

Pioneer in integrated consulting services



in association with



September 2014



MINISTRY OF MUNICIPAL
AFFAIRS



CITIES & VILLAGES
DEVELOPMENT BANK
(CVDB)

Regional and Local Development Project (RLDP)

Development of a National Strategy to Improve the Municipal Solid Waste Management Sector in the Hashemite Kingdom of Jordan

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

PAGE INTENTIONALLY LEFT BLANK

Development of a National Strategy to Improve the Municipal Solid Waste Management Sector in the Hashemite Kingdom of Jordan



LDK Consultants Engineers and Planners SA

Mostaqbal Engineering & Environmental
Consultants co

Date:	02/09/2014
Version:	02
Description:	BASELINE STUDY ON THE EXISTING MSWM SYSTEM IN THE HASHEMITE KINGDOM OF JORDAN (1 st DRAFT REPORT)
Status:	Final Report

	Name, Company	Position	Signature	Date
Prepared by:	Mr. Christos Stathis, LDK Mr. George Tsivilis, LDK Mr. Demetrios Syriggas, LDK Mrs. Khulood Tubaishat, LDK Mr. Marwan Rizkallah, LDK Mrs. Eleni Avramidi, LDK Mr. Ammar Abu Drais, Mostaqbal	Sr. Consultant Pr. Consultant Pr. Consultant Sr. Consultant Pr. Consultant Sr. Consultant Sr. Consultant		02/09/2014
Checked by:	Mr. Constantinos Nicolopoulos, LDK Mr. Yanal Abeda, Mostaqbal	Project Director Project Manager		03/09/2014
Approved by:	Mr. Constantinos Nicolopoulos, LDK	Project Director		03/09/2014

Disclaimer

This report has been prepared for the use of the Ministry of Municipal Affairs (MoMA) and Cities and Villages Development Bank (CVDB) in the context of the project mentioned above. Copyright and all intellectual property right ownership is reserved by LDK Consultants and Mostaqbal and the document is issued on the condition that is not copied, reproduced or disclosed, either wholly or in part, to any third parties other than the Ministry of Municipal Affairs (MoMA) and Cities and Villages Development Bank (CVDB) or their officers and employees who are directly involved in the project, nor may it be referred or quoted to, or filed with, any other person or body without our written consent.



PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

1	INTRODUCTION	1-21
1.1	GENERAL	1-21
1.2	EXECUTIVE SUMMARY	1-22
1.2.1	SCOPE	1-22
1.2.2	METHODS & TOOLS	1-22
1.2.3	KEY-FINDINGS	1-23
1.2.3.1	Strengths	1-23
1.2.3.2	Weaknessess	1-25
1.2.3.3	Opportunities	1-28
1.2.3.4	Threats	1-31
1.2.4	CONCLUSIONS & RECOMMENDATIONS	1-34
1.2.4.1	Legal & Regulatory Framework	1-34
1.2.4.2	Institutional Set-Up	1-35
1.2.4.3	Technical & Operational Performance	1-36
1.2.4.4	Financial Issues	1-38
1.2.4.5	Public Awareness & Education	1-39
1.2.4.6	Socio-Economic Issues of Waste-Pickers.....	1-40
1.2.4.7	Public-Private Partnerships	1-40
2	METHODS & TOOLS	2-1
2.1	HORIZONTAL ANALYSIS.....	2-1
2.2	IN-DEPTH DIAGNOSIS	2-2
2.3	NON-RESPONSE PROCEDURE	2-3
2.4	SWOT ANALYSIS	2-4
3	MSWM LEGAL & REGULATORY FRAMEWORK.....	3-1
3.1	GENERAL	3-1
3.2	MSWM RELATED LEGAL & REGULATORY FRAMEWORK IN JORDAN	3-1
3.2.1	OVERVIEW	3-1
3.2.2	JORDAN'S MSWM RELATED STRATEGIES	3-3

3.2.2.1	National Agenda for Sustainable Development (2006 – 2015).....	3-3
3.2.2.2	National Environmental Strategy for Jordan, 1991	3-6
3.2.2.3	National Energy Strategy	3-7
3.2.2.4	National Privatization Strategy	3-8
3.2.3	JORDAN'S MSWM RELATED LAWS, REGULATIONS & INSTRUCTIONS ..	3-9
3.2.3.1	MoMA Legislative Framework	3-9
3.2.3.1.1	<i>Municipalities Law No. 13/2011</i>	3-9
3.2.3.1.2	<i>Joint Services Councils Regulation No. 75/2009</i>	3-9
3.2.3.1.3	<i>Supplies, Purchases & Civil Works for Municipalities Regulation No. 70/2009.....</i>	3-10
3.2.3.1.4	<i>Regulation for the Prevention of Health Nuisances No. 8/2014</i>	3-10
3.2.3.2	MoENV Legislative Framework	3-11
3.2.3.2.1	<i>Environmental Protection Law No. 52/2006.....</i>	3-11
3.2.3.2.2	<i>Management of Solid Waste Regulation No. 27/2005.....</i>	3-12
3.2.3.2.3	<i>Instructions for Management of Solid Waste (2006)</i>	3-13
3.2.3.2.4	<i>Management, Transportation & Handling of Harmful & Hazardous Substances Regulation No. 24/2005.....</i>	3-13
3.2.3.2.5	<i>Instruction for Hazardous Waste Management & Handling (2003)</i>	3-13
3.2.3.3	Other MSWM Related Legislation	3-14
3.2.3.3.1	<i>Public Health Law No. 47/2008.....</i>	3-14
3.2.3.3.2	<i>Law of Agriculture No. 44/2002.....</i>	3-14
3.2.3.3.3	<i>Water Authority of Jordan (WAJ) Law No. 18/1988 and its Amendments ..</i>	3-14
3.2.3.3.4	<i>Cultural Heritage & Antiquities Law No. 21/1988 and its Amendment Law No.23/2004.....</i>	3-15
3.2.3.3.5	<i>Regulation of Development Zones No. 2/2008</i>	3-15
3.2.3.3.6	<i>Renewable Energy & Energy Efficiency Law</i>	3-15
3.2.3.3.7	<i>Regulation for Protecting the Environment from Pollution Emergency Situations No. 26/2005.....</i>	3-16
3.2.3.3.8	<i>Regulation for Licensing / Environmental Impact Assessment No. 37/2005.....</i>	3-17
3.2.3.3.9	<i>Regulation for Soil Protection No. 25/2005.....</i>	3-18
3.2.3.3.10	<i>Regulation for Natural Reserves & National Parks No. 29/2005</i>	3-18
3.2.3.3.11	<i>Regulation for Air Protection No. 28/2005.....</i>	3-19
3.2.3.3.12	<i>Regulation for Groundwater Monitoring No. 85/2002</i>	3-19
3.2.3.3.13	<i>Regulation for Regulating the Investment of Non-Jordanians</i>	3-19
3.2.3.3.14	<i>Privatization Law No. 25/2000</i>	3-20
3.2.3.3.15	<i>Regulation No.80/2008 for Implementing Privatization Transactions ..</i>	3-20

3.2.3.3.16	Regulation of Nuisance Prevention and Solid Waste Collection Fees of GAM No. 83/2009.....	3-21
3.2.3.4	MSWM Related Forthcoming Legislation	3-21
3.2.3.4.1	General.....	3-21
3.2.3.4.2	New Amended Environmental Protection Law.....	3-22
3.2.3.4.3	Law for the General Framework for Waste Management.....	3-23
3.2.3.4.4	Draft PPP Law.....	3-23
3.3	INTERNATIONAL REGULATORY FRAMEWORK FOR WASTE MANAGEMENT	3-24
3.3.1	GENERAL.....	3-24
3.3.2	EU SWM RELATED POLICY & LEGISLATION.....	3-24
3.3.2.1	EU Environmental Policy.....	3-24
3.3.2.2	EU Thematic Strategy on the Prevention & Recycling of Waste	3-26
3.3.2.3	The EU Waste Framework Directive (Directive 2008/98/EC)	3-26
3.3.2.4	Other EU Waste Legislation	3-29
3.3.3	US EPA SWM RELATED POLICY & REGULATIONS	3-31
3.4	GAPS, CONCLUSIONS & RECOMMENDATIONS.....	3-34

4 EXISTING MSWM INSTITUTIONAL SET-UP IN JORDAN ... 4-1

4.1	ADMINISTRATIVE DIVISION OF JORDAN.....	4-1
4.2	MSWM RELATED INSTITUTIONAL STRUCTURE	4-5
4.3	ROLES & RESPONSIBILITIES.....	4-6
4.3.1	LOCAL & REGIONAL LEVEL.....	4-6
4.3.1.1	Municipalities & JSCs.....	4-6
4.3.1.2	Greater Amman Municipality (GAM)	4-12
4.3.1.3	Aqaba Special Economic Zone Authority (ASEZA).....	4-12
4.3.1.4	Petra Development and Tourism Regional Authority (PDTRA)	4-12
4.3.1.5	United Nations High Commissioner for Refugees (UNHCR)	4-12
4.3.1.6	United Nations Relief and Works Agency (UNRWA)	4-13
4.3.1.7	Other Development Zones' Authorities	4-14
4.3.2	NATIONAL LEVEL	4-16
4.3.2.1	Ministry of Municipal Affairs.....	4-16
4.3.2.2	Ministry of Environment.....	4-18
4.3.2.3	Ministry of Health.....	4-19
4.3.2.4	Ministry of Agriculture	4-19
4.3.2.5	Ministry of Energy & Mineral Resources	4-19

4.3.2.6	Ministry of Planning and International Cooperation	4-19
4.3.2.7	Ministry of Public Works & Housing	4-20
4.3.2.8	Ministry of Water & Irrigation	4-20
4.3.2.9	Water Authority of Jordan.....	4-20
4.4	CONFLICTS OF RESPONSIBILITIES, GAPS & DEFICIENCIES	4-20
4.5	SWOT ANALYSIS	4-21

5 TECHNICAL & OPERATIONAL PERFORMANCE OF EXISTING MSWM SYSTEM..... 5-1

5.1	DEMOGRAPHIC CHARACTERISTICS	5-1
5.1.1	RESIDENTIAL POPULATION.....	5-2
5.1.1.1	Permanent Native Population.....	5-2
5.1.1.1.1	<i>Present Population</i>	5-2
5.1.1.1.2	<i>Future Trends of Permanent Native Population</i>	5-9
5.1.1.2	Refugees	5-14
5.1.1.2.1	<i>Palestinian Refugees</i>	5-14
5.1.1.2.2	<i>Non-Palestinian Refugees</i>	5-15
5.1.1.3	Total Residential Population.....	5-22
5.1.2	SEASONAL POPULATION.....	5-27
5.2	IDENTIFICATION OF MSW	5-30
5.2.1	MSW DEFINITION	5-30
5.2.2	MSW SOURCES	5-30
5.3	MSW GENERATION.....	5-31
5.3.1	MSW GENERATION RATES	5-31
5.3.2	MSW QUANTITIES	5-33
5.4	MSW COMPOSITION	5-37
5.5	EXISTING MSWM ACTIVITIES	5-42
5.5.1	PREVENTION & REUSE	5-42
5.5.2	STREET CLEANING / COLLECTION.....	5-42
5.5.3	TRANSPORTATION	5-45
5.5.3.1	Local Transportation.....	5-45
5.5.3.2	Trans-Boundary Transportation	5-47
5.5.4	TRANSFER	5-47
5.5.5	RECYCLING & MATERIALS RECOVERY	5-50
5.5.5.1	Formal Recycling Facilities.....	5-50
5.5.5.2	Informal Recycling Facilities.....	5-51

5.5.5.3	Composting / Anaerobic Digestion	5-51
5.5.6	ENERGY RECOVERY	5-52
5.5.7	FINAL DISPOSAL	5-52
5.6	PLANNED & PROPOSED MSWM UNITS/ACTIVITIES.....	5-62
5.7	SWOT ANALYSIS	5-64
5.8	CONCLUSIONS & RECOMMENDATIONS	5-66

6 FINANCIAL ANALYSIS OF EXISTING MSWM SYSTEM.....6-1

6.1	OBJECTIVES AND METHOD.....	6-1
6.2	OVERVIEW OF EXISTING MSWM SYSTEMS, ON FINANCIAL ASPECTS	6-2
6.3	MUNICIPALITIES.....	6-8
6.3.1	MUNICIPALITIES CAPITAL EXPENDITURES (CAPEX)	6-8
6.3.2	MUNICIPALITIES' OPERATIONAL EXPENDITURES (OPEX).....	6-13
6.3.3	MUNICIPALITIES' REVENUES	6-24
6.3.4	MUNICIPALITIES' FINANCIAL BALANCE & COST RECOVERY LEVEL	6-31
6.3.5	EFFICIENCY & PRODUCTIVITY OF MSWM SYSTEM	6-38
6.4	JSCS	6-50
6.4.1	JSCs' CAPITAL EXPENDITURES (CAPEX)	6-50
6.4.2	JSCs' OPERATIONAL EXPENDITURES (OPEX)	6-52
6.4.3	JSCs' REVENUES	6-57
6.4.4	JSCs' FINANCIAL BALANCE & COST RECOVERY LEVEL	6-60
6.4.5	EFFICIENCY & PRODUCTIVITY OF JSCs' SYSTEM.....	6-69
6.5	RECOMMENDED EFFICIENCIES.....	6-71
6.6	SWOT ANALYSIS FOR MSWM FINANCIAL ISSUES.....	6-76

7 EXISTING PUBLIC AWARENESS & EDUCATION PROGRAMS ON MSWM.....7-1

7.1	INTRODUCTION.....	7-1
7.2	LIST OF EXISTING AWARENESS & EDUCATION PROGRAMS ON MSWM - ACTIVITIES CONDUCTED BY MUNICIPALITIES	7-2
7.2.1	PROJECTS / CAMPAIGNS CARRIED OUT BY GAM.....	7-3
7.2.1.1	Electronic Waste Project "Beware Of It" (GAM, 2011)	7-3
7.2.1.2	Determination Campaign for the Times of Waste Disposal from Homes and Shops (GAM, 2010).....	7-4
7.2.1.3	Project of Defining the Times for Waste Disposal of its Sources – Phase I (GAM, 2010)	7-4
7.2.1.4	Project of Litter Separation & Sorting of Household Waste at Source - phase II (GAM, 2010)	7-5

7.2.1.5	Project of Training Volunteers for the Project of Litter Separation & Sorting of Waste at source (Dahiet Al-Hussein – Phase II) (GAM)	7-6
7.2.1.6	Designation of Environmental Awareness Program for Fourth Area (GAM)	7-6
7.2.2	PROJECTS / CAMPAIGNS CARRIED OUT BY OTHER ENTITIES	7-7
7.2.2.1	Awareness Campaign to Introduce the Concept of Source-Separation of Waste (Greater Madaba Municipality, 2010).....	7-7
7.2.2.2	Preparing a Questionnaire to Assess People's Reaction to Waste Separation (Greater Madaba Municipality, 2011)	7-7
7.2.2.3	Conducting Lectures for School Students about the Environment & SWM (Greater Madaba Municipality, 2012)	7-8
7.2.2.4	Awareness Campaign to Introduce Environmental Awareness & Health Impacts from Environmental Pollution (Greater Madaba Municipality, 2013).. ..	7-8
7.2.2.5	Public Places & Street Cleaning Campaign (Greater Salt Municipality, 2013)	7-8
7.2.2.6	Environmental, Health & Public Safety Protection Campaign in Jordan Valley (New Deir Allah Municipality, 2009)	7-9
7.2.2.7	Executing Public Hygiene Campaigns Repeatedly in Corporation with Relevant Authority (New Deir Allah Municipality, 2013)	7-9
7.2.2.8	Preparing a Brochure about the Collection of Domestic Waste (New Deir Allah Municipality, 2013)	7-10
7.2.2.9	Public Hygiene Campaign with Schools for the Collection of Waste (Swaymeh Municipality, 2011)	7-10
7.2.2.10	Campaign for Collecting Tree Prunings to Convert it into Animal Feed (Swaymeh Municipality, 2013)	7-11
7.3	LIST OF EXISTING AWARENESS & EDUCATION PROGRAMS ON MSWM - ACTIVITIES CONDUCTED BY NGOS	7-11
7.3.1	CLEAN-UP THE WORLD CAMPAIGN (RSCN, JREDS, JES)	7-12
7.3.2	TRAINING COURSE ON RECYCLING FOR SCOUT BOYS IN DEBBEN – AJLOUN (JES, 2013)	7-12
7.3.3	KEEP IT, DON'T THROW IT TO GARBAGE CAMPAIGN - AMMAN SCHOOLS (JES, 2013).....	7-13
7.3.4	BOTTOM OF THE SEA CLEANUP CAMPAIGN (JES, 2014)	7-13
7.3.5	DON'T WASTE IT, REUSE IT CAMPAIGN (JES, 2014).....	7-13
7.3.6	AMMAN IS CLEAN BY ITS PEOPLE (AHL AL-BALAD, 2013-2014).....	7-14
7.4	THE IMPACT OF THE PROGRAMS/CAMPAIGNS	7-14
7.4.1	GENERAL.....	7-14
7.4.2	TARGET GROUPS	7-15
7.4.3	GEOGRAPHICAL COVERAGE	7-15
7.4.4	SOCIAL & ECONOMIC CONTEXT	7-16
7.4.5	DESIGN & ACTIVITIES	7-16
7.4.6	DURATION	7-16
7.4.7	PARTNERS	7-16
7.4.8	EFFICIENCY	7-17

7.5	ASSESSMENT OF PRODUCED AWARENESS MATERIALS	7-17
7.5.1	PRESS RELEASES	7-18
7.5.2	LEAFLETS.....	7-18
7.5.3	RADIO SIGNALS.....	7-18
7.5.4	OTHER PROMOTING MATERIAL.....	7-18
7.5.5	WORKSHOPS	7-18
7.5.6	CONCLUSION.....	7-19
7.6	SWOT ANALYSIS	7-19
7.7	CONCLUSIONS & RECOMMENDATIONS	7-21
7.7.1	CONCLUSIONS	7-21
7.7.2	RECOMMENDATIONS	7-21
8	SOCIO-ECONOMIC SURVEY OF WASTE-PICKING ACTIVITIES.....	8-1
8.1	INTRODUCTION.....	8-1
8.2	WASTE-PICKERS.....	8-4
8.2.1	WASTE-PICKERS IN THE CITY LEVEL	8-4
8.2.2	FORMAL WASTE-PICKERS IN THE DUMPSITE LEVEL	8-8
8.2.3	INFORMAL WASTE-PICKERS IN THE DUMPSITE LEVEL	8-11
8.3	MIDDLEMEN IN THE CITY LEVEL.....	8-13
8.4	MIDDLEMEN "CONTRACTORS" IN THE DUMPSITE LEVEL	8-16
8.5	FINAL DESTINATIONS (INDUSTRY)	8-19
8.6	SWOT ANALYSIS.....	8-22
8.7	RECOMMENDATIONS	8-29
9	EXISTING PUBLIC-PRIVATE PARTNERSHIPS IN MSWM .	9-1
9.1	INTRODUCTION.....	9-1
9.2	EXISTING MAJOR MSWM PPP CONTRACTS IN JORDAN.....	9-1
9.3	AUTHORITIES' CAPACITY FOR CONTRACTING AND MONITORING PPP CONTRACTS.....	9-3
9.4	SWOT ANALYSIS.....	9-4
9.5	CONCLUSIONS & RECOMMENDATIONS	9-6
10	LIST OF REFERENCES.....	10-1
	ANNEXES.....	A1-1
	ANNEX 1: QUESTIONNAIRES FOR HORIZONTAL ANALYSIS	A1-1

PART I: QUESTIONNAIRES FOR HORIZONTAL ANALYSIS WITH FOCUS ON THE MUNICIPALITIES	A1-1
PART II: QUESTIONNAIRES FOR HORIZONTAL ANALYSIS WITH FOCUS ON THE JSCS	A1-1
ANNEX 2: QUESTIONNAIRES FOR IN-DEPTH DIAGNOSIS	A2-1
PART I: QUESTIONNAIRES FOR IN-DEPTH DIAGNOSIS WITH FOCUS ON THE MUNICIPALITIES	A2-1
PART II: QUESTIONNAIRES FOR IN-DEPTH DIAGNOSIS WITH FOCUS ON THE JSCS	A2-1
ANNEX 3: REPLIES OF MUNICIPALITIES & JSCS TO THE HORIZONTAL ANALYSIS & IN-DEPTH DIAGNOSIS QUESTIONNAIRES	A3-1
PART I: REPLIES OF MUNICIPALITIES TO THE HORIZONTAL ANALYSIS QUESTIONNAIRES	A3-1
PART II: REPLIES OF MUNICIPALITIES TO THE IN-DEPTH DIAGNOSIS QUESTIONNAIRES	A3-1
PART III: REPLIES OF JSCs TO THE HORIZONTAL ANALYSIS QUESTIONNAIRES	A3-1
PART IV: REPLIES OF JSCs TO THE IN-DEPTH DIAGNOSIS QUESTIONNAIRES	A3-1
ANNEX 4: QUESTIONNAIRES USED FOR THE SOCIO-ECONOMIC SURVEY	A4-1
PART I: QUESTIONNAIRES FOR INDIVIDUAL WASTE-PICKERS	A4-1
PART II: QUESTIONNAIRES FOR MIDDLEMEN/CONTRACTORS	A4-1
PART III: QUESTIONNAIRES FOR THE INDUSTRY	A4-1
ANNEX 5: REPLIES TO QUESTIONNAIRES OF THE SOCIO-ECONOMIC SURVEY	A5-1
PART I: REPLIES OF INDIVIDUAL WASTE-PICKERS AT THE CITY LEVEL	A5-1
PART II: REPLIES OF INDIVIDUAL WASTE-PICKERS (FORMAL) AT THE DUMPSITE LEVEL	A5-1
PART III: REPLIES OF INDIVIDUAL WASTE-PICKERS (INFORMAL) AT THE DUMPSITE LEVEL	A5-1
PART IV: REPLIES OF MIDDLEMEN AT THE CITY LEVEL	A5-1
PART V: REPLIES OF CONTRACTORS AT THE DUMPSITE LEVEL	A5-1
PART VI: REPLIES OF THE INDUSTRY	A5-1
ANNEX 6: EXPECTED TOTAL, URBAN & RURAL PERMANENT POPULATION OF JORDAN, BY DISTRICT	A6-1
ANNEX 7: EXPECTED NON-PALESTINIAN REFUGEES OF JORDAN, BY DISTRICT (TOTAL, URBAN & RURAL)	A7-1
ANNEX 8: EXPECTED OVERALL RESIDENTIAL POPULATION OF JORDAN, BY DISTRICT (TOTAL, URBAN & RURAL)	A8-1
ANNEX 9: EXPECTED TOURIST POPULATION OF JORDAN, BY GOVERNORATE	A9-1
ANNEX 10: MAPS & DRAWINGS	A10-1

LIST OF TABLES

Table 3-1: Proposed SWM initiatives of the National Agenda 2006-2015	3-5
Table 3-2: Major gaps in the current SWM legislation in Jordan.....	3-35
Table 4-1: Administrative division of Jordan up to the Municipality level	4-2
Table 4-2: Jordanian Municipalities not having formed JSCs but sending their MSW to JSCs' facilities	4-7
Table 4-3: Catchment areas of JSCs and other MSWM related Local Authorities.....	4-8
Table 4-4: Basic attributes of Municipalities', JSCs' and the MoMA's operation in terms of MSWM	4-11
Table 4-5: Level of capacity of Municipalities' and JSCs' personnel in terms of MSWM according to Horizontal Analysis and In-Depth Diagnosis surveys (2014)	4-11
Table 4-6: Basic characteristics of Development Zones in Jordan	4-15
Table 5-1: Permanent population of Jordan according to the 1952, 1961, 1979, 1994 and 2004 censuses (source: DOS, 2012) and estimation for the year 2014	5-2
Table 5-2: Estimated permanent population of Jordan during the years 1994, 2004, 2012 and 2014 ⁽¹⁾ , by District ..	5-4
Table 5-3: Distribution of urban and rural population in Jordan, by Governorate and Region	5-8
Table 5-4: Values of estimated growth rate (%) of permanent population of Jordan, years 2015 - 2040	5-10
Table 5-5: Expected total, urban and rural permanent population of Jordan, by District	5-12
Table 5-6: Populations of registered Palestinian refugees residing in the 10 UNRWA refugee camps (http://www.unrwa.org)	5-14
Table 5-7: Non-Palestinian refugee population of Jordan (2014)	5-16
Table 5-8: Expected total, urban and rural non-Palestinian refugees' population of Jordan, by District	5-20
Table 5-9: Present total residential population of Jordan by District, 2014	5-22
Table 5-10: Expected total, urban and rural residential population of Jordan of Jordan, by District	5-25
Table 5-11: Overnights at classified hotels by location and country groups, 2011 (source: MoTA, 2011).....	5-27
Table 5-12: Expected overnights of tourists in Jordan, by Governorate	5-29
Table 5-13: Evolution of per capita MSW generation rate in Jordan, 2012-2039	5-32
Table 5-14: Current and future MSW generation in Jordan due to residents by District, 2014-2039 (values in tn/yr)	5-34
Table 5-15: Current and future MSW generation in Jordan due to tourists by Governorate, 2014-2039 (values in tn/yr)	5-36
Table 5-16: MSW composition in Jordan according to different studies/surveys in the last 15 years.....	5-38
Table 5-17: MSW composition according to replies of the horizontal analysis and in-depth diagnosis surveys. 5-40	
Table 5-18: Average values of MSW composition as provided by the horizontal analysis and in-depth diagnosis surveys	5-41
Table 5-19: Proposed MSW composition by Governorate, according to Governorates' urbanization index.....	5-41
Table 5-20: Temporary MSW storage equipment allocated in and operated by the Municipalities	5-43
Table 5-21: Sorting at source programs implemented in Jordan during the last years	5-44
Table 5-22: Machinery allocated in and operated by Municipalities for MSW transportation.....	5-45
Table 5-23: Transfer Stations in Jordan, 2014.....	5-48
Table 5-24: Final Disposal Sites in Jordan, 2014	5-54

Table 5-25: Problems facing the active FDS in Jordan to maintain operation	5-57
Table 5-26: Indicative list of projected projects in SWM in the NRP context	5-64
Table 6-1: OPEX breakdown of the Irbid, Mafraq, Salt and Ma'an JSCs per category, 2013 (values in JOD) ...	6-54
Table 6-2: ` JSCs' financial balance incl. CAPEX+OPEX, 2011-2013.....	6-67
Table 6-3: JSCs' cost recovery incl. CAPEX+OPEX, 2011-2013	6-67
Table 7-1: MSWM related awareness programs/campaigns in Jordan, 2009-2014	7-3
Table 7-2: MSWM related awareness programs/campaigns by NGOs in Jordan.....	7-11
Table 8-1: The Waste-pickers targeted in the survey	8-4
Table 8-2: The average collected amount of recyclable materials and its local prices	8-7
Table 8-3: Average collected amount of recyclable Materials and its selling local prices by informal waste-pickers in the dumpsite level.....	8-12
Table 8-4: Average amount of collected materials.....	8-14
Table 8-5: Purchasing prices of scrap materials.....	8-15
Table 8-6: Price of selling materials.....	8-16
Table 8-7: Types and locations of the surveyed industries	8-19
Table 8-8: Prices of purchase scrap materials	8-20
Table 8-9: Number of middlemen deal with target recycling companies.....	8-21
Table 9-1: Summary of adopted PPP initiatives in in the SWM sector in Jordan.....	9-2

LIST OF FIGURES

Figure 2-1: A SWOT analysis, with its four elements in a 2x2 matrix	2-4
Figure 3-1: Summary of the legal framework governing SWM in Jordan.....	3-2
Figure 3-2: Jordan's National Agenda dimensions (source: MoPIC, 2006)	3-4
Figure 3-3: Hierarchy of SWM practices (source: EC, 2010).....	3-27
Figure 3-4: Life-cycle thinking into waste policies (source: EC, 2010).....	3-28
Figure 4-1: Administrative division of Jordan in Governorates (source: www.kinghussein.gov.jo)	4-1
Figure 4-2: UNRWA camps in Jordan	4-14
Figure 4-3: Organizational chart of MoMA.....	4-17
Figure 4-4: SWOT Analysis for the existing institutional set-up in MSWM sector in Jordan	4-22
Figure 5-1: Permanent population of Jordan, years 1952-2014	5-2
Figure 5-2: Population of Jordan in 2014, by Governorate	5-8
Figure 5-3: Growth rate (%) of permanent population of Jordan, years 1979-2014.....	5-9
Figure 5-4: Estimated growth rate (%) of permanent population of Jordan, years 2015 - 2040.....	5-10
Figure 5-5: Estimated evolution of permanent population of Jordan, 2015-2040.....	5-11
Figure 5-6: Syrian refugee presence, April 2014 (source: UNHCR, 2014)	5-16
Figure 5-7: Distribution of overnights in Jordan during 2011	5-28
Figure 5-8: Expected MSW generation in Jordan by residential population	5-33
Figure 5-9: MSW generation in 2014, by Governorate	5-37
Figure 6-1: Cost-effectiveness of MSWM system.....	6-4

Figure 6-2: CAPEX evolution 2011 – 2013 (incl. Irbid and GAM)	6-9
Figure 6-3: CAPEX evolution 2011 – 2013 (not incl. Irbid and GAM)	6-9
Figure 6-4: CAPEX per inhabitant	6-10
Figure 6-5: CAPEX per tn, ...	6-11
Figure 6-6: OPEX evolution 2011-2013 – Northern Region.....	6-14
Figure 6-7: OPEX evolution 2011-2013 – Central Region	6-14
Figure 6-8: OPEX evolution 2011-2013 – Southern Region	6-15
Figure 6-9: OPEX per inhabitant 2011-2013 – Northern Region	6-16
Figure 6-10: OPEX per inhabitant 2011-2013 – Central Region.....	6-16
Figure 6-11: OPEX per inhabitant 2011-2013 – Southern Region.....	6-17
Figure 6-12: OPEX per tonne 2011-2013 – Northern Region	6-18
Figure 6-13: OPEX per tonne 2011-2013 – Central Region	6-18
Figure 6-14: OPEX per tonne 2011-2013 – Southern Region	6-19
Figure 6-15: OPEX distribution 2013 – Northern Region.....	6-20
Figure 6-16: OPEX distribution 2013 – Central Region	6-20
Figure 6-17: OPEX distribution 2013 – Southern Region	6-21
Figure 6-18: Collection cost 2013 – Northern Region.....	6-22
Figure 6-19: Collection cost 2013 – Central Region	6-22
Figure 6-20: Collection cost 2013 – Southern Region	6-23
Figure 6-21: REVENUE evolution 2011-2013 – Northern Region	6-25
Figure 6-22: REVENUE evolution 2011-2013 – Central Region (incl. GAM).....	6-26
Figure 6-23: REVENUE evolution 2011-2013 – Central Region (not incl. GAM).....	6-26
Figure 6-24: REVENUE evolution 2011-2013 – Southern Region.....	6-27
Figure 6-25: REVENUE per inhabitant 2011-2013 – Northern Region	6-28
Figure 6-26: REVENUE per inhabitant 2011-2013 – Central Region	6-28
Figure 6-27: REVENUE per inhabitant 2011-2013 – Southern Region	6-29
Figure 6-28: REVENUE per tonne 2011-2013 – Northern Region.....	6-30
Figure 6-29: REVENUE per tonne 2011-2013 – Central Region	6-30
Figure 6-30: REVENUE per tonne 2011-2013 – Southern Region	6-31
Figure 6-31: FINANCIAL BALANCE MSWM 2011-2013 – Northern Region.....	6-32
Figure 6-32: FINANCIAL BALANCE MSWM 2011-2013 – Central Region (incl. GAM)	6-32
Figure 6-33: FINANCIAL BALANCE MSWM 2011-2013 – Central Region (not incl. GAM)	6-33
Figure 6-34: FINANCIAL BALANCE MSWM 2011-2013 – Southern Region	6-33
Figure 6-35: COST RECOVERY 2011-2013 – Northern Region	6-34
Figure 6-36: COST RECOVERY 2011-2013 – Central Region	6-35
Figure 6-37: COST RECOVERY 2011-2013 – Southern Region	6-35
Figure 6-38: Number of MSWM employees per Municipality – Northern Region	6-39
Figure 6-39: Number of MSWM employees per Municipality – Central Region.....	6-39
Figure 6-40: Number of MSWM employees per Municipality – Southern Region.....	6-40
Figure 6-41: Efficiency – productivity of MSWM System: tn/d per employee, 2013.....	6-41
Figure 6-42: Efficiency – productivity of MSWM System: inhabitants served per employee, 2013 – Northern Region	6-42
Figure 6-43: Efficiency – productivity of MSWM System: inhabitants served per employee, 2013 – Central Region	6-43

Figure 6-44: Efficiency – productivity of MSWM System: inhabitants served per employee, 2013 – Southern Region	6-43
Figure 6-45: Efficiency – productivity of MSWM System: inhabitants served per vehicle, 2013 – Northern Region ..	6-44
Figure 6-46: Efficiency – productivity of MSWM System: inhabitants served per vehicle, 2013 – Central Region	6-44
Figure 6-47: Efficiency – productivity of MSWM System: inhabitants served per vehicle, 2013 – Southern Region	6-45
Figure 6-48: Efficiency – productivity of MSWM System: tn/d per vehicle, 2013 – Northern Region	6-46
Figure 6-49: Efficiency – productivity of MSWM System: tn/d per vehicle, 2013 – Central Region	6-46
Figure 6-50: Efficiency – productivity of MSWM System: tn/d per vehicle, 2013 – Southern Region	6-47
Figure 6-51: Efficiency – productivity of MSWM System: containers served per vehicle, 2013	6-48
Figure 6-52: JSCs' CAPEX evolution, 2011-2013	6-51
Figure 6-53: CAPEX per tonne	6-52
Figure 6-54: JSCs' OPEX evolution, 2011-2013	6-53
Figure 6-55: OPEX per tn, 2013	6-54
Figure 6-56: Cost analysis in Irbid (Al-Ekaider) JSC, 2013	6-55
Figure 6-57: Cost analysis in Mafraq JSC, 2013	6-55
Figure 6-58: Cost analysis in Balqa (Al Salt) JSC, 2013	6-56
Figure 6-59: Cost analysis in Ma'an JSC, 2013	6-56
Figure 6-60: REVENUE evolution, 2011-2013	6-57
Figure 6-61: REVENUE per tonne	6-58
Figure 6-62: REVENUE structure in Irbid (Al Ekaider) JSC, 2013	6-59
Figure 6-63: REVENUE structure in Mafraq JSC, 2013	6-59
Figure 6-64: JSCs' financial balance, 2011-2013	6-61
Figure 6-65: JSCs' cost recovery, 2011-2013	6-62
Figure 6-66: JSCs financial balance 2011-2013 – Northern Region	6-63
Figure 6-67: JSCs cost recovery 2011-2013 – Northern Region	6-64
Figure 6-68: JSCs financial balance 2011-2013 – Central Region	6-64
Figure 6-69: JSCs cost recovery 2011-2013 – Central Region	6-65
Figure 6-70: JSCs financial balance 2011-2013 – Southern Region	6-65
Figure 6-71: JSCs cost recovery 2011-2013 – Southern Region	6-66
Figure 6-72: JSCs' cost recovery incl. CAPEX+OPEX, 2011-2013	6-68
Figure 6-73: Efficiency – productivity of JSCs' system, tn/d per employee	6-70
Figure 6-74: SWOT Analysis for MSWM financial issues in the MSWM sector in Jordan	6-76
Figure 7-1: SWOT Analysis for the already performed public awareness and education activities in the MSWM sector in Jordan	7-20
Figure 8-1: Structure of the waste-picking system and cycle in Jordan	8-2
Figure 8-2: Education level of Waste-pickers in the city level	8-5
Figure 8-3: Points of collection targeted by waste-pickers in the city level	8-7
Figure 8-4: Ages of the formal waste-pickers in the dumpsite level	8-9
Figure 8-5: Educational level of waste-pickers	8-9
Figure 8-6: Waste-picking activities at the Al Huseyneyat dumpsite	8-17
Figure 8-7: Waste-picking activities at Zarqa Transfer Station	8-18



Figure 8-8: Overview of the manufacturing process of paper, the storage area and shredding machines	8-21
Figure 8-9: SWOT for informal waste-pickers in the City level.....	8-23
Figure 8-10: SWOT for formal waste-pickers in the Dumpsite level	8-24
Figure 8-11: SWOT for Informal waste-pickers in the Dumpsite level	8-25
Figure 8-12: SWOT for Middlemen in the city level	8-26
Figure 8-13: SWOT for Contractors in the Dumpsite level.....	8-27
Figure 8-14: SWOT for Final destinations (industry).....	8-28
Figure 9-1: SWOT Analysis for the application of PPP approach in the MSWM sector in Jordan	9-5

ABBREVIATIONS

Three R's	Reduce – Reuse – Recycle (approach)
AFD	Agence Française de Développement
ASEZ	Aqaba Special Economic Zone
ASEZA	Aqaba Special Economic Zone Authority
ASG	Assistant Secretary General
BOO	Build - Own - Operate
BOOT	Build - Own - Operate - Transfer
BOT	Build - Operate - Transfer
BTO	Build - Transfer - Operate
CAPEX	Capital Expenditures
C&D	Construction & Demolition Waste
CFR	Code of Federal Regulations
CVDB	Cities & Villages Development Bank
CSC	Common Services Council
CSR	Corporate Social Responsibility
DBO	Design - Build - Operate
DBOT	Design - Build - Operate - Transfer
DD	Due Diligence
DZ	Development Zones
DLS	Department of Land and Survey
DOS	Department of Statistics
EAP	Environment Action Programme
EC	European Commission
EIA	Environmental Impact Assessment
EIB	European Investment Bank



EJC	Emirati Jordanian Camp
ELV	End-of-Life Vehicles
EOI	Expression of Interest
EPC	Executive Privatization Commission
EU	European Union
FDS	Final Disposal Site
GAM	Greater Amman Municipality
GDP	Gross Domestic Product
GO	Governmental Organization
GoJ	Government of Jordan
H&S	Health & Safety
IBRD	International Bank for Reconstruction and Development
IDA	Irbid Development Area
ISWM	Integrated Solid Waste Management
IUCN	International Union for Conservation of Nature
JBC	Jordan Biogas Company
JES	Jordan Environment Society
JOD	Jordanian Dinars
Jordan	Hashemite Kingdom of Jordan
JREDS	Royal Marine Conservation Society of Jordan
JSC	Joint Services Council
JUST	Jordan University of Science & Technology
JV	Joint Venture
KHBTDA	King Hussein Bin Talal Development Area
LCA	Life-Cycle Analysis
LDK	LDK Consultants Engineers & Planners S.A.
LFG	Landfill Gas
MDA	Ma'an Development Area

MIS	Management Information System
MoAGR	Ministry of Agriculture
MoEDU	Ministry of Education
MoENV	Ministry of Environment
MoEMR	Ministry of Energy & Mineral Resources
MoF	Ministry of Finance
MoH	Ministry of Health
Mol	Ministry of Interior
MoMA	Ministry of Municipal Affairs
MoPIC	Ministry of Planning & International Cooperation
MoPSD	Ministry of Public Sector Development
MoPWH	Ministry of Public Works & Housing
MOSTAQBAL	Mostaqbal Engineering & Environmental Consultants
MoTA	Ministry of Tourism & Antiquities
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
MWI	Ministry of Water & Irrigation
NES	National Environmental Strategy
NGO	Non-Governmental Organization
NRP	National Resilience Plan
OPEX	Operational Expenditures
PAP	Petra Archaeological Park
PDTR	Petra Development and Tourism Region
PDTRA	Petra Development and Tourism Regional Authority
PPP	Public-Private Partnership
QCBS	Quality & Cost Based Selection
RCRA	Resource Conservation and Recovery Act



RFP	Request for Proposals
QRACEST	Queen Rania Al-Abdullah Center for Environmental Science & Technology
RLDP	Regional & Local Development Project
RSCN	Royal Society for Conservation of Nature
SDZ	Special Development Zones
SD	Secretary General
SW	Solid Waste
SWEEP-NET	Regional Solid Waste Exchange of information & ExPertise NETwork in Mashreq & Maghreb countries
SWM	Solid Waste Management
SWMP	Solid Waste Management Plan
SWOT	Strengths, Weaknesses, Opportunities and Threats
Syria	Syrian Arab Republic
TC	Technical Committee
ToR	Terms of Reference
TS	Transfer Station
UN	United Nations
UNDP	United Nations Development Program
UNHCR	United Nations High Commissioner for Refugees
UNRWA	United Nations Relief and Works Agency
US	United States
USAID/Jordan	US Agency for International Development in Jordan
USEPA	US Environmental Protection Agency
WAJ	Water Authority of Jordan
WB	World Bank
WEEE	Waste from Electrical & Electronic Equipment
WFD	Waste Framework Directive
WtE	Waste-to-Energy

1 INTRODUCTION

1.1 GENERAL

The Government of Jordan (GoJ) has received assistance by the World Bank (WB) and the Agence Française de Développement (AFD) in supporting the Regional & Local Development Project (RLDP).

The RLDP is being implemented by the Ministry of Municipal Affairs (MoMA) of the Hashemite Kingdom of Jordan (Jordan) with the assistance of the Cities & Villages Development Bank (CVDB) and aims to assist GoJ in promoting regionally balanced local development, principally through Municipalities and other ancillary support institutions by:

- a) improving the equity and adequacy of central-local resource transfers;
- b) restructuring the CVDB to improve its efficiency and diversify its products and services;
- c) strengthening municipal financial management, revenue generation and service delivery capacity;
- d) improving regional planning and inter-municipal coordination to take advantage of economies of scale and strategic development opportunities.

The RLDP is envisaged as a first stage of a long-term process of decentralization in Jordan.

In this context, the MoMA/CVDB has received a loan from the International Bank for Reconstruction and Development (IBRD) to fund consulting services for ***“the Development of a National Strategy to improve the Municipal Solid Waste Management Sector in the Hashemite Kingdom of Jordan”***, hereafter called ***“the Project”***.

The Project refers to the formulation of the National Strategy for Municipal Solid Waste Management (MSWM) in Jordan for the following years. Its main objective is to identify the most cost effective, efficient, affordable, and quality-service environmentally and socially sound MSWM framework in Jordan through improvements to institutional, operational, financial, socio-economic, and legal aspects.

Under this framework, the MoMA/CVDB has selected through a Quality & Cost Based Selection (QCBS) procedure the ***Joint Venture (JV) of “LDK Consultants Engineers & Planners S.A.” (LDK, Greece) and “Mostaqbal Engineering & Environmental Consultants” (MOSTAQBAL, Jordan)***, hereafter called ***“the Consultant”***, to carry out the Project.

The present document is the ***“Baseline Study on the existing MSWM system in the Hashemite Kingdom of Jordan” (1st Draft Report of the Project)***, which according to the Project’s Terms of

Reference (ToR) and the Consultant's technical proposal approved by the MoMA/CVDB is the outcome of Task 1 of the Project implementation procedure, i.e. the "Diagnosis of the existing MSWM system in Jordan".

1.2 EXECUTIVE SUMMARY

1.2.1 SCOPE

The scope of the report on hand is to review, assess and evaluate the existing conditions of the MSWM sector in Jordan in legal, institutional, operational, financial and socio-economic terms, as well as to assess the experience and capacity of the public and private sectors in the implementation of public awareness and education programs and to estimate their capacity and potential in establishing Public-Private Partnerships (PPP).

In this way, the baseline conditions of the MSWM sector in Jordan will be diagnosed, which will act as the basis upon which the National MSWM Strategy will be developed in the following stages of the Project.

1.2.2 METHODS & TOOLS

The methods and tools that have been used by the Consultant to cater for the above scope are the following:

- Collection of horizontal information on the existing conditions of the MSWM sector in the Kingdom ("Horizontal Analysis" survey). To acquire this information, several secondary sources (books, studies, reports, presentations, scientific articles, newsletters and magazines, public and private libraries, the internet, etc.) were reviewed, assessed, evaluated and finally used, whereas collected information has been supplemented through the use of two (2) dedicated questionnaires transmitted to all Municipalities and Joint Services Councils (JSCs, *also called Common Services Councils-CSCs*) of the Kingdom.
- Collection of detailed information related to the current MSWM activities of ten (10) selected Municipalities and five (5) selected JSCs of Jordan ("In-Depth Diagnosis survey") through the use of two (2) dedicated questionnaires and direct interviews of their representatives responsible for MSWM.
- Follow-up of a Non-Response Procedure, as approved by the Client through the Inception Phase of the Project, for ensuring maximum replying rates by the Municipalities and JSCs in the Horizontal Analysis and the In-Depth Diagnosis surveys.

- Performing of a SWOT Analysis, for the identification of strengths, weaknesses, opportunities and threats of the existing MSWM system in Jordan, in order to submit recommendations for improvement that would be valuable for the following phases of the Project.

Especially for the analysis of the socio-economic profile of waste-picking activities (formal and informal) in Jordan, a socio-economic survey was conducted, through the use of three (3) dedicated questionnaires and direct interviews with individual waste-pickers (informal and formal), middlemen, formal recycling (waste-picking) contractors and the recycling industry.

1.2.3 KEY-FINDINGS

The key-findings of the baseline analysis of the MSWM sector in Jordan are presented in the following summarized SWOT analysis.

1.2.3.1 STRENGTHS

Institutional Set-Up

- The factual willingness of GoJ to shift from an old, inefficient, costly and environmentally unstable MSWM system that is based on the management of mixed waste and dumping/landfilling, towards a modern and integrated one that will be based on the “Three R’s” approach (Reduce, Reuse, Recycle).
- The responsibilities of different entities dealing with MSWM are adequately described in the relevant policy and regulatory framework.
- There is no conflict of responsibilities apparent between the different authorities dealing with MSWM.
- There are rational interactions described in the relevant legislation between the different MSWM competent authorities (e.g. MoMA having operational role, MoENV having monitoring role).
- The JSC network is widely and rationally developed and could be maintained to cater for the future MSWM needs.

Technical & Operational Performance

- MSW transfer has already been implemented in Jordan.
- There is one big Municipality (GAM) having made significant progress in MSWM by maturing, building and operating a sanitary landfill, sophisticated MSW treatment facilities, and also by promoting recycling in pilot scale (sorting-at-source activities, JES, etc.), which could act as a pilot for all other local authorities.

- The scientific level of public officers and technicians is quite high; also, they are actually willing to proceed to the necessary changes.

Financial Conditions

- There are positive financial effects from the experience gained from existing MSWM practices for various waste streams and by-products, either alone or in cooperation with the private sector, such as collection of recyclables at dumpsites, LFG utilisation at the Al Ghabawi landfill, biowaste anaerobic digestion in Jordan Biogas Plant, etc.

Public Awareness & Education Experience & Capacity

- There seems to be a big interest from decision makers of the public and private stakeholders in implementing effective public awareness programs on integrated MSWM.
- The target audience of public awareness campaigns, which is mainly the general public, can be motivated to participate if there are well designed awareness programs on MSWM.
- There is high availability of potential partners from the private sector and NGOs to carry out public awareness and education campaigns.

Socio-Economic Conditions of Waste-Picking Activities

- Informal waste-pickers working individually in the city:
 - have a good knowledge of the waste collection points and the kind of generated materials in each segment of the city;
 - have a high potential for classifying recyclable materials according to their marketing prices; and
 - earn a daily income, which although unstable, is enough to cater for their basic needs.
- Formal waste-pickers working in dumpsites:
 - have better working conditions due to the formal character of their job; and
 - earn a stable daily income, as the remuneration for sorting and picking the recyclables, paid by the Contractors.
- Middlemen operating in the city:
 - grant professional license from the relevant Municipalities to do final sorting of the waste at their stations; and
 - are considered as a good profitable, viable and lucrative business.
- Contractors operating in dumpsites:
 - have a high potential for classifying recyclable materials according to their marketing prices; and
 - work formally, thus providing better working conditions to associate waste-pickers.
- All types of waste-picking individuals and middlemen:
 - increase significantly the diversion rates of recyclables from disposal/landfilling; and

- decrease the existing MSWM costs (collection, transport, transfer, and disposal).
- The relative Industries:
 - are being involved in this business for a long time;
 - have the flexibility to get materials directly from individual waste-pickers and middlemen/Contractors;
 - are professionally licensed by the relevant Municipalities;
 - have quality control systems at their establishments; and
 - use the recyclable materials as raw materials in the manufacturing process.

Capacity & Potential for PPP

- There is high potential to provide better MSWM services through PPP than currently experienced.
- The environmental awareness of Jordanian citizens seems to increase continuously.
- The basic legislative framework is available or being prepared.
- The private sector has a better technical adequacy to design, build and operate sophisticated MSWM facilities.
- The private sector is able to provide the necessary financial resources for the upgrade of the MSWM system to integrated level.

1.2.3.2 WEAKNESSES

Institutional Set-Up

- There is no comprehensive single regulation currently in force for MSWM in Jordan.
- There are no specifically determined responsibilities for sophisticated MSWM activities, such as recycling, recovery, etc.
- Municipalities and JSCs have low operational efficiency in terms of their MSWM provided services.
- MoENV, Municipalities and JSCs lack in some cases qualified human resources to fulfill their targets.
- The private sector faces very low entrance rate into the MSWM business.
- Municipalities and JSCs lack autonomy with regards to administrative, financial and operational capacity.
- Often splitting and merging of small Municipalities in Jordan often creates administrative gaps with effect – inter alia – to MSWM.

Technical & Operational Performance

- Special and hazardous waste (WEEE, ELV components, batteries and accumulators, used tyres, C&D waste, hazardous medical and industrial waste) usually end up to the MSW storage network (bins, containers), thus deteriorating the MSW quality and risk
- Lack of a Management Information System (MIS) in national level for recording and analysis of relevant MSWM data, making regular monitoring, planning and problem solving in the sector difficult.
- Complete absence of regular sorting-at-source programs all over the Kingdom.
- Extensive informal waste-picking in the city and the dumpsite level, posing significant effects to the public hygiene of citizens.
- MSW prevention and reuse practices and initiatives are almost absent.
- Low efficiency level of mechanical equipment for street cleaning and collection.
- Very low levels of coverage of actual MSW collection needs in some cases (even 20%).
- Limited remaining life-span of some final disposal sites (e.g. the Aqaba dumpsite).
- Low sanitation level of all final disposal sites, with the exception of the Al Ghabawi landfill.
- Low levels of MSW recycling and energy recovery facilities.
- Absence of composting facilities.
- Poor maintenance of infrastructure and equipment in almost all of the cases.

Financial Conditions

- The key economic indicators (CAPEX, OPEX, REVENUE, and COST RECOVERY) and the efficiency - effectiveness of the existing MSWM system, are at alarmingly adverse levels, for the vast majority of MSWM operators.
- The current MSWM fee collection system (through the Electricity Company, deducting directly 10% as administrative charges plus the cost of street-lighting) doesn't allow for direct collection of fees and flexible funding of MSWM activities.
- There is lack of modern, specialized and comprehensive legislative frameworks (e.g. for tariff and payments collection, for sorting-at-source systems of recyclables and biowaste, for typology/standardization of MSWM systems' planning and design, for data recording, etc.).
- The operators, enterprises and population apply irrational habits and practices regarding the payment for the MSWM services, which is a result of an inefficient billing and collection system.

Public Awareness & Education Experience & Capacity

- There is lack of capacity in public awareness among Municipality staff.
- There is no designated department or section for public awareness and public participation among Municipalities with only one exception of GAM.
- There is lack of financial resources to implement public awareness and public participation programs in Municipalities and JSCs.

- There is lack of a national umbrella, such as national strategy for public awareness and public participation, as it is proven that implementing a national awareness program where all Municipalities are participating and collaborating would lead to more effective results and greater success.

Socio-Economic Conditions of Waste-Picking Activities

Informal waste-pickers in the City level

- Not able to command a decent price for the recyclables collected. This is because the prices of recyclables are dictated by the buyers or the middlemen.
- Lack of legislative framework identifying the role that should be taken by the informal waste management sector in order to minimize landfilling.
- Absence of key roles that civil societies or NGOs can tackle to convergence the views between this informal sector and the relevant governmental agencies.
- Large scale hazards due to lack of education and awareness regarding to the health and safety issues at the workplace and in doing the waste-picking activities.

Formal waste-pickers in the Dumpsite level

- Not using proper and appropriate personal protective equipment.
- Lack of hygienic conditions at the workplaces (landfills / transfer stations), as there are no sanitation facilities for the workers.
- No privacy of working females in the dumpsite level for satisfying their special needs.

Informal waste-pickers in the Dumpsite level

- Not able to command a decent price for the recyclables collected. This is because the prices of recyclables are dictated by the buyers or the middlemen.
- Not using proper and appropriate personal protective equipment.
- Lack of hygienic conditions at the landfills and transfer station as there are no sanitation facilities for the workers.
- Mostly, having no access to electricity, sanitation or education.

Middlemen in the city level

- Not using proper and appropriate personal protective equipment.
- The inability to develop the work procedure due to the lack of educational background as the advanced technology used worldwide for doing better secondary processing of the recyclable materials are still vague and meaningless for most of them.
- Lack of communications with relevant governmental agencies, which might be of significance important to improve their environmental conditions.

Contractors in the Dumpsite level

- Working with their staff at very bad health and environment conditions.
- Not using any simple technology for carrying out the secondary sorting of the recyclable materials.
- Unable to handle the operational activities in bad weather conditions, due to the lack of infrastructure at the workplace.
- Cannot work at night or evening.

Final Destinations (Industry)

- The quality of recyclable materials transferred from the landfill or transfer station is usually very low.
- There is great variance between the local and international prices of raw materials.
- Lack of legislative or policy framework for identifying the role of each involved parties in the recycling business as well as the role of the concerned governmental agencies on that.

Capacity & Potential for PPP

- Low fees currently paid by Jordanian citizens to the local authorities for MSWM.
- Lack of financial resources of local authorities to cover increased MSWM costs due to PPP.
- Low experience of the Jordanian authorities in implementing PPP projects in the MSWM sector and in general.

1.2.3.3 OPPORTUNITIES

Institutional Set-Up

- High potential to increase MSWM efficiency through institutional capacity building.
- Increasing autonomy of Municipalities and JSCs may increase performance in MSWM.
- Performance monitoring of Municipalities and JSCs may increase efficiency of provided MSWM services.
- Strengthening cooperation of MoMA and MoENV in the MSWM sector through the planned new law (Framework Law or Environmental Protection Law).
- Harmonization of the relationship between the private and public sectors in MSWM through the draft new PPP Law.
- Use of GAM and ASEZA as examples for institutional set-up and monitoring/control of MSWM activities (GAM for Municipalities/JSCs and ASEZA for DZs).

Technical & Operational Performance

- High biowaste content of Jordanian MSW increase the feasibility of WtE projects in terms of LFG or anaerobic digestion practices.
- Individual waste-pickers can be integrated in future recycling plants, thus improving their living standards and financial condition.
- GAM can be a pilot for all the other local authorities in the country in terms of development, operation and performance maximisation of MSWM facilities.
- Separate collection and management of hazardous and special waste currently entering the waste bins can have many environmental and social advantages.
- Great potential for the establishment of MSW recycling and energy recovery facilities, possibly with the cooperation of the private sector.
- High willingness of Donors to support Jordan to the refugee problem could be turned into an advantage, by supporting the establishment of MSWM facilities, at least in the Northern Region.

Financial Conditions

- Funding assistance programs of international organizations destined for Jordan can and should be exploited as a powerful tool for financing a part of the required SWM interventions.
- The involvement of private sector in MSWM operations, under a sound and sustainable scheme, could contribute in defuse the burden of recurrent costs and debt service costs. Partnerships between Municipalities and private entities (PPP) would generate new revenue for the municipal budget.
- The integration of the informal sector in MSWM operations (e.g. recyclables recovery, etc.), under a sustainable institutionalized framework, can prove as a prosperous source of income for both the waste-pickers' families and the municipal budget.

Public Awareness & Education Experience & Capacity

- Availability of experienced NGOs in the field, which can be utilized to implement public awareness programs in cooperation with the local or national authorities.
- High potential to have volunteers especially amongst youth to participate in campaigns (e.g. Ahl Al-Balad).
- MSWM is a priority at all levels of society and an efficient public awareness and education policy on MSWM can be easily acknowledged by all stakeholders, especially by general public and the private sector.
- Companies' increasing interest in Corporate Social Responsibility gives great potential in implementing MSWM related campaigns with participation of the private sector.
- Many international initiatives can support public awareness and education in MSWM.

Socio-Economic Conditions of Waste-Picking Activities

Informal waste-pickers in the City level

- There is greater awareness of the importance of waste management in the community today than ever before. This will give this target group a better chance to work with a community group or NGOs for collecting their recyclable waste stream.
- The fact that waste management is primarily the responsibility of local government also represents an opportunity, because local government “Municipalities” is supposed to be accountable to the community. Moreover, it is also supposed to implement policies to minimize waste. Waste-pickers can argue that they play an important role in minimizing waste, which big waste management companies are not interested in doing.
- Establishment of waste-pickers’ cooperative, which can play crucial role on supporting the waste-pickers, regulating and organizing them. Issuing licenses for each member to act his job formally.
- Mobilizing community support for groups of waste-pickers in case of establishment such cooperative.
- If waste-pickers are well-organized (“Cooperative of waste-pickers”), they should be able to negotiate better prices from the middlemen or intermediaries who buy their recyclables.

Formal waste-pickers in the Dumpsite level

- The fact that waste management is primarily the responsibility of local government also represents an opportunity, because local government “Municipalities” is supposed to be accountable to the community. Moreover, it is also supposed to implement policies to minimize waste. Waste-pickers can argue that they play an important role in minimizing waste, which big waste management companies are not interested in doing.
- Having a potential to work as a group “shareholders” and establish a profit company involved them, which can give them opportunities to contract with any relevant JSC.

Informal waste-pickers in the Dumpsite level

- The fact that waste management is primarily the responsibility of local government also represents an opportunity, because local government “Municipalities” is supposed to be accountable to the community. Moreover, it is also supposed to implement policies to minimize waste. Waste-pickers can argue that they play an important role in minimizing waste, which big waste management companies are not interested in doing.
- Be enrolled in the Municipality’s sorting staff, as they have the basic knowledge on marketing the collecting recyclable materials.

Middlemen in the city level

- Follow up the development of work procedure at their destination by establishing an NGO which targeting the creation of added values to this kind of business.
- This NGO will help and support them to be well organized and being able communicates with any relevant governmental agencies as a one structural body.

Contractors in the Dumpsite level

- Follow up the development of work procedure at their destination by establishing an NGO which targeting the creation of added values to this kind of business.
- This NGO will help and support them to be well organized and being able communicates with any relevant governmental agencies as a one structural body.
- Gain a good experience to offer his services again to the relevant JSC.

Final Destinations (Industry)

- Reduction of the manufacturing prices due to the use of recyclable materials.
- Playing key role on the cycle of selling and purchasing of the recyclable materials from all waste vendors and suppliers.
- Getting transformation fees from any private waste company might be involved in this kind of business in the future.

Capacity & Potential for PPP

- Positive political context.
- The PPP projects in the MSWM sector can be combined with revenue making elements (energy generation, selling of recyclables, minimisation of carbon emissions, etc.).
- Supporting the public participation shares through equipment, studies, etc. financed by funds and donations to be provided to the Kingdom from international sources (National Resilience Plan, etc.) can decrease the level of investments and expected profit of the private sector (= burden for citizens).
- PPP projects can impact the economy in a positive way through creating job opportunities and other benefits.

1.2.3.4 THREATS

Institutional Set-Up

- Unclear responsibilities and framework of PPP in MSWM may affect the potential of the sector. Revision and update of the PPP framework needs to be done the soonest.

Technical & Operational Performance

- High trends of population increase due to instability in neighbouring countries (Syria, Iraq, etc.).
- Potentially higher rates of increase of waste generation rates than expected.
- Financial crisis may be an obstacle to Integrated MSWM in Jordan due to unwillingness of citizens to increase their MSWM fees.
- Significant funds are required to bring the current MSWM facilities in an acceptable state (infrastructure, equipment).

Financial Conditions

- A new influx of refugees will jeopardize the financial sustainability of MSWM system and can lead it to collapse, in most Municipalities of the country.
- The implementation of new treatment facilities may result in proliferation of the operating expenses of operation bodies, if not preceded by a well-documented feasibility study and cost-benefit analysis.

Public Awareness & Education Experience & Capacity

- Awareness program to be excluded or very much marginalized from the actual implementation plan of the MSWM Strategy.
- Public awareness is often considered by the Municipalities as not under their mandate or as secondary and not important issue.

Socio-Economic Conditions of Waste-Picking Activities

Informal waste-pickers in the City level

- Changing the infrastructure of the waste collection points in the cities.
- Issuing new legal framework, preventing them from acting their job freely in the city level.
- The local prices of the recyclable materials can be variable due to the political situation in the Arab region.
- Privatization of the waste collection services, which might lead to introduce the concept waste sorting at the source.

Formal waste-pickers in the Dumpsite level

- They are not socially secured, so they can be terminated or fired from their obligations with getting no rights.
- Privatization of waste treatment and sorting at the landfills or transfer stations.

Informal waste-pickers in the Dumpsite level

- Privatization of waste treatment and sorting at the landfills or transfer stations.
- The waste-picking activities at the landfill or transfer station where they mainly work might be awarded to other contractor.

Middlemen in the city level

- The other export fees might be imposed on the recycling materials.
- Privatization of waste collection and treatment. This might reduce the amount of receiving materials.
- Due to the environmental auditing activities carried out by the Ministry of Environment, the sorting plants belong to the middlemen might be closed. This will depend on their environmental compliance.

Contractors in the Dumpsite level

- The other export taxes might be imposed on the recycling materials.
- Privatization of waste collection and treatment. This might reduce the amount of receiving materials.
- Firing of the active working area at the landfill or transfer station might take long time to extinguished as well as controlled. This as per the contract is one of his responsibility.

Final Destinations (Industry)

- The export taxes on recycling paper imposed by the Jordanian Government. And other similar taxes which might be imposed in the future.
- The prices of Chinese product in the local market.
- Lack of user awareness about the quality of recycling products.

Capacity & Potential for PPP

- Potentially low willingness of Jordanian citizens to pay more for better MSWM services.
- Social controversy due to the need for increasing the MSWM fees paid by the Jordanian citizens.
- Potentially bad reputation of PPP due to failed PPP initiatives in the past.
- Lack of awareness of Jordanian citizens on environmental problems caused by current MSWM practices, as well as of the benefits of service improvement through PPP.

1.2.4 CONCLUSIONS & RECOMMENDATIONS

1.2.4.1 LEGAL & REGULATORY FRAMEWORK

Through the analysis and comparison of local and international legal and regulatory framework of MSWM in Jordan, it is apparent that the Jordanian MSWM framework is way less developed than the EU and the US ones.

The most important existing legal gap regarding MSWM in Jordan is basically, the **direction of the GoJ towards SWM in general, and especially MSWM**. Other gaps that were identified are the following:

- Priority to SW prevention and management, promoting the “*reduce-reuse-recycle*” (Three R’s) approach.
- Setting of priorities/hierarchy of allowed SWM practices [prevention → preparing for re-use → recycling → other recovery (e.g. energy recovery) → landfilling]
- Implementation of the “*polluter-pays principle*” in SWM.
- Avoidance of co-management of MSW with hazardous (e.g. medical, industrial, etc.) or special SW streams (e.g. WEEE, waste batteries and accumulators, ELVs, used tires, C&D, etc.).
- Prohibition of unsafe disposal of SW / promotion of environmentally sound disposal sites for both non-hazardous and hazardous SW.
- Implementation of the “*extended producer responsibility*” approach.
- Exclusion from the SW disposal facilities of the following: liquid waste, flammable waste, explosive or oxidizing waste, medical or infectious clinical waste, used tires (with certain exceptions), C&D, any other type of waste which does not meet specific acceptance criteria.
- Establishment of a national recording and monitoring system for SW and enforcement of its use and implementation.
- Setting of specific penalties for violation of the SWM legislation.
- Setting the procedure to prepare and conduct SWM Plans in National, Regional and/or Local level.
- Setting responsibilities of all concerned public authorities with regards to the whole SWM chain, including SWM recycling and other recovery (e.g. WtE) that is not described anywhere in the current legislative framework.
- Setting targets for the enforcement of source separation of the basic MSW streams (paper, metal, plastic and glass), as well as for biowaste.
- Setting targets for recycling and recovery of MSW.
- Setting targets for prohibition of biowaste disposal in landfills.
- Setting targets for recycling and recovery of C&D waste, including backfilling.
- Setting targets for recycling and recovery of special SW streams, i.e. for WEEE, waste batteries and accumulators, ELVs, etc.

- Setting guidelines for declassification of by-products as waste.
- Setting guidelines for safe management of hazardous and special waste streams.
- Setting the framework for importing/exporting hazardous and non-hazardous SW from/to abroad.
- Enlightening of the private sector involvement potential in SWM and encouraging partnerships through incentives, etc.
- Issuing of technical specifications for any possible option of MSWM: street cleaning, temporary storage, collection, transportation, transfer, recycling / materials recovery (including composting, etc.), other recovery (e.g. energy recovery), and disposal.
- Issuing of technical specifications for safe closure, rehabilitation and after-care of uncontrolled dumpsites.
- Issuing of technical specifications for management of hazardous and special waste streams (e.g. WEEE, waste batteries and accumulators, ELVs, C&D, etc.).
- Establishment of a List of Waste (Waste Catalogue) for easier classification, management, recording and monitoring of SW.
- Establishment of classification index for disposal and recovery SWM activities.

All aforementioned gaps will need to be filled through the issuance of:

- (a) the expected National MSWM Strategy (i.e. the present Project);
- (b) the new expected amendment of the Environmental Protection Law;
- (a) the new expected Law for the General Framework for Waste Management;
- (b) other Regulations or Instructions.

Other significant gaps indirectly related with the MSWM sector are the following:

1. The lack of particularized privatization principles and procedures for SWM activities and facilities. This could be resolved through the expected amendment (or replacement) of the Privatization Law No. 25/2000, the new expected amendment of the Environmental Protection Law or the new expected Law for the General Framework for Waste Management, and probably through the issuance of a specific Law or Regulation for PPP in the SWM sector.
2. Insufficient level of MSWM master planning. It is proposed that the MSWM master planning in Jordan should be developed in three levels:
 - a. National level: whole country;
 - b. Regional level: Region or JSC; and
 - c. Municipality level: Municipality, including both urban and rural areas.

1.2.4.2 INSTITUTIONAL SET-UP

From the institutional point of view, it was identified that there is no conflict of responsibilities between competent Authorities dealing with MSWM in Jordan. The range of responsibilities for each entity is

quite definite, even though responsibilities are currently derived from a number of acts and not from one individual.

Specific gaps that were identified relative to the allocation of responsibilities in Jordan with focus on MSWM are the following:

1. Responsibilities do not cover the whole range of the MSWM chain, e.g. for MSW treatment activities (recycling, composting, WtE, etc.). However, it seems to be efficient to assume that the local authorities, alone (e.g. Municipalities, GAM, Special Development Zones' authorities) or through joint co-operations (JSCs) should be responsible for these activities, as actually done.
2. Responsibilities for regulating the PPP approach in the MSWM sector in Jordan will be vague until issuance of the new expected PPP framework or the revision of the existing one. The only exception to this is the WtE sector, which is regulated through the General Electricity Law as well as Law of Renewable Energy.

The aforementioned gaps will be filled through amended or new legislative framework, as mentioned in the previous section.

Other identified deficiencies of the current institutional set-up of the MSWM sector in Jordan are:

- There is no clear policy in Jordan related with the Municipalities' or JSCs' performance monitoring in terms of carrying out MSWM services. This has caused an overall deterioration of JSCs performance over the years and has weakened their financial and technical capacities making them dependent on MoMA's technical assistance and financial subsidy.
- The MoENV, as well as the Municipalities and JSCs lack in most cases of qualified human resources to fulfill their targets. This is why extensive institutional capacity building needs to be carried out in all levels.
- Due to the low intrusion of formal public or private sector in MSW sorting and recycling, informal waste-picking flourishes both in the "city" and the "dumpsite" level. There are several measures recommended in the relevant sections referring to the socio-economic survey.

1.2.4.3 TECHNICAL & OPERATIONAL PERFORMANCE

Extensive variance has been identified in relation to the current state of the technical and operational features of the MSWM system in Jordan. The GAM has been progressing during the years and has reached an acceptable state, while the rest country has been in a much lower level. This is why the GAM's experience needs to be highlighted and utilised as a pilot all over the Kingdom.

The proposed roadmap is the following: steps should be made on-by-one. At first level, significant efforts will need to be made to deal with extreme problems, such as the vast population increase in the

Northern Region of Jordan, as well as in lesser level in the whole Kingdom. After this, the state of the current facilities should be made acceptable and efficiently operative, and the next level efforts should be made to reach a state-of-the-art level and get in line with the European and International state.

Specific and attainable targets should be set in the short-, middle- and long-term, so as the GoJ to be in position to set priorities, secure funding and facilitate their implementation and maintenance. This will be exactly the objective of the MSWM Strategy that is going to be developed and approved in the following stages of this Project.

At this early stage, our initial recommendations can be summarised as follows:

- Extension of the MSW collection coverage levels to reach the 100% of the population.
- Supplement the Municipalities' collection and storage equipment, followed by appropriate washing and maintenance.
- Increase automation of street cleaning and MSW collection practices.
- Promotion of MSW prevention and reuse practices.
- Promotion and enforcement of separate collection and management of special and hazardous waste (WEEE, ELV components, batteries and accumulators, used tyres, C&D waste, hazardous medical and industrial waste), by giving financial incentives where possible.
- Promotion of sorting-at -source programs with view to increase MSW prevention, reuse and recycling, at first in pilot level and later in full scale.
- Rehabilitation of dumpsites and establishment of sanitary final disposal facilities. This could be made by upgrading the existing dumpsites.
- Utilization of the LFG quantities in all new landfills, in order to produce energy as an alternative source.
- Establishment of appropriate waste treatment facilities (recycling, composting, anaerobic digestion, WtE), with respect to the ISWM hierarchy in the long-term:
 - landfilling is limited to residual (i.e. non-recyclable and non-recoverable) waste;
 - energy recovery is limited to non-recyclable materials;
 - recycled waste is used as a major, reliable source of raw material, through the development of non-toxic material cycles;
 - food waste is recycled as organic material or nutrient material.
- Integration of informal waste-pickers in the new recycling (or generally MSWM) facilities;
- Increase flexibility and budgeting of maintenance of infrastructure and equipment, to ensure durability of the ISWM system.
- Establishment of a MIS system in national level, that could be the basis for statistical analysis and decision making for taking initiatives towards increasing the operational efficiency of the MSWM system in Jordan (national, regional, local initiatives).

1.2.4.4 FINANCIAL ISSUES

As mentioned above, the key economic indicators (CAPEX, OPEX, REVENUE, and COST RECOVERY) and the efficiency - effectiveness of the existing MSWM system, were found to be at alarmingly adverse levels, for the vast majority of MSWM operator. This is due to several factors discussed in the respective sections.

So, the objectives of the new MSWM Strategy in terms of the improvement of the financial state of the sector should be the following:

- Progressive abandonment of the mixed MSWM system and gradually moving to a new MSWM system that will minimize the disposal in dumpsites and landfills.
- Increasing efficiency-effectiveness of the MSWM system, in all stages (planning, organisation, management, operation, etc.).
- Reduction of capital and operational costs.
- Generation of new revenue sources.
- Increase of revenues and cost recovery with view to minimise the GoJ subsidies

The proposed – at this stage – recommended efficiencies are the following:

- Development of new legislative framework for regulating diversion of revenue making materials (recyclables and biowaste) from the dumpsites/landfills, and construction/operation of the relevant facilities.
- Exploitation of LFG and biogas collected by landfills and biowaste digestion units respectively for energy production and sale.
- Typology / Standardization of key magnitudes for MSW collection, siting of transfer stations, landfills, treatment plants, etc., with view to minimisation of capital and operational costs.
- Drafting of Municipal and JSC Operational MSWM Programs with view to achieve financial sustainability of Municipalities and JSCs in terms of MSWM.
- Regular monitoring of performance of Municipalities and JSCs in the framework of the implementation of the Municipal and JSC Operational MSWM Programs.
- Providing incentives to Municipalities to establish JSCs with view to financial efficiency-effectiveness.
- Provision of technical assistance for training of staff and guidance on establishing proper institutional conditions.
- Development of an Integrated Management Information System (MIS) for MSWM. Installation and operation of this MIS by the Municipalities and JSCs.
- Removing obstacles affecting proper maintenance of MSWM equipment by the Municipalities and JSCs.

- Preparation of a Law for restructuring the fee system, on the basis of the “*polluter-pays principle*”, at least for bulk producers of MSW, and implementation of the fee calculation system.
- Preparation of a Law (or addition to the foregoing law) for restructuring the fees collection system, probably through disengagement by the Electricity Company and implementation of the new fee collection system.
- Preparation of a Law for PPPs in MSWM operations.
- Provision of Technical Assistance to Municipalities and JSCs for strengthening the capacity of staff to manage and supervise PPP contracts.
- Institutionalization of the framework for integration of informal sector in MSWM, in close cooperation with waste-pickers (including training and technical assistance).

1.2.4.5 PUBLIC AWARENESS & EDUCATION

The analysis and assessment of current situation on public awareness and education in MSWM in Jordan showed that such programs/campaigns that were implemented during the last few years were very limited, randomly located, flashy and not designed in professional way according to international standards.

Municipalities, JSCs and generally the local authorities have been generally proved to be technically underqualified to professionally design and implement awareness programs, situation which is also deteriorated by their weak financial capacity. Specific exceptions exist, such as GAM, the Greater Madaba Municipality, etc., but their efforts have not been occurred as a result of a national targeted strategy, being fragmentary. Added to this, programs/campaigns supported by the central government (MoH, MoENV, etc.) are also fragmentary and not widely applied.

Significant initiatives have been organised and implemented by NGOs, which are much more flexible and – in many cases – technically qualified than public authorities to play the role of the public awareness inspirer. However, the so far initiatives of NGOs were implemented in isolation from each other in most of the cases (the Clean-up The World Campaign could probably be considered as an exception) and without the participation or support of Municipalities/JSCs.

All this happen due to the absence of a national public awareness and education policy for the sector, deficiency that is to be resolved in the next steps of the current Project (Action 2.5: Definition of Public Awareness and Education Policy).

After precise guidelines are set in terms of public awareness on MSWM, the sector can be strongly revitalized, since there is an increasing interest of the general public, the GoJ and the private sector in proper MSWM. The public awareness and education policy can have great influence in the success of the MSWM strategy under development.

Added to that, training programs should be designed and implemented for the staff of Municipalities, JSCs and other authorities dealing with MSWM, on the methodology for implementing awareness programs on their own means, based on their roles and positions. The awareness concept should be included in the job description of each one of them.

Further, new divisions for public awareness and public participation in MSWM campaign should be developed and created in local or central government level, and special budgets should be dedicated for their causes. Generally, financial support of local authorities to carry out public awareness campaigns should be allocated on a regular basis.

Finally, partnerships between the public sector, the private sector, academic institutions and NGOs should be established to ensure effective and successful implementation of public awareness and education programs. The private sector has a high potential of investing in public awareness campaigns in the framework of their CSR policy.

1.2.4.6 SOCIO-ECONOMIC ISSUES OF WASTE-PICKERS

Recommendations linked with the analysis and findings of the socio-economic survey are the following:

- Special efforts should be made to promote integration of waste-pickers in the new proposed MSWM facilities deriving from the Strategy.
- A database should be prepared about the recycling business in Jordan, for their involvement in any relevant stakeholder's consultation purposes in the future.
- Controlling the informal waste-picking activities in the dumpsite level is an essential action to be taken by relevant JSCs to reduce the expected negative impacts of such kind of activities.
- Establishment of a waste-pickers' cooperative would be helpful for organizing waste-picking activities.
- Stakeholders' consultation should be a top priority for making governmental decision considering the recycling business in Jordan.

1.2.4.7 PUBLIC-PRIVATE PARTNERSHIPS

Regarding PPP, it seems that there is high potential for PPP projects in Jordan, provided that the increase of the MSWM fees paid by the Jordanian citizens would be affordable. Generally, fees and costs are a major obstacle towards proper MSWM in Jordan.

Privatisation could be a good way to proceed to fees' increase in environmentally friendly societies, avoiding pressure on the Government, provided that privatisation eventually leads to higher efficiency. Environmental awareness campaigns can play a significant role in this, by raising the sensibility of the public for sharing the responsibility with their local authorities for proper SWM. This could result in



raising of the citizen's willingness to pay for better living conditions and for a safer environment, thus increasing the PPP potential in MSWM.

The types of PPP projects that seem to be more easily realised in the MSWM sector in Jordan are the following:

- Contracting MSW collection and transport activities (relative low level of investments in relation to OPEX); and
- Contracting treatment or disposal of collected MSW (considerable level of investments that can be provided by the private sector).

2 METHODS & TOOLS

As proposed in the Consultant's technical proposal and Inception Report approved by the CVDB/MoMA, the Consultant has used a series of methods and tools in the framework of the current Task (Task 1), in order to ensure efficient data collection and to carry out effective assessment of the baseline conditions of the current MSWM system and sector in Jordan.

