLs through a vaccination programme: vaccinations for hepatitis B are provided for those who were born before 1998. For those born after 1998, tetanus and hepatitis B vaccinations are provided through the national vaccination programme but the hepatitis A vaccination is not provided. The health programme, in cooperation with ICIP, will assess the needs for the vaccination of hepatitis A and will provide this to protect workers from fecal-oral diseases. UNRWA will extend the vaccination programme to JCP workers when JCP contract is extended to six months.

Through the modalities indicated in section 4.5, residents will be aware of the communication channels with relevant UNRWA staff, the waste disposal modalities and the role of SLs and JCP workers. ICIP will moreover organise staff rewarding days in which the community will be invited. Such initiatives will contribute to acknowledge the work of the solid waste collection operators. Manual waste collection will be improved through the procurement of vehicles equipped with bins lifting systems and the improvement of manual carts. SLs works in coordination with the mini-truck drivers in order to quicken waste collection operations.

5) Cooperation with external stakeholders for solid waste removal

Description of the problem

Currently, UNRWA has cooperation arrangements only with Nablus municipality and Jericho JSC. However, the quality of service is not optimal. In Nablus, waste is removed daily by the municipality but a significant portion of the containers is filled by waste disposed of by non-authorised users. The space for the camps' waste is thus limited. The municipality does not request fees for the removal of waste but UNRWA pays a lump sum of USD 60,000 per year to the JSC of Jenin for the waste disposal at Zaharat al Finjan landfill (the requested amount is USD 100,000 and the rest is paid by the Palestinian Authority).

In Jericho camps, waste is partially removed by the local JSC, who has access to the camps between three and five times per week with waste compactors. However, waste is not removed efficiently and the containers are often damaged by the trucks' operators during the emptying activities. Burning of waste and uncontrolled waste dumping are regularly performed by the residents.

General strategic actions

- UNRWA will assess the advantage of continuing the collaboration with public authorities for SWM removal for Nablus and Jericho camps.

Specific actions

UNRWA will assess the advantage, from economic, public health and environmental sustainability perspective, of maintaining the collaboration with public authorities or implement solid waste management in Nablus and Jericho sub-areas independently.

If the collaboration was to be terminated, ICIP will assess the needs to decide whether to redistribute the existing fleet or to procure new trucks for these camps.

6) Informal waste accumulations

Description of the problem

Informal waste accumulations are very common in the camps and can be found both on so called "private property" and in public areas. Waste accumulation presents a sanitation risk to the population because these sites become breeding grounds for insects, attract wild animals and emit odours. Moreover, budget availibility poses a constraint as to when cleaning campaigns can be performed.

General strategic actions

- Awareness raising will be carried out in order to inform and educate camp residents on the public health risks associated with such practices.

- Camps cleaning campaigns will be carried out minimum twice a year, with an increase to four times per year in the highest need camps, until a positive change in camp resident behaviour is observed.

Specific actions

Waste cleaning campaigns will be performed between two and four times per year depending on the conditions in the camps and budget availability. When possible, they should be implemented in coordination with CSCs and CBOs.

The number of cleaning campaigns might decrease if awareness and education programmes are long-lasting and successful. Such programmes should, among other aspects, clarify to the residents the proper use of the distributed bins and containers, management of special waste in the camp and the public health risks of uncontrolled waste accumulations.

The distribution of public and household bins in strategic locations identified in the camps' plans is expected to contribute to reducing the uncontrolled dumping phenomena in camps.

7) Storage of UNRWA's SWM vehicles and equipment

Description of the problem

When possible, manual carts are stored in closed and roofed areas, such as ex-distribution centres, usually located in the proximity of the CSO office. In other cases, they are stored in the open. Brooms and shovels are usually stored inside manual carts' barrels. In rare occasions, manual carts have been employed for private use.

When possible, tractors are stored in UNRWA office areas in the camps. Compactors are parked in various areas, sometimes depending on where drivers live.

General strategic actions

- The SWM vehicles and equipment will be stored in officially authorised locations designated by the CSO in coordination with the SF.

- The ASO will identify the best locations for the storage of waste compactors.

Specific strategic actions

Waste collection vehicles will be stored in a closed and roofed area. It will be paved and equipped with drainage for cleaning the vehicles and equipment. The CSOs, in coordination with the SFs, will identify the best locations in the camps to be designated for such use.

Private vehicles will not be allowed to be stored in that area. Moreover, the entry and exit of carts and vehicles will be recorded.

Waste collection vehicles are property of UNRWA and they will not be used for private purpose.

4.1.4 Special waste management

In this strategy, the classification of "special waste" includes: construction and demolition waste, pruning waste, bulky waste and medical waste. Palestinian regulations do not give specific and strict guidelines for the disposal of such fractions and the West Bank lacks proper waste treatment and disposal facilities, with an exception of the medical waste treatment plant in Hebron governorate.

1) Construction and demolition waste, pruning waste and bulky waste management

Description of the problem

Management of construction and demolition waste, pruning waste and bulky waste varies among the camps and depends on the quantities generated, the residents' cooperation level and the availability of budget. The removal of these wastes is a responsibility of the producer, who should make an arrangement for it. In practice, these are either accumulated along the streets or in the proximity of peripheral collection points. Consequently, UNRWA often ends up taking care of these wastes despite its limited budget. UNRWA frequently asks the support of the Popular Committees for this operation, who would sub-contract owners of trucks and bulldozers or a nearby municipality. However, in most cases, the Popular Committees would request reimbursement from UNRWA. Currently, these fractions are commonly dumped randomly in the countryside or burned during winter (bulky and pruning waste) due to limited treatment facility.

General strategic actions

- UNRWA will not collect and/or remove any type of special waste such as construction and demolition waste, pruning waste and bulky waste, and will fully delegate the removal service to other stakeholders.

Specific strategic actions

UNRWA will no longer provide construction and demolition, pruning and bulky waste removal services for camps residents and will fully delegate this responsibility to popular committees, CBOs, external institutions or organisations. This will also be discussed with DORA. In the framework of the ICIP's shelter project with the self help approach, and as stipulated in the contracts with the beneficiaries, UNRWA highlighted that it will not have any responsibility towards the removal of construction and demolition waste. However, UNRWA will provide camp-by-camp reports on the beneficiaries of the project to DORA/CSCs to facilitate their removal of the waste.

The body entitled to manage such waste:

- Can put in place ethically correct techniques to encourage the positive behaviours of refugees towards the disposal of such waste.
- Can request the payment of collection fees.
- Is fully responsible for the dumping of the waste at legal/approved dumping sites.

If the body delegated to manage this implimentation fails to perform its duties, ICIP will not take the responsibility for these fractions.

2) Medical waste management

Description of the problem

Medical waste is generated at health centres and households. At clinics, sharp waste is properly segregated in all the camps and stored inside plastic or cardboard boxes. At Hebron area clinics, potentially infectious waste is separated and delivered, together with sharp waste, to a microwave treatment plant. The majority of the camps in other areas dispose of all medical waste with municipal solid waste, which poses possible risks for solid waste management operators and the environment. Households are advised to store the sharp waste in plastic bottles and deliver them to the clinics (Hebron area) or dump them with other household waste. However, residents do not usually abide by this guidance and the number of injuries caused by the sharp waste and reported by SLs is significant.

General strategic actions

- UNRWA will seek safe and environmentally-friendly hazardous medical waste collection and disposal options for UNRWA health centres in the camps.

Specific actions

UNRWA will seek safe and environmentally-friendly hazardous medical waste prevention, collection, recycling and disposal options for UNRWA health centres in the camps. In doing so, UNRWA will:

- Seek collaboration with local public or private stakeholders for the collection, treatment and disposal of hazardous and potentially hazardous medical waste. In the meanwhile, UNRWA will apply transitory measures to ensure that the hazardous and potentially hazardous medical waste are delivered to the closest treatment facility;
- Train its medical staff on the safe management of hazardous and potentially hazardous medical waste, on the municipal-like waste segregation practices in the clinics in case of implementation of waste recovery and recycling programmes, and on management of sharp and infectious medical waste at household level;
- Apply colour coding for the segregation of medical waste: sharp box (transparent), potentially infectious waste (yellow), average waste (black). The transparent and yellow bags will have the biohazard warning symbol;
- Ensure that storage of hazardous and potentially hazardous medical waste follows the WHO guidelines;
- Facilitate scientific studies or initiatives aimed at exploring hazardous and potentially hazardous medical waste prevention, reuse, recycling and treatment options by providing data and access to its clinics.

4.2 Waste Prevention, Recovery and Recycling

Regulations in the West Bank are inadequate for promoting sustainable solid waste recycling initiatives. Apart from a limited number of organic waste composting facilities and registered metal waste recovery and recycling enterprises, waste trade and recycling initiatives are mainly informal and lack any environmental protection measure. Also, the population in the West Bank has rarely been included in waste recovery programmes.

Due to the novelty of waste recovery and recycling programmes in the West Bank, and the non-effectiveness of the awareness campaigns carried out for the camps' population, it is not suggested to implement large scale waste recovery and recycling programmes for households. It is expected that the quality and quantities of the collected materials would not be sufficient to recover the expenditures for the organization of a separate household collection system.

Description of the problem

UNRWA aims to implement sustainable and environmentally-friendly measures including facilitating initiatives to promote waste prevention, recovery and recycling.

Solid waste generation in the camps is generally increasing, not only due to the rise of population but also due to a change of habits of the residents themselves. This has a direct impact on:

- UNRWA's budget for SWM
- The quality of waste collection service
- The environment in general because the amount of landfilled waste increases

However, UNRWA does not have the budget and the capacity to directly implement solid waste prevention, recovery and recycling programmes. Moreover, the organisation and execution of such activities go beyond the mandate of UNRWA.

General actions

- UNRWA will strive to promote and facilitate solid waste prevention, recovery and recycling activities in the camps, but will not take over the management and implementation of such activities directly.

Specific actions

UNRWA will not directly implement waste recovery and recycling interventions in the camps. However, UNRWA will support such programmes conducted by the Popular Committees or CBOs. UNRWA will not lend its vehicles to Popular Committees, CBOs or other third parties.

UNRWA will support the Popular Committees or CBOs by identifying solid waste recovery and recycling enterprises, and assist the establishment of collaboration agreements.

Depending on the waste fractions that can be recycled by the identified enterprises, UNRWA will distribute containers for the collection of such fractions in its installations. Staff at each installation will coordinate with the Popular Committees or CBOs in charge of the waste recycling operations for the collection of the segregated material. School staff and students will not directly collect nor transport the waste.

UNRWA will allow projects or initiatives aimed at involving a limited number of households and/or commercial activities in waste segregation and recycling programmes for special and small-scale awareness campaigns.

UNRWA will facilitate research activities for improvement of sustainability assessment methods, advancement of waste management solutions and assessment of the informal and formal recycling sector in the West Bank by providing data and facilitating access to camps.

4.3 Monitoring and Evaluation Plan

The monitoring and evaluation plan for the Strategy will enable periodic assessment of outputs and outcomes.

The outputs will be monitored through semi-annual, annual and technical reports. Regular technical supervision should be provided to UNRWA staff on the field. The outcomes will be monitored through key indicators set in the logical framework and the monitoring and evaluation matrix that will be developed for each camp SWM Plan.

Effective monitoring and evaluation would require an efficient data management system. Therefore, UNRWA will develop a database that will be accessible and updated by all relevant departments.

As presented in Chapter 5: Implementation Steps, UNRWA will periodically perform evaluations to determine the achievements of outputs and outcomes and to provide recommendations.

In particular, this will:

- Help to identify technical achievements and lessons learned about project design, implementation and management, and to review the actions proposed in the SWM Strategy;
- Help to assess the effectiveness of the established partnerships;
- Help to propose amending the work plan if the activities and the expected results are not on track.

After the six-year period of the strategy implementation, a final evaluation will assess the impact of the strategy, the sustainability of the results and the achievement of the objectives.

4.3.1 Data management and reporting for performance analysis and budget management

Data management is important to monitor performance, control expenditures, minimise errors and help decision-makers. Data have to be updated regularly and they have to be available to the relevant personnel, who should be trained on using the data management system.

Description of the problem

SWM comprises of a multitude of operations with variable factors. To monitor the performances of the SWM system, predict variations and allocate budget, consistent data need to be collected regularly. UNRWA's data management on SWM is fragmented and incomplete. For example, data on daily weighing of waste at disposal sites and records of special expenses in the camps can only be collected at the SFs' offices. However, they are not registered accurately and the availability of some information depends on the personal knowledge of the foremen. Other data are handled by different departments, making it time consuming to collect all relevant data. Budget for the coming year, thus, is allocated on the basis of the general expenses covered in the previous year, without comprehensive analysis of costs and savings potentials.

General actions

- ICIP will develop an online database, in which daily collected data, expenditures and reports will be stored.
- UNRWA will procure tablet computers/smart phones for the daily compilation of the database by the SFs and truck drivers.
- ASOs will coordinate with other UNRWA departments for the collection and elaboration of data, with the scope of improving the performance and the budget saving potential of all departments involved in SWM.

Specific actions

It is necessary for UNRWA to improve the data management and add information sharing function for the departments. Regular performance analyses and expense monitoring will help assess the appropriateness of the SWM system in place and adapt to a transition that will take place in the camps. For this, ICIP will design an online database with types of data described below:

Waste collection data: The daily waste removal and disposal data will be recorded daily by SFs on the database by using tablet computers/smart phone.

The daily trucks weighing data will be provided to SFs by the drivers by using tablet computers/ smart phones or log books and the weighting receipt will also be submitted. If a compactor truck is serving more than one camp, SF will calculate the proportion of the generated waste per camp by comparing population of camps based on the PCBS population statistics.

If disposal facilities without a weighing bridge are used, waste disposal estimations will be volumetric and either based on the number of tractor/truck loads or the number of containers emptied. Other data that will be registered by SFs are listed in table 4. Each month, ASO will retrieve the waste disposal data from the online database and will elaborate on them as needed. ICIP will coordinate with PLD to gain access to the running costs and special maintenance expenditures of the vehicles. Annually, ASO will provide a statistical analysis on the waste disposal, which should be available for other ICIP units through a report. Also, ASO will collect the weighing receipts and the weighting data sheets each month and store them in order of date.

UNRWA will monitor the amount of waste disposed of in the camps' collection points by non-authorised users. ASO, in coordination with CSO, will draft a report on the results obtained from the communication with the external SWM service providers and the improvements achieved on the implementation of SWM programmes in the camps surroundings to see if the amount of waste delivered by non-authorised external users to UNRWA's facilities is decreasing.

Extra running costs: SFs will register the expenditures of emergency and special solid waste removal campaigns, conditions of equipment and maintenance interventions. ICIP will also get GPS data and maps in order to highlight the most critical hotspots in the camps and efficiently work on them.

Medical waste management: Medical waste generated in UNRWA clinics sited in Nablus and Jerusalem areas is currently managed by ICIP, while in Hebron area medical waste is managed by health programme. The health programme in the Nablus and Jerusalem areas will provide ICIP the information on hazardous and potentially hazardous medical waste generation. ASO will complete this information by indicating the institution that collected the waste and the disposal location. Such data will help ICIP and health programme to establish partnerships with waste treatment facilities and to predict future expenditures and needs.

Camp regular expenditures: For monitoring the expenditures on protective clothing and waste collection equipment (shovels and brooms), ASO will keep an online record of the items purchased yearly. It will also include the amount of items distributed to each camp. SFs will record the number of items distributed to each labourer to monitor individual demand. This will help monitor the quality of the purchased items and assess misuses.

Workers management: SFs will keep an online record of the leaves requested by SLs. Daily information on leave requests will be shared with CSO and ASO will have access to a monthly report.

Awareness activities/refugee participation. SFs, in coordination with education programme and other involved organizations, will keep an online record of the type of education/awareness activities carried out in the camps, the type and number of direct beneficiaries, the expenditures and the date.

ICIP will indicates the frequency through which repots should be submitted and the person in charge of drafting such reports:

- Statistics on the yearly variation of waste generation and expenditures for solid waste management (by ASO);
- Extraordinary, emergency and maintenance interventions in the camps (by ASO in coordination with SFs);
- Improvements on hazardous medical waste management and disposal (by ASO in coordination with health programme);
- Protective clothing distribution and utilisation (by ASO in coordination with SFs);
- Environmental education and awareness programmes and campaigns – organisational aspects, expenditures and results (ASO in coordination with the education programme or camp institutions who participated);

- Control of non-authorised external users (ASO in coordination with SFs);
- Report on JCP sanitation workers attendance and performances (SFs);
- Report on the collaboration with external partners and camps' institutions (ASO);
- Expenditures analysis for different cost categories and assessment of saving potentials.

Table 4.2 Data collection system for solid waste management in refugee camps

Type of data	Input by	Minimum aspects to be considered
Daily waste removal and disposal data	SFs	-Daily weights/volumes of waste disposed - UN code of the compactor truck used for waste disposal - Costs for waste transportation - Name of the driver - Waste disposal facility - Time of truck's service
Extra running costs	SFs	- Type of intervention (maintenance of equipment, cleaning campaigns, strikes management) - Who carried out the intervention - Expenditure
Medical waste management	Staff nurse/medical staff	- Number of sharp boxes disposed per week - Number of infectious waste bags disposed per day - Name of the institution who collected waste - Medical waste treatment/ disposal location
Provision of protective clothing	ASO and SFs	- Number of purchased items - Expenditure per type of gear - Distribution per camp
Workers management	SFs	- Number and periods of leave - Worker profile (seniority, role, etc.)