Those methods/tools are the following:

- Horizontal Analysis to all Municipalities and JSCs of Jordan, with view to collect appropriate horizontal information for the MSWM sector in the Kingdom;
- In-Depth Diagnosis of specific issues related to the current MSWM system in Jordan, to selected Municipalities and JSCs;
- Non-Response Procedure, for the acquisition of replies from Municipalities and JSCs participating in the Horizontal Analysis and the In-Depth Diagnosis surveys;
- SWOT Analysis, for the identification of strengths, weaknesses, opportunities and threats of the existing MSWM system in Jordan, in order to submit recommendations for improvement.

2.1 HORIZONTAL ANALYSIS

A *Horizontal Analysis* survey has been performed to shed light on the existing situation of the MSWM sector in Jordan (national level). In its context, specific general data on MSWM have been sought by Municipalities and JSCs of the Kingdom.

Apart from the standard desk study of available information provided by the Client and other sources (books, studies, reports, presentations, scientific articles, newsletters and magazines, public and private libraries, the internet, etc.), two (2) types of questionnaires have been developed by the Consultant and distributed by MoMA to all Municipalities and JSCs, accompanied by an official letter by the Minister of Municipal Affairs, asking for their support and on-time reply in a three (3) weeks deadline. To do so, the MoMA used its available lists, which include 91 Municipalities (except GAM and ASEZA) and 18 JSCs¹.

¹ At first, the list included 22 JSCs, but three (3) of them (Jerash, Amman and Theeban JSCs) don't carry out MSWM, whereas another one (Ajeeza JSC) was ceased during May 2014.

The questionnaires, which are appended in Annex 1 of this report, were related to all aspects of the MSWM system, focusing – inter alia – on institutional, operational, financial, social and economic issues, etc.

All replies received between the given time-frame, have been registered (see database in Annex 3), analysed and evaluated for the assessment of the baseline conditions of the MSWM systems in Jordan.

At the end of the second week after distribution of the questionnaires, the Consultant carried out an appropriate *Non-Response Procedure*, as will be described in section 2.3, in order to ensure maximum level of responses by the Municipalities/JSCs and to directly collect the missing or not-received information.

2.2 IN-DEPTH DIAGNOSIS

In parallel with the Horizontal Analysis, the Consultant carried out an *In-Depth Diagnosis* survey, in order to deepen further the acquired information on the MSWM system in Jordan. This survey has been performed in five (5) JSCs and ten (10) Municipalities that have been selected by the Client's designated TC as representative of all others in the Kingdom in terms of socio-economic and urban development context or as operating of top major dumpsites in the Kingdom.

As per the Client's decision, the Greater Amman Municipality (GAM) and the Aqaba Special Economic Zone Authority (ASEZA) have been excluded from the In-Depth Diagnosis survey. The Municipalities and JSCs that participated in it were the following:

- **JSCs:**
 1. Irbid (Al Ekaider) JSC;
 2. Mafrqa JSC;
 3. Ma'an JSC;
 4. Karak JSC; and
 5. Balqa (Al Salt) JSC.
- **Municipalities:**
 1. Greater Irbid Municipality;
 2. Al-Khaldieh Municipality;
 3. Sabha W Al-Dafianeh Municipality;
 4. Greater Ajloun Municipality;
 5. New Oum Al-Rasas Municipality;
 6. Al-Shoneh Al-Wsta Municipality;
 7. Greater Zarqa Municipality;

8. New Al-Qawiera Municipality;
9. New Al-Shobak Municipality; and
10. Greater Tafilah Municipality.

For these Municipalities and JSCs, the Consultant carried out on-site missions in order to investigate and get more information on their MSWM activities that were not able to be collected through their replies in the Horizontal Analysis. The method that was used during these missions was that of “direct interviews” of the Municipalities/JSCs’ focal persons, by using additional structured questionnaires. For that reason, two (2) types of questionnaires have been developed by the Consultant, the one customized for the JSCs and the other for the Municipalities. Those questionnaires are appended in Annex 2 of this report, whereas the registered replies of the JSCs and Municipalities are appended in Annex 3.

2.3 NON-RESPONSE PROCEDURE

The *Non-Response Procedure* was mostly followed to ensure and maximize response of Municipalities and JSCs to the Horizontal Analysis survey questionnaires. Starting at the end of the second week after distribution of the questionnaires, the Consultant started making phone calls to the Municipalities/JSCs’ focal persons, in order to check the status of their feedback. For starter, phone calls were directed at Mayors or JSCs’ Heads and according to their responses; phone calls were directed towards the focal points within each entity.

Through these calls, it was found that in some cases, the sent documents were lost or never received by the focal points. In those cases, extra copies were sent by the Consultant through e-mails or faxes, and were followed-up by new phone calls. It should be noted that these cases were a major constraint to proper data collection and causing delay to the whole process.

At the end of the second week, response rate hardly exceeded 30% of the Municipalities and 50% of the JSCs. At the end of the third week, percentage response reached about 50% of the Municipalities and 94% of the JSCs. Phone call procedures were repeated for missing information. It must be noted that the quality and size of information within filled questionnaires was variable according to local understanding and available data on each entity. Data and information were cross-checked and respective mends were done in consultation with each entity.

Added to that, the In-Depth Diagnosis Survey also involved the need for acquisition of missing information during field visits. So, the Consultant was promised to receive the missing data by e-mail or fax. Within the third week after the field visits, the Consultant made direct phone calls (using cellular phones and landlines) to concerned staff to urge for fulfilling the survey and sending the missing or not received information. The response rate was very high. This protocol also proved to be time

consuming due to delays by some entities causing constraints to fulfill time framework of the activity. It must be noted that, since in many ways data and information has been reviewed and mended according to each entity, reliability of information and data were positively affected.

2.4 SWOT ANALYSIS

SWOT Analysis (alternatively SWOT matrix) is a structured planning method used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project. It involves specifying the objectives of the project and identifying the internal and external factors that are favourable and unfavourable to achieving its objective. The degree to which the internal environment matches with the external environment is expressed by the concept of *strategic fit*.

The SWOT Analysis' objective is to recommend strategies that ensure the best alignment between the internal situation and the external environment. Setting of strategy should be done after the SWOT Analysis has been performed, so as achievable goals or objectives are recommended.

- Strengths: characteristics of the project that give it an advantage over others.
- Weaknesses: characteristics that place the project at a disadvantage relative to others.
- Opportunities: elements that the project could exploit to its advantage.
- Threats: elements in the environment that could cause trouble for the project.

Figure 2-1 presents a schematic diagram of the SWOT matrix.



Figure 2-1: A SWOT analysis, with its four elements in a 2x2 matrix



SWOT Analysis is used as inputs for the creative generation of possible strategies, by asking and answering each of the following four questions:

1. How can we USE each Strength?
2. How can we STOP each Weakness?
3. How can we EXPLOIT each Opportunity?
4. How can we DEFEND against each Threat?

As asked by the Project's ToR and highlighted in the Consultant's technical proposal approved by the MoMA/CVDB and the Consultant's Inception Report, the SWOT method is selected to be the tool for the assessment of the current situation of the MSWM sector in Jordan, with focus on all relevant aspects (institutional set-up, operational performance, financial conditions, public awareness and education level, socio-economic attributes and PPP potential).

3 MSWM LEGAL & REGULATORY FRAMEWORK

3.1 GENERAL

The Jordanian legal system is based on the Civil Law system, where laws, and the related written regulations and instructions are the main steps of the legal hierarchy, and the first source and main written law is the Constitution.

It is the Parliament that reviews, approves, and produces “*Laws*”. Laws are usually drafted by the concerned Ministry and sent to the Parliament through the Council of Ministers. The Parliament through the representatives of the Lower House will review each law and send it the Upper House, where it is also discussed and either approved as sent or modified and sent back to the Lower House. Through this process and followed by a royal decree, the law will be published in the National Gazette.

On the other hand, the Council of Ministers is sufficient to review and produce “*Regulations*” stemming from any specific law. Each Ministry may also produce the so-called “*Instructions*” to specify the procedures and mechanisms for implementation of laws or regulations.

As part of the Due Diligence (DD) process carried out for this Project, this chapter focuses on existing as well as forthcoming Jordanian legislation that might have a legal impact and interfere with the existing or proposed MSWM in Jordan.

3.2 MSWM RELATED LEGAL & REGULATORY FRAMEWORK IN JORDAN

3.2.1 OVERVIEW

Solid Waste Management (SWM) in Jordan is one of the most complex sectors due to the wide variety of Solid Waste (SW) types, which, in turn, involves many different competent entities depending on their relevant area of interest. Generally, SWM in Jordan involves the following entities:

1. The MoMA through either one of its executive arms: the Municipalities or the JSCs, with the exception of the Greater Amman Area, the Aqaba Special Economic Zone (ASEZ) and the Petra Development and Tourism Region (PDTR).
2. The Ministry of Environment (MoENV), which is the official entity in charge of the environment and its components, since its establishment in 2003.

The summary of the legal framework governing SWM in Jordan, as prepared by the Consultant, is briefly presented in Figure 3-1.

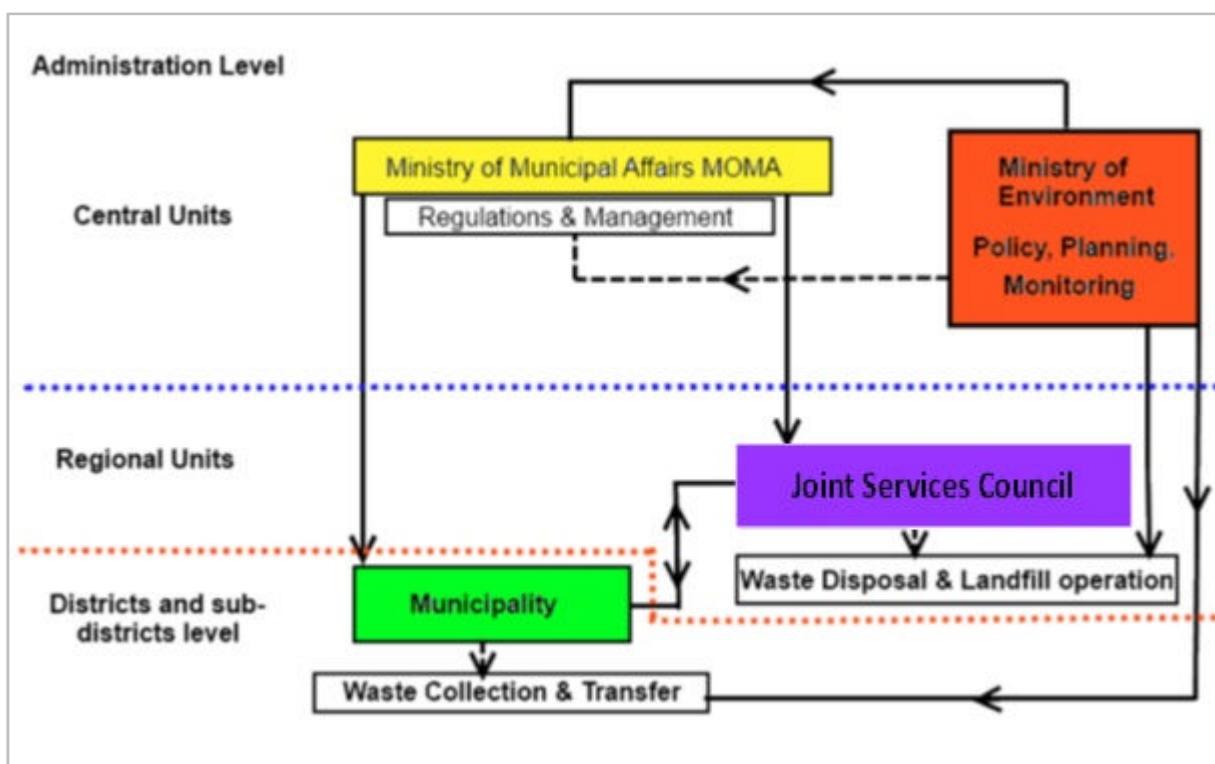


Figure 3-1: Summary of the legal framework governing SWM in Jordan

Added to that, other entities are directly responsible for SWM in specific areas in Jordan. The GAM is mainly responsible for the Greater Amman Area within the Capital of Jordan. The ASEZA is responsible for the Special Economic Zone of Aqaba. Both entities are working independently, having the delegation from the MoMA and using their own regulations.

A special case is the Petra Development and Tourism Regional Authority (PDTRA), which is responsible for SWM within the PDTR, the Petra Archaeological Park (PAP) included. The PDTRA differs from GAM and ASEZA in the event that it doesn't have its own regulations. It is ruled by a "Commissioners Council" which reports directly to the Prime Minister.

The legal and regulatory framework governing waste in Jordan consists mainly of MoMA legislative framework that includes:

- a. the Municipalities Law No. 13/2011;
- b. the Joint Services Councils Regulation No. 75/2009;
- c. the Supplies, Purchases, and Civil Works for Municipalities Regulation No. 70/2009; and
- d. the Regulation for the Prevention of Health Nuisances No. 8/2014.

Added to that, the following MoENV legislative framework is in force:

- a. the Environmental Protection Law No. 52/2006, providing legal tools for the management of environmental issues but not explicitly for SWM issues;
- b. the Management of Solid Waste Regulation No. 27/2005;
- c. the Management, Transportation and Handling of Harmful and Hazardous Substances Regulation No. 24/2005;
- d. the Instruction for Hazardous Waste Management and Handling (2003); and
- e. the Instructions for the Management of Solid Waste (2006).

A short description of the basic elements of the relative policies, laws, regulations, instructions and standards is provided in the following sections. Such acts reflect the high interest of the GoJ in dealing with SWM in Jordan. Development of required legislation and enforcement of existing legal framework is considered on the top of the agenda of the Government, since MSW is poised to be one of the most promising and profitable sectors beside being an environmental nuisance that must be curbed. Proper SWM, according to international standards, can be considered as a key factor towards a Green Economy of which Jordan is striving to work with.

3.2.2 JORDAN'S MSWM RELATED STRATEGIES

3.2.2.1 NATIONAL AGENDA FOR SUSTAINABLE DEVELOPMENT (2006 – 2015)

Produced in 2000 by the Ministry of Public Sector Development (MoPSD) within the Prime Ministry, **Jordan's National Agenda (2006-2015)**, prioritised “*environmentally-sustainable economic development*” in a wide range of sectors, including energy efficiency, transport, and waste management. The National Agenda manifests important guidance leading towards Jordan's development on different levels and dimensions. However, it is not utilised to the extend that could be beneficial.

Generally, the National Agenda policy initiatives were developed along three main dimensions that include:

- a. Government Policies;
- b. Basic Rights and Freedoms; and
- c. Services, Infrastructure and Economic Sectors.

Figure 3-2 presents the aforementioned dimensions and their interaction to each other, with target the improvement of welfare of the Kingdom and its population. The coordinating body for the implementation of the National Agenda is the Ministry of Planning & International Cooperation (MoPIC).

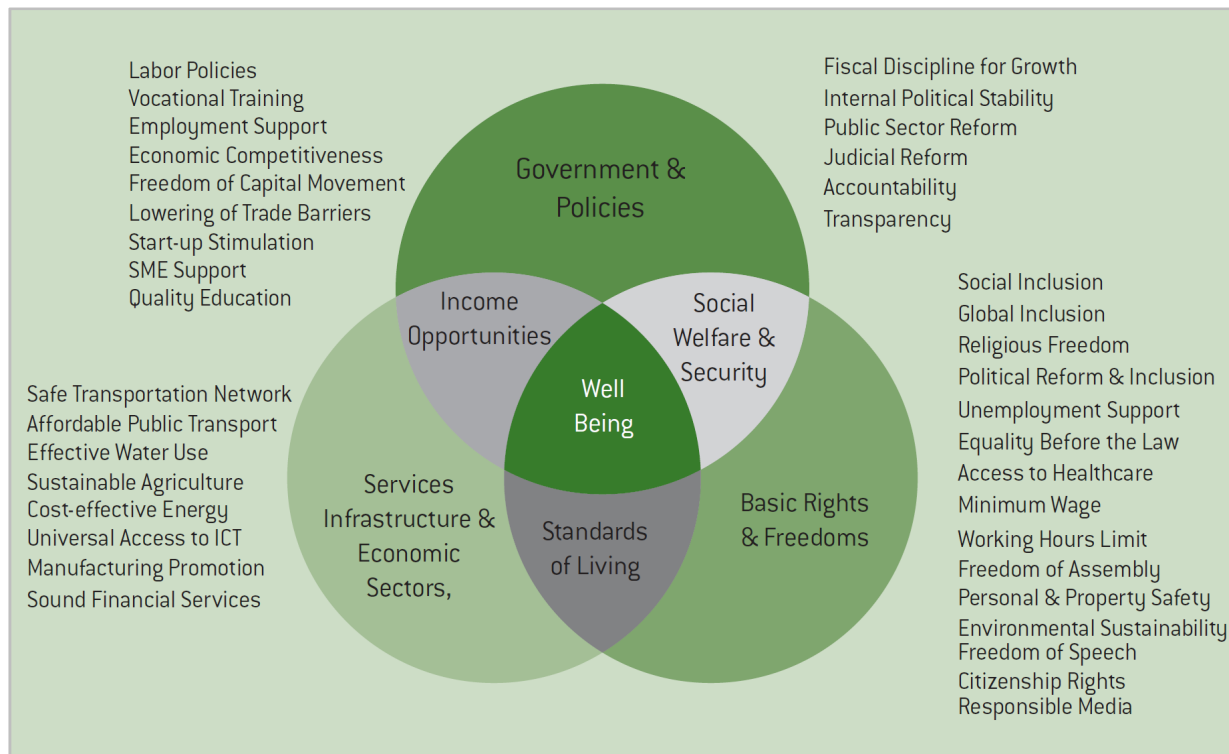


Figure 3-2: Jordan's National Agenda dimensions (source: MoPIC, 2006)

The National Agenda 2006-2015 was structured based on the development of initiatives, in support of achieving its goals and targets, around eight themes. One of these themes is **Infrastructure Upgrade** which is a central pillar of socioeconomic development in Jordan. Infrastructure quality and access cost are of prime concern to private investors, as they have a direct impact on the competitiveness of Jordanian companies. Moreover, infrastructure plays a central role in enhancing the quality of life of citizens. This theme also advocates environmentally sustainable economic development, a matter of increasing concern given the fast rate of degradation of Jordan's natural resources. Most important it covers **Environmental Protection and Sustainability** through several initiatives that include:

1. Development of solid waste management policies, promotion of environmentally sound disposal sites, encouragement of recycling and minimization of solid waste generation.
2. Development of a hazardous and chemical waste institutional framework which includes knowledge dissemination mechanisms and information tracking, along with an enforcement regime, in order to ensure that hazardous and chemical waste is adequately stored, collected, and disposed of.

3. Improvement of medical waste segregation, transportation, storage and treatment, including update and enforcement of the legislative framework.

One of the most important performance indicators set by the National Agenda, along with targets and a timeline, is the need for an Integrated Solid Waste Management (ISWM) hierarchy.

A summary of the SWM initiatives as proposed by the National Agenda is included in Table 3-1.

Table 3-1: Proposed SWM initiatives of the National Agenda 2006-2015

Extension of SW Service Coverage	Promotion of Environmentally Sound SW Disposal & Treatment	Minimization of SW Generation	Maximization of SW Reuse & Recycling
• Provision of financial, technical and human resource capacity-building to empower Authorities to extend waste collection and disposal services to all people in urban and rural areas. • Prioritization of full coverage of recyclables collection measures in urban areas. • Prioritization of hygienic and cost effective collection technologies. • Encouragement of private sector participation in (a) supply of SW collection equipment, (b) SW collection, and (c) transfer of SW, in order to ensure better service levels.	• Disposal of a gradually increasing proportion of SW in an environmentally sound way. • Establishment of a program to prevent/mitigate the environmental impacts of existing disposal sites. • Establishment of environmental and health quality guidelines and standards governing SW disposal.	• Inducement of beneficial changes in lifestyles, production and consumption patterns, through economic or other instruments. • Reduction of the production and consumption of containers and packaging materials, especially for non-biodegradable. • Involvement of the private sector by increasing public awareness and education programs.	• Establishment and implementation of programs for efficient separation of different types of SW at the point of generation to facilitate recycling and reuse. • Establishment and implementation of a national program for SW recycling and reuse.

Even though this strategy was a very important step towards environmental protection and sustainable development, moving up from a small environmental department at MoMA to a separate Ministry of Environment, it really did not tackle properly manmade pollution such as SW. SWM was not treated as a main subject of highest importance, as it should, but it was mentioned within other main subjects. Since then, the SWM sector evolved in Jordan without a real guidance. Added to that, the strategy is quite old regardless of its content which does not cover many new developments in Jordan or the

World. Many entities included within the scope of this strategy have produced their own strategies and action plans. Therefore, it is very apparent that, this current project to produce a national strategy for MSWM in Jordan, is in the correct step toward the development of the sector.

3.2.2.2 NATIONAL ENVIRONMENTAL STRATEGY FOR JORDAN, 1991

A strategy project, the so-called “Jordan National Environment Strategy Project” was launched in January 1989, and was followed by the 1st National Environmental Workshop, held in Amman. It was a combined aim of the Jordanian government and the International Union for Conservation of Nature (IUCN) to compile a document that accurately reflected the special characteristics of the total environment of Jordan and the measures required to safeguard and preserve the Kingdom’s environment for future generations.

The **National Environmental Strategy (NES)** was produced in 1991 by the former Ministry of Municipal, Rural Affairs & the Environment (later divided into the MoMA and MoENV), at a time where environmental responsibility was fully under the jurisdiction of MoMA. The Department of Environment and later the General Corporation of Environmental Protection were the main entities in charge of environmental matters in Jordan. It represents a compilation of work prepared by many Jordanian experts who participated in ten resource-sector working groups.

The NES remains the foundation of environmental hierarchy in Jordan, covering basically the following:

1. Geographical Overview;
2. Agriculture & Lands;
3. Surface & Groundwater;
4. Wildlife & Habitats;
5. Coastal & Marine Environment;
6. Energy & Mineral Resources;
7. Population;
8. Housing & Settlements;
9. Environmental Health;
10. Atmosphere & Air Quality;
11. Antiquities & Cultural Resources; and
12. Legal Framework & Initiatives for the Strategy.

SW, including industrial and hazardous waste was generally included as one important environmental issue that must be tackled, and disposal sites must be selected properly to avoid negative environmental impacts to land and groundwater. It was recommended to add it as an indicator for monitoring and detection systems in marine life protection.

3.2.2.3 NATIONAL ENERGY STRATEGY

Energy is a major challenge for Jordan and its economy due to the lack of local energy resources and the great need for energy for social and economic development. Based on that, and the needed social and economic development being implemented to improve the quality of life in Jordan, it is experienced in Jordan that the demand for energy will have exceeded 4% annually for oil products and 7% annually for the electricity consumption (PEEREA, 2010).

The high importance of energy efficiency is evident, taking into account the high cost of importing crude oil and oil products during the last years (e.g. 17.6% of GDP in 2008). Such values are considered extremely high when compared to international levels.

Other challenges include the provision of necessary funding for investment in the development of the energy industry and its installations on-time to meet energy needs, promoting an efficient use of energy in all sectors and upgrading oil derivatives products specifications in line with international standards in order to ensure safety and environmental protection.

In line with the National Agenda (see section 3.2.2.1), a **National Energy Strategy for 2005-2015** was submitted by the Ministry of Energy & Mineral Resources (MoEMR) and approved by the Council of Ministers in 2004. Since completion of that strategy, primary energy demand has grown at 5.5% per year, much faster than the original expectation (3.4% annually). Similarly, electricity demand has grown at 7.4% per year, much faster than projected (4.6% annually). So, in 2006, the Royal Committee on the Energy Sector was mandated to work on upgrading the 2004 National Energy Strategy and as a result the **Jordan Energy Sector Master Plan (also referred to as “Energy Strategy”) for the period (2007-2020)** was prepared by the MoEMR and approved by the Council of Ministers in December 2007.

The main recommendations of the Jordan Energy Strategy 2007-2020 can be summarised as follows (recommendations mentioned in bold show the correlation of the Energy Strategy to the MSWM Strategy under development):

- maintain and expand the current functioning of the Jordan Petroleum Refinery and enable it to function on a commercial basis;
- restructure the Jordan Petroleum Refinery by unbundling of activities and ending the Concession Agreement;
- liberalise the oil market and open it up to competition;
- remove subsidies on oil products, in phases, and review the pricing policy for such products in a regular manner in line with international prices;
- **diversify the sources and kinds of imported energy to reduce dependency on a single source or kind and to ensure security of energy supply to the Kingdom from a variety of sources, as well as develop related infrastructure;**

- **increase the use of natural gas as a fuel in various sectors and specifically electricity generation;**
- encourage the establishment of natural gas distribution companies in cities;
- **increase the contribution of renewable energy in total energy consumption and put in place an energy efficiency policy;**
- develop the market on the principle of selling energy to consumers at its cost price, as a minimum;
- continue with the restructuring of the electricity sector;
- establish a single regulatory body for the energy sector which will take over some of the responsibilities of the MoEMR as well as other bodies currently functioning in the energy sector, and accordingly restructure MoEMR and its agencies;
- develop the related environmental regulations and instructions.

SWM is in-line with the aforementioned recommendations, since SW can be exploited as an alternative energy source, either direct through Waste-to-Energy (WtE) projects, or indirect through utilization of Landfill Gas (LFG) or biogas emissions. In this way, diversification of energy consumption is also strengthened, whereas LFG and biogas exploitation are considered as renewable sources of energy.

3.2.2.4 NATIONAL PRIVATIZATION STRATEGY

In Jordan, there is no special national privatization strategy for SWM, which can be noted through very few reported PPP interventions.

Although privatization of SWM activities is not banned, it remains the decision of the public authority in charge. As noted from the replies of Municipalities to the questionnaires of the horizontal analysis and in-depth diagnosis surveys, very few investments are foreseen for the future and this is mostly due to poor capacity of the local authorities to invest for MSWM projects (collection, treatment). Even though privatization or PPP interventions usually improve the quality of provided services, they include various investments that will most probably raise the cost of operation which shall be borne by the public entity in charge. Thus, a feasibility study is required for every project, to analyse the costs and benefits to the local communities, including the benefits to local residents and the environment.

Given that the Jordan's National Agenda for Sustainable Development (2006-2015) prescribes the development of SWM policies promoting environmentally sound disposal sites, encouraging recycling practices and minimizing SW generation, such policies could include the PPP approach where possible.

3.2.3 JORDAN'S MSWM RELATED LAWS, REGULATIONS & INSTRUCTIONS

3.2.3.1 MOMA LEGISLATIVE FRAMEWORK

3.2.3.1.1 MUNICIPALITIES LAW NO. 13/2011

The **Municipalities Law No. 13/2011** constitute the foundation of Municipalities and JSCs as the executive of MoMA. In terms of MSWM, it stipulates responsibility of MoMA at the whole Kingdom, with the exceptions of the Greater Amman Area and the Aqaba Special Economic Zone.

In the framework of this Law, MSWM activities are being performed by Municipal Councils and JSCs. Particularly in relation to JSCs, the Municipalities Law and amendment stipulate that the Minister of Municipal Affairs has the legal mandate to establish Municipalities and/or JSCs for a close group of Municipal Councils, Rural Councils or villages. This is to be done upon a recommendation from the Local Governor. Based on that, the JSC or Municipality enjoys juridical personality and assumes the responsibilities assigned to Municipal Councils in issues related to services and "joint projects". JSCs are basically regulated through Joint Services Councils Regulation No. 75/2009 as discussed below.

The Council of Ministers has the right to issue instructions in order to ascertain implementation of any of the stipulations referred to above in relation to the JSCs that could cover authorities and assigned responsibilities of the JSC in managing and operating joint projects; taxes, fees and returns generated from joint projects conducted by the JSC in addition to the means for their collection; and contribution to the financing of JSCs and the preparation and ratification of the JSC budget. In addition, the Law sets several financial aspects regarding the financing of the JSCs.

3.2.3.1.2 JOINT SERVICES COUNCILS REGULATION NO. 75/2009

The **Joint Services Councils Regulation No. 75/2009** is basically the legal basis for the operation of JSCs and it is the most recent amendment of the "JSCs Regulation No. 17/1983".

Regarding SWM in Jordan the JSCs' responsibilities stated in the Regulation include the establishment of landfills and waste disposal sites. On the other hand, Municipalities are responsible for the collection and transportation of SW to be disposed. No reference is made for recycling or other recovery (e.g. WtE) practices for MSWM.

The Regulation identifies the revenue streams of the JSCs and their sources to be:

- a. contributions from member Municipal Councils and beneficiary villages per JSC;
- b. funds that are allocated to the JSCs by the Council of Ministers (based on the recommendation of the Minister of Municipal Affairs) from budget allocated for the benefit of Municipalities; and

- c. revenues from collected fees, loans, donations, aids and any other funds (with the need for prior approval of the Council of Ministers if the source of funding comes from a non-Jordanian entity).

The Regulation also puts the level of contribution of Municipal Councils to the budget of the respective JSC in the hands of the JSC itself, and in case the Municipal Council does not pay due amounts, or in case there is no agreement among JSC members on amount of contributions from the Municipal Councils, such amounts are set and deducted from budgets assigned to the Municipal Councils by virtue of a Ministerial Instruction from the Minister of Municipal Affairs.

3.2.3.1.3 SUPPLIES, PURCHASES & CIVIL WORKS FOR MUNICIPALITIES REGULATION NO. 70/2009

The **Supplies, Purchases & Civil Works for Municipalities Regulation No. 70/2009** controls all supplies, purchases, and civil works performed as part of MoMA services and daily activities.

In order to implement all stipulations of the Regulation, Municipalities (and respectively JSCs) have been classified into two categories as follows:

- **Category I:** includes the Municipalities in the provincial centres and districts; and
- **Category II:** includes the rest of Municipalities, as well as the JSCs.

The Regulation sets, inter alia, the methodology for granting approvals for purchases, supplies and provision of services, directly or in case of tender, according to a set of budget ceiling. In cases of low budget procurements, flexible procedures are followed, while in cases of high budget procurements, the approval of expenditures is granted by the Minister of Municipal Affairs by following proper administrative procedures.

It is highlighted that the JSCs are obligated to obtain the approval of the Minister of Municipal Affairs for any direct purchase that exceeds 300 Jordanian Dinars (JOD) especially for maintenance and daily activities.

3.2.3.1.4 REGULATION FOR THE PREVENTION OF HEALTH NUISANCES NO. 8/2014

The **Regulation for the Prevention of Health Nuisances No. 8/2014** was issued in July 2014 replacing the **Regulation No. 1/1978** (and its Amendment of 2009). It was produced according to Article (40) of the Municipalities Law No. 13/2011 and it basically prohibits any person, entity, or activity from causing any nuisance to anybody or from damaging public health. Such nuisances may include bad odours, noise, waste (solid waste, effluents), or any other practice deemed harmful to public health or sanity.

Most significant issues of the Regulation No. 8/2014 are the following:

1. the Municipal Health Inspectors have the authority to enter any entity during the day to assure or inspect for any nuisance;
2. private entities are responsible for providing suitable means for collection and temporary storage of MSW (bins, containers) of closed-type, which should be properly located in suitable places within the entity layout. Private entities should prevent collection and disposal of MSW unless approved by the respective Municipality;
3. the Municipalities shall charge the private entities about 20% of their license fees for waste management;
4. the Municipalities shall provide waste collection and transportation services to the public, by charging the public according to the following schedule:
 - a. 1st Class Municipalities: 24 JOD for each household;
 - b. 2nd Class Municipalities: 15 JOD for each household; and
 - c. 3rd and 4th Class Municipalities: 8 JOD for each household;
5. charges for the MSW collection, disposal or treatment from any commercial, industrial or other entities can be specified, upon proposal of the Minister of Municipal Affairs and approval of the Prime Ministry;
6. the Municipalities shall charge 5 JOD for any dead carcasses of animals (cows, camels, donkeys, mules) and 2 JOD for the animals (sheep, dogs, goats);
7. such regulation does not apply within the jurisdiction of GAM.

3.2.3.2 MOENV LEGISLATIVE FRAMEWORK

Since its establishment in 2003, the MoENV has been stated as the official entity in charge of the environment and its components.

Particularly in relation to SWM, the legislations pursuant to the Environmental Protection Law and respective Regulations and Instructions are described hereunder. The following section provides a summary for the aforementioned legislations followed by an identification of the specific articles that are relevant to the Project.

3.2.3.2.1 ENVIRONMENTAL PROTECTION LAW No. 52/2006

The **Environmental Protection Law No. 52/2006** states that MoENV is the official national body accountable for the protection of the environment and its components namely: air quality, water, soil, biodiversity and human beings.

The provisions of Article (3) of the Law stipulate that all official entities should abide to the environmental requirements stated by the MoENV. Moreover, MoENV is also mandated to collaborate with respective local, regional and international entities for environmental protection and pollution prevention as in Articles (4) and (5) within the Law.

MoENV's responsibilities according to the Law include, but are not limited to the following:

- setting of necessary policies and plans for environmental protection; and
- issuing of specifications for environmental quality objectives, which shall serve in the processes of licensing and license renewal.

The specifications to be issued by MoENV take into account handling of hazardous substances and their final disposal among others. The entry of hazardous substances and waste into the Kingdom is clearly prohibited through the provisions of the Law.

Moreover, the Law introduces the need to carry out Environmental Impact Assessments (EIAs) for certain projects prior to their commencement (the process of EIAs is further detailed in the Environmental Impact Assessment Regulation No. 37/2005 addressed subsequently). Furthermore, by virtue of Article (14), MoENV should grant approval for environmental studies and projects submitted on behalf of any official entity to a donor agency.

Penalties and consequences associated to environmental violations are further described in the Law depending on the case. The Environmental Inspectors are given the power of judicial police; however, written warnings for any activity violating environmental specifications are only done by the Minister of Environment upon the recommendation of the Secretary General.

The Law also sets delegation of responsibilities of the Minister of Environment to lower administrative scales, bodies, institutions or Non-Governmental Organizations (NGOs). In more detail, the Minister of Environment is authorized to delegate any of his responsibilities to the Secretary General, the Ministry's local directorates, or the local governor. Furthermore, MoENV can delegate some of its responsibilities to other governmental bodies, institutions or environmental NGOs. However, any delegation of responsibilities should be clearly specified in writing.

3.2.3.2.2 MANAGEMENT OF SOLID WASTE REGULATION No. 27/2005

The **Management of Solid Waste Regulation No. 27/2005** provides the basic definitions governing SWM, such as of “solid waste”, “solid waste management”, “solid waste dumps”, etc.

SW is defined as “solid and semi-solid materials, to be treated or disposed of, resulting from any activity and not included in the definition of harmful and hazardous waste appearing in the management, transportation and handling of harmful and hazardous substances regulations in force”. SWM is also defined as “all activities related to SW, including the stages of sorting, collection, transport, storage, treatment, recycling and final disposal thereof”.

The Regulation also states that its provisions shall serve as a reference which governs the management of SW in order to ensure that their management process is done in such a manner that

protects the environment and public health. It lists MoENV's responsibilities and involvement in SWM (e.g. in specifying waste dump sites) and obligations of any party conducting SWM. Last, but not least, it refers to instructions issued to ensure the implementation of its provisions.

3.2.3.2.3 INSTRUCTIONS FOR MANAGEMENT OF SOLID WASTE (2006)

The **Instructions for the Management of Solid Waste (2006)** was issued complementary to the Management of Solid Waste Regulation No. 27/2005. The Instruction lists similar definitions for SWM while elaborating on the technical specification related to SWM namely; SW collection, transport and final disposal. Through Article (4), the Instruction states that MoENV should encourage and provide incentives to the private sector in order to invest in SW treatment and recycling.

Qualitative and quantitative requirements for the selection and establishment of MSW dumpsites are also provided through the provisions of these Instructions. These requirements are stated while taking into consideration the following: natural resources, geographical and geological factors, social and cultural factors and economic and general safety requirements. The Instruction also addresses issues related to the establishment, closure and rehabilitation of SW dumpsites.

3.2.3.2.4 MANAGEMENT, TRANSPORTATION & HANDLING OF HARMFUL & HAZARDOUS SUBSTANCES REGULATION No. 24/2005

The **Management, Transportation & Handling of Harmful and Hazardous Substances Regulation No. 24/2005** defines harmful and hazardous substances and waste as *"any substances that cannot be disposed of in the dumping sites designated for general waste, or into drainage networks, due to their hazardous characteristics and their harmful effects on the environment and life forms, and which require special means to treat and permanently dispose of"*.

The preparation of technical and other specification related to the different stages of the management of hazardous substances and waste are delegated to a Technical Committee chaired by Secretary General of the MoENV (members of this technical committee are listed within the Regulation). The responsibilities of this Technical Committee are also provided in the Regulation, which further provides the requirements to be granted authorization for dealing with hazardous substances and waste.

3.2.3.2.5 INSTRUCTION FOR HAZARDOUS WASTE MANAGEMENT & HANDLING (2003)

The **Instruction for Hazardous Waste Management and Handling (2003)** is divided into three (3) main sections that address hazardous waste: (a) hazardous waste producers; (b) transporters; and (c) operators of dumpsites and landfills where the final disposal of hazardous waste takes place.

The Instruction lists general procedures to be carried out by the producer of hazardous waste, procedures related to the collection and storage of hazardous waste, emergency plans and

procedures, record-keeping and reporting, and general precautionary measures to be taken into consideration during the packing of hazardous waste.

The Instruction also draws special conditions for owners and operators of the site allocated for storage, treatment and final disposal of hazardous waste. Issues related to the safety and well-being of site staff is also discussed as well as conditions for waste storage. Furthermore, Article (10) of the Instruction states that anyone who violates the provisions of these Instructions shall be punished in accordance with the Environmental Protection Law.

3.2.3.3 OTHER MSWM RELATED LEGISLATION

3.2.3.3.1 PUBLIC HEALTH LAW NO. 47/2008

The **Public Health Law No.47/2008** regulates SW in terms of disposal sites' monitoring and conformance with the Jordanian Standards. Furthermore, it prohibits under penalty of legal liability events or accidents causing unsanitary conditions, including improper handling and/or disposal of SW, WW or other waste.

3.2.3.3.2 LAW OF AGRICULTURE NO. 44/2002

The **Law of Agriculture No. 44/2002** stipulates through Article (32) that no person shall dispose any type of SW or liquid waste' or any substance harmful to the environment. It must be adhered to and followed where the owner of any project or establishment must undertake not to violate the borders of any forest nor agricultural area, if any, and not to throw any remnants.

3.2.3.3.3 WATER AUTHORITY OF JORDAN (WAJ) LAW NO. 18/1988 AND ITS AMENDMENTS

The **Water Authority Law No. 18/1998** and its amendments state that the Ministry of Water & Irrigation (MWI) is the entity responsible for all water and WW systems and related projects. However, the Law does not relieve MWI or the Water Authority of Jordan (WAJ) from abiding to the legislations obligatory for official entities.

According to the Law, the general rules of the groundwater control regulation are that the groundwater is state-owned and it is subject to state control. Article (6) of paragraph (e) states: *"Draw terms, standards and special requirements in relation to the preservation of water and water-basins, protect them from pollution, and ascertain the safety of water and wastewater structures, public and private distribution and disposal networks, and take the necessary action to ensure technical control and supervision, including, all necessary tests"*.

Article (30) of the Law states that any one shall be sentenced to not less than six (6) months, and no more than two (2) years imprisonment or to a fine not less than 1,000 JOD and no more than 5,000 JOD, or both punishments if he/she has caused damage to any of the Authority's projects, or ruined or destroyed any water resources or the Authority's public sewers or acted in any way which may cause the damage or destruction of construction, equipment, vehicles or materials related to the Authority; or polluted any water resource, which is under the management or supervision of the Authority directly or indirectly, or caused its pollution and failed to remove the causes thereof within the period fixed by the Authority.

3.2.3.3.4 CULTURAL HERITAGE & ANTIQUITIES LAW NO. 21/1988 AND ITS AMENDMENT LAW NO.23/2004

The **Cultural Heritage & Antiquities Law (No. 21/1988 and amendment No. 23/2004)** stipulates the duties for the implementation of the archaeological policy of Jordan; i.e. for:

- (a) management, protection and maintenance of local archaeology;
- (b) spread of awareness of its importance; and
- (c) investigation and recording of archaeological sites and its importance.

The Law gives the Minister of Tourism the authority to specify the allowable distance of any establishment from any known archaeological site. Still, in case of finding any kind of antiquities during any excavation, the proponent must report it to the nearest police station as well as the closest Department of Antiquities.

3.2.3.3.5 REGULATION OF DEVELOPMENT ZONES NO. 2/2008

The **Regulation of Development Zones No. 2/2008** aims at enhancing the economic capacity in the Kingdom, attracting investments and creating an advanced investment environment for economic activities. It is the responsibility of a Commission established through this regulation to:

- regulate the investment environment in the development zones and monitor economic activities within;
- supervise the implementation of Master Developers obligations to manage and develop Development Zones; and
- protect the environment, water resources, natural resources and biological diversity in the manner consistent with environmental laws and regulations in Jordan.

3.2.3.3.6 RENEWABLE ENERGY & ENERGY EFFICIENCY LAW

A new **Renewable Energy and Energy Efficiency Law** has been approved by the cabinet in 2010. This law allows the MoEMR to work with other specialised entities to conserve energy and increase energy efficiency in different sectors (Article (3c)), whereas the Council of Ministers will issue by-laws

necessary for execution of the provisions, including procedures and measures for energy conservation and energy efficiency in the various sectors (Article (17)).

The law also sets incentives to promote renewable energy utilisation in Jordan, which can be met through SWM (WtE, LFG projects, biogas projects, etc.). In this context, MoEMR has, inter alia, the following responsibilities:

- a. exploits renewable energy resources for increasing the level of their contribution to the total energy mix;
- b. contributes to environmental protection and achieves sustainable development;
- c. identifies specialized technical bodies and geographical locations in Jordan which demonstrate high potential for exploiting renewable energy sources;
- d. issues tenders to attract proposals on competitive basis for the development of any approved site for that purpose;
- e. accepts proposals through the Council of Ministers to develop any site for the purpose of exploiting renewable energy sources;
- f. establishes and runs a fund known as "Renewable Energy Sources and Energy Efficiency Fund" with the aim of providing necessary funding for relevant purposes.

3.2.3.3.7 REGULATION FOR PROTECTING THE ENVIRONMENT FROM POLLUTION EMERGENCY SITUATIONS No. 26/2005

According to the Regulation for Protecting the Environment from Pollution Emergency Situations No. 26/2005, Articles (9) to (12) list the responsibilities of any establishment or project in the case of any emergency case. Each facility existing in any Governorate and/or handling hazardous substances shall:

- nominate an officer who will be responsible before the Local Operations Committee to implement the emergency plan of the facility where he is employed;
- provide the necessary requirements for protection including manpower, instruments and equipment to be ready for use in an emergency situation;
- submit regular reports to the Local Operations Committee indicating the quantity, quality, potential hazard and location of such substances, as well as the location of control equipment therein; and
- remove any violation for handling emergency situations and provide the necessary requirements for that purpose, including equipment and manpower, in accordance with standards set by the MoENV.

3.2.3.3.8 REGULATION FOR LICENSING / ENVIRONMENTAL IMPACT ASSESSMENT NO. 37/2005

The environmental assessment of alternatives in Jordan stems from the national Environmental Protection Law No. 52/2006. The MoENV is the agency responsible for implementing the EIA system, contained within **Environmental Impact Assessment Regulation No. 37/2005**. According to this regulation, most businesses must obtain the MoENV's approval prior to commencing operations.

The licensing procedure shall start when the project owner submits an application to the MoENV to obtain the Environmental Approval needed to establish the project. The project location shall be established according to appropriate zoning standards in Jordan by the Central Licensing Committee. It will be screened and classified as one of the following categories, on the basis of the recommendations of the Central Licensing Committee, as follows:

1. **Category 1:** The project requires a comprehensive EIA. In case of Category 1, the MoENV shall advise the project owner in writing, requesting a full comprehensive EIA for the project.

The project owner through his consultant shall submit a preliminary draft of the ToR for the EIA study he intends to conduct; after agreeing with the Ministry on the content of the draft, the general framework and scope of the study, the nature of anticipated significant impacts of the project, and the entities concerned with and affected by the project, a scoping (public hearing) session will be conducted. The Ministry will invite the necessary stakeholders, including concerned individuals or representatives of any public or private party (GOs and NGOs) that may be potentially affected by the project, to participate in investigating the preliminary draft to identify significant impacts of the project on the environment. During this session, the owner/consultant will present the project and its suggested impacts. They will allow the invitees to participate, discuss, and list their concerns. These will be listed and documented in special forms regarding all environmental components (VECs). Based on that, the full EIA will be conducted. The EIA report will be sent to the MoENV and will be reviewed by a technical EIA Committee chaired by the Secretary General, and a group of experienced, technically specialized professionals.

Upon the Ministry's receipt of the draft EIA document, the Technical Committee shall review and analyse the draft to ascertain its compliance with the provisions of certain regulations. If it finds that the application fulfils relevant conditions and requirements, the party making the submission is advised thereof. But if it finds that the application does not fulfil the conditions and requirements, the Technical Committee shall require the project owner to provide any additional information needed to complete its analysis of the draft. The Technical Committee shall issue its decision 45 days after the date of receipt of the draft that is in fulfilment of the conditions and requirements thereof, in accordance with the following:

- a. Approving the draft and considering it as final EIA document. This will occur if it is shown that the project's environmental impacts are appropriately dealt in the study, including the plan for reducing adverse impacts. The approval shall be valid for one year from the date it is issued.
- b. Denial of environmental approval of the project if it is shown that its implementation would cause significant impact to the environment and that the plan for reducing adverse impacts is inadequate for that purpose.
2. **Category 2:** The project will require a preliminary environmental assessment, based on which the need to conduct a comprehensive EIA will be determined accordingly.
3. **Category 3:** The project does not require any kind of environmental assessment.

In the context of this Regulation, it is noted that SW produced at any establishment or as a result of any activity, must be taken into consideration and managed probably in the framework of the respective EIA. Added to that, it should be noted that any SWM facility (landfill, treatment plant, etc.) usually applies for a full EIA (Category 1) and requires the approval of the MoENV.

3.2.3.3.9 REGULATION FOR SOIL PROTECTION NO. 25/2005

According to the **Regulation for Soil Protection No. 25/2005**, the MoENV, in cooperation with the Ministry of Agriculture (MoAGR) and any other entity concerned with soil protection, shall carry out the following tasks and authorities:

- a. Set up a comprehensive environmental plan to protect the soil and determine optimal land uses.
- b. Monitor sources of soil pollution and control them to the limit permitted environmentally, in accordance with the locally established standards and specifications.
- c. Set the necessary instructions to protect soil from the harmful effects of industrial dust, SW or wastewater.

3.2.3.3.10 REGULATION FOR NATURAL RESERVES & NATIONAL PARKS NO. 29/2005

The **Regulation for Natural Reserves & National Parks No. 29/2005** authorizes the MoENV to coordinate with other concerned parties in purchasing or leasing lands within the borders of a Natural Reserve or National Park, otherwise the owners of these lands shall have the right to use it in a manner not in conflict with the protection objectives and the management plan of the reserve or park.

Subject to the provisions of any other legislation, no person is permitted to carry out any activities within the boundaries of the Natural Reserve or National Park including the exploitation of the natural resources thereof, without the approval of the management of the Natural Reserve or National Park.

Any SW generated through such exploitation, is subjected to legal responsibility and it is the responsibility of the proponent of the exploitation to manage such SW properly.

3.2.3.3.11 REGULATION FOR AIR PROTECTION NO. 28/2005

The Regulation for Air Protection No. 28/2005 obligates any established facility (including any SWM facilities for disposal, treatment facility, etc.) to the following:

- a. install apparatuses and equipment necessary to guarantee the reduction of the emission of air pollutants so as not to exceed the maximum permissible levels;
- b. provide the MoENV with regular reports setting out the results of monitoring of pollutants produced by the facility itself or in cooperation with any other entity;
- c. set up a plan to handle emergency situations in which air pollutants are leaked; and
- d. provide ventilation methods in public areas appropriate to the size of the place and its capacity and the kind of activity practiced within, in a manner that guarantees air circulation and freshness, and appropriate air temperature, and in compliance with the Jordanian construction code.

3.2.3.3.12 REGULATION FOR GROUNDWATER MONITORING NO. 85/2002

The **Regulation for Groundwater Monitoring No. 85/2002** stipulates the responsibility of groundwater monitoring and development to the WAJ. It is also compulsory for any project owner to protect and prevent any pollution sources to groundwater in the area of his project. He must take every means and mitigation measures within his project to protect groundwater and wells. In case of mishaps, he is responsible to report such matter to WAJ.

3.2.3.3.13 REGULATION FOR REGULATING THE INVESTMENT OF NON-JORDANIANS

The **Regulation for Regulating the Investment of Non-Jordanians** stipulates and specifies the percentage of non-Jordanian ownership or participation in the sectors and activities listed within. Non-Jordanian investors may own any project wholly or partially or may participate in it in any percentage except for cases and activities stipulated in Article (3) (no more than 50%), Article (4) (no more than 49%) or Article (6) (0%) of the regulation unless through a recommendation to the Council of Ministers as stated in Article (8) and depending on concerned sector legislations.

The Regulation does not stipulate directly SWM, but it generally makes reference in Article (3-B) to engineering services, construction, and technical testing, as sectors where SWM facilities can fall and subjected to the no more than 50% stipulation.

3.2.3.3.14 PRIVATIZATION LAW NO. 25/2000

The **Privatization Law No. 25/2000** sets the general legal framework for privatization in Jordan and was produced to coordinate and regulate mainly the restructuring and privatization of public institutions and enterprises owned by the public sector. It defined privatisation as the adoption of an economic methodology which enhances the role of the private sector in the economy to include public sector enterprises the nature of which requires that they may be managed on commercial bases.

The Law is general and not specific towards SWM projects, and includes, inter alia, the following:

- describes privatization and its objectives;
- establishes the so-called “*Executive Privatisation Commission*” (EPC) as a financially and administratively independent entity affiliated to the Prime Minister;
- creates the Privatization Proceeds Fund; and
- outlines the general provisions for establishing public-private partnerships.

In addition to the possibility to restructure and privatize the public administration, the Privatization Law outlines a set of schemes for the establishment of specific investments such as BOT (Build - Operate - Transfer), BTO (Build - Transfer - Operate), BOO (Build - Own - Operate) or BOOT (Build - Own - Operate - Transfer), etc. which are all considered as PPP possibilities requiring an agreement between a private sector and a public administration.

It must be noted that the status of this Law is not clear nowadays, since the EPC has been recently dismantled (May 2014).

3.2.3.3.15 REGULATION NO.80/2008 FOR IMPLEMENTING PRIVATIZATION TRANSACTIONS

Public-Private Partnerships (PPP) in general are regulated by the provisions of the Regulation No.80/2008 for Implementing Privatization Transactions, which was established by virtue of Article (20) of the Privatization Law No.25/2000. The 2008 Regulation provides a generic definition of PPPs, which may provide a generic reference as to what constitutes a concession agreement; PPP is defined as “*a relatively long-term written agreement between the public and private sectors for the purpose of providing a service of a general nature or implementing a project or performing a certain task whereby project financing and allocation of risks arising there from shall be pursuant to the contract*”. Moreover, it is generally accepted that a concession contract is one of the three main forms of international contracts; it may represent a permit, a license or a lease.

It also contains the terms and conditions on which the concession is granted, creating a mini-legal system which regulates the relevant activities.

Concessions are usually awarded after succeeding in a bidding process initiated by a Request for Proposals (RFP) announced by the GoJ. The Regulation No.80/2008 does not provide a detailed procedure for tendering, but provides some guidance. Article (11) provides that investors who are bidding for a tender shall be selected in one phase or two phases if an established Steering Committee recommends so as stated in Article (4). According to the Regulation, the GoJ in coordination with the Steering Committee must provide interested and qualified investors a tendering document which defines the relevant financial and technical criteria for pre-qualification and qualification.

Still, it should be noted that this regulation is derived - as mentioned above - from the Privatization Law No.25/2000 which has been delineated as well as the EPC Commission which is responsible for its implementation. Based on that, the status of the Regulation is unclear at this time, awaiting the new regulation pending at the Parliament.

3.2.3.3.16 REGULATION OF NUISANCE PREVENTION AND SOLID WASTE COLLECTION FEES OF GAM NO. 83/2009

The **Regulation of Nuisance Prevention and Solid Waste Collection Fees of GAM No. 83/2009** states basically the role and responsibility of GAM to attain fees for the collection, transportation, disposal, and treatment of SW according to the following:

1. **For residential units:** fees are collected based on monthly electricity consumption as follows:
 - a. Annual fee of 20 JOD divided monthly if monthly electricity consumption is ≤ 200 kWh.
 - b. For units with electricity consumption > 200 kWh, the amount of 5 fils per kWh is added to the aforementioned 20 JOD fee.
2. **For commercial and industrial establishments:** 20% of annual professional license fees.
3. **Other fees** depending on the type, size, and quantity of SW from any establishment requiring special care.

This Regulation also prohibits for any person or establishment to collect, transport, treat, or dispose of SW in the city of Amman without the consent of Greater Amman Mayor.

3.2.3.4 MSWM RELATED FORTHCOMING LEGISLATION

3.2.3.4.1 GENERAL

According to consultation with the MoENV, it has been confirmed that presently, key draft legislations in the pipeline are: amendments to the Environment Protection Law, draft Waste Framework Law, environmental permitting, inspection and audit, environmental funding and economic instruments.

Those amendments/acts have been identified as being necessary to fill existing gaps of the environmental legislation and protocols - the MSWM ones included - with view to regulate in detail and boost towards environmental protection in Jordan, which is MoENV's purpose.

At the time, the forthcoming MoENV draft legislations relevant to this Project include:

- the new amended Environmental Protection Law; and
- the Law for the General Framework for Waste Management.

Although there is urgent need to issue the aforementioned laws, they have not been put into force yet and their date of issuance remains unknown. However, it is important to acknowledge that these proposed draft laws are subject to continuous change.

3.2.3.4.2 NEW AMENDED ENVIRONMENTAL PROTECTION LAW

A **draft amended Environmental Protection Law** is currently under preparation by the MoENV in cooperation with the US company "AECOM" through a project financed by the US Agency for International Development in Jordan (USAID/Jordan). This law is supposed to be in its final drafting process and still cannot be counted on as a law, until approved by the GoJ and the Parliament. In broad terms, the Amended Environmental Protection Law aims to highlight and increase the consequences associated with any environmental violation. Thus, where the current Law falls short from mentioning penalties for many acts of violation, the amended Law aims to cover that gap or emphasises on the penalties for such violation.

The Amended Environmental Protection Law states that an Environmental Protection Regulation is to be issued complementary to the Law.

The last produced draft of the law (dated May, 2014) includes a few articles regarding SWM in Jordan as follows:

- Article (4), which stipulates the responsibility of production of a national policy and plan for SWM according to SW type, as well as the approval of SW disposal locations to the MoENV.
- Article (13), which allows import of non-hazardous SW for recycling and reprocessing purposes, depending on its availability in Jordan.
- Article (14), which stipulates that the responsibility for SW collection, transportation, and treatment will depend on conditions set by the MoENV.
- Article (15), which prohibits disposal or incineration of SW in non-designated areas.

3.2.3.4.3 LAW FOR THE GENERAL FRAMEWORK FOR WASTE MANAGEMENT

The MoENV has fervently worked to issue a law that will serve as an umbrella for SWM in general: the **General Framework for Waste Management**. As a result, by 2008, the existing shortcomings in SWM legislations have been assessed, studied, and consequently, a draft of this law has been prepared by the MoENV with the assistance of the European Commission (EC), covering both municipal and hazardous waste. Although this draft has been made public for any concerned entity to review and provide feedback, MoENV has particularly approached and consulted with other respective official entities for their opinion.

In broad terms, the Law promotes the “**reduce-reuse-recycle**” (Three R’s) approach and states Life-Cycle Analysis (LCA) and the “**polluter-pays principle**” as tools to achieve the objectives of such an approach. Moreover, the Law calls for optimizing benefits from SW, by permitting the permanent disposal of SW only when no secondary raw materials can be extracted of it, or if their extraction is deemed not feasible compared to the cost for their disposal.

As part of the DD process carried out for this Project, it was indicated by more than one official officer at MoENV that this law is not high on the agenda of the recent administration, whereas the desired direction is that SWM issues to be clarified through the new Amended Environmental Protection Law.

3.2.3.4.4 DRAFT PPP LAW

According to the ToR of the present project, a **new PPP Law** has been in preparation. However, as the EPC has been dismantled since May 2014 and its assets have returned to the Ministry of Finance (MoF), a draft version of it could not be acquired by the Consultant since its status is not clear for the time being and for the future as well.

The Consultant has been informed that the relevant laws and regulations lead by the EPC, the Privatization Law No. 25/2000, will be frozen and be ineffective at this time. This case also includes any drafts produced for the purposes of developing or improving the PPP process in Jordan. Still, unless it contradicts with the new situation, the General Electricity Law as well as Law of Renewable Energy can be a possible route toward PPP in the SW sector. Even though, the scope will be limited to WtE projects.

3.3 INTERNATIONAL REGULATORY FRAMEWORK FOR WASTE MANAGEMENT

3.3.1 GENERAL

Strengthening and harmonization of environmental legislation through adaptation of relevant international best practices to the Jordanian context and its enforcement in different fields including SWM are being supported by the European Union (EU) as well as the United States (US) in order to enable the GoJ to meet the international standards as part of its overall national environmental reform process.

One important issue that has been considered as part of the key areas of international cooperation with Jordan in the environmental sector is SWM. In order to manage SW properly, and in compliance with the international standards, the SWM policy and legislation must incorporate basic principles and rules that encourage and promote their implementation.

As mentioned before, the forthcoming MoENV draft legislations (amended Environmental Protection Law / Law for the General Framework for Waste Management) have not yet been set in force, so it is an opportunity to discuss the basic guidelines of the relevant EU and USEPA (US Environmental Protection Agency) policy and legislation in order to act as a basis for future recommendations.

3.3.2 EU SWM RELATED POLICY & LEGISLATION

3.3.2.1 EU ENVIRONMENTAL POLICY

SWM has been very high in the EU environmental agenda for more than a decade. The **EU 6th Environment Action Programme (EAP) for 2002-2012** had identified waste prevention and management as one of its four (4) top priorities, with primary objective to ensure that economic growth would not lead to more and more waste. The mottoes were to turn Europe “into a recycling society” and “into a zero-waste generating society”.

Recently (January 2014), the **7th EAP to 2020 “Living well, within the limits of our planet”** was entered into force with target to guide the EU environmental policy until 2020 and also set some guidelines for 2050.

The 7th EAP has set the following priority objectives, all of which are linked in one way or another with MSW:

1. to protect, conserve and enhance the EU natural capital;
2. **to turn the EU into a resource-efficient, green and competitive low-carbon economy;**
3. to safeguard the EU citizens from environment-related pressures and risks to health and well-being;
4. to maximise the benefits of EU environment legislation by improving implementation;
5. to improve the knowledge and evidence base for EU environment policy;
6. to secure investment for environment and climate policy and address environmental externalities;
7. to improve environmental integration and policy coherence;
8. to enhance the sustainability of the EU cities;
9. to increase the EU effectiveness in addressing international environmental and climate-related challenges.

It is also mentioned that the 7th EAP shall be based on the *precautionary principle*, the *principles of preventive action* and of *rectification of pollution at source* and the *polluter-pays principle*.

In terms of turning the EU into a resource-efficient, green and competitive low-carbon economy, the 7th EAP targets, inter alia, to:

- reducing the per capita waste generation and waste generation in absolute terms;
- limiting energy recovery to non-recyclable materials;
- phasing out of landfilling of recyclable or recoverable waste;
- ensuring high quality recycling where the use of recycled material does not lead to overall adverse environmental or human health impacts;
- developing markets for secondary raw materials;
- managing hazardous waste efficiently, to minimise significant adverse effects on human health and the environment;
- applying market-based instruments and other measures that privilege prevention, recycling and re-use more systematically;
- supporting the development of non-toxic material cycles;
- removing the barriers facing recycling activities in the EU internal market;
- reviewing of the existing prevention, re-use, recycling, recovery and landfill diversion targets, so as to move towards a lifecycle-driven “circular” economy, with a cascading use of resources and residual waste that is close to zero.

This requires, in particular full implementation of the EU waste legislation, applying the waste hierarchy in accordance with the Waste Framework Directive (see below) and the effective use of market-based instruments and other measures to ensure that:

- (1) landfilling is limited to residual (i.e. non-recyclable and non-recoverable) waste;
- (2) energy recovery is limited to non-recyclable materials;

- (3) recycled waste is used as a major, reliable source of raw material for the Union, through the development of non-toxic material cycles;
- (4) hazardous waste is safely managed and its generation is reduced;
- (5) illegal waste shipments are eradicated, with the support of stringent monitoring; and
- (6) food waste is reduced.

3.3.2.2 EU THEMATIC STRATEGY ON THE PREVENTION & RECYCLING OF WASTE

In line with the EU environmental policy, the EU waste policy contributes to increasing the EU's resource-efficiency and reducing the negative environmental and health impacts over the life-cycle of resources. The **Thematic Strategy on the Prevention and Recycling of Waste** adopted in 2005 was based on the 6th EAP guidelines and sets as long-term goal for the EU to become a recycling society that seeks to avoid waste and uses waste as a resource. To this end, the Strategy sets out key actions to modernize the existing legal framework and to promote waste prevention, reuse and recycling, with waste disposal only as last resort.

The key-actions to achieve its objectives are:

1. Implementation and enforcement of existing EU waste legislation;
2. Simplification and Modernisation Further elaboration of the EU's recycling policy;
3. Introduction of life-cycle thinking into waste policy;
4. Promotion of more ambitious waste prevention policies;
5. Improvement of the knowledge base;
6. Development of common reference standards for recycling; and
7. Further elaboration of the EU's recycling policy.

Based on the above, the strategy resulted in the revision of the Waste Framework Directive, the cornerstone of the EU waste policy. This revision brought a modernised approach to SWM, marking a shift away from thinking about waste as an unwanted burden to seeing it as a valued resource.

3.3.2.3 THE EU WASTE FRAMEWORK DIRECTIVE (DIRECTIVE 2008/98/EC)

The revised **Waste Framework Directive (WFD) (Directive 2008/98/EC)** focuses on waste prevention and puts in place new targets which will help the EU move towards its goal of becoming a recycling society.

It streamlines waste legislation, incorporating rules on a number of issues and sets the basic concepts and definitions related to waste management and lays down waste management principles such as the "*polluter-pays principle*" or the "*waste management hierarchy*".

The WFD introduces a five-step hierarchy of waste management practices (see Figure 3-3), where prevention is the best option, followed by reuse, recycling and other forms of recovery (e.g. energy recovery), with disposal (e.g. landfilling) as the last resort.

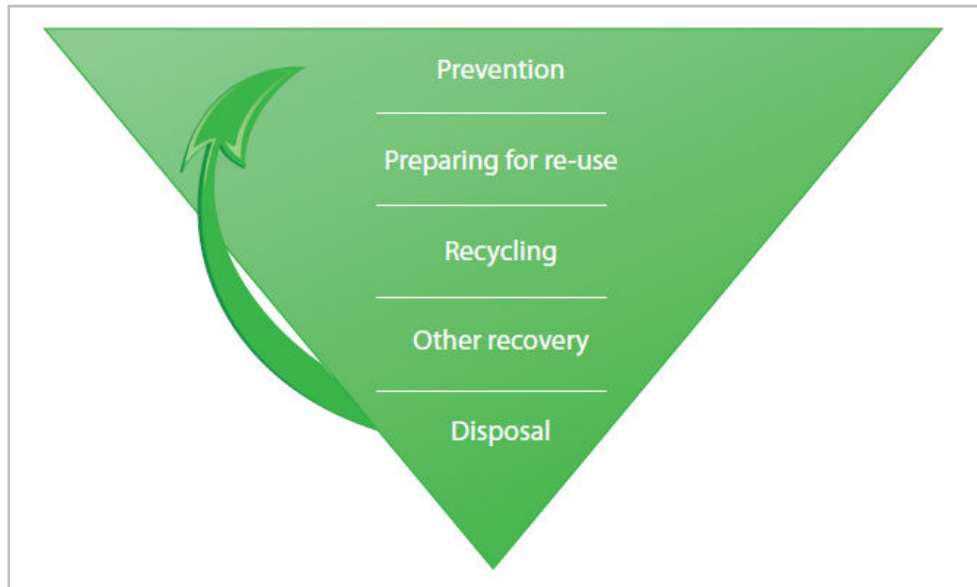


Figure 3-3: Hierarchy of SWM practices (source: EC, 2010)

The waste hierarchy generally lays down a priority order of what constitutes the best overall environmental option in waste legislation and policy, while departing from such hierarchy may be necessary for specific waste streams when justified for reasons of, inter alia, technical feasibility, economic viability and environmental protection.

The WFD has introduced the concept of life-cycle thinking into waste policies (see Figure 3-4). This approach gives a broader view of all environmental aspects and ensures any action has an overall benefit compared to other options. It also means that activities dealing with waste should be compatible with other environmental initiatives as well.

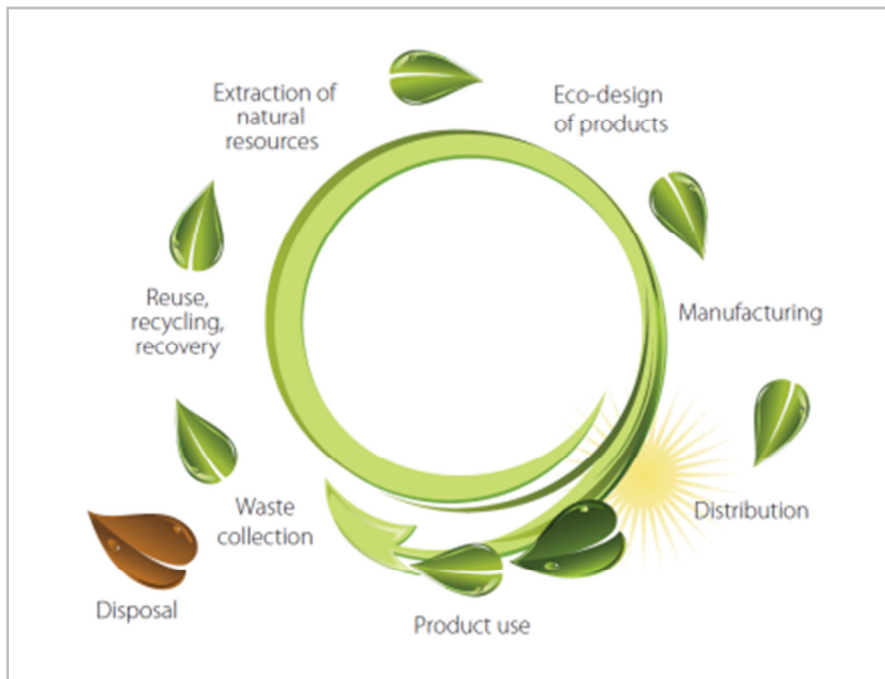


Figure 3-4: Life-cycle thinking into waste policies (source: EC, 2010)

Waste prevention is highlighted in the WFD and specific actions to reach waste prevention and decoupling objectives for 2020 are described. The concept of the extended producer responsibility is entered, in order to strengthen the re-use, prevention, recycling and other recovery of waste.

The recovery, re-use and recycling of waste is also regulated. Where necessary to facilitate or improve waste recovery, waste is suggested to be collected separately if technically, environmentally and economically practicable and not be mixed with other waste or other materials with different properties. Subject to this, a target has been set to separately collect at least the following waste fractions: paper, metal, plastic and glass by 2015.

Additionally, recycling targets have been set for the EU Member States to recycle $\geq 50\%$ of their MSW and $\geq 70\%$ of Construction & Demolition Waste (C&D, including backfilling) by 2020.

Regarding biowaste:

- their separate collection is encouraged with view to composting and digestion;
- their treatment is encouraged in a way that fulfils a high level of environmental protection;
- the use of environmentally safe materials produced from them is encouraged.

As a conclusion, the WFD has a significant effect on SWM in the EU, promoting reuse / recycling / other recovery (e.g. energy recovery) of SW by principal, in comparison with sanitary disposal. Waste disposal should be carried out without endangering human health, without harming the environment and, in particular:

- a. without risk to water, air, soil, plants or animals;
- b. without causing a nuisance through noise or odours; and
- c. without adversely affecting the countryside or places of special interest.

3.3.2.4 OTHER EU WASTE LEGISLATION

Other important pieces of EU legislation that relate to the SWM sector are:

- Directive 1999/31/EC *on the landfill of waste* (Landfill Directive), as amended by Regulation (EC) No 1882/2003 and Regulation (EC) No 1137/2008;
- Directive 2000/76/EC *on the incineration of waste* (Waste Incineration Directive), as amended by Regulation (EC) No 1137/2008;
- Directive 2009/28/EC *on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC*;
- Directive 94/62/EC *on packaging and packaging waste* (Packaging and Packaging Waste Directive), as amended by Directive 2004/12/EC, Directive 2005/20/EC and Regulation (EC) No 219/2009;
- Directive 2000/53/EC *on end-of-life vehicles* (End-of-Life Vehicles Directive), as amended by Decisions 2002/525/EC, 2005/438/EC, 2005/673/EC, 2008/33/EC and 2008/112/EC;
- Directive 2002/96/EC *on waste electrical and electronic equipment* (WEEE) (WEEE Directive) and Directive 2002/95/EC *on the restriction of the use of certain hazardous substances in electrical and electronic equipment*, as amended by Directives 2003/108/EC, 2008/34/EC, 2008/35/EC and 2008/112/EC;
- Directive 2006/66/EC *on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC* (Batteries Directive), as amended by Directive 2008/12/EC and Directive 2008/103/EC;
- Directive 96/59/EC *on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)* (PCB/PCT Directive), as amended by Regulation (EC) No 596/2009;
- Directive 2010/75/EU *on industrial emissions (integrated pollution prevention and control)* (Industrial Emissions – IPPC Directive); and
- Directive 2006/21/EC *on the management of waste from extractive industries and amending Directive 2004/35/EC*, as amended by Regulation (EC) No 596/2009.

Directive 1999/31/EC (Landfill Directive) implements the EU policy for waste management (CEC 1999) which aims to encourage the recovery of value from waste products and to reduce the disposal of biodegradable waste (biowaste) to landfill.

A standard waste acceptance procedure is laid down so as to avoid any risks:

- waste must be treated before being landfilled;

- hazardous waste within the meaning of the Directive must be assigned to a hazardous waste landfill;
- landfills for non-hazardous waste must be used for municipal waste and for non-hazardous waste;
- landfill sites for inert waste must be used only for inert waste.

The following waste may not be accepted in a landfill:

- liquid waste;
- flammable waste;
- explosive or oxidising waste;
- hospital and other clinical waste which is infectious;
- used tires, with certain exceptions;
- any other type of waste which does not meet specific acceptance criteria.

It is also important to mention that the Landfill Directive sets an obligation for reduction of the biowaste sent to landfills to 75%, 50% and 35% of the 1995 levels, 5, 8 and 15 years respectively after bringing the Directive into force. This implies that landfilling is not considered a sustainable approach to organic fraction of SW in the long-term.

Directive 2000/76/EC (Waste Incineration Directive) sets several standards and technical requirements (air emissions, water discharges contamination, plant designs) that have to be respected by the designers and operators of plants incinerating waste. Therefore this directive allows for another significant alternative option for managing and treating SW by incineration, in order to produce energy.

Directive 2009/28/EC is related to the promotion of the use of energy from renewable sources, which sets mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy and for the share of energy from renewable sources in transport. Overall, in 2020 there shall be at least a 20% share of energy from renewable sources in the EU gross final energy consumption. Such targets are likely to create incentives for the use of renewable energy sources, such as the LFG emitted from landfills or thermal power of waste. Therefore, anaerobic treatment of SW through composting, exploitation of the LFG emissions and/or thermal treatment of SW is promoted through this Directive.

The **Packaging & Packaging Waste Directive (Directive 94/62/EC)**, the **End-of-Life Vehicles Directive (Directive 2000/53/EC)**, the **WEEE Directives (Directives 2002/96/EC and 2006/66/EC)** and the **PCB/PCT Directive (Directive 96/59/EC)** set standards, targets and timeframe for the separate collection and management of packaging waste, end-of-life vehicles, WEEE and batteries & accumulators and waste containing PCBs/PCTs respectively, in respect of their reuse, recycling and recovery. With regards to the vehicles (new and end-of-life) and WEEE, specific measures to restrict

the use of hazardous substances are applied. All the aforementioned Directives could act as guides for separate management, reuse, recycling and recovery of the relevant waste fractions in Jordan.

Directive 2010/75/EC (Industrial Emissions - IPPC Directive) sets high standards for issuing permits for industrial and agricultural activities with a high pollution potential, such as waste management plants. These high standards promote high quality waste management procedures (recycling, recovery or disposal of waste in the least polluting way possible) in order to achieve stricter standards.

Finally, **Directive 2006/21/EC** sets standards and targets for the management of waste resulting from the extraction, treatment and storage of mineral resources and the working of quarries. It states that this particular extractive waste must be managed in specialised facilities in compliance with specific rules, inter alia by applying the concept of "*best available techniques*" and after having obtained a permit from the competent authorities. The objectives must be as follows:

- to prevent or reduce the generation of waste and/or its harmful nature;
- to encourage waste recovery through recycling, re-use or reclaiming; and
- to encourage the short and long-term safe disposal of waste.

This Directive could act as a guide for separate management of waste from extractive industries in Jordan.

3.3.3 US EPA SWM RELATED POLICY & REGULATIONS

In the US, the **Resource Conservation and Recovery Act (RCRA)** addresses SW and hazardous waste and rules their management activities. It is the public law that creates the framework for the proper management of hazardous and non-hazardous SW. It also includes a Congressional mandate directing the USEPA to develop a comprehensive set of regulations to implement the law.

The RCRA regulations are contained in Title 40 "Protection of the Environment" of the Code of Federal Regulations (CFR), Parts 239 through 299. Of them, Parts 239 through 259 contain the regulations for SW.

Part 239 – Requirements for State Permit Program Determination of Adequacy

This part specifies the requirements that State permit programs must meet to be determined adequate by the USEPA, and the procedures that the USEPA will follow in determining the adequacy of State permit programs or other systems of prior approval and conditions required to be adopted and implemented by States.

Part 240 – Guidelines for the Thermal Processing of Solid Waste

This Guideline regulates the procedure to treat MSW by incineration at facilities designed to process ≥ 50 tn/d of MSW. It defines the minimum levels of performance required from these facilities and their design, and stresses the importance to dispose of the Thermal Processing Operation residues and non-hazardous waste which cannot be thermally processed in an environmental friendly manner in accordance with USEPA's guidelines.

Part 241 – Solid Waste Uses as Fuels or Ingredients in Combustion Units

This part identifies the requirements and procedures for the identification of SW used as fuels or ingredients in combustion units.

Part 243 – Guidelines for the Storage and Collection of Residential, Commercial and Institutional Solid Waste

These Guidelines delineate the minimum levels of performance required for SW collection operations; the storage of solid waste, safety of personnel, collection equipment, collection frequency, and collection management. It also presents additional suggested actions or preferred methods by which the objective of the requirements can be realized. The collection system must ensure the protection of the health and safety of personnel associated with the operation.

Part 246 – Source Separation for Materials Recovery Guidelines

This part delineates the minimum actions for the recovery of natural resources included in SW, through source separation of residential, commercial, and institutional SW. It presents the recommended procedures to separate different types of waste at source to fulfil the requirements of these regulations.

Part 247 – Comprehensive Procurement Guideline for Products Containing Recovered Materials

The purpose of these Guidelines is to assist procuring Agencies in complying with the requirements of section 6002 of the Solid Waste Disposal Act, as they designate items that are or can be made with recovered materials.

Part 254 – Prior Notice of Citizen Suits

This Part provides the guidelines of pursuing suits by any person to enforce the Act, where there is alleged to be a violation by any person of any permit, standard, regulation, condition, requirement, or order which has become effective under the Act, or a failure of the Administrator to perform any act or

duty under the Act, which is not discretionary with the Administrator. It also prescribes procedures governing the notice requirements as prerequisite to the commencement of such actions.

Part 255 – Identification of Regions and Agencies for Solid Waste Management

The guidelines of this Part are applicable to policies, procedures, and criteria for the identification of those areas which have common SWM problems and which are appropriate units for planning regional SWM services. The guidelines also define and guide the identification of which functions will be carried out by which Agencies.

The purposes of these guidelines are to:

1. provide useful criteria for selecting the regions and Agencies to be identified;
2. provide guidance for conducting the process which will result in formal identification of those regions and Agencies; and
3. set the responsibilities of the identified Agencies and their relationships to other programs.

Part 256 – Guidelines for Development and Implementation of State Solid Waste Management Plans

This Part aims at assisting in the development and implementation of State Solid Waste Management Plans (SWMP), by defining the scope of these plans. The guidelines of this Part contain methods for achieving the objectives of environmentally sound management and disposal of solid and hazardous waste, resource conservation, and maximum utilization of valuable resources, and address the minimum requirements for approval of State SWMP.