Education, training and awareness activities	ASO	- Type of activity - Number and type of beneficiaries - Expenditure - Period of implementation

4.3.2 Indicators

The indicators listed below have been obtained through a general assessment that was completed for all the 19 camps in a three month period (January – April 2017). They should be improved through the development of assessment reports and SWM plans for each camp. The baseline assessments will be used to determine baseline values for the indicators.

To properly assess the indicators, this background information of the camps should be collected and updated regularly:

Category of information	Description
Distribution of refugees by income	Mapping of low-income/difficult neighbourhoods and assess the number of families
Provision of waste collection service by public authorities in the surrounding areas	Installation of municipal containers in the areas around the camp, provision of regular collection service by compactors of public authorities
Municipal solid waste generation	Average daily quantity of municipal solid waste disposed of in a year per person (kg/p*d) Variation of waste disposed compared with the previous year (tonnes/year) Unit of measurement (weight, volumetric)

UNRWA, within the development of the Strategy, identified some basic indicators, which description is summarised reported in ANNEX III – Indicators for monitoring and evaluation of SWM. Other indicators, as well as the definition of targets, should be proposed through the development of the SWM for the camps.

4.4 Trainings for Solid Waste Management Operators

Description of the problem

As indicated in the operational guidelines of ICIP, SLs and JCP workers are trained by the SFs on their duties and health and safety in their work place. The SFs, in turn, are trained by the training unit under the Human Resources Department. With the implementation of the SWM Strategy, the SWM operators will require further training or follow-ups.

General strategic actions

- SWM operators will receive training on data collection and management, health and safety, and SWM operations.

Specific actions

Training or technical updates will be delivered to the ASOs, the SFs, the SLs, the JCP workers and the drivers. The suggested training is based on the new ICIP structure (once functional) that expects the ASOs will have an academic background in engineering and SFs will have a diploma. However, it is recommended that they both have an environmental health background.

The ASOs should not require any specific training on SWM due to their technical background but they might need to be updated on the following issues:

1. National legislative framework on SWM;
2. Institutional and operational variations on SWM in their areas;
3. Solid waste recycling initiatives in their areas.

The first two topics might be covered by the Environmental Quality Authority or the Ministry of Local Government, in coordination with the different JSCs. The third topic might be covered by local or international consultants with expertise on the waste recycling markets in the West Bank.

SFs will receive training on the following topics:

1. General aspects of SWM
2. SWM in the West Bank
3. SWM plan of his/her camp
4. Emergency contingency plan
5. Health and safety for SLs
6. Communication techniques for camp residents
7. Immunity and privileges of UN staff
8. Information Technology
9. English language

The first five topics can be covered by the ASO, in collaboration with local or international experts, while the last four might need a support from the training unit or external experts.

The SFs will be updated by the ASOs on features of the new equipment provided in the camps. The knowledge required of SLs and JCP workers is listed in table 4. The training for them can be performed directly by the SFs, in cooperation with the training unit if needed.

The training for the drivers will be carried out by the ASO, in coordination with the training unit and PLD.

The CSOs might not need a specific training on SWM. Nonetheless, it is suggested that they are constantly updated on the development of camp's SWM plans by participating in institutional meetings.

Table 4.3 Training needs for solid waste management operators

Operators	Type of background required	Training needs
ASO	- Environmental Engineer - Water, Sanitation and Health Engineer	

Operators	Type of background required	Training needs
SFs	- Diploma in Public Health - Diploma in Environmental Engineering	- General aspects of SWM - SWM in the territory - SWM plan of the camp - Communication techniques for camps' residents - Health and safety for SLs - Immunity and privileges for UN staff - Emergency contingency plan - Information Technology - English language
Sanitation labourers	- Not specified	- SWM plan of the camp in which they are employed
JCP sanitation	- Not specified	- SWM plan of the camp in which they are employed - Rights and duties - Health and safety - Immunity and privileges (for SLs) - Roles of JCP workers and SFs - Emergency contingency plan - Characteristics of the waste that can be loaded on compactor trucks - SWM equipment for the camps
Compactor truck/ truck drivers	- Not specified	- Characteristics of the waste that can be loaded on compactor trucks - Routes (inside and outside the camps) - SWM plan of the camp in which they are employed or that they service. - Health and safety - Immunity and privileges - Data reporting modalities

4.5 Communication with Camp Residents

Description of the problem

Communication with residents is an important part of SF duties, as it builds lines of communication, ensuring prompt follow up in case of emergencies, improve the services and contribute to the population's behavioural change. The only communication channel available for residents today is the one-way communication between CSOs and SFs.

Communication should be two way and should include the camp institutions that participate in SWM programmes at all levels.

General strategic actions

- UNRWA will meet DORA and relevant refugees institutions every six months to discuss and evaluate SWM services;
- UNRWA will distribute flyers and posters in camps about SWM good practices;
- UNRWA will improve communication techniques by using web sites and including camps' institutions in the communication management;
- UNRWA will carry out a survey to measure the level of camp residents' satisfaction.

Specific actions

CSOs and the SFs will confirm their availability to receive visits from residents in their offices and will be reachable by telephone. It is recommended that a hotline number is provided to residents instead of UNRWA staffs' private numbers. Such a service will be out-sourced. In cases of emergency, SFs will report to the ASO.

If other camp institutions receive complaints from camp residents, they will promptly report to the SFs. UNRWA will organise biannual meetings to discuss improvements and challenges to camp SWM. The SFs will communicate directly with residents if anomalies are observed during their daily duties.

UNRWA in cooperation with camps institutions will assess residents' satisfaction by distributing a survey on an annual basis. Survey preparation and the statistical analysis will be carried out by ICIP and M&E.

UNRWA will distribute flyers and posters about SWM best practices. To avoid materials waste, paper adverts will only be used in specific awareness and communication campaigns. Posters will be posted at strategic locations.

4.6 Education, Awareness and Participation of Refugees

Description of the problem

UNRWA staff members consider refugee behaviour towards SWM to be problematic, mostly due to the following behaviours: accumulation of waste next to peripheral containers and inside the camps, littering, disposal of unsuitable waste items and misuse of waste bins. Adults and children frequently setting waste on fire is also a concern. These behaviours negatively affect public health, the environment and the effectiveness of the work of SLs.

General strategic actions

- ICIP, in cooperation with camps institutions, will target households and commercial activities with long-lasting awareness campaigns;
- ICIP, in coordination with the education programme, will implement SWM education programmes for school-age children in UNRWA schools.

Specific actions

The achievement of positive behavioural change of camp populations will require the participation of all camp residents to awareness campaigns and education programmes, and the support of all possible stakeholders. For its programmes, UNRWA will focus on two targets: households and students.

Households will be included in awareness programmes through the organisation of workshops, conferences or special camp initiatives. Religious guides will also be an effective channel of communication for good SWM practices. Such awareness initiatives will be repeated with a certain frequency: workshops and conferences every one to three months; special camps initiatives (e.g. Sanitation Labourers' Day, Environmental Concern Day, cleaning campaigns) once a year; religious guides' communications once a week.

Events, good practices or service changes will be advertised through brochures and posters. These will be well targeted and convey specific messages on the system in place. To prevent further waste generation, paperless communication media such as radio, web sites and television will be preferred when possible.

Awareness programmes will include the participation of several stakeholders. UNRWA medical staff will hold conferences on public health impacts caused by improper SWM practices.

Women's centres will help with the communication with women. Youth centres or other camp institutions will promote special initiatives and help advertising the messages.

Awareness campaigns for households will aim at achieving the following results:

- Refugees keep the area in front of their shelters clean;
- Refugees are aware of the proper waste disposal modalities, types of waste allowed to be disposed of and disposal timings;
- Refugees are aware of the best practices for household hazardous medical waste manage ment;
- Refugees are aware of the SWM system and the communication channels with relevant UNRWA staff;
- Refugees are aware of sanitation workers' roles and stop harassing them;
- Refugees are aware of the possible public health and environmental impacts deriving from improper SWM.

In coordination with the governorates or other public authorities, UNRWA may invite external residents to participate in the awareness events. However, this will not entail any further expenditure for UNRWA.

School-age children in UNRWA schools will be included in long-lasting education programmes throughout their whole school curriculum. These programmes will be developed by the Education Programme and ICIP. They will be harmonised in all schools to prevent gender differences in the level of environmental education.

Teachers, external experts or Environmental Health Unit's staff will give students theoretical and practical lectures on SWM. Summer schools, exhibitions, cleaning campaigns and area rehabilitation will include the participation of the community in general. Where space is available, schools will be provided with organic waste composters to facilitate practical recycling activities.

Students, teachers and schools canteens' staff will be made aware of the school's SWM system, such as waste segregation initiatives, and will comply with the policies. Students will be made aware of the camps' SWM schemes and the public health and environmental issues related to improper SWM. Hence, teachers will attend SWM training, which could be held by external experts or ICIP.

Some governmental schools attended by refugees benefit from UNRWA SWM system. UNRWA Education Programme will coordinate with the Education Department of the government to deliver lectures on the SWM system, public health and environmental impact of improper SWM. These schools will also be invited to participate in camps' special initiatives.

4.7 Emergency Preparedness for Solid Waste Management

Description of the problem

The West Bank field is prone to different types of threats:

(1) unrest, shortages and/or deficiencies internal to UNRWA;
(2) local circumstances affecting SWM operations in one or more camps;
(3) external and unexpected events having an impact on parts or all of the West Bank.

In the first category of events, there are:

- UNRWA employee strikes
- Unfavourable exchange rate between NIS and USD: budget is calculated in USD while expenditures are in NIS
- Unexpected breakdown of SWM vehicles

The second category of events might comprise of:

- Political constraints, such as closure of streets and curfews
- Incursions of Israeli security forces in the camps
- Natural disasters such as flooding, severe snowfalls and earthquakes
- Breakdown of external SWM system (closure of waste disposal facilities, unavailability of local partners such as Jericho JSC or Nablus municipality)

The third category includes:

- Armed conflict

In case of a natural disaster, ICIP takes part in the emergency teams (one per area), which organise relief operations with other UNRWA departments, local authorities and civil defence forces. Other events such as street closures and UNRWA's internal issues are managed by ICIP, in coordination with other departments, without any emergency plan. While the political situation in the West Bank is particularly fragile, the camps do not have any emergency contingency plan in place.

The new National Strategy for Solid Waste Management in the Palestinian Territories was approved in late October 2017, but not yet available when this Strategy was developed. Unfortunately, no emergency preparedness plan is availible at the country level. Thus UNRWA is not in a position to develop sound security and contingency plans. However, the situation may change during the period of implementation of this Strategy.

General strategic actions

- ICIP will prepare emergency contingency plans for each camp;
- ICIP will define a specific budget for emergency situations.

Specific actions

If an emergency preparedness plan or other relevant security and contingency documents at the country level are available, UNRWA will work on the development of security and contingency plans, in compliance with the PA's directives.

In coordination with other UNRWA departments and the CSOs, ICIP will define an emergency contingency plan for each camp. Depending on the emergency level, coordination with local authorities and/or civil defence forces might also be required. Membership of the Area Emergency teams will be extended to SFs and a number of SLs per camp. Members will be prepared to different emergency levels that may arise in the camps. ASOs will be the heads of operations for their areas, while CSOs will be team leaders in their camps. UNRWA's personnel will be trained by the Safety and Security Department.

In compliance with the minimum standards for disaster response in the Sphere Project, the emergency team will define alternative areas or facilities inside or outside the camps to dispose solid waste, in case of complete road blockade or unavailability of usual facilities.

The emergency team will identify possible partners for SWM service in cases of UNRWA unrest, deficiencies or vehicle breakdowns. Based on the expenditures in the past for emergency situations, ICIP will define a budget to ensure minimum coverage for the possible emergencies listed above.

4.8 Institutional Inter-linkages

Description of the problem

Improvement of SWM operations will require systematic collaboration between different UNRWA departments. Such collaboration could also bring cost-saving opportunities.

General strategic actions

- ICIP will establish systematic collaboration with other UNRWA departments

Specific actions

ICIP will collaborate with the following units and departments:

Camp Improvement Programme and M&E Unit

- Provision of up-to-date thematic camp maps, GPS elaborations and any other type of cartography needed;

Health Programme

- Organisation of education and awareness raising campaigns for school age and adult refugees on sanitary impacts of negative SWM behaviours and management of household medical waste.
- Assessment of training needs for clinic staff on the management of medical waste
- Monitoring of sick leave
- Vaccinations for SWM operators

Education Programme

- Environmental education for school-age refugees
- Organisation of awareness activities including cleaning and rehabilitation campaigns outside the schools

Information Systems Office

- Development of a database on SWM service and expenditures

Training Unit (HR)

- Provision of training programmes for SWM operators

PLD

- Procurement of vehicles and other equipment
- Provision of data concerning running costs and maintenance costs of trucks
- Support the upgrade of sanitation labourers to truck drivers

Job Creation Programme

- Employment and assignment of duties for JCP workers
- Monitoring of JCP worker performance
- Provision of required protective equipment

Safety and Security Department

- Assistance with emergency contingency plans for the camps

To ensure the best results, more than one departments will collaborate for the same activity:

- Education programme, health programme and environmental health unit will collaborate for environmental education and awareness raising campaigns.

- Information system office, PLD, education programme, health programme, the training unit and the environmental health unit will collaborate for the development of a database and the systematic provision of data.

4.9 Cooperation with External Partners

Description of the problem

It is currently not possible to outsource municipal SWM service to public authorities due to the quality of their service and the requested service fees. In the past, UNRWA signed agreements with local JSCs for the emptying of peripheral containers. In some cases, the service was not optimal as it was not provided daily or effectively. In other instances, the requested fee was too high for UNRWA's budget. Therefore, the collaboration was terminated.

The West Bank has a very limited number of SWM facilities. Only three sanitary landfills are available, among which two present low environmental performances (Zahrat al Finjan and Al Mynia) and one has a very short lifetime (Jericho). A fourth sanitary landfill was expected to be constructed in Ramun but the project has been stopped due to objections of nearby communities. The number of transfer stations is also limited and their environmental performances are low and fees are generally high. Due to budgetary issues, UNRWA prefers to avoid transfer stations.

The involvement of popular committees and CBOs has been limited to awareness campaigns and marginal special waste management. The participation of external stakeholders has been restricted to some environmental education activities and special waste removal campaigns.

General strategic actions

- UNRWA will establish partnerships and collaborations with external stakeholders and camp institutions to improve SWM services and residents' involvement in programmes.

Specific strategic actions

ICIP will establish partnerships with the following stakeholders for the below listed activities:

Research centres/external environmental and education experts

- Waste composition and generation analyses
- Improvements of manual carts
- Development of environmental education and awareness campaigns
- Provision of trainings for UNRWA personnel

Local enterprises

- Maintenance of UNRWA equipment
- Waste recovery initiatives (introduction of enterprises to popular committees; limited provision of space)
- Cleaning campaigns

Public institutions (governorates, municipalities, JSCs, health centres, PA Ministry of Health)

- Discussion on proper SWM solutions for the neighbouring communities around camps
- Creation of emergency contingency plans for natural disasters and armed conflicts
- Use of waste transfer and disposal facilities
- Agreement for the provision of waste removal services (if advantageous from the economic, public health and environmental point of view)

- Agreements for the management (transportation, treatment and disposal) of hazardous and potentially hazardous medical waste

Popular committees and other camp institutions

- Special waste management (construction and demolition waste, pruning waste, bulky waste)
- Waste recovery and recycling activities
- Communication with refugees
- Participation in environmental education and awareness campaigns
- Participation in the census of non-authorised external users

steps for plan implementation

The development of the SWM Strategy was preceded by an assessment which highlighted several critical points in many aspects of UNRWA's SWM. The Strategy aims at addressing all issues within a six year period. UNRWA identified some actions that could be undertaken before the official implementation of the Strategy in September 2017. They are:

- Improvement of data collection system with the distribution of improved paper forms to SFs. The forms will include the daily quantity of waste removed, the UN codes of the compactors, number of trips to the disposal site in a day.
- Design the database framework for data collection and budget control. This will be developed by the Information System Office.
- Assess possibilities to improve the manual carts through internal resources.

UNRWA WBFO is currently implementing different SWM projects with the support of NGOs and consultancy firms. The Shu'fat project ("Improvement of Environment and Hygiene Conditions of the Community of Shu'fat refugee camp" – an EU funded project) began in April 2016 and aims to improve the SWM system of the camp. This programme is expected to end in March, 2019. The "Nur Shams Project" (a humanitarian project – funded by the Italian Cooperation) began at the end of July 2017 and includes the development of a SWM plan for the camp as well as a partial need assessment for Tulkarm camp. This is expected to be clustered with Nur Shams camp. The plan is expected to be partially implemented within the duration of the project in April, 2018. Although the drafting of the projects started before the beginning of the development of the Strategy (May 2017), UNRWA will ensure that the proposed actions will satisfy the requirements outlined in the Strategy.