Part 257 – Criteria for Classification of Solid Waste Disposal Facilities and Practices

The criteria in this Part are adopted for determining which SW disposal facilities and practices pose a reasonable probability of adverse effects on health or the environment.

Part 258 – Criteria for Municipal Solid Waste Landfills

This Part aims at establishing minimum national criteria for all MSW landfill units, and for MSW landfills that are used to dispose of sewage sludge, to ensure the protection of human health and the environment. It sets the location restrictions for new landfill units, and for lateral expansions of older units, and defines the operating and design criteria of the MSW landfills, and the criteria for groundwater monitoring and for closure and after-care of these landfill units.

3.4 GAPS, CONCLUSIONS & RECOMMENDATIONS

The most important existing legal gap regarding MSWM in Jordan is basically, the **direction of the GoJ towards SWM in general, and especially MSWM.**

Through the analysis and comparison of local and international policy and legislative framework, as provided in the previous sections, it is apparent that the Jordanian SWM framework is way less developed than the EU and the US ones. Therefore, the links to be discussed are very limited in relation to required detail.

However, significant steps are currently being made in the Jordanian context, through the following:

- (c) the preparation of the National Strategy to improve the MSWM sector including a relevant Action Plan (i.e. the present Project) as being promoted by the MoMA and the CVDB;
- (d) the preparation of the new amended Environmental Protection Law, as described in section 3.2.3.4.2 of the report on hand; and
- (e) the preparation of the Law for the General Framework for Waste Management, as described in section 3.2.3.4.3 of the report on hand.

With regards to the National MSWM Strategy, it is planned to have been finalized by end of 2014, whereas it can be set in force at early 2015.

On the other hand, as it regards the two laws, as informed during our co-ordinations with relevant MoENV officers, it seems that the Law for the General Framework for Waste Management is not high in the agenda of the present MoENV administration, whereas the desired direction is that SWM issues will be clarified through the new amended Environmental Protection Law.

In our opinion, this would not cause a problem provided that the appropriate provisions are included in the one law or the other, as well as in corresponding Regulations/Instructions of theirs. However, it seems more practical for the SWM sector that the General Framework of Waste Management Law is issued, since it would be more direct and specific.

It is noted that the EU SWM framework matches better to the draft General Waste Management Framework Law provisions, since the latter has been derived from the EU legislation. Both frameworks have been based on the precautionary principle, the principles of pollution preventive action, the ratification of pollution at source and the polluter pays principle. The EU legislation is directed towards absolute terms. On the other hand, although the draft Jordanian General Framework of Waste Management Law is based on the same principles, it is limited to economic and technical feasibility and has been mostly adjusted to the local conditions of Jordan.

In addition, the EU legislation contains separate Directives for many specific components of SWM, as listed in section 3.3.2.4, including incineration, landfilling, etc. The draft Jordanian General Framework

of Waste Management Law seems to incorporate such components as articles within its provisions, but it mainly focuses on landfilling rather than on other SWM practices. So, other SWM practices, such as waste recycling, incineration, etc. are included in the draft law, but need more detail to be regulated. This may happen through appropriate Regulations or Instructions.

The same arguments apply when comparing US legislation with the Jordanian framework.

Table 3-2 includes a more specific comparison between the Jordanian SWM policy and legislative framework and the related international ones, through the identification of **major gaps of the Jordanian framework** in contrast to them. Those gaps are proposed to be embedded in the upcoming SWM legislative framework in Jordan in order to be aligned to the international policy. The table also includes suggestions on the nature of the policy and legislative acts that could be issued for resolving those gaps. Further analysis and linkage will be part of the next stages of the project.

Table 3-2: Major gaps in the current SWM legislation in Jordan

#	Gaps	(1)	(2)	(3)
1	Priority to SW prevention and management, promoting the “ <i>reduce-reuse-recycle</i> ” (Three R’s) approach	✓	✓*	
2	Setting of SWM priorities: prevention → preparing for re-use → recycling → other recovery (e.g. energy recovery) → landfilling allowing the implementation of lower priority practices only when the higher priority ones have been stressed or are deemed as not feasible	✓	✓*	
3	Implementation of the “ <i>polluter-pays principle</i> ” in SWM	✓	✓*	
4	Avoidance of co-management of MSW with hazardous (e.g. medical, industrial, etc.) or special SW streams (e.g. WEEE, waste batteries and accumulators, ELVs, used tires, C&D, etc.)	✓	✓	✓
5	Prohibition of unsafe disposal of SW / promotion of environmentally sound disposal sites for both non-hazardous and hazardous SW	✓	✓*	✓
6	Implementation of the “ <i>extended producer responsibility</i> ” approach	✓	✓*	✓
7	Exclusion from the SW disposal facilities of the following: liquid waste, flammable waste, explosive or oxidizing waste, medical or infectious clinical waste, used tires (with certain exceptions), C&D, any other type of waste which does not meet specific acceptance criteria			✓
8	Establishment of a national recording and monitoring system for SW and enforcement of its use and implementation		✓*	✓
9	Setting of specific penalties for violation of the SWM legislation		✓*	✓
10	Setting the procedure to prepare and conduct SWM Plans in National, Regional and/or Local level		✓*	✓
11	Setting responsibilities of all concerned public authorities with regards to the whole SWM chain, including SWM recycling and other recovery (e.g. WtE) that is not described anywhere in the current legislative framework		✓*	✓
12	Setting targets for the enforcement of source separation of the basic MSW streams (paper, metal, plastic and glass), as well as for biowaste		✓	✓
13	Setting targets for recycling and recovery of MSW		✓	✓

#	Gaps	(1)	(2)	(3)
14	Setting targets for prohibition of biowaste disposal in landfills		✓	✓
15	Setting targets for recycling and recovery of C&D waste, including backfilling		✓	✓
16	Setting targets for recycling and recovery of special SW streams, i.e. for WEEE, waste batteries and accumulators, ELVs, etc.		✓	✓
17	Setting guidelines for declassification of by-products as waste		✓	✓
18	Setting guidelines for safe management of hazardous and special waste streams		✓*	✓
19	Setting the framework for importing/exporting hazardous and non-hazardous SW from/to abroad		✓*	✓
20	Enlightening of the private sector involvement potential in SWM and encouraging partnerships through incentives, etc.	✓	✓*	✓
21	Issuing of technical specifications for any possible option of MSWM: street cleaning, temporary storage, collection, transportation, transfer, recycling / materials recovery (including composting, etc.), other recovery (e.g. energy recovery), and disposal			✓
22	Issuing of technical specifications for safe closure, rehabilitation and after-care of uncontrolled dumpsites			✓
23	Issuing of technical specifications for management of hazardous and special waste streams (e.g. WEEE, waste batteries and accumulators, ELVs, C&D, etc.)			✓
24	Establishment of a List of Waste (Waste Catalogue) for easier classification, management, recording and monitoring of SW			✓
25	Establishment of classification index for disposal and recovery SWM activities		✓*	✓
* Those gaps have already been included in the draft version of the Law for the General Framework for Waste Management. (1) MSWM Strategy. (2) Environmental Protection Law or Law for the General Framework for Waste Management. (3) Other Regulation or Instruction.				

Another gap of the Jordanian legislative framework concerning SWM that has been identified is the **lack of particularized privatization principles and procedures for SWM activities and facilities**. The current Privatization Law No. 25/2000 is very general and focuses mainly on restructuring and privatization of public institutions and enterprises owned by the public sector, having very little provisions for the establishment of specific investments following the PPP approach. Furthermore, as mentioned before (sections 3.2.3.3.14 and 3.2.3.4.4), all laws and regulations leaded by the EPC are currently frozen since dismantlement of the EPC in May 2014.

Upon dismantlement of the EPC, the whole PPP framework of Jordan is planned to be revised and updated in order to improve the PPP process. According to our opinion, a specific Law or Regulation for PPP in the SWM sector would be a plus. Alternatively, there could be provisions for PPP in the aforementioned SWM Law(s) or Regulation(s).

A further gap of the Jordanian legislative context is related with the **level of MSWM master planning**. In the current legislation, there is very little provision on this. However, in the draft Law for the General Framework for Waste Management, two levels for MSWM planning are proposed: the National level, and the Municipality level. This seems not to be optimum in the Integrated SWM concept, since there are many elements of the MSWM chain that are not limited in the Municipality level (e.g. SW transfer, processing and treatment, disposal, etc.) but also in the JSC level. Furthermore, in most of the cases, the Municipalities have less technical capacity in MSWM and are less environmentally-oriented by the respective JSCs. So, in our opinion, the MSWM master planning should be developed in the following levels: (a) the National level, (b) the JSC level, and (c) the Municipality level.

4 EXISTING MSWM INSTITUTIONAL SET-UP IN JORDAN

4.1 ADMINISTRATIVE DIVISION OF JORDAN

In terms of geographical zoning, Jordan is divided in three (3) Regions: the Northern, the Central and the Southern. Each Region is administratively divided in four (4) Governorates, which are the highest local administration divisions in the Kingdom. In total, there are twelve (12) Governorates (“*Muhafathat*”), namely:

- the Irbid, Mafrqa, Ajloun and Jerash Governorates in Northern Jordan;
- the Amman (or Capital), Madaba, Balqa and Zarqa Governorates in Central Jordan; and
- the Aqaba, Ma'an, Karak and Tafilah Governorates in Southern Jordan.

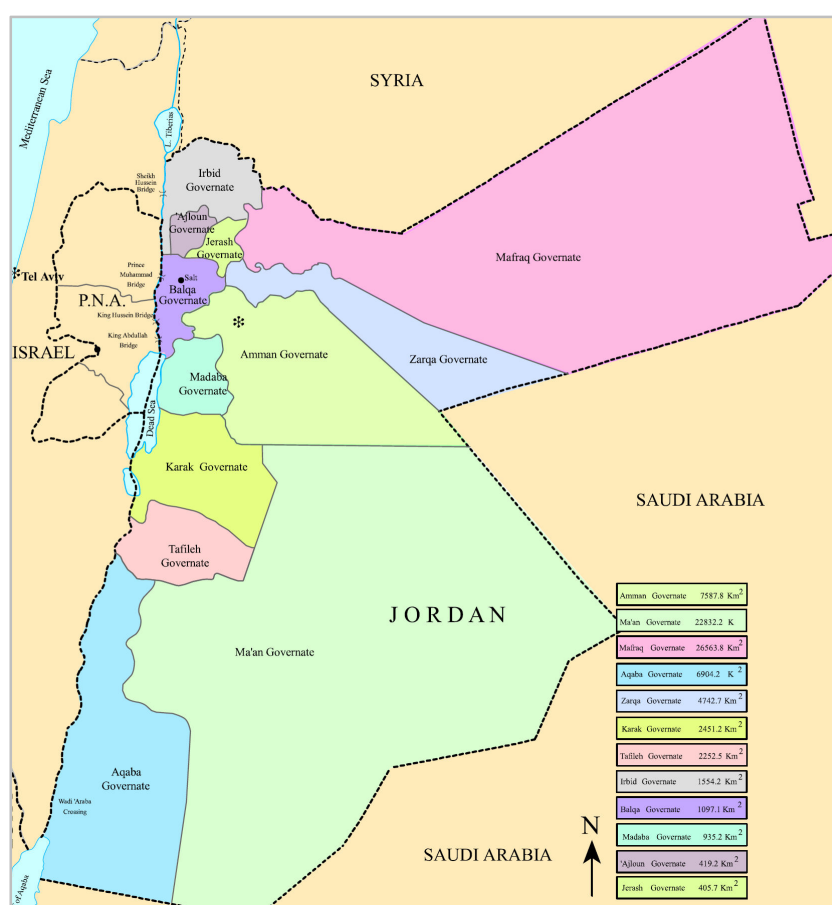


Figure 4-1: Administrative division of Jordan in Governorates (source: www.kinghussein.gov.jo)

The administrative hierarchy of Governorates is sub-divided into Districts (*"Liwa"*), Sub-Districts (*"Qada"*), Municipalities (*"Baladiyah"*), districts of Municipalities, towns and villages. Municipalities may establish JSCs by virtue of the Municipalities' Law No. 13/2011 and the JSC's Regulation No. 75/2009 in order to achieve economies of scale and consequently an improved level of services quality in an economically feasible manner to adjacent Municipalities.

A detailed listing of the administrative divisions of Jordan up to the Municipality level is given in Table 4-1. The names of Districts, Sub-Districts and Municipalities have been taken from DOS (2004, 2012) and from the MoMA.

Table 4-1: Administrative division of Jordan up to the Municipality level

Governorates	Districts	Sub-Districts	Municipalities
Northern Region			
Irbid Governorate	Greater Irbid District	Greater Irbid Sub-District	West Irbid
	Aghwar Shamaliyah District	Aghwar Shamaliyah Sub-District	Greater Irbid
	Bani Knenanah District	Bani Knenanah Sub-District	
	Bani Obeid District	Bani Obeid Sub-District	
	Wastiyyah District	Wastiyyah Sub-District	
	Tayba District	Tayba Sub-District	Sahel Horan Al-Kaffarat New Al-Yarmouk Al-Shua'la Al-Saroo New Al-Tayba Al-Wasattyah Khaled Bin Waleed Ma'adh bin Jabal
	Mazar Shamali District	Mazar Shamali Sub-District	New Al-Mazar
	Kura District	Kura Sub-District	Rabiet Al-Kura New Deir Abi Saeed Burqush Sharhabil bin Hasna Tabqa Fahal
	Al-Ramtha District	Al-Ramtha Sub-District	New Al-Ramtha
Mafraq Governorate	Greater Mafraq District	Mafraq Sub-District	Greater Mafraq Al-Zatari W Al-Manshieh
		Balama Sub-District	New Balama
		Rehab Sub-District	New Rehab
		Manshiyeh Sub-District	Manshiet Bani Hassan
	Badiyah Shamaliyah District	Salahia Sub-District	Al-Salahia and Naifa
		Sabha Sub-District	Sabha W Al-Dafianeh
		Oum Al-Jemal Sub-District	New Oum Al-Jemal
		Deir Al-Kahaf Sub-District	New Deir Al-Kahaf

Governo rates	Districts	Sub-Districts	Municipalities
	Badiyah Shamaliyah Gharbiyah District	Oum Al-Qutain Sub-District	Oum Al-Qutain W Al-Mkafetah
		Badiyah Shamaliyah Gharbiyah Sub-District	Hussein bin Abdullah Al-Amer
		Al-Sarhan Sub-District	Al-Sarhan
		Hosha Sub-District	Al-Basileh New Hosha
		Khaldieh Sub-District	Al-Khaldieh
	Al-Rouaishad District	Al-Rouaishad Sub-District	New Al-Rouaishad Bani Hashim Al-Safawi Eastern Badiah (not a Municipality – desert)
Ajloun Governorate	Greater Ajloun District	Ajloun Sub-District	Greater Ajloun Al-Junied Al-Shafa Al-Oyoun
		Sakhray Sub-District	
		Orjan Sub-District	
	Kofranjah District	Kofranjah Sub-District	New Kofranjah
Jerash Governorate	Greater Jerash District	Jerash Sub-District	Greater Jerash Al-Merad Bab Amman Al-Naseem
		Mastabah Sub-District	
		Burma Sub-District	Burma
Central Region			
Amman (Capital) Governorate	Greater Amman District	Amman Sub-District	Greater Amman Municipality (GAM)
	Marka District	Marka Sub-District	
	Quaismeh District	Quaismeh Sub-District	
	Al-Jami'ah District	Al-Jami'ah Sub-District	
	Wadi Essier District	Wadi Essier Sub-District	
	Sahab District	Sahab Sub-District	Sahab
	Ajeeza District	Ajeeza Sub-District	Ajeeza Al-Ameriya
		Oum Al-Rasas Sub-District	New Oum Al-Rasas
		-	Middle Badiah (not a Municipality – desert)
	Almoaqr District	Almoaqr Sub-District	Almoaqr
		Rojom Eshami Sub-District	
	Naor District	Naor Sub-District	Naor
		Um-Ebsateen Sub-District	Um-Ebsateen
		Husban Sub-District	Husban
Madaba Governorate	Madaba District	Greater Madaba Sub-District	Greater Madaba
		Jrainah Sub-District	
		Maeen Sub-District	

Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)

Governorates	Districts	Sub-Districts	Municipalities
	Theban District	Faisaliah Sub-District	Jabal Bani Hamida
		Theban Sub-District	New Theban
		Areedh Sub-District	
		Maleeh Sub-District	Lib W Maleeh
Balqa Governorate	Greater Balqa (Salt) District	Balqa (Salt) Sub-District	Greater Salt
		Allan Sub-District	
		Ira & Yarqa Sub-District	
		Al-Arda Sub-District	New Al-Arda
	New Deir Allah District	New Deir Allah Sub-District	New Deir Allah New Madi
	Aghwar Janoobiyyeh District	Aghwar Janoobiyyeh Sub-District	Al-Shoneh Al-Wsta Swaymeh
	New Ain Al-Basha District	New Ain Al-Basha Sub-District	New Ain Al-Basha
	Mahes & Al-Fahis District	Mahes & Al-Fahis Sub-District	Al-Fahis Mahes
Zarqa Governorate	Greater Zarqa District	Greater Zarqa Sub-District	Greater Zarqa Al-Hallabat
		Bereen Sub-District	New Bereen
		Al-Duleil Sub-District	Al-Duleil
		Al-Azraq Sub-District	New Al-Azraq
			<i>Al-Azraq Sahara (not a Municipality – desert)</i>
	Russeifeh District	Russeifeh Sub-District	Al-Russeifeh
	Hashimiya District	Hashimiya Sub-District	New Al-Hashimiya
Southern Region			
Aqaba Governorate	Greater Aqaba District	Aqaba Sub-District	Aqaba City (ASEZ) Qutar and Rahma
		Wadi Araba Sub-District	Wadi Araba Qariqara and Finan
	Qawiera District	Qawiera Sub-District	New Al-Qawiera
		Deeseh Sub-District	Qura Hawd Al-Daisa
Ma'an Governorate	Greater Ma'an District	Ma'an Sub-District	Greater Ma'an Al-Ashari <i>Southern Badiah (not a Municipality – desert)</i>
		Iel Sub-District	Al-Sharah
		Mraighah Sub-District	
		Athroh Sub-District	
		Al-Jafr Sub-District	Al-Jafr
	Greater Petra District	Petra Sub-District	Petra (PDTR) New Ail
	Greater Shobak District	Greater Shobak Sub-District	New Al-Shobak
	Husseinieh District	Husseinieh Sub-District	New Al-Husseinieh

Governorates	Districts	Sub-Districts	Municipalities
Karak Governorate	Greater Karak District	Karak Sub-District	Greater Karak
	Mazar Janoobiyyeh District	Mazar Janoobiyyeh Sub-District	Mu'tah and Mazar
		Mo'ab Sub-District	New Mo'ab
	Qasr District	Qasr Sub-District	Sultani
		Mowjeb Sub-District	
	Al-Agwar Al-Janobeiah District	Safi Sub-District	New Talal
		Aghwar Almazara'a Sub-District	Al-Agwar Al-Janobeiah Abdullah Bin Rawaha
	Ai District	Ai Sub-District	Ai (Al-Hzmaan)
Tafilah Governorate	Faqo'e District	Faqo'e Sub-District	Shehan
	Al-Qatraneh District	Al-Qatraneh Sub-District	Al-Qatraneh
	Tafilah District	Tafilah Sub-District	Greater Tafilah Al-Qadisieh
	Al-Hassa District	Al-Hassa Sub-District	Al-Hassa
	Besara District	Besara Sub -District	Besara

According to the table, Jordan is divided in 51 Districts, 89 Sub-Districts and 103 Municipalities, the GAM, ASEZ and PDTR included. Also, there are four (4) areas covered by the Jordanian desert, which are not included in any Municipality, but they are administered by the "Municipality Engineering Directorate" at each Governorate. It is noted that changes of the administrative division are very often in Jordan, mostly through merging or splitting of small Municipalities.

4.2 MSWM RELATED INSTITUTIONAL STRUCTURE

The existing administrative structure for MSWM in the Jordanian context consists of three (3) levels:

1. Ministry level (national), which is mainly regulated by the MoMA;
2. JSC level (regional); and
3. Municipality level (local).

Other institutions that in one way or another also have participatory roles in MSWM around the Kingdom are the following:

- In local level:
 4. the GAM;
 5. the ASEZA;
 6. the PDTRA;
 7. the United Nations High Commissioner for Refugees (UNHCR);

8. the United Nations Relief and Works Agency (UNRWA); and
 9. the Authorities of the provisioned Development Zones (DZ) of Jordan (in the future).
- In national level:
 10. the Ministry of Environment (MoENV);
 11. the Ministry of Health (MoH);
 12. the Ministry of Agriculture (MoAGR);
 13. the Ministry of Energy & Mineral Resources (MoEMR);
 14. the Ministry of Planning & International Cooperation (MoPIC);
 15. the Ministry of Public Works & Housing (MoPWH);
 16. the Ministry of Water & Irrigation (MWI); and
 17. the Water Authority of Jordan (WAJ).

In the following chapters, the existing MSWM institutional set-up in local, regional, and national level is presented. Responsibilities of each competent entity are presented and interactions between them are discussed. Conflicts or overlaps of responsibilities between them are also assessed, while gaps and deficiencies of the current set-up are identified. Finally, follows a SWOT analysis of the existing institutional set-up.

4.3 ROLES & RESPONSIBILITIES

Till today, there is not any single act that gives a clear picture of roles and responsibilities of all entities dealing with MSWM. This is considered as a gap in the relevant policy framework, which has been highlighted in section 3.4 of this report.

4.3.1 LOCAL & REGIONAL LEVEL

4.3.1.1 MUNICIPALITIES & JSCS

According to Article (40) of the Municipalities Law No. 13/2011, MSWM regularly lies with the responsibility of the municipal authorities (local level). In this context, street cleaning, collection, transfer/transport, treatment and disposal of MSW is the responsibility of Municipal Councils.

In order to achieve economies of scale and consequently an improved level of service quality in an economically feasible manner to adjacent Municipalities, Municipalities may establish JSCs by virtue of the JSCs Regulation No. 75/2009 (which amended Regulation No. 17/1983). In this context, it is

common practice that Municipalities keep the responsibilities of street cleaning and MSW collection and pass the responsibilities of transfer/transport and disposal to JSCs². This doesn't mean that a Municipality cannot operate a transfer station on its own resources.

Of course, not all Municipalities establish JSCs. For example, GAM, which is the largest and most populated Municipality of Jordan, is having adequate technical and financial capacity to operate the whole MSWM cycle by its own resources.

Other Municipalities not being members of a JSC, which however are serviced by JSC's MSW disposal facilities, are listed in Table 4-2.

Table 4-2: Jordanian Municipalities not having formed JSCs but sending their MSW to JSCs' facilities

#	Municipality Name	Served by
Jerash Governorate		
1	Greater Jerash	Irbid (Al Ekaider) JSC
2	Al-Merad	Irbid (Al Ekaider) JSC
3	Bab Amman	Irbid (Al Ekaider) JSC
4	Al-Naseem	Irbid (Al Ekaider) JSC
5	Burma	Irbid (Al Ekaider) JSC
Amman (Capital) Governorate		
1	Almoaqr	GAM
2	Naor	GAM
3	Sahab	GAM
4	Husban	GAM
5	Um-Ebsateen	GAM
6	Ajeeza	GAM
7	Al-Ameriya	GAM
8	New Oum Al-Rasas	GAM
Madaba Governorate		
1	Theban	Madaba JSC
2	Lib W Maleeh	Madaba JSC
3	Jabal Bani Hamida	Madaba JSC

² No reference is made in the relevant legislation about responsibilities of Municipalities/JSCs for MSWM recycling or other recovery (e.g. WtE) facilities. However, it is assumed that such facilities should be ruled by the respective entities that are in charge for MSW disposal.

#	Municipality Name	Served by
Zarqa Governorate		
1	Greater Zarqa	GAM
2	Al-Russeifeh	GAM
Aqaba Governorate		
1	Aqaba City (ASEZ)	Aqaba JSC
Ma'an Governorate		
1	Petra (PDTR)	Ma'an JSC

Currently, there are twenty-one (21) JSCs in Jordan³. Of them, eighteen (18)⁴ are dealing with MSWM, operating MSW Transfer Stations (TS) and/or disposal sites. Table 4-3 gives the catchment areas of those JSCs. The table also lists those Municipalities or entities carrying out MSWM through their own facilities. Drawing 01 in Annex 10 gives a map of the JSCs' membership, while Drawing 02 gives the catchment area of JSCs in terms of service provision.

Table 4-3: Catchment areas of JSCs and other MSWM related Local Authorities

#	JSC Name	Catchment areas
Northern Region		
1	Irbid (Al Ekaider) JSC	<u>Irbid Governorate (9 Municipalities):</u> Greater Irbid, West Irbid, New Al-Ramtha, Sahel Horan, Al-Kaffarat, New Al-Yarmouk, Al-Shua'la, Al-Saroo, New Al-Mazar <i>Also serving (without being members):</i> <u>Jerash Governorate (5 Municipalities):</u> Greater Jerash, Al-Merad, Bab Amman, Al-Naseem, Burma
2	Aghwar Shamaliyah JSC	<u>Irbid Governorate (6 Municipalities):</u> Khaled Bin Waleed, Ma'adh bin Jabal, Tabqa Fahal, Sharhabil bin Hasna, New Al-Tayba, Al-Wasattyah <u>Ajloun Governorate (1 Municipality):</u> Al-Shafa
3	Rabiet Al-Kura JSC	<u>Irbid Governorate (3 Municipalities):</u> Rabiet Al-Kura, New Deir Abi Saeed, Burqush
4	Mafraq JSC	<u>Mafraq Governorate (10 Municipalities):</u> Greater Mafraq, New Rehab, New Balama, New Hosha, Manshiet Bani Hassan, Al-Khaldieh, Al-Basilieh, Al-Zatari W Al-Manshieh, Al-Sarhan, Hussein bin Abdullah Al-Amer
5	Badiah Shamaliyah JSC	<u>Mafraq Governorate (8 Municipalities):</u> New Oum Al-Jemal, Sabha W Al-Dafianeh, Oum Al-Qutain W Al-Mkafetah, New Al-Rouaishad, Al-Salahia and Naifa, Bani Hashim, Al-Safawi, New Deir Al-Kahaf

³ Recently, the Ajeeza JSC, which consisted of the Ajeeza, Al-Ameriya, and New Oum Al-Rasas Municipalities, was ceased.

⁴ The three (3) JSCs not dealing with MSWM are the following:

- Jerash JSC, which is serviced by Irbid JSC in terms of MSWM;
- Amman JSC, which is serviced by GAM in terms of MSWM; and
- Theeban JSC, which is serviced by Madaba JSC in terms of MSWM.

#	JSC Name	Catchment areas
6	Ajloun JSC	<u>Ajloun Governorate (4 Municipalities):</u> Greater Ajloun, New Kofranjah, Al-Junied, Al-Oyoun
Central Region		
-	GAM*	<u>Amman (Capital) Governorate (1 Municipality):</u> GAM <i>Also serving:</i> <u>Amman (Capital) Governorate (8 Municipalities):</u> Almoaqr, Naor, Sahab, Um-Ebsateen, Husban, Ajeeza, Al-Ameriya, New Oum Al-Rasas <u>Zarqa Governorate (2 Municipalities):</u> Greater Zarqa, Al-Russeifeh
7	Madaba JSC	<u>Madaba Governorate (1 Municipality):</u> Greater Madaba Municipality <i>Also serving:</i> <u>Madaba Governorate (3 Municipalities):</u> New Theban, Lib W Maleeh, Jabal Bani Hamida
8	Balqa (Al Salt) JSC	<u>Balqa Governorate (5 Municipalities):</u> Greater Salt, New Ain Al-Basha, New Al-Arda, Al-Fahis, Mahes
9	Al-Shoneh Al-Wsta JSC	<u>Balqa Governorate (4 Municipalities):</u> New Deir Allah, New Madi, Al-Shoneh Al-Wsta, Swaymeh
10	Zarqa JSC	<u>Zarqa Governorate (5 Municipalities):</u> New Al-Hashimiya, New Bereen, Al-Duleil, Al-Hallabat, New Al-Azraq
Southern Region		
11	Aqaba JSC	<u>Aqaba Governorate (4 Municipalities):</u> Qura Hawd Al-Daisa, Qariqara and Finan, Wadi Araba, Qutar and Rahma <i>Also serving:</i> <u>Aqaba Governorate (1 Local Authority):</u> Aqaba City (ASEZ)
12	Qawiera JSC	<u>Aqaba Governorate (1 Municipality):</u> New Al-Qawiera Municipality
13	Shobak JSC	<u>Ma'an Governorate (2 Municipalities):</u> Al-Ashari, New Al-Shobak
14	Ma'an JSC	<u>Ma'an Governorate (4 Municipalities):</u> Greater Ma'an, New Al-Husseinieh, Al-Jafr, Al-Sharah <i>Also serving:</i> <u>Ma'an Governorate (1 Local Authority):</u> Petra (PDTR)
15	Ail JSC	<u>Ma'an Governorate (1 Municipality):</u> New Ail Municipality
16	Karak JSC	<u>Karak Governorate (9 Municipalities):</u> Greater Karak, Mu'tah and Mazar, Shehan, Abdullah Bin Rawaha, Ai (Al-Hzmaan), New Mo'ab, Al-Qatranah, Sultani, New Talal
17	Al-Agwar Al-Janobeiah JSC	<u>Karak Governorate (1 Municipality):</u> Al-Agwar Al-Janobeiah
18	Tafilah JSC	<u>Tafilah Governorate (4 Municipalities):</u> Greater Tafilah, Besara, Al-Qadisieh, Al-Hassa

The Municipalities and JSCs do not have sufficient revenues to provide MSWM services in an efficient way and to invest. That's why both entities receive financial support from the MoMA: the Municipalities through low interest loans by CVDB; the JSCs through annual subsidies. However, there is no clear policy in Jordan related with the Municipalities' or JSCs' performance reviews in terms of carrying out MSWM services. This has caused an overall deterioration of JSCs performance over the years and has weakened their financial and technical capacities making them dependent on MoMA's technical assistance and financial subsidy. It is also noted that Municipalities and JSCs suffer from low



autonomy in institutional, technical and financial terms. Approval of the Minister of Municipal Affairs is required for almost all issues.

Municipalities and JSCs follow the same operational guidelines regarding MSWM, as the JSCs' responsibilities derive from the Municipalities' ones. However, there are certain differences between them, related to the institutional set-up and operational attributes of Municipalities and JSCs in respect of MSWM. A list of these differences is included in Table 4-4.

Finally, it needs to be mentioned that in most cases, the Municipalities or JSCs suffer qualified human resources shortage to fulfill their targets. This is evident in their own replies to the questionnaires of the horizontal analysis and the in-depth diagnosis, as presented in Table 4-5. As a result, it is clear that further institutional capacity building is needed to improve the current MSWM status.

Table 4-4: Basic attributes of Municipalities', JSCs' and the MoMA's operation in terms of MSWM

	Municipalities	JSCs	MoMA
Main roles and responsibilities	Responsible for MSWM. Regularly dealing with street cleaning, MSW collection and in some cases transfer/transport.	Responsible for MSWM upon delegation of responsibilities by the Municipalities. Regularly dealing with transfer/ transport, treatment and disposal	Facilitation, supporting and monitoring of Municipalities'/JSCs' performance. Establishment of JSCs with Ministerial Decision.
Funding of MSWM activities	Collection of MSWM fees through the electricity bill Paying Municipality contribution to the JSCs for further MSWM activities. Borrowing with low interest by the CVDB.	Collection of Municipality contributions. Collection of gate fees in MSWM facilities by the private sector. Revenues from recycling contracts (where applied). MoMA support for balancing costs and revenues.	Lending the Municipalities through the CVDB Providing support to the JSCs
Ability to set-up Public-Private Partnerships (PPP)	Yes	Yes	Yes

Table 4-5: Level of capacity of Municipalities' and JSCs' personnel in terms of MSWM according to Horizontal Analysis and In-Depth Diagnosis surveys (2014)

Institutional entity	Type of survey	Recorded level of capacity (# of replies out of # of statistical sample)		
		High	Medium	Low
Municipalities	Horizontal analysis questionnaires	8/29 (28%)	21/29 (72%)	-
	In-depth diagnosis questionnaires	4/9 (45%)	3/9 (33%)	2/9 (22%)
	Total	11/36 (30%)	23/36 (64%)	2/36 (6%)
JSCs	Horizontal analysis questionnaires	5/14 (36%)	8/14 (57%)	1/14 (7%)
	In-depth diagnosis questionnaires	-	5/5 (100%)	-
	Total	5/17 (29%)	11/17 (65%)	1/17 (6%)

4.3.1.2 GREATER AMMAN MUNICIPALITY (GAM)

The GAM was established through the Municipalities Law as a special independent entity, not operating under the umbrella of MoMA. Amman's first Municipal Council was established in 1909. In 1914, the City of Amman was made the head of the Amman District. The city's population at the time was only 1,500-2,000 people, but its economic activity soon made it larger. Today, GAM accounts for ~40% of Jordan's population. It serves 22 municipal districts (suburbs) within the Greater Amman area. MSWM is between GAM's main responsibilities, including street cleaning, collection, transfer, transportation and disposal at the Al Ghabawi sanitary landfill, which is the most advanced MSW disposal facility in the Kingdom.

4.3.1.3 AQABA SPECIAL ECONOMIC ZONE AUTHORITY (ASEZA)

The ASEZ is a duty-free economic development zone for tourism, recreational services, professional services, multi-modal transportation, and value-added industries. It covers approximately 375km² and includes the land borders of Saudi Arabia and Israel, extending to the territorial waters of Egypt.

In terms of MSWM, the ASEZA is mainly responsible to serve the City of Aqaba through the so-called "Aqaba City Services Center", where street cleaning, MSW collection and MSW transportation to the Al Aqaba dumpsite are being carried out. Those activities are regularly done through private companies, which sign PPP service contracts with ASEZA.

4.3.1.4 PETRA DEVELOPMENT AND TOURISM REGIONAL AUTHORITY (PDTRA)

The PDTRA is a legally, financially and administratively independent Authority, founded in 2009 and aiming to develop the Petra region touristically, economically, socially, culturally, and thus contribute to flourishing of the local community. It aims to diversify investments in the tourism sector and other active sectors in the region by providing a variety of contributions that focus on the needs of tourists as well as of the local community. The Petra Authority is mainly responsible for the management of the touristic Petra and Wadi Mosa areas. Such mission includes the street cleaning, collection and transportation of produced MSW to the Ma'an landfill.

4.3.1.5 UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES (UNHCR)

During the last years, the operational environment in Jordan has been affected considerably by the deterioration in the security situation in the neighbouring Syrian Arab Republic (Syria) and the continued influx of Syrians into the country. Added to them, more than 30,000 refugees from other countries reside in Jordan, mostly Iraqis. The UNHCR has been taking action in cooperation with GoJ and other partners to ensure that refugees – whether they live in or outside camps – are properly registered, have access to protection, legal assistance, shelter, core relief items, food, potable water,

medical care, education and psychosocial support and that they can develop in a dignified manner find a durable solution to their situation.

According to UNHCR figures (www.unhcr.org), the majority of refugees reside in non-camp settings, predominantly in Northern Jordan but also in the other regions. However, a significant number of refugees live in three refugee camps (more than 107,000 in April 2014):

- the Zaatari camp;
- the Emirati Jordanian Camp (EJC); and
- the Azraq camp.

Added to the aforementioned entities catering for MSWM all over the country (Municipalities, JSCs, GAM, ASEZA, PDTRA), the UNHCR finances MSWM in the three refugee camps.

4.3.1.6 UNITED NATIONS RELIEF AND WORKS AGENCY (UNRWA)

The Palestinian refugees are a special category of their own, due to their large numbers (>2 millions), common origin with the native Jordanians and long stay in the Kingdom (from late '50s and late '70s). This is why the majority of Palestinian refugees have the Jordanian citizenship. The UN agency supporting this part of the population is the UNRWA for Palestine Refugees.

The UNRWA for Palestine Refugees has been funded almost entirely by voluntary contributions from United Nations (UN) Member States, while it also receives some funding from the Regular Budget of the UN, which is used mostly for international staffing costs.

The Agency's services encompass education, health care, relief and social services, camp infrastructure and improvement, microfinance and emergency assistance, including in times of armed conflict. UNRWA services are available to all those living in its areas of operations who meet this definition, who are registered with the Agency and who need assistance. When the Agency began operations in 1950, it was responding to the needs of about 750,000 Palestine refugees. Today, some 5 million Palestine refugees are eligible for UNRWA services in Jordan and the neighbouring countries.

In Jordan, ten (10) camps operate by UNRWA, accommodating ~18% of their total population in the Kingdom (around 365,000 residents), in Zarqa, Talbieh, Marka, Souf, Jerash, Jabal el-Hussein, Irbid, Baqa'a, Husn and Amman (New Camp). Figure 4-2 shows their locations.

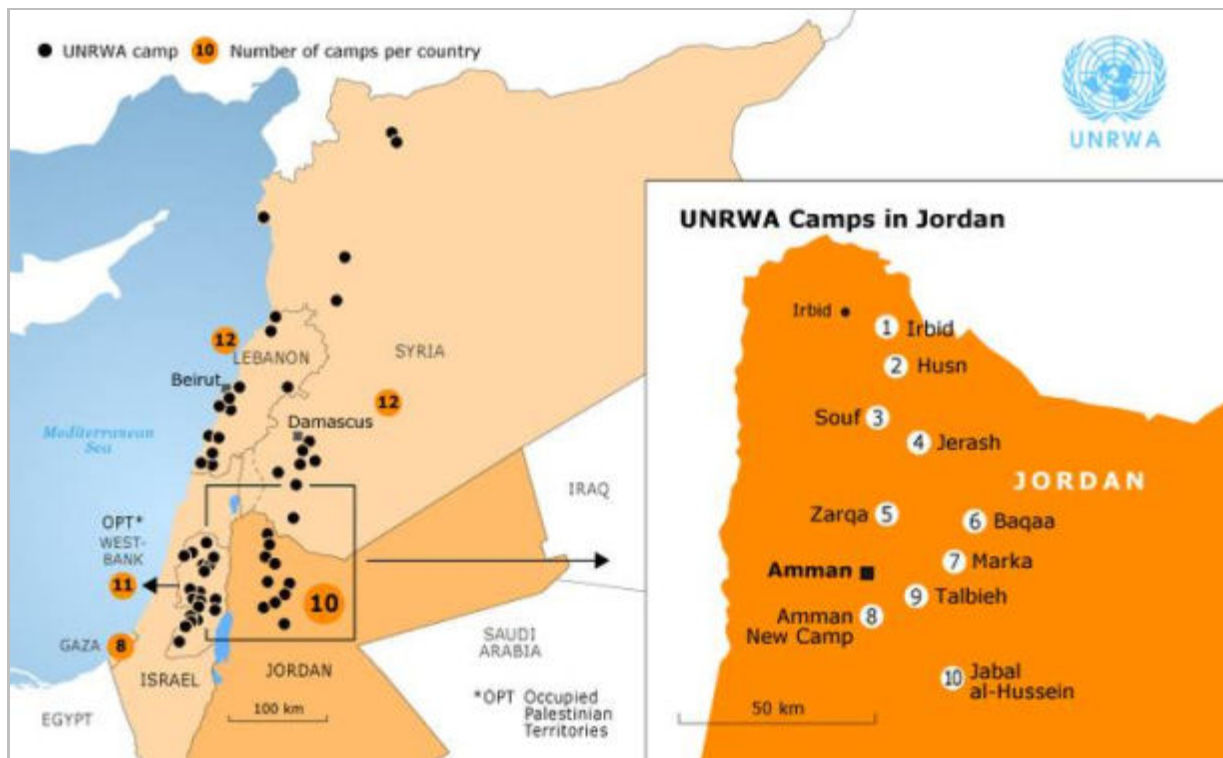


Figure 4-2: UNRWA camps in Jordan

In terms of MSWM, the UNRWA's main job is to provide street cleaning and sweeping services in branch roads within the ten refugee camps, followed by MSW collection and transportation in cooperation with the respective Municipalities as well as with GAM.

4.3.1.7 OTHER DEVELOPMENT ZONES' AUTHORITIES

Based on the ASEZ successful concept, GoJ plans to establish the following Development Zones (DZ) in the short- or mid-term:

1. The King Hussein Bin Talal Development Area (KHBTD) in Mafrag;
2. The Ma'an Development Area (MDA);
3. The Irbid Development Area (IDA);
4. The Dead Sea Development Zone;
5. The Jabal Ajloun Development Zone; and
6. The Business Park Development Area – Dabouq.

Currently, none of the aforementioned DZs is operating and their expected date of operation varies and depends on the intentions of potential investors, since in most cases they have been in stagnation. Table 4-6 gives the basic characteristics of the six DZs.

Table 4-6: Basic characteristics of Development Zones in Jordan

Development Zone	Location	Area (km ²)	Investment activities
King Hussein Bin Talal Development Area (KHBTD)	Ma'raq Governorate (60km SE of Amman)	21	• Light and medium industry sector: ◦ Food and beverage; ◦ Pharmaceutical and medical supplies; ◦ Light chemicals; ◦ A wide range of other manufactured products; • Logistics sector; • Residential; • Community Services; and • Commercial sector.
Ma'an Development Area (MDA)	Ma'an Governorate (218km S of Amman)	9	• Industrial Park; • Residential Community (15,000 residents); • Skill Development Center; and • Hajj Oasis.
Irbid Development Area (IDA)	Irbid Governorate (20km E of Irbid)	3.2	• Service Industry (Information and Communication Technology); • Health Care; • Research and Development; • Residential (~12,000 residents); and • Mixed Use Commercial.
Dead Sea Development Zone	Balqa Governorate 55km W of Amman	40	• 4 and 5-star international resort properties and hotels • 3-star accommodations • Eco-lodges and other facilities • Residential developments and community services • Recreational facilities, spas, restaurants, conference centres and other attractions.
Jabal Ajloun Development Zone	Ajloun Governorate (40km N of Amman)	2,200 dunums	• Eco-tourism developments • Hotels, spas and resort amenities • Community style living; varied real estate developments • Retail and services
Business Park Development Area – Dabouq	Amman Governorate (Dabouq – suburb of Amman)	N/A	• Professional Services • GO/NGO's • Medical and Health • Education • Leisure & entertainment • Safety, Security and Compliance • Media • Residential

In terms of MSWM, the Managing Authorities of the six DZs is expected to be responsible for street cleaning, MSW collection and transportation to appropriate transfer, treatment or disposal sites, when operative.

4.3.2 NATIONAL LEVEL

4.3.2.1 MINISTRY OF MUNICIPAL AFFAIRS

MoMA's mission is to facilitate, support and monitor the performance of Municipalities and JSCs in SWM, to enable them to achieve good governance and improve the level of services they provide to their constituents, as well as to actively participate in realizing local development in a balanced manner across Jordan.

Furthermore, and as per the general policies articulated by MoMA, it works to promote the role of Municipalities as public service providers and delegate to them sufficient authorities and powers for this purpose, in addition to supporting them in setting up productive service projects in an aim to improve their financial sustainability and standing. Also, in alignment with the above, MoMA works to support joint municipal efforts in delivering services and collecting revenues, specifically in establishing and management of SW disposal sites through the JSCs.

To realize this mandate and specifically the part relating to the JSCs, MoMA has linked all JSCs to Assistant Secretaries General (ASG) who report to the Secretary General (SG), who reports to the Minister. Additionally, it should be noted that the Directorate for JSCs is responsible and dedicated for tracking and processing the affairs of the all the JSCs in Jordan. The Director for JSCs is connected to the ASG as indicated in Figure 4-3.

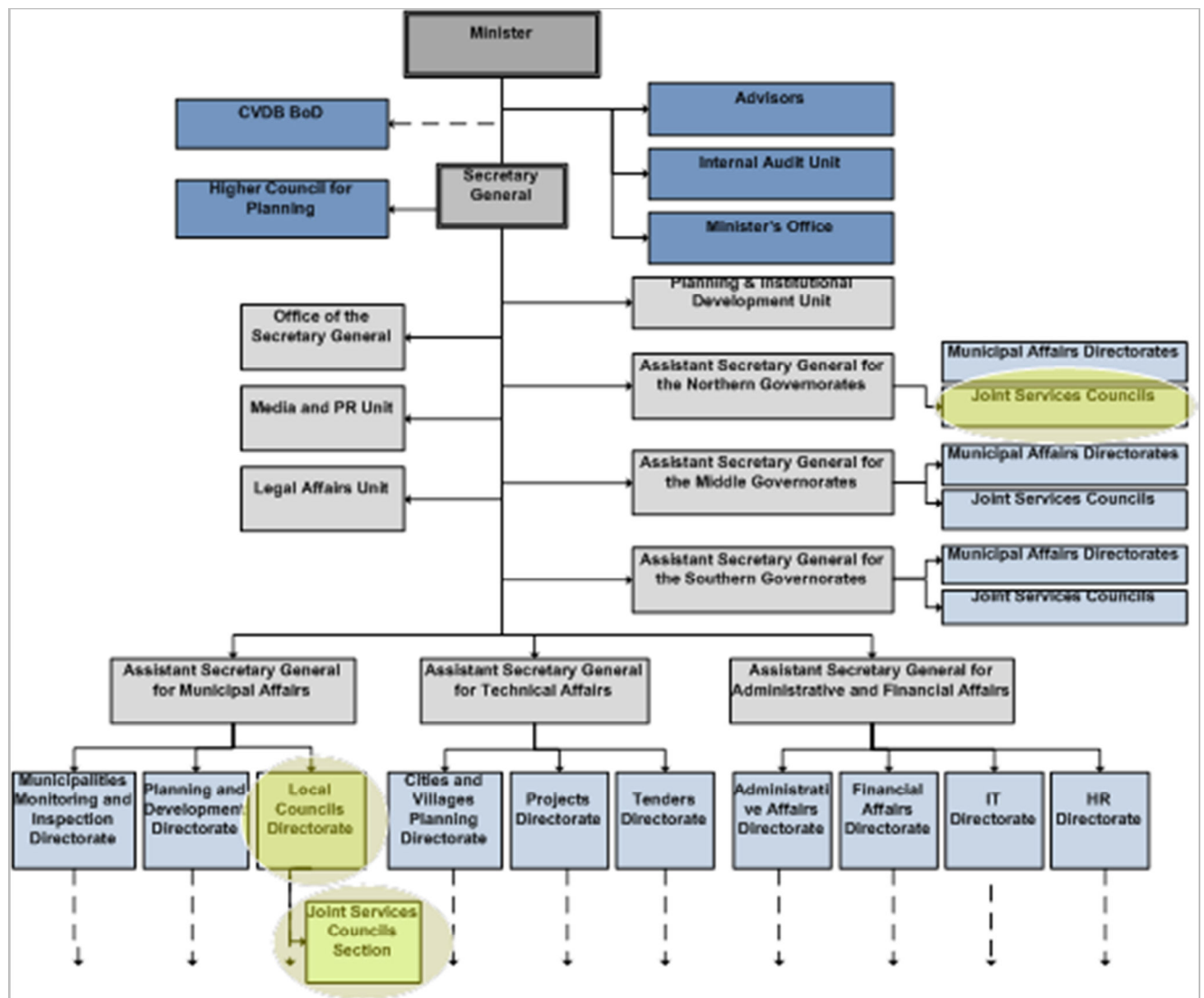


Figure 4-3: Organizational chart of MoMA

As already mentioned, the MoMA supports financially both the Municipalities and the JSCs, i.e. the first through low interest loans via the CVDB and the latter through annual subsidies.

Another policy of MoMA is to encourage Municipalities to partner with the private sector in implementing joint projects that serve the local communities and lead to sustainable local development. MoMA also partially provides the necessary equipment and machinery that Municipalities require for their MSWM activities.

Some key challenges that MoMA faces in terms of MSWM, are the following (indicative/not exhaustive list):

- Deficiencies in the existing legislative framework.

- Improper siting and design of waste disposal sites. Long distances of serviced areas to disposal sites without the use of transfer stations increases MSW transportation cost (need for additional transfer stations).
- Limited participation of the private sector in MSWM activities.
- Joint disposal of MSW with other types of waste (special waste, medical waste, etc.) in disposal sites.
- Unorganized waste management practices, methods and inefficient use of the disposal sites' area.
- Lack of necessary heavy machinery in many cases and improper maintenance.
- Low availability and reliability of MSWM data and information. Absence of weighbridges on the entrances of many disposal sites to weigh the collection vehicles in order to know the exact amounts of waste entering the sites.
- Improper and unorganized separation of recyclable materials is done in unsanitary conditions and influencing land filling practices.
- Insufficient qualified personnel on Municipalities and JSCs in many case.

The aforementioned challenges will also be discussed – inter alia – in the following Chapters of the report.

4.3.2.2 MINISTRY OF ENVIRONMENT

According to the Environmental Protection Law No. 52/2006, the Management of Solid Waste Regulation No. 27/2005 and the Instructions for the Management of Solid Waste (2006), the MoENV oversees MSWM activities carried out by the Municipalities and JSCs in order to ensure that they are being carried out in an environmentally safe way. In this context, the MoENV is responsible for the safe MSW disposal, monitoring of environmental emissions and issuing of necessary permits to construct and operate various MSWM facilities.

It is also the leading entity of the Committee which is responsible for the selection of sites for the establishment of MSW landfills, also involving representatives from:

- the MoMA;
- the MWI;
- the MoH;
- the MoAGR;
- the Ministry of Tourism & Antiquities (MoTA);
- the Department of Land and Survey (DLS) of the MoF; and
- the Ministry of Interior (MoI) – Governorate level.

This Committee is responsible and decides upon the location and technical specifications of the sites.

The MoENV is also the competent authority for the implementation of all directives under this strategy, whereas it is responsible for organizing hygiene campaigns and implementing awareness programs and training in the field of SWM.

However, as noted by MoENV officials during the meetings carried out for the Project, the MoENV suffers qualified human resources shortage to fulfill its targets and further institutional capacity building is a requirement.

4.3.2.3 MINISTRY OF HEALTH

MoH's Health Directorate is responsible for monitoring professional Health and Safety (H&S) of the employees in MSWM facilities (disposal sites, etc.), as well as in any other industrial establishment. This is done through annual check-ups, which is a requirement for every worker in Jordan.

In addition, MoH's Environmental Health Directorate is responsible for inspecting and evaluating MSWM facilities (disposal sites, etc.) in terms of their environmental performance. However, this role has been declining in the recent years, whereas the MoH's Environmental Health Directorate can still interfere anytime it receives specific complaints. This Directorate also takes part in national Committees relevant to SWM.

4.3.2.4 MINISTRY OF AGRICULTURE

MoAGR regulates SWM through the Agricultural Law No. 44/2002, which stipulates through Article (32) that no person is allowed to dispose any type of SW, liquid waste or other harmful substance to the environment. It must be adhered to and followed where the owner of a project or establishment must undertake not to violate the borders of any forest nor agricultural area, if any, and not throwing remnants.

4.3.2.5 MINISTRY OF ENERGY & MINERAL RESOURCES

MoEMR regulates renewable energy market through the development of WtE projects in cooperation with Municipalities, JSCs or other entities (e.g. the GAM). During consultations with MoEMR, the Consultant was informed that the MoEMR has received a significant number of Expressions of Interest (EOI) and inquiries during the last years for several WtE technologies/facilities that could potentially be implemented/established in the Kingdom.

4.3.2.6 MINISTRY OF PLANNING AND INTERNATIONAL COOPERATION

It is MoPIC's responsibility to coordinate and regulate international cooperation programs and partnerships, such as the EU-Jordan and US-Jordan ones. To do so, MoPIC deals in many ways with

local and international donors in supporting all kinds of projects in Jordan, the SWM projects included. Lately, it has been dealing with international agencies such as the UNCHR, the United Nations Development Program (UNDP) and the WB in that regard, as a main result of the Syrian Refugee Crisis. In this context, MoPIC is running the National Resilience Plan (NRP) 2014-2016, which includes plans and support in SWM.

4.3.2.7 MINISTRY OF PUBLIC WORKS & HOUSING

Established in 1954, MoPWH's main responsibilities are the construction of main roads in the Kingdom, as well as supervision and coordination of public governmental facilities, the MSWM ones included.

4.3.2.8 MINISTRY OF WATER & IRRIGATION

The MWI, established in 1988, is the official body responsible for the overall monitoring of the water sector, water supply and wastewater system and related projects, planning and management, the formulation of national water strategies and policies, research and development, information systems and procurement of financial resources. Its role also includes the provision of centralized water-related data, standardization and consolidation of data.

4.3.2.9 WATER AUTHORITY OF JORDAN

WAJ monitors environmental impacts on soil, groundwater and surface water due to leachate generation and management in SW disposal sites.

4.4 CONFLICTS OF RESPONSIBILITIES, GAPS & DEFICIENCIES

From the institutional point of view, there is **no conflict of responsibilities** between competent Authorities dealing with MSWM in Jordan. The range of responsibilities for each entity is quite definite, even though responsibilities are currently derived from a series of policy and legislative acts.

On the other hand, specific **gaps** have been identified relative to the allocation of responsibilities in Jordan with focus on MSWM. Those are the following:

3. Responsibilities do not cover the whole range of the MSWM chain, e.g. for MSW treatment activities (recycling, composting, WtE, etc.). However, it seems to be efficient to assume that the local authorities, alone (e.g. Municipalities, GAM, SDZ's authorities) or through joint co-operations (JSCs) should be responsible for these activities, as actually done.

4. Due to the EPC dismantlement since May 2014, responsibilities for regulating the PPP approach in the MSWM sector in Jordan will be vague until revision and update of the respective PPP framework. The only exception to this is the WtE sector, which are regulated through the General Electricity Law as well as Law of Renewable Energy.

As also recommended in section 3.4 of this report, it seems to be better if a dedicated MSWM law was issued, setting responsibilities of all concerned public authorities with regards to the whole SWM chain, including SWM recycling and other recovery (e.g. WtE).

Other **deficiencies** of the current institutional set-up of the MSWM sector in Jordan are:

- There is no clear policy in Jordan related with the Municipalities' or JSCs' performance monitoring in terms of carrying out MSWM services. This has caused an overall deterioration of JSCs performance over the years and has weakened their financial and technical capacities making them dependent on MoMA's technical assistance and financial subsidy.
- The MoENV, as well as the Municipalities and JSCs lack in most cases of qualified human resources to fulfill their targets. This is why extensive institutional capacity building needs to be carried out in all levels.
- Due to the low intrusion of formal public or private sector in MSW sorting and recycling, informal waste-picking flourishes both in the "city" and the "dumpsite" level. This will be further discussed in the socio-economic analysis that follows in section 8 of this report.

4.5 SWOT ANALYSIS

As mentioned in section 2.4, Figure 4-4 summarizes the Strengths, Weaknesses, Opportunities and Threats deriving from the existing institutional set-up of the MSWM sector in Jordan.



Figure 4-4: SWOT Analysis for the existing institutional set-up in MSWM sector in Jordan

The SWOT analysis focuses entirely on the four elements above, allowing the identification of the forces influencing positively or negatively the Strategy.

Internal factors affecting the objectives of the Strategy include the resources and experience readily available in MoMA. Positive factors include:

1. Responsibilities of MoMA are adequately known.
2. No conflict of responsibilities between the MoMA and the other authorities dealing with MSWM.
3. Increasing autonomy of Municipalities and JSCs may increase performance in MSWM.
4. Performance monitoring of Municipalities and JSCs may increase efficiency of provided MSWM services.

On the other hand, negative internal factors include:

1. No specifically determined responsibilities for sophisticated MSWM activities (recycling, recovery, etc.).
2. Low operational efficiency as well as qualified human resources of Municipalities and JSCs in MSWM.
3. Low entering of the private sector into MSWM.
4. Low autonomy of Municipalities and JSCs with regards to administrative, financial and operational issues.
5. Often splitting and merging of small Municipalities in Jordan.

External factors typically refer to things where MoMA has low or no control. Negative external factors include:

1. Unclear responsibilities and framework of PPP in MSWM may affect the potential of the sector. Revision and update of the PPP framework needs to be done the soonest.
2. No comprehensive single regulation for MSWM in Jordan.

On the other hand, positive external factors on the other hand include:

1. High potential to increase MSWM efficiency through institutional capacity building.
2. Strengthening cooperation of MoMA and MoENV in the MSWM sector through the planned new law (Framework Law or Environmental Protection Law).
3. Harmonization of the relationship between the private and public sectors in MSWM through the draft new PPP Law.
4. Availability of success cases in Jordan such as in GAM and ASEZA that can be used as a guide.

5 TECHNICAL & OPERATIONAL PERFORMANCE OF EXISTING MSWM SYSTEM

5.1 DEMOGRAPHIC CHARACTERISTICS

Jordan has been facing a unique situation in the region as a result of distinct and sudden population increases due to four (4) waves of immigration. The first wave occurred in 1948 from Palestine and the second in 1967 from the West Bank, which was part of the Kingdom of Jordan at that time, after the so-called “Six Day War”. The third wave occurred in 1991 due to the “Gulf War” and the last one – which still happens – started 2011 due to the deterioration in the security situation in the neighbouring Syrian Arab Republic (Syria).

As a result, the population of Jordan has been increasing constantly during the last 6 decades and the Kingdom’s population is a combination of native population and refugees. As already mentioned in section 4.3.1.6, the Palestinian refugees are a special category of their own, due to their large numbers (>2 millions), common origin with the native Jordanians and long stay in the Kingdom. This is why the majority of Palestinian refugees have the Jordanian citizenship and are counted in native population.

The population increases, together with other economic and technical constraints, have challenged planners and decision makers to develop strategies to resolve many of the difficult problems in Jordan, and in particular address SWM. This is why the estimation of current and future population is a core element for the development of the MSWM Strategy through this Project.

In the coming sections, detailed analysis of the residential and seasonal population of Jordan is made for the Project planning period, so as to form the basis upon which the MSW generation calculations and the MSWM Strategy in general will be based.

5.1.1 RESIDENTIAL POPULATION

5.1.1.1 PERMANENT NATIVE POPULATION

5.1.1.1.1 PRESENT POPULATION

According to the Jordan Statistical Yearbook of the Jordanian Department of Statistics (DOS) for 2012 (DOS, 2012), the population of Jordan has increased significantly during the last decades. Table 5-1 shows the trends of permanent population increase according to the censuses of 1952, 1961, 1979, 1994 and 2004, as well as the official estimated permanent population of the Kingdom by the year 2014. The table shows that the permanent population of Jordan has increased more than 11 times from 1952 until 2014.

Table 5-1: Permanent population of Jordan according to the 1952, 1961, 1979, 1994 and 2004 censuses (source: DOS, 2012) and estimation for the year 2014

Year	Population (in thousands)	Growth rate (%)
1952*	586.20	-
1961*	900.80	4.8%
1979*	2,133.00	4.4%
1980	2,233.00	4.688%
1981	2,319.00	3.851%
1982	2,409.00	3.881%
1983	2,502.00	3.861%
1984	2,599.00	3.877%
1985	2,700.00	3.886%
1986	2,805.00	3.889%
1987	2,914.00	3.886%
1988	3,027.00	3.878%
1989	3,144.00	3.865%
1990	3,468.00	10.305%
1991	3,701.00	6.719%
1992	3,844.00	3.864%
1993	3,993.00	3.876%
1994*	4,139.40	3.666%
1995	4,264.00	3.010%
1996	4,383.00	2.791%
1997	4,506.00	2.806%

Year	Population (in thousands)	Growth rate (%)
1998	4,623.00	2.597%
1999	4,738.00	2.488%
2000	4,857.00	2.512%
2001	4,978.00	2.491%
2002	5,098.00	2.411%
2003	5,230.00	2.589%
2004*	5,350.00	2.294%
2005	5,473.00	2.299%
2006	5,600.00	2.320%
2007	5,723.00	2.196%
2008	5,850.00	2.219%
2009	5,980.00	2.222%
2010	6,113.00	2.224%
2011	6,249.00	2.225%
2012	6,388.00	2.224%
2013**	6,530.10	2.224%
2014**	6,675.30	2.224%

* According to censuses.

** Based on the assumption that the population growth rate for years 2013 and 2014 is equal to the average values of the 2009-2012 period.

It is noted that the >1.3 million people (~25%) increase of the permanent population of Jordan during the last 10 years can be attributed in great extent to the influx of immigrants from Iraq after the 2003

occupation of Baghdad. The number of Iraqis who entered Jordan during that period accounts more than half a million and the great majority of this number has been given Jordanian citizenship and is considered as a wave of immigration counted in the native Jordanian population.

Figure 5-1 shows the permanent population of Jordan since 1952.

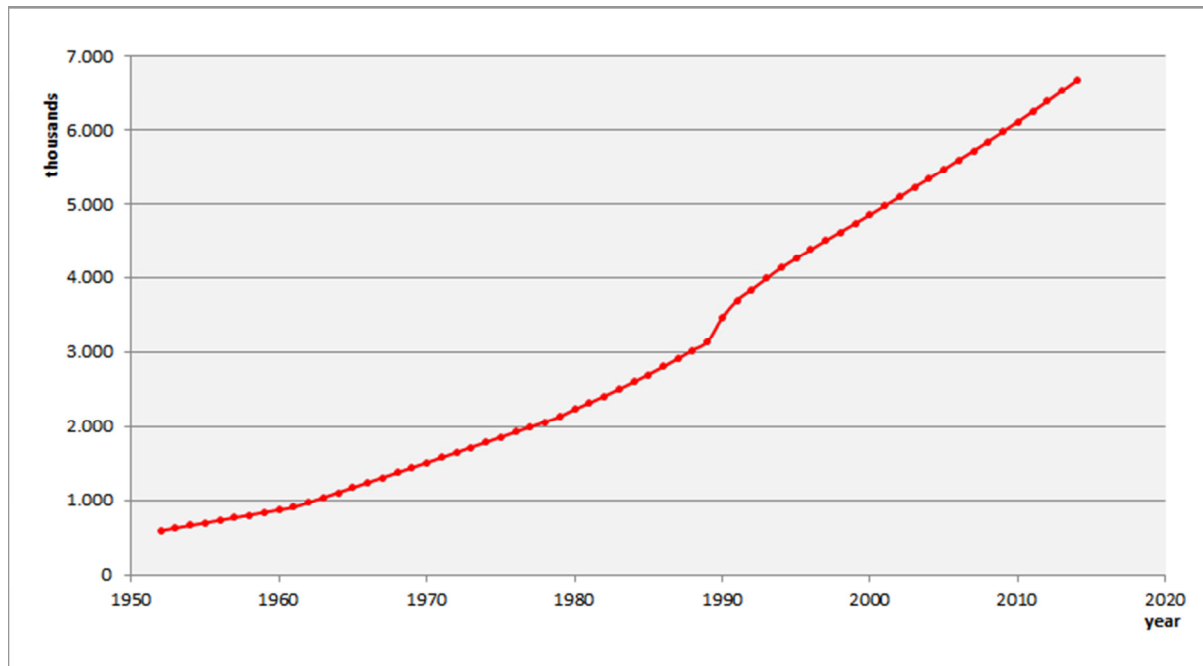


Figure 5-1: Permanent population of Jordan, years 1952-2014

It is noted that although demographic data have been acquired by the Municipalities in the framework of the Horizontal Analysis and In-Depth Diagnosis surveys, such data could not be used due to the fact that not the whole sample of Municipalities responded (in fact ~50% of responses were received). So, given the fact that an overall methodology should be applied for the whole country, the DOS surveys and projections were the only available reliable data that could not be disputed. It is noted that it would not be a right choice to use different sources of population data for different areas, such as the local master plans for the Greater Irbid, Greater Mafraq and Al-Ramtha areas (CCM, 2014) and different sources for the rest of the country, since it would add unreliability to the approach.

So, given the fact that the official censuses are being published by District and not by Municipality, the District administrative level was selected as the minimum level to base the estimations. In this context, the 1994 and 2004 censuses' data, as well as the DOS projections for 2012 were used. This overall approach ensures reliability of results. It is also noted that the District level approach is more than adequate to cater for the scope of the Strategy, which according of the approved Inception Report (section 3.3.1.1) will be limited at the regional level.



Table 5-2 shows the recorded populations by District, according to the 1994 and 2004 censuses, as well as DOS' estimations for 2012 and our projections for 2014 according to the population 2.224% growth rate for years 2013 and 2014. The population is divided in urban and rural population, where the urban population includes localities with population higher than 5,000 persons, as were defined in the 2004 census. It is noted that Syrian refugees and residents of the UNRWA and UNHCR camps (Palestinian or non-Palestinian) have not been counted.

Table 5-2: Estimated permanent population of Jordan during the years 1994, 2004, 2012 and 2014⁽¹⁾, by District

#	Administrative Division	1994 ⁽²⁾			2004 ⁽³⁾			2012 ⁽⁴⁾			2014 ⁽⁵⁾		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
NORTHERN REGION													
Irbid Governorate													
1	Greater Irbid District	289,546	91,632	381,178	331,995	40,777	372,772	381,554	78,536	460,090	398,713	82,068	480,781
2	Bani Obeid District	7,864	2,489	10,353	86,388	6,171	92,559	95,046	19,564	114,610	99,321	20,443	119,764
3	Wastiyyah District	14,862	4,703	19,565	8,031	15,918	23,949	24,423	5,027	29,450	25,521	5,253	30,774
4	Tayba District	18,114	5,733	23,847	21,242	7,793	29,035	29,590	6,090	35,680	30,920	6,364	37,285
5	Mazar Shamali District	27,081	8,570	35,651	19,524	24,505	44,029	44,865	9,235	54,100	46,883	9,650	56,533
6	Kura District	54,322	17,191	71,513	58,105	32,701	90,806	92,492	19,038	111,530	96,652	19,894	116,546
7	Bani Knenanah District	39,399	12,469	51,868	13,143	62,955	76,098	77,606	15,974	93,580	81,096	16,692	97,788
8	Al-Ramtha District	60,240	19,064	79,304	97,490	11,316	108,806	110,869	22,821	133,690	115,855	23,847	139,702
9	Aghwar Shamaliyah District	59,519	18,836	78,355	67,096	17,955	85,051	86,554	17,816	104,370	90,447	18,617	109,064
SUM of Irbid Governorate		570,948	180,686	751,634	703,014	220,091	923,105	943,000	194,100	1,137,100	985,408	202,829	1,188,237
Mafraq Governorate													
1	Greater Mafraq District	45,790	95,954	141,744	62,814	38,482	101,296	49,066	76,014	125,080	51,272	79,433	130,705
2	Badiyah Shamaliyah District	8,767	18,371	27,138	-	57,623	57,623	27,840	43,130	70,970	29,092	45,070	74,162
3	Badiyah Shamaliyah Gharbiyah District	-	-	-	10,310	64,515	74,825	36,164	56,026	92,190	37,790	58,546	96,336
4	Al-Rouaishad District	3,241	6,791	10,032	-	9,802	9,802	4,731	7,329	12,060	4,944	7,659	12,602
SUM of Mafraq Governorate		57,798	121,116	178,914	73,124	170,422	243,546	117,800	182,500	300,300	123,098	190,707	313,805
Ajloun Governorate													
1	Greater Ajloun District	49,683	24,056	73,739	57,303	34,033	91,336	86,042	27,318	113,360	89,912	28,546	118,458
2	Kofranjah District	14,020	6,789	20,809	21,638	5,362	27,000	25,458	8,082	33,540	26,602	8,446	35,048
SUM of Ajloun Governorate		63,703	30,845	94,548	78,941	39,395	118,336	111,500	111,500	146,900	116,514	36,992	153,506



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	1994 ⁽²⁾			2004 ⁽³⁾			2012 ⁽⁴⁾			2014 ⁽⁵⁾		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Jerash Governorate													
1	Greater Jerash District	62,458	60,732	123,190	78,205	75,042	153,247	120,100	71,600	191,700	125,501	74,820	200,321
SUM of Jerash Governorate		62,458	60,732	123,190	78,205	75,042	153,247	120,100	71,600	191,700	125,501	74,820	200,321
SUM OF NORTHERN REGION		754,907	393,379	1,148,286	933,284	504,950	1,438,234	1,292,400	483,600	1,776,000	1,350,521	505,348	1,855,870
CENTRAL REGION													
Amman Governorate													
1	Greater Amman District	1,189,114	117,903	1,307,017	547,939	-	547,939	661,593	42,077	703,670	691,346	43,969	735,315
2	Marka District	-	-	-	480,380	-	480,380	579,344	36,846	616,190	605,398	38,503	643,901
3	Quaismeh District	-	-	-	255,836	-	255,836	308,048	19,592	327,640	321,902	20,473	342,375
4	Al-Jami'ah District	-	-	-	274,637	-	274,637	334,515	21,275	355,790	349,559	22,232	371,790
5	Wadi Essier District	120,270	11,925	132,195	149,830	21,544	171,374	208,105	13,235	221,340	217,464	13,831	231,294
6	Sahab District	44,634	4,426	49,060	43,779	13,074	56,853	68,296	4,344	72,640	71,368	4,539	75,907
7	Ajeeza District	29,519	2,927	32,446	-	41,963	41,963	50,357	3,203	53,560	52,622	3,347	55,969
8	Almoaqr District	16,594	1,645	18,239	-	29,963	29,963	35,944	2,286	38,230	37,560	2,389	39,949
9	Naor District	33,918	3,363	37,281	15,351	50,527	65,878	79,297	5,043	84,340	82,863	5,270	88,133
SUM of Amman Governorate		1,434,049	142,189	1,576,238	1,767,752	157,071	1,924,823	2,325,500	147,900	2,473,400	2,430,082	154,551	2,584,633
Madaba Governorate													
1	Madaba District	47,453	36,371	83,824	69,834	30,964	100,798	88,930	35,650	124,580	92,929	37,253	130,183
2	Theban District	13,302	10,195	23,497	5,782	22,755	28,537	25,070	10,050	35,120	26,197	10,502	36,699
SUM of Madaba Governorate		60,755	46,566	107,321	75,616	53,719	129,335	114,000	45,700	159,700	119,127	47,755	166,882
Balqa Governorate													
1	Greater Balqa (Salt) District	129,007	73,939	202,946	73,188	36,255	109,443	97,520	38,260	135,780	101,906	39,980	141,886
2	New Deir Allah District	25,133	14,405	39,538	6,891	39,504	46,395	41,255	16,185	57,440	43,110	16,913	60,023
3	Shouna Janoobiyyeh	21,357	12,241	33,598	21,657	17,057	38,714	34,396	13,494	47,890	35,943	14,101	50,044



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	1994 ⁽²⁾			2004 ⁽³⁾			2012 ⁽⁴⁾			2014 ⁽⁵⁾		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
	District												
4	New Ain Al-Basha District	-	-	-	99,465	29,060	128,525	114,449	44,901	159,350	119,596	46,920	166,516
5	Mahes & Al-Fahis District	-	-	-	22,129	-	22,129	19,780	7,760	27,540	20,669	8,109	28,779
SUM of Balqa Governorate		175,498	100,584	276,082	223,330	121,876	345,206	307,400	120,600	428,000	321,224	126,024	447,248
Zarqa Governorate													
1	Greater Zarqa District	609,711	29,758	639,469	420,940	27,205	448,145	529,651	30,609	560,260	553,470	31,985	585,456
2	Russeifeh District	-	-	-	265,463	2,001	267,464	315,648	18,242	333,890	329,844	19,062	348,906
3	Hashimiya District	-	-	-	38,021	8,132	46,153	54,500	3,150	57,650	56,951	3,291	60,243
SUM of Zarqa Governorate		609,711	29,758	639,469	724,424	37,338	761,762	899,800	52,000	951,800	940,266	54,339	994,604
SUM OF CENTRAL REGION		2,280,013	319,097	2,599,110	2,791,122	370,004	3,161,126	3,646,700	366,200	4,012,900	3,810,698	382,669	4,193,367
SOUTHERN REGION													
Aqaba Governorate													
1	Greater Aqaba District	52,759	14,344	67,103	79,935	4,906	84,841	99,612	16,228	115,840	104,092	16,957	121,050
2	Qawiera District	10,014	2,722	12,736	7,373	9,753	17,126	20,088	3,272	23,360	20,991	3,420	24,411
SUM of Aqaba Governorate		62,773	17,066	79,839	87,308	14,659	101,967	119,700	19,500	139,200	125,083	20,377	145,460
Ma'an Governorate													
1	Greater Ma'an District	19,711	26,495	46,206	26,430	24,530	50,960	36,048	29,662	65,710	37,670	30,995	68,665
2	Greater Petra District	7,300	9,811	17,111	14,140	9,667	23,807	16,847	13,863	30,710	17,605	14,486	32,091
3	Greater Shobak District	4,215	5,666	9,881	-	11,062	11,062	7,834	6,446	14,280	8,186	6,736	14,922
4	Husseinieh District	2,761	3,711	6,472	-	8,306	8,306	5,870	4,830	10,700	6,134	5,047	11,181
SUM of Ma'an Governorate		33,987	45,683	79,670	40,570	53,565	94,135	66,600	54,800	121,400	69,595	57,264	126,860
Karak Governorate													
1	Greater Karak District	20,927	38,261	59,188	20,171	44,447	64,618	27,693	51,417	79,110	28,939	53,729	82,668
2	Mazar Janoobiyyeh District	14,937	27,311	42,248	22,173	34,820	56,993	24,424	45,346	69,770	25,522	47,386	72,908

Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	1994 ⁽²⁾			2004 ⁽³⁾			2012 ⁽⁴⁾			2014 ⁽⁵⁾		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
3	Qasr District	5,865	10,722	16,587	-	20,801	20,801	8,909	16,541	25,450	9,310	17,285	26,595
4	Al-Agwar Al-Janobeiah District	9,910	18,120	28,030	23,642	8,781	32,423	13,855	25,725	39,580	14,478	26,881	41,360
5	Ai District	4,820	8,813	13,633	4,754	4,906	9,660	4,148	7,702	11,850	4,335	8,048	12,383
6	Faqo'e District	3,565	6,519	10,084	-	12,154	12,154	5,202	9,658	14,860	5,436	10,092	15,528
7	Al-Qatraneh District	-	-	-	-	6,946	6,946	2,969	5,511	8,480	3,102	5,759	8,861
SUM of Karak Governorate		60,025	109,745	169,770	70,740	132,855	203,595	87,200	161,900	249,100	91,122	169,181	260,302
Tafilah Governorate													
1	Tafilah District	27,977	9,354	37,331	31,765	15,071	46,836	39,743	15,947	55,690	41,530	16,664	58,194
2	Al-Hassa District	7,556	2,526	10,082	6,868	12,451	19,319	7,657	3,073	10,730	8,002	3,211	11,213
3	Besara District	11,519	3,851	15,370	9,020	10	9,030	16,400	6,580	22,980	17,137	6,876	24,013
SUM of Tafilah Governorate		47,052	15,731	62,783	47,653	27,532	75,185	63,800	25,600	89,400	66,669	26,751	93,420
SUM OF SOUTHERN REGION		203,837	188,225	392,062	246,271	228,611	474,882	337,300	261,800	599,100	352,469	273,574	626,043
SUM OF JORDAN		3,238,757	900,701	4,139,458	3,970,677	1,103,565	5,074,242	5,276,400	1,111,600	6,388,000	5,513,689	1,161,591	6,675,279

⁽¹⁾ Excluding Syrian Refugees and Palestinian Refugees residing in the UNRWA refugee camps.

⁽²⁾ According to the General Census of Population and Housing of Jordan 1994 (DOS, 1994).

⁽³⁾ According to the Population and Housing Census (DOS, 2004).

⁽⁴⁾ According to the Jordan Statistical Yearbook 2012, Issue No. 63 (DOS, 2012).

⁽⁵⁾ Based on the assumption of population growth rate equal to 2.224% for years 2013 and 2014.

Figure 5-2 shows the distribution of the permanent population of Jordan by Governorate.