In January 2017, UNRWA, in collaboration with another organisation, explored the possibility of designing a transfer station in Fawwar camp, to aggregate some of its peripheral containers. The construction of this transfer station is expected to take place before the first quarter of 2018.

At the conclusion of the Strategy drafting period, UNRWA will implement a fundraising campaign (November – December 2017). In this regard, UNRWA will identify different areas of intervention (education and awareness needs, infrastructur needs, improvement of working conditions of SLs, etc.) and map the interest of potential donors. The scope is to implement these activities as soon as possible to meet the current interests of donors while not being interdependent of others.

The implementation of the Shu'fat, Nur Shams and Fawwar projects will give opportunities for UNRWA to build an expertise on the drafting and development of SWM plans. This expertise will be improved through:

- Analysis of data and expenditures recorded in the database;
- Implementation of M&E plans.

With the acquired expertise, UNRWA will draft a priority list in July, 2018 for the plans and interventions in other camps. This list will help UNRWA to organise activities for the following years.

Between January and February 2018, moreover, UNRWA will draft a report on lessons learned from the implemented and ongoing projects and draft guidelines for the design of plans for other camps. The guidelines will be regularly revised during the review periods for lessons learned and Strategy.

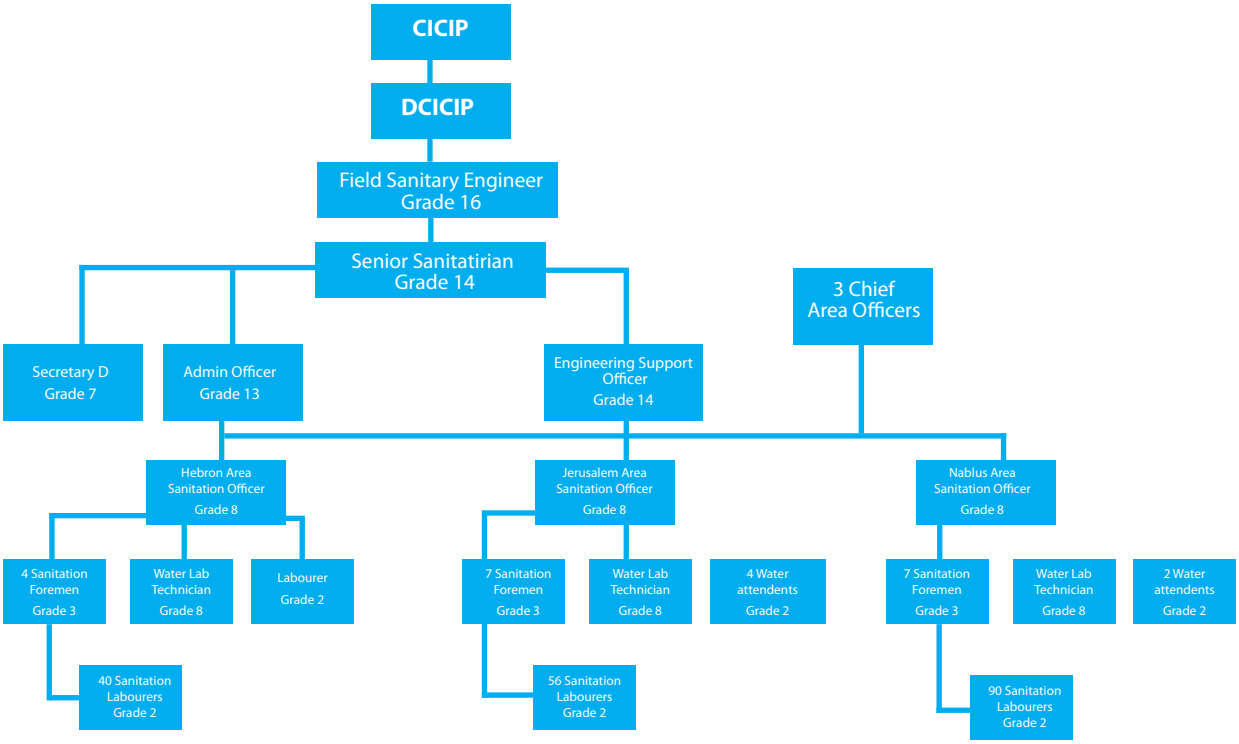
UNRWA will systematically carry out a baseline study, a needs assessment and a plan for a group of at least four camps, to be proceeded with a single procurement phase. SWM plans for each group will be carried out over a period of 6 months (averagely 1.5 months per camp). The implementation in the camps, instead, will last minimum 9 months, which corresponds to the time required for the procurement of vehicles and the assessment of the first results. Exceptions are made for the first group of camps (3, 4, 5 and 6) and for the last group of camps (15, 16, 17, 18 and 19). The implementation of the plans in the first group, in fact, is expected to last one full year (these camps should be the most critical ones in the priority list, thus the implementations of project is expected to be more problematic than in other less critical camps. The last group, instead, should include the less critical camps, with the possibility of developing the plans and the projects faster (5 camps with the same time of 4 camps).

The lessons learnt report and the review of the guidelines should be implemented at different stages during the Strategy implementation period: last quarter of 2019, first quarter of 2021 and last quarter of 2023. UNRWA will revise the Strategy during the first quarter of 2021, together with a lessons learned and a guidelines' revision session.

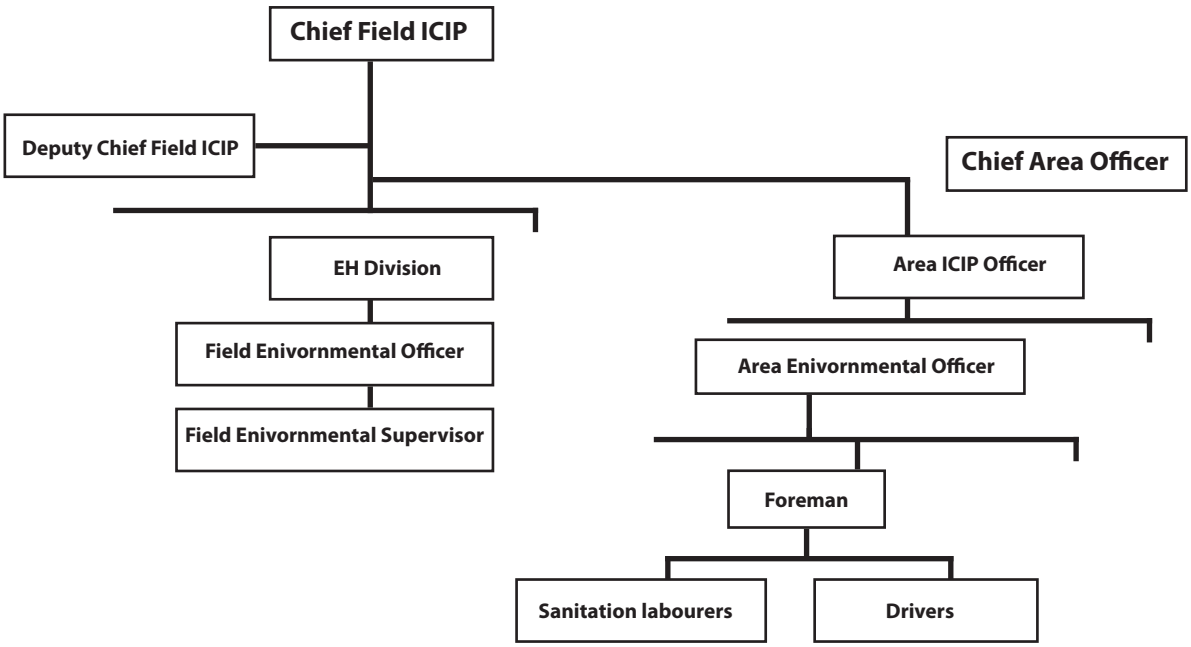
The recommended working schedule for the Strategy implementation steps is reported in Annex V – Strategy Implementation Steps, while the related budget is summarised in Annex VI – Budget.

Annex I – ICIP Structures

Organization chart of the current ICIP concerned with SWM



Proposed ICIP structure at UNRWA Jordan FO for SWM functions



Annex II – Tipping Fee Analysis

The current dumping fees and waste disposal cost are reported in Table II.1 and II.2, respectively.