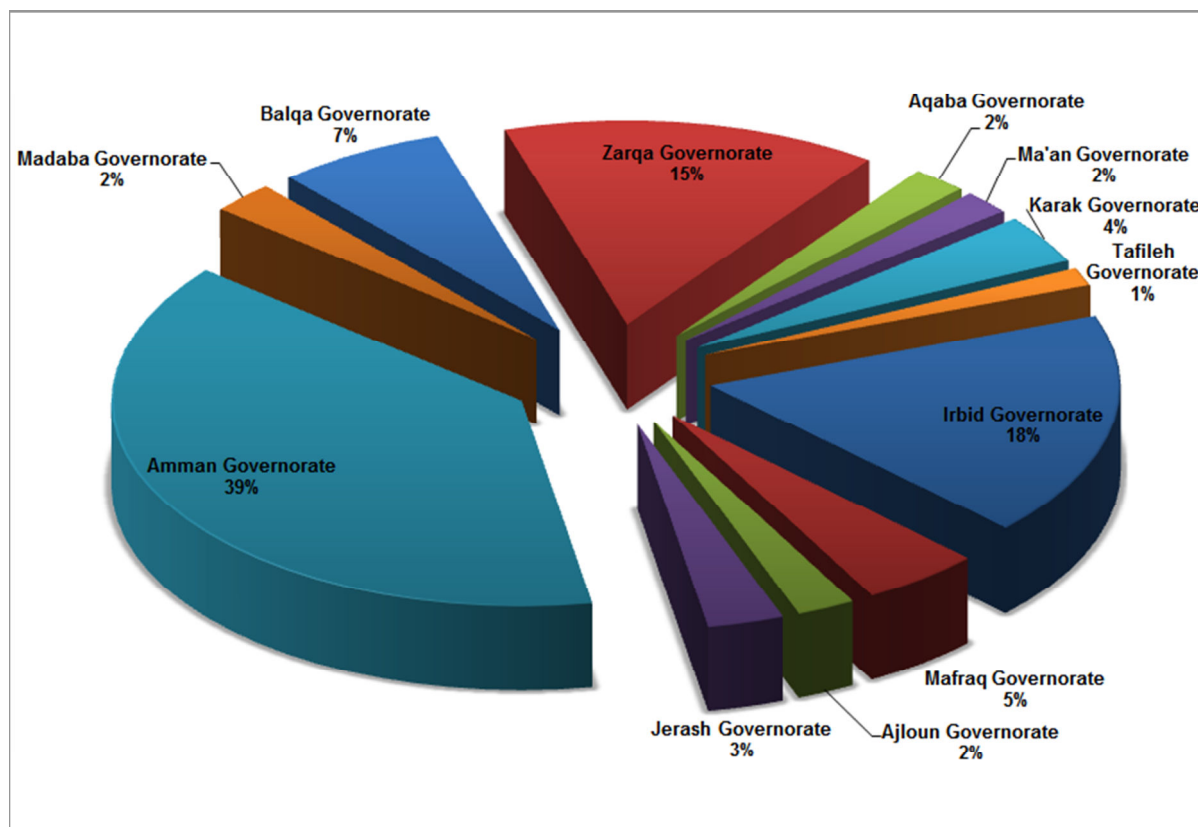


Figure 5-2: Population of Jordan in 2014, by Governorate

Based on the above, the expected native population of Jordan at the end of 2014 is estimated at 6,675,279 people, of which ~82.60% will live in urban and ~17.40% in rural areas. The most urbanized region is the Central Region, where ~91% of residents live in urban areas (~95% in Zarqa and ~94% in Amman Governorates), whereas the less urbanized region is the Southern Region, where the rural population reaches an average of ~44% of residents (~65% in Karak Governorate). Table 5-3 gives the respective percentages of urban and rural population in Jordan, by Governorate and Region.

Table 5-3: Distribution of urban and rural population in Jordan, by Governorate and Region

#	Governorate	% of urban population	% of rural population
NORTHERN REGION			
1	Irbid	82.9%	17.1%
2	Mafraq	39.2%	60.8%
3	Jerash	75.9%	24.1%
4	Ajloun	62.6%	37.4%
Sum of Northern Region		72.8%	27.2%

#	Governorate	% of urban population	% of rural population
CENTRAL REGION			
5	Amman	94.0%	6.0%
6	Madaba	71.4%	28.6%
7	Balqa	71.8%	28.2%
8	Zarqa	94.5%	5.5%
Sum of Central Region		90.9%	9.1%
SOUTHERN REGION			
9	Aqaba	86.0%	14.0%
10	Ma'an	54.9%	45.1%
11	Karak	35.0%	65.0%
12	Tafilah	71.4%	28.6%
Sum of Southern Region		56.3%	43.7%
SUM OF JORDAN		82.6%	17.4%

5.1.1.1.2 FUTURE TRENDS OF PERMANENT NATIVE POPULATION

Based on the data of Table 5-1, Figure 5-3 presents the variance of the population growth rate during the 1979-2014 period (red line). The orange line is the exponential trendline representing the population growth during this period.

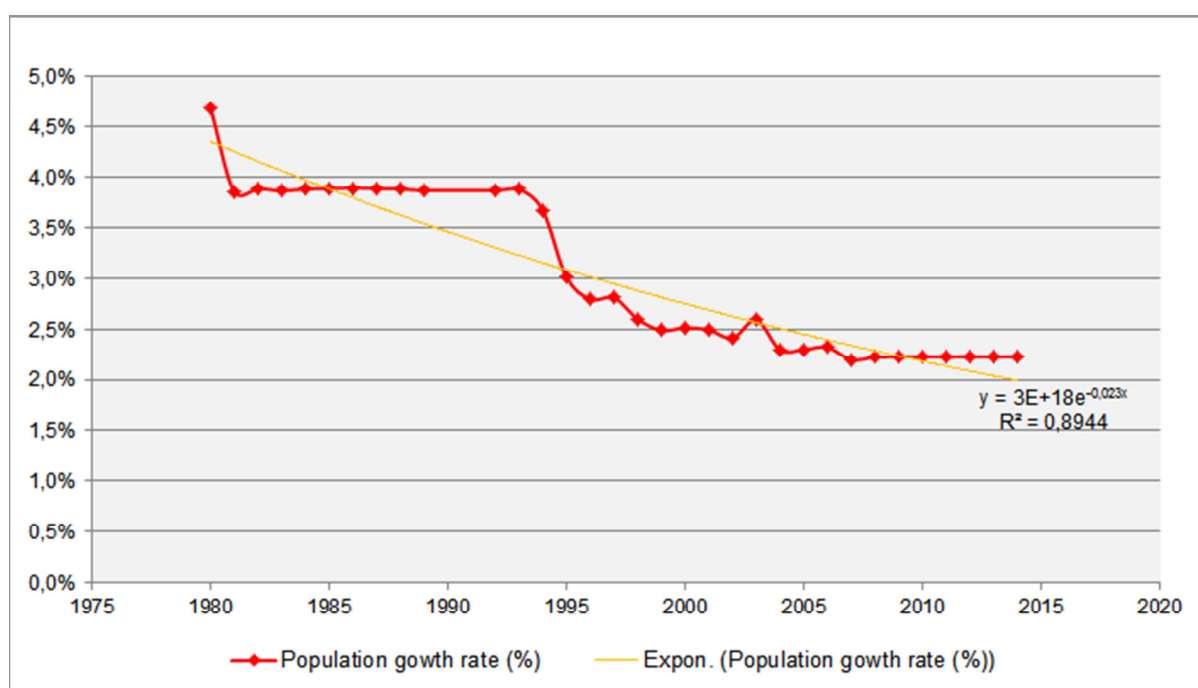


Figure 5-3: Growth rate (%) of permanent population of Jordan, years 1979-2014

If this trend is followed for the next 25 years (2015-2040), the population growth rate is expected to have positive values, but will be constantly decreasing during the years. Figure 5-4 shows the estimated growth rate (%) of permanent population of Jordan for the following 25 years (2015 - 2040), when it is expected to be around +1.29%. Table 5-4 gives the expected values of this growth rate (%).

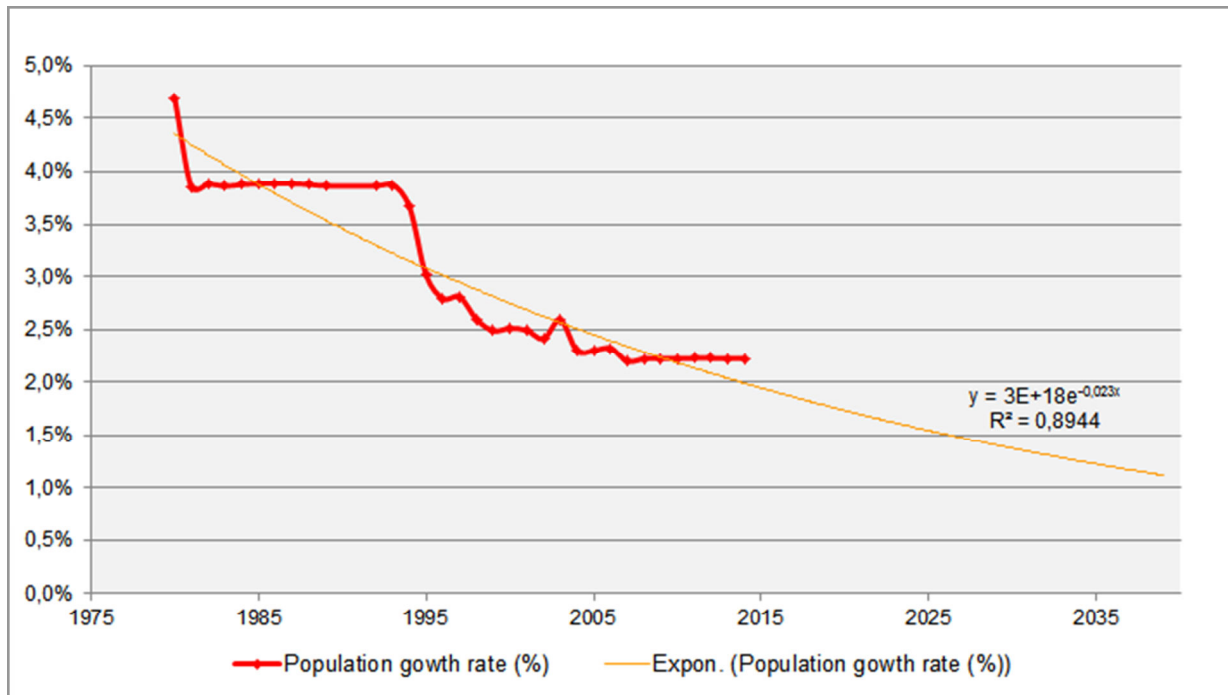


Figure 5-4: Estimated growth rate (%) of permanent population of Jordan, years 2015 - 2040

Table 5-4: Values of estimated growth rate (%) of permanent population of Jordan, years 2015 - 2040

Year	Growth rate (%)
2014	2.224%
2015	2.237%
2016	2.187%
2017	2.137%
2018	2.088%
2019	2.041%
2020	1.994%
2021	1.949%
2022	1.905%
2023	1.861%
2024	1.819%
2025	1.778%
2026	1.737%
2027	1.698%
2028	1.659%

Year	Growth rate (%)
2029	1.621%
2030	1.585%
2031	1.549%
2032	1.513%
2033	1.479%
2034	1.445%
2035	1.412%
2036	1.380%
2037	1.349%
2038	1.318%
2039	1.288%
2040	1.259%

Based on the calculated rates of Table 5-4, Figure 5-5 shows the estimated numbers of the permanent population of Jordan by 2040. The total permanent population in 2040 is expected to reach the number of 10,354,974 inhabitants, of which 8,553,066 will reside in urban and 1,801,908 in rural areas.

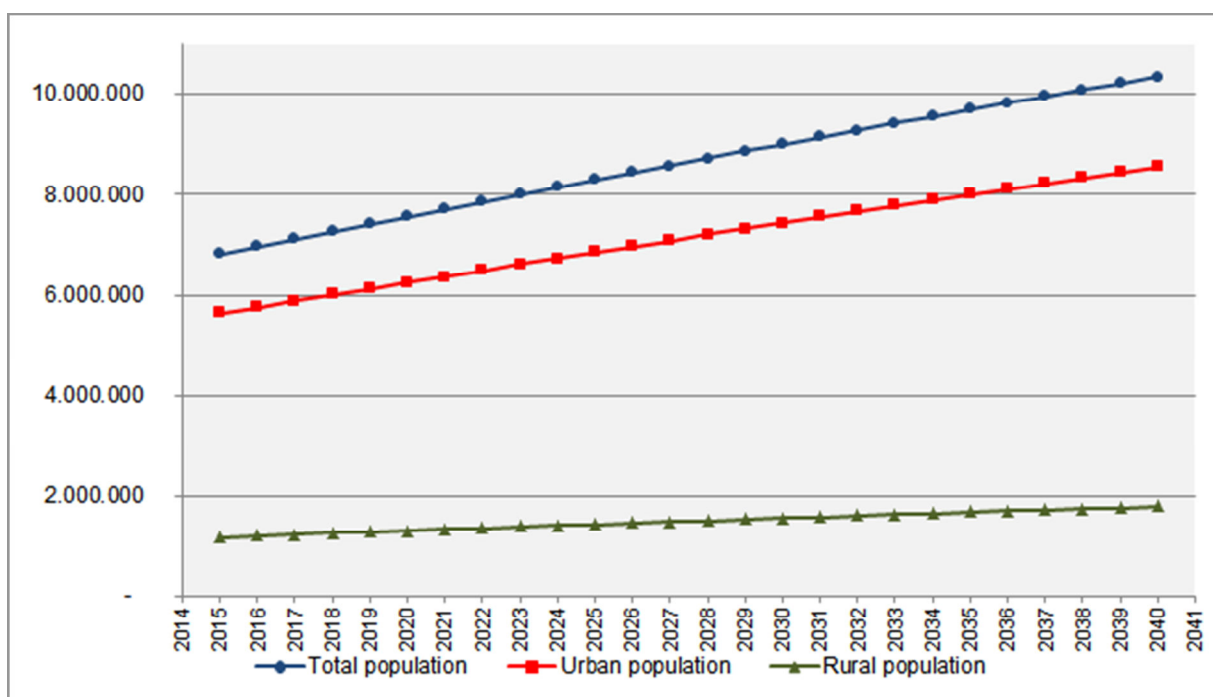


Figure 5-5: Estimated evolution of permanent population of Jordan, 2015-2040

Table 5-5 presents the expected permanent population of Jordan – total, urban and rural – at the end of every 5-year period starting from 2015, according to the aforementioned trends, by District. The respective detailed yearly data are appended in Annex 6.



Table 5-5: Expected total, urban and rural permanent population of Jordan, by District

#	Administrative Division	2015			2019 (end of 2015-2019 period)			2024 (end of 2020-2024 period)			2029 (end of 2025-2029 period)			2034 (end of 2030-2034 period)			2039 (end of 2035-2039 period)		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
NORTHERN REGION																			
Irbid Governorate																			
1	Greater Irbid District	407,634	83,904	491,538	443,195	91,224	534,420	487,065	100,254	587,319	529,862	109,063	638,925	571,209	117,573	688,783	610,810	125,725	736,535
2	Bani Obeid District	101,543	20,901	122,444	110,402	22,724	133,126	121,330	24,974	146,303	131,991	27,168	159,158	142,290	29,288	171,578	152,155	31,318	183,473
3	Wastiyyah District	26,092	5,371	31,463	28,369	5,839	34,208	31,177	6,417	37,594	33,916	6,981	40,897	36,563	7,526	44,088	39,097	8,048	47,145
4	Tayba District	31,612	6,507	38,119	34,370	7,074	41,444	37,772	7,775	45,547	41,091	8,458	49,549	44,297	9,118	53,415	47,368	9,750	57,118
5	Mazar Shamali District	47,932	9,866	57,798	52,113	10,727	62,840	57,272	11,788	69,060	62,304	12,824	75,128	67,166	13,825	80,991	71,823	14,783	86,606
6	Kura District	98,814	20,339	119,153	107,435	22,114	129,548	118,069	24,302	142,371	128,443	26,438	154,881	138,466	28,501	166,967	148,066	30,477	178,543
7	Bani Knenanah District	82,911	17,066	99,976	90,144	18,555	108,698	99,067	20,391	119,458	107,771	22,183	129,954	116,181	23,914	140,095	124,236	25,572	149,807
8	Al-Ramtha District	118,448	24,380	142,828	128,781	26,507	155,288	141,528	29,131	170,659	153,964	31,691	185,655	165,978	34,164	200,142	177,485	36,532	214,018
9	Aghwar Shamaliyah District	92,470	19,033	111,504	100,538	20,694	121,231	110,489	22,742	133,231	120,198	24,741	144,938	129,577	26,671	156,248	138,560	28,520	167,081
SUM of Irbid Governorate		1,007,456	207,367	1,214,823	1,095,346	225,458	1,320,803	1,203,768	247,775	1,451,543	1,309,540	269,546	1,579,086	1,411,728	290,580	1,702,308	1,509,601	310,725	1,820,326
Mafrq Governorate																			
1	Greater Mafrq District	52,419	81,210	133,629	56,992	88,295	145,287	62,634	97,035	159,668	68,137	105,561	173,698	73,454	113,798	187,252	78,547	121,687	200,234
2	Badiah Shamaliyah District	29,743	46,078	75,821	32,337	50,098	82,436	35,538	55,057	90,595	38,661	59,895	98,556	41,678	64,569	106,246	44,567	69,045	113,612
3	Badiyah Shamaliyah Gharbiyah District	38,636	59,856	98,491	42,006	65,077	107,084	46,164	71,519	117,683	50,220	77,803	128,024	54,139	83,875	138,014	57,893	89,690	147,582
4	Al-Rouaishad District	5,054	7,830	12,884	5,495	8,513	14,008	6,039	9,356	15,395	6,570	10,178	16,748	7,082	10,972	18,055	7,573	11,733	19,306
SUM of Mafrq Governorate		125,852	194,974	320,826	136,831	211,984	348,815	150,375	232,967	383,342	163,588	253,437	417,025	176,354	273,214	449,567	188,580	292,155	480,735
Ajloun Governorate																			
1	Greater Ajloun District	91,924	29,185	121,108	99,943	31,731	131,674	109,836	34,872	144,708	119,487	37,936	157,423	128,811	40,896	169,707	137,741	43,731	181,472
2	Kofranjah District	27,198	8,635	35,833	29,570	9,388	38,959	32,497	10,318	42,815	35,353	11,224	46,577	38,111	12,100	50,211	40,754	12,939	53,692
SUM of Ajloun Governorate		119,121	37,820	156,941	129,513	41,119	170,632	142,333	45,189	187,522	154,840	49,160	203,999	166,922	52,996	219,918	178,495	56,670	235,165
Jerash Governorate																			
1	Greater Jerash District	128,309	76,494	204,803	139,503	83,167	222,670	153,311	91,400	244,711	166,782	99,431	266,213	179,797	107,190	286,987	192,262	114,621	306,883
SUM of Jerash Governorate		128,309	76,494	204,803	139,503	83,167	222,670	153,311	91,400	244,711	166,782	99,431	266,213	179,797	107,190	286,987	192,262	114,621	306,883
SUM OF NORTHERN REGION		1,380,738	516,655	1,897,393	1,501,193	561,728	2,062,920	1,649,788	617,330	2,267,118	1,794,751	671,573	2,466,324	1,934,802	723,979	2,658,780	2,068,938	774,171	2,843,109
CENTRAL REGION																			
Amman Governorate																			
1	Greater Amman District	706,814	44,953	751,767	768,476	48,875	817,351	844,544	53,712	898,256	918,752	58,432	977,184	990,445	62,992	1,053,437	1,059,111	67,359	1,126,470
2	Marka District	618,943	39,364	658,308	672,940	42,798	715,738	739,551	47,035	786,585	804,533	51,168	855,701	867,314	55,160	922,474	927,443	58,985	986,427
3	Quaismeh District	329,104	20,931	350,035	357,815	22,757	380,572	393,233	25,009	418,242	427,786	27,207	454,992	461,167	29,330	490,497	493,139	31,363	524,502
4	Al-Jami'ah District	357,380	22,729	380,109	388,557	24,712	413,269	427,019	27,158	454,177	464,540	29,544	494,084	500,789	31,850	532,639	535,508	34,058	569,566
5	Wadi Essier District	222,329	14,140	236,469	241,725	15,374	257,098	265,652	16,895	282,547	288,994	18,380	307,374	311,545	19,814	331,359	333,144	21,188	354,332
6	Sahab District	72,965	4,640	77,605	79,330	5,045	84,375	87,182	5,545	92,727	94,843	6,032	100,875	102,244	6,503	108,747	109,332	6,953	116,286
7	Ajeeza District	53,799	3,422	57,221	58,493	3,720	62,213	64,283	4,088	68,371	69,931	4,448	74,379	75,388	4,795	80,183	80,614	5,127	85,741
8	Almoaqr District	38,401	2,442	40,843	41,751	2,655	44,406	45,884	2,918	48,802	49,915	3,175	53,090	53,810	3,422	57,233	57,541	3,660	61,200
9	Naor District	84,717	5,388	90,105	92,108	5,858	97,965	101,225	6,438	107,663	110,119	7,003	117,123	118,712	7,550	126,262	126,942	8,073	135,016
SUM of Amman Governorate		2,484,452	158,009	2,642,462	2,701,194	171,794	2,872,988	2,968,572	188,799	3,157,371	3,229,413	205,388	3,434,801	3,481,415	221,415	3,702,831	3,722,775	236,766	3,959,541
Madaba Governorate																			
1	Madaba District	95,009	38,087	133,095	103,297	41,409	144,706	113,522	45,508	159,030	123,497	49,507	173,004	133,134	53,370	186,504	142,364	57,070	199,434



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015			2019 (end of 2015-2019 period)			2024 (end of 2020-2024 period)			2029 (end of 2025-2029 period)			2034 (end of 2030-2034 period)			2039 (end of 2035-2039 period)		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
2	Theban District	26,784	10,737	37,521	29,120	11,674	40,794	32,003	12,829	44,832	34,815	13,956	48,771	37,531	15,045	52,577	40,133	16,089	56,222
SUM of Madaba Governorate		121,792	48,824	170,616	132,417	53,083	185,500	145,524	58,337	203,862	158,311	63,463	221,775	170,665	68,416	239,081	182,497	73,159	255,656
Balqa Governorate																			
1	Greater Balqa (Salt) District	104,186	40,875	145,061	113,275	44,440	157,716	124,488	48,839	173,327	135,426	53,131	188,557	145,994	57,277	203,271	156,116	61,248	217,363
2	New Deir Allah District	44,075	17,291	61,366	47,920	18,800	66,720	52,663	20,661	73,324	57,290	22,476	79,767	61,761	24,230	85,991	66,043	25,910	91,953
3	Shouna Janoobiyyeh District	36,747	14,417	51,163	39,953	15,674	55,627	43,907	17,226	61,133	47,765	18,739	66,505	51,493	20,202	71,694	55,062	21,602	76,665
4	New Ain Al-Basha District	122,272	47,970	170,242	132,939	52,155	185,094	146,098	57,317	203,415	158,935	62,354	221,289	171,337	67,219	238,557	183,216	71,880	255,095
5	Mahes & Al-Fahis District	21,132	8,291	29,422	22,975	9,014	31,989	25,250	9,906	35,156	27,468	10,776	38,245	29,612	11,617	41,229	31,665	12,423	44,087
SUM of Balqa Governorate		328,411	128,843	457,255	357,062	140,083	497,145	392,406	153,950	546,355	426,885	167,477	594,362	460,197	180,546	640,742	492,101	193,062	685,164
Zarqa Governorate																			
1	Greater Zarqa District	565,854	32,701	598,555	615,219	35,554	650,772	676,116	39,073	715,189	735,524	42,506	778,031	792,920	45,823	838,743	847,892	49,000	896,892
2	Russeifeh District	337,224	19,488	356,712	366,643	21,189	387,831	402,935	23,286	426,221	438,340	25,332	463,672	472,545	27,309	499,854	505,306	29,202	534,508
3	Hashimiya District	58,226	3,365	61,590	63,305	3,658	66,964	69,571	4,021	73,592	75,684	4,374	80,058	81,590	4,715	86,306	87,247	5,042	92,289
SUM of Zarqa Governorate		961,303	55,554	1,016,857	1,045,167	60,401	1,105,567	1,148,622	66,380	1,215,002	1,249,549	72,212	1,321,761	1,347,055	77,847	1,424,903	1,440,444	83,244	1,523,688
SUM OF CENTRAL REGION		3,895,959	391,230	4,287,189	4,235,840	425,361	4,661,201	4,655,124	467,466	5,122,590	5,064,158	508,540	5,572,698	5,459,332	548,224	6,007,556	5,837,818	586,231	6,424,049
SOUTHERN REGION																			
Aqaba Governorate																			
1	Greater Aqaba District	106,421	17,337	123,758	115,705	18,849	134,554	127,158	20,715	147,873	138,331	22,535	160,867	149,126	24,294	173,420	159,464	25,978	185,442
2	Qawiera District	21,461	3,496	24,957	23,333	3,801	27,134	25,642	4,177	29,820	27,896	4,544	32,440	30,072	4,899	34,971	32,157	5,239	37,396
SUM of Aqaba Governorate		127,882	20,833	148,715	139,038	22,650	161,688	152,801	24,892	177,693	166,227	27,080	193,306	179,198	29,193	208,391	191,622	31,217	222,838
Ma'an Governorate																			
1	Greater Ma'an District	38,512	31,689	70,201	41,872	34,453	76,326	46,017	37,864	83,881	50,060	41,191	91,251	53,967	44,405	98,372	57,708	47,484	105,192
2	Greater Petra District	17,999	14,810	32,809	19,569	16,102	35,671	21,506	17,696	39,202	23,396	19,251	42,647	25,222	20,753	45,975	26,970	22,192	49,162
3	Greater Shobak District	8,369	6,887	15,256	9,100	7,487	16,587	10,000	8,229	18,229	10,879	8,952	19,831	11,728	9,650	21,378	12,541	10,319	22,860
4	Husseinieh District	6,271	5,160	11,431	6,818	5,610	12,429	7,493	6,166	13,659	8,152	6,707	14,859	8,788	7,231	16,019	9,397	7,732	17,129
SUM of Ma'an Governorate		71,152	58,546	129,698	77,360	63,653	141,013	85,017	69,954	154,971	92,487	76,101	168,588	99,704	82,039	181,743	106,617	87,727	194,343
Karak Governorate																			
1	Greater Karak District	29,586	54,931	84,517	32,167	59,723	91,891	35,351	65,635	100,986	38,458	71,402	109,860	41,459	76,974	118,432	44,333	82,310	126,643
2	Mazar Janoobiyyeh District	26,093	48,446	74,539	28,369	52,672	81,042	31,178	57,886	89,064	33,917	62,972	96,889	36,564	67,886	104,450	39,099	72,593	111,691
3	Qasr District	9,518	17,672	27,190	10,348	19,213	29,562	11,373	21,115	32,488	12,372	22,970	35,342	13,337	24,763	38,100	14,262	26,480	40,742
4	Al-Agwar Al-Janobeiah District	14,802	27,483	42,285	16,094	29,881	45,974	17,687	32,838	50,525	19,241	35,724	54,965	20,742	38,511	59,254	22,180	41,181	63,362
5	Ai District	4,432	8,228	12,660	4,818	8,946	13,764	5,295	9,832	15,127	5,761	10,695	16,456	6,210	11,530	17,740	6,641	12,329	18,970
6	Faqo'e District	5,557	10,318	15,876	6,042	11,218	17,261	6,640	12,329	18,969	7,224	13,412	20,636	7,788	14,459	22,246	8,327	15,461	23,789
7	Al-Qatraneh District	3,171	5,888	9,060	3,448	6,402	9,850	3,789	7,036	10,825	4,122	7,654	11,776	4,444	8,251	12,695	4,752	8,823	13,575
SUM of Karak Governorate		93,160	172,966	266,126	101,288	188,056	289,343	111,313	206,670	317,984	121,094	224,830	345,924	130,544	242,374	372,918	139,594	259,178	398,772
Tafilah Governorate																			
1	Tafilah District	42,459	17,037	59,497	46,164	18,523	64,687	50,733	20,357	71,090	55,191	22,146	77,336	59,498	23,874	83,371	63,623	25,529	89,151
2	Al-Hassa District	8,181	3,283	11,463	8,895	3,569	12,463	9,775	3,922	13,697	10,634	4,267	14,901	11,464	4,600	16,063	12,258	4,919	17,177
3	Besara District	17,521	7,030	24,551	19,049	7,643	26,693	20,935	8,400	29,335	22,774	9,138	31,912	24,551	9,851	34,402	26,253	10,534	36,788
SUM of Tafilah Governorate		68,161	27,350	95,511	74,107	29,736	103,843	81,443	32,679	114,122	88,599	35,551	124,149	95,512	38,325	133,837	102,134	40,982	143,116
SUM OF SOUTHERN REGION		360,355	279,695	640,050	391,792	304,095	695,887	430,574	334,196	764,769	468,407	363,561	831,968	504,959	391,931	896,889	539,967	419,102	959,069
SUM OF JORDAN		5,637,052	1,187,580	6,824,632	6,128,825	1,291,184	7,420,009	6,735,486	1,418,991	8,154,477	7,327,316	1,543,674	8,870,990	7,899,092	1,664,133	9,563,225	8,446,722	1,779,504	10,226,226

5.1.1.2 REFUGEES

5.1.1.2.1 PALESTINIAN REFUGEES

As mentioned above, the Palestinian refugees from the late '50s and '70s are counted as native population and they are included in the numbers of Table 5-2. The only exception to this are the around 365,000 Palestinian refugees that still live in the ten (10) UNRWA refugee camps all over the country, as have been shown in Figure 4-2 (section 4.3.1.6). Table 5-6 includes the populations currently residing in those camps.

Table 5-6: Populations of registered Palestinian refugees residing in the 10 UNRWA refugee camps
(<http://www.unrwa.org>)

#	Camp Name	Population	District
NORTHERN REGION			
Irbid Governorate			
1	Irbid	26,000	Al-Ramtha District
2	Husn (Martyr Azmi el-Mufti)	23,000	Al-Ramtha District
3	Souf	21,000	Greater Irbid District
SUM of Irbid Governorate		70,000	
Jerash Governorate			
4	Jerash	25,000	Greater Jerash District
SUM of Jerash Governorate		25,000	
SUM OF NORTHERN REGION		95,000	
Zarqa Governorate			
5	Zarqa	21,000	Greater Zarqa District
6	Baq'a	105,000	Greater Zarqa District
SUM of Zarqa Governorate		126,000	
Amman Governorate			
7	Marka	54,000	Marka District
8	Talbieh	8,000	Ajeeza District
9	Amman New Camp	52,000	Ajeeza District
10	Jabal Al Hussein	30,000	Ajeeza District
SUM of Amman Governorate		144,000	
SUM OF CENTRAL REGION		270,000	
SUM OF JORDAN		365,000	

For the future, it is assumed that that presence of Palestinian refugees will not face significant changes.

5.1.1.2.2 NON-PALESTINIAN REFUGEES

Jordan continues to provide asylum for a large number of Syrians, Iraqis and other refugees, despite the substantial strain on national systems and infrastructure. This pressure has become even more acute over the last years, as the global financial crisis has had an impact on Jordan's economic situation and infrastructure for water, electricity, SWM, education and health care.

According to UNHCR figures (www.unhcr.org), Syrians have rapidly become the largest refugee population of concern to UNHCR in Jordan, with over 500,000 individuals registered or awaiting registration, most of whom come from the Syrian Deraa. The current population of refugees in Jordan accounts to around 625,790 (UNCHR Jordan Overview as of end April, 2014), of which:

- 594,596 Syrians (95%);
- 27,188 Iraqis (4.3%); and
- 4,006 other nationalities (0.7%).

Out of the 594,596 Syrians registered with UNHCR, 486,900 (81.9%) live in host communities outside of camps, whereas the rest lives in three refugee camps:

- the Zaatari camp (103,450 refugees);
- the Emirati Jordanian Camp located within Al-Hallabat Municipality (EJC, 3,811 refugees); and
- the Azraq camp (435 refugees) located within New Al-Azraq Municipality.

Figure 5-6 shows the presence of Syrian refugees in Jordan according to the April 2014 UNHCR overview.

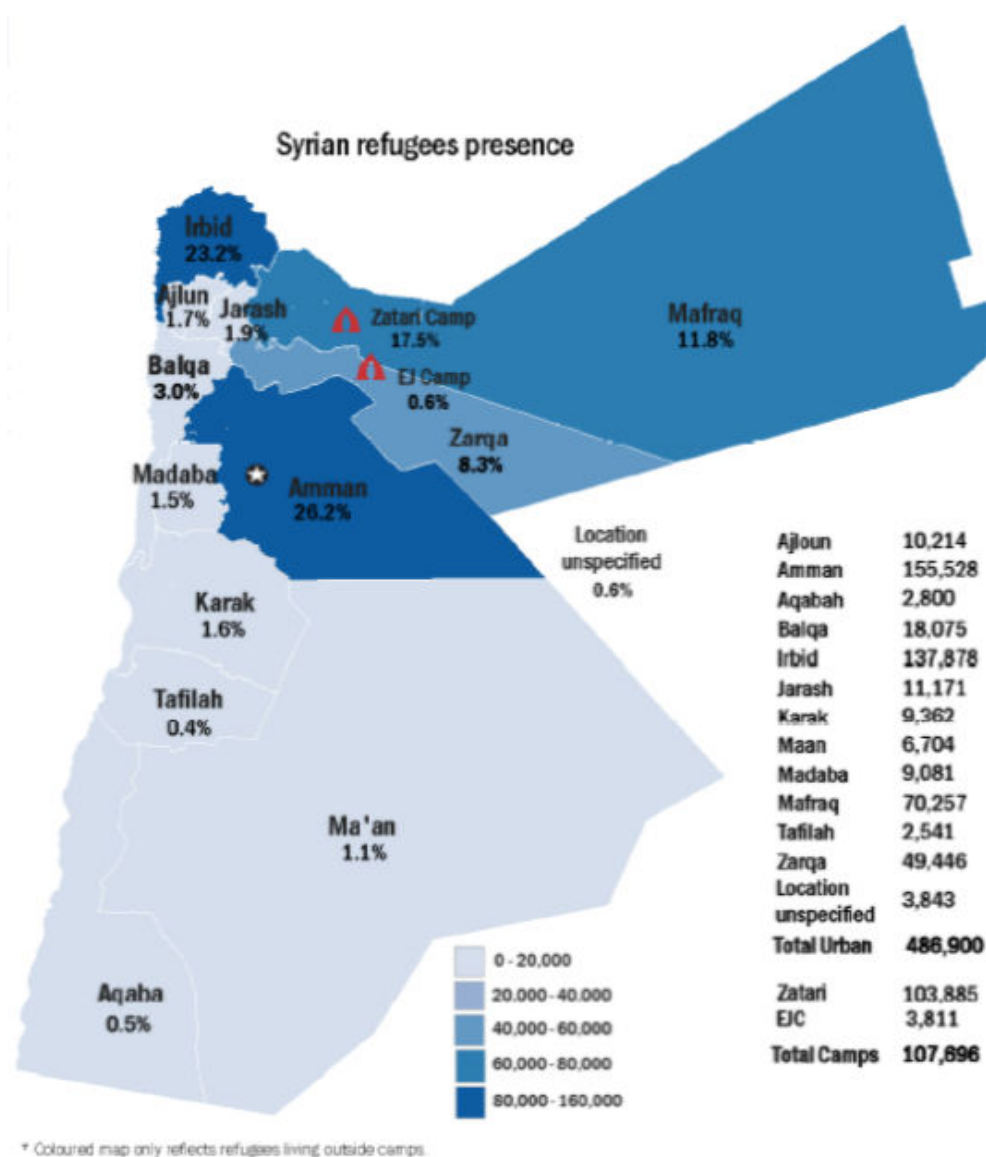


Figure 5-6: Syrian refugee presence, April 2014 (source: UNHCR, 2014)

Table 5-7 gives the UNHCR registered refugees' population of Jordan by District, considering that their allocation within each Governorate is proportional to the allocation of the permanent native population. UNHCR refugee camps with population >5,000 are considered as urban in the analysis.

Table 5-7: Non-Palestinian refugee population of Jordan (2014)

#	Administrative Division	2014		
		Urban	Rural	Total
NORTHERN REGION				
Irbid Governorate				
1	Greater Irbid District	48,128	9,906	58,035
2	Bani Obeid District	11,989	2,468	14,457
3	Wastiyyah District	3,081	634	3,715

#	Administrative Division	2014		
		Urban	Rural	Total
4	Tayba District	3,732	768	4,501
5	Mazar Shamali District	5,659	1,165	6,824
6	Kura District	11,667	2,401	14,068
7	Bani Knenanah District	9,789	2,015	11,804
8	Al-Ramtha District	13,985	2,879	16,863
9	Aghwar Shamaliyah District	10,918	2,247	13,165
SUM of Irbid Governorate		118,947	24,483	143,431
Mafraq Governorate				
1	Greater Mafraq District	115,169	18,155	133,324
2	Badiyah Shamaliyah District	6,649	10,301	16,950
3	Badiyah Shamaliyah Gharbiyah District	8,637	13,381	22,019
4	Al-Rouaishad District	1,130	1,750	2,880
SUM of Mafraq Governorate		131,585	43,588	175,173
Ajloun Governorate				
1	Greater Ajloun District	6,403	2,033	8,436
2	Kofranjah District	1,894	601	2,496
SUM of Ajloun Governorate		8,297	2,634	10,931
Jerash Governorate				
1	Greater Jerash District	7,585	4,522	12,107
SUM of Jerash Governorate		7,585	4,522	12,107
SUM OF NORTHERN REGION		266,415	75,228	341,643
CENTRAL REGION				
Amman Governorate				
1	Greater Amman District	45,860	2,917	48,776
2	Marka District	40,159	2,554	42,713
3	Quaismeh District	21,353	1,358	22,711
4	Al-Jami'ah District	23,188	1,475	24,662
5	Wadi Essier District	14,425	917	15,343
6	Sahab District	4,734	301	5,035
7	Ajeeza District	3,491	222	3,713
8	Almoaqr District	2,492	158	2,650
9	Naor District	5,497	350	5,846
SUM of Amman Governorate		161,197	10,252	171,449
Madaba Governorate				
1	Madaba District	5,491	2,201	7,692
2	Theban District	1,548	621	2,169
SUM of Madaba Governorate		7,039	2,822	9,861
Balqa Governorate				
1	Greater Balqa (Salt) District	4,595	1,803	6,397
2	New Deir Allah District	1,944	763	2,706
3	Shouna Janoobiyyeh District	1,621	636	2,256

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

#	Administrative Division	2014		
		Urban	Rural	Total
4	New Ain Al-Basha District	5,392	2,115	7,508
5	Mahes & Al-Fahis District	932	366	1,298
SUM of Balqa Governorate		14,483	5,682	20,165
Zarqa Governorate				
1	Greater Zarqa District	30,102	5,986	36,087
2	Russeifeh District	17,939	1,037	18,976
3	Hashimiya District	3,097	179	3,276
SUM of Zarqa Governorate		51,139	7,201	58,340
SUM OF CENTRAL REGION		233,858	25,957	259,815
SOUTHERN REGION				
Aqaba Governorate				
1	Greater Aqaba District	2,490	406	2,896
2	Qawiera District	502	82	584
SUM of Aqaba Governorate		2,992	487	3,480
Ma'an Governorate				
1	Greater Ma'an District	2,167	1,783	3,950
2	Greater Petra District	1,013	833	1,846
3	Greater Shobak District	471	387	858
4	Husseinieh District	353	290	643
SUM of Ma'an Governorate		4,003	3,294	7,297
Karak Governorate				
1	Greater Karak District	1,176	2,183	3,360
2	Mazar Janoobiyyeh District	1,037	1,926	2,963
3	Qasr District	378	702	1,081
4	Al-Agwar Al-Janobeiah District	588	1,092	1,681
5	Ai District	176	327	503
6	Faqo'e District	221	410	631
7	Al-Qatranah District	126	234	360
SUM of Karak Governorate		3,703	6,875	10,578
Tafilah Governorate				
1	Tafilah District	1,324	531	1,855
2	Al-Hassa District	255	102	357
3	Besara District	546	219	765
SUM of Tafilah Governorate		2,125	853	2,978
SUM OF SOUTHERN REGION		12,823	11,509	24,333
SUM OF JORDAN		513,096	112,694	625,790

Based on current trends, UNHCR expects the numbers of refugees fleeing to Jordan to increase, with the potential risk of a larger, sudden influx. The most possible push factors include the civil war taking place in Syria, as well as the recent (June 2014) crisis in Iraq.

Even though it is neither easy nor reliable to calculate the increase of the number of refugees to Jordan for the future due to the abnormal trend that depends highly on politics, the Consultant made some necessary assumptions for the following years. So, it is assumed that the following average yearly rates will be experienced:

- 2015-2017: +10%
- 2018-2019: 0
- 2020-2022: -10%
- 2023-2024: - 5%
- After 2025: 0

Based on the above rates, Table 5-8 shows the expected non-Palestinian population of Jordan – total, urban and rural – at the end of every 5-year period starting from 2015, by District. The respective detailed yearly data are appended in Annex 7.



Table 5-8: Expected total, urban and rural non-Palestinian refugees' population of Jordan, by District

#	Administrative Division	2015			2019 (end of 2015-2019 period)			2024 (end of 2020-2024 period)			2029 (end of 2025-2029 period)			2034 (end of 2030-2034 period)			2039 (end of 2035-2039 period)		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
NORTHERN REGION																			
Irbid Governorate																			
1	Greater Irbid District	49,205	10,128	59,333	59,538	12,255	71,793	39,171	8,063	47,234	39,171	8,063	47,234	39,171	8,063	47,234	39,171	8,063	47,234
2	Bani Obeid District	12,257	2,523	14,780	14,831	3,053	17,884	9,758	2,008	11,766	9,758	2,008	11,766	9,758	2,008	11,766	9,758	2,008	11,766
3	Wastiyyah District	3,150	648	3,798	3,811	784	4,595	2,507	516	3,023	2,507	516	3,023	2,507	516	3,023	2,507	516	3,023
4	Tayba District	3,816	785	4,601	4,617	950	5,568	3,038	625	3,663	3,038	625	3,663	3,038	625	3,663	3,038	625	3,663
5	Mazar Shamali District	5,786	1,191	6,977	7,001	1,441	8,442	4,606	948	5,554	4,606	948	5,554	4,606	948	5,554	4,606	948	5,554
6	Kura District	11,928	2,455	14,383	14,433	2,971	17,403	9,496	1,954	11,450	9,496	1,954	11,450	9,496	1,954	11,450	9,496	1,954	11,450
7	Bani Knenanah District	10,008	2,060	12,068	12,110	2,493	14,602	7,967	1,640	9,607	7,967	1,640	9,607	7,967	1,640	9,607	7,967	1,640	9,607
8	Al-Ramtha District	14,298	2,943	17,241	17,300	3,561	20,861	11,382	2,343	13,725	11,382	2,343	13,725	11,382	2,343	13,725	11,382	2,343	13,725
9	Aghwar Shamaliyah District	11,162	2,298	13,460	13,506	2,780	16,286	8,886	1,829	10,715	8,886	1,829	10,715	8,886	1,829	10,715	8,886	1,829	10,715
SUM of Irbid Governorate		121,609	25,031	146,640	147,147	30,288	177,434	96,811	19,927	116,738	96,811	19,927	116,738	96,811	19,927	116,738	96,811	19,927	116,738
Mafraq Governorate																			
1	Greater Mafraq District	117,746	18,561	136,307	142,472	22,459	164,931	93,736	14,776	108,512	93,736	14,776	108,512	93,736	14,776	108,512	93,736	14,776	108,512
2	Badiah Shamaliyah District	6,798	10,532	17,330	8,226	12,743	20,969	5,412	8,384	13,796	5,412	8,384	13,796	5,412	8,384	13,796	5,412	8,384	13,796
3	Badiyah Shamaliyah Gharbiyah District	8,831	13,681	22,511	10,685	16,554	27,239	7,030	10,891	17,921	7,030	10,891	17,921	7,030	10,891	17,921	7,030	10,891	17,921
4	Al-Rouaishad District	1,155	1,790	2,945	1,398	2,165	3,563	920	1,425	2,344	920	1,425	2,344	920	1,425	2,344	920	1,425	2,344
SUM of Mafraq Governorate		134,529	44,563	179,093	162,781	53,922	216,702	107,097	35,476	142,573	107,097	35,476	142,573	107,097	35,476	142,573	107,097	35,476	142,573
Ajloun Governorate																			
1	Greater Ajloun District	6,546	2,078	8,624	7,921	2,515	10,435	5,211	1,654	6,866	5,211	1,654	6,866	5,211	1,654	6,866	5,211	1,654	6,866
2	Kofranjah District	1,937	615	2,552	2,343	744	3,088	1,542	490	2,031	1,542	490	2,031	1,542	490	2,031	1,542	490	2,031
SUM of Ajloun Governorate		8,483	2,693	11,176	10,264	3,259	13,523	6,753	2,144	8,897	6,753	2,144	8,897	6,753	2,144	8,897	6,753	2,144	8,897
Jerash Governorate																			
1	Greater Jerash District	7,755	4,623	12,378	9,383	5,594	14,977	6,173	3,680	9,854	6,173	3,680	9,854	6,173	3,680	9,854	6,173	3,680	9,854
SUM of Jerash Governorate		7,755	4,623	12,378	9,383	5,594	14,977	6,173	3,680	9,854	6,173	3,680	9,854	6,173	3,680	9,854	6,173	3,680	9,854
SUM OF NORTHERN REGION		272,376	76,911	349,287	329,575	93,062	422,637	216,835	61,228	278,062	216,835	61,228	278,062	216,835	61,228	278,062	216,835	61,228	278,062
CENTRAL REGION																			
Amman Governorate																			
1	Greater Amman District	46,886	2,982	49,868	56,732	3,608	60,340	37,325	2,374	39,699	37,325	2,374	39,699	37,325	2,374	39,699	37,325	2,374	39,699
2	Marka District	41,057	2,611	43,668	49,679	3,160	52,839	32,685	2,079	34,764	32,685	2,079	34,764	32,685	2,079	34,764	32,685	2,079	34,764
3	Quaismeh District	21,831	1,388	23,219	26,415	1,680	28,095	17,379	1,105	18,485	17,379	1,105	18,485	17,379	1,105	18,485	17,379	1,105	18,485
4	Al-Jami'ah District	23,706	1,508	25,214	28,685	1,824	30,509	18,872	1,200	20,073	18,872	1,200	20,073	18,872	1,200	20,073	18,872	1,200	20,073
5	Wadi Essier District	14,748	938	15,686	17,845	1,135	18,980	11,741	747	12,487	11,741	747	12,487	11,741	747	12,487	11,741	747	12,487
6	Sahab District	4,840	308	5,148	5,856	372	6,229	3,853	245	4,098	3,853	245	4,098	3,853	245	4,098	3,853	245	4,098
7	Ajeeza District	3,569	227	3,796	4,318	275	4,593	2,841	181	3,022	2,841	181	3,022	2,841	181	3,022	2,841	181	3,022
8	Almoaqr District	2,547	162	2,709	3,082	196	3,278	2,028	129	2,157	2,028	129	2,157	2,028	129	2,157	2,028	129	2,157
9	Naor District	5,620	357	5,977	6,800	432	7,232	4,474	285	4,758	4,474	285	4,758	4,474	285	4,758	4,474	285	4,758
SUM of Amman Governorate		164,804	10,481	175,285	199,413	12,682	212,095	131,198	8,344	139,542	131,198	8,344	139,542	131,198	8,344	139,542	131,198	8,344	139,542
Madaba Governorate																			
1	Madaba District	5,614	2,250	7,864	6,793	2,723	9,516	4,469	1,792	6,261	4,469	1,792	6,261	4,469	1,792	6,261	4,469	1,792	6,261



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015			2019 (end of 2015-2019 period)			2024 (end of 2020-2024 period)			2029 (end of 2025-2029 period)			2034 (end of 2030-2034 period)			2039 (end of 2035-2039 period)		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
2	Theban District	1,583	634	2,217	1,915	768	2,683	1,260	505	1,765	1,260	505	1,765	1,260	505	1,765	1,260	505	1,765
SUM of Madaba Governorate		7,197	2,885	10,081	8,708	3,491	12,199	5,729	2,297	8,026	5,729	2,297	8,026	5,729	2,297	8,026	5,729	2,297	8,026
Balqa Governorate																			
1	Greater Balqa (Salt) District	4,697	1,843	6,540	5,684	2,230	7,914	3,740	1,467	5,207	3,740	1,467	5,207	3,740	1,467	5,207	3,740	1,467	5,207
2	New Deir Allah District	1,987	780	2,767	2,404	943	3,348	1,582	621	2,203	1,582	621	2,203	1,582	621	2,203	1,582	621	2,203
3	Shouna Janoobiyyeh District	1,657	650	2,307	2,005	786	2,791	1,319	517	1,836	1,319	517	1,836	1,319	517	1,836	1,319	517	1,836
4	New Ain Al-Basha District	5,513	2,163	7,676	6,671	2,617	9,288	4,389	1,722	6,111	4,389	1,722	6,111	4,389	1,722	6,111	4,389	1,722	6,111
5	Mahes & Al-Fahis District	953	374	1,327	1,153	452	1,605	758	298	1,056	758	298	1,056	758	298	1,056	758	298	1,056
SUM of Balqa Governorate		14,807	5,809	20,616	17,917	7,029	24,946	11,788	4,625	16,412	11,788	4,625	16,412	11,788	4,625	16,412	11,788	4,625	16,412
Zarqa Governorate																			
1	Greater Zarqa District	30,775	6,120	36,895	37,238	7,405	44,643	24,500	4,872	29,371	24,500	4,872	29,371	24,500	4,872	29,371	24,500	4,872	29,371
2	Russeifeh District	18,341	1,060	19,401	22,192	1,283	23,475	14,601	844	15,445	14,601	844	15,445	14,601	844	15,445	14,601	844	15,445
3	Hashimiya District	3,167	183	3,350	3,832	221	4,053	2,521	146	2,667	2,521	146	2,667	2,521	146	2,667	2,521	146	2,667
SUM of Zarqa Governorate		52,283	7,362	59,645	63,262	8,909	72,171	41,622	5,861	47,483	41,622	5,861	47,483	41,622	5,861	47,483	41,622	5,861	47,483
SUM OF CENTRAL REGION		239,090	26,538	265,628	289,299	32,111	321,410	190,336	21,126	211,463	190,336	21,126	211,463	190,336	21,126	211,463	190,336	21,126	211,463
SOUTHERN REGION																			
Aqaba Governorate																			
1	Greater Aqaba District	2,546	415	2,961	3,080	502	3,582	2,027	330	2,357	2,027	330	2,357	2,027	330	2,357	2,027	330	2,357
2	Qawiera District	513	84	597	621	101	722	409	67	475	409	67	475	409	67	475	409	67	475
SUM of Aqaba Governorate		3,059	498	3,558	3,702	603	4,305	2,435	397	2,832	2,435	397	2,832	2,435	397	2,832	2,435	397	2,832
Ma'an Governorate																			
1	Greater Ma'an District	2,215	1,823	4,038	2,680	2,205	4,886	1,763	1,451	3,215	1,763	1,451	3,215	1,763	1,451	3,215	1,763	1,451	3,215
2	Greater Petra District	1,035	852	1,887	1,253	1,031	2,283	824	678	1,502	824	678	1,502	824	678	1,502	824	678	1,502
3	Greater Shobak District	481	396	878	582	479	1,062	383	315	699	383	315	699	383	315	699	383	315	699
4	Husseinieh District	361	297	658	436	359	796	287	236	523	287	236	523	287	236	523	287	236	523
SUM of Ma'an Governorate		4,093	3,367	7,460	4,952	4,075	9,027	3,258	2,681	5,939	3,258	2,681	5,939	3,258	2,681	5,939	3,258	2,681	5,939
Karak Governorate																			
1	Greater Karak District	1,202	2,232	3,435	1,455	2,701	4,156	957	1,777	2,734	957	1,777	2,734	957	1,777	2,734	957	1,777	2,734
2	Mazar Janoobiyyeh District	1,060	1,969	3,029	1,283	2,382	3,665	844	1,567	2,411	844	1,567	2,411	844	1,567	2,411	844	1,567	2,411
3	Qasr District	387	718	1,105	468	869	1,337	308	572	880	308	572	880	308	572	880	308	572	880
4	Al-Agwar Al-Janobeiah District	602	1,117	1,718	728	1,351	2,079	479	889	1,368	479	889	1,368	479	889	1,368	479	889	1,368
5	Ai District	180	334	514	218	405	623	143	266	410	143	266	410	143	266	410	143	266	410
6	Faqo'e District	226	419	645	273	507	781	180	334	514	180	334	514	180	334	514	180	334	514
7	Al-Qatraneh District	129	239	368	156	290	445	103	190	293	103	190	293	103	190	293	103	190	293
SUM of Karak Governorate		3,786	7,029	10,815	4,581	8,505	13,086	3,014	5,596	8,610	3,014	5,596	8,610	3,014	5,596	8,610	3,014	5,596	8,610
Tafilah Governorate																			
1	Tafilah District	1,353	543	1,896	1,637	657	2,295	1,077	432	1,510	1,077	432	1,510	1,077	432	1,510	1,077	432	1,510
2	Al-Hassa District	261	105	365	316	127	442	208	83	291	208	83	291	208	83	291	208	83	291
3	Besara District	558	224	782	676	271	947	445	178	623	445	178	623	445	178	623	445	178	623
SUM of Tafilah Governorate		2,172	872	3,044	2,629	1,055	3,683	1,729	694	2,423	1,729	694	2,423	1,729	694	2,423	1,729	694	2,423
SUM OF SOUTHERN REGION		13,110	11,767	24,877	15,863	14,238	30,101	10,437	9,367	19,804	10,437	9,367	19,804	10,437	9,367	19,804	10,437	9,367	19,804
SUM OF JORDAN		524,576	115,215	639,791	634,737	139,411	774,148	417,608	91,721	509,329	417,608	91,721	509,329	417,608	91,721	509,329	417,608	91,721	509,329

5.1.1.3 TOTAL RESIDENTIAL POPULATION

Based on all the above, Table 5-9 summarizes the total residential population (permanent native population and refugees) of Jordan during the year 2014, divided into urban and rural.

Table 5-9: Present total residential population of Jordan by District, 2014

#	Administrative Division	Urban	Rural	Total
NORTHERN REGION				
Irbid Governorate				
1	Greater Irbid District	467,841	91,974	559,816
2	Bani Obeid District	111,310	22,911	134,221
3	Wastiyyah District	28,602	5,887	34,489
4	Tayba District	34,653	7,133	41,785
5	Mazar Shamali District	52,542	10,815	63,357
6	Kura District	108,318	22,295	130,614
7	Bani Knenanah District	90,885	18,707	109,592
8	Al-Ramtha District	178,840	26,725	205,566
9	Aghwar Shamaliyah District	101,365	20,864	122,229
SUM of Irbid Governorate		1,174,356	227,312	1,401,668
Mafrq Governorate				
1	Greater Mafrq District	166,441	97,588	264,029
2	Badiah Shamaliyah District	35,741	55,371	91,112
3	Badiyah Shamaliyah Gharbiyah District	46,427	71,927	118,355
4	Al-Rouaishad District	6,073	9,409	15,483
SUM of Mafrq Governorate		254,683	234,295	488,978
Ajloun Governorate				
1	Greater Ajloun District	96,315	30,579	126,894
2	Kofranjah District	28,497	9,047	37,544
SUM of Ajloun Governorate		124,811	39,626	164,438
Jerash Governorate				
1	Greater Jerash District	158,086	79,342	237,428
SUM of Jerash Governorate		158,086	79,342	237,428
SUM OF NORTHERN REGION		1,711,936	580,576	2,292,512
CENTRAL REGION				
Amman Governorate				
1	Greater Amman District	737,206	46,886	784,092
2	Marka District	699,557	41,057	740,614
3	Quaismeh District	343,255	21,831	365,086
4	Al-Jami'ah District	372,746	23,706	396,453
5	Wadi Essier District	231,889	14,748	246,637
6	Sahab District	76,102	4,840	80,942
7	Ajeeza District	146,113	3,569	149,681

#	Administrative Division	Urban	Rural	Total
8	Almoaqr District	40,052	2,547	42,599
9	Naor District	88,360	5,620	93,979
SUM of Amman Governorate		2,735,279	164,803	2,900,082
Madaba Governorate				
1	Madaba District	98,420	39,454	137,875
2	Theban District	27,745	11,123	38,868
SUM of Madaba Governorate		126,166	50,577	176,743
Balqa Governorate				
1	Greater Balqa (Salt) District	106,501	41,783	148,283
2	New Deir Allah District	45,054	17,676	62,729
3	Shouna Janoobiyyeh District	37,563	14,737	52,300
4	New Ain Al-Basha District	124,988	49,036	174,024
5	Mahes & Al-Fahis District	21,601	8,475	30,076
SUM of Balqa Governorate		335,707	131,706	467,413
Zarqa Governorate				
1	Greater Zarqa District	709,572	37,971	747,543
2	Russeifeh District	347,783	20,099	367,882
3	Hashimiya District	60,049	3,470	63,519
SUM of Zarqa Governorate		1,117,404	61,540	1,178,944
SUM OF CENTRAL REGION		4,314,556	408,626	4,723,182
SOUTHERN REGION				
Aqaba Governorate				
1	Greater Aqaba District	106,582	17,363	123,945
2	Qawiera District	21,493	3,501	24,994
SUM of Aqaba Governorate		128,075	20,864	148,940
Ma'an Governorate				
1	Greater Ma'an District	39,836	32,778	72,615
2	Greater Petra District	18,618	15,319	33,937
3	Greater Shobak District	8,657	7,123	15,781
4	Husseinieh District	6,487	5,338	11,824
SUM of Ma'an Governorate		73,598	60,558	134,156
Karak Governorate				
1	Greater Karak District	30,115	55,913	86,027
2	Mazar Janoobiyyeh District	26,559	49,311	75,871
3	Qasr District	9,688	17,987	27,675
4	Al-Agwar Al-Janobeiah District	15,067	27,974	43,041
5	Ai District	4,511	8,375	12,886
6	Faqo'e District	5,657	10,503	16,159
7	Al-Qatraneh District	3,228	5,993	9,221
SUM of Karak Governorate		94,825	176,056	270,881
Tafilah Governorate				
1	Tafilah District	42,854	17,195	60,049



#	Administrative Division	Urban	Rural	Total
2	Al-Hassa District	8,257	3,313	11,570
3	Besara District	17,683	7,096	24,779
SUM of Tafilah Governorate		68,794	27,604	96,398
SUM OF SOUTHERN REGION		365,292	285,083	650,375
SUM OF JORDAN		6,391,785	1,274,285	7,666,069

On the other hand, Table 5-10 presents the estimated total residential population of Jordan – divided into urban and rural – at the end of every 5-year period starting from 2015, by District. The respective detailed yearly data are appended in Annex 8.



Table 5-10: Expected total, urban and rural residential population of Jordan of Jordan, by District

#	Administrative Division	2015			2019 (end of 2015-2019 period)			2024 (end of 2020-2024 period)			2029 (end of 2025-2029 period)			2034 (end of 2030-2034 period)			2039 (end of 2035-2039 period)		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
NORTHERN REGION																			
Irbid Governorate																			
1	Greater Irbid District	477.839	94.032	571.871	523.734	103.479	627.212	547.237	108.317	655.553	590.034	117.126	707.159	631.381	125.636	757.017	670.982	133.787	804.769
2	Bani Obeid District	113.800	23.424	137.224	125.233	25.777	151.010	131.087	26.982	158.069	141.748	29.176	170.925	152.048	31.296	183.344	161.913	33.327	195.240
3	Wastiyyah District	29.242	6.019	35.261	32.180	6.624	38.803	33.684	6.933	40.617	36.423	7.497	43.921	39.070	8.042	47.112	41.605	8.564	50.168
4	Tayba District	35.428	7.292	42.720	38.987	8.025	47.012	40.810	8.400	49.210	44.129	9.083	53.212	47.335	9.743	57.078	50.406	10.375	60.781
5	Mazar Shamali District	53.718	11.057	64.775	59.114	12.168	71.282	61.878	12.736	74.614	66.910	13.772	80.683	71.772	14.773	86.545	76.429	15.731	92.160
6	Kura District	110.742	22.794	133.536	121.867	25.084	146.951	127.565	26.257	153.821	137.939	28.392	166.331	147.962	30.455	178.417	157.561	32.431	189.993
7	Bani Knenanah District	92.919	19.126	112.044	102.253	21.047	123.301	107.034	22.031	129.065	115.739	23.823	139.561	124.148	25.554	149.702	132.203	27.212	159.415
8	Al-Ramtha District	181.745	27.323	209.069	195.081	30.068	225.149	201.910	31.474	233.384	214.346	34.034	248.380	226.361	36.507	262.867	237.867	38.875	276.743
9	Aghwar Shamaliyah District	103.632	21.331	124.963	114.044	23.474	137.517	119.375	24.571	143.946	129.084	26.570	155.653	138.463	28.500	166.963	147.446	30.349	177.796
SUM of Irbid Governorate		1.199.065	232.398	1.431.463	1.312.492	255.745	1.568.238	1.370.579	267.701	1.638.281	1.476.351	289.473	1.765.824	1.578.540	310.506	1.889.046	1.676.412	330.652	2.007.064
Mafrq Governorate																			
1	Greater Mafrq District	170.165	99.771	269.936	199.465	110.754	310.219	156.369	111.811	268.181	161.873	120.337	282.210	167.190	128.575	295.765	172.282	136.464	308.746
2	Badiah Shamaliyah District	36.541	56.610	93.151	40.563	62.842	103.404	40.950	63.441	104.391	44.073	68.279	112.352	47.090	72.953	120.042	49.979	77.429	127.408
3	Badiyah Shamaliyah Gharbiyah District	47.466	73.536	121.003	52.691	81.631	134.322	53.194	82.410	135.604	57.250	88.694	145.945	61.169	94.766	155.935	64.923	100.581	165.503
4	Al-Rouaishad District	6.209	9.620	15.829	6.893	10.679	17.572	6.959	10.781	17.739	7.489	11.603	19.092	8.002	12.397	20.399	8.493	13.158	21.651
SUM of Mafrq Governorate		260.381	239.538	499.919	299.612	265.905	565.517	257.472	268.443	525.915	270.685	288.913	559.599	283.451	308.690	592.141	295.677	327.631	623.308
Ajloun Governorate																			
1	Greater Ajloun District	98.470	31.263	129.733	107.864	34.245	142.109	115.047	36.526	151.573	124.698	39.590	164.288	134.022	42.550	176.572	142.952	45.386	188.338
2	Kofranjah District	29.134	9.250	38.384	31.914	10.132	42.046	34.039	10.807	44.846	36.895	11.714	48.608	39.653	12.589	52.243	42.295	13.428	55.724
SUM of Ajloun Governorate		127.604	40.513	168.117	139.777	44.378	184.155	149.086	47.333	196.419	161.593	51.304	212.896	173.675	55.140	228.815	185.248	58.814	244.062
Jerash Governorate																			
1	Greater Jerash District	161.064	81.117	242.181	173.886	88.761	262.647	184.485	95.080	279.565	197.956	103.111	301.067	210.971	110.870	321.841	223.436	118.301	341.737
SUM of Jerash Governorate		161.064	81.117	242.181	173.886	88.761	262.647	184.485	95.080	279.565	197.956	103.111	301.067	210.971	110.870	321.841	223.436	118.301	341.737
SUM OF NORTHERN REGION		1.748.114	593.566	2.341.679	1.925.767	654.790	2.580.557	1.961.623	678.558	2.640.181	2.106.585	732.801	2.839.386	2.246.636	785.206	3.031.842	2.380.772	835.398	3.216.171
CENTRAL REGION																			
Amman Governorate																			
1	Greater Amman District	753.700	47.935	801.635	825.208	52.483	877.691	881.869	56.086	937.955	956.077	60.806	1.016.883	1.027.771	65.365	1.093.136	1.096.436	69.732	1.166.169
2	Marka District	714.000	41.976	755.976	776.619	45.958	822.577	826.235	49.114	875.349	891.218	53.246	944.464	953.998	57.239	1.011.238	1.014.128	61.063	1.075.191
3	Quaismeh District	350.935	22.319	373.254	384.230	24.437	408.667	410.612	26.115	436.727	445.165	28.312	473.477	478.546	30.435	508.982	510.518	32.469	542.987
4	Al-Jami'ah District	381.086	24.237	405.323	417.242	26.536	443.779	445.891	28.358	474.249	483.412	30.745	514.157	519.662	33.050	552.712	554.381	35.258	589.639
5	Wadi Essier District	237.077	15.078	252.155	259.570	16.508	276.078	277.393	17.642	295.035	300.735	19.127	319.861	323.286	20.561	343.847	344.885	21.934	366.819
6	Sahab District	77.805	4.948	82.753	85.186	5.418	90.604	91.036	5.790	96.825	98.696	6.277	104.973	106.097	6.748	112.845	113.185	7.199	120.384
7	Ajeeza District	147.368	3.649	151.017	152.811	3.995	156.806	157.124	4.269	161.393	162.772	4.628	167.400	168.229	4.975	173.204	173.455	5.308	178.763
8	Almoaqr District	40.948	2.604	43.552	44.833	2.851	47.684	47.911	3.047	50.959	51.943	3.304	55.247	55.838	3.551	59.389	59.569	3.789	63.357
9	Naor District	90.336	5.745	96.082	98.907	6.290	105.198	105.698	6.722	112.421	114.593	7.288	121.881	123.186	7.835	131.020	131.416	8.358	139.774
SUM of Amman Governorate		2.793.256	168.491	2.961.747	3.044.607	184.476	3.229.083	3.243.770	197.143	3.440.913	3.504.611	213.732	3.718.343	3.756.613	229.759	3.986.373	3.997.973	245.110	4.243.083
Madaba Governorate																			
1	Madaba District	100.622	40.337	140.960	110.090	44.133	154.222	117.991	47.300	165.291	127.966	51.299	179.265	137.603	55.162	192.765	146.833	58.862	205.695



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015			2019 (end of 2015-2019 period)			2024 (end of 2020-2024 period)			2029 (end of 2025-2029 period)			2034 (end of 2030-2034 period)			2039 (end of 2035-2039 period)		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
2	Theban District	28.366	11.371	39.738	31.035	12.441	43.476	33.263	13.334	46.597	36.075	14.461	50.536	38.791	15.551	54.342	41.393	16.594	57.987
SUM of Madaba Governorate		128.989	51.709	180.697	141.125	56.574	197.699	151.254	60.634	211.888	164.040	65.760	229.800	176.394	70.712	247.106	188.226	75.455	263.681
Balqa Governorate																			
1	Greater Balqa (Salt) District	108.884	42.718	151.601	118.959	46.670	165.630	128.227	50.307	178.534	139.166	54.598	193.764	149.734	58.744	208.478	159.855	62.715	222.570
2	New Deir Allah District	46.062	18.071	64.133	50.324	19.743	70.068	54.245	21.282	75.527	58.872	23.097	81.969	63.343	24.851	88.194	67.625	26.531	94.155
3	Shouna Janoobiyyeh District	38.404	15.067	53.470	41.957	16.461	58.418	45.226	17.743	62.969	49.084	19.257	68.341	52.812	20.719	73.531	56.381	22.120	78.501
4	New Ain Al-Basha District	127.785	50.133	177.918	139.609	54.772	194.381	150.486	59.039	209.526	163.324	64.076	227.399	175.726	68.941	244.667	187.604	73.601	261.206
5	Mahes & Al-Fahis District	22.085	8.664	30.749	24.128	9.466	33.594	26.008	10.204	36.212	28.227	11.074	39.301	30.370	11.915	42.285	32.423	12.720	45.143
SUM of Balqa Governorate		343.218	134.652	477.871	374.978	147.113	522.091	404.193	158.574	562.767	438.673	172.101	610.774	471.984	185.170	657.154	503.889	197.687	701.576
Zarqa Governorate																			
1	Greater Zarqa District	722.629	38.821	761.450	778.457	42.958	821.415	826.616	43.945	870.560	886.024	47.378	933.402	943.420	50.695	994.115	998.391	53.872	1.052.263
2	Russeifeh District	355.564	20.548	376.113	388.835	22.471	411.306	417.536	24.130	441.665	452.941	26.176	479.116	487.146	28.152	515.298	519.906	30.046	549.952
3	Hashimiya District	61.392	3.548	64.940	67.137	3.880	71.017	72.092	4.166	76.259	78.205	4.520	82.725	84.111	4.861	88.972	89.768	5.188	94.956
SUM of Zarqa Governorate		1.139.586	62.917	1.202.502	1.234.429	69.309	1.303.738	1.316.244	72.241	1.388.485	1.417.170	78.073	1.495.244	1.514.677	83.708	1.598.385	1.608.066	89.105	1.697.171
SUM OF CENTRAL REGION		4.405.049	417.768	4.822.817	4.795.139	457.472	5.252.611	5.115.460	488.592	5.604.052	5.524.494	529.667	6.054.161	5.919.668	569.350	6.489.019	6.298.154	607.358	6.905.511
SOUTHERN REGION																			
Aqaba Governorate																			
1	Greater Aqaba District	108.967	17.752	126.718	118.786	19.351	138.137	129.185	21.045	150.230	140.358	22.865	163.223	151.153	24.624	175.776	161.491	26.308	187.799
2	Qawiera District	21.974	3.580	25.554	23.954	3.902	27.856	26.051	4.244	30.295	28.304	4.611	32.915	30.481	4.966	35.447	32.566	5.305	37.871
SUM of Aqaba Governorate		130.941	21.331	152.272	142.740	23.253	165.993	155.236	25.289	180.525	168.662	27.476	196.139	181.634	29.589	211.223	194.057	31.613	225.670
Ma'an Governorate																			
1	Greater Ma'an District	40.728	33.512	74.239	44.553	36.659	81.212	47.780	39.315	87.095	51.824	42.642	94.466	55.730	45.856	101.586	59.472	48.935	108.406
2	Greater Petra District	19.034	15.662	34.696	20.822	17.133	37.955	22.331	18.374	40.705	24.220	19.929	44.149	26.046	21.431	47.477	27.794	22.870	50.664
3	Greater Shobak District	8.851	7.283	16.134	9.682	7.967	17.649	10.384	8.544	18.927	11.262	9.267	20.529	12.111	9.965	22.077	12.924	10.634	23.559
4	Husseinieh District	6.632	5.457	12.089	7.255	5.969	13.224	7.780	6.402	14.182	8.439	6.944	15.382	9.075	7.467	16.542	9.684	7.968	17.653
SUM of Ma'an Governorate		75.245	61.913	137.158	82.312	67.728	150.039	88.275	72.635	160.910	95.745	78.781	174.527	102.962	84.720	187.682	109.875	90.407	200.282
Karak Governorate																			
1	Greater Karak District	30.788	57.164	87.952	33.622	62.424	96.047	36.308	67.412	103.721	39.415	73.179	112.594	42.416	78.751	121.167	45.290	84.088	129.378
2	Mazar Janoobiyyeh District	27.154	50.415	77.568	29.653	55.054	84.707	32.022	59.453	91.475	34.761	64.540	99.301	37.408	69.453	106.861	39.943	74.160	114.103
3	Qasr District	9.905	18.390	28.295	10.816	20.082	30.899	11.681	21.687	33.367	12.680	23.542	36.222	13.645	25.335	38.980	14.570	27.051	41.621
4	Al-Agwar Al-Janobeiah District	15.404	28.600	44.004	16.822	31.232	48.054	18.166	33.727	51.893	19.720	36.613	56.333	21.221	39.400	60.622	22.659	42.070	64.730
5	Ai District	4.612	8.563	13.174	5.036	9.351	14.387	5.439	10.098	15.536	5.904	10.962	16.866	6.354	11.796	18.150	6.784	12.596	19.380
6	Faqo'e District	5.783	10.738	16.521	6.316	11.726	18.041	6.820	12.663	19.483	7.404	13.746	21.150	7.967	14.793	22.760	8.507	15.795	24.302
7	Al-Qatraneh District	3.300	6.128	9.428	3.604	6.691	10.295	3.892	7.226	11.118	4.225	7.844	12.069	4.547	8.442	12.988	4.855	9.014	13.868
SUM of Karak Governorate		96.946	179.995	276.942	105.869	196.561	302.429	114.327	212.266	326.594	124.108	230.426	354.534	133.558	247.970	381.528	142.608	264.773	407.381
Tafilah Governorate																			
1	Tafilah District	43.813	17.580	61.393	47.801	19.180	66.981	51.810	20.789	72.600	56.268	22.578	78.846	60.575	24.306	84.881	64.700	25.961	90.661
2	Al-Hassa District	8.442	3.387	11.829	9.210	3.696	12.906	9.983	4.006	13.988	10.841	4.350	15.192	11.671	4.683	16.354	12.466	5.002	17.468
3	Besara District	18.079	7.254	25.333	19.725	7.915	27.639	21.379	8.578	29.958	23.219	9.317	32.535	24.996	10.030	35.025	26.698	10.713	37.410
SUM of Tafilah Governorate		70.333	28.222	98.555	76.736	30.791	107.526	83.172	33.373	116.545	90.328	36.245	126.573	97.242	39.019	136.261	103.864	41.676	145.539
SUM OF SOUTHERN REGION		373.465	291.461	664.927	407.656	318.333	725.988	441.011	343.563	784.574	478.844	372.928	851.772	515.396	401.298	916.693	550.403	428.470	978.873
SUM OF JORDAN		6.526.628	1.302.795	7.829.423	7.128.562	1.430.594	8.559.156	7.518.094	1.510.713	9.028.807	8.109.923	1.635.396	9.745.319	8.681.700	1.755.854	10.437.554	9.229.330	1.871.226	11.100.555

5.1.2 SEASONAL POPULATION

According to the most updated statistical data from the Jordanian MoTA, Table 5-11 gives the numbers of overnights of Jordanian and non-Jordanian tourists in classified hotels.

Table 5-11: Overnights at classified hotels by location and country groups, 2011 (source: MoTA, 2011)

#	Origin of Tourists Location	African Countries	American Countries	Arab Countries	Asia & Pacific Countries	European Countries	Jordanian	SUM
1	Amman	29,827	277,487	1,312,537	245,012	622,629	372,123	2.859.615
2	Aqaba	1,676	29,395	62,473	21,715	432,277	395,820	943.356
3	Petra	1,399	58,839	3,558	41,428	169,848	22,490	297.562
4	Dead Sea	2,012	33,614	39,122	22,982	180,593	144,484	422.807
5	Madaba	299	5,163	1,369	2,651	19,044	940	29.466
6	Irbid	78	326	9,094	1,215	5,350	4,484	20.547
7	Jerash	12	366	1,043	249	2,476	1,963	6.109
8	Ajloun	2	37	59	10	241	570	919
9	Wadi Rum	0	926	111	1,230	20,337	997	23.601
10	Tafilah	24	712	63	275	4,079	761	5.914
11	Al-Azraq	0	6	237	0	40	8	291
12	Karak	0	53	794	237	700	760	2.544
13	Ma'an	511	1,685	1,455	1,106	12,604	7,184	24.545
14	Al-Fahis	0	0	44	0	12	4	60
15	Zarqa	0	5	527	24	44	463	1.063
SUM		35.840	408,614	1,432,486	338,134	1,470,274	953,051	4,638,399

Given that the overnights spent by Jordanian residents in 2011 were 953,051, the overall overnights by non-residents (tourists) on the Kingdom were **3,685,348**. Of them, around 67.5% were spent in Amman, 14.9% in Aqaba, 7.6% in Dead Sea, 7.5% in Petra and the remaining 2.6% was distributed between the other places (Figure 5-7).

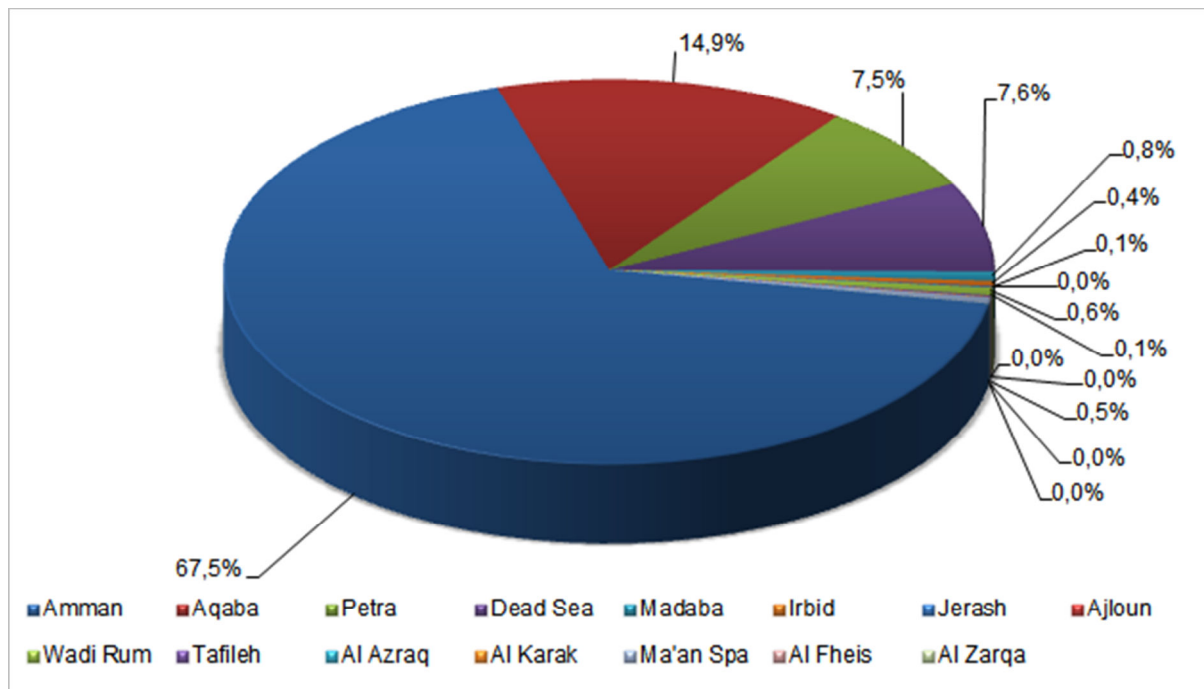


Figure 5-7: Distribution of overnights in Jordan during 2011

To forecast the growth in the tourist numbers visiting Jordan in the following 25 years, the National Tourism Strategy for Jordan 2011-2015 (MoTA, 2010) have been utilized. This Strategy forecasts an average tourism growth rate in the Middle East more than 5% in yearly basis, up to 2020. Jordan has great potential to follow this trend, due to its natural beauty, archaeological heritage, stable political conditions, positive investment vision, etc. So, it is assumed that this trend can be expected to be retained by at least 2024, whereas it can gradually be reduced to 2.5% for the next fifteen years.