Table II.1 Dumping fees for each landfill or transfer station (based on data from 2016)
Source: "Assessment of solid waste management in refugee camps in the West Bank" (Cesvi, 2017)

Disposal facility	NIS/t	USD/t
ZAF	34	9.4
Ramallah (TS)	120	33.3
Eizarya (TS)	40.5	11.3
Al Mynia	40.5	11.3
Eizarya (June 2017)	52.5	14.6
	NIS/y	**USD/year**
Jericho	90,000	25,000
Jammala	5,400	1,500

Table II.2 Tonnes of waste delivered and expenditures for the use of each facility (based on data from 2016)
Source: "Assessment of solid waste management in refugee camps in the West Bank" (Cesvi, 2017)

Disposal facility	Tonnes/y	NIS/y	USD/y
ZAF	11,553	392,804	109,112
Ramallah (TS)	3,374	404,868	112,463
Eizarya (TS)	4,213	170,627	47,396
Al Mynia	7,880	319,143	88,651
Jericho	6,504	90,000	25,000
Jammala	839	5,400	1,500
Total	34,692	1,382,841	384,123

Note: The overall waste quantity is lower than expected because waste from Balata, Askar and N1 was collected and disposed for free by Nablus municipality.

Table II.3 Tonnes of waste delivered to each facility by waste origin and expenditures for the use of each facility by origin

Source: "Assessment of solid waste management in refugee camps in the West Bank" (Cesvi, 2017)

ZAF	Waste origin	Tonnes/y	NIS/y	USD/y
	Nur Shams + Tulkarem	4259	144,806	40,224
	Jenin	2839	96,518	26,811
	Far'a	1620	55,090	15,303
	Ramallah sub-area	252	8,558	2,377
	Ramallah sub-area	39	1,318	366
	Ramallah sub-area	178	6,047	1,680
	Ramallah sub-area	297	10,110	2,808
	Ramallah sub-area	1,429	48,584	13,495
	Ramallah sub-area	640	21,773	6,048
Ramallah (TS)	Ramallah sub-area	671	80,519	22,366
	Ramallah sub-area	377	45,270	12,575
	Ramallah sub-area	321	38,549	10,708
	Ramallah sub-area	645	77,363	21,490
	Ramallah sub-area	543	65,145	18,096
	Shu'fat	403	48,382	13,440
	Ramallah sub-area	414	49,641	13,789
Eizarya (TS)	Ramallah sub-area	686	27,796	7,721
	Ramallah sub-area	432	17,487	4,858
	Ramallah sub-area	669	27,112	7,531
	Ramallah sub-area	75	3,023	840
	Ramallah sub-area	712	28,828	8,008
	Shu'fat	1,639	66,380	18,439
Al Mynia	Dheisheh	2,594	105,065	29,185
	Aida + Beit Jibrin	1,061	42,968	11,936
	Arroub	2,227	90,182	25,051
	Fawwar	1,998	80,927	22,480
Jericho	Ein Sultan + Aqabat Jaber	6,833	90,000	25,000
Jammala	Deir Ammar	839	5,400	1,500
Total		34,692	1,382,841	384,123

Note 1: Overall waste quantites are lower than expected because waste from Balata, Askar and Camp No.1 was collected and disposed of for free by the Nablus municipality.

Note 2: "Ramallah sub-area" refers to compactors collecting from different camps and delivering to different disposal facilities. The camp of origin of waste is not reported on the weighing receipts, thus it is not possible to link the camp with the facility.

In 2016, tipping fees were paid only for 34,692 tonnes of waste and they amounted to NIS 1,382,841. The average tipping cost – considering also the flat cost of disposal in Jericho and Jammala – was NIS 39.9 per ton. In 2016, tipping fees were paid only for a part of the waste collected (34,692 out of 46,611 tonnes), because Nablus municipality disposed the waste from Balata, Askar and N1 for free. However, a contribution was requested later. Table II.4 shows the expected future disposal costs considering the current situation stable in terms of tipping fees and applying exclusively the population growth. It may be considered a "best case scenario". Table II.5 presents other two future scenarios: the first considers to keep the average tipping fee stable over the years, but applied to all the waste generated by the camps ("medium case scenario"); the latter considers, in addition, a yearly increase of tipping fees ("worst case scenario").

Table II.4 Estimation of future costs keeping the current tipping fees stable, but applying population growth ("best case scenario")

	Hebron Area: Fawwar, Arroub, Dhiesheh, Aida, Beit Jibrin Al Minya landfill	**Jerusalem Area:** Kalandia, Ama'ri, Shu'fat, Jalazone, Deir Ammar, Aqabat Jaber, Ein Sultan - Eizaryia TS, ZAF, Ramallah TS, lumpsum for Ein Sultan and Aqabat Jaber and Deir Ammar	**Nablus Area:** Nurshams, Tulkarem, Jenin, Far'a, N1, Askar, Balata - ZAF, lumpsum for Balata, Askar and Camp No. 1	**Total disposal cost (USD/year)**
2018	**95,758**	**253,333**	**148,304**	**497,396**
2019	**98,497**	**259,350**	**150,158**	**508,005**
2020	**101,314**	**265,529**	**152,051**	**518,894**
2021	**104,212**	**271,875**	**153,984**	**530,071**
2022	**107,192**	**278,392**	**155,958**	**541,542**
2023	**110,258**	**285,085**	**157,973**	**553,316**
2024	**113,411**	**291,959**	**160,031**	**565,401**

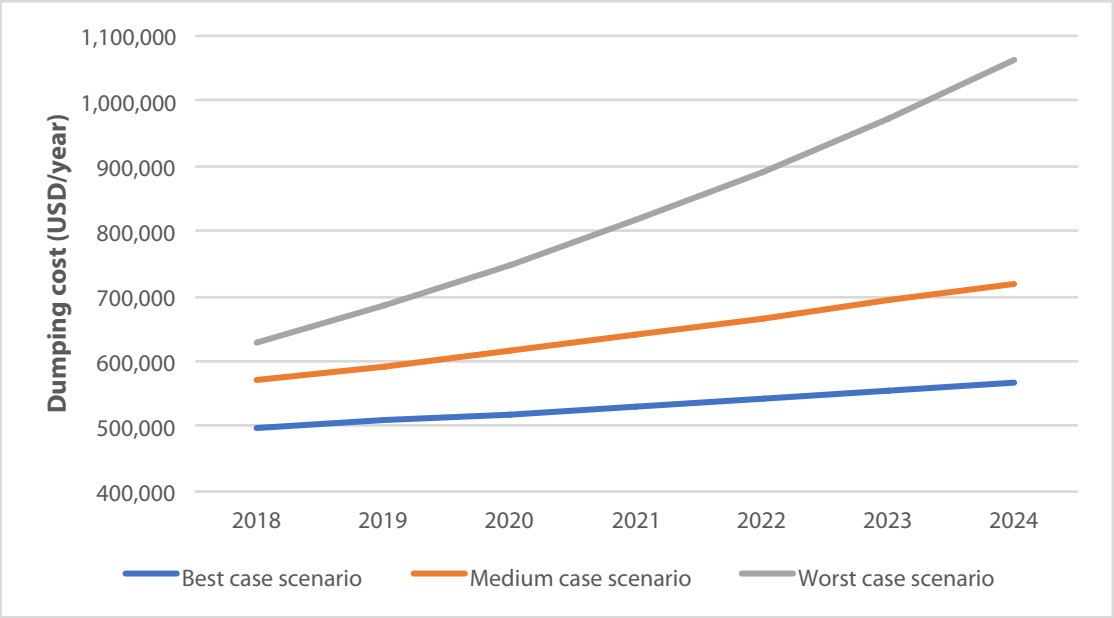
Table II.5 Future scenarios of waste dumping cost ("medium case scenario" and "worst case scenario")

		Waste generated	Fixed dumping fee scenario			Increasing dumping fee scenario		
			Average dumping fee	Overall dumping cost		Average dumping fee	Overall dumping cost	
Year	**Refugees**	**Tonnes/y**	**NIS/t**	**NIS/y**	**USD/y**	**NIS/t**	**NIS/y**	**USD/y**
2016*	**185,345**	**34,692**	**40**	**1,382,841**	**391,896**	**39.9**	**1,382,841**	**391,896**
2016	**242,257**	**46,611**	**40**	**1,857,938**	**526,538**	**39.9**	**1,857,938**	**526,538**
2017	**251,947**	**48,475**	**40**	**1,932,256**	**547,600**	**41.9**	**2,028,869**	**574,980**
2018	**262,025**	**50,414**	**40**	**2,009,546**	**569,504**	**43.9**	**2,215,525**	**627,878**
2019	**272,506**	**52,431**	**40**	**2,089,928**	**592,284**	**46.1**	**2,419,353**	**685,643**
2020	**283,406**	**54,528**	**40**	**2,173,525**	**615,976**	**48.5**	**2,641,934**	**748,722**
2021	**294,743**	**56,709**	**40**	**2,260,466**	**640,615**	**50.9**	**2,884,991**	**817,605**
2022	**306,532**	**58,978**	**40**	**2,350,885**	**666,239**	**53.4**	**3,150,411**	**892,824**
2023	**318,794**	**61,337**	**40**	**2,444,920**	**692,889**	**56.1**	**3,440,248**	**974,964**

***: with number of refugees and waste generated from all the camps excluding Balata, Askar and Camp No. 1**

Assumptions

- Average refugee population growth rate is 4.00% and stable over the years
- Waste generated per capita is stable over years, or at least compensated by recycling activities
- Exchange rate: USD 1 = NIS 3.52859 (Infoeuro November 2017)
- Yearly dumping fee growth rate is 5% and stable over the years



Graph II.1 Trends of waste dumping cost according to different scenarios

Currently, it is not possible to foresee an increase in dumping fees, but it is very probable during the implementation period of the Strategy. Such an increase, coupled with refugee population growth, would have a relevant impact on the overall dumping cost, even under the favourable condition of having no increase of quantity of waste generated and landfilled per person.

Annex III – Fleet Management

As introduced in Chapter 5, all camps will have their own SWM plan. Procurement of waste collection vehicles that would assist SLs in the collection operation will be included in almost all camps. The type of vehicles to be purchased should be selected by taking into consideration the waste generation rate, terrain and the distance to the waste transfer or disposal facility. Another factor to consider is the average costs for maintenance of the compactors' hydraulic systems. This maintenance cost can reach USD 10,000[6] per year per compactor and depends on the use of the vehicle. Based on this observation, it might be more economically advantageous to employ a non-compactor truck, although the time required for the operations may become longer. The viability of mini-compactors or non-compactors should be evaluated case-by-case, by comparing all the costs and benefits that the two types of vehicles might bring.

The possible prices for the suggested types of trucks are:

Non-compactor truck: USD 55,000 - 65,000
Mini-compactor truck: USD 80,000 - 120,000

The development of the Strategy will also include the possible construction of transfer stations in camps. Depending on how waste is stored at the transfer stations, the procurement of hook-lifts or new compactors might be necessary. The cost for the hook-lift (UN code 336) and 9.68 t payload compactors procured in 2015 was USD 170,000 each.

With the gradual introduction of new waste collection vehicles and the procurement of heavy duty waste transportation trucks, the existing fleet should be redistributed. The advantage of re-distributing the compactors, especially the 1511, 1512 and 1523, should be assessed considering annual maintenance costs, specialised drivers' requirements and adjustments needed to adapt the compactors' lifting system to the types of containers already available in the camps (e.g. Jericho camps).

6 PLD is negotiating a contract with an external partner to pay 500,000 NIS (140,000 USD) per year for the external maintenance of all compactors (hydraulic part).

Table 1 – Distribution of the fleet in the Field, technical specifications and expected period of service

Served Camp	Type Vehicle	UN Code	Manufacturer	Model	Max authorised transportable weight (t)	On road date	By Time
Fawwar + Arroub	Compactor	1565	Volvo	FLH	9,68	15/06/2015	15/06/2035
Dheisheh + Aida + Beit Jibrin	Compactor	1567	Volvo	FLE	9,68	15/06/2015	15/06/2035
Am'ari	Compactor	1511	Volvo	FL6	8,26	10/02/2004	10/02/2024
Shu'fat	Compactor	1512	Volvo	FL6	8,26	10/02/2004	10/02/2024
Kalandia	Compactor	1523	Volvo	FL6	8,26	27/01/2004	27/01/2024
Shu'fat	Compactor	1532	Volvo	FM9	9,06	16/10/2007	16/10/2027
Jalazone	Compactor	1564	Volvo	FLE	9,68	01/06/2015	01/06/2035
Shu'fat	Hooklift	336	Volvo	FM12	17,13	15/09/2014	15/09/2034
Deir 'Ammar	Tractor	2400	CASE	IH		10/07/2005	10/07/2015
Aqbat Jabr	Tractor	2401	CASE	IH		10/07/2005	10/07/2015
Kalandia	Tractor	2403	CASE	IH		10/07/2005	10/07/2015
Shu'fat	Tractor	2418	LANDINI	REX		30/06/2013	30/06/2023
Ein el-Sultan	Tractor	629	TIGERCAR	B400cc		18/06/2015	18/06/2025
Shu'fat	Tractor	630	TIGERCAR	B400cc		18/06/2015	18/06/2025
Shu'fat	Tractor	631	TIGERCAR	B400cc		13/04/2016	13/04/2026
Dheisheh	Tractor	2419	LANDINI	REX		24/02/2015	24/02/2025
Tulkarm+Nur Shams	Compactor	1566	VOLVO	FLH	9,68	15/06/2015	15/06/2035
Jenin+Far'a	Compactor	1568	VOLVO	FLH	9,68	15/06/2015	15/06/2035
Jenin/Am'ari	Tractor	2402	CASE	IH		10/07/2005	10/07/2015

Table 2 Average daily distance covered by the compactors, litres of fuel consumed, annual cost of fuel and actors and tractors (USD 1= NIS 3.6)

UN code	Cost fuel (USD)/y	Days of inactivity (year 2016)	Depreciation (USD/y)	Maintenance costs (USD/year 2016)		Tot expenditure per vehicle (USD/year 2016)	Time left before replacement (at August 2017)	Estimated total cost until replacement (USD)
				Ramallah	Jerusalem			
1565	1,227	2	6,897	4,562	5,146	28,882	15 years 10 months	457,304
1567	8,446	5	6,897	2,051	4,937	22,331	15 years 10 months	353,570
1511	4,181	18	4,461		15,886	24,528	4 years 6 months	110,377
1512	2,407	76	4,461		3,646	10,514	4 years 6 months	47,314
1523	3,774	43	4,412		2,755	10,941	4 years 5 months	48,325
1532	3,928	95	6,970	118	2,667	13,683	8 years 2 months	111,745
1564	8,222	109	6,897	602	6,700	22,422	15 years 10 months	355,012
336	8,763		7,197	1,392	6,700	24,052	15 years 3 months	366,796
2400	1,056		0		436	1,493		
2401	1,477		0		4,940	6,417		
2403	546		0		746	1,292		
2418	222		3,254		865	4,341	3 years 10 months	16,641
629	630		2,418		340	3,388	5 years 10 months	19,762
630	234		2,418		660	3,312	5 years 10 months	19,321
631			2,203			2,203	6 years 8 months	14,688
2419	231		261		1,021	3,866	5 years 6 months	21,264
1566	8,871	90	6,897	1,117	4,500	21,386	15 years 10 months	338,611
1568	8,923	90	6,897	1,316	4,500	21,636	15 years 10 months	342,569
2402	382		0		556	938		
	74,571		**74,895**	**11,158**	**67,000**	**227,626**		

Objectives	*Indicators*	*Unit*	*Interpretation*	*Sources*
1. Ensure access to solid waste services that meet minimum acceptable standards.	1.1 % of bins emptied regularly (per camp, monthly)	%	Effectiveness of waste collection from bins.	Reports from SLs
	1.2 % of the households receiving frequent (5 days per week) collection service (per camp, monthly)	%	Coverage of waste collection service.	Reports from SFs
	1.3 % of streets swept regularly (per camp, monthly)	%	Coverage of street sweeping.	Reports from SFs
	1.4 Number of refugees living in camps with a functional solid waste management system (per camp, yearly)	Number	Number of refugees living in camps with functional SWM service.	Structured interviews, observations and reviews of documents
2. Reduce waste generation and encourage reuse and recycling.	2.1 % of solid waste recycled (per camp, monthly)	%	Proportion of waste recycled.	Organizations handling recycling
	2.2 Tonnes of waste generated per person (per camp, yearly)	t	Average amount of waste generated per person.	Database
3. Increase cost efficiency.	3.1 % difference in expenditure of management of bulky, C&D and pruning waste compared to the previous semester (per camp, every 6 months)	%	Change in expenditure of management of special waste. This is used to monitor a transition of responsibility of special waste management from UNRWA to CSCs.	Database
	3.2 Cost of waste disposal per person (per camp, monthly)	USD	Cost of waste disposal at landfills and transfer facilities per person.	Receipts from drivers; Database
	3.3 Total USD spent on maintenance/ substitution of equipment (per camp, yearly)	USD	Cost of maintenance and substitution of equipment.	Database
	3.4 Total USD spent on waste collection in camps (per camp, yearly)	USD	Cost of waste collection in each camp.	Database
4. Implement an efficient and effective waste management system that is robust and sustainable under the prevailing political, technical and financial framework.	4.1 % of municipal-like solid waste dumped illegally (per camp, yearly)	%	Proportion of waste disposed that does not follow the disposal method set by UNRWA.	Receipts from drivers; Database
	4.2 % of pre-determined routes followed (per camp, monthly)	%	Assess whether drivers are following the pre-determined routes or not.	Reports from PLD