Given these trends, Table 5-12 shows the expected tourist population of Jordan at the end of every 5-year period starting from 2015, by Governorate. The respective detailed yearly data are appended in Annex 9.

Table 5-12: Expected overnights of tourists in Jordan, by Governorate

#	Administrative Division	2015	2019 (end of 2015-2019 period)	2024 (end of 2020-2024 period)	2029 (end of 2025-2029 period)	2034 (end of 2030-2034 period)	2039 (end of 2035-2039 period)
NORTHERN REGION							
1	Irbid Governorate	19,525	23,732	30,289	34,269	38,773	43,868
2	Mafrq Governorate	0	0	0	0	0	0
3	Ajloun Governorate	424	516	658	745	842	953
4	Jerash Governorate	5,039	6,126	7,818	8,845	10,008	11,323
SUM OF NORTHERN REGION		24,988	30,374	38,765	43,859	49,623	56,144
CENTRAL REGION							
5	Amman Governorate	3,023,562	3,675,159	4,690,537	5,306,912	6,004,284	6,793,296
6	Madaba Governorate	169,995	206,630	263,718	298,373	337,581	381,942
7	Balqa Governorate	67,729	82,325	105,070	118,876	134,498	152,172
8	Zarqa Governorate	1,073	1,305	1,665	1,884	2,131	2,411
SUM OF CENTRAL REGION		3,262,359	3,965,418	5,060,990	5,726,045	6,478,494	7,329,822
SOUTHERN REGION							
9	Aqaba Governorate	693,009	842,356	1,075,084	1,216,359	1,376,198	1,557,042
10	Ma'an Governorate	355,454	432,057	551,426	623,888	705,872	798,629
11	Karak Governorate	137,490	167,120	213,292	241,320	273,032	308,910
12	Tafilah Governorate	6,264	7,613	9,717	10,994	12,438	14,073
SUM OF SOUTHERN REGION		1,192,216	1,449,146	1,849,519	2,092,561	2,367,540	2,678,654
SUM OF JORDAN		4,479,564	5,444,937	6,949,273	7,862,465	8,895,657	10,064,620

5.2 IDENTIFICATION OF MSW

5.2.1 MSW DEFINITION

The definition of “Municipal Solid Waste” varies between different countries, reflecting diverse waste management practices. In the Jordanian legislation, there is no clear definition of MSW. As mentioned in section 3.2.3.2.2, the term of “Solid Waste” is defined through the **Management of Solid Waste Regulation No. 27/2005**, as:

“Solid and semi-solid materials, to be treated or disposed of, resulting from any activity and not included in the definition of harmful and hazardous waste appearing in the management, transportation and handling of harmful and hazardous substances regulations in force”.

Based on that, it is obvious that the MSW can be defined as the SW part of municipal waste. According EEA (2013), municipal waste is defined as follows:

“Municipal waste is mainly produced by households, though similar waste from sources such as commerce, offices and public institutions are included. The amount of municipal waste generated consists of waste collected by or on behalf of municipal authorities and disposed of through the waste management system. In this context, municipal waste is understood as waste collected by or on behalf of municipalities. However, the definition also includes waste from the same sources and other waste similar in nature and composition that is 'collected directly by the private sector (business or private non-profit institutions) not on behalf of municipalities (mainly separate collection for recovery purposes) (Eurostat, 2012)”.

As a result, MSW are defined as follows:

“Solid and semi-solid materials produced by households, as well as other waste similar in nature and composition resulting from any activity (commerce, offices, public institutions, etc.) and not included in the definition of harmful and hazardous waste, that are collected by or on behalf of municipal authorities or by the private sector (business or private non-profit institutions) and disposed of through the waste management system”.

5.2.2 MSW SOURCES

Based on the above definition and on the ToR of the Project, the MSW sources in Jordan are the following:

- Residential (single family homes, multi-family homes, parks);
- Commercial (shops, offices, retail stores, restaurants, hotels, slaughterhouses, services stations, green markets);
- Wastewater treatment facilities (residuals);
- Industrial (small-scale manufacturing, trades and crafts);
- Institutional (universities, schools, hospitals, prisons); and
- Agricultural (animal farm wastes, plant nurseries, olive mills)

It is noted that the majority of industrial waste, as well as of agricultural waste, is not classified as MSW, due to their harmful character or different nature and composition. The same happens with the slaughterhouses' waste. Only a very little portion of these waste categories can be defined as MSW, which relates to the waste produced by the personnel outside the industrial or agricultural production activities.

Last but not least, it is important to note that there is a series of special and hazardous waste streams currently ending up in the waste collectors (bins, etc.) in Jordan that are not considered as MSW, whose handling should be separately managed and authorized. Such waste streams are (indicatively): Waste from Electrical & Electronic Equipment (WEEE), batteries and accumulators, End-of-Life Vehicles' (ELV) components, used tyres, C&D waste, hazardous medical and industrial waste, etc.

5.3 MSW GENERATION

5.3.1 MSW GENERATION RATES

In Jordan, no Management Information System (MIS) is being used in central level for registering the quantities of MSW being generated in the country. As a result, indirect calculation of MSW generation will be made, using the globally accepted method through the population data (see section 5.1 and relevant MSW generation rates).

According to the "Country Report on the Solid Waste Management in Jordan" prepared by *Abu Qdais and El-Fayez* for SWEEP-NET (May 2012), the average MSW generation rates in the Kingdom were 0.95 kg/cap/d in urban and 0.85 kg/cap/d in rural areas in 2012.

Those rates are average values, including all MSW sources as mentioned above. It is assumed that the highest rates are expected to be met in Amman, Irbid and Zarqa areas, due to their high urbanization and commercial activity, whereas lower rates are expected in less urbanized areas.

MSW generation is not a stable process; it is a rather increasing number over the years, because of the improvement of living standards of the local population and the change of consumption behaviour patterns. So, it would be safe to consider a % yearly increase of MSW generation rate during the Strategy life-cycle.

According to *Hoornweg and Bhada-Tata (2012)*, the average per capita MSW generation rate in the whole Middle East and North Africa (MENA) is expected to increase from 1.1 kg/cap/d in 2012 to 1.43 kg/cap/d in 2025. This supposes an average yearly increase rate of the per capita MSW generation rate at +2.04%, which is going to be used for the urban population of Jordan for the whole planning period as well, whereas for the rural population it is going to be used by half (+1.02%). Table 5-13 shows the expected evolution of per capita MSW generation rate in Jordan for the period 2012-2039 based on this trend.

Table 5-13: Evolution of per capita MSW generation rate in Jordan, 2012-2039

Year	MSW Generation Rate (kg/cap/d)	
	Urban	Rural
2012	0.95	0.85
2013	0.97	0.86
2014	0.99	0.87
2015	1.01	0.88
2016	1.03	0.89
2017	1.05	0.89
2018	1.07	0.90
2019	1.09	0.91
2020	1.12	0.92
2021	1.14	0.93
2022	1.16	0.94
2023	1.19	0.95
2024	1.21	0.96
2025	1.24	0.97

Year	MSW Generation Rate (kg/cap/d)	
2026	1.26	0.98
2027	1.29	0.99
2028	1.31	1.00
2029	1.34	1.01
2030	1.37	1.02
2031	1.39	1.03
2032	1.42	1.04
2033	1.45	1.05
2034	1.48	1.06
2035	1.51	1.07
2036	1.54	1.08
2037	1.57	1.10
2038	1.61	1.11
2039	1.64	1.12

According to the data of this table, the MSW generation rate in Jordan is assumed to reach ~1.64 kg/cap/d in urban areas and ~1.12 kg/cap/d by 2039.

The aforementioned rates refer to the residential population of Jordan. Added to this, different MSW generation rates should be applied to specific categories of people, such as the tourists and refugees living in camps. As it regards the tourist population, a current MSW generation rate of 1.20 kg/cap/d will be applied, which is expected to increase in a much smoother way through the years, with a

0.50% rate. Regarding the refugee population living in camps, their MSW generation rate is expected to be much lesser, due to their relative poor living-conditions. It is assumed that a rate of 0.64 kg/cap/d should be used for refugees living in camps with >5,000 refugees ("urban") and 0.52 kg/cap/d for those living in smaller camps ("rural"). As expected, the MSW generation rate of refugees in camps is not assumed to raise over time.

5.3.2 MSW QUANTITIES

Based on the population data described in section 5.1, as well as the respective MSW generation rates calculated in section 5.3.1, the current and provisioned MSW quantities in Jordan are calculated.

Table 5-14 presents the current and provisioned MSW quantities by residential population, whereas Table 5-15 gives the respective quantities due to tourists. Both tables include estimates up to 2039, i.e. 25 years from today.

According to the tables, the MSW currently produced in Jordan by residential population reaches the amount of 2,650,857 tn/yr and is expected to reach >6,000,000 tn/yr by 2039 (see Figure 5-8), while the contribution of the touristic sector is very minimal, almost 0.2% (5,120 tn/yr in 2014 and 13,681 tn/yr in 2039).

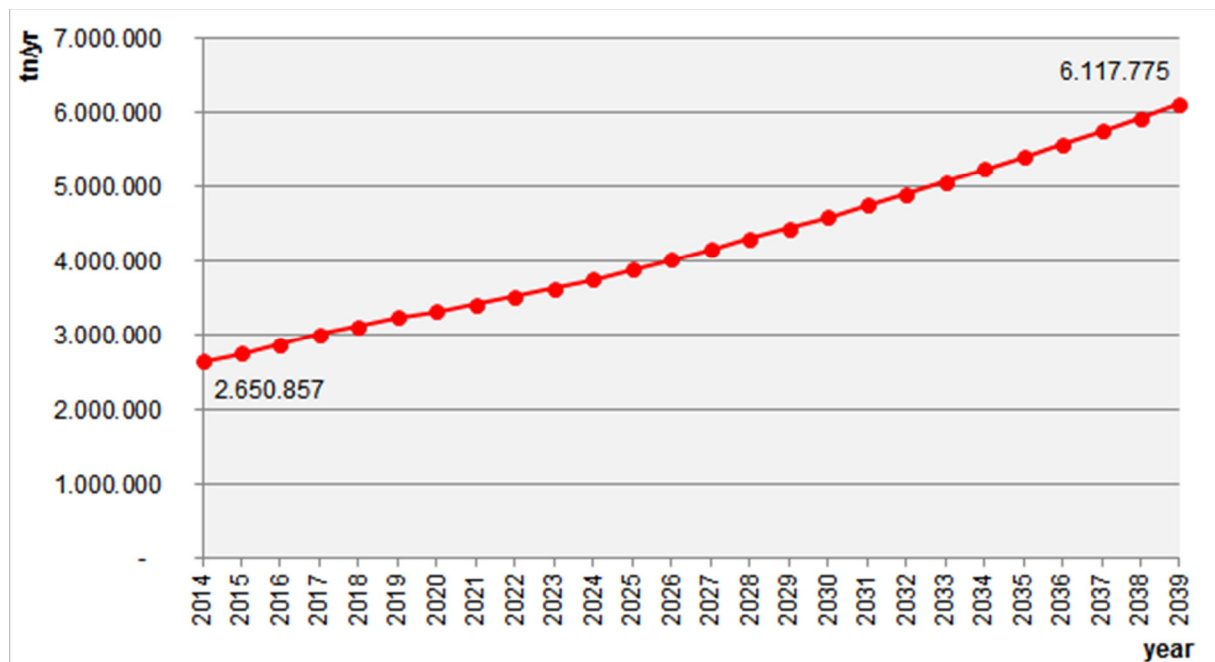


Figure 5-8: Expected MSW generation in Jordan by residential population



Table 5-14: Current and future MSW generation in Jordan due to residents by District, 2014-2039 (values in tn/yr)

#	Administrative Division	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
NORTHERN REGION																											
Irbid Governorate																											
1	Greater Irbid District	195,350	203,277	213,134	223,512	231,717	240,147	245,967	252,202	258,838	266,959	275,336	284,996	294,905	305,064	315,480	326,156	337,095	348,303	359,783	371,540	383,578	395,902	408,517	421,427	434,637	448,152
2	Bani Obeid District	47,440	49,415	51,871	54,456	56,500	58,599	60,049	61,602	63,255	65,278	67,365	69,772	72,240	74,771	77,365	80,024	82,750	85,541	88,401	91,330	94,329	97,399	100,541	103,757	107,048	110,414
3	Wastiyyah District	12,190	12,698	13,329	13,993	14,518	15,058	15,430	15,829	16,254	16,774	17,310	17,928	18,563	19,213	19,880	20,563	21,263	21,981	22,715	23,468	24,239	25,027	25,835	26,661	27,507	28,372
4	Tayba District	14,769	15,384	16,148	16,953	17,589	18,243	18,694	19,178	19,692	20,322	20,972	21,721	22,489	23,277	24,085	24,913	25,761	26,630	27,521	28,433	29,366	30,322	31,300	32,301	33,326	34,374
5	Mazar Shamali District	22,393	23,326	24,485	25,705	26,670	27,661	28,345	29,078	29,859	30,814	31,799	32,935	34,100	35,294	36,519	37,774	39,061	40,379	41,728	43,111	44,526	45,976	47,459	48,977	50,530	52,119
6	Kura District	46,165	48,087	50,477	52,992	54,981	57,025	58,436	59,947	61,555	63,524	65,555	67,897	70,298	72,761	75,286	77,874	80,526	83,243	86,025	88,875	91,794	94,781	97,839	100,969	104,171	107,447
7	Bani Knenanah District	38,735	40,348	42,353	44,464	46,132	47,847	49,031	50,299	51,649	53,300	55,004	56,969	58,984	61,051	63,169	65,341	67,566	69,845	72,180	74,572	77,020	79,527	82,093	84,718	87,405	90,154
8	Al-Ramtha District	66,784	69,088	71,952	74,968	77,352	79,801	81,493	83,304	85,232	87,592	90,026	92,833	95,712	98,665	101,691	104,793	107,972	111,229	114,564	117,981	121,479	125,060	128,725	132,477	136,315	140,242
9	Aghwar Shamaliyah District	43,202	45,000	47,236	49,590	51,451	53,364	54,684	56,098	57,604	59,446	61,346	63,538	65,785	68,090	70,453	72,875	75,356	77,899	80,503	83,170	85,901	88,696	91,558	94,487	97,483	100,549
SUM of Irbid Governorate		487,029	506,621	530,984	556,633	576,911	597,745	612,129	627,537	643,939	664,011	684,713	708,589	733,077	758,187	783,929	810,313	837,349	865,049	893,422	922,479	952,231	982,690	1,013,867	1,045,773	1,078,421	1,111,823
Mafraq Governorate																											
1	Greater Mafraq District	77,805	80,342	85,676	91,435	93,364	95,335	93,013	91,130	89,648	90,135	90,731	92,893	95,099	97,350	99,645	101,987	104,374	106,808	109,289	111,817	114,393	117,018	119,692	122,416	125,189	128,014
2	Badiah Shamaliyah District	30,435	31,567	33,192	34,918	36,012	37,131	37,509	37,967	38,501	39,395	40,321	41,547	42,799	44,076	45,379	46,707	48,062	49,443	50,850	52,285	53,746	55,236	56,753	58,298	59,872	61,475
3	Badiyah Shamaliyah Gharbiyah District	39,534	41,006	43,116	45,358	46,780	48,233	48,724	49,320	50,012	51,174	52,376	53,970	55,596	57,255	58,947	60,672	62,432	64,226	66,054	67,918	69,817	71,751	73,722	75,729	77,774	79,856
4	Al-Rouaishad District	5,172	5,364	5,640	5,934	6,120	6,310	6,374	6,452	6,542	6,694	6,852	7,060	7,273	7,490	7,711	7,937	8,167	8,402	8,641	8,885	9,133	9,386	9,644	9,907	10,174	10,446
SUM of Mafraq Governorate		152,946	158,279	167,625	177,645	182,276	187,008	185,620	184,869	184,703	187,399	190,279	195,470	200,766	206,170	211,682	217,303	223,035	228,878	234,834	240,904	247,089	253,391	259,811	266,350	273,010	279,791
Ajloun Governorate																											
1	Greater Ajloun District	44,454	46,275	48,391	50,600	52,516	54,484	56,096	57,788	59,558	61,562	63,623	65,890	68,213	70,593	73,033	75,531	78,090	80,711	83,393	86,139	88,949	91,824	94,765	97,774	100,850	103,996
2	Kofranjah District	13,153	13,691	14,318	14,971	15,538	16,120	16,597	17,098	17,622	18,214	18,824	19,495	20,182	20,887	21,608	22,348	23,105	23,880	24,674	25,486	26,317	27,168	28,038	28,928	29,839	30,770
SUM of Ajloun Governorate		57,607	59,966	62,708	65,572	68,054	70,604	72,693	74,886	77,180	79,776	82,448	85,384	88,395	91,480	94,641	97,879	101,195	104,591	108,067	111,625	115,266	118,992	122,803	126,702	130,689	134,766
Jerash Governorate																											
1	Greater Jerash District	79,009	81,909	85,231	88,689	91,738	94,864	97,499	100,253	103,122	106,324	109,612	113,192	116,856	120,607	124,444	128,370	132,385	136,490	140,688	144,979	149,365	153,847	158,426	163,104	167,881	172,761
SUM of Jerash Governorate		79,009	81,909	85,231	88,689	91,738	94,864	97,499	100,253	103,122	106,324	109,612	113,192	116,856	120,607	124,444	128,370	132,385	136,490	140,688	144,979	149,365	153,847	158,426	163,104	167,881	172,761
SUM OF NORTHERN REGION		776,591	806,775	846,548	888,538	918,978	950,221	967,942	987,544	1,008,943	1,037,510	1,067,053	1,102,635	1,139,094	1,176,443	1,214,695	1,253,864	1,293,964	1,335,008	1,377,011	1,419,987	1,463,952	1,508,920	1,554,907	1,601,929	1,650,001	1,699,141
CENTRAL REGION																											
Amman Governorate																											
1	Greater Amman District	281,000	292,989	306,792	321,210	333,943	347,041	358,079	369,646	381,736	395,283	409,237	424,485	440,142	456,213	472,706	489,628	506,986	524,787	543,039	561,749	580,925	600,576	620,707	641,329	662,449	684,076
2	Marka District	258,680	269,179	281,266	293,892	305,042	316,512	326,177	336,306	346,893	358,756	370,975	384,328	398,038	412,111	426,554	441,372	456,572	472,160	488,143	504,527	521,319	538,527	556,156	574,214	592,708	611,646
3	Quaismeh District	130,838	136,420	142,847	149,561	155,489	161,588	166,727	172,113	177,742	184,050	190,547	197,647	204,937	212,420	220,100	227,979	236,061	244,349	252,848	261,559	270,488	279,638	289,011	298,613	308,447	318,517
4	Al-Jami'ah District	142,079	148,141	155,120	162,410	168,848	175,471	181,052	186,900	193,013	199,863	206,919	214,629	222,545	230,671	239,010	247,566	256,343	265,343	274,572	284,032	293,728	303,663	313,842	324,269	334,948	345,883
5	Wadi Essier District	88,389	92,160	96,502	101,037	105,042	109,162	112,634	116,272	120,075	124,337	128,726	133,522	138,447	143,502	148,690	154,013	159,473	165,072	170,813	176,699	182,731	188,912	195,244	201,731	208,374	215,177
6	Sahab District	29,008	30,245	31,670	33,159	34,473	35,825	36,965	38,159	39,407	40,805	42,246	43,820	45,436	47,095	48,798	50,544	52,336	54,174	56,058	57,989	59,969	61,998	64,076	66,205	68,385	70,617
7	Ajeeza District	42,412	43,325	44,376	45,473	46,442	47,439	48,279	49,160	50,080	51,111	52,173	53,334	54,526	55,749	57,004	58,292	59,613	60,968	62,358	63,782	65,241	66,737	68,269	69,839	71,446	73,093
8	Almoagr District	15,267	15,918	16,668	17,451	18,143	18,855	19,454	20,083	20,739	21,476	22,234	23,062	23,913	24,786	25,682	26,601	27,544	28,511	29,503	30,520	31,561	32,629	33,723	34,843	35,990	37,165
9	Naor District	33,680	35,117	36,771	38,499	40,026	41,595	42,918	44,305	45,754	47,378	49,050	50,878	52,754	54,681	56,657	58,686	60,766	62,900	65,087	67,330	69,628	71,983	74,396	76,868	79,399	81,991
SUM of Amman Governorate		1,021,353	1,063,496	1,112,012	1,162,692	1,207,448	1,253,489	1,292,285	1,332,943	1,375,439	1																



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
2	Theban District	13,538	14,087	14,713	15,365	15,944	16,538	17,044	17,573	18,124	18,737	19,367	20,051	20,752	21,471	22,206	22,960	23,731	24,520	25,328	26,154	27,000	27,864	28,749	29,653	30,577	31,521
SUM of Madaba Governorate		61,563	64,057	66,904	69,868	72,501	75,204	77,505	79,909	82,415	85,202	88,066	91,178	94,367	97,633	100,979	104,404	107,911	111,500	115,173	118,931	122,775	126,707	130,727	134,838	139,041	143,336
Balqa Governorate																											
1	Greater Balqa (Salt) District	51,679	53,775	56,113	58,541	60,767	63,053	65,092	67,213	69,413	71,811	74,275	76,914	79,619	82,390	85,228	88,134	91,109	94,154	97,271	100,460	103,722	107,059	110,471	113,960	117,527	121,173
2	New Deir Allah District	21,862	22,749	23,738	24,765	25,707	26,674	27,537	28,433	29,364	30,379	31,421	32,538	33,682	34,854	36,054	37,284	38,542	39,831	41,149	42,498	43,878	45,290	46,733	48,209	49,718	51,261
3	Shouna Janoobiyyeh District	18,227	18,966	19,791	20,648	21,433	22,239	22,958	23,706	24,482	25,328	26,197	27,128	28,082	29,059	30,060	31,085	32,134	33,208	34,308	35,432	36,583	37,760	38,963	40,194	41,452	42,738
4	New Ain Al-Basha District	60,650	63,109	65,853	68,703	71,316	73,999	76,392	78,880	81,463	84,277	87,168	90,266	93,440	96,692	100,022	103,433	106,924	110,498	114,156	117,898	121,727	125,643	129,648	133,742	137,929	142,208
5	Mahes & Al-Fahis District	10,482	10,907	11,381	11,874	12,325	12,789	13,203	13,633	14,079	14,565	15,065	15,600	16,149	16,711	17,287	17,876	18,479	19,097	19,729	20,376	21,038	21,715	22,407	23,114	23,838	24,577
SUM of Balqa Governorate		162,900	169,506	176,876	184,530	191,548	198,754	205,181	211,865	218,802	226,361	234,126	242,446	250,971	259,705	268,651	277,811	287,190	296,789	306,613	316,665	326,948	337,466	348,222	359,220	370,464	381,958
Zarqa Governorate																											
1	Greater Zarqa District	251,606	261,079	271,851	283,084	293,176	303,559	312,548	321,947	331,751	342,608	353,789	365,907	378,351	391,125	404,235	417,687	431,487	445,640	460,152	475,029	490,277	505,904	521,914	538,315	555,113	572,314
2	Russeifeh District	131,924	137,560	143,930	150,570	156,585	162,772	168,189	173,844	179,735	186,227	192,910	200,132	207,548	215,161	222,974	230,991	239,215	247,649	256,298	265,164	274,251	283,564	293,105	302,880	312,890	323,142
3	Hashimiya District	22,778	23,751	24,851	25,998	27,036	28,105	29,040	30,016	31,033	32,154	33,308	34,555	35,836	37,150	38,499	39,883	41,303	42,760	44,253	45,784	47,353	48,961	50,608	52,296	54,024	55,794
SUM of Zarqa Governorate		406,308	422,390	440,633	459,652	476,797	494,436	509,777	525,807	542,520	560,989	580,007	600,595	621,735	643,436	665,709	688,562	712,005	736,048	760,702	785,976	811,882	838,428	865,627	893,490	922,027	951,250
SUM OF CENTRAL REGION		1,652,125	1,719,448	1,796,425	1,876,742	1,948,294	2,021,883	2,084,749	2,150,525	2,219,175	2,295,611	2,374,304	2,459,923	2,547,810	2,638,003	2,730,539	2,825,458	2,922,800	3,022,603	3,124,909	3,229,759	3,337,196	3,447,262	3,560,001	3,675,458	3,793,679	3,914,708
SOUTHERN REGION																											
Aqaba Governorate																											
1	Greater Aqaba District	43,977	45,820	47,803	49,855	51,842	53,884	55,842	57,866	59,957	62,170	64,444	66,832	69,283	71,797	74,375	77,019	79,729	82,507	85,353	88,270	91,257	94,316	97,449	100,656	103,939	107,299
2	Qawiera District	8,868	9,240	9,640	10,054	10,454	10,866	11,261	11,669	12,091	12,537	12,996	13,477	13,971	14,478	14,998	15,531	16,078	16,638	17,212	17,800	18,403	19,020	19,651	20,298	20,960	21,638
SUM of Aqaba Governorate		52,845	55,060	57,443	59,908	62,296	64,751	67,103	69,535	72,048	74,707	77,440	80,310	83,254	86,275	89,373	92,550	95,807	99,145	102,566	106,070	109,660	113,336	117,100	120,954	124,899	128,936
Ma'an Governorate																											
1	Greater Ma'an District	24,760	25,722	26,820	27,961	28,969	30,003	30,878	31,792	32,742	33,799	34,884	36,062	37,266	38,498	39,757	41,044	42,359	43,703	45,076	46,478	47,909	49,371	50,863	52,386	53,940	55,526
2	Greater Petra District	11,572	12,021	12,534	13,068	13,539	14,022	14,431	14,858	15,302	15,796	16,303	16,854	17,417	17,992	18,581	19,182	19,797	20,425	21,066	21,722	22,391	23,074	23,771	24,483	25,209	25,950
3	Greater Shobak District	5,381	5,590	5,828	6,076	6,296	6,520	6,710	6,909	7,115	7,345	7,581	7,837	8,099	8,366	8,640	8,920	9,205	9,497	9,796	10,100	10,412	10,729	11,053	11,384	11,722	12,067
4	Husseinieh District	4,032	4,188	4,367	4,553	4,717	4,886	5,028	5,177	5,332	5,504	5,680	5,872	6,068	6,269	6,474	6,684	6,898	7,116	7,340	7,568	7,801	8,039	8,282	8,530	8,783	9,042
SUM of Ma'an Governorate		45,745	47,522	49,550	51,657	53,521	55,431	57,048	58,736	60,492	62,445	64,449	66,625	68,850	71,126	73,452	75,830	78,259	80,742	83,278	85,868	88,513	91,213	93,970	96,783	99,655	102,585
Karak Governorate																											
1	Greater Karak District	28,575	29,625	30,791	31,996	33,096	34,220	35,217	36,250	37,318	38,477	39,661	40,926	42,215	43,530	44,871	46,237	47,630	49,049	50,495	51,968	53,469	54,996	56,552	58,135	59,747	61,388
2	Mazar Janoobiyyeh District	25,201	26,128	27,156	28,219	29,189	30,180	31,060	31,971	32,912	33,934	34,979	36,094	37,231	38,391	39,573	40,778	42,007	43,258	44,534	45,833	47,156	48,503	49,875	51,272	52,693	54,140
3	Qasr District	9,193	9,531	9,906	10,293	10,647	11,009	11,330	11,662	12,005	12,378	12,759	13,166	13,581	14,004	14,435	14,875	15,323	15,779	16,245	16,718	17,201	17,692	18,193	18,702	19,221	19,749
4	Al-Agwar Al-Janobeiah District	14,296	14,822	15,405	16,008	16,558	17,121	17,620	18,137	18,671	19,250	19,843	20,476	21,121	21,779	22,449	23,133	23,830	24,540	25,264	26,001	26,751	27,515	28,294	29,086	29,892	30,713
5	Ai District	4,280	4,438	4,612	4,793	4,957	5,126	5,275	5,430	5,590	5,763	5,941	6,130	6,323	6,520	6,721	6,926	7,135	7,347	7,564	7,784	8,009	8,238	8,471			



Table 5-15: Current and future MSW generation in Jordan due to tourists by Governorate, 2014-2039 (values in tn/yr)

#	Administrative Division	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
NORTHERN REGION																											
1	Irbid Governorate	22	24	25	26	28	29	31	33	34	36	38	39	41	42	43	44	46	47	48	50	51	53	55	56	58	60
2	Mafraq Governorate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Ajloun Governorate	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	Jerash Governorate	6	6	6	7	7	8	8	8	9	9	10	10	10	11	11	11	12	12	13	13	13	14	14	15	15	15
SUM OF NORTHERN REGION		29	30	32	34	35	37	39	42	44	46	49	50	52	53	55	57	58	60	62	64	66	68	70	72	74	76
CENTRAL REGION																											
5	Amman Governorate	3,455	3,646	3,848	4,060	4,285	4,522	4,771	5,035	5,313	5,607	5,916	6,095	6,278	6,467	6,662	6,863	7,070	7,283	7,502	7,728	7,961	8,201	8,448	8,702	8,964	9,234
6	Madaba Governorate	194	205	216	228	241	254	268	283	299	315	333	343	353	364	375	386	397	409	422	435	448	461	475	489	504	519
7	Balqa Governorate	77	82	86	91	96	101	107	113	119	126	133	137	141	145	149	154	158	163	168	173	178	184	189	195	201	207
8	Zarqa Governorate	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3
SUM OF CENTRAL REGION		3,728	3,934	4,152	4,381	4,623	4,879	5,148	5,433	5,733	6,050	6,384	6,576	6,774	6,978	7,188	7,405	7,628	7,858	8,095	8,338	8,590	8,848	9,115	9,390	9,672	9,964
SOUTHERN REGION																											
9	Aqaba Governorate	792	836	882	931	982	1,036	1,094	1,154	1,218	1,285	1,356	1,397	1,439	1,482	1,527	1,573	1,620	1,669	1,720	1,771	1,825	1,880	1,936	1,995	2,055	2,117
10	Ma'an Governorate	406	429	452	477	504	532	561	592	625	659	696	717	738	760	783	807	831	856	882	909	936	964	993	1,023	1,054	1,086
11	Karak Governorate	157	166	175	185	195	206	217	229	242	255	269	277	285	294	303	312	321	331	341	351	362	373	384	396	408	420
12	Tafilah Governorate	7	8	8	8	9	9	10	10	11	12	12	13	13	13	14	14	15	15	16	16	16	17	18	18	19	19
SUM OF SOUTHERN REGION		1,363	1,438	1,517	1,601	1,690	1,783	1,881	1,985	2,095	2,211	2,333	2,403	2,476	2,550	2,627	2,706	2,788	2,872	2,958	3,047	3,139	3,234	3,331	3,431	3,535	3,641
SUM OF JORDAN		5,120	5,402	5,701	6,016	6,348	6,699	7,069	7,460	7,872	8,307	8,766	9,030	9,302	9,582	9,871	10,168	10,474	10,790	11,115	11,450	11,795	12,150	12,516	12,893	13,281	13,681

The current total MSW generation in the Kingdom is calculated at **2,655,977 tn/yr** for 2014, for a **~7.7 million population including the refugees**. This quantity seems to be reliable, since it is quite proportional to other estimates from reliable sources. For example, according to the SWEEP-NET Country Profile of Jordan (SWEEP-NET, 2010), the MSW generation was estimated at 1,944,284 tn/yr in 2009 for a 5.8 million population. Also, according to *Alhyasat and Al-Nsour* (2013), the respective MSW generation for the year 2012 was equal to 2,077,215 tn/yr for a ~6.4 million population.

In the future, the MSW generation is expected to reach:

- 3.247.635 tn/yr in 2019;
- 3.765.334 tn/yr in 2024;
- 4.460.963 tn/yr in 2029; and
- 5.247.173 tn/yr in 2034.

Figure 5-9 shows the allocation of the current MSW generation by Governorate in 2014. The majority of MSW is produced in Amman (38.5%), Irbid (18.4%) and Zarqa Governorate (15.3%).

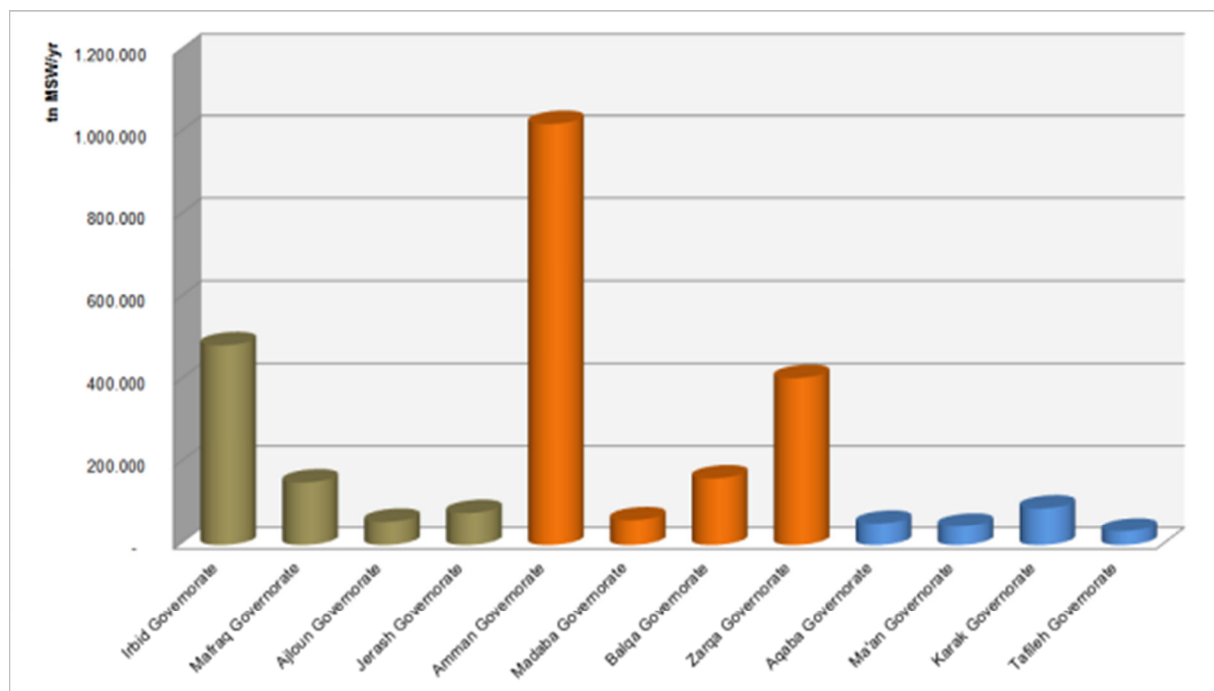


Figure 5-9: MSW generation in 2014, by Governorate

5.4 MSW COMPOSITION

During the last 15 years, there have been several studies and surveys to identify the SW composition in Jordan. Table 5-16 summarizes their results.

Table 5-16: MSW composition in Jordan according to different studies/surveys in the last 15 years

Source:	QRACEST/JUST		Chopra et al.	Abu Qdais and El-Fayez (SWEEPNET)	Alhyasat and Al-Nsour	Jaradat and Al-Khashman
Reference area:	Al Ekaider dumpsite	Al Ekaider dumpsite	Jordan	Jordan	Jordan	Ma'an
Material \ Year	(2006) ⁽¹⁾	(2012) ⁽²⁾	(2001)	(2012)	(2013)	(2012)
Biowaste	74.9%	35%	56%	52%	50%	64.92%
Paper & cardboard	6.3%	20%	16%	13%	15%	15.57%
Plastics	7.1%	17%	13%	17%	16%	11.02%
Metals	1.4%	3%	5%	1%	1.5%	3.4%
Glass	0.9%	5%	7%	3%	2%	2.79%
Cloth	4.2%	7%	1%	-	-	-
Wood & yard waste	2.8%	5%	-	-	-	-
Others	2.4%	8%	2%	14%	15.5%	2.3%
SUM	100%	100%	100%	100%	100%	100%

⁽¹⁾ Sampling period: March/April, 2006.

⁽²⁾ Sampling period: March/April, 2006.

It is evident that there are significant variations between the results of these studies/surveys that could be due to different planning features (e.g. sampling after removal of recyclables by relevant Contractors at the dumpsite level, etc.), fragmentary sampling, etc.

To ensure reliability of the finally selected MSW composition for the Strategy, the Consultant sought for relevant feedback from the Municipalities of the Kingdom in the framework of the horizontal analysis and the in-depth diagnosis surveys, since they are responsible for MSW collection and could probably have reliable data; however the variations were found to be bigger, i.e.:

- Biowaste: 30%-85%;
- paper & cardboard: 2%-40%;
- plastics: 0%-30%;
- metals: 0%-15%;
- glass: 0%-10%
- cloth: 0%-15%
- wood & yard waste: 0%-20%
- inert waste: 0%-10%
- others: 0%-15%

The results of these replies are given in Table 5-17.



Table 5-17: MSW composition according to replies of the horizontal analysis and in-depth diagnosis surveys

Municipality Material	Greater Irbid	Sahel Horan	New Al-Mazar	Sabha W Al-Dafiane	New Al-Rouaishad	Al-Safawi	Greater Ajloun	New Kofranjah	Al-Junied	Al-Oyoun	GAM	Greater Madaba	New Theban	Lib W Maleeh	Jabal Bani Hamida	Greater Salt	New Ain Al-Basha	New Deir Allah	Swaymeh	Al-Shoneh Al-Wsta	Al-Fahis	Greater Zarqa	New Al-Qawiera	New Al-Husseinieh	New Al-Shobak	Greater Karak	Shehan	New Mo'ab	Al-Qatranah	Greater Tafilah
Biowaste	60%	65%	65%	80%	70%	80%	60%	40%	85%	50%	50%	55%	30%	70%	45%	40%	75%	65%	65%	60%	55%	57.0%	30%	70%	40%	48.5%	80%	70%	50%	50%
Paper & cardboard	8%	5%	6%	3%	10%	10%	15%	5%	2%	30%	15%	30%	10%	9%	35%	25%	3.75%	10%	10%	5%	20%	14.4%	40%	15%	20%	17.4%	20%	5%	10%	5%
Plastics	12%	5%	4%	4%	2%	10%	15%	10%	1%	-	16%	5%	20%	5%	10%	20%	3.75%	10%	10%	10%	1%	12.3%	30%	5%	20%	3.5%	-	5%	5%	15%
Metals	6%	6%	2%	10%	2%	-	1%	5%	3%	-	1%	5%	-	-	2%	15%	6.25%	2%	5%	5%	2%	1.6%	-	3.5%	-	5.2%	-	5%	10%	10%
Glass	4%	5%	5%	3%	5%	-	1%	5%	2%	-	2%	1%	10%	-	2%	-	2.5%	2%	5%	5%	1%	1.8%	-	0.5%	10%	0.4%	-	5%	-	10%
Cloth	1%	7%	5%	-	-	-	3%	15%	1%	-	9%	-	10%	-	2%	-	2.5%	1%	5%	10%	1%	0.0%	-	2.5%	10%	-	-	-	3%	10%
Wood & yard waste	6%	2%	10%	-	1%	-	5%	5%	3%	5%	5%	2%	-	1%	2%	-	3.75%	5%	-	-	20%	0.0%	-	3%	-	0.7%	-	-	10%	-
Inert	3%	2%	1%	-	-	-	-	5%	3%	5%	2%	-	10%	-	1%	-	1.25%	5%	-	-	-	0.0%	-	0.5%	-	24.3%	-	-	10%	-
Others	-	3%	2%	-	10%	-	-	10%	-	10%	-	2%	10%	15%	1%	-	1.25%	-	-	5%	-	0.0%	-	-	-	-	-	10%	2%	-
SUM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The average values of the MSW compositions provided by the Municipalities are given in Table 5-18.

Table 5-18: Average values of MSW composition as provided by the horizontal analysis and in-depth diagnosis surveys

Material	Average values (%)
Biowaste	59%
Paper & cardboard	14%
Plastics	10%
Metals	5%
Glass	4%
Cloth	5%
Wood & yard waste	5%
Inert	5%
Others	6%

Secure generalized conclusions cannot be made, but it seems that highly urbanized and/or populated Municipalities (e.g. the GAM, the Greater Madaba, Greater Al Salt, Al-Shoneh Al-Wsta, Greater Karak, and Greater Tafilah Municipalities) tend to have relative low percentages of biowaste and increased values of paper/cardboard/plastics and the opposite.

Based on that, we suggest that the MSWM Strategy should be based on three different MSW compositions that could be applied per Governorate, in respect of their urbanization index, as given in Table 5-19. Those compositions are proposed for the whole duration of the MSWM Strategy.

Table 5-19: Proposed MSW composition by Governorate, according to Governorates' urbanization index

Urban/Total Population	0%-50%	50%-75%	75%-100%
Material			
Biowaste	65%	57%	50%
Paper & cardboard	9%	13%	15%
Plastics	9%	13%	15%
Metals	2%	3%	4%
Glass	2%	3%	4%
Cloth	3%	1%	1%
Wood & yard waste	5%	2%	1%
Others	5%	8%	10%
Application to Governorates:	Mafraq, Karak,	Jerash, Madaba, Balqa, Ma'an, Tafilah	Amman, Irbid, Ajloun, Zarqa, Aqaba

5.5 EXISTING MSWM ACTIVITIES

5.5.1 PREVENTION & REUSE

As already mentioned, the “*reduce-reuse-recycle*” (Three R’s) approach is a basic guideline in the EU SWM policy. According to Jordan’s National Agenda (2006-2015) maximization of environmentally sound SW reuse (and recycling) is addressed. However, by now, very few steps have been made in Jordan towards the reduction or reuse of MSW.

In Jordan, MSW recovery and reuse activities are being taking place by the following factors:

- small size companies, which practice MSW recovery, reuse and recycling, and
- informal sector waste-pickers, who practice SW sorting and re-use.

By now, there is not available information during the implementation of this report for the first category, since it is a voluntary decision taken in the framework of the companies’ environmental policy or Corporate Social Responsibility (CSR).

On the other hand, the waste-pickers operate individually or under the supervision of a so-called “*Middleman*” in the City or in the Dumpsite level and sort out quantities of waste in order to produce personal income; however in the same time and without being their target, they recover significant quantities of recyclables, thus minimizing the volume of waste to be collected for MSWM. In Chapter 8 of this report, a full-fledged socio-economic analysis of the waste-pickers’ phenomenon is done.

5.5.2 STREET CLEANING / COLLECTION

As mentioned in Chapter 3 of this report, Municipalities are responsible for street cleaning and MSW collection. In this context, Municipalities place waste storage containers in the city grid, where the citizens can throw away their MSW, so as to be collected.

In some occasions, the street cleaning and MSW collection services are being contracted by the local Authorities to the private sector (PPP). For example, the ASEZA has an active contract with a private Contractor to carry out street cleaning and collection of the Aqaba City, whereas the PDTRA follows the same method for the Petra Archaeological Park. The contracts are being reaffirmed in a yearly basis.

According to the replies of Municipalities to the Horizontal Analysis and the In-Depth Diagnosis questionnaires, it is evident that in most of the cases, street cleaning is being carried out manually, without the use of mechanical systems. Of these who replied, the only exceptions were the GAM, the

Greater Madaba, the Al-Fahis and the Al-Shoneh Al-Wsta Municipalities, where both manual and mechanical street-cleaning is experienced. Mechanical sweeping is being performed through mechanical sweepers (8 in GAM, 1 in Greater Madaba, 2 in Al-Fahis and 1 in Al-Shoneh Al-Wsta).

Table 5-20 presents the numbers and capacities of the MSW storage equipment (bins, containers) currently used by the Municipalities (only 24 Municipalities replied), as well as their coverage of actual needs. It is surprising that most of the Municipalities that replied to the questionnaires declared very low coverage of their needs, which in some case lies under 50%.

Table 5-20: Temporary MSW storage equipment allocated in and operated by the Municipalities

#	Municipality	Total number	Total capacity (m ³)	Coverage (% of actual needs)
Northern Region				
Irbid Governorate				
1	Greater Irbid	850	(0.5m ³ , 1m ³ , 8m ³) capacity per bin/container	80%
2	Khaled Bin Waleed	375	412.5	65%
3	Sharhabil bin Hasna	100	110	20%
4	Rabiet Al-Kura	150	165	40%
Mafrq Governorate				
1	New Balama	70	77	20%
2	Al-Khaldieh	106	(1.1m ³) capacity per bin	99%
3	Sabha W Al-Dafiane	200 120 500	(1m ³) (0.3m ³) (0.24m ³) capacity per bin	80%
4	Al-Safawi	70	77	N/A
Ajloun Governorate				
1	Greater Ajloun	280 (metal bins)	308	45%
2	New Kofranjah	25	32	50%
3	Al-Junied	250	315	40%
4	Al-Oyoun	1,000	1,100	100%
Jerash Governorate				
-	No reply			
Central Region				
Amman Governorate				
1	New Oum Al-Rasas	100	72	100%
Madaba Governorate				
1	New Theban	2,000	N/A	65%
2	Jabal Bani Hamida	300	N/A	100%
Balqa Governorate				
1	New Ain Al-Basha	300	330	60%
2	Swaymeh	200	240	80%

#	Municipality	Total number	Total capacity (m ³)	Coverage (% of actual needs)
3	Al-Shoneh Al-Wsta	10 metal and 200 stationary 2 press containers	(0.25m ³) capacity per bin N/A	30%
4	Al-Fahis	470	51.5	100%
Zarqa Governorate				
1	Greater Zarqa	2,000 5 open-top containers	(1.1m ³) capacity per bin N/A	100%
Southern Region				
Aqaba Governorate				
1	New Al-Qawiera	400	(0.96m ³) capacity per bin	100%
Ma'an Governorate				
1	New Al-Shobak	543	597.3	60%
Karak Governorate				
1	Shehan	400	440	70%
2	New Mo'ab	N/A	N/A	70%
Tafilah Governorate				
1	Greater Tafilah	700	(1.1m ³) capacity per bin	100%

For washing and maintenance of bins and containers, some Municipalities do it on own means and personnel, while others hire sub-contractors.

In the sample of 40 Municipalities providing information in the framework of the Horizontal Analysis and the In-Depth Diagnosis surveys regarding the level of satisfaction of the street sweeping activities, 15 of them (37.5%) declared high satisfaction, whereas 18 (45.0%) declared medium satisfaction and 7 of them (17.5%) low satisfaction.

Finally, it needs to be highlighted that organised sorting at source and separate collection of MSW fractions (e.g. recyclables, biowaste, etc.) has not been followed widely in Jordan yet. Only in some specific cases have such programs been implemented as pilots to cater for the future. These programs are presented in Table 5-21.

Table 5-21: Sorting at source programs implemented in Jordan during the last years

Municipality	Program Name	# of Years of Implementation	Target population	Types of Recycled / Recovered materials	Quantity of Recycled / Recovered Materials (tn/yr)
GAM	Um Utheinah Waste Sorting Project	3	12,000	Paper & cardboard, metals, plastics, glass	240
	Marka Waste Sorting Project (see also sections 7.2.1.6)	N/A	N/A	N/A	N/A

Municipality	Program Name	# of Years of Implementation	Target population	Types of Recycled / Recovered materials	Quantity of Recycled / Recovered Materials (tn/yr)
	Dahiet Al-Hussein Sorting Project (see also sections 7.2.1.4 and 7.2.1.5)	N/A	N/A	N/A	N/A
	co-operation with the Jordan Environment Society	since 1994	N/A	Paper & cardboard, metals, plastics, glass	N/A
Greater Madaba	Experimental program for introducing SW separation at source	2010 - 2012	N/A	Paper & cardboard, metals, plastics	1,500
Al-Shoneh Al-Wsta	Green hands	2009	N/A (in hotels)	metals, plastics, glass	109.5

At this point, the importance of the awareness raising campaigns to the success of sorting at source needs to be highlighted, since it is the most critical tool that can help towards the increase of the sorting participation and sorting efficiency rates, mostly through the youth.

5.5.3 TRANSPORTATION

5.5.3.1 LOCAL TRANSPORTATION

Local transportation of MSW in Jordan is being carried out by the Municipalities, which use their equipment to transport it to Transfer Stations or directly to the final disposal sites. Table 5-22 includes the numbers of vehicles used by the Municipalities for this activity, according to their replies to the Horizontal Analysis and the In-Depth Diagnosis surveys (42 Municipalities replied).

Table 5-22: Machinery allocated in and operated by Municipalities for MSW transportation

#	Municipality	Closed Refuse Vehicles	Open Transport Vehicles	Wheel Loaders
Northern Region				
Irbid Governorate				
1	Greater Irbid	3	6	0
2	Sahel Horan	3	2	0
3	Khaled Bin Waleed	4	0	1
4	Sharhabil bin Hasna	2	4	0
5	New Al-Mazar	10	2	2
6	Rabiet Al-Kura	3	1	1
7	New Deir Abi Saeed	6	4	1

Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)

#	Municipality	Closed Refuse Vehicles	Open Transport Vehicles	Wheel Loaders
8	Burqush	7	3	1
Mafrq Governorate				
1	New Balama	6	0	0
2	Al-Khaldieh	0	6	0
3	Sabha W Al-Dafianeh	3	0	0
4	New Al-Rouaishad	2	0	0
5	Al-Salahia and Naifa	3	0	0
6	Al-Safawi	1	1	0
Ajloun Governorate				
1	Greater Ajloun	5	0	3
2	New Kofranjah	5	2	2
3	Al-Junied	4	2	1
4	Al-Shafa	4	1	2
5	Al-Oyoun	4	3	2
Jerash Governorate				
-	No reply			
Central Region				
Amman Governorate				
1	GAM	207	13	35
2	New Oum Al-Rasas	4	0	0
Madaba Governorate				
1	Greater Madaba	20	6	3
2	New Theban	0	0	1
3	Lib W Maleeh	4	2	1
4	Jabal Bani Hamida	0	1	0
Balqa Governorate				
1	New Ain Al-Basha	6	2	2
2	New Deir Allah	4	4	1
3	Swaymeh	3	2	1
4	Al-Shoneh Al-Wsta	6	0	2
5	Al-Fahis	4	6	3
Zarqa Governorate				
1	Greater Zarqa	65	33	2 (+1 Crawler Dozer)
Southern Region				
Aqaba Governorate				
1	New Al-Qawiera	3	0	0
2	Wadi Araba	1	0	0
Ma'an Governorate				
1	New Al-Husseinih	2	0	1
2	New Al-Shobak	3	0	0

#	Municipality	Closed Refuse Vehicles	Open Transport Vehicles	Wheel Loaders
Karak Governorate				
1	Mu'tah and Mazar	12	1	2
2	Shehan	4	2	2
3	New Talal	2	1	1
4	Ai (Al-Hzmaan)	2	0	0
5	New Mo'ab	6	4	1
6	Al-Qatraneh	3	1	1
Tafilah Governorate				
1	Greater Tafilah	7	0	0

Around half of the Municipalities operate their own washing & maintenance station for their waste transport vehicles & machinery. The rest signs yearly contracts with private stations for these services.

5.5.3.2 TRANS-BOUNDARY TRANSPORTATION

Trans-boundary transportation of waste refers to the transportation of waste from the producer country to a different country. Currently, no trans-boundary transportation of MSW takes place in Jordan. This is verified by the responses of Municipalities and JSCs to the Horizontal Analysis and the In-Depth Diagnosis surveys. The only Municipality that reported trans-boundary MSW transportation is the Khaled Bin Waleed Municipality (Horizontal Analysis questionnaire), which however documented transportation outside the borders of the Municipality – and not the Kingdom of Jordan – to the Al Aghwar Al Shamaliyah dumpsite.

5.5.4 TRANSFER

Several Transfer Stations have been established by Municipalities or JSCs in many places of Jordan in order to minimise the transportation cost through reduced labour and operating costs, when MSW needs to be transported to a distant receptor. They also reduce the total number of vehicular trips traveling to and from the receptor.

Table 5-23 gives the basic attributes of the Transfer Stations in Jordan, according to relevant data from the MoMA, GAM, as well as the replies of Municipalities and JSCs to the Horizontal Analysis and In-Depth Diagnosis surveys.

Table 5-23: Transfer Stations in Jordan, 2014

#	Name	Type	Location	JSC or Municipality Responsible	Date of Establishment	Area (donums)	Daily Capacity (tn/d)	Coverage
Northern Region								
1	Taqabbal & Madinat Al Shahinat Transfer Station (to Al Ekaider dumpsite)	Stationary	Taqabbal & Madinat Al Shahinat	Irbid (Al Ekaider) JSC	2008	4.5	30	Greater Irbid
2	Burma Transfer Station (to Al Ekaider dumpsite)	N/A	Burma	Irbid (Al Ekaider) JSC	N/A	N/A	N/A	<u>Jerash Governorate (5 Municipalities):</u> Greater Jerash, Al-Merad, Bab Amman, Al-Naseem, Burma
3	Aghwar Al Shamaliyah Transfer Station (to Al Aghwar Al Shamaliyah dumpsite)	N/A	Aghwar Al Shamaliyah	Aghwar Shamaliyah JSC	N/A	N/A	60	<u>Irbid Governorate (6 Municipalities):</u> Khaled Bin Waleed, Ma'adh bin Jabal, Tabqa Fahal, Sharhabil bin Hasna, New Al-Tayba, Al-Wasattyah <u>Ajloun Governorate (1 Municipality):</u> Al-Shafa
4	Rabiet Al-Kura Transfer Station (to Al Ekaider dumpsite)	N/A	Rabiet Al-Kura	Rabiet Al-Kura JSC	N/A	N/A	85	<u>Irbid Governorate (3 Municipalities):</u> Rabiet Al-Kura, New Deir Abi Saeed, Burqush
5	Ajloun Transfer Station (to Al Ekaider dumpsite)	Stationary	Ajloun	Ajloun JSC	2006	18.5	70	<u>Ajloun Governorate (4 Municipalities):</u> Greater Ajloun, New Kofranjah, Al-Junied, Al-Oyoun
Central Region								
6	Sha'eer Transfer Station	Stationary	Qwesmeh, Amman	GAM	2003	17	2,500	GAM
7	Al-Shoneh Al-Wsta Transfer Station (New Deir Allah dumpsite)	Stationary	N/A	Al-Shoneh Al-Wsta JSC	N/A	N/A	N/A	Al-Shoneh Al-Wsta Municipality
8	Al Salt Transfer Station (to Al Homra dumpsite)	N/A	N/A	Greater Salt Municipality	N/A	N/A	N/A	Greater Salt Municipality



#	Name	Type	Location	JSC or Municipality Responsible	Date of Establishment	Area (donums)	Daily Capacity (tn/d)	Coverage
9	Zarqa Transfer Station (to Al Ghabawi landfill)	Mobile	Wadi Al-Osh	Greater Zarqa Municipality	2004	100	1,200	Greater Zarqa Municipality
10	Al-Russeifeh Transfer Station (to Al Ghabawi landfill)	N/A	Al-Russeifeh	Al-Russeifeh Municipality	N/A	N/A	N/A	Al-Russeifeh Municipality
Southern Region								
11	Beir-Khaddad Transfer Station (to Ma'an dumpsite)	Stationary	New Al-Shobak	Shobak JSC	2008	20	80	New Al-Shobak Municipality
12	Al-Husseinieh Transfer Station (to Ma'an dumpsite)	N/A	New Al-Husseinieh	New Al-Husseinieh Municipality	1994	N/A	10	New Al-Husseinieh Municipality
13	Mu'tah and Mazar Transfer Station (to Al Layoun dumpsite)	N/A	Mu'tah and Mazar	Mu'tah and Mazar Municipality	N/A	N/A	N/A	Mu'tah and Mazar Municipality
14	Sultani Transfer Station (to Karak dumpsite)	N/A	Sultani	Sultani Municipality	N/A	N/A	N/A	Sultani Municipality

5.5.5 RECYCLING & MATERIALS RECOVERY

5.5.5.1 FORMAL RECYCLING FACILITIES

By now, even though maximization of environmentally sound SW recycling (and reuse, as mentioned before) is an objective of the Jordan's National Agenda (2006-2015), no specific quantitative targets have been set. As a result, formal recycling activities are not widely applied in Jordan, although there seems to be high market demand/potential, as occurs through the socio-economic survey of waste-picking activities which is presented in Chapter 8 of the report on hand.

As mentioned before, GAM has developed and operated three (3) pilot separation-at-source projects, namely "Marka", "Dahiet Al-Hussein", and "Um Utheinah", but their performance was poor due to lack of proper management, equipment, and maintained awareness.

As mentioned in *Alhyasat and Al-Nsour* (2013), a 15 years BOT contract was signed in 2006 by GAM and a private operator to build, operate and transfer a 600 tn/d maximum capacity "dirty" Materials Recovery Facility (MRF)⁵ next to Al Ghabawi landfill (60 tn/d as a start). This MRF was planned to be operational in 2008, but a legal dispute between the GAM and the private operator prevented the start of operations until now, although the plant is almost complete.

Except from GAM which is active in preparing and organising recycling facilities in Jordan, the only Municipality having progressed in the past in the field is the Greater Ma'an Municipality, which had built and used to operate a MSW recycling plant (sorting station). However, according to information from the MoMA, this plant is not operating any more, since it has been damaged and is undergoing a rehabilitation process. No further information has been made available to the Consultant on this plant.

Finally, the Jordan Environment Society (JES), which is a Jordanian NGO, operates a simple-practice and low-capacity "clean" MRF, where already sorted recyclables are being transported by GAM and refining is being carried out.

On the other hand, many JSCs have managed to promote recycling by leasing their dumpsites for companies (Contractors) with fixed fees. The Contractors then hire individual waste-pickers to recover recyclables from the working face, with the attached health and safety concerns. In Chapter 8, a socio-economic survey of those waste-pickers that was carried out through the Project is given between

⁵ A Materials Recovery Facility (MRF) is a place where SW is delivered to be separated, processed and stored for later use as raw materials for remanufacturing and reprocessing. "Clean" MRFs receive SW separated at source, whereas "dirty" MRFs receive one - mixed - SW stream.

others. The JSCs currently having active contracts of this type, as occurred through the Horizontal Analysis and the In-Depth Diagnosis surveys, are the following:

1. the Karak JSC, at the Al Lajoun dumpsite;
2. the Al-Shoneh Al-Wsta JSC, at the New Deir Allah dumpsite;
3. the Balqa JSC, at the Al Homra dumpsite;
4. the Zarqa JSC, at the Al-Duleil dumpsite;
5. the Al-Agwar Al-Janobeiah JSC, at the Al Barkah and Al Samar dumpsites;
6. the Irbid JSC, at the Al Ekaider dumpsite; and
7. the Mafraq, at the Al Huseyneyat dumpsite.

Further information on the aforementioned contracts are listed in section 9.2 of the report on hand.

5.5.5.2 INFORMAL RECYCLING FACILITIES

According to *Alhyasat and Al-Nsour* (2013), the number of individual informal waste-pickers (or *scavengers*) in Jordan in the City or the Dumpsite level counts at around 5,000. Some of the recycling is carried out before the SW reaches the final disposal sites; however, much is done at the disposal sites by individuals (including entire families) who live near or even at the disposal site.

In Chapter 8 of this report, a full-fledged socio-economic analysis of waste-pickers is presented.

5.5.5.3 COMPOSTING / ANAEROBIC DIGESTION

Currently, neither aerobic (composting) nor anaerobic (digestion) treatment of MSW takes place in Jordan, as is apparent from the responses of Municipalities and JSCs to the Horizontal Analysis and the In-Depth Diagnosis surveys.

The only exception is a methanisation component (plant), which has been installed in the Jordan Biogas plant at the old Al-Russeifeh dumpsite, as it is described in the following section.

This methanisation plant, which is comprised by anaerobic digesters, is receiving 17-20 tn/d of organic waste from the municipal slaughterhouses, the Central Market and some selected hotels and restaurants and is producing about 50 m³/h of biogas for utilization in electricity generation, in parallel with production with organic compost.

More details for the whole plant are given in the following section.

5.5.6 ENERGY RECOVERY

In Jordan, there are two (2) WtE projects currently being active, both by GAM. These are:

1. A Design-Build-Operate-Transfer (DBOT) project for a 6 MW LFG recovery and power generation system at the Al Ghabawi landfill, the *“Amman Ghabawi Landfill Gas to Energy Project”*.

This project includes the construction, reshaping and final capping of cells and LFG extraction from the cells # 1, #2 and #3 of the Al Ghabawi landfill site. Construction of Phase I (cell #1) started in 2013 and is about to be executed, so as operation of the unit can be started. According to the signed contract, it is scheduled to be transferred by the Contractor to GAM in 2017.

The purpose of the Al Ghabawi LFG project is to reduce the greenhouse gas emissions from the landfill by the controlled extraction and utilization of the LFG (and mostly its CH₄ content) for energy recovery purposes. Furthermore, using LFG as a fuel will displace electricity from the national grid that is dominated by fossil fuel power plants. This is why the project has been proposed by GAM as a CDM project, in order to grant further income through carbon emissions trade.

2. The Jordan Biogas plant, which is a pilot LFG recovery plant in the old Al-Russeifeh dumpsite. The plant has been implemented by Jordan Biogas Company (JBC), which was established in 1997 and is owned at 50% by GAM and 50% by the Central Electricity Generation Company CEGCO. The objectives of the company are:

- to utilize biogas in electricity generation
- to produce organic compost
- to reduce greenhouse gas emissions
- to transfer technology and exchange expertise

The Al-Russeifeh pilot plant combines:

- LFG collection wells and network, comprised by 84 wells of 12-25m depth;
- the methanisation plant, as mentioned above; and
- Electricity generation from LFG and methanisation biogas.

The plant is having a 1 MW/h capacity. The energy produced is sold to the Central Electricity Generating Company of Jordan.

5.5.7 FINAL DISPOSAL

MSW that is not recycled, which is the great majority in Jordan, is disposed of in Final Disposal Sites (FDS) all over the Kingdom.

According to data from MoMA, eighteen (18) FDS are currently operating in Jordan for MSW. Of them, four (4) FDS operate in Northern Region, five (5) in Central Region and nine (9) in Southern Region of Jordan.

The Al Ghabawi landfill which is the largest FDS operated by GAM is the only engineered sanitary landfill. The rest 17 FDS are dumpsites of variable condition and disposal practices, operated by the respective JSCs.

Apart from the 18 FDS, another two (2) have been identified through the Horizontal Analysis questionnaire replied by GAM: the Al Beida and the Al-Russeifeh disposal sites. However, these FDS are not used for MSW disposal but for C&D waste only.

Table 5-24 gives the basic attributes of the FDS in Jordan according to data from the MoMA and *Aljaradin and Persson* (2012). Their estimated life span has been recorded through the JSCs' Horizontal Analysis and In-Depth Diagnosis surveys.



Table 5-24: Final Disposal Sites in Jordan, 2014

#	Name	Location	JSC Responsible	Date of Establishment	Initially Designed Age & Estimated Life-Span	Area (donums)	Daily Capacity (tn/d)	Coverage	Status	Available MSWM facilities on site
Northern Region										
1	Al Ekaider dumpsite	Al Ekaider village, 27km east of Irbid City	Irbid JSC	1983	50 years <5 years remaining	856	600 – 1,300	<u>Irbid Governorate (9 Municipalities):</u> Greater Irbid, West Irbid, New Al-Ramtha, Sahel Horan, Al-Kaffarat, New Al-Yarmouk, Al-Shua'la, Al-Saroo, New Al-Mazar <u>Jerash Governorate (5 Municipalities):</u> Greater Jerash, Al-Merad, Bab Amman, Al-Naseem, Burma Yarmouk University, JUST Al Hassan Industrial Estate Companies Materials precipitated from the sewage treatment water	Active (controlled tipping)	1. Access road 2. Entrance gate 3. Weighbridge 4. Guard rooms 5. Administration Office 6. Drivers' Room with separate WC building 7. Control Room 8. Maintenance workshop 9. Pilot LFG Plant 10. Power generator 11. Borrow pits 12. Equipment: 1 compactor (not operating), 4 bulldozers, 4 loaders, 3 trucks, pick-up, 3 spraying tractors, water tank, Diana truck, bus
2	Al Aghwar Al Shamaliyah dumpsite	Al Mansheah / Ma'adh bin Jabal	Aghwar Shamaliyah JSC	1987	20 years <5 years remaining	76	146-180	<u>Irbid Governorate (6 Municipalities):</u> Khaled Bin Waleed, Ma'adh bin Jabal, Tabqa Fahal, Sharhabil bin Hasna, New Al-Tayba, Al-Wasattyah <u>Ajloun Governorate (1 Municipality):</u> Al-Shafa	Active (controlled tipping)	1. Guard room 2. Umbrellas 3. Maintenance workshop 4. Equipment: bulldozer, 2 loaders, truck, pick-up, spraying tractor
3	Al Huseyneyat dumpsite	25km east of Al Mafrqa City	Mafrqa JSC	1986	50 years 16-20 years remaining	380	120 - 180	<u>Mafrqa Governorate (10 Municipalities):</u> Greater Mafrqa, New Rehab, New Balama, New Hosha, Manshiet Bani Hassan, Al-Khaldieh, Al-Basileh, Al-Zatari W Al-Manshieh, Al-Sarhan, Hussein bin Abdullah Al-Amer Ael Al Beat University Military units Farms and factories in the area	Active (controlled tipping)	1. Weighbridge 2. Guard room 3. Administration office 4. Toilets 5. Maintenance workshop 6. Umbrellas 7. Fencing (iron) 8. ~4,000 trees 9. Equipment: 2 bulldozers with chains, loader, 2 trucks, spraying tractor, water tank, bus
4	Al Badiah Al Shamaliyah dumpsite	south of Manarah	Badiah Shamaliyah JSC	2002	100 years 16-20 years remaining	360	20-85	<u>Mafrqa Governorate (8 Municipalities):</u> New Oum Al-Jemal, Sabha W Al-Dafianeh, Oum Al-Qutain W Al-Mkafetah, New Al-Rouaishad, Al-Salahia and Naifa, Bani Hashim, Al-Safawi, New Deir Al-Kahaf	Active (controlled tipping)	1. Access road 2. Equipment: loader, tractor
Central Region										
5	Al Ghabawi landfill	Ohod municipal district / 40km from Amman City Centre	GAM	2003	N/A	2,000	2,000-2,500	<u>Amman (Capital) Governorate (9 Municipalities):</u> GAM, Almoaqr, Naor, Sahab, Um-Ebsateen, Husban, Ajeeza, Al-Ameriya, New Oum Al-Rasas <u>Zarqa Governorate (2 Municipalities):</u> Greater Zarqa, Al-Russeifeh	Active (engineered sanitary landfill)	1. Access road 2. Fencing 3. Daily cover 4. Bottom lining system 5. Leachate collection system and Leachate Treatment Plant 6. LFG extraction system and LFG-to-energy plant 7. 4 leachate storage/evaporation ponds 8. Weighbridge and weighing room 9. Internal road network



#	Name	Location	JSC Responsible	Date of Establishment	Initially Designed Age & Estimated Life-Span	Area (donums)	Daily Capacity (tn/d)	Coverage	Status	Available MSWM facilities on site
										10. Administration office 11. Maintenance workshop 12. Trees 13. Electrical transformer 14. Water well 15. Equipment: 6 compactors, 5 bulldozers, 2 wheeled-loaders, track-loader, grader, shovel, fuel-tank truck, 2 leachate-tank trucks, 6 dumper trucks, 2 generators
-	Al Beida waste landfill	Al Beida	GAM	N/A	N/A	N/A	N/A	<u>Amman (Capital) Governorate (9 Municipalities):</u> GAM, Almoaqr, Naor, Sahab, Um-Ebsateen, Husban, Ajeeza, Al-Ameriya, New Oum Al-Rasas	Active (engineered C&D landfill)	N/A information
-	Al-Russeifeh landfill	Al-Russeifeh	GAM	N/A	N/A	N/A	N/A	<u>Zarqa Governorate (2 Municipalities):</u> Greater Zarqa, Al-Russeifeh	Active (engineered C&D landfill)	N/A information
6	Madaba dumpsite	2km from Madaba City	Madaba JSC	1974	15 years 11-15 years remaining	163	300-500	<u>Madaba Governorate (1 Municipality):</u> Greater Madaba Municipality <u>Madaba Governorate (3 Municipalities):</u> New Theban, Lib W Maleeh, Jabal Bani Hamida	Active (controlled tipping)	1. Administrative office 2. Networks (telephone, electricity, water) 3. Equipment: 2 bulldozers, 2 loaders, 3 trucks, water tank, fuel tank, tractor, 4 pick-ups
7	Al Homra dumpsite	12km from Al Salt City	Balqa (Al Salt) JSC	1989	25 years 16-20 years remaining	267	250-500	<u>Balqa Governorate (5 Municipalities):</u> Greater Salt, New Ain Al-Basha, New Al-Arda, Al-Fahis, Mahes Private companies and factories	Active (controlled tipping)	1. Power generator 2. Equipment: 2 bulldozers, 3 loaders, spraying tractor, bus, 2 trucks, 2 electricity generators
8	New Deir Allah dumpsite	New Al Twal / New Deir Allah area	Al-Shoneh Al-Wsta JSC	1998	50 years N/A	364	290	<u>Balqa Governorate (4 Municipalities):</u> New Deir Allah, New Madi, Al-Shoneh Al-Wsta, Swaymeh	Active (controlled tipping)	1. Access road 2. Equipment: loader, truck with chain, truck
9	Al-Duleil dumpsite	Al-Hallabat Castle Area	Zarqa JSC	1991	25 years 16-20 years remaining	270	300-350	<u>Zarqa Governorate (5 Municipalities):</u> New Al-Hashimiya, New Bereen, Al-Duleil, Al-Hallabat, New Al-Azraq	Active (controlled tipping – occasional burning)	1. Guard room 2. Equipment: bulldozer, loader, truck, pick-up
Southern Region										
10	Al Aqaba dumpsite	10km north-east of Aqaba City	Aqaba JSC	2000	N/A <5 years remaining	60	100-120	<u>Aqaba Governorate (4 Municipalities):</u> Qura Hawd Al-Daisa, Qariqara and Finan, Wadi Araba, Qutar and Rahma <u>Aqaba Governorate (1 Local Authority):</u> Aqaba City (ASEZ) Private companies and factories	Active (controlled tipping)	1. Access road 2. Power generator 3. Equipment: bulldozer, loader, truck, digger
11	Al-Qawiera dumpsite	4.5km north-west of the desert road	Qawiera JSC	1997	50 years >20 years remaining	380	25-47	<u>Aqaba Governorate (1 Municipality):</u> New Al-Qawiera Municipality	Active (controlled tipping)	-
12	Al Mohamadeah Village dumpsite	Al Mohamadeah Village / Shobak	Shobak JSC	1983	N/A >20 years remaining	444	60	<u>Ma'an Governorate (2 Municipalities):</u> Al-Ashari, New Al-Shobak	Active (open dumping - burning - occasional tipping)	-
13	Ma'an dumpsite	East of Ma'an City	Ma'an JSC	1993	50 years >20 years	500	55-80	<u>Ma'an Governorate (4 Municipalities):</u> Greater Ma'an, New Al-Husseinieh, Al-Jafr, Al-Sharah <u>Ma'an Governorate (1 Local Authority):</u> Petra (PDTR)	Active (controlled tipping)	1. Guard room 2. Umbrellas 3. Maintenance workshop 4. Equipment: bulldozer, 2 loaders, truck, pick-up, tractor, digger



#	Name	Location	JSC Responsible	Date of Establishment	Initially Designed Age & Estimated Life-Span	Area (donums)	Daily Capacity (tn/d)	Coverage	Status	Available MSWM facilities on site
14	Ail dumpsite	8km east of Basta / New Ail area	Ail JSC	1984	N/A	274	42	<u>Ma'an Governorate (1 Municipality):</u> New Ail Municipality	Active (controlled tipping – occasional burning)	1. Access road 2. Fencing (from 3 sides) 3. Guard room 4. Equipment: loader (bad condition), truck, small car (bad condition)
15	Al Lajoun dumpsite	25km east of Karak City	Karak JSC	1995	15 years 11-15 years remaining	485	600-800	<u>Karak Governorate (9 Municipalities):</u> Greater Karak, Mu'tah and Mazar, Shehan, Abdullah Bin Rawaha, Ai (Al-Hzmaan), New Mo'ab, Al-Qatraneh, Sultani, New Talal Mo'tah University	Active (controlled tipping)	1. Guard room 2. Equipment: 2 bulldozers, 2 loaders, truck, pick-up, tractor
16	Joarf Al Daraweash dumpsite	Joarf Al Daraweash	Tafilah JSC	1985	25 years 11-15 years remaining	450	50-100	<u>Tafilah Governorate (4 Municipalities):</u> Greater Tafilah, Besara, Al-Qadisieh, Al-Hassa	Active (controlled tipping)	1. Guard room 2. Maintenance workshop 3. Equipment: bulldozer, 2 loaders, truck, 2 pick-ups, tractor
17	Al Barkah dumpsite	Aghwar Al Mazrah / Dead Sea	Al-Agwar Al-Janobeiah JSC	1997	15 years >20 years remaining	205	22	<u>Karak Governorate (1 Municipalities):</u> Al-Agwar Al-Janobeiah Private companies and factories (including Botas City)	Active (open dumping - burning - occasional tipping)	-
18	Al Samar dumpsite	Aghwar Al Safi / Al Samar	Al-Agwar Al-Janobeiah JSC	1997	10 years >20 years remaining	153	25	<u>Karak Governorate (1 Municipalities):</u> Al-Agwar Al-Janobeiah Private companies and factories (including Botas factory)	Active (open dumping - burning - occasional tipping)	-

Furthermore, there are some “old” FDS recorded by MoMA or the Municipalities and JSCs in the framework of the Horizontal Analysis and the In-Depth Diagnosis surveys, which used to operate but do not any more. These are the following:

- Irbid Governorate:
 - Iskayeen dumpsite (reported by Rabiet Al-Kura, New Deir Abi Saeed and Burqush Municipalities)
- Mafrq Governorate:
 - Al-Rouaishad dumpsite (reported by New Al-Rouaishad Municipality)
 - Al-Safawi dumpsite (reported by Safawi Municipality)
- Ajloun Governorate:
 - Sakhra dumpsite (reported by Al-Shafa Municipality)
 - Manshya dumpsite (reported by Al-Shafa Municipality)
- Balqa Governorate:
 - Kaouleen dumpsite (reported by Al-Fahis Municipality)
- Zarqa Governorate:
 - Azraq dumpsite (reported by Zarqa JSC)
- Ma'an Governorate:
 - Al-Husseinieh dumpsite (reported by New Al-Husseinieh Municipality and Ma'an JSC)
 - Two (2) more dumpsites (not named) (reported by Ma'an JSC)
- Karak Governorate:
 - Kanzeer dumpsite (reported by MoMA)
- Tafilah Governorate
 - One (1) open dumpsite (reported by Tafilah JSC)

Table 5-25 presents the problems that the JSCs face for the operation of the active MSW FDS, as identified by the MoMA and the JSCs' Horizontal Analysis and In-Depth Diagnosis. It is noted that the shortages in infrastructure that is mentioned hereunder does not refer to the rehabilitation and upgrade of the dumpsites to sanitary landfills, but the identified deficiencies to operate the way they do today.