	4.3 % of solid waste collected (per camp, monthly)	%	Effectiveness of waste collection.	Receipts from drivers; Database
	4.4 % of solid waste burned (per camp, monthly)	%	Proportion of waste burned by residents or sanitation workers.	Reports from SFs
5. Provide socially acceptable and equitable SWM service.	5.1 Number of complaints received from refugees on SWM (per camp, monthly)	Number	Satisfaction level of camp residents on cleanliness of the streets. It is assumed that those unsatisfied will make complaints.	Reports from SFs
	5.2 % of complaints responded to by ICIP (per camp, monthly)	%	Response rate of ICIP to complaints from camp residents.	ASO, SF or CSO
	5.3 Number of waste burning points (per camp, monthly)	Number	Change in the number of burning points.	Reports from SFs
	5.4 % of refugees in camps that know about SWM service provided by UNRWA (per camp, per sex, per age group, yearly)	%	Measures awareness of refugees about SWM service provided by UNRWA such as disposal methods, collection time, etc.	Survey
	5.5 % of participants of awareness raising sessions whose knowledge on SWM is not less than 80% (per camp, per sex, per age group, per session)	%	Effectiveness of awareness raising sessions.	Test results
	5.6 Number of camp institutions that participate in planning meetings (per camp, per sex, per meeting)	Number	Number of camp institutions at planning meetings to see if a planning process of a camp specific plan is participatory or not.	Minutes of the meetings
6. Protect public and occupational health and the environment.	6.1 % of waste collection points with scores 10 and above (per camp, monthly)	%	This indicator assesses the conditions of bins.	Reports from SFs
	6.2 % of households that dispose of their solid waste in a safe way (per camp, monthly)	%	Proportion of households who dispose of their solid waste in a way that does not threaten their or other households' health (arising, for example, from the breeding of flies and rodents or from polluting	Reports from SFs

		%	water sources).	Reports from SFs
	6.3 Number of SLs that were not allowed to start their shifts due to lack of one or more protective gears (per camp, weekly)	Number	Usage of protective gears by SLs.	Database
	6.4 Number of injuries reported by SLs due to sharp materials in the waste (per camp, monthly)	Number	monitors injuries reported by SLs due to sharp materials in waste.	Reports from SFs
	6.5 Number of sick leaves taken by SLs due to waste related diseases (per camp, monthly)	Number	Health impact of SWM on SLs.	Database
	6.6 % of students involved in activities on SWM education (per camp, per type of activity, per sex, per grade, yearly)	%	Participation of students in SWM education activities.	Reports from school principals
	6.7 % of solid waste disposed of at sanitary landfills (per camp, yearly)	%	Proportion of waste transported to sanitary landfills.	Receipts from drivers; Database

Annex V – Strategy Implementation Steps

	Months 2017					Months 2018												Quarters 2019				Quarters 2020			
	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	1	2	3	4
Shu'fat (1) – EU Project (started Apr 2016)																									
Nur Shams (2) – Italian cooperation humanitarian project																									
Fund raising campaign																									
Nur Shams – baseline study, needs assessment, plan design																									
Drafting of priority list for plans and interventions in other camps																									
Lesson learnt report and guidelines for implementing SWM Plans																									
Camp 3 – baseline study, needs assessment, plan design																									
Camp 4 – baseline study, needs assessment, plan design																									
Camp 5 – baseline study, needs assessment, plan design																									
Camp 6 – baseline study, needs assessment, plan design																									
Nur Shams – Finalisation of plan implementation																									
Camp 3 – plan implementation																									
Camp 4 – plan implementation																									
Camp 5 – plan implementation																									
Camp 6 – plan implementation																									
Lesson learnt report, review and implementation guidelines																									
Camp 7 – baseline study, needs assessment, plan design																									
Camp 8 – baseline study, needs assessment, plan design																									
Camp 9 – baseline study, needs assessment, plan design																									
Camp 10 – baseline study, needs assessment, plan design																									
Camp 7 – plan implementation																									
Camp 8 – plan implementation																									
Camp 9 – plan implementation																									
Camp 10 – plan implementation																									

	Quarters 2021				Quarters 2022				Quarters 2023			
	1	2	3	4	1	2	3	4	1	2	3	4
Lesson learnt report, review and implementation guidelines, review of SMW Strategy												
Camp 11 – baseline study, needs assessment, plan design												
Camp 12 – baseline study, needs assessment, plan design												
Camp 13 – baseline study, needs assessment, plan design												
Camp 14 – baseline study, needs assessment, plan design												
Camp 11 – plan implementation												
Camp 12 – plan implementation												
Camp 13 – plan implementation												
Camp 14 – plan implementation												
Camp 15 – baseline study, needs assessment, plan design												
Camp 16 – baseline study, needs assessment, plan design												
Camp 17 – baseline study, needs assessment, plan design												
Camp 18 – baseline study, needs assessment, plan design												
Camp 19 – baseline study, needs assessment, plan design												
Camp 15 – plan implementation												
Camp 16 – plan implementation												
Camp 17 – plan implementation												
Camp 18 – plan implementation												
Camp 19 – plan implementation												
Lesson learnt report, review of SWM strategy and implementation guidelines												

ANNEX VI – Budget

The budget presented for the West Bank field SWM Strategy was calculated considering that the actions proposed in the Strategy will be carried out over a period of six years, as described in the implementation steps chapter.

The budget focuses on the following cost categories:

- Personnel
- Vehicles for waste collection and disposal
- Camps equipment
- Working conditions for waste management operators
- Waste storage and disposal costs
- Management of emergencies
- Waste analysis

For each category, capital costs, running costs and contingency costs are considered where appropriate. They are reported – per area – in the following tables.

Table VI.1 Capital costs required for the implementation of the Strategy

	Hebron area	Jerusalem area	Nablus area	TOTAL	Note
Working conditions					
After Work Areas	6,400	11,200	11,200	28,800	Improvement of the areas for SLs
Camp's equipment					
Bins	77,149	135,287	232,533	444,969	Bins for HHs, streets and UNRWA institutions
Waste storage facilities	245,000	230,000	350,000	825,000	Construction or rehabilitation of transfer stations and collection points
Waste collection vehicles and material	351,280	549,322	483,530	1,384,132	Procurement of motorized vehicles for collection and foreman, street cleaning material, upgrading of manual carts and manual carts storage area
Waste transportation vehicles		200,450	200,450	400,900	Procurement of new heavy duty vehicles (hook-lift trucks t or large compactors)
TOTAL	**679,829**	**1,126,259**	**1,277,713**	**3,083,801**	

Table VI.2 Running and contingency costs required for the implementation of the Strategy (based on current costs)

	Hebron area	Jerusalem area	Nablus area	TOTAL	Note
Personnel management					
Wages	537,780	775,092	1,144,380	2,457,252	SLs, SFs, ASOs, drivers
Training	16,800	26,250	35,350	78,400	Sls, SFs and drivers
Working conditions					
PPE	12,040	16,899	27,029	55,968	For SLs and SFs
After Work Area	640	1,120	1,120	2,880	Maintenance
Camp's equipment					
Bins	7,570	13,284	23,008	43,862	Maintenance after delivery
Waste storage facilities	7,900	8,800	11,200	27,900	Maintenance for facilities constructed or rehabilitated
Waste collection vehicles and material	33,730	44,014	57,503	135,247	Maintenance of new vehicles and carts
Waste transportation vehicles	34,046	126,870	49,290	210,206	Maintenance of new and existing vehicles
Waste disposal fees	113,411	291,959	160,031	565,401	Expected dumping fees in 2024 (see Annex II)
Sub-TOTAL 1 per year	**763,917**	**1,304,287**	**1,508,910**	**3,577,115**	
Other costs					
Emergency budget				240,000	Annual contingency for emergency
Awareness and education campaigns				190,000	A campaign per camp per year
Communication with refugees				42,000	Hotline to receive complaints and feedback from refugees
Waste generation and composition analysis				3,000	Cost per campaign is 15,000 USD, here only 1/5 is considered because a campaign every 5 years is expected
Sub-TOTAL 2 per year				**475,000**	
Total per year	**763,917**	**1,304,287**	**1,508,910**	**4,052,115**	

Cost savings

Several possible cost savings have not been included in the budget due to their dependency on the different SWM plans for each camp. Some cost savings may derive from the following factors:

- Waste prevention and recycling initiatives carried out by camp institutions or other external entrepreneurs;
- Control of non-authorised external users dumping waste into UNRWA's containers;
- Introduction of mechanised solid waste collection system and a decrease of staff as a result;
- Analysis of the expenditures registered in the database, once fully in use.

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