Table 5-25: Problems facing the active FDS in Jordan to maintain operation

#	Name	JSC Responsible	Identified Problems
Northern Region			
1	Al Ekaider dumpsite	Irbid JSC	➤ Shortage in infrastructure: ○ poor fencing ○ service roads ➤ Shortage in services: ○ electricity network and generator ○ water tank ➤ Shortage in equipment: ○ Trucks ○ Heavy Lowboy

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

#	Name	JSC Responsible	Identified Problems
			○ Waste roller ○ Spraying tractors ○ Pulley ropes with various lengths ○ Compressor ○ Compactor ➤ Little capability to maintain/repair machinery and equipment ➤ No standardization of machinery and equipment ➤ Lack of trained personnel ➤ Lack of planning (short, medium and long term plan) ➤ Difficult to locate and acquire landfill site in order to expand ➤ Dumping of irregular hazardous waste ➤ Internal fires causing harmful air emissions ➤ Non-engineered dumping
2	Al Aghwar Al Shamaliyah dumpsite	Aghwar Shamaliyah JSC	➤ Shortage in infrastructure: ○ fencing ○ service roads ○ administration office and services building ○ pavement of access road ➤ Shortage in services: ○ electricity network and generator ○ water tank ➤ Shortage in equipment: ○ Spraying tractor ○ Loaders ○ Trucks ○ Pick-up vehicle ○ Bus ○ Compactor ➤ Little capability to maintain/repair machinery and equipment ➤ Need for capacity building to staff
3	Al Huseyneyat dumpsite	Mafraq JSC	➤ Shortage in infrastructure: ○ Washing station for equipment ➤ Shortage in services: ○ electricity network and generator ○ water tank ○ water well ➤ Shortage in equipment: ○ Compactor ○ Jack hammer ○ Trucks ○ Spraying tractor ○ Hanger ➤ Little capability to maintain/repair machinery and equipment ➤ No standardization of machinery and equipment ➤ Difficulty to obtain spare parts ➤ Need for capacity building to staff ➤ Difficult to locate and acquire landfill site in order to expand
4	Al Badiyah Al Shamaliyah dumpsite	Badiyah Shamaliyah JSC	➤ Shortage in infrastructure: ○ fencing ➤ Shortage in equipment: ○ Bulldozer ○ Bus ➤ Proximity to an army base
Central Region			
5	Al Ghabawi landfill	GAM	➤ Poor maintenance/repair of machinery and equipment ➤ Lack of trained personnel
6	Madaba dumpsite	Madaba JSC	➤ Shortage in infrastructure: ○ fencing

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

#	Name	JSC Responsible	Identified Problems
			○ service roads ➤ Shortage in equipment: ○ Compactor ○ Bulldozer ○ Jack hammer ○ Trucks ➤ Little capability to maintain/repair machinery and equipment ➤ Difficulty to obtain spare parts ➤ Lack of trained personnel ➤ Difficult to locate and acquire landfill site in order to expand
7	Al Homra dumpsite	Balqa (Al Salt) JSC	➤ Shortage in infrastructure: ○ service roads ○ enlargement of access road ○ administration office ➤ Shortage in services: ○ electricity network and generator ○ water tank ➤ Shortage in equipment: ○ Jack hammer ○ Loader ○ Spraying motor ○ First aid equipment ➤ Lack of trained personnel ➤ Little capability to maintain/repair machinery and equipment ➤ Difficulty to obtain spare parts ➤ No standardization of machinery and equipment ➤ Difficult to locate and acquire landfill site in order to expand
8	New Deir Allah dumpsite	Al-Shoneh Al-Wsta JSC	➤ Shortage in infrastructure: ○ fencing ○ service roads ○ enlargement of access road ○ maintenance workshop ➤ Shortage in services: ○ electricity network and generator ○ water tank ○ fuel tank ➤ Shortage in equipment: ○ Trucks ○ Pick-up ○ Loader ○ Spraying tractor
9	Al-Duleil dumpsite	Zarqa JSC	➤ Shortage in infrastructure: ○ fencing ○ service roads ○ umbrellas ○ administration office ○ maintenance workshop ➤ Shortage in services: ○ electricity network and generator ○ water tanks ○ fuel tank ➤ Shortage in equipment: ○ Compactor ○ Loader ○ Jack hammer ○ Spraying tractor ○ Trucks ○ Bulldozer ○ Bus

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

#	Name	JSC Responsible	Identified Problems
			- Compressor - Need for training and capacity building to staff
Southern Region			
10	Al Aqaba dumpsite	Aqaba JSC	- Shortage in infrastructure: - fencing - administration office - maintenance workshop - service roads - Shortage in equipment: - Truck - Compactor - Loader - The dumpsite is too small in Size - Location of the dumpsite
11	Al-Qawiera dumpsite	Qawiera JSC	- Shortage in infrastructure: - fencing - administration office - Shortage in services: - electricity network and generator - water tanks - Shortage in equipment: - Truck - Compactor - Loader - Bulldozer - Jack hammer
12	Al Mohamadeah Village dumpsite	Shobak JSC	- Shortage in infrastructure: - fencing - service roads - administration office - umbrellas - maintenance workshop - Shortage in equipment: - Spraying tractor - Bulldozer - Loader - Pick-up - Jack hammer - Lack of trained personnel - Little capability to maintain/repair machinery and equipment - Difficulty to obtain spare parts
13	Ma'an dumpsite	Ma'an JSC	- Shortage in infrastructure: - fencing - administration office - Shortage in services: - electricity network and generator - Shortage in equipment: - Compactor - Pick-up - Bus
14	Ail dumpsite	Ail JSC	- Shortage in infrastructure: - poor fencing - service roads - umbrella - maintenance workshop - small administration office - Shortage in services: - electricity network and generator

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

#	Name	JSC Responsible	Identified Problems
			○ water tank ○ water well ➤ Shortage in equipment: ○ Bulldozer ○ Loader ○ Spraying tractor ○ bus
15	Al Lajoun dumpsite	Karak JSC	➤ Shortage in infrastructure: ○ service roads ○ administration office ➤ Shortage in services: ○ Connection with electricity and water networks ➤ Shortage in equipment: ○ Bulldozer ○ Trucks ○ Bus ○ Spraying tractor ○ First aid equipment ➤ Shortage in qualified staff ➤ Lack of trained personnel ➤ Little capability to maintain/repair machinery and equipment ➤ No standardization of machinery and equipment ➤ Difficult to locate and acquire landfill site in order to expand ➤ Need for capacity building to staff
16	Joarf Al Daraweash dumpsite	Tafilah JSC	➤ Shortage in infrastructure: ○ service roads ○ enlargement of access road ➤ Shortage in services: ○ water tank ○ fuel tank ➤ Shortage in equipment: ○ Bulldozer ○ Trucks ○ Bus ○ Spraying tractor ○ First aid equipment ➤ Over loaded staff ➤ Little capability to maintain/repair machinery and equipment ➤ Location of the landfill, too windy
17	Al Barkah dumpsite	Al-Agwar Al-Janobeiah JSC	➤ Shortage in infrastructure: ○ fencing ○ administration office ○ umbrellas ➤ Shortage in services: ○ connection with water network ○ connection with telephone network ➤ Shortage in equipment: ○ Bulldozer ○ Spraying tractor ○ Pick-up ○ Truck ➤ Shortage in staff
18	Al Samar dumpsite	Al-Agwar Al-Janobeiah JSC	➤ Shortage in infrastructure: ○ fencing ○ administration office ○ umbrellas ➤ Shortage in services: ○ connection with water network ○ connection with telephone network

#	Name	JSC Responsible	Identified Problems
			➤ Shortage in equipment: ○ Bulldozer ○ Spraying tractor ○ Pick-up ○ Truck ➤ Shortage in staff

In most cases, shortages in infrastructure have been identified (works, equipment, connection to networks, etc.). Difficulties for carrying out maintenance and repair of vehicles and equipment are also very high, and this is due to low financial budgeting and difficulty to obtain spare parts. Machinery and equipment used in the FDS is often not standardized.

Lack of experienced staff is also mentioned, where poor training and capacity building is experienced. Staff overload have also been mentioned in some occasions.

5.6 PLANNED & PROPOSED MSWM UNITS/ACTIVITIES

Several MSWM units and activities have been planned or are under evaluation for the following years in Jordan.

Planned units include the following:

1. Establishment of a MSW sorting station in the New Deir Abi Saeed Municipality through a grant from MoENV, as documented by the replies of the municipality to the Horizontal Analysis survey. The projected year for starting-up the facility's operation is 2017.
2. New transfer station in Al-Oyoun Municipality through funding of the MoPIC, as documented by the replies of the municipality to the Horizontal Analysis survey. Start-up is expected in 2019.
3. Establishment of two (2) new Transfer Stations by GAM (SOGREAH, 2011):
 - One in Tareq district to serve the North and North-Western districts.
 - One in Moqabalain district to serve the Western – South-western districts.

The attributes of these two transfer stations are planned to be as follows:

#	Name	Location	Assumed Required Area (m ²)	Daily Capacity (tn/d)	Coverage
1	Tareq Transfer Station	Tareq municipal district	16,147.5	827 (2022 target)	GAM municipal districts: Abu Nseir, Shafa Badran, Aljbeha, Tla Al Ali, Sweileh, Tareq, Abdali, 33% of Basman

#	Name	Location	Assumed Required Area (m ²)	Daily Capacity (tn/d)	Coverage
2	Moqabalain Transfer Station	Moqabalain municipal district	16,305	658 (2022 target)	GAM municipal districts: Badr Jadida, Wadi Sir, Zahran, Marj Al Hammam, Naor, Husban, Moqabalain, 33% of Badr, 67% of Khrebet Al Soq

However, it is noted that according to GAM internal information, the plans for the two Transfer Stations have recently been cancelled. However, it is not impossible that they are revived in the future.

Units currently under evaluation include the following:

- Upgrade of the Al Ekaider site to be transformed into an engineered sanitary landfill to cater for the future ISWM needs of the Irbid JSC catchment area. The feasibility study of the project has been finalised by 2012 (LDK Consultants *et al.*, 2012) in the framework of the Al-Ekaider Solid Waste Management Project (MeHSIP-PPIF) funded by the European Investment Bank (EIB) and GoJ is in the process of evaluation. The technical components of the project include:
 - Closure/rehabilitation of the existing Al Ekaider dumpsite;
 - Construction of an extended sanitary landfill, including bottom lining systems, LFG management, leachate collection and treatment, etc.;
 - Closure/rehabilitation of the existing wastewater ponds of the site;
 - Construction of complementary pilot-scale waste treatment facilities, including:
 - a “clean” MRF for separation and recycling; and
 - an aerobic composting plant.
 - Treatment/disposal facility for olive oil mill WW (zibar).
- Also, the replies of JSCs and Municipalities to the Horizontal Analysis and In-Depth Diagnosis surveys revealed some other plans that the Consultant had not been aware of, which need to be examined in terms of feasibility and accepted by the MoMA. These plans are the following:
 - Upgrade of the old Dair Abu Said dumpsite of the Rabya Al Koura JSC (reply of the JSC to the Horizontal Analysis questionnaire); and
 - Establishment of a new disposal site in the Mudawara City territory (reply of the JSC to the Horizontal Analysis questionnaire).
- A great deal of investments are being prepared in the Northern Governorates and merely the Irbid and Mafraq ones through the National Resilience Plan (NRP) 2014-2016, which includes planning and support in SWM. This is due to the suffocating conditions of the MSWM in these areas, which has been created through the rapid population increase in Northern Jordan by Syrian refugees. An indicative list of these projects according to the NRP draft documents is included in Table 5-26.

Table 5-26: Indicative list of projected projects in SWM in the NRP context

#	Unit
1	Rehabilitation and upgrade of nine (9) dumpsites: Al Ekaider dumpsite, Al Aghwar Al Shamaliyah dumpsite, Al Huseyneyat dumpsite, Al Badiah Al Shamaliyah dumpsite, Al Homra dumpsite, Al-Duleil dumpsite, New Deir Allah dumpsite, Al-Rouaishad dumpsite (old), Al-Safawi dumpsite (old).
2	Establishment of two (2) transfer stations, one in Irbid and one in Mafraq
3	Establishment of two (2) composting plants, of which the one has been proposed for the Al Ekaider site
4	Establishment of two (2) anaerobic digestion plants, of which the one has been proposed for the Al Ekaider site
5	Establishment of four (4) recycling plants, two in Irbid and two in Mafraq

4. The EU Delegation in Jordan has assigned a Framework Contract (FWC) to international consultants, in order to provide for local MSWM Plans for Irbid, Al-Ramtha and Mafraq Municipalities. Based on these plans, that were produced in May 2014, the following projects were proposed:
- For Irbid and New Al-Ramtha Municipalities:
 - Establishment of a combined MRF / Composting facility; and
 - Upgrade of the Al Ekaider landfill.
 - For Mafraq Municipality:
 - Upgrade of the Al Huseyneyat dumpsite; and
 - Establishment of an MRF in the Al Huseyneyat dumpsite.

Our assessment is that most of the proposed facilities seem to be in the right side. Coherence of the several proposals is high, with only a few differences; however in order to establish them, they will first need to be assessed in terms of the MSWM Strategy and its Action Plan that will be proposed in the framework of the current Project.

Also, appropriate feasibility studies will need to be conducted before establishing such units, with view to evaluate their feasibility and set the units' basic specifications (capacity, siting, coverage, level of planning, etc.).

5.7 SWOT ANALYSIS

The Strengths, Weaknesses, Opportunities and Threats regarding the technical and operational performance of the existing MSWM system in Jordan are summarized below.

Strengths

- The JSC network is widely and rationally developed and could be maintained to cater for the future MSWM needs
- MSW transfer has already been implemented in Jordan

- There is one big Municipality (GAM) having made significant progress in MSWM by maturing, building and operating a sanitary landfill, sophisticated MSW treatment facilities, and also by promoting recycling in pilot scale (sorting-at-source activities, JES, etc.), which could act as a pilot for all other local authorities

Weaknesses

- Special and hazardous waste (WEEE, ELV components, batteries and accumulators, used tyres, C&D waste, hazardous medical and industrial waste) ending up to the MSW storage network (bins, containers)
- Lack of a Management Information System (MIS) in national level for recording relevant MSWM data
- Complete absence of regular sorting-at-source programs all over the Kingdom
- Extensive informal waste-picking in the City and the Dumpsite level, posing significant effects to the public hygiene of citizens.
- MSW prevention and reuse practices and initiatives are almost absent
- Low efficiency level of mechanical equipment for street cleaning and collection
- Very low levels of coverage of actual MSW collection needs in some cases (even 20%)
- Limited remaining life-span of some FDS (e.g. the Aqaba dumpsite)
- Low sanitation level of all final disposal sites, with the exception of the Al Ghabawi landfill
- Low levels of MSW recycling and energy recovery facilities
- Absence of composting facilities
- Poor maintenance of infrastructure and equipment in almost all of the cases

Threats

- High trends of population increase due to instability in neighbouring countries (Syria, Iraq, etc.)
- Potentially higher rates of increase of waste generation rates than expected
- Financial crisis may be an obstacle to Integrated MSWM in Jordan due to unwillingness of citizens to increase their MSWM fees
- Significant funds are required to bring the current MSWM facilities in an acceptable state (infrastructure, equipment)

Opportunities

- High biowaste content of Jordanian MSW increase the feasibility of WtE projects in terms of LFG or anaerobic digestion practices
- Individual waste-pickers can be integrated in future recycling plants, thus improving their living standards and financial condition
- GAM can be a pilot for all the other local authorities in the country in terms of development, operation and performance maximisation of MSWM facilities

- Separate collection and management of hazardous and special waste currently entering the waste bins can have many environmental and social advantages
- Great potential for the establishment of MSW recycling and energy recovery facilities, possibly with the cooperation of the private sector
- High willingness of Donors to support Jordan to the refugee problem could be turned into an advantage, by supporting the establishment of MSWM facilities, at least in the Northern Region

5.8 CONCLUSIONS & RECOMMENDATIONS

As a conclusion, it can be said that there is big variance in the current state of the MSWM system in Jordan. The GAM has been progressing during the years and has reached an acceptable state, while the rest country has been in a much lower level. This is why the GAM's experience needs to be highlighted and utilised all over the Kingdom.

Steps should be made on-by-one. At first level, significant efforts will need to be made to deal with extreme problems, such as the vast population increase in the Northern Region of Jordan, as well as in lesser level in the whole Kingdom. After this, the state of the current facilities should be made acceptable and efficiently operative, and the next level efforts should be made to reach a state-of-the-art level and get in line with the European and International state.

Specific and attainable targets should be set in the short-, middle- and long-term, so as the GoJ to be in position to set priorities, secure funding and facilitate their implementation and maintenance. This will be exactly the objective of the MSWM Strategy that is going to be developed and approved in the following stages of this Project.

At this early stage, our initial recommendations can be summarised as follows:

- Extension of the MSW collection coverage levels to reach the 100% of the population;
- Supplement the Municipalities' collection and storage equipment, followed by appropriate washing and maintenance;
- Increase automation of street cleaning and MSW collection practices;
- Promotion of MSW prevention and reuse practices;
- Promotion and enforcement of separate collection and management of special and hazardous waste (WEEE, ELV components, batteries and accumulators, used tyres, C&D waste, hazardous medical and industrial waste), by giving financial incentives where possible;
- Promotion of sorting-at -source programs with view to increase MSW prevention, reuse and recycling, at first in pilot level and later in full scale;
- Rehabilitation of dumpsites and establishment of sanitary final disposal facilities. This could be made by upgrading the existing dumpsites;

- Utilization of the LFG quantities in all new landfills, in order to produce energy as an alternative source;
- Establishment of appropriate waste treatment facilities (recycling, composting, anaerobic digestion, WtE), with respect to the ISWM hierarchy in the long-term:
 - landfilling is limited to residual (i.e. non-recyclable and non-recoverable) waste;
 - energy recovery is limited to non-recyclable materials;
 - recycled waste is used as a major, reliable source of raw material, through the development of non-toxic material cycles;
 - food waste is recycled as organic material or nutrient material.
- Integration of informal waste-pickers in the new recycling (or generally MSWM) facilities;
- Increase flexibility and budgeting of maintenance of infrastructure and equipment, to ensure durability of the ISWM system;
- Establishment of a MIS system in national level, that could be the basis for statistical analysis and decision making for taking initiatives towards increasing the operational efficiency of the MSWM system in Jordan (national, regional, local initiatives).

6 FINANCIAL ANALYSIS OF EXISTING MSWM SYSTEM

6.1 OBJECTIVES AND METHOD

The scope of this action is to examine the financial issues of existing MSWM system and of the Bodies responsible for the MSWM operations. Specifically:

- to review the main financial sizes: CAPital EXpenditures (CAPEX), OPerational EXpenditures (OPEX), and Revenues arising from MSWM operations;
- to estimate the financial balance and the cost recovery data;
- to attach the degree of efficiency - effectiveness of the MSWM system in every stage (collection, transfer, disposal) using proper indicators
- to investigate and identify existing gaps in the MSWM system;
- to point out financial burdens that Municipalities are facing in undertaking their responsibilities; and
- to recommend efficiencies to be introduced in the system, relevant to labour redundancy, labour productivity, revenue generation capacity, machinery and equipment availability, improvement of cash flow for recurrent expenditures, fund raising, organization and management.

The data used in the preparation of this chapter were based on the inventory conducted in selected JSCs and Municipalities (Horizontal Analysis and In-Depth Diagnosis surveys), as already mentioned.

The methodology followed after collecting the completed questionnaires included the following steps:

1. The data entered in the primary database, which was developed by the Consultant
2. Then a secondary database was created, through which we processed the data collected. The processing concerned on:
 - cross-checking / comparison / confirmation and correction of data
 - disposition of the data in proper order (chronologically and by category), so to be possible to extract the requested indicators and charts
3. Then, we analysed the outcomes and proceeded to highlight and comment on the major issues
4. Finally we formulated the conclusions

In applying the methodology we faced a number of problems, the main ones were:

1. the lack of data, as:
 - a number of organizations did not respond to the questionnaires,
 - some of the requested information are not held by the organizations (e.g. the distinct accounting keeping of MSWM costs, the MSWM cost analysis in categories of expenditures etc.).
 - In many cases, in the completed questionnaires only a number of the required questions were answered, not all of them. In such cases the production of indices became difficult because missing a factor of fraction calculation (it was available the numerator-e.g. the tn/d- but not the denominator-e.g. the number of employees in MSWM Dep., or the number of vehicles etc.)
2. the names of the Municipalities were not always possible to be matched with the nomenclature classification being kept in the official statistics (districts and sub-districts). This fact hampered matching of critical data (such as population, quantities of waste generated, quantities of waste entering in disposal sites) with accurate values at the level of Municipalities
3. in some cases, the information given in the two types of questionnaires (horizontal and in-depth) contradicted
4. in some cases, the amount of SW generation was given in cubic metres (m³), instead of tonnes.
5. in many cases, a significant number of financial data as well as of data relevant to SW quantities and population is based on Bodies' estimations, not on measurements.

To overcome the problems we used various by-case techniques, such as:

- taking into account all information that was contained in both the horizontal and in-depth questionnaires.
- elaboration of population data crosschecking between the official statistics and the declared replies from Municipalities
- converting the form of some data (given in questionnaires) into more suitable forms using proper coefficients (e.g. conversion of m³ of SW into tonnes, using the coefficient 0.25 tn/m³)
- use data and findings of other studies (the most recent ones) which have been carried out with related objects.

6.2 OVERVIEW OF EXISTING MSWM SYSTEMS, ON FINANCIAL ASPECTS

The main conclusions drawn from the analysis of economic data of the existing MSWM system as well as of the institutions that perform the operations of MSWM system are the following:

- (i) The strong geographical polarization that characterizes all key financial figures (CAPEX, OPEX, REVENUE), as well as the more complicated factors of efficiency - effectiveness of MSWM system (tn/d per employee, tn/d per vehicle, vehicles per container etc.), i.e. the large value disparities of these figures in the various regions of the country.
- At one end (pole), with the highest indices values, there is always a small team of Municipalities, usually 2-3 (not the same Municipalities for each indicator).
 - At the other end (pole), with very low indices values, there is the majority of the Municipalities.
 - An intermediate poling field, i.e. with magnitude values which lie in between the values of the two end poles, is also formed in some cases, with a small number of Municipalities.

The significant diversification of the indicators among the various regions of the country are not -only and exclusively- due to the (respectively sharp) variation of demographic characteristics (population, density) or waste generation which are also polarized (e.g. 70% of total MSW in country is generated in three cities). They are also due to strong variations on the level of organization and planning, of revenue generation capability, of access in funding sources etc.

- (ii) the very low CAPEX per capita, met in the vast majority of MSWM bodies, which are insufficient to cover the needs in equipment and machinery
- (iii) the high, in many cases, OPEX per tonne, which reveals the low productivity of MSWM system, especially when correlated with the level of service quality and the degree of coverage of population needs, which remain at low levels
- (iv) the REVENUE (per capita and per tonne) collected against the services is very low, and reveals the inadequacy of both the tariff scheme and of the fees and charges collection practices applied by the MSWM Bodies (by the Municipalities to the residents and by the JSCs to the Municipalities, private and public entities).
- (v) the Cost Recovery, which reflects the capacity of revenue to cover costs⁶, is very low for the majority of MSWM Bodies. This negative fact becomes even more unfavourable when:
- the cost recovery is calculated as a percentage of the sum of CAPEX + OPEX (and not only as a percentage of OPEX).
 - fixed assets (land, buildings, machinery, equipment) are taken into account with depreciations for the calculation of costs (and not considered as sunk costs)
- (vi) the indicators related to the efficiency - effectiveness of MSWM system that merge all parameters and aspects of MSWM system and attach the integrated picture of the sustainability of the system, are at very low levels, for the vast majority of MSWM Bodies.

⁶ *Operational cost recovery* is defined as the ability to generate enough revenue to cover operational expenditure, while meeting applicable service standards. *Full cost recovery* is defined as the ability to generate enough revenue to cover operational and capital expenditures, while meeting applicable service standards

An indicative comparison between *costs per tonne* of waste collected and *tonnes of waste collected per vehicle per day*, as illustrated in the following diagram, reveals that minimum effectiveness together with maximum collection costs is the most usual case for the Municipalities, while only in two cases the effectiveness value is higher than costs.

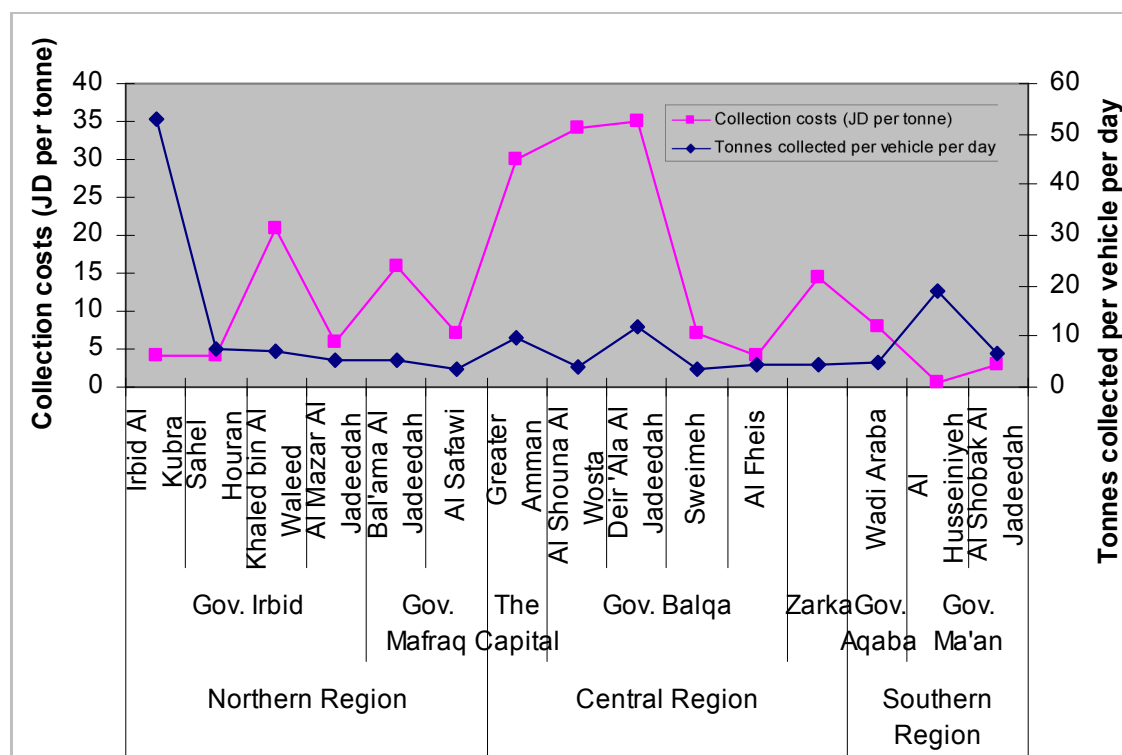


Figure 6-1: Cost-effectiveness of MSWM system

- (vii) The pre-existing (poor) economic data of MSWM system has worsened even further after the massive influx of refugees and the rapid increase in the population to service, as well as the expansion of MSWM service areas. The continuation of the negative evolution of the key economic figures, together with the very low degree of efficiency - effectiveness, jeopardize the sustainability of MSWM system and can lead it to collapse, in most Municipalities of the country, if properly designed measures will not be implemented quickly and at all levels of the system.

The main financial figures and indicators of efficiency - effectiveness of MSWM system are described in detail in the following sections of this chapter, both for Municipalities and for the JSC.

However, it is important to say that the investigation of the economic issues of SWM through a strictly 'sealed' economic standpoint, it would be incomplete and elliptical, especially when that discussion concerns the processing of a national level plan, as the present study does. Examination and evaluation of purely economic indicators is certainly a necessary task in this context, but is not in itself

sufficient to bring out a multitude of other non-strictly-economic factors affecting the economics of SWM systems, critically in many cases.

Many of the results arisen by the financial assessment of MSWM systems have been proved to be strongly linked with natural and urban conditions, traditional patterns and practices of population and workers, technical conditions (status, availability and degree of maintenance equipment), planning and organizational level of MSWM operator bodies, policy objectives - constraints, legal mechanisms, etc., are some of the so-called "non-strictly economic" factors which are in continuous interaction with strictly economic ones.

Examination of the data in the context of this study revealed -to a very large extent- these non-strictly-economic parameters, which are presented flowingly as *Critical issues*.

a) Critical issues that influence the cost and the efficiency - effectiveness of MSWM system

Temporary Storage and Collection stage

- Unfavourable topography and adverse urban characteristics are factors that contribute in increase the cost of collection. In settlements sited on hilly, steep terrain and / or settlements with very narrow streets, the collection cost is higher than in other cities where the topography is relatively flat. For example, the index *population served per MSWM employee* displays the lowest price in Amman (630), a city that is characterized by a mountainous topography, the same time as the higher average *cost of collection and transport per ton of solid waste* occurs in the same city (35 JOD/tn).
- The poor maintenance of the bins, makes collecting and loading work harder and more time-consuming, discredits faster and disables the equipment availability, leading to increased costs in the stage of collecting and loading.

Transfer and disposal

- The poor maintenance of the vehicles discredits faster and disables the vehicle availability, leading to increased costs in the stage of collecting and transfer.
- The location of Transfer Stations and disposal facilities is a factor that contributes to the formation of transport costs, positively or negatively. Where these facilities are sited in very remote locations from the served area, increase vehicle-kilometres and fuel expense, with a corresponding reduction in the time to be allocated to the collection routes within the settlements.
- Improper (rocky, hard) constitution of the ground used for soil cover of waste at disposal sites, increases the degree of difficulty at work and wear of the machinery used.
- Weather conditions and lack of water in the sites are similar (negative) impact on working conditions and increase the work time.

- The overloading of services with employees, which coexists alongside and together with the lack of staff. This is due to lack of rationally designed organizational structure, resulting in high values of "workers per capita" and "workers per tonne" indicators.
- Capacity of technical staff in dealing with the available equipment/machines.

b) Critical issues relating to revenue and cost recovery

- Along with all the necessary measures that should be promoted in order for smoothing "technical" malfunctions of the existing tariff scheme services, and for improving cost recovery, it is necessary to point out a factor which contributes to new revenue generating. This is about shift from the existing solid waste management system, which is dominated by the concept of the mixed waste collection and management, to a modern concept and management based on the management and exploitation of more solid waste streams such as packaging waste, organic fraction, recyclable materials pre-selected at source, as well as the exploitation of LFG and biogas collected by biowaste digestion units (aerobic, anaerobic) for energy production and sale. Such an enlargement would be of great significance as it would contribute:
 - in generation of new revenue sources;
 - to reduce the burden on the public budget, in the section relating to the subsidy of Municipalities' expenditure; and
 - to weaken the dependence of public institutions from lending and discharge the current expenditure from interest.

It is recorded as positive the fact that some Municipalities, either alone or in cooperation with the private sector, apply management practices on various waste streams-other than-municipal urban- although not under an integrated framework (since there are no specific national plans), such as old tires (New Al-Shobak, Greater Ajloun, Khaled Bin Waleed, Sharhabil bin Hasna, New Al-Mazar, Al-Oyoun, New Deir Allah, Al-Fahis), batteries (Greater Ajloun), and C&D waste (Al-Shoneh Al-Wsta).

- The involvement of private sector in MSWM operations, under a sound and sustainable scheme, could also contribute in defuse the burden of recurrent costs and debt service costs. Partnerships between Municipalities and private entities (PPP) would generate new revenue for the municipal budget. A prerequisite for success PPPs is to strengthen the capacity of Municipalities' staff to manage and supervise the relevant contracts. In this context, raising private sector's awareness and provision of incentives would be very helpful.
- the integration of informal sector in MSWM operations (e.g. recyclables recovery, etc.), will prove as a prosperous source of income for both the waste-pickers' families and the municipal budget. Preconditions for integration of informal sector are: a) institutionalization of the framework, in close cooperation with waste-pickers, b) training the waste-pickers to perform

their work properly with minimal public health risks, c) support waste-pickers with technical assistance.

c) Critical Planning Organization and Management issues, horizontally relating to efficiency-effectiveness of MSWM system

The following factors have influence, to a greater or lesser extent, in all the key financial figures and efficiency - effectiveness of MSWM system in the country.

- Primary and critical requirement for a national level planning is the availability of valid and accurate data. The diagnosis survey revealed the existence of a serious gap in the MSWM system as regards to the collection and regular updating of data (demographic, SW quantity and composition, measurements, mapping of routes, bins and containers, detail cost and revenue analysis, feasibility analysis, etc.). The development and operation of an integrated Management Information System (MIS), that would operate uniformly by all bodies involved in the MSWM system is a prominent priority.
- Lack of clarity in responsibilities of bodies involved in planning and operation of MSWM system, and/or overlap in the designated responsibilities.
- Weak planning effort, concerning on many fields of the MSWM system. Indicatively:
 - Lack of measurements of waste quantity and composition that hinders to set the plan and design foundation. There were only two Municipalities out of the sample which responded that they measure waste (Shehan, Greater Salt).
 - The lack of discrete - organized MSWM Department in the municipal structure. Apart from those Municipalities which have organized distinct MSW department (usually under the title: "Health Dep.", "Health and Environment Dep."), many Municipalities do not have any (Sabha & Dafyaneh. Greater Ajloun, New Oum Al-Rasas, Al-Shoneh Al-Wsta), others perform related services through the "Transportation Dep.", the "Administration Dep.", the "Vehicle Control Dep." (New Al-Qawiera), while some other reported that the MSW services are handled by the "Municipality".
 - There are no specifically designed routing plans followed in collecting the waste. The routing is usually decided by the driver (though each vehicle is assigned to collect the waste from designated areas), more than one collection vehicles often follow the same route, and once a vehicle is filled, it interrupts the collection route and travels to the landfill. This irrationalism results in redundancy and duplication of tasks, and aspects the efficiency of the collection process.
 - Requests for purchase of equipment usually aim to tackle an urgent problem and do not consist part of an integrated - properly designed MSWM program with short, medium and long term objectives. It leads to a fragmentation of available CAPEX and inefficiency of expenditures.

- Municipal borders are not always the economically optimum boundaries for integrating MSWM operations (especially for treatment and disposal facilities' location). Planning in a broader scale, it becomes more feasible to achieve efficient economies of scale. Also, the fragmentation of a Municipality in many MSWM service zones, administrated by respectively many offices, leads to increase of OPEX and reduction of efficiency.
- The poor integration of management operations, as not all Municipalities incorporates in JSC (e.g. Al-Shoneh Al-Wsta, etc.).

6.3 MUNICIPALITIES

6.3.1 MUNICIPALITIES CAPITAL EXPENDITURES (CAPEX)

The examination of replies of Municipalities to the Horizontal Analysis and In-Depth Diagnosis questionnaires about capital expenditure (CAPEX) for the last three years revealed that only three (3) Municipalities are able to significantly invest in MSWM: the GAM predominantly with more than 30 million JOD in 2012, the Greater Irbid Municipality subsequently with more than 5.0 million JOD in 2012 and 2013, and the Greater Zarqa Municipality with gradually increased investments from 1.1 million JOD in 2011 to 1.9 million JOD in 2013 and 4.0 million JOD in 2013 (see Figure 6-2).

Two other Municipalities, the New Al-Mazar Municipality with CAPEX of 500-600 million JOD and the Al-Shoneh Al-Wsta with CAPEX over 0.3 million JOD in all years of the considered period, are likely to consist a group of "second speed" Municipalities, concerning investment ability.

In all other Municipalities, the CAPEX lies at very low levels (0-0.2 million JOD) with the exception of the Greater Salt Municipality which exceeded this level, though only for one year of the considered period (see Figure 6-3).

The unequal distribution of CAPEX reflects principally the large differentiations in ability of Municipalities to access funding sources, although in some Municipalities the trend of CAPEX evolution shows a steady upward, with the Greater Zarqa Municipality in a predominant position (see Figure 6-3).

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

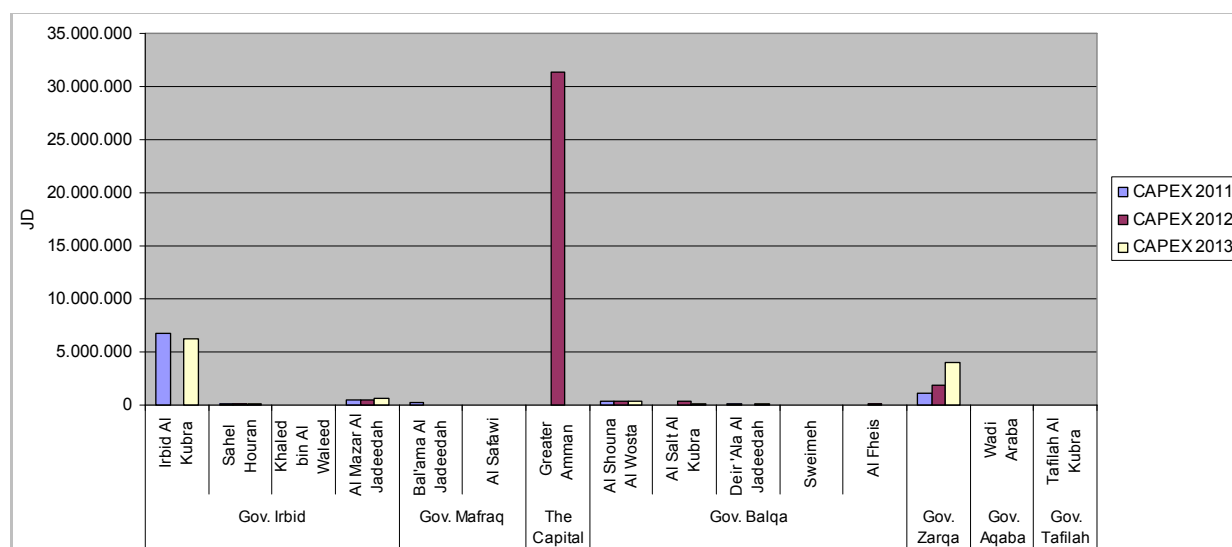


Figure 6-2: CAPEX evolution 2011 – 2013 (incl. Irbid and GAM)

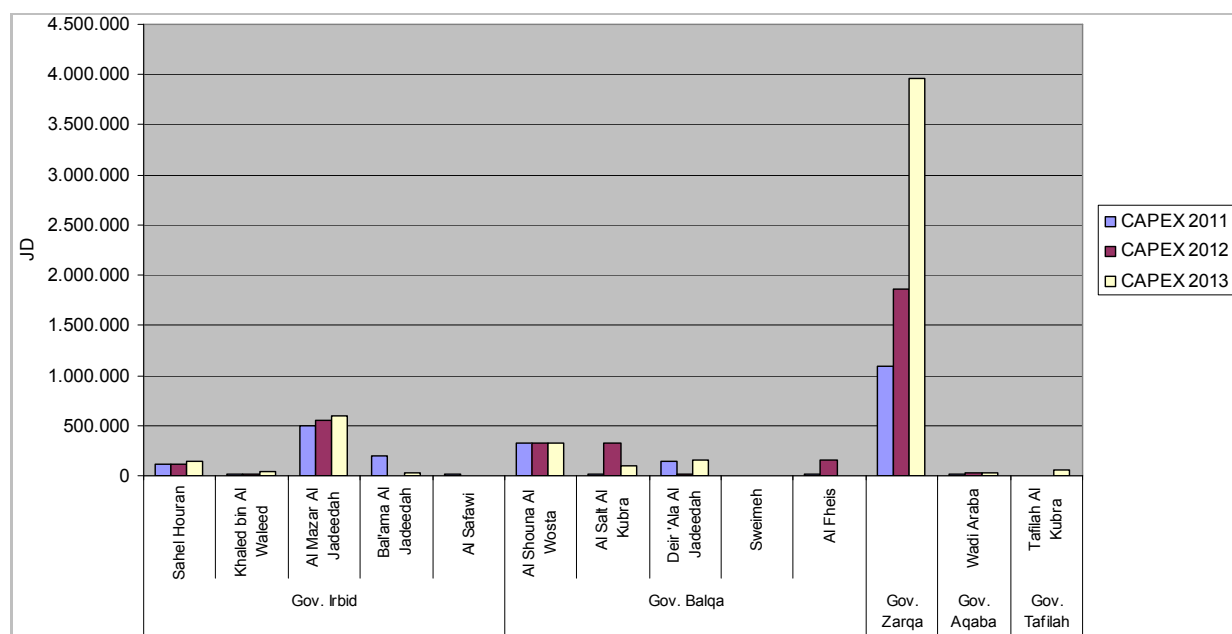


Figure 6-3: CAPEX evolution 2011 – 2013 (not incl. Irbid and GAM)

The CAPEX attributable per capita, considering the “current formal population 2013”, amounts to about 11 JOD/inhabitant in the New Al-Mazar Municipality, varies over 2.0 JOD up to 8.0 JOD/inhabitant in Greater Zarqa Municipality and up to 4.0 JOD/inhabitant in three Municipalities (New Deir Allah, Al-Shoneh Al-Wsta, and Sahel Houran), while in all other Municipalities accounts for under 2.0 JOD/inhabitant (see Figure 6-4).

Taking into account the refugees and the seasonal population (tourist), the CAPEX per inhabitant is formed accordingly, as the case (Figure 6-4).

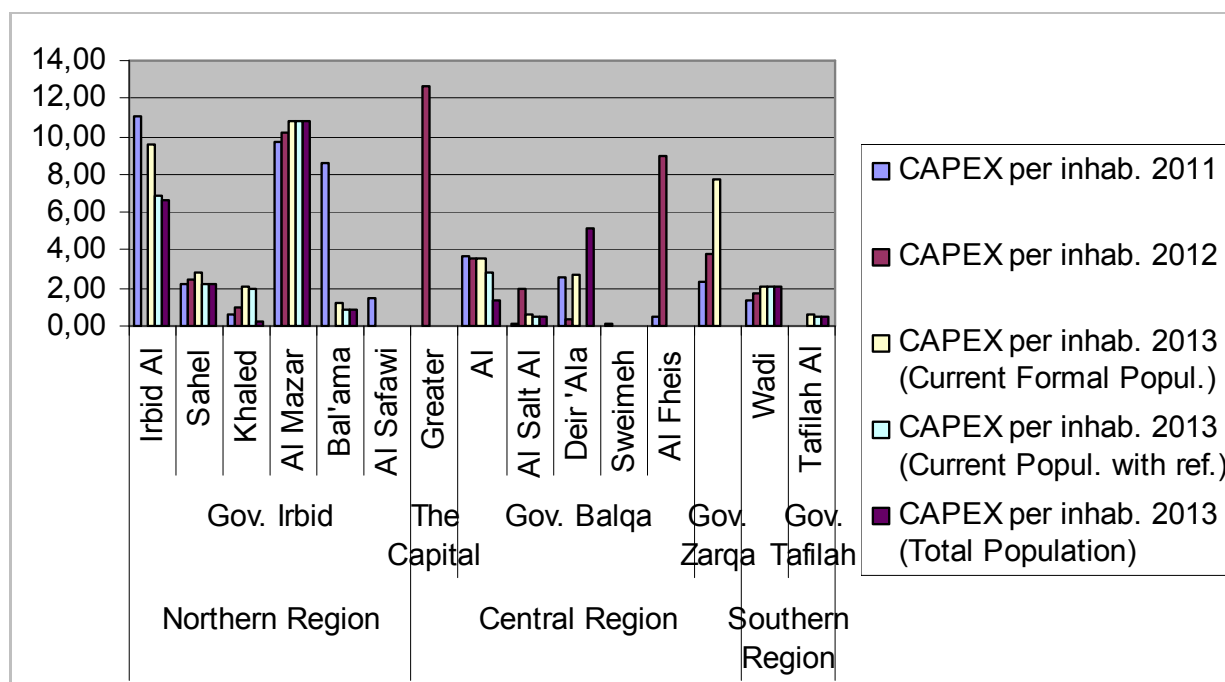


Figure 6-4: CAPEX per inhabitant

The highest **CAPEX per tonne**, in all years of the considered period, attributes to the Municipality of Al-Shoneh Al-Wsta (over 35-60 JOD/tn), and subsequently to the Municipalities of Greater Zarqa (26 JOD/tn in 2013) and New Al-Mazar (25 JOD/tn). In the New Balama Municipality, it accounts for about 22.0 JOD/tn, but only for the year 2011 (see Figure 6-5). In all other Municipalities it attributes less than 10.0 JOD/tn, excluding the Wadi Araba Municipality, in which it varies in the range of 12-15 JOD/tn, but only for two years (2012 and 2013).

The evolution of index during the years of considered period has not the same direction for all Municipalities. In four (4) Municipalities it moves downwards and in four (4) upwards.

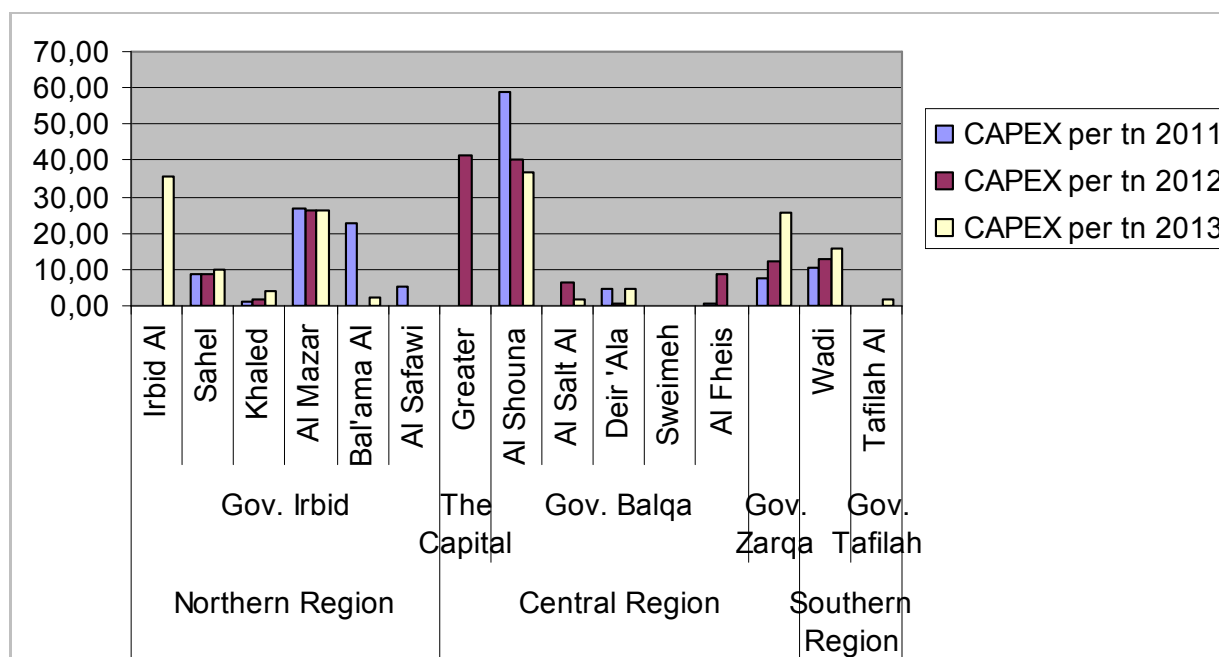


Figure 6-5: CAPEX per tn,

The low values of **CAPEX per inhabitant** and **CAPEX per tonne** reflect the deficiencies of necessary equipment (collection, transport, transshipment), which cannot be acquired due to lack of funding. This finding has been confirmed and cross-checked through the analysis of the results of the questionnaires query 24 ("Difficulties, deficiencies, Proposals, Recommendations"). Many of the answers to this question, concerned on highlighting the *Lack of financial support for the purchase of modern and proper equipment and machinery of MSWM*, while the intensity of the problems associated with these deficiencies was rated in most cases with H (of High intensity). The deficiencies are recorded below.

- Street cleaning equipment: lack of automatic equipment and machinery for the mechanical cleaning of streets
- Collection equipment: shortage of waste collection machinery and lack of modern collection equipment, since the applied system is mostly manual
- Temporary Storage equipment and machinery
 - Shortage of Bins
 - Shortage of containers
 - Inadequacy of modern equipment for temporary waste storage
- Compaction and Transportation machinery
 - Shortage of Vehicles
 - Shortage of Pick-Up vehicles
 - Shortage of waste compactors
 - Small bulldozer

- Loader truck
- Shortage of machinery for SWM transfer
- Infrastructures
 - Lack of engineered landfilling approaches
 - The lack of a drainage system in the entire area, which increases the burdens of health nuisance (New Theban)
 - Lack of a Sewage system in the area (Sahel Horan)
 - The Lack of transfer station (New Balama, Burqush, New Deir Allah, New Mo'ab, Al-Fahis)
 - The Expenses of waste transfer (Mu'tah and Mazar)
 - Lack of a washing, maintenance station (New Balama)

Correlated with the low values of CAPEX indicators is the poor maintenance of existing equipment (bins, picking vehicles, compactors etc.), a major problem faced by Municipalities. Lack of resources compels Municipalities to operate the available old equipment without any possibility of repair damage and of regular preventive maintenance.

These findings have been confirmed and cross-checked through the analysis of the results of the questionnaires to the query 24 ("Difficulties, deficiencies, Proposals, Recommendations"), where the majority of Municipalities marked the issue of maintenance with H (of High intensity) in most cases.

The unequal distribution of CAPEX between Municipalities reflects, to a large extent, the level of coverage of needs in providing municipal waste management services (collection, transfer). Particularly as regards to the Household Waste, the actual cover of needs in many Municipalities is of less than 100% (not completely coverage of actual needs). This finding has been confirmed and cross-checked through the analysis of the results of the questionnaires to the query 24 ("Difficulties, deficiencies, Proposals, Recommendations"). The following table shows the Municipalities with coverage needs less than 100%.

Region	Governorate	Municipalities with not full needs coverage	Needs Coverage percentage (%)
Northern	Irbid	Greater Irbid	90
		Al-Khaldieh	95
		Sabha W Al-Dafianeh	80
		Sharhabil bin Hasna	80
		Rabiet Al-Kura	50
		New Deir Abi Saeed	70
	Mafraq	New Balama	70
		Al-Khaldieh	95
		New Al-Rouaishad	80

Region	Governorate	Municipalities with not full needs coverage	Needs Coverage percentage (%)
		Al-Salahia and Naifa	90
		Al-Safawi	95
	Ajloun	New Kofranjah	70
		Al-Shafa	90
Central	Madaba	New Theban	70
		Jabal Bani Hamida	95
	Balqa	New Deir Allah	90
		Swaymeh	95
		Al-Shoneh Al-Wsta	60
Southern	Ma'an	New Al-Husseinieh	80
	Karak	Shehan	85
		Ai (Al-Hzmaan)	65

Generally, problems arisen due to reduced CAPEX tie down the technical capacity of Municipalities and impact on the reduction of efficiency – effectiveness of the entire MSWM system.

6.3.2 MUNICIPALITIES' OPERATIONAL EXPENDITURES (OPEX)

The examination of operating costs (OPEX) during the years 2011-2013 occurring from the replies of Municipalities to the Horizontal Analysis and In-Depth Diagnosis questionnaires revealed polarization forms similar to those met in the case of CAPEX. Specifically:

- there are only six (6) Municipalities where CAPEX are being counted:
 - GAM, mainly, with 30.0 million JOD in 2012;
 - Greater Zarqa, with 7.0 million JOD (average);
 - New Deir Allah, with 4 million JOD in 2013;
 - Greater Irbid, with 2.0 million JOD, steadily in all years of the considered period;
 - Greater Salt, with 1.12 and 1.14 million JOD in 2012 and 2013 respectively;
 - Greater Madaba, marginally around 1 million JOD and only in 2013.
- the OPEX of all other Municipalities are counted in thousands JOD, less than 0.5 million JOD and up to very low amounts.

The following charts illustrate the OPEX evolution during the years 2011-2013, analytically per Municipality, grouped by region and governorate.

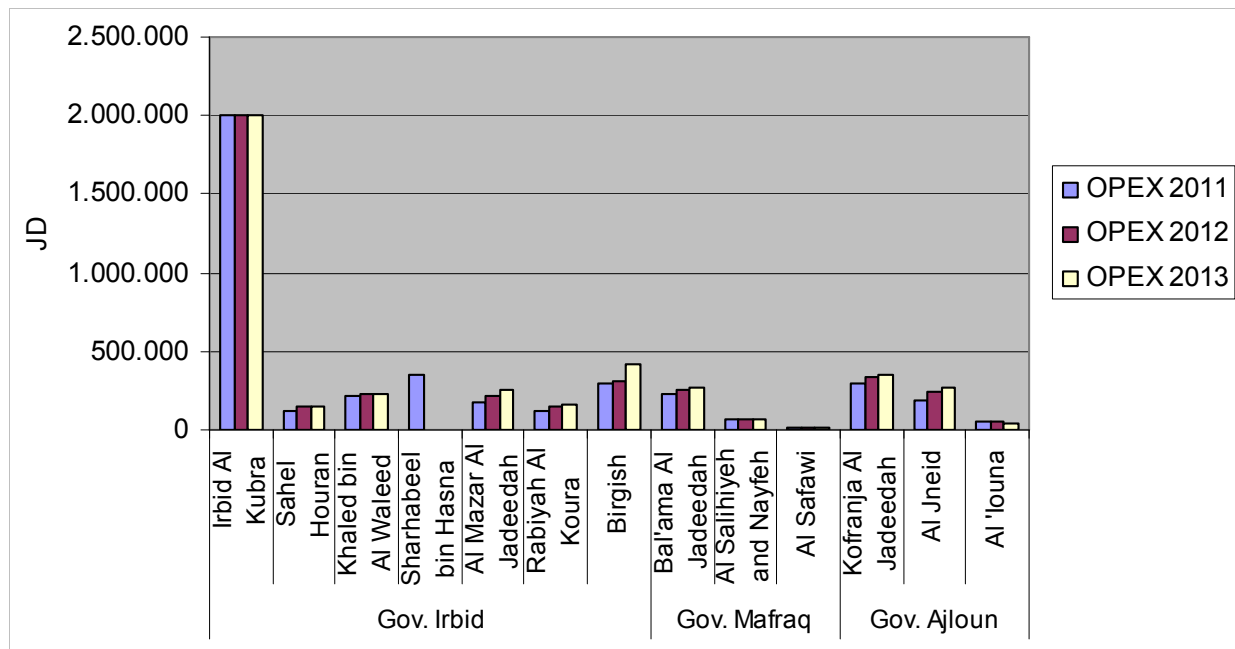


Figure 6-6: OPEX evolution 2011-2013 – Northern Region

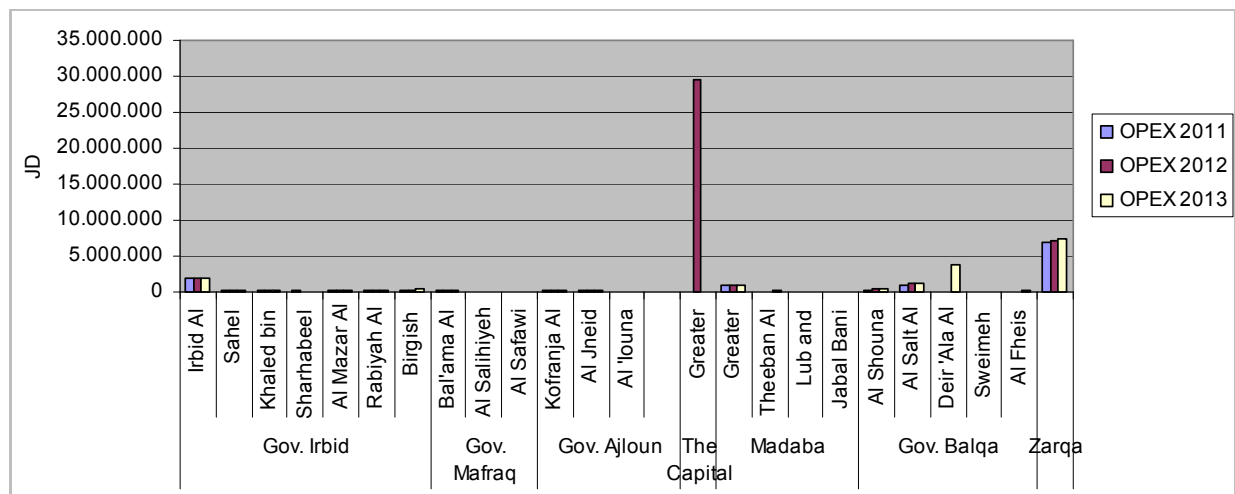


Figure 6-7: OPEX evolution 2011-2013 – Central Region

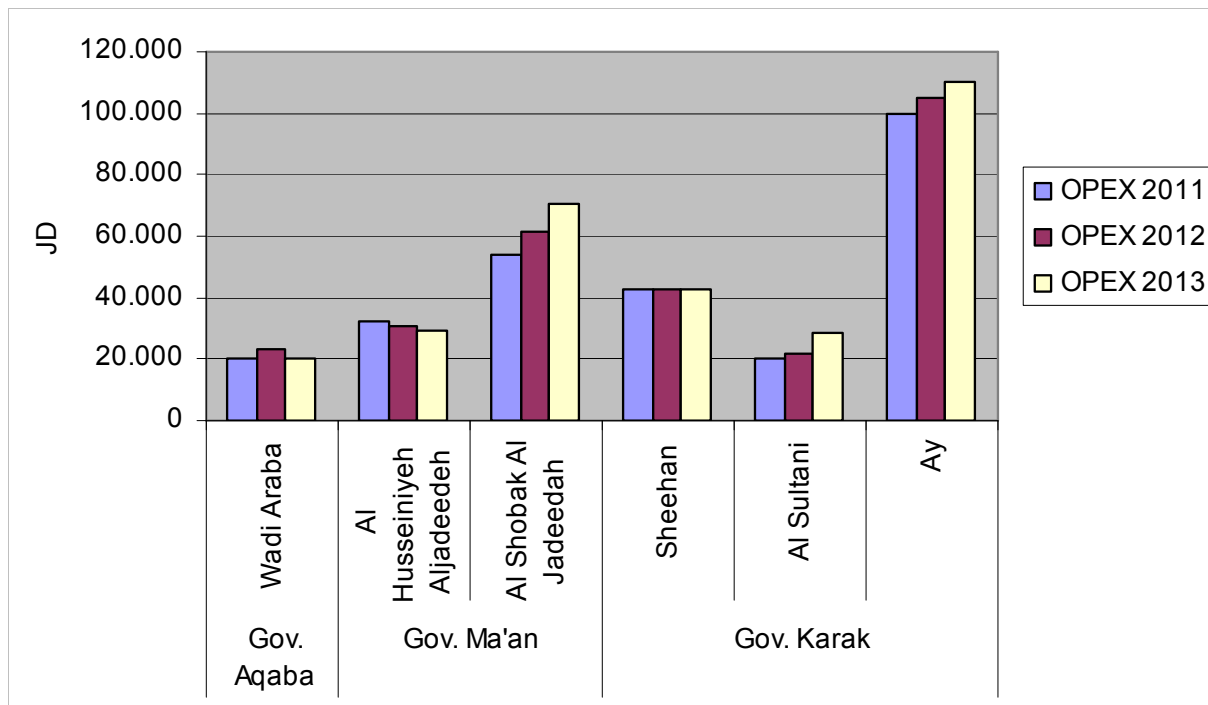


Figure 6-8: OPEX evolution 2011-2013 – Southern Region

The wide variation of the index that occurs between the pole GAM - Irbid, primarily, against all others, is basically due to the concentration of population, of volume of services and of the number of employees working in the provision of services.

Operational expenditures attributable per resident (considering the "current formal population"), differ significantly among the various Municipalities:

- In *Northern Region*, the OPEX/inhabitant in three Municipalities varies in the range of 10.0-12.0 JOD, and in other three Municipalities varies in the range of 4-8.0 JOD/inhabitant. In all other Municipalities the indicator value is below 4.0 JOD/inhabitant.
- In *Central Region*, one Municipality (New Deir Allah) performs the highest value among all Municipalities in the country (more than 70 JOD/inhabitant throughout the considered three years period), while in all other Municipalities of the region the indicator is below 20 JOD/inhabitant and in several cases below 10.0 JOD/inhabitant.
- In *Southern Region*, only one Municipality (Ai (Al-Hzmaan)) performs on the level of 9.0 JOD/inhabitant. In two Municipalities the indicator varies in the range of 4.0-6.50 JOD/inhabitant and in three Municipalities in the range of 1.0-1.50 JOD/inhabitant.

In case that the refugee population and the seasonal population will be taken into consideration, the above data are modified proportionally and depending on the population that is summed per case.

The **OPEX per inhabitant** during the years 2011-2013 and under all possible population considerations, are showed in the following charts, analytically per Municipality, grouped by region and governorate. To do so, the OPEX data from the replies of Municipalities to the Horizontal Analysis and In-Depth Diagnosis questionnaires were used.

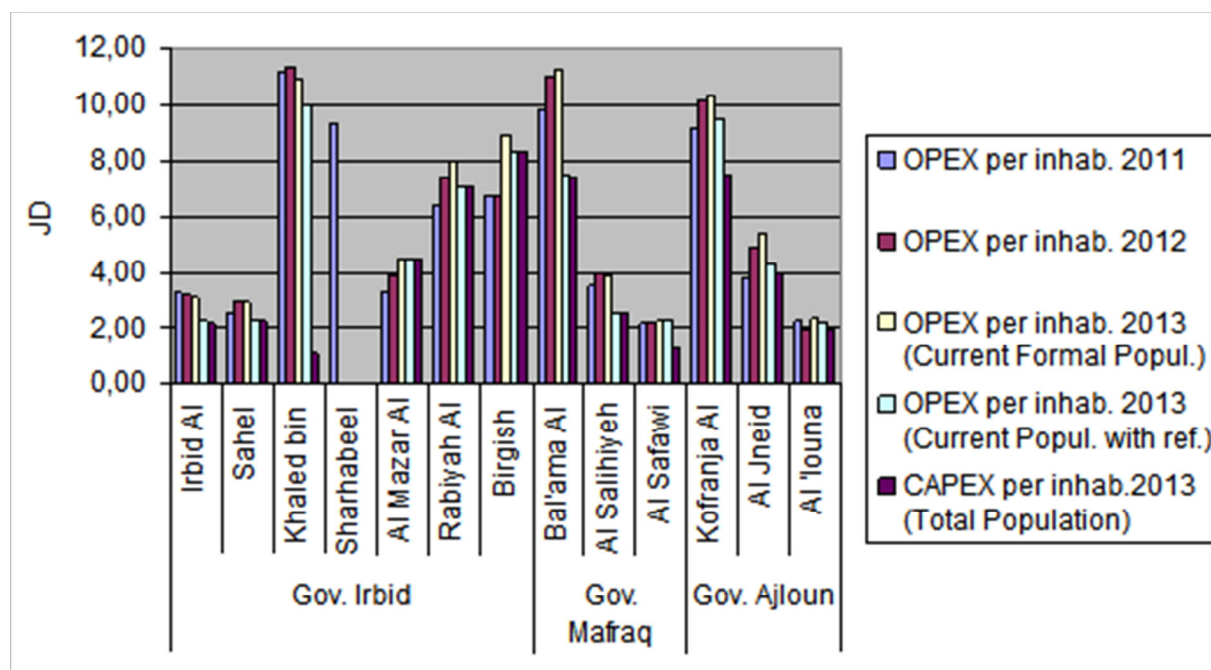


Figure 6-9: OPEX per inhabitant 2011-2013 – Northern Region

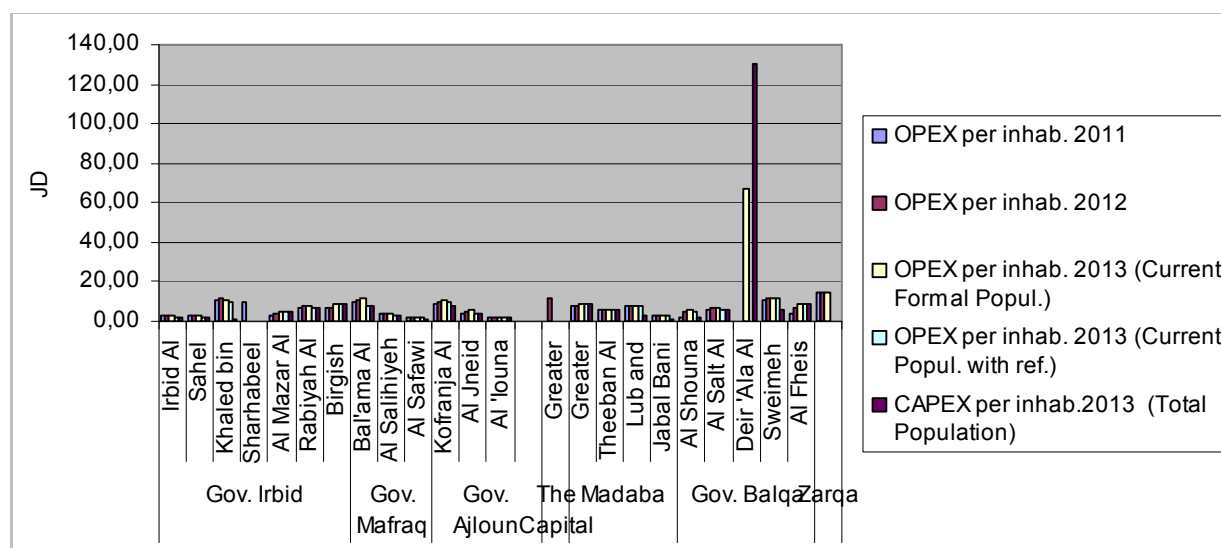


Figure 6-10: OPEX per inhabitant 2011-2013 – Central Region

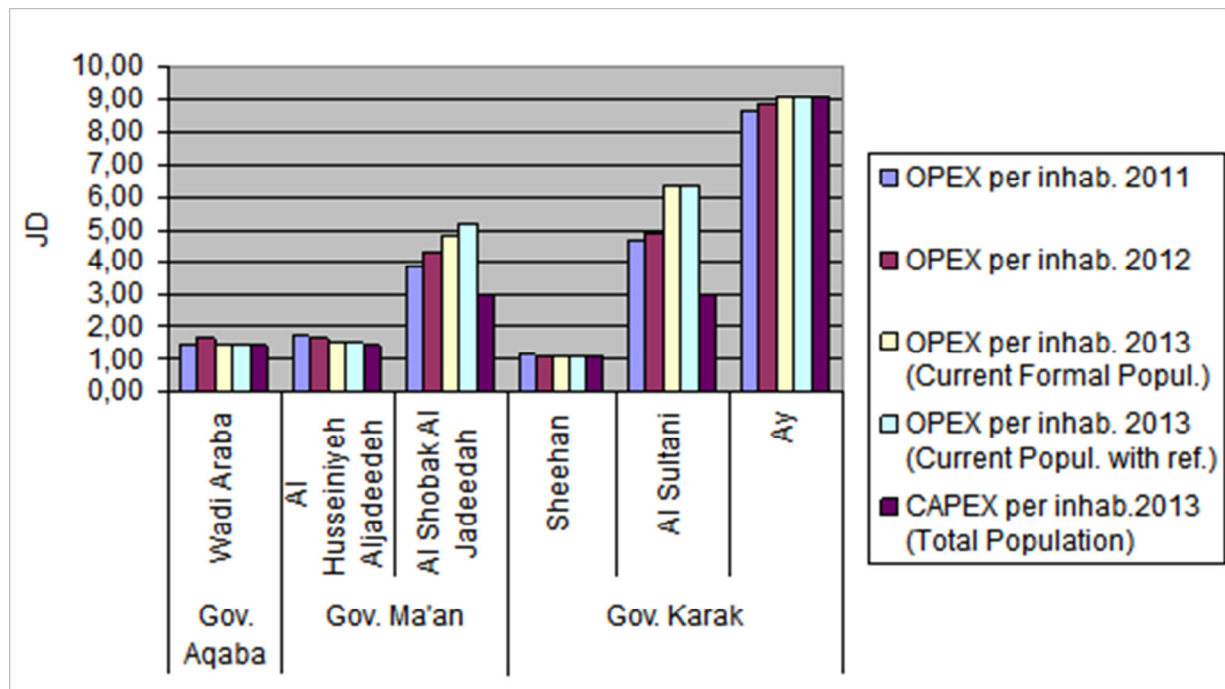


Figure 6-11: OPEX per inhabitant 2011-2013 – Southern Region

Looking at the indicator **OPEX per tonne** of managed MSW, the following can be observed:

- In *Northern Region*, in five Municipalities the indicator is lying constantly above 20 JOD/tn and up to 35 JOD/tn, in one Municipality it ranges from 12-18 JOD/tn, and in all others from 5-10 JOD/tn.
- In *Central Region*, in one Municipality (New Deir Allah) the indicator has risen up to 110 JOD/tn in 2013, in two other Municipalities (Al-Shoneh Al-Wsta and Greater Zarqa) it ranged between 30-60 JOD/tn during the considered three years period, whereas in another two Municipalities it stood at 20 JOD/tn steadily during the three years. In all other Municipalities it fluctuated below 10 JOD/tn. Considering GAM, with 40 JOD/tn, it can be said that it constitutes the average value of OPEX per tonne among the Municipalities of the Region.
- In *Southern Region*, the indicator varies from 40 JOD/tn (Ai (Al-Hzmaan)) to 10-20 JOD/tn (Wadi Araba and Sultani) and to less than 5 JOD/tn (two Municipalities).

The analytical data for **OPEX** of managed MSW **per tonne** during the years 2011-2013 are shown in the following charts.

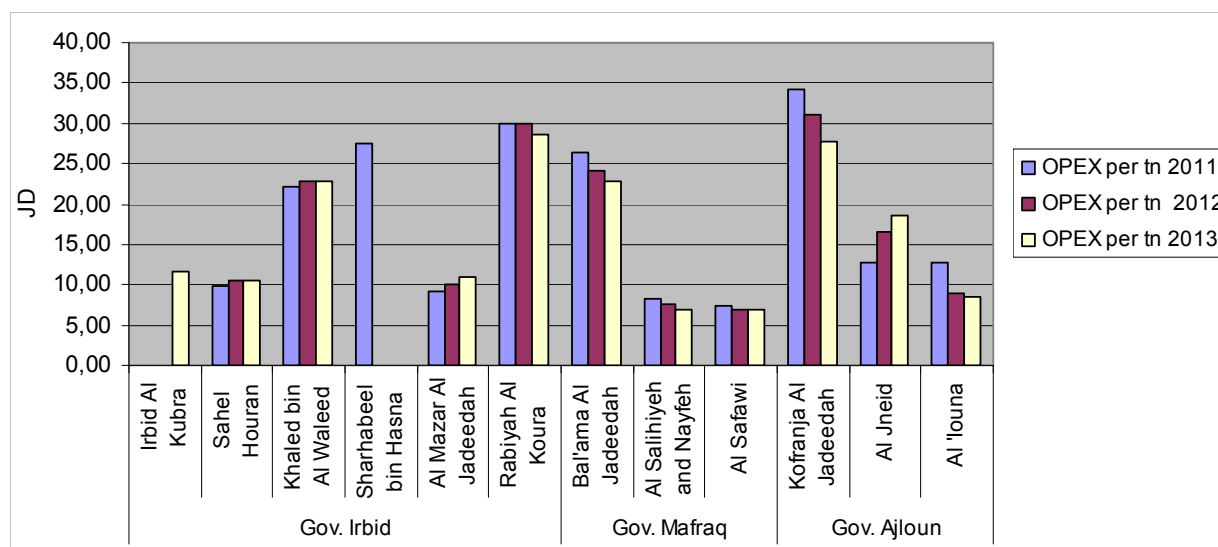


Figure 6-12: OPEX per tonne 2011-2013 – Northern Region

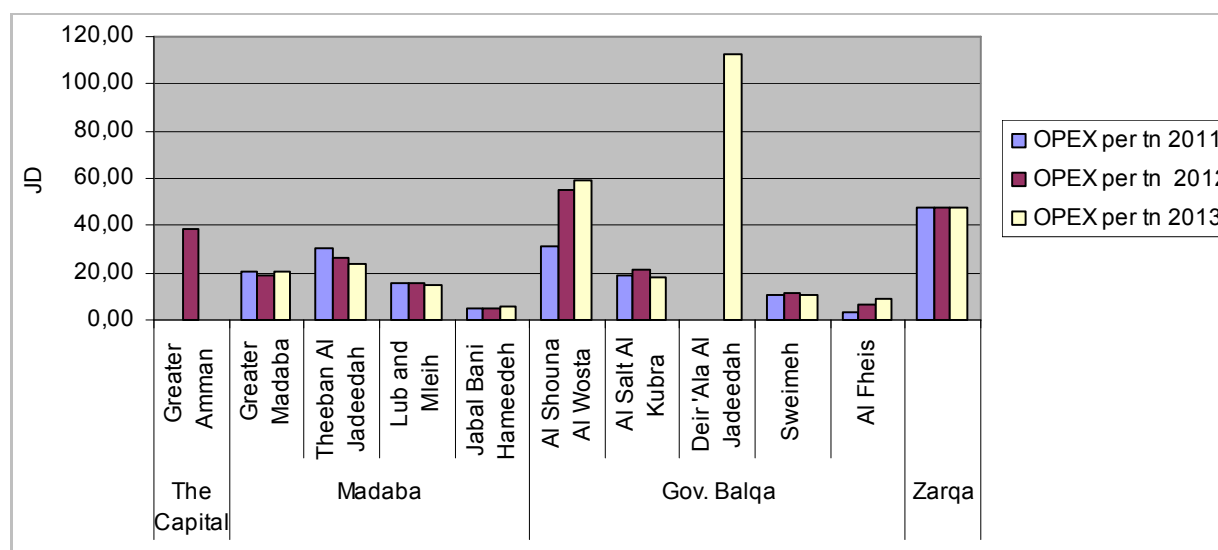


Figure 6-13: OPEX per tonne 2011-2013 – Central Region

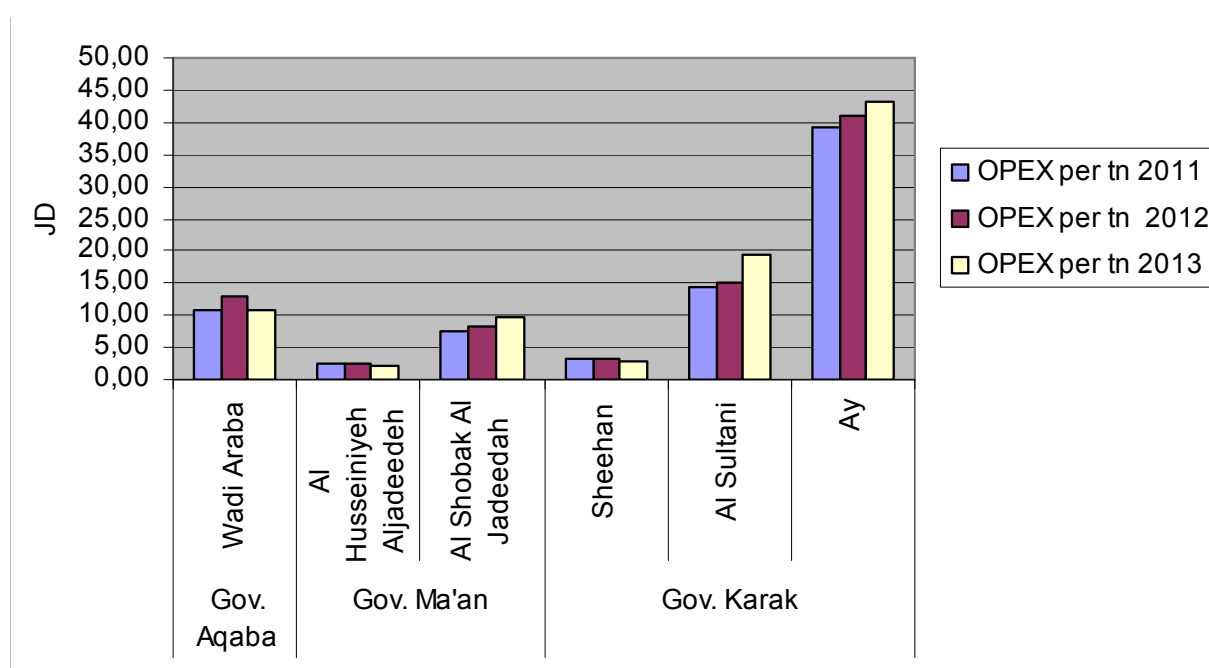


Figure 6-14: OPEX per tonne 2011-2013 – Southern Region

The **breakdown of operating costs per stage** is given in the following charts. The key findings are:

- most of the OPEX concerns on collection;
- nine Municipalities in Northern region and four Municipalities in Central Region did not report expenditures related to waste disposal. This gap may indicate the (found) fact that the Municipalities do not pay their contributions to the JSC to which they belong;
- three Municipalities in Northern Region and one Municipality in Central Region recorded the total declared OPEX exclusively in collection. Another Municipality in Central Region recorded the total of OPEX declared exclusively in transport. These types of records are incorrect and reveal the lack of detailed data records system in the Municipalities;
- the portion of costs related to disposal, when recorded, occupies the 10-35% of the total MSWM OPEX. In a few cases of Municipalities, this portion is minimized.

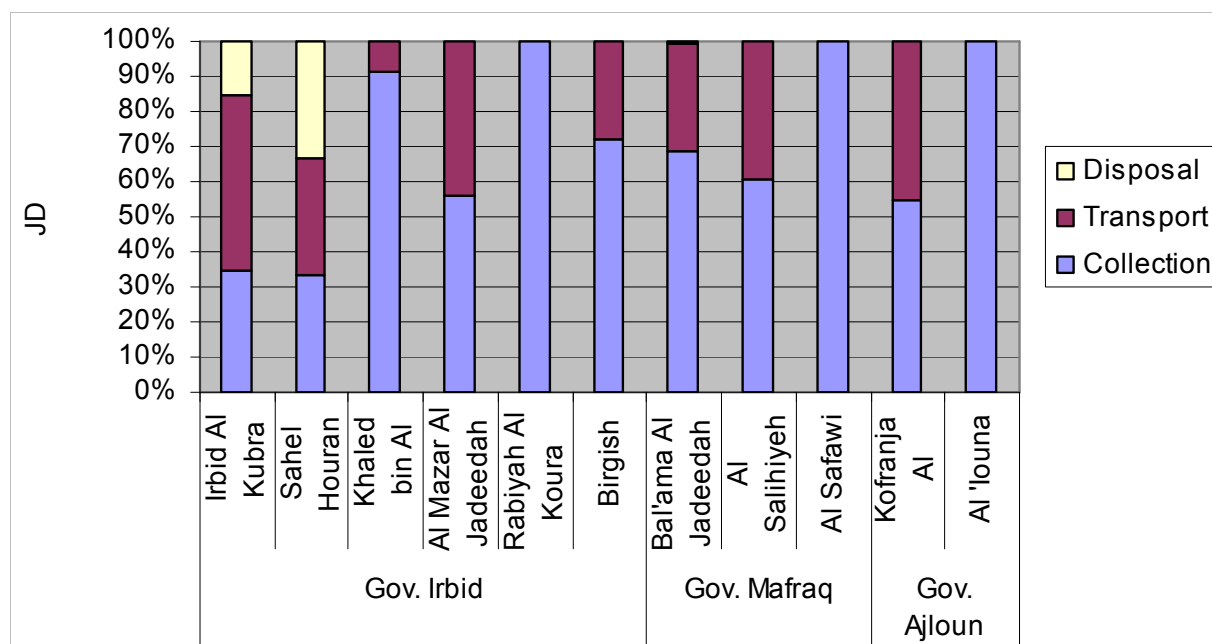


Figure 6-15: OPEX distribution 2013 – Northern Region

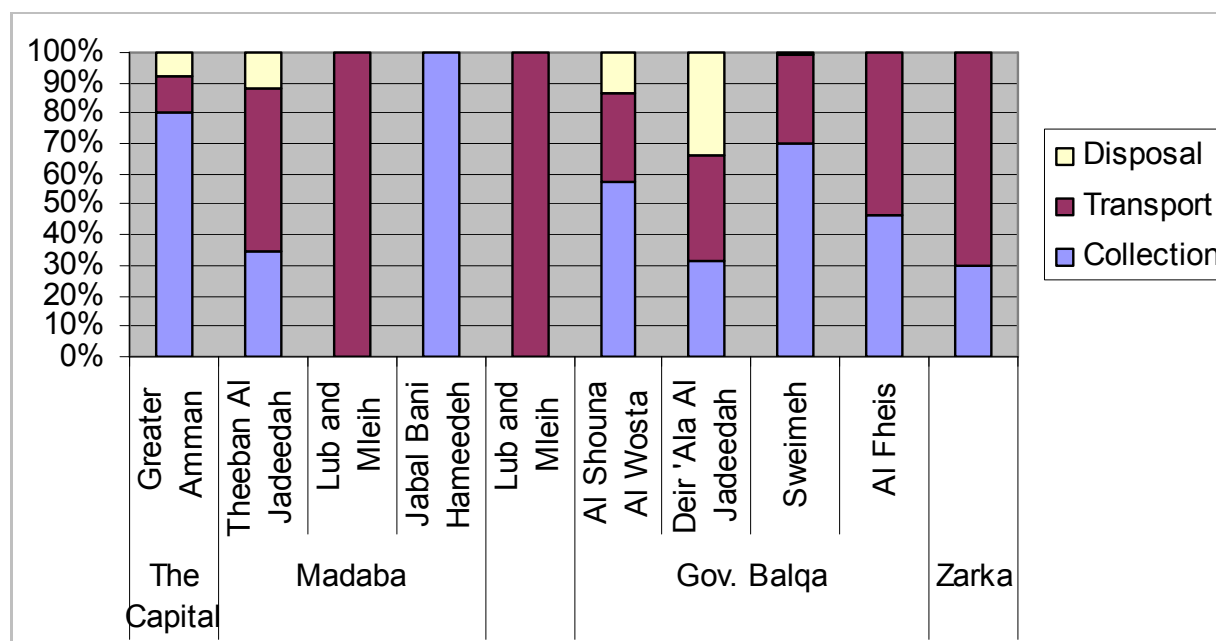


Figure 6-16: OPEX distribution 2013 – Central Region

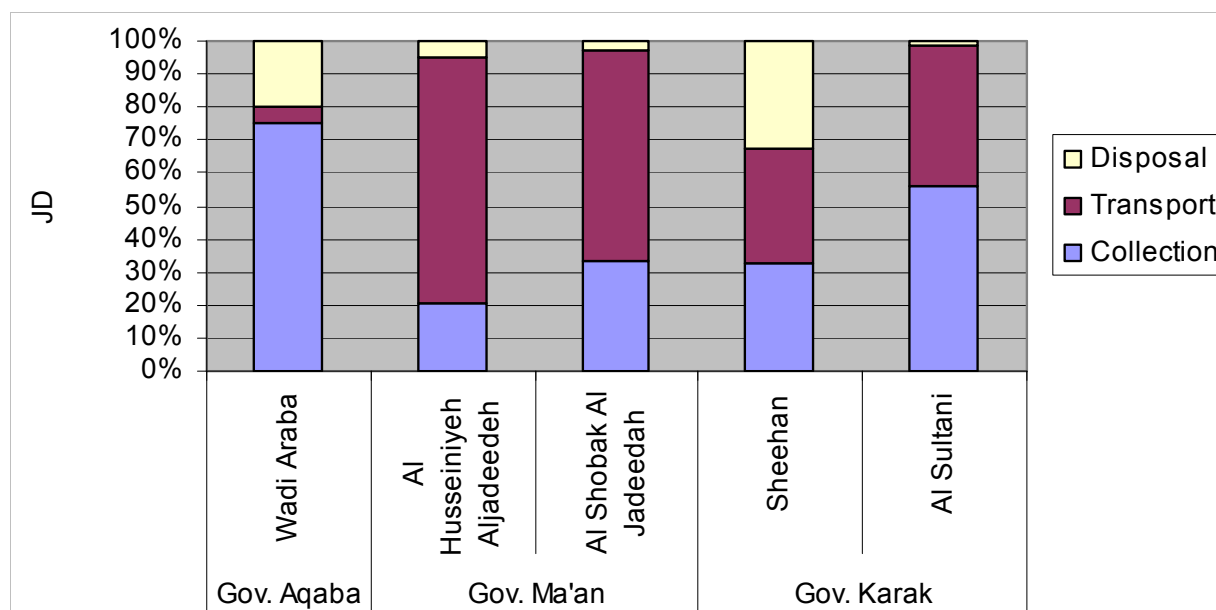


Figure 6-17: OPEX distribution 2013 – Southern Region

The **cost of collection** is given more apparently in the next charts. The main finding is the wide variation of the indicator among the various Municipalities of the country:

- In *Northern Region*, from 5 to 30 JOD/tn. In two Municipalities the indicator varies in the range of 20-30 JOD/tn, in other two Municipalities it rises to 15 JOD/tn, while in all others it ranges from 5 to 8 JOD/tn.
- In *Central Region*, from 5 to 35 JOD/tn. In two Municipalities the cost of collection fluctuates in the range of 30-35 JOD/tn, in one Municipality (Greater Zarqa) it is 14 JOD/tn, while in all other Municipalities it ranges between 5-8 JOD/tn.
- In *Southern Region*, it ranges between 1-11 JOD/tn. In two Municipalities the indicator fluctuates in the range of 8-11 JOD/tn, while in all others from 1 to 3 JOD/tn.

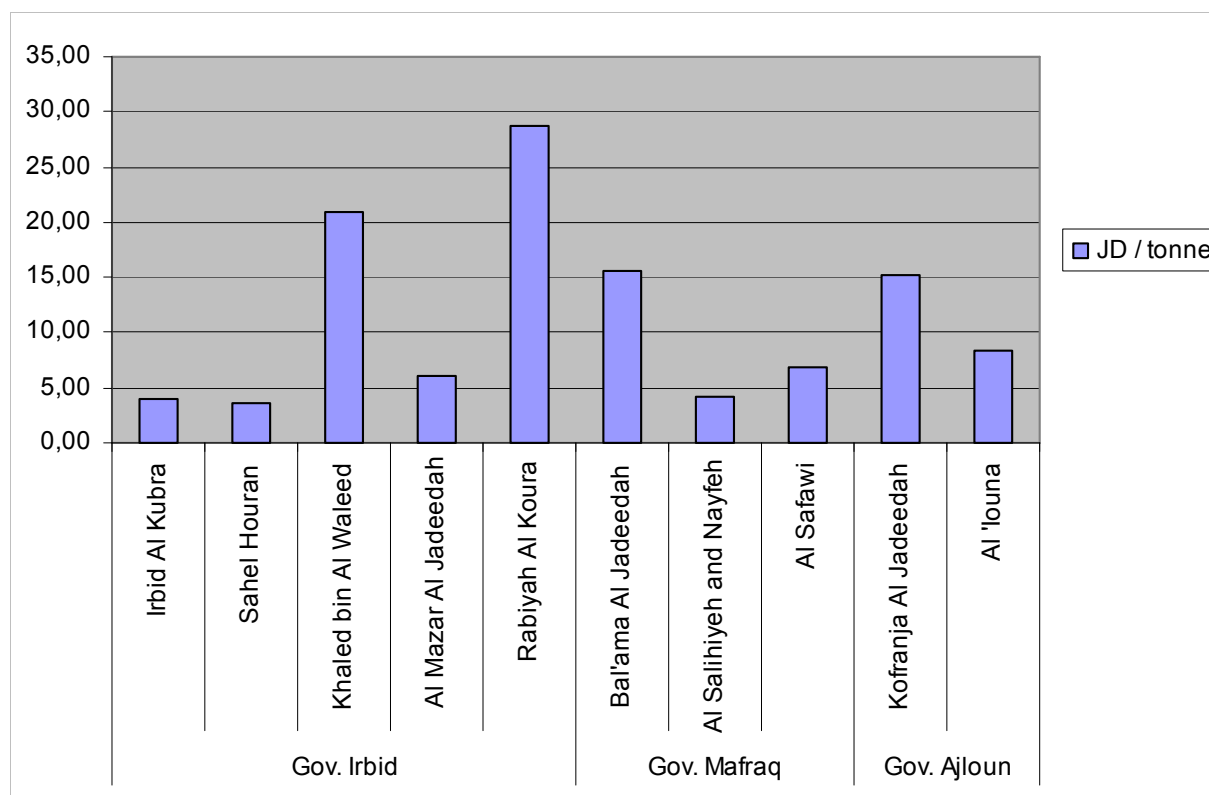


Figure 6-18: Collection cost 2013 – Northern Region

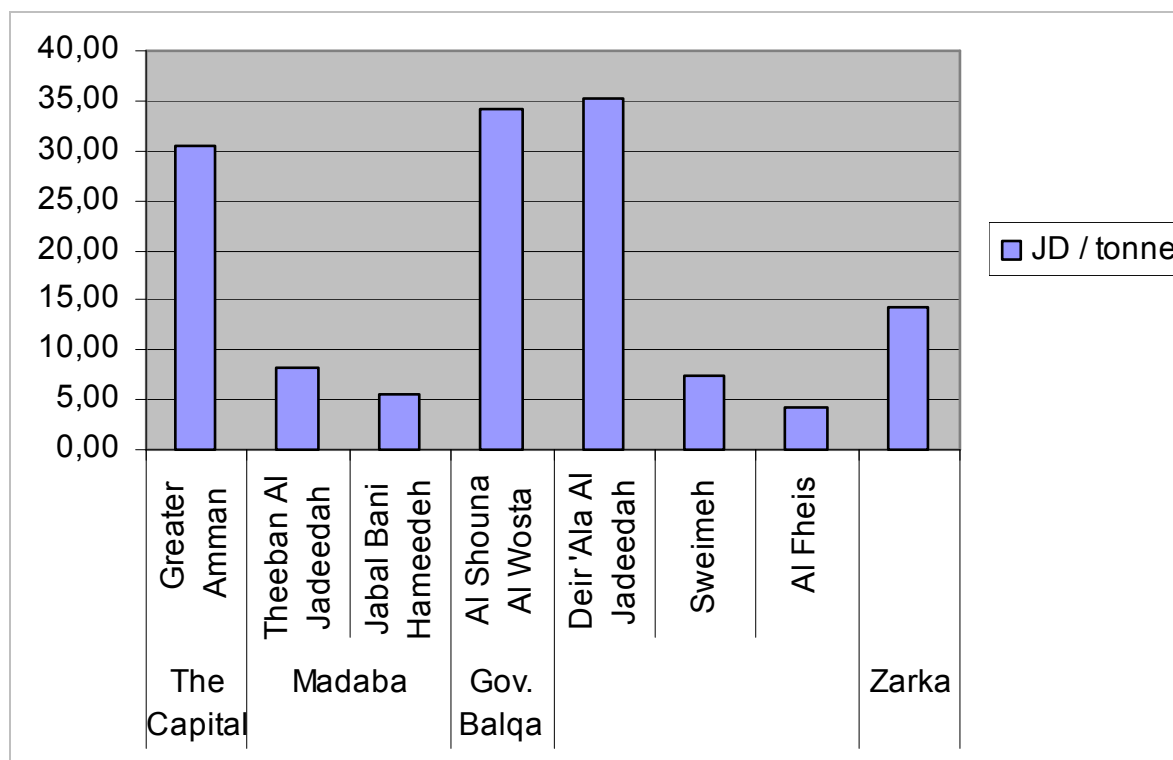


Figure 6-19: Collection cost 2013 – Central Region

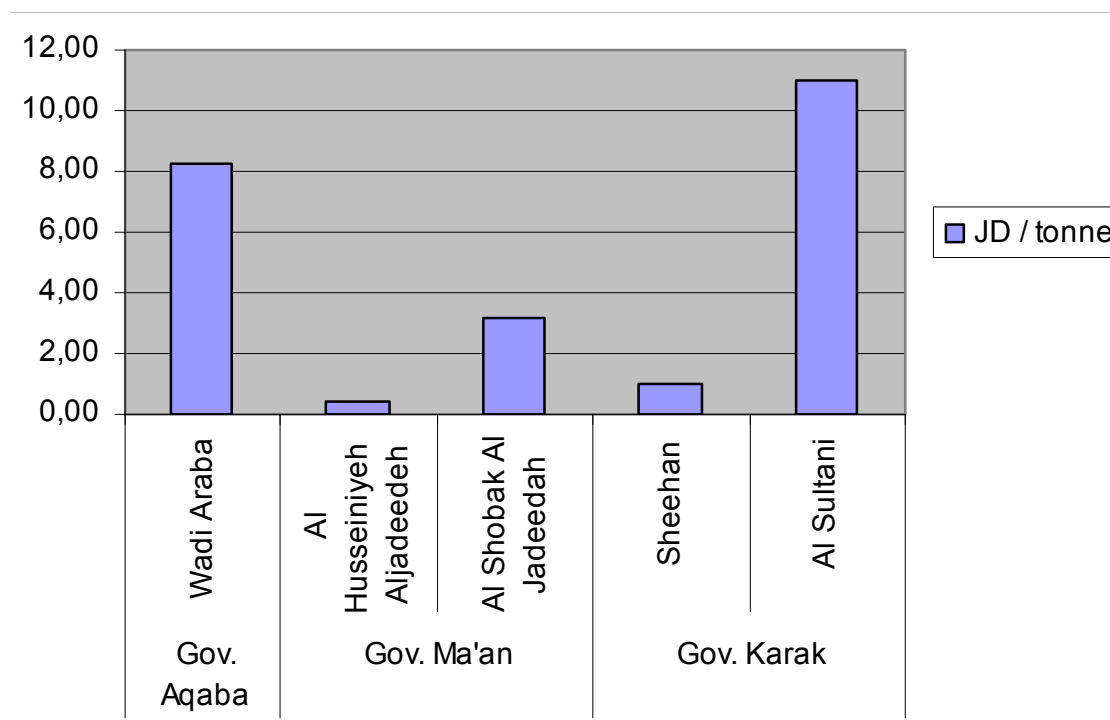


Figure 6-20: Collection cost 2013 – Southern Region

From the presentation of OPEX related indicators, a number of conclusions can be inferred:

- The high values of OPEX do not always conform to the polarization of the population or of the waste generation, although these polarizations are taken for granted (e.g. the 70% of total waste generation in the country is concentrated in three Municipalities).
- The previous finding leads to the conclusion that the wide variations in OPEX per inhabitant, OPEX per tonne of managed MSW and Collection costs, reflect respective large differences in the efficiency of MSWM system among the various Municipalities of the country. The very high values of the indicators are formed due to a combination of factors such as:
 - misallocation of staff involved in waste management (e.g., administrative overload in relation to the workforce);
 - need for overload on the number of staff employed in collection stage, in order to cover the obstacles encountered at this stage, resulting in reduced collection efficiency, such as: broken wheels bins, lack of appropriate equipment for collecting, especially in areas with difficult topography terrain (steep, narrow streets, etc.), delay to unloading, accidents and injuries;
 - expansion of the expenditure related with the transportation of waste to disposal sites, due to the long distance between collection points and drop points, in combination with lack of Transfer Station, that leads to increases the cost of fuel and maintenance (indicatively: Mu'tah and Mazar, New Al-Mazar, New Kofranjah, New Theban, Swaymeh);

- expansion of the expenditure related with the collection and transportation of waste, due to poor route design, and even lack of planning (e.g. the route is decided by the driver of the vehicle over a truck following the same route) that leads to redundancy and duplication of work and reduce the efficiency in collection - transport stage;
- the difficulty to repair the machinery, because the repairing station is far (indicatively: Burqush, New Al-Qawiera);
- the cost of Fuel, in combination with not increasing the fees in line with the increase of fuel prices; and
- the high operational costs of the machinery.

The above conclusions have been confirmed and crossed over with respective notes recorded in the questionnaire (query No. 24 Difficulties, Deficiencies, Proposals, Recommendations) by the Bodies. Several of the conclusions are also confirmed in other studies conducted in the recent past.

6.3.3 MUNICIPALITIES' REVENUES

The solid waste fee system is based on the Regulation for the Prevention of Health Nuisances No. 8/2014, where it is stated that Municipal Councils or any other substitute council performing municipal services shall charge an annual fee for MSW collection and disposal services from households for each housing unit. The fee calculation is based on the classification of the Municipalities, according to size and location. Four (4) classes of Municipalities are defined (classes 1-4), where class (1) refers to Municipalities located in provincial centres and main cities of the country (District Centres) and class (4) is assigned for Municipalities with a population of less than 5,000 inhabitants. The charges are:

- Class (1): 24 JOD;
- Class (2): 15 JOD; and
- Classes (3) and (4): 8 JOD.

Furthermore, for professional entities that are required to renew their occupational license every year, a 20% of the fee charged for the acquisition/renewal of such a license is deducted for the benefit of the respective council to cover SWM related services.

The examination of revenue during the years 2011 - 2013 revealed forms polarizations similar to those met in the examination of CAPEX and OPEX. Specifically:

- In *Northern Region*, only in one Municipality (Greater Irbid) the revenues are counted in million JOD (2.5-3.5 million JOD) throughout all years of the considered period. In another Municipality (Sahel Horan) revenue exceeded 1 million JOD but only in 2013. In the other Municipalities of the region revenue is extremely low (0.03-0.165 mil JOD). The revenue evolution is showing an increasing trend from 2011 to 2013. The increasing trend of revenue

may indicate an efficiency improvement in collecting the charges for the Municipalities of the region.

- in *Central Region*, the polarization exaggerates, with the revenue of GAM at 23 million JOD, the revenue of Greater Zarqa Municipality constantly over 2.0 million JOD the revenue of two Municipalities around 0.5 million JOD (Greater Madaba, Greater Salt) and the revenue of all other Municipalities at extremely low levels (0.006-0.08 million JOD).
- in *Southern Region*, one Municipality (Greater Tafilah) raises revenue from 0.25 to 0.45 million JOD in three years, while the income of all other Municipalities of the region is at very low levels (0.006 up to 0.09 million JOD).

Data of revenue evolution for the years 2011 - 2013 are given in detail in the following charts.

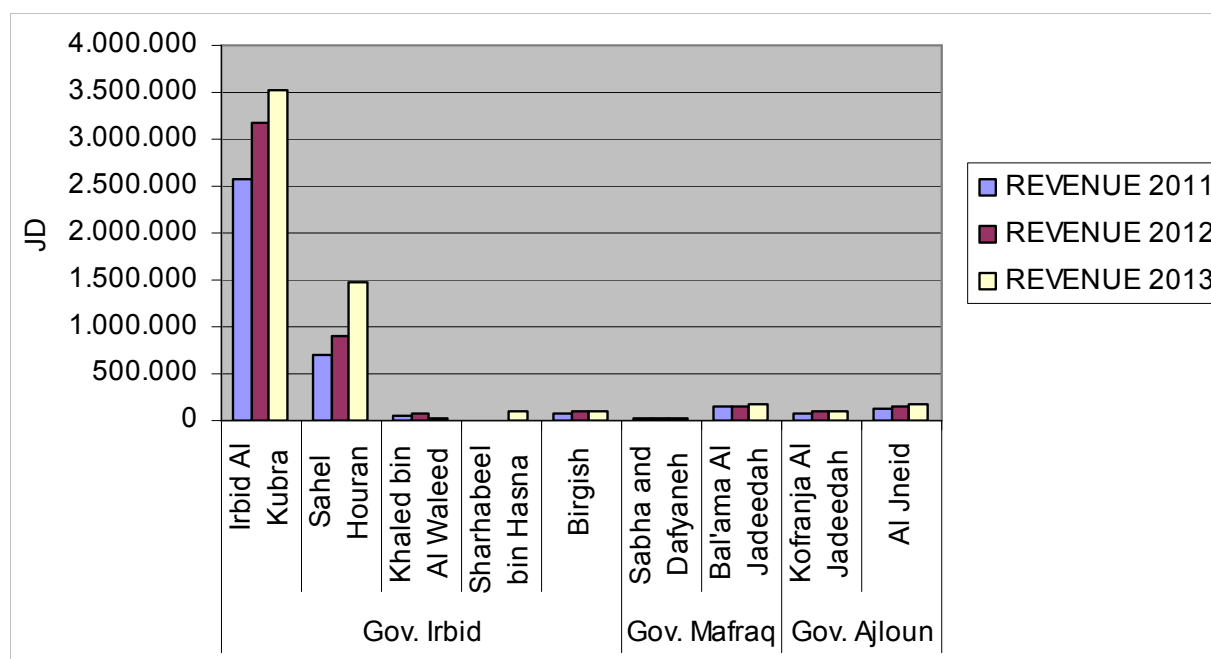


Figure 6-21: REVENUE evolution 2011-2013 – Northern Region

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

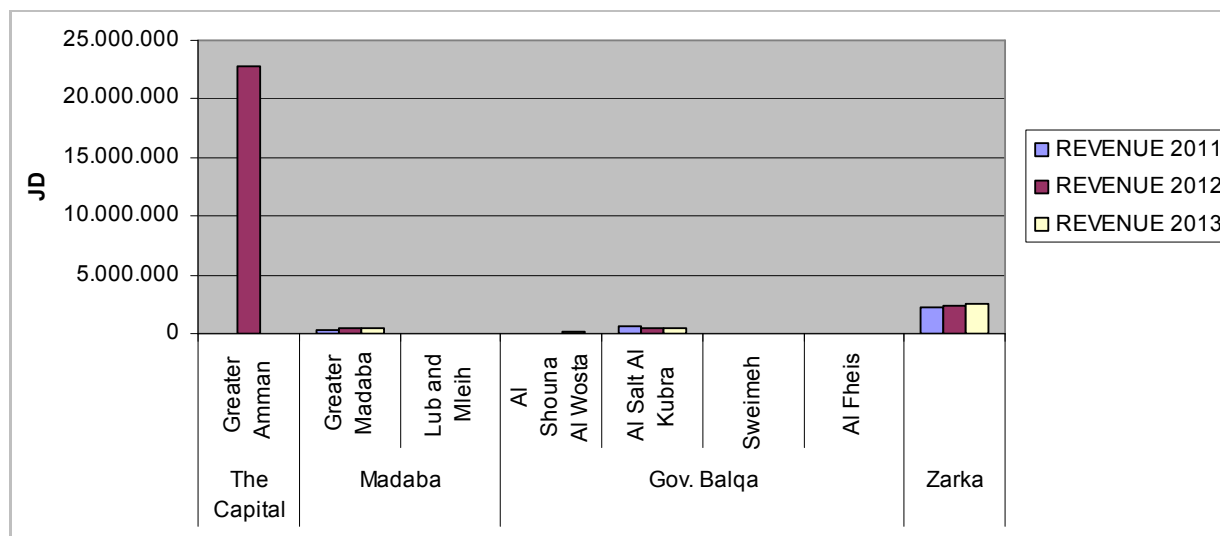


Figure 6-22: REVENUE evolution 2011-2013 – Central Region (incl. GAM)

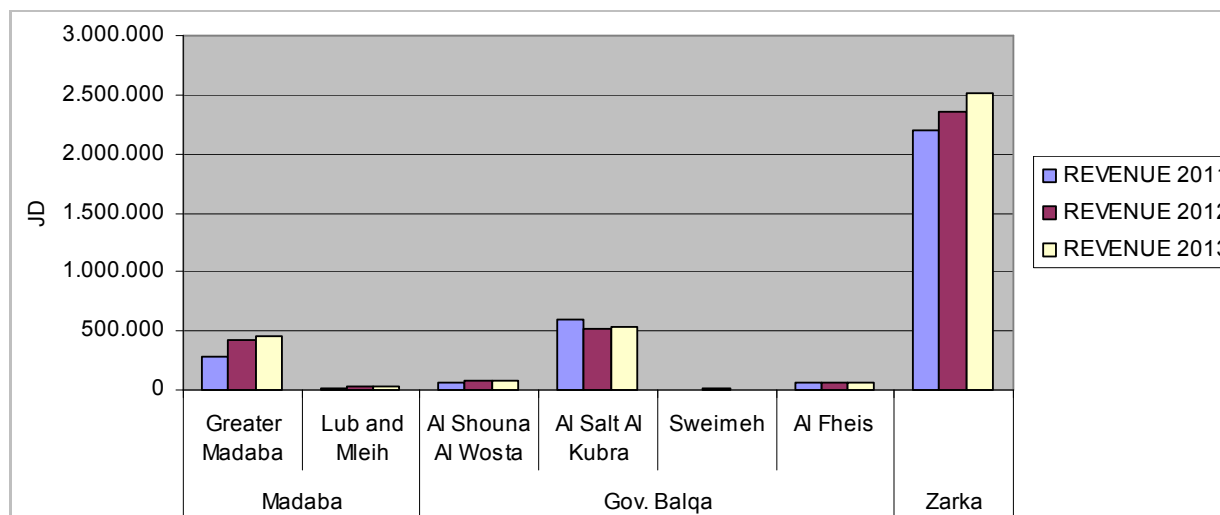


Figure 6-23: REVENUE evolution 2011-2013 – Central Region (not incl. GAM)

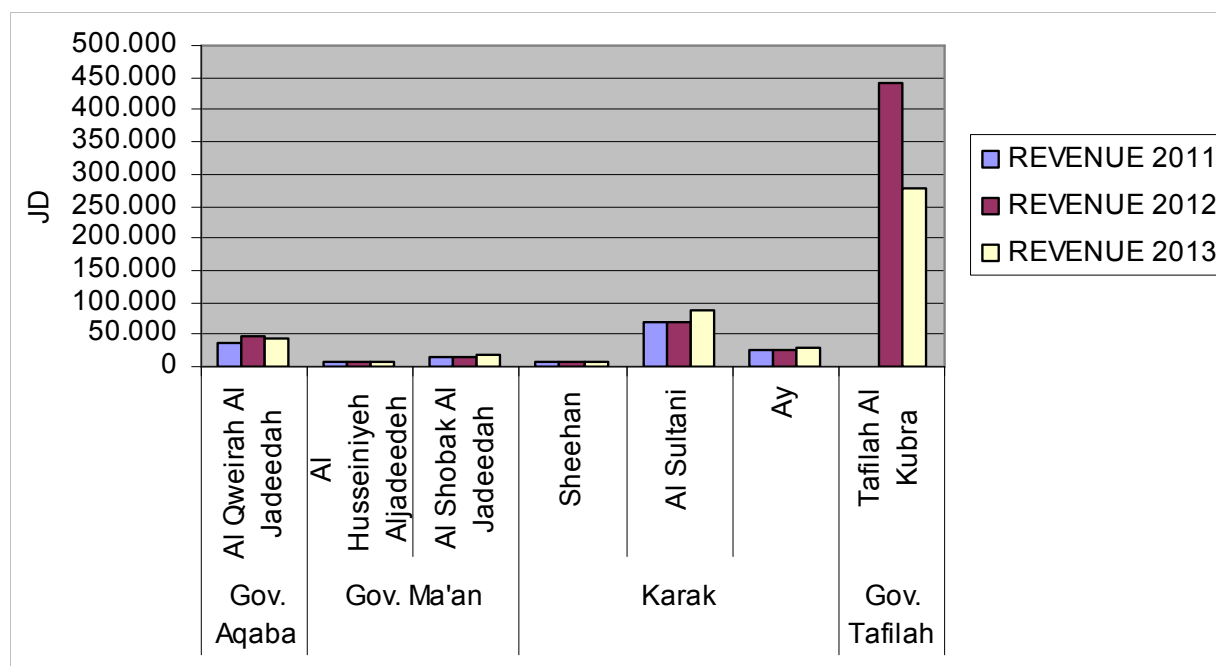


Figure 6-24: REVENUE evolution 2011-2013 – Southern Region

Looking at the **Revenue per inhabitant** (taking in consideration the current formal population) we can observe the following:

- In *Northern Region* the indicator varies hugely from 1.40 (Sabha W Al-Dafianeh) up to 30 JOD/inhabitant (Sahel Horan), with the majority of Municipalities of the region to be in the range of 2.5-6.5 JOD/inhabitant.
- In *Central Region* the indicator varies also hugely from 0.80 JOD/inhabitant (Al-Shoneh Al-Wsta) and 1.0 JOD/inhabitant (Swaymeh) up to 9.20 JOD/inhabitant (GAM), with the majority of Municipalities of the region to be in the range of 2.0-4.5 JOD/inhabitant.
- In *Southern Region* the indicator varies also hugely from 0.20 JOD/inhabitant (Shehan) and 1.20 JOD/inhabitant (New Al-Shobak) up to 16.0 JOD/inhabitant (Sultani), with the majority of Municipalities of the region to be in the range of 1.5-2.5 JOD/inhabitant.

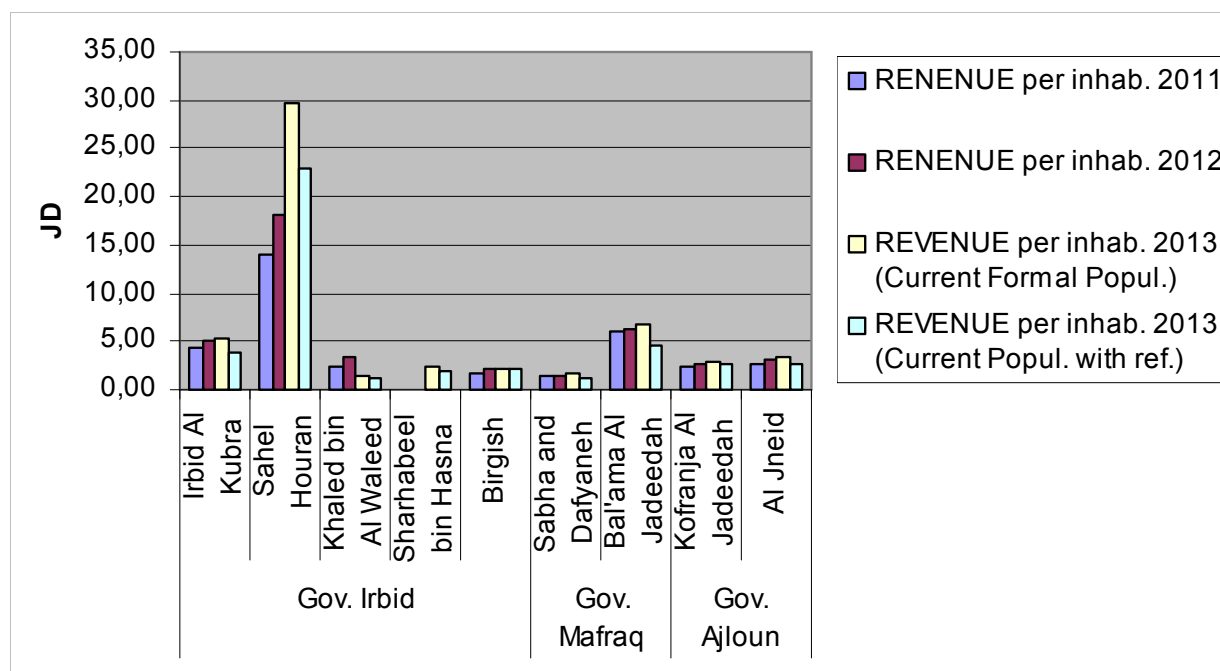


Figure 6-25: REVENUE per inhabitant 2011-2013 – Northern Region

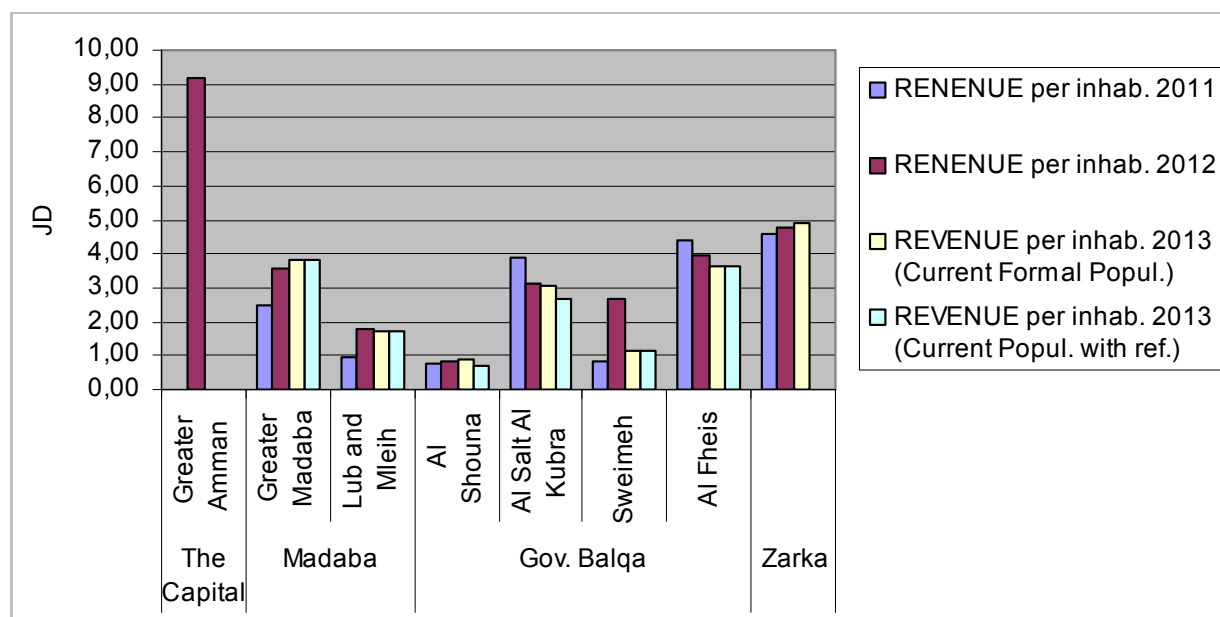


Figure 6-26: REVENUE per inhabitant 2011-2013 – Central Region

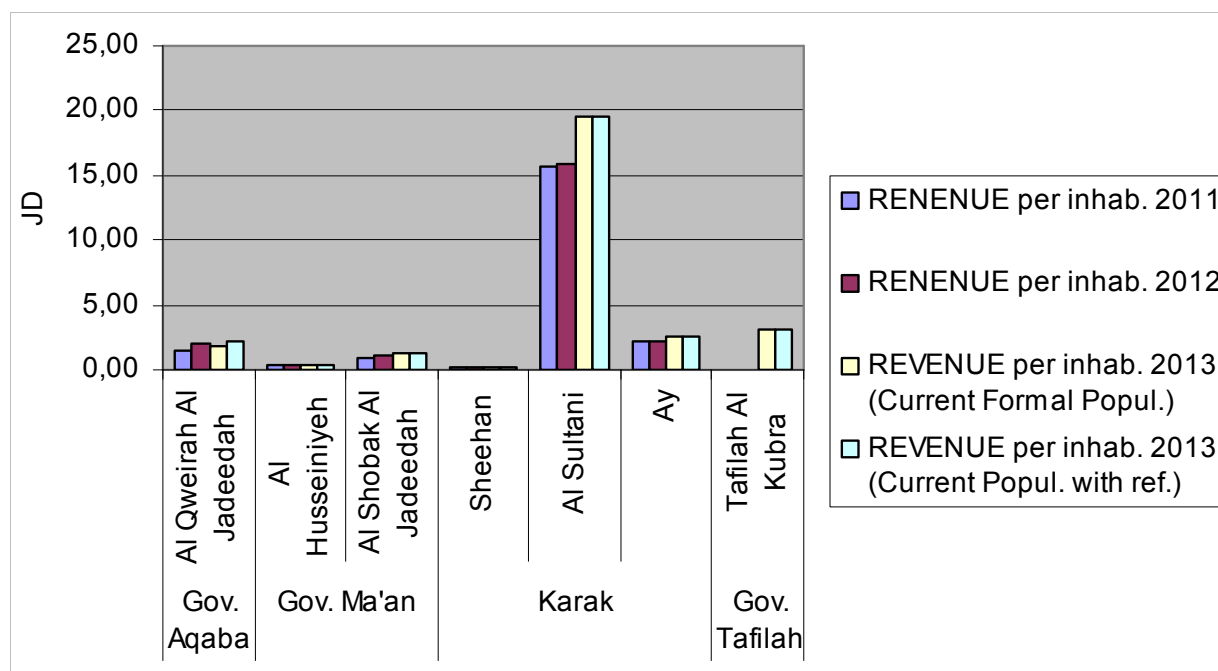


Figure 6-27: REVENUE per inhabitant 2011-2013 – Southern Region

The examination of **Revenue per tonne** revealed the following findings:

- In *Northern Region*, only one Municipality collects over 60 and up to 110 JOD/yr within the three years, while all other Municipalities of the region collect less than 20 JOD/yr.
- In *Central Region*, only one Municipality collects 30 JOD/yr (in 2012), the Greater Zarqa Municipality collects constantly over 15 JOD/yr during the three years, three others collect 5-12 JOD/yr during the three years, and all others collect less than 5 JOD/yr.
- In *Southern Region*, only one Municipality collects more than 50 and up to 60 JOD/yr during the three considered years, while all other Municipalities of the region collect less than 10 JOD/yr.

Revenue per tonne data, for the considered period 2011-2013, are given analytically per Municipality, grouped by region and governorate, in the following diagrams.

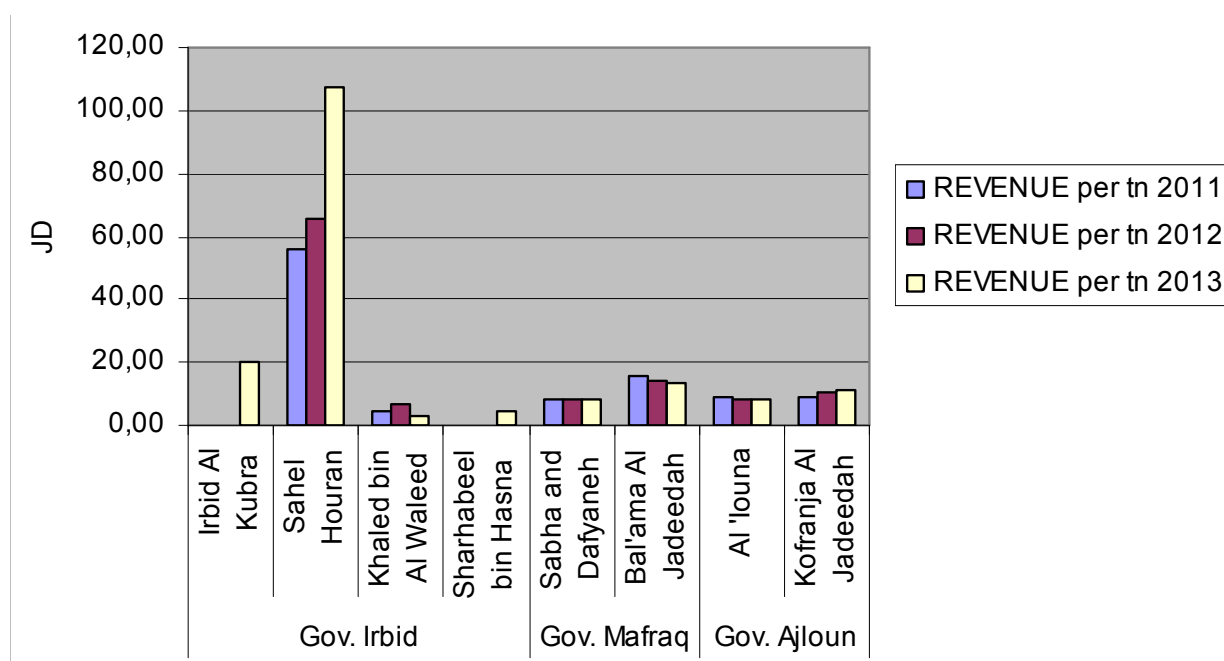


Figure 6-28: REVENUE per tonne 2011-2013 – Northern Region

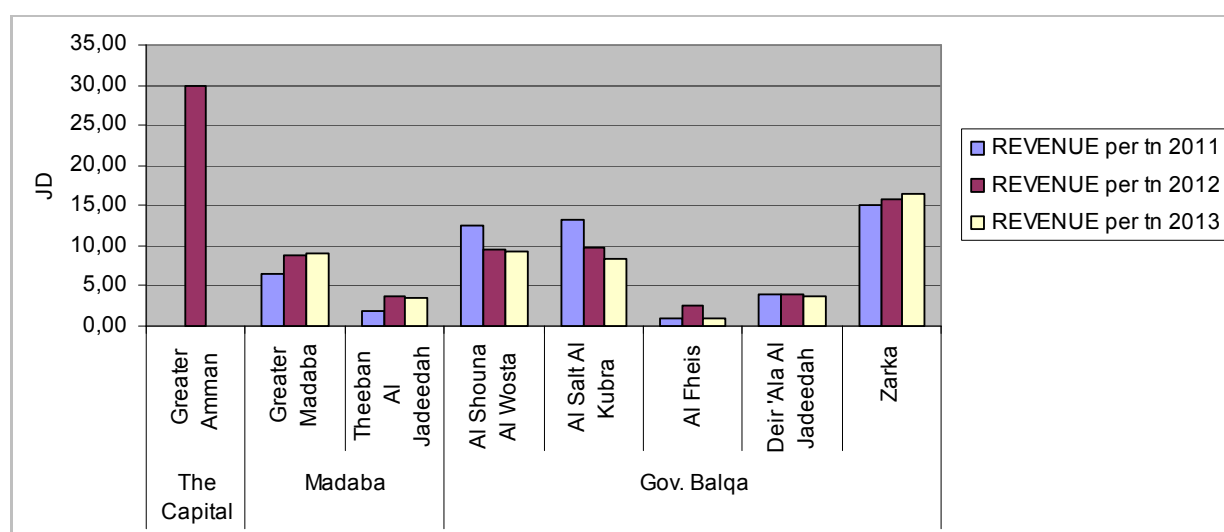


Figure 6-29: REVENUE per tonne 2011-2013 – Central Region

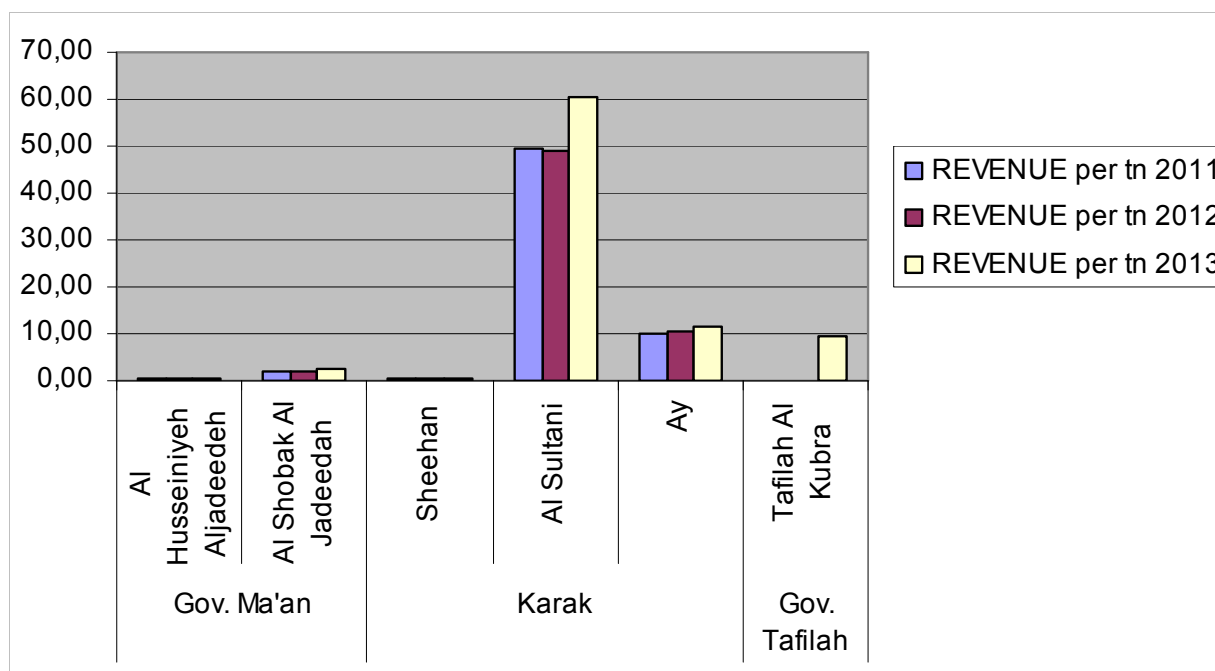


Figure 6-30: REVENUE per tonne 2011-2013 – Southern Region

The very large differentiations of revenue among the various Municipalities in the country, as revealed by the indicators “Revenue per inhabitant” and “Revenue per tn”, reflect the different pricing applied in the various categories of Municipalities. On the other hand, the extremely low values of the indicators reveal the inefficiency of the systems and practices applied for both pricing and collecting the charges.

6.3.4 MUNICIPALITIES' FINANCIAL BALANCE & COST RECOVERY LEVEL

The observation of **Financial Balance of Municipalities** revealed the following findings:

- In *Northern Region*: Only a Municipality (Sahel Horan) has positive results, both in “REV-OPEX” and “REV - (CAPEX + OPEX)” indicators, in all years of the considered period. One Municipality (Greater Irbid) has also positive results on both indicators, but only in the year 2012. All other Municipalities have negative results in all years of the considered period, though without significant exacerbations, rather due to low values of OPEX and CAPEX.
- In *Central Region*, not any of the Municipalities has a positive result in any of the years of the considered period
- In *Southern Region*, a Municipality (Sultani) has positive results, both in “REV-OPEX” and “REV - (CAPEX + OPEX)” indicators, in all years of the considered period. All other Municipalities have negative results in all years of the considered period.

The Financial Balance of the Municipalities for the considered period 2011-2013, are given analytically per Municipality, grouped by region and governorate, in the following diagrams.

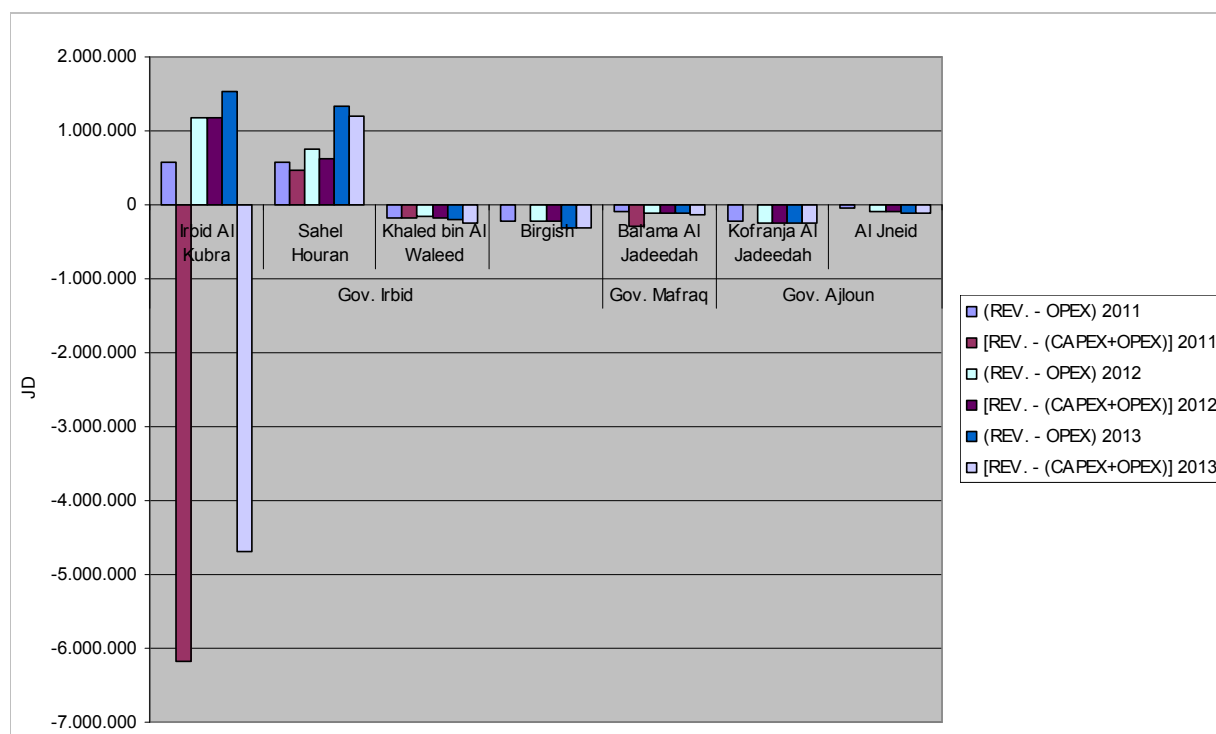


Figure 6-31: FINANCIAL BALANCE MSWM 2011-2013 – Northern Region

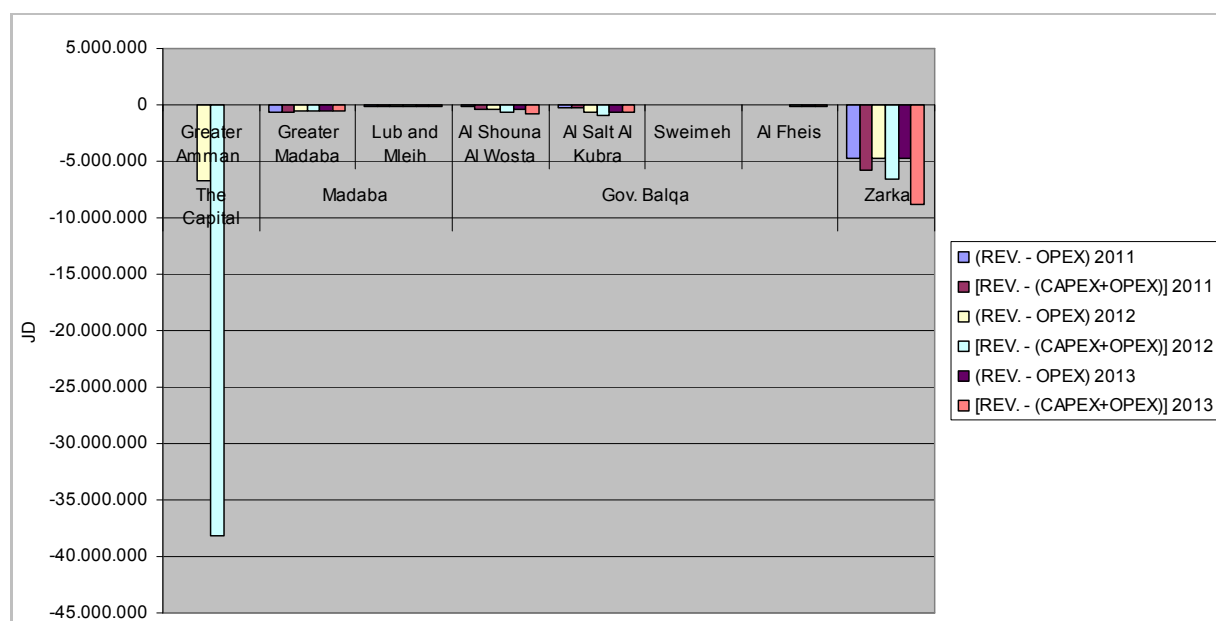


Figure 6-32: FINANCIAL BALANCE MSWM 2011-2013 – Central Region (incl. GAM)

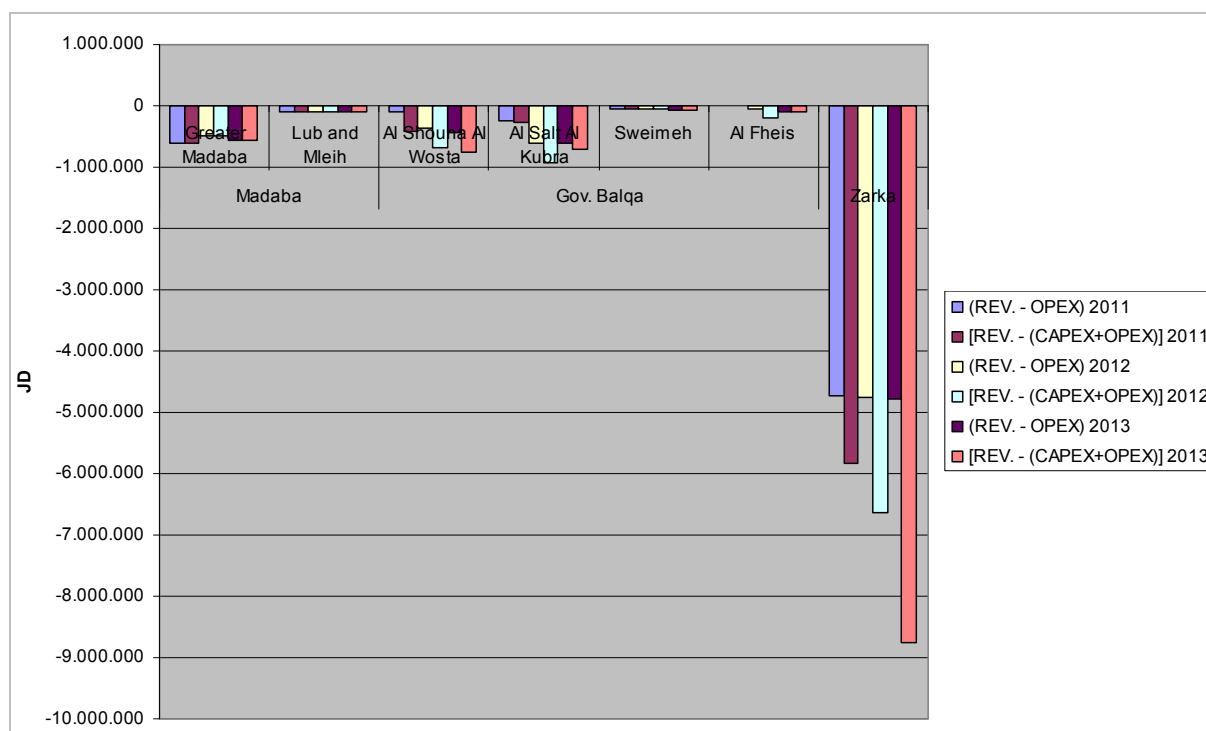


Figure 6-33: FINANCIAL BALANCE MSWM 2011-2013 – Central Region (not incl. GAM)

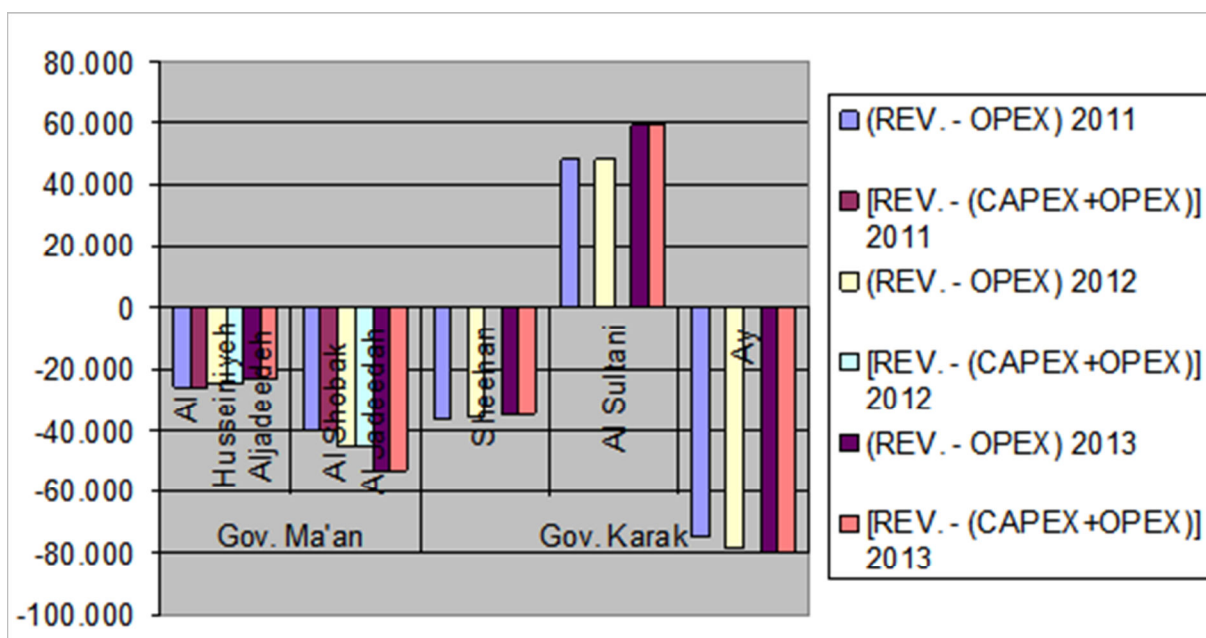


Figure 6-34: FINANCIAL BALANCE MSWM 2011-2013 – Southern Region

Respectively, the Cost Recovery in percentage is given in the following diagrams.

- In *Northern Region*: Only one Municipality (Sahel Horan) recovers fully the cost in all years of the considered period, both relatively to the OPEX and to the CAPEX+OPEX. Another

Municipality (Greater Irbid) recovers fully the cost relatively to the OPEX, although not relatively to CAPEX+OPEX. In all other Municipalities of the region the recovery percentage is very low.

- In *Central Region* only one Municipality (Al-Fahis) and only for one year (2011) recovers fully the OPEX ($REV / OPEX > 100\%$), while for the next years 2012 and 2013 the recovery percentage flows at much lower levels (62% and 40 % respectively). In all other Municipalities of the region the recovery percentage is very low.
- In *Southern Region* only one Municipality (Sultani) recovers fully the cost in all years of the considered period both relatively to the OPEX and to the CAPEX+OPEX. In all other Municipalities of the region the recovery percentage is very low.

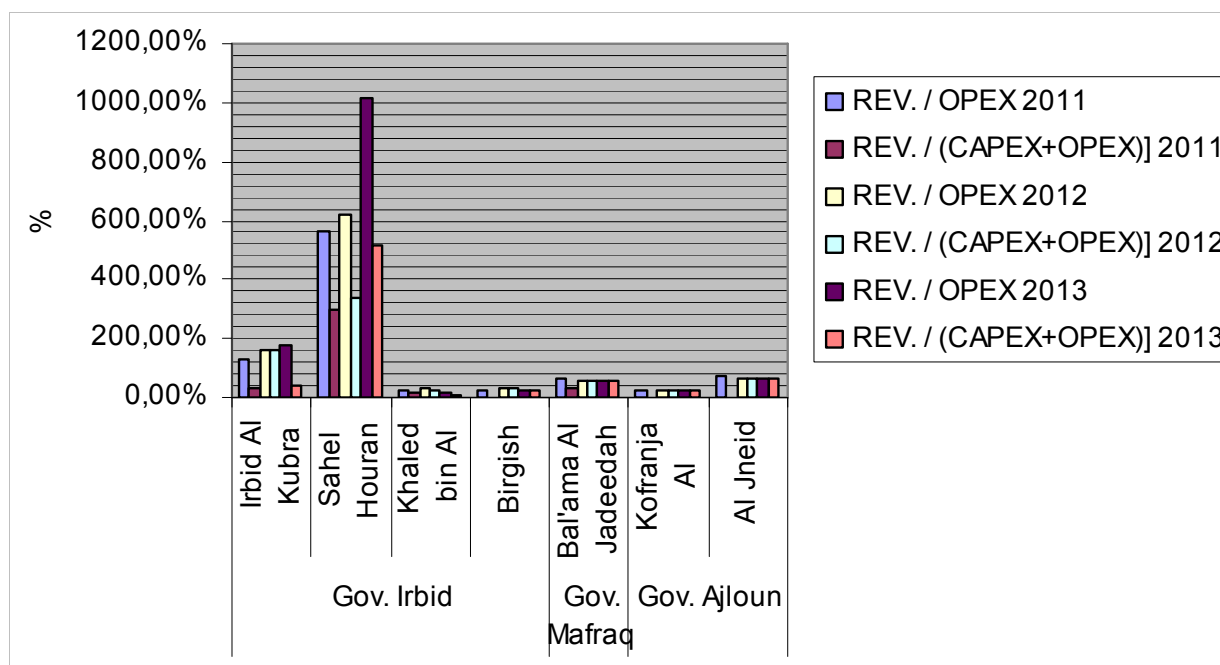


Figure 6-35: COST RECOVERY 2011-2013 – Northern Region

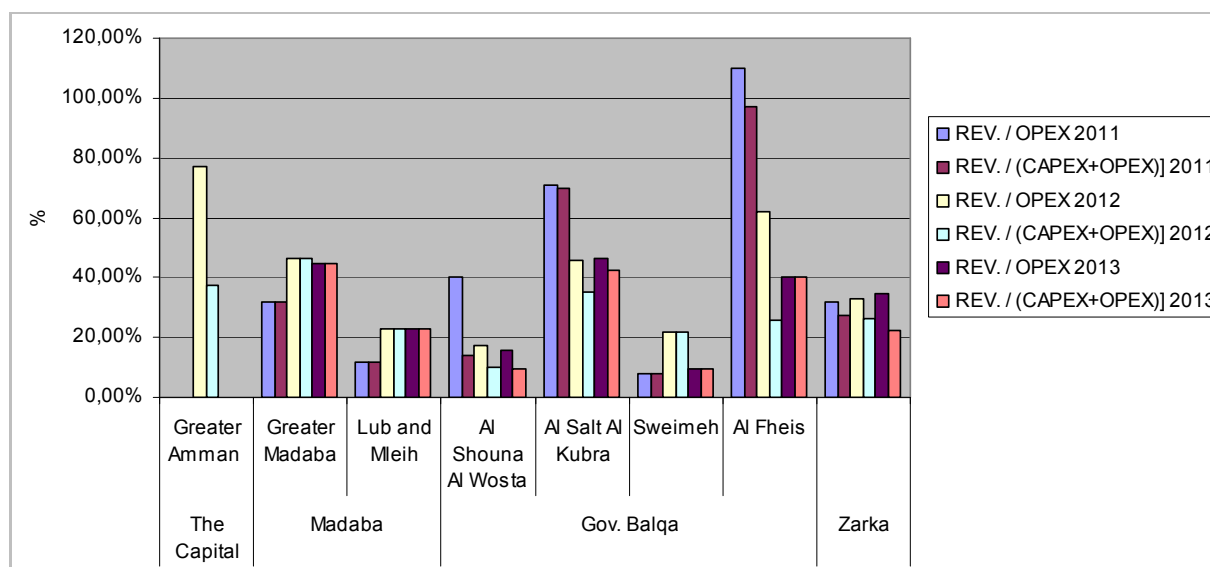


Figure 6-36: COST RECOVERY 2011-2013 – Central Region

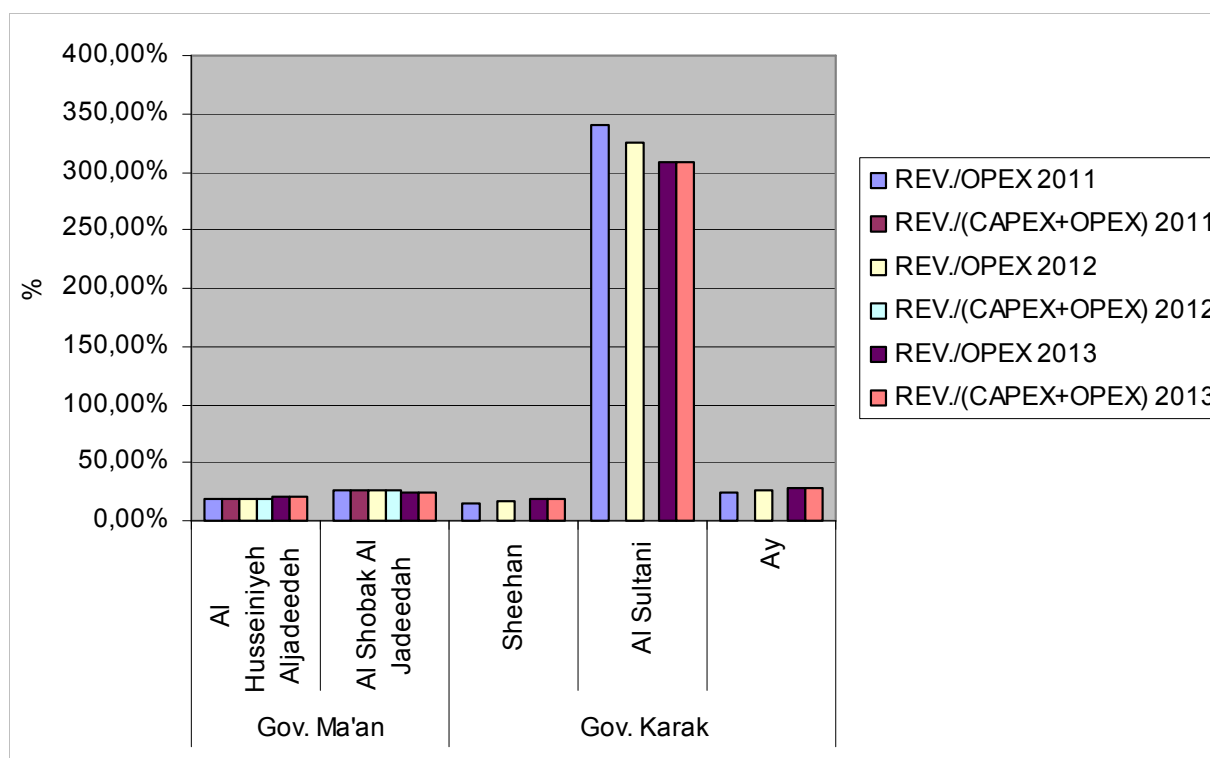


Figure 6-37: COST RECOVERY 2011-2013 – Southern Region

The analysis of financial data acquired by the Municipalities, revealed that **the current practices of cost recovery for MSWM are poor**, since the revenues from such services is not covering the cost of providing them. The Municipalities usually subsidize their MSWM services from their own budgets.

The **low cost recovery level** may be attributed to the following reasons:

1. The relatively low level of the MSWM fees (according to the Regulation No. 8/2014) against the provided services.
2. The indirect collection of fees through the Electricity Company and not directly by the Municipalities.
3. The 10% deduction of collected fees by the Electricity Company, as administrative charges. In fact, most of the Municipalities do not have a clear view of their relevant revenues, since the Electricity Company deducts directly these 10% amounts and the cost of the street lighting bill through a financial balance sheet, without any consultation with the Municipalities.
4. In certain neighbourhoods more than one household is connected to the electricity meter and yet they pay for only one house.

These impose to amending the current tariff system in order to cover at least the operation and maintenance costs, especially if taking into consideration that such a flat fee system does not create incentives to minimize waste.

However, when assessing the MSWM policy approach, the financial capacity municipal administration is not the only factor to be taken into consideration. The economic capacity of the community is a factor of great significance that should also be taken in account. According to national indicators (DOS, 2012), the MSWM system **costs per capita** are expressed as a percentage of the **national income per capita** and given in the following table.

Costs (OPEX) per capita / GDP per capita	0.39%
Costs (Total) per capita / GDP per capita	0.44%
Costs (OPEX) per capita / Private Final Consumption Expenditures per capita	0.68%
Costs (Total) per capita / Private Final Consumption Expenditures per capita	0.76%

The total MSWM costs are lower in developing countries than in developed countries, whereas MSWM costs per capita are higher in developing countries than in developed countries, obviously due to the large difference in income per capita. This pattern is similar to patterns observed in other parts of the world. It is not possible to conclude that there is an absolute maximum share of the national income that can be spent on MSWM. On the other hand, these observations lead to the conclusion that the local economic capacity is a significant parameter when establishing the objectives and targets of the local MSWM system.

In Municipalities with large segments of very poor inhabitants, it becomes difficult to implement uniform user charges reflecting the real costs of MSWM.

Thus, while in principle the full costs of the MSWM system should be passed on to the users directly and should reflect the amount of waste collected, such a financial model is very difficult to implement. User charges are desirable to the extent that they strengthen public awareness of waste minimization

by making the MSWM costs visible to the households. However, it might be that the major benefits of cost-related user charges are improved accountability and cost-consciousness in the Municipalities. The highly differentiated incomes, coupled with areas of absolute poverty in many of the case Municipalities, imply that cross-subsidization of the MSWM system is required in order to secure sufficient funding of an acceptable waste management system.

Along with all the aforementioned "technical" malfunctions of the existing tariff scheme services, it is necessary to point out a factor which contributes to new revenue generating. This is about shift from the existing solid waste management system, which is dominated by the concept of the mixed waste collection and management, to a modern concept and management based on the management and exploitation of more solid waste streams such as packaging waste, organic fraction, recyclable materials pre-selected at source, as well as the exploitation of LFG and biogas collected by biowaste digestion units (aerobic, anaerobic) for energy production and sale. Such an enlargement would be of great significance as it would contribute:

- in generation of new revenue sources;
- to reduce the burden on the public budget, in the section relating to the subsidy of Municipalities' expenditure; and
- to weaken the dependence of public institutions from lending and discharge the current expenditure from interest.

It is recorded as positive the fact that some Municipalities, either alone or in cooperation with the private sector, apply management practices on various waste streams-other than-municipal urban-although not under an integrated framework (since there are no specific national plans), such as old tires (New Al-Shobak, Greater Ajloun, Khaled Bin Waleed, Sharhabil bin Hasna, New Al-Mazar, Al-Oyoun, New Deir Allah, Al-Fahis), batteries (Greater Ajloun), and C&D waste (Al-Shoneh Al-Wsta),.

Especially as regards to composting of biowaste, it should be pointed out that it will generate significant benefits for the environment, for the municipal budget and for the national economy, since:

- MSW will divert from the landfills, resulting on minimization the emissions produced from this type of waste under unsanitary landfilling conditions;
- the use of compost in the Jordanian agricultural sector will minimize adverse environmental impacts caused by chemical fertilizers;
- utilizing compost will decrease the expenditures allocated to importing the fertilizers (most of fertilizers are imported from abroad); and
- high fraction of Jordanian SW is organic, despite the fact that 91% of Jordan's land is arid to semi-arid.

The **integration of informal sector** in MSWM operations (e.g. recyclables recovery, etc.), will prove as a prosperous source of income for both the waste-pickers' families and the municipal budget.

Preconditions for integration of informal sector are: a) institutionalization of the framework, in close cooperation with waste-pickers, b) training the waste-pickers to perform their work properly with minimal public health risks, c) support waste-pickers with technical assistance.

The **involvement of private sector** in MSWM operations, under a sound and sustainable scheme, could also contribute in defuse the burden of recurrent costs and debt service costs. Partnerships between Municipalities and private entities (PPP) would generate new revenue for the municipal budget. A prerequisite for success PPPs is to strengthen the capacity of Municipalities' staff to manage and supervise the relevant contracts.

Another factor that should be taken into account when considering the cost recovery issues is the **operational expenditure arising from new treatment facilities**. Even if external grant funds finance the investment cost and despite the consideration of investment cost as sunk costs (from the standpoint of Municipality), a large increase in the operational costs following the opening of the new waste treatment facilities might be difficult to sustain.

6.3.5 EFFICIENCY & PRODUCTIVITY OF MSWM SYSTEM

The number of employees in municipal solid waste management operations varies, depending on the needs and ability of each Municipality.

The following diagrams illustrate the number of employees in municipal solid waste management operations, analytically per Municipality, grouped by region.

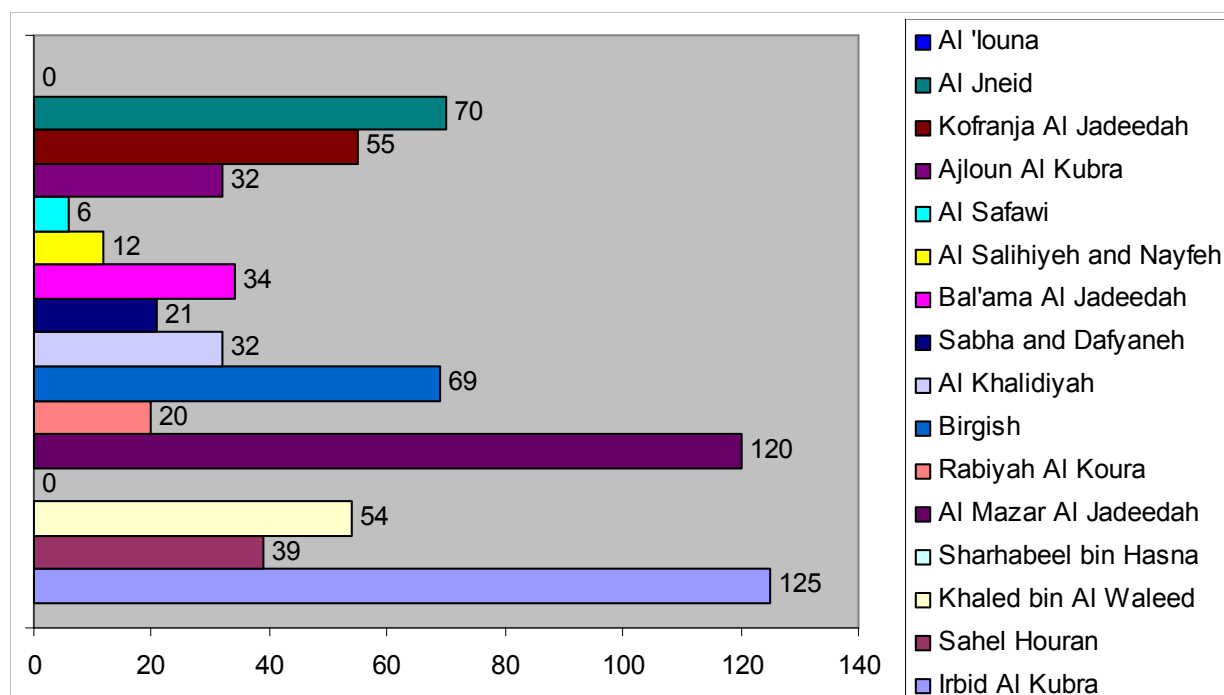


Figure 6-38: Number of MSWM employees per Municipality – Northern Region

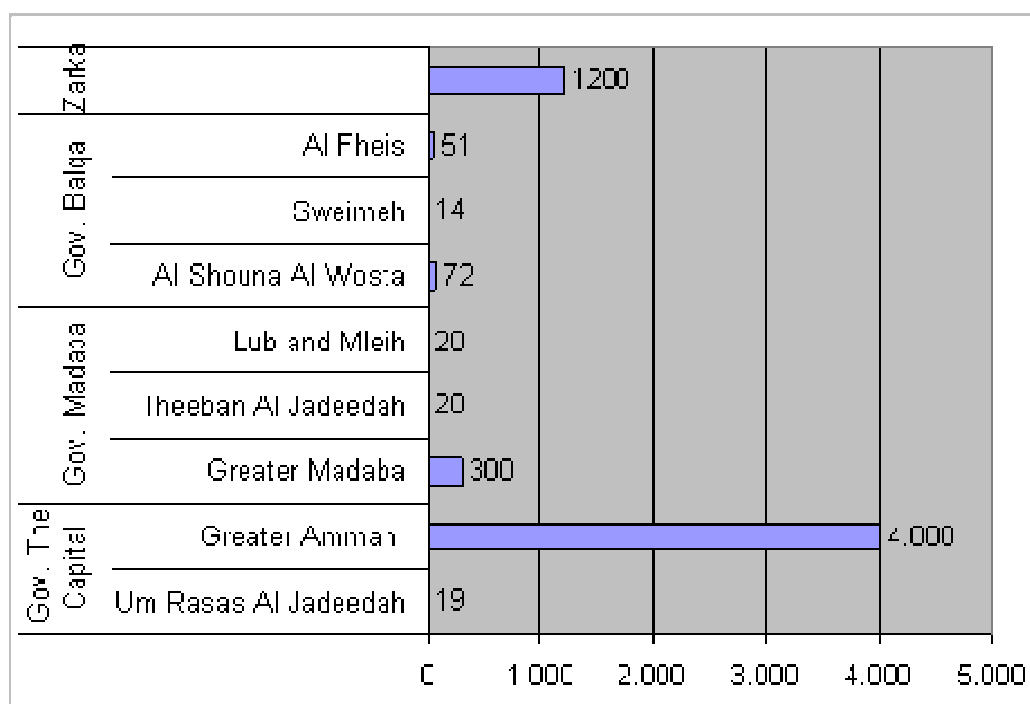


Figure 6-39: Number of MSWM employees per Municipality – Central Region

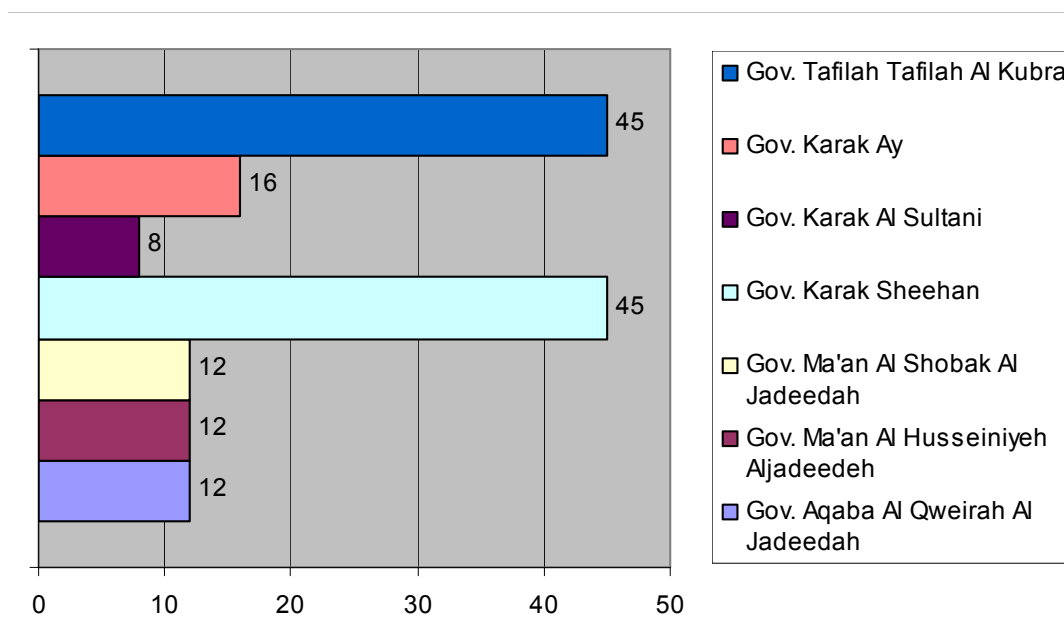


Figure 6-40: Number of MSWM employees per Municipality – Southern Region

Considering the amount of managed solid waste which corresponds to an employee (see Figure 6-41), was found that this indicator is very low, less than 2 tn/employee, for the vast majority of Municipalities, ranging between 0.33 (Al-Shoneh Al-Wsta) and 1.78 (Greater Tafilah). Only in three Municipalities the indicator values above 2 tn/employee (Greater Irbid: 3.80, New Al-Husseiniyah: 3.17 and Greater Ajloun: 2.66).

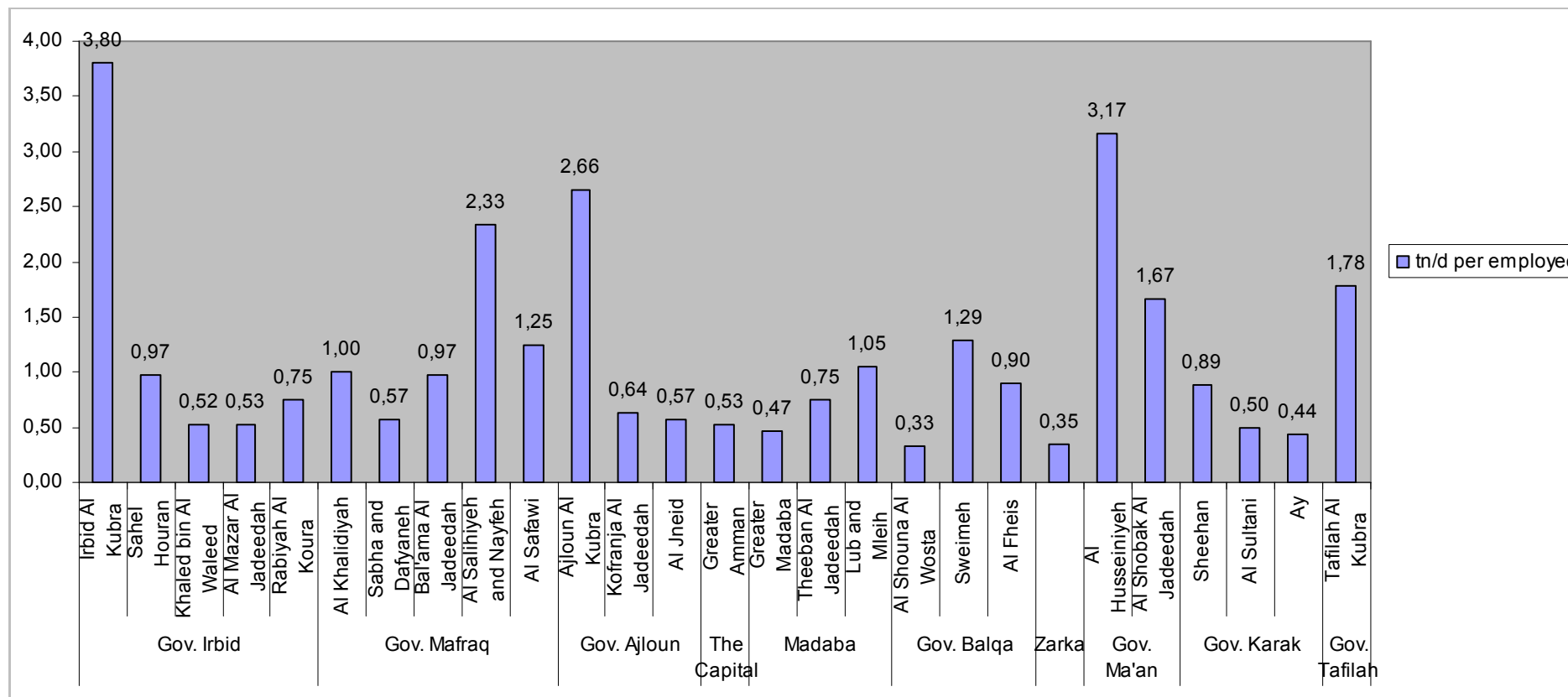


Figure 6-41: Efficiency – productivity of MSWM System: tn/d per employee, 2013

The examination of the indicator **"number of residents served per employee"**, considering as putative population sizes both the current formal population and the population with refugees, revealed that (see Figure 6-42, Figure 6-43, Figure 6-44):

- In all regions, for the vast majority of the Municipalities this indicator varies from 500 to 2,000 inhabitants/ employee.
- Only in one Municipality of the Northern Region (Greater Irbid) the indicator exceeds 5,000 inhabitants/ employee and in another one of the Central Region (Al-Shoneh Al-Wsta) it exceeds 1,500 inhabitants/ employee.

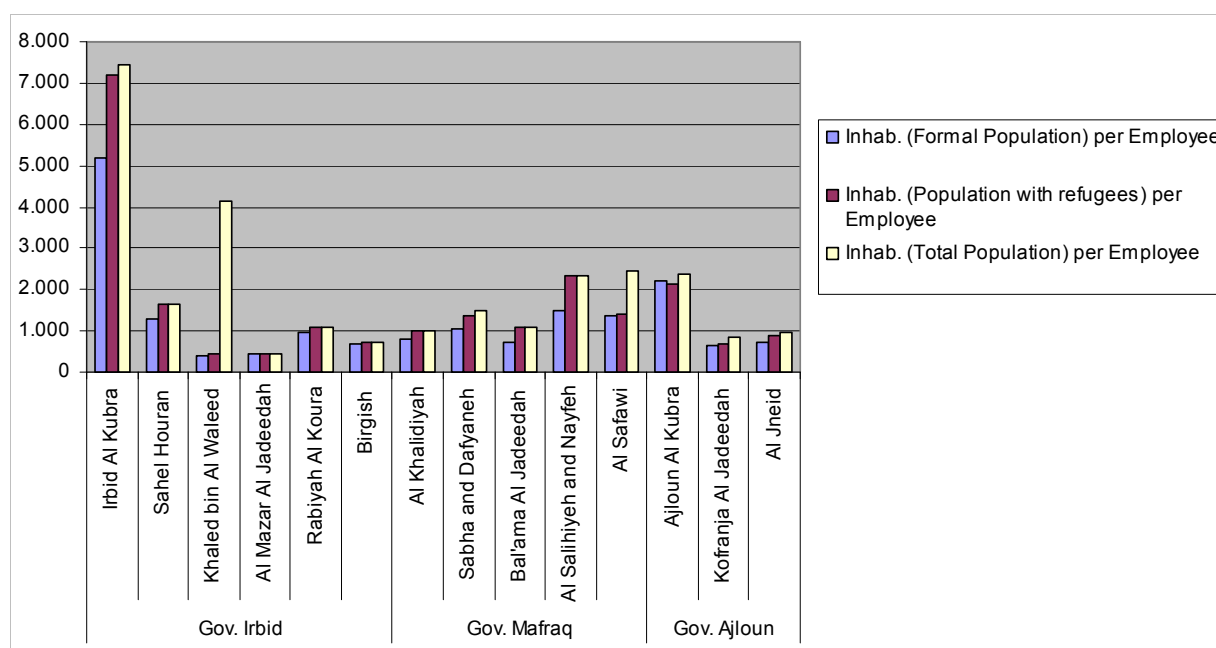


Figure 6-42: Efficiency – productivity of MSWM System: inhabitants served per employee, 2013 – Northern Region

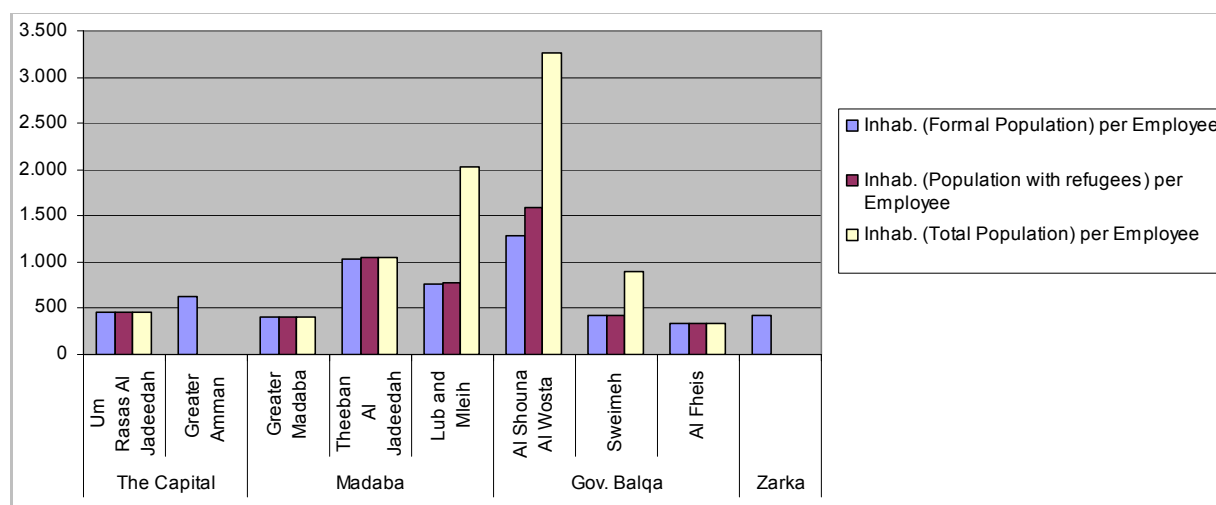


Figure 6-43: Efficiency – productivity of MSWM System: inhabitants served per employee, 2013 – Central Region

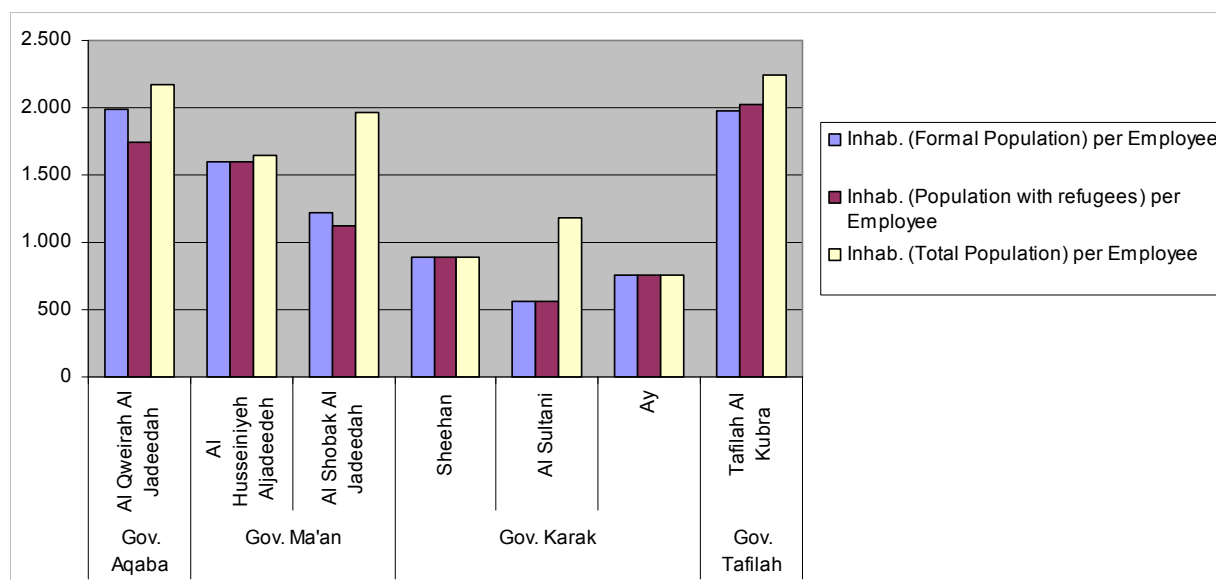


Figure 6-44: Efficiency – productivity of MSWM System: inhabitants served per employee, 2013 – Southern Region

The examination of the indicator “**number of residents served per vehicle**”, considering as putative population sizes both the current formal population and the population with refugees, revealed that it varies in a wide range from 100,000 inhabitants/vehicle in Irbid to less than 10,000 inhabitants/vehicle in the vast majority of Municipalities (see Figure 6-45, Figure 6-46, Figure 6-47).

Lack of route planning, unfavourable topography and urban characteristics of settlements as well as different level of maintenance should be considered as the main factors which may account for this variation.

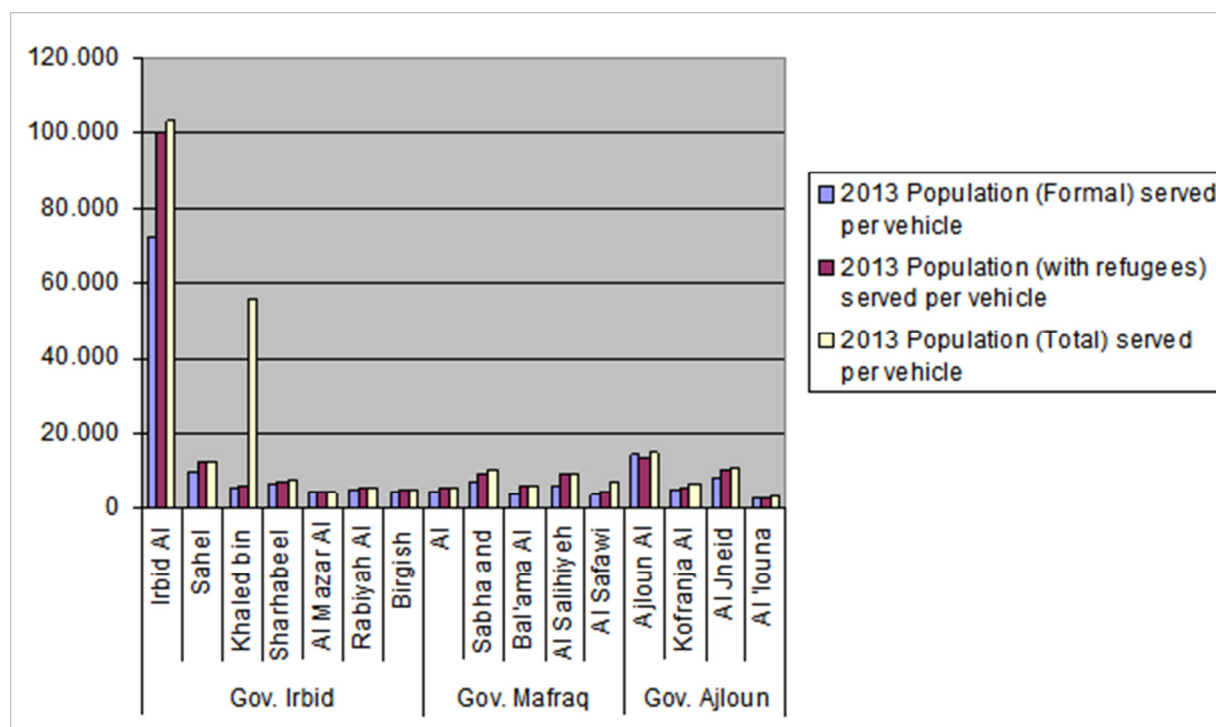


Figure 6-45: Efficiency – productivity of MSWM System: inhabitants served per vehicle, 2013 – Northern Region

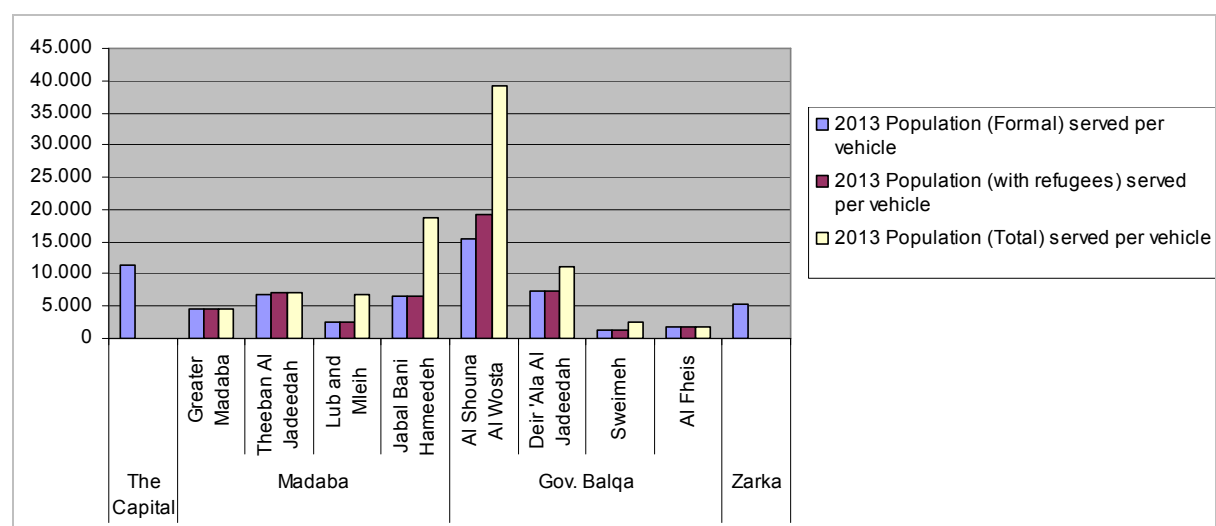


Figure 6-46: Efficiency – productivity of MSWM System: inhabitants served per vehicle, 2013 – Central Region

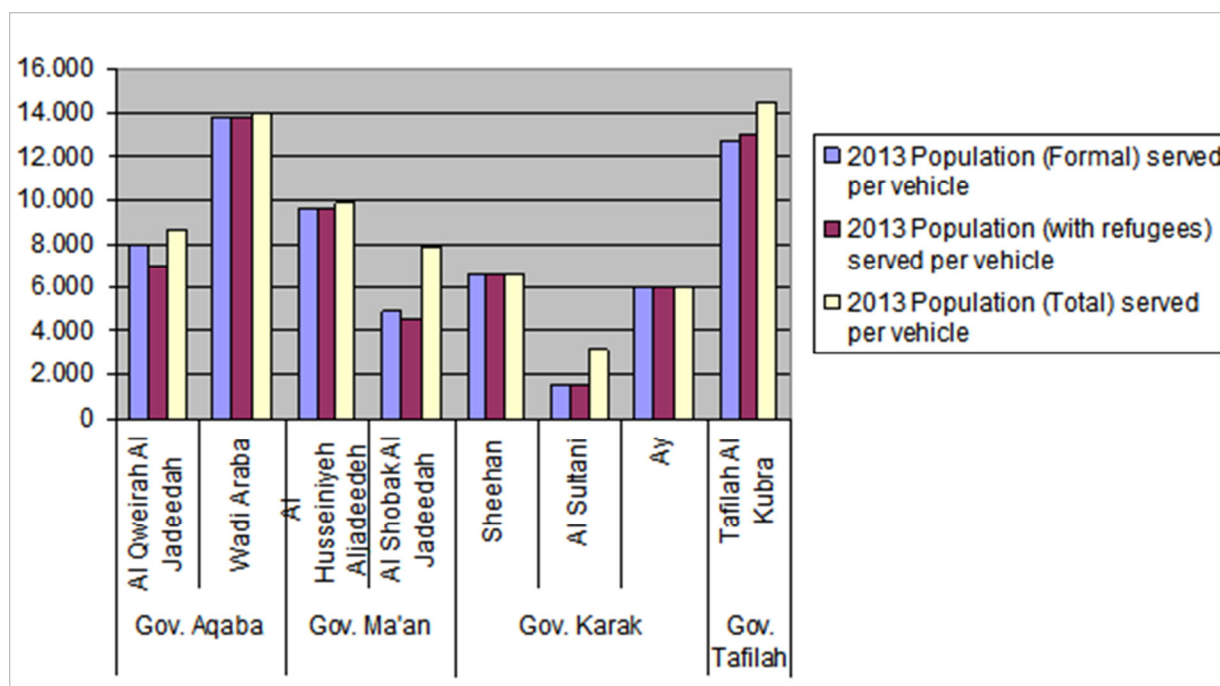


Figure 6-47: Efficiency – productivity of MSWM System: inhabitants served per vehicle, 2013 – Southern Region

The examination of the indicator "**amount of waste transported per truck per day**", revealed the following findings:

- In *Northern Region*: in one Municipality (Greater Irbid) the indicator values above 50 tn/d per vehicle, in another one (Greater Ajloun) it moves around 20 tn/d per vehicle, while in all other Municipalities of the region it lies below 10 tn per vehicle.
- In *Central Region*: in three Municipalities (Greater Amman, Jabal Bani Hamida and New Deir Allah) the indicator varies from above 8 up to 12 tn/d per vehicle, while in all other Municipalities of the region it varies in the range 2.5-4.5 tn/d per vehicle.
- In *Southern Region*: in one Municipality (New Al-Husseinieh) the indicator values 19 tn per vehicle, in another Municipality (Greater Tafilah) values 11 tn per vehicle and in all other Municipalities varies in the range 1.0 - 7.0 tn per vehicle.

Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)

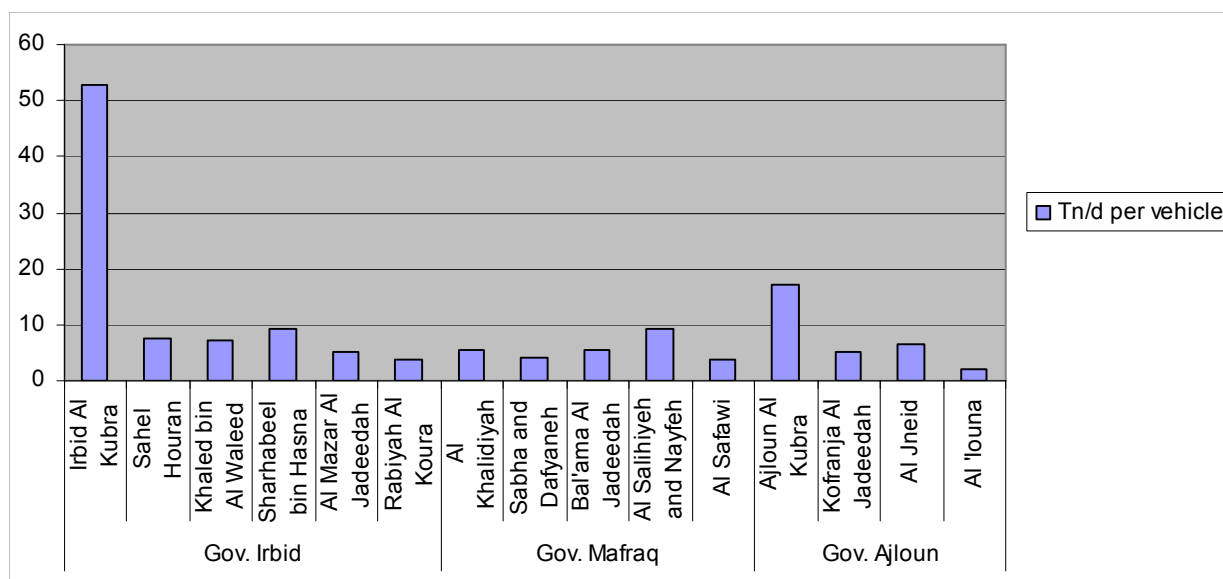


Figure 6-48: Efficiency – productivity of MSWM System: tn/d per vehicle, 2013 – Northern Region

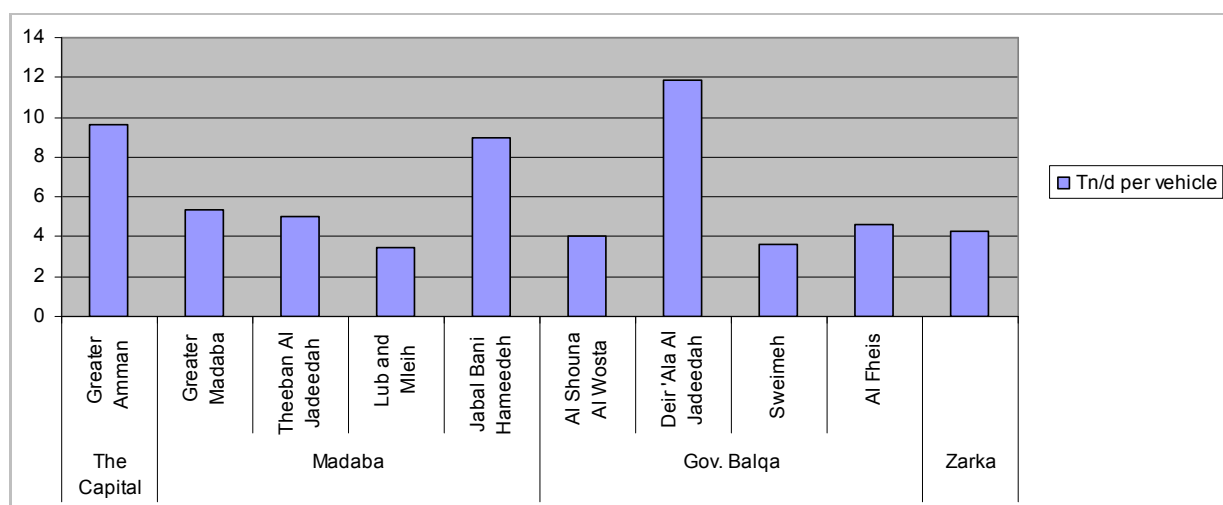


Figure 6-49: Efficiency – productivity of MSWM System: tn/d per vehicle, 2013 – Central Region

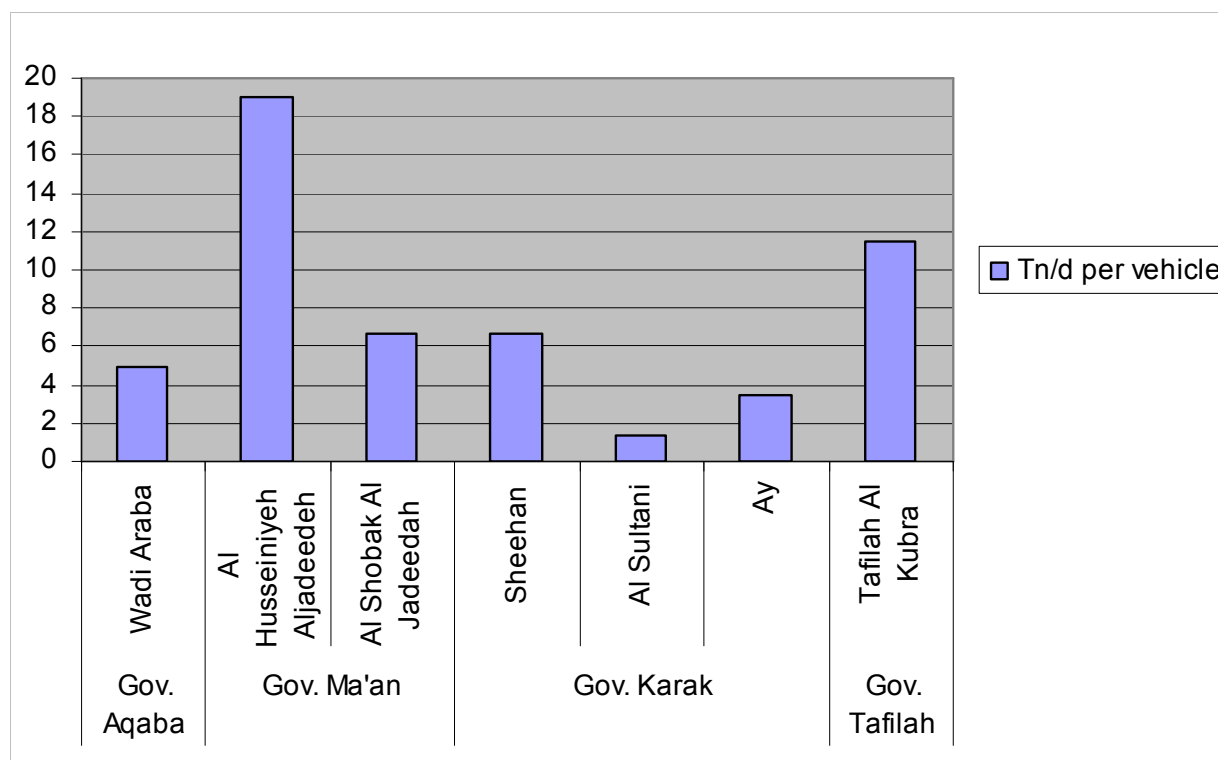


Figure 6-50: Efficiency – productivity of MSWM System: tn/d per vehicle, 2013 – Southern Region

For a more in-depth estimation of the efficiency - effectiveness of MSWM system one more indicator was used: the **"number of containers that are served by vehicle"**. Considering this indicator it is observed that:

- The highest value (667) occurs in the Municipality of New Theban in Madaba Governorate, followed by the Sabha W Al-Dafianeh Municipality in Mafrq Governorate (373) and Jabal Bani Hamida (300). In the range 100-300 three Municipalities were found, while for all other Municipalities the indicator values below 100 containers per vehicle.

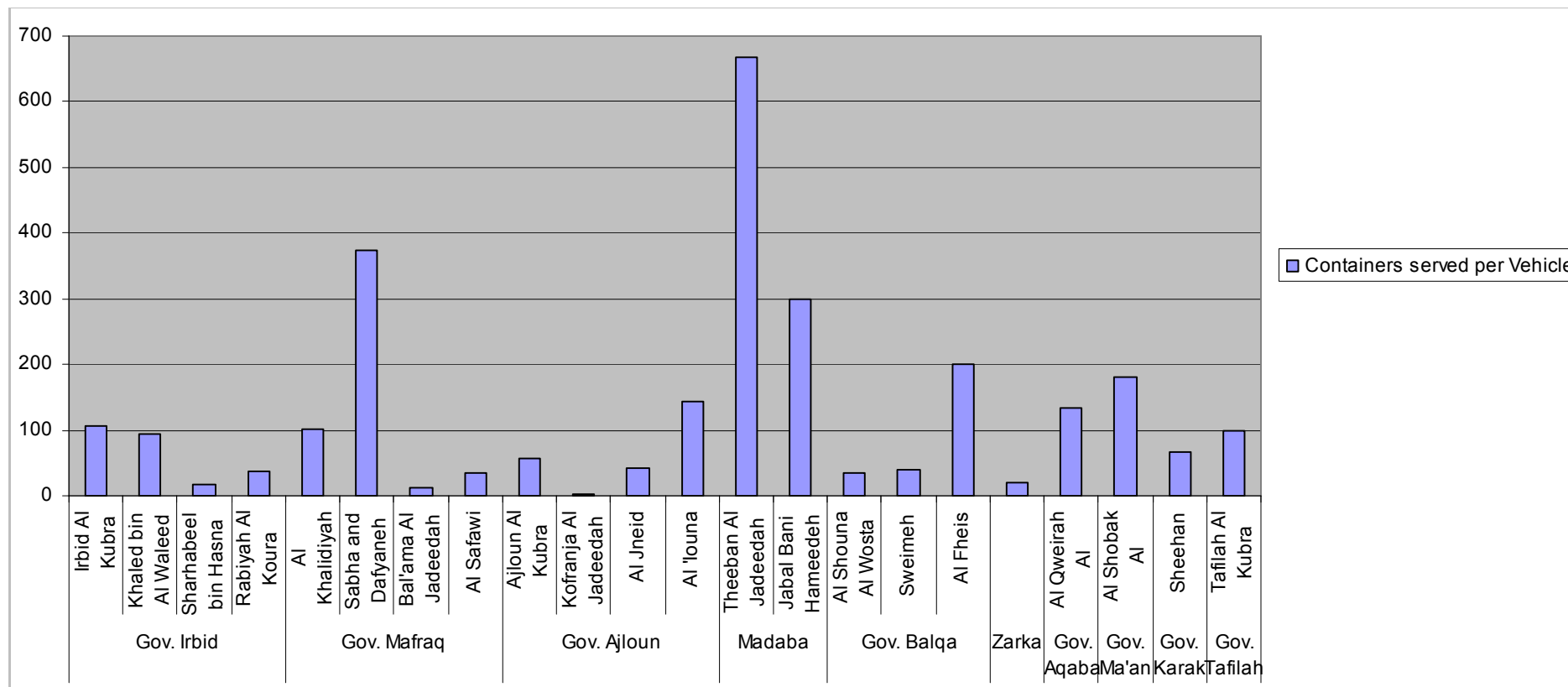


Figure 6-51: Efficiency – productivity of MSWM System: containers served per vehicle, 2013

The very low degree of efficiency - effectiveness of MSWM system should be taken as the overall conclusion. The interpretative reasons are all that mentioned in the OPEX plus the following:

Problems affecting in efficiency - effectiveness of MSWM system	Municipalities that reported the problem
Design / Planning	
Improper sitting of bins (L and M)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Greater Ajloun, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak
Empirical design of waste collection itineraries and routes (L)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Greater Ajloun, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah
Organizational	
Lack of a SW department, and training for them (H)	Sahel Horan
working in two shifts: morning and evening shifts, The difficulty of dividing the work into two shifts: Morning shift and evening shift (M)	Rabiet Al-Kura, Mu'tah and Mazar
Population – Service area	
Rapid urbanization outstripping service capacity (H)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Greater Ajloun, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah
Uncontrolled proliferation of squatter settlements (H and L)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Greater Ajloun, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah
The vast area of the area covered by the Municipality (H)	New Theban, Mu'tah and Mazar
The big expansion of the geographical area for the collection of waste (M)	Burqush
Natural conditions	
The nature and topography of the area (M)	Burqush
Institutional, Regulations	
Overlapping authorizations in decision making for financial and administrative issues (H, M, L)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Sabha W Al-Dafiane, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah
No proper institutional set-up for the MSWM activities (H, M, L)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Sabha W Al-Dafiane, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah
Lack of legislation (H, M, L)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Sabha W Al-Dafiane, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah, Greater Madaba
Lack of control on special waste (hazardous industrial, infectious medical etc.) (H, M, L)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Sabha W Al-Dafiane, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah
lack of modern cleanliness regulation (H, M, L)	Greater Irbid, Al-Khaldieh, Sabha W Al-Dafiane, Sabha W Al-Dafiane, New Oum Al-Rasas, New Deir Allah, New Al-Qawiera, New Al-Shobak, Greater Tafilah

Problems affecting in efficiency - effectiveness of MSWM system	Municipalities that reported the problem
Staff	
Shortage of cleaning workers (H, M)	Al-Khaldieh, Sahel Horan, Khaled Bin Waleed, Rabiet Al-Kura, Al-Khaldieh, New Al-Rouaishad, Al-Salahia and Naifa, New Kofranjah, Al-Junied, New Deir Allah, Al-Fahis, New Al-Shobak
Lack / Shortage of drivers (H, M)	New Al-Mazar, New Theban, Mu'tah and Mazar
Shortage of trained, specialized and professional staff, Lack of knowledge of workers in a sound collection,	Al-Khaldieh, Sahel Horan, Khaled Bin Waleed, Rabiet Al-Kura, Al-Khaldieh, New Al-Rouaishad, Al-Salahia and Naifa, New Kofranjah, Al-Junied, New Deir Allah, Al-Fahis, New Al-Shobak
Other	
The public random dispose of waste (H)	Sahel Horan

6.4 JSCS

6.4.1 JSCS' CAPITAL EXPENDITURES (CAPEX)

The JSCs' **CAPEX evolution** during 2011-2013 is shown in the following diagram.

Only in two JSCs the CAPEX exceed 0.5 million JOD (Karak and Mafraq) and in two other cases lie between 0.2 and 0.3 million JOD.

This figure reveals the uneven distribution of investments among the JSCs and reflects the different level of capability in access to finance sources.

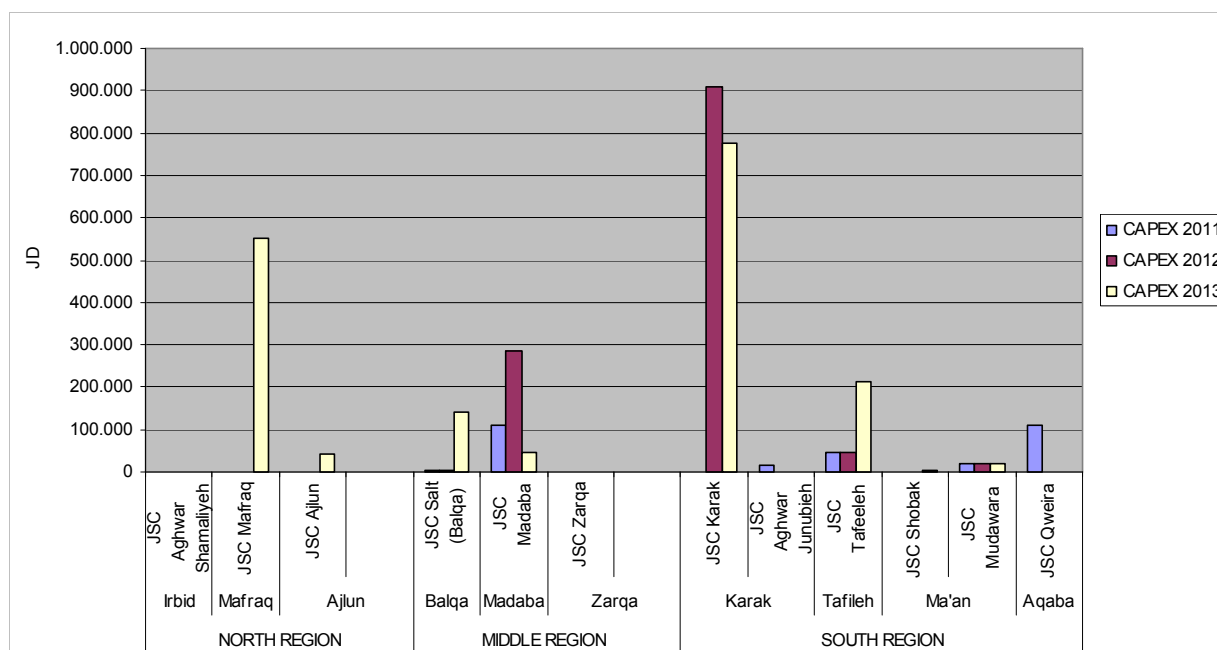


Figure 6-52: JSCs' CAPEX evolution, 2011-2013

The examination of **CAPEX per tonne** revealed a large heterogeneity, with the indicator ranging from 16.67 JOD/tn (Mudawara) to 2.56 JOD/tn (Karak). In all the rest JSCs the indicator value is insignificant. The high value in Mudawara is explained due to the very small amount of waste.

The above figure proves that there is not a smooth correlation between quantity of managed waste and equipment needed to manage them.

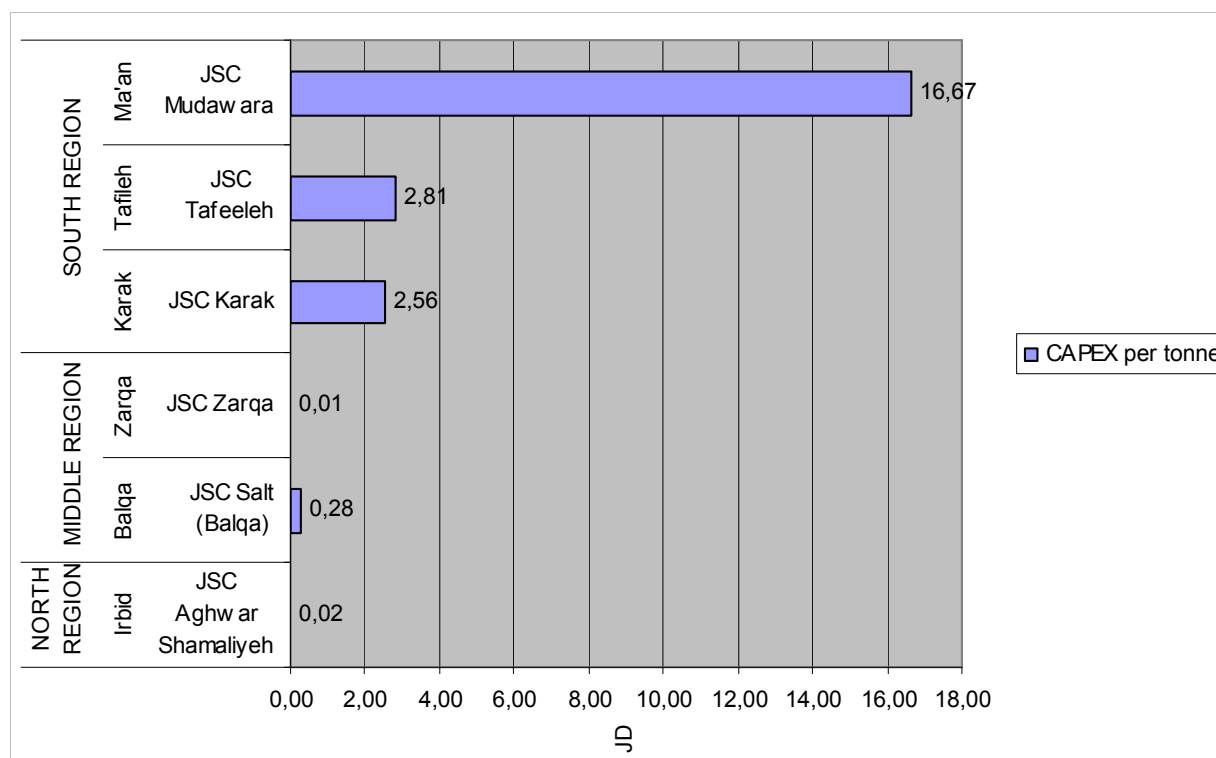


Figure 6-53: CAPEX per tonne

6.4.2 JSCS' OPERATIONAL EXPENDITURES (OPEX)

The JSCs' **OPEX evolution** during 2011-2013 tends to rise in most JSCs. A notable variation among the JSCs is also observed for the indicator, which is explained mainly due to the differentiation of number of employees and the increase in fuel prices.

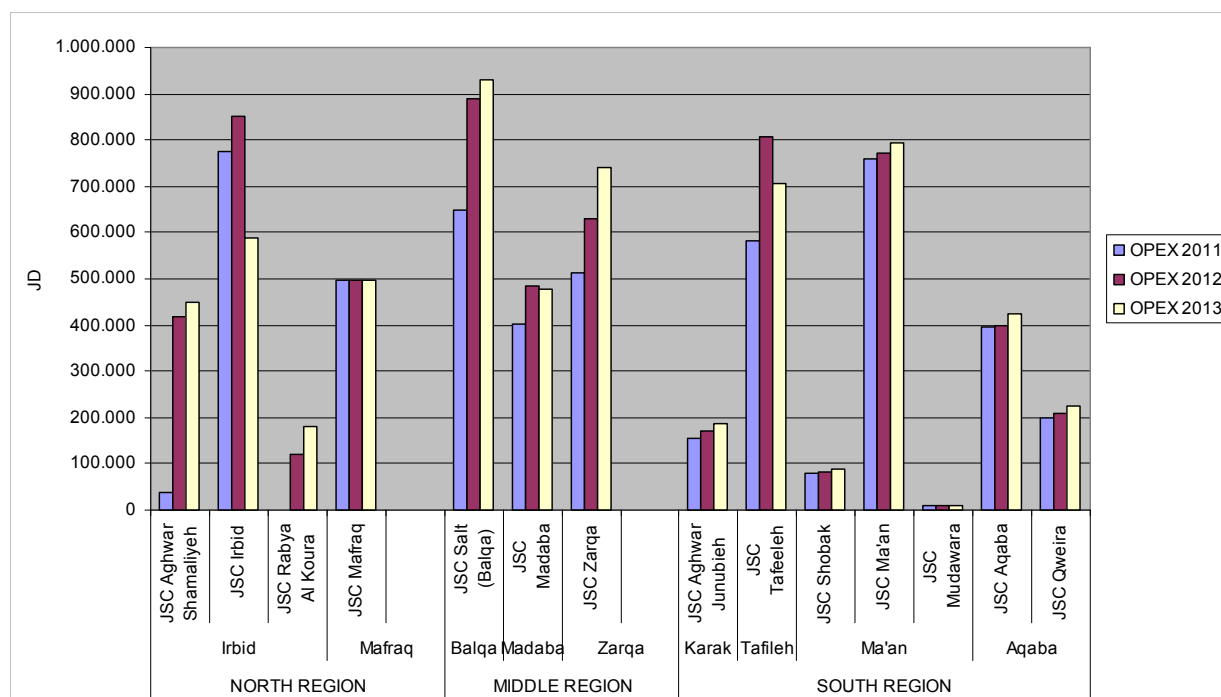


Figure 6-54: JSCs' OPEX evolution, 2011-2013

The **OPEX per tonne** vary in the range 20-30 JOD/tn for three JSCs, in the range 10-13 JOD/tn for other three JSCs and below 10 JOD/tn JSC for all the other JSCs.

High values of the indicator may be due to a combination of factors such as: irrational chart (mostly), increased maintenance costs (e.g. due to frequent breakdowns in rocky soils).

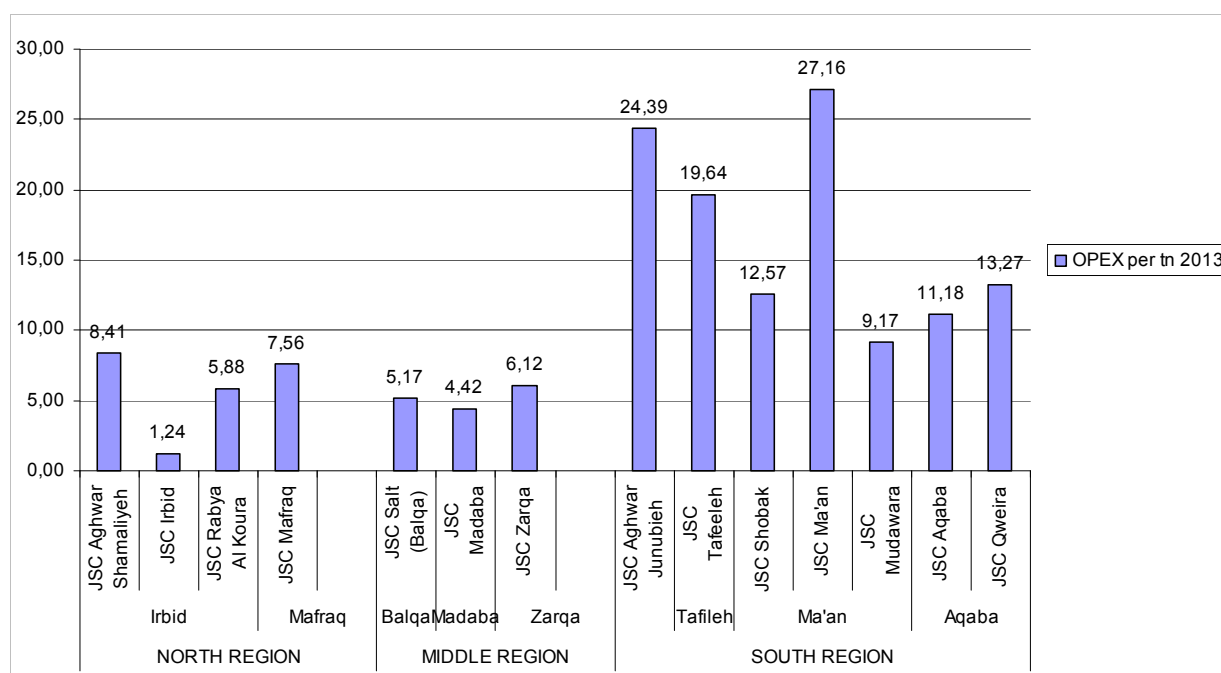


Figure 6-55: OPEX per tn, 2013

For four JSCs a more in-depth cost analysis was feasible to be carried out, concerning on breakdown of OPEX per main category. The results are shown in the following table and graph. It can be observed that the main cost is the cost of personnel payroll, followed by maintenance costs and fuel.

Table 6-1: OPEX breakdown of the Irbid, Mafrq, Salt and Ma'an JSCs per category, 2013 (values in JOD)

OPEX Category	JSC Irbid	JSC Mafrq	JSC Salt (Balqa)	JSC Ma'an
Permanent staff	455,000	803,517	710,000	490,000
Seasonal staff	1,500	0	0	0
Total Cost of staff	456,500	803,517	710,000	490,000
Cost of fuel	35,000	50,000	40,000	40,000
Cost of electricity	3,000	2,000	8,000	6,000
Cost of maintenance and repairs (equipment, installations, buildings)	2,000	70,000	35,000	52,000
Cost of new equipment	0	5,000	0	0
Total JSC	496,500	930,517	793,000	588,000

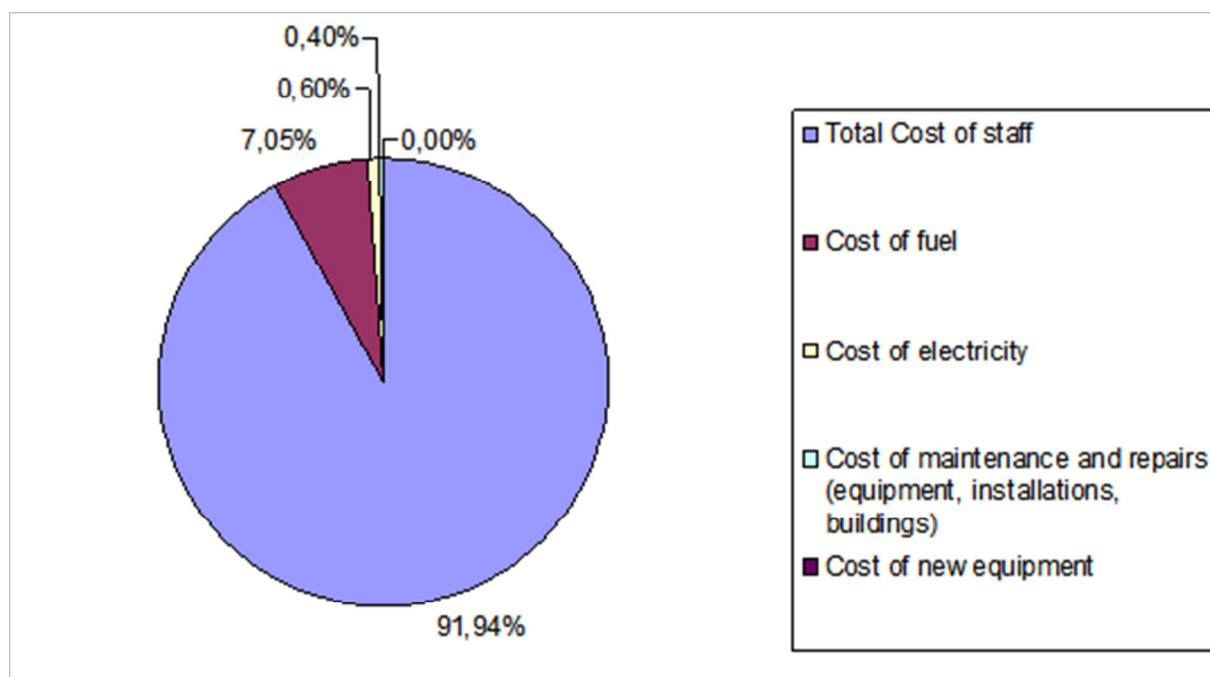


Figure 6-56: Cost analysis in Irbid (Al-Ekaider) JSC, 2013

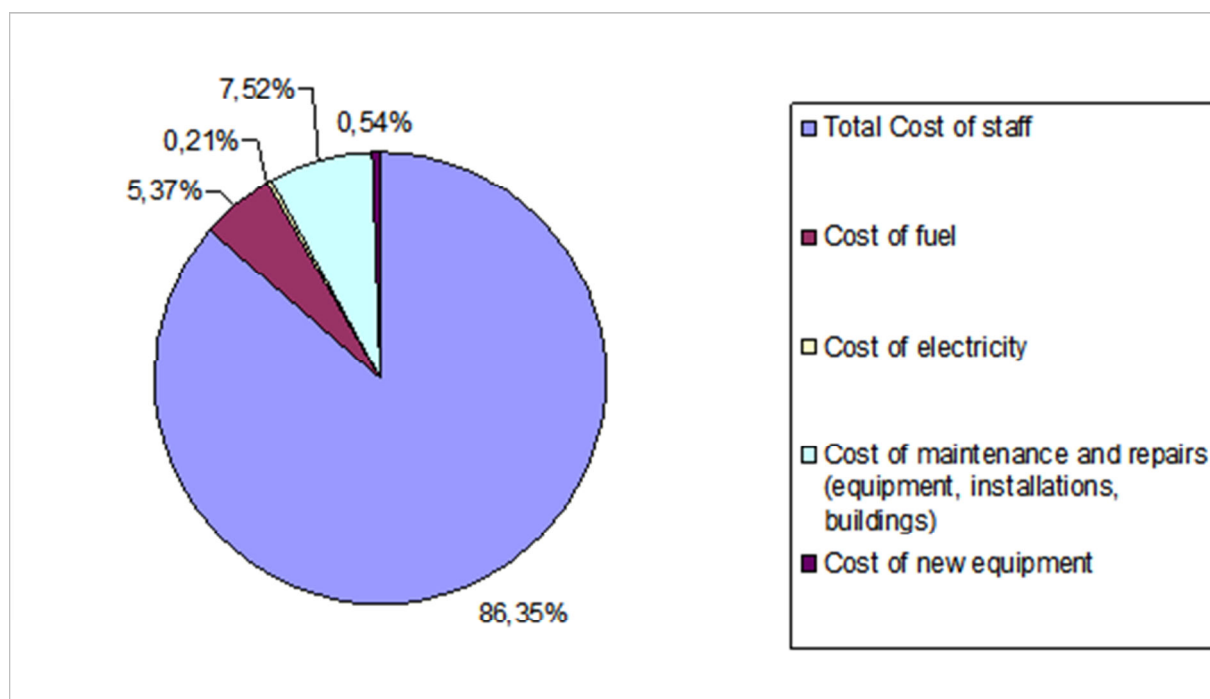


Figure 6-57: Cost analysis in Mafraq JSC, 2013

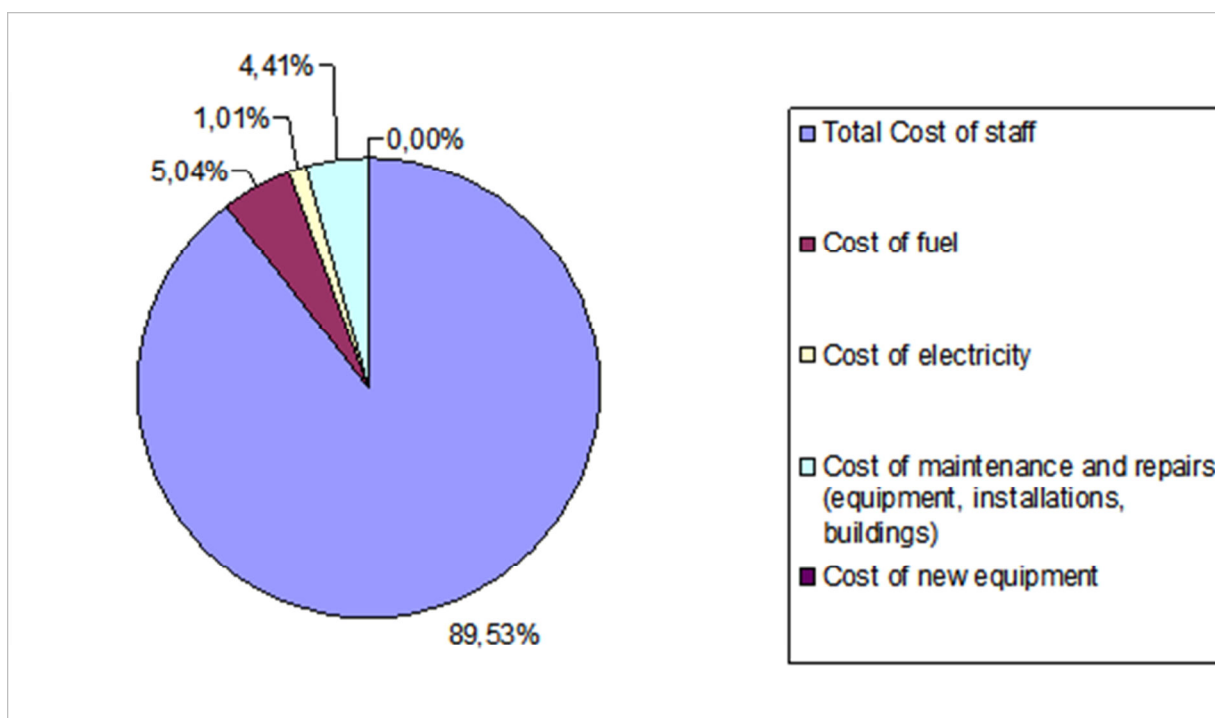


Figure 6-58: Cost analysis in Balqa (Al Salt) JSC, 2013

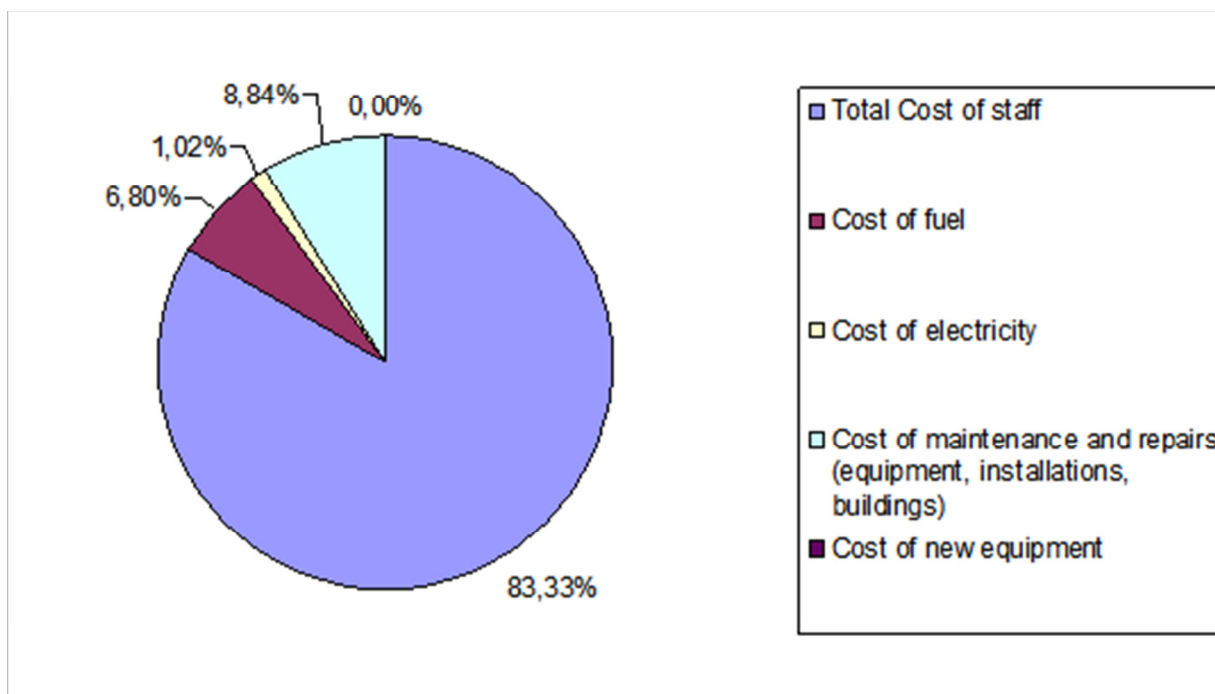


Figure 6-59: Cost analysis in Ma'an JSC, 2013

6.4.3 JSCS' REVENUES

The JSCs Regulation (No. 17/1983, as amended by Regulation No. 75/2009) identifies the revenue streams of the JSCs and their sources to be:

- contributions from member Municipal Councils and beneficiary villages per JSC;
- funds that are allocated to the JSCs by the Council of Ministers (based on the recommendation of the Minister of Municipal Affairs) from budget allocated for the benefit of Municipalities; and
- revenues from collected fees, loans, donations, aids and any other funds (with the need for prior approval of the Council of Ministers if the source of funding comes from a non-Jordanian entity).

The examination of JSCs' Revenues revealed that only in two cases the revenues exceed 1 million JOD: in JSC Irbid (in all years of the considered period) and in Karak for 2012 (see Figure 6-60).

In one case (JSC Salt) the revenues approach the 1 million JOD in 2013 and in three cases are around 0.5 million JOD (Mafraq, Madaba, Aghwar Shamaliyah). In all other JSCs the revenue is riveted to very low levels.

The revenue evolution of JSC over the last three years indicates an upward trend for most JSCs, while only in two of them indicates a slight decrease (Madaba, Karak).

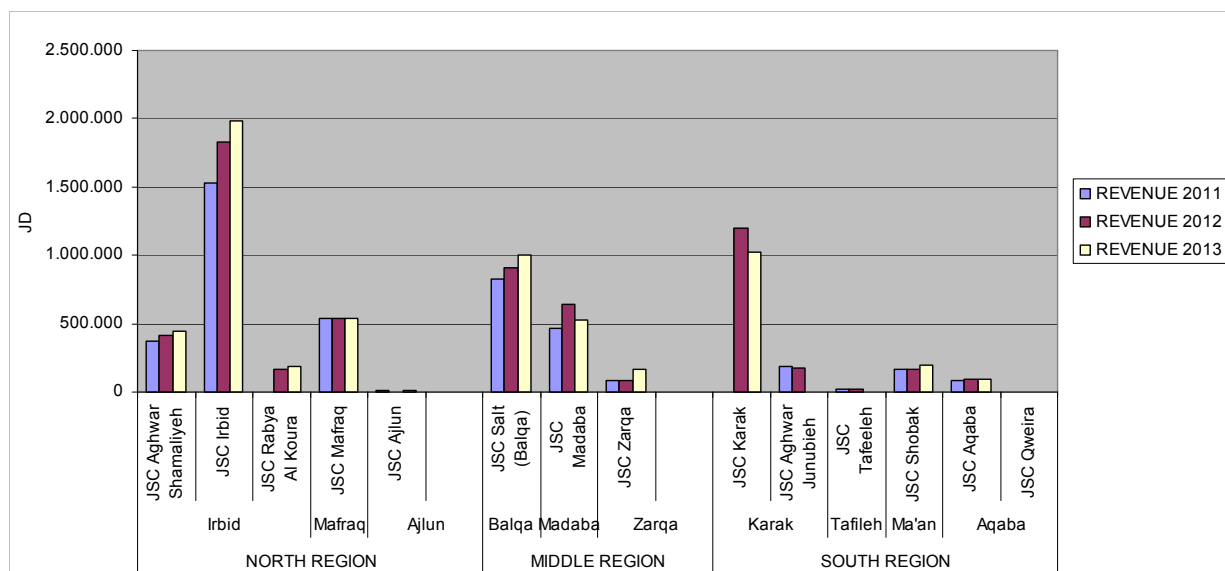


Figure 6-60: REVENUE evolution, 2011-2013

Examining the **revenue collected per each tonne** managed by the JSCs it is found that the average lies on the range 4-8 JOD/tn. Lower values (< 4 JOD/tn) occur in several JSCs, while only in one JSC (Shobak) the indicator rises to 28 JOD/tn (see Figure 6-61).

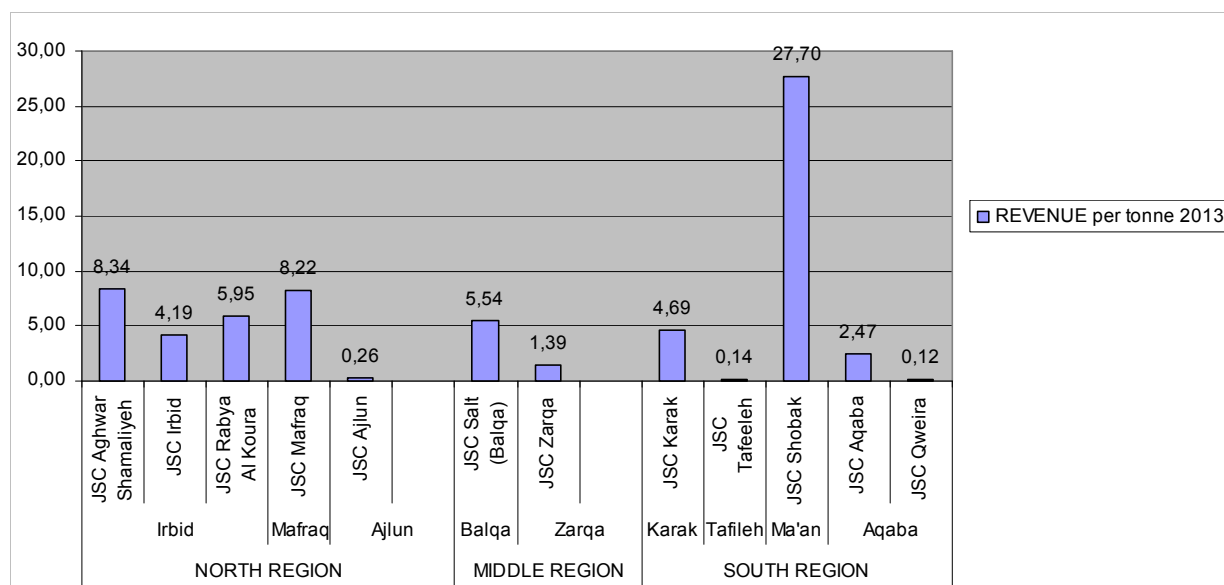


Figure 6-61: REVENUE per tonne

For two JSCs a more in-depth revenue analysis was feasible to be carried out, concerning on breakdown of REVENUES per main source category. The results are shown in the following table and graphs. It can be observed that the main revenue source category is the “loans, donations, aids and other funds”, while “Revenue from selling reused, recycled materials from waste” is a notable source of critical significance.

REVENUES CATEGORY 2013	JSC Irbid		JSC Mafrag	
Contributions from the Municipalities and beneficiary villages who are members of the JSC	320,000	16.10%	2,000	0.37%
Funds allocated by the Council of Ministers (from the collected fees)	0	0.00%	60,000	11.11%
Loans, donations, aids and other funds	1,400,000	70.42%	420,000	77.78%
Fine/penalty	4,000	0.20%	0	0.00%
Revenue from selling reused, recycled materials from waste	110,000	5.53%	50,000	9.26%
Revenue from energy recovery from waste	0	0.00%	0	0.00%
Factories which dumb their waste in the dumpsite	154,000	7.75%	8,000	1.48%
Total REVENUES of JSC	1,988,000		540,000	

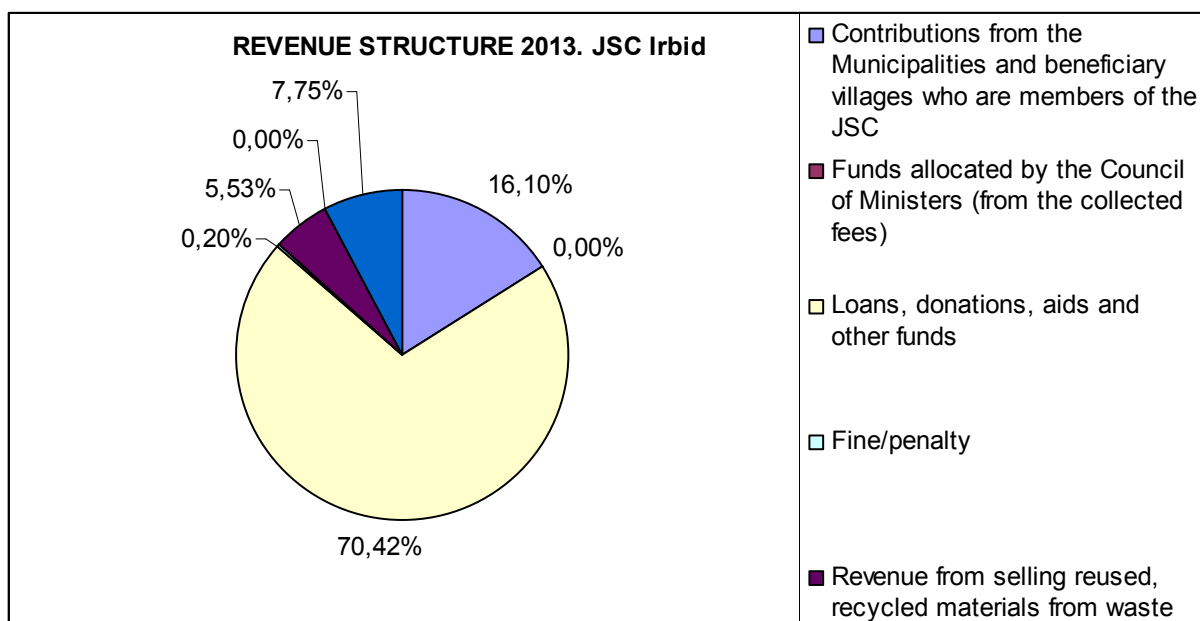


Figure 6-62: REVENUE structure in Irbid (Al Ekaider) JSC, 2013

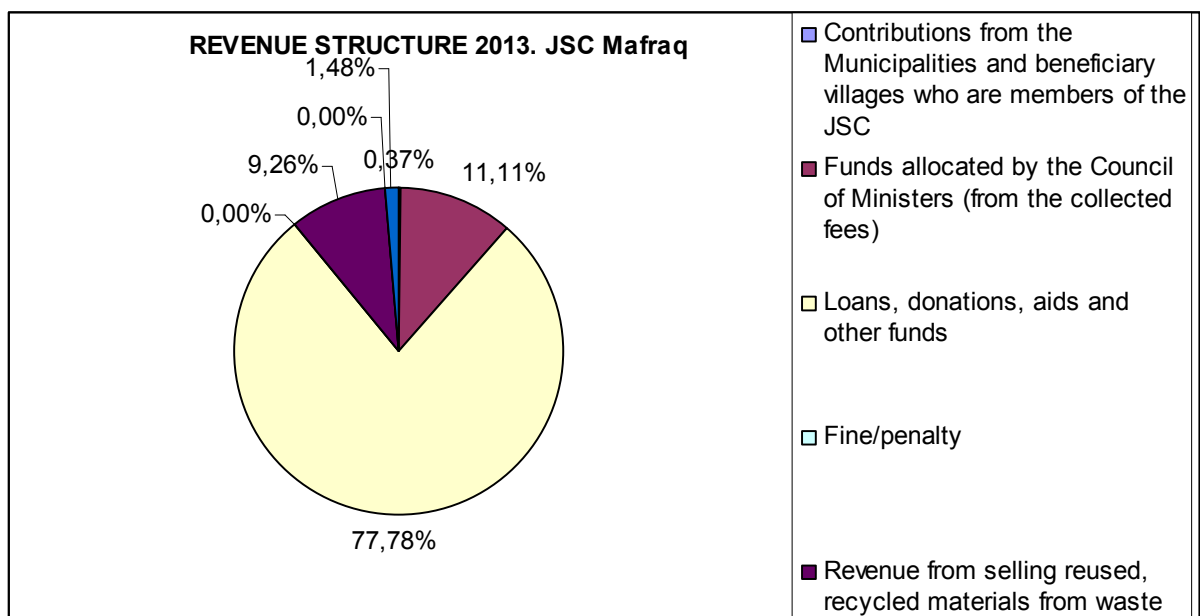


Figure 6-63: REVENUE structure in Mafraq JSC, 2013



6.4.4 JSCS' FINANCIAL BALANCE & COST RECOVERY LEVEL

The Financial Balance of revenue - operating expenses was found negative for 4 JSC and positive for the rest, with the strongest in JSC Irbid (Figure 6-64). Similarly, four (4) JSCS cannot recover the cost of their operating expenses (Figure 6-65).

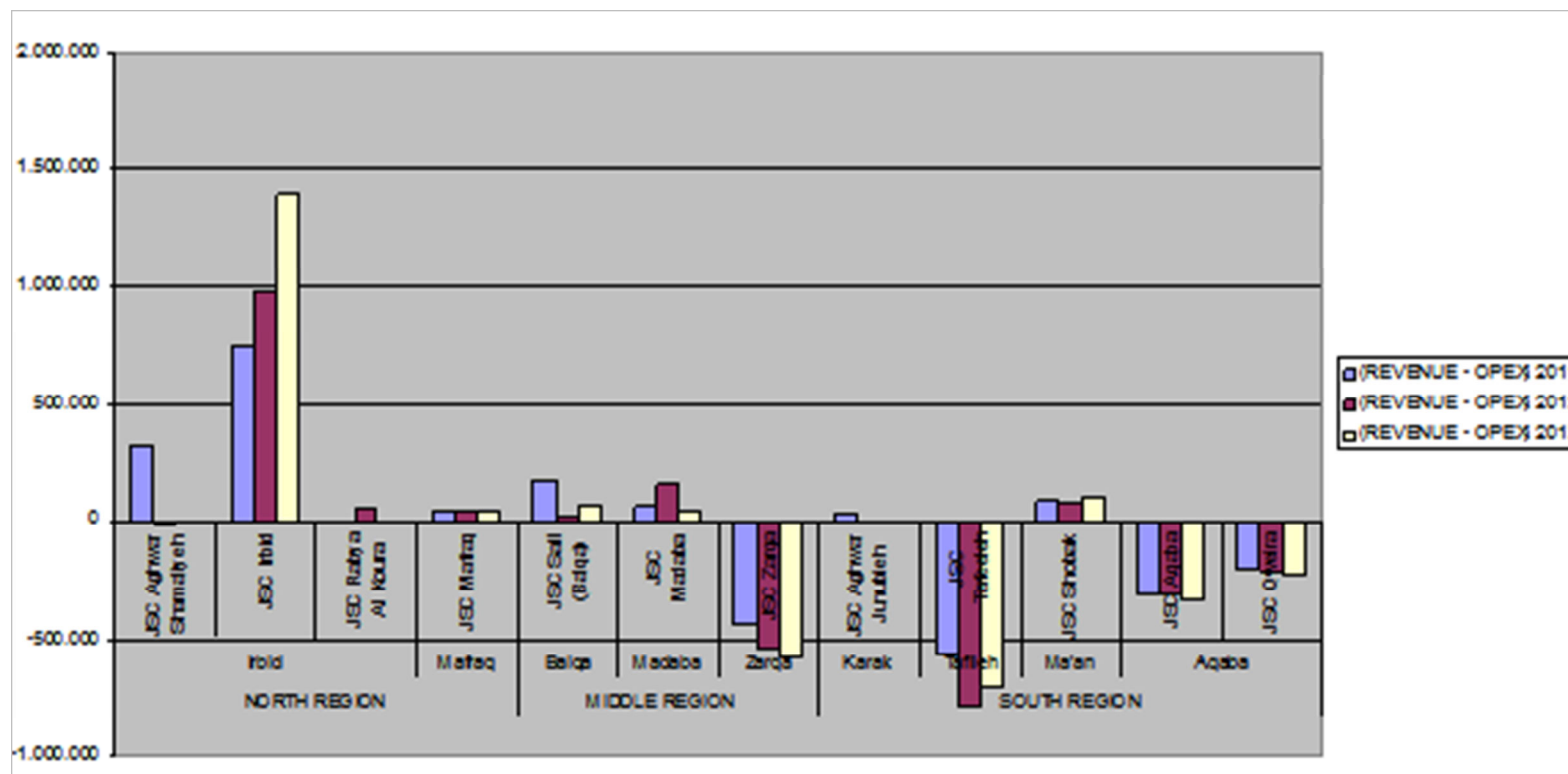


Figure 6-64: JSCs' financial balance, 2011-2013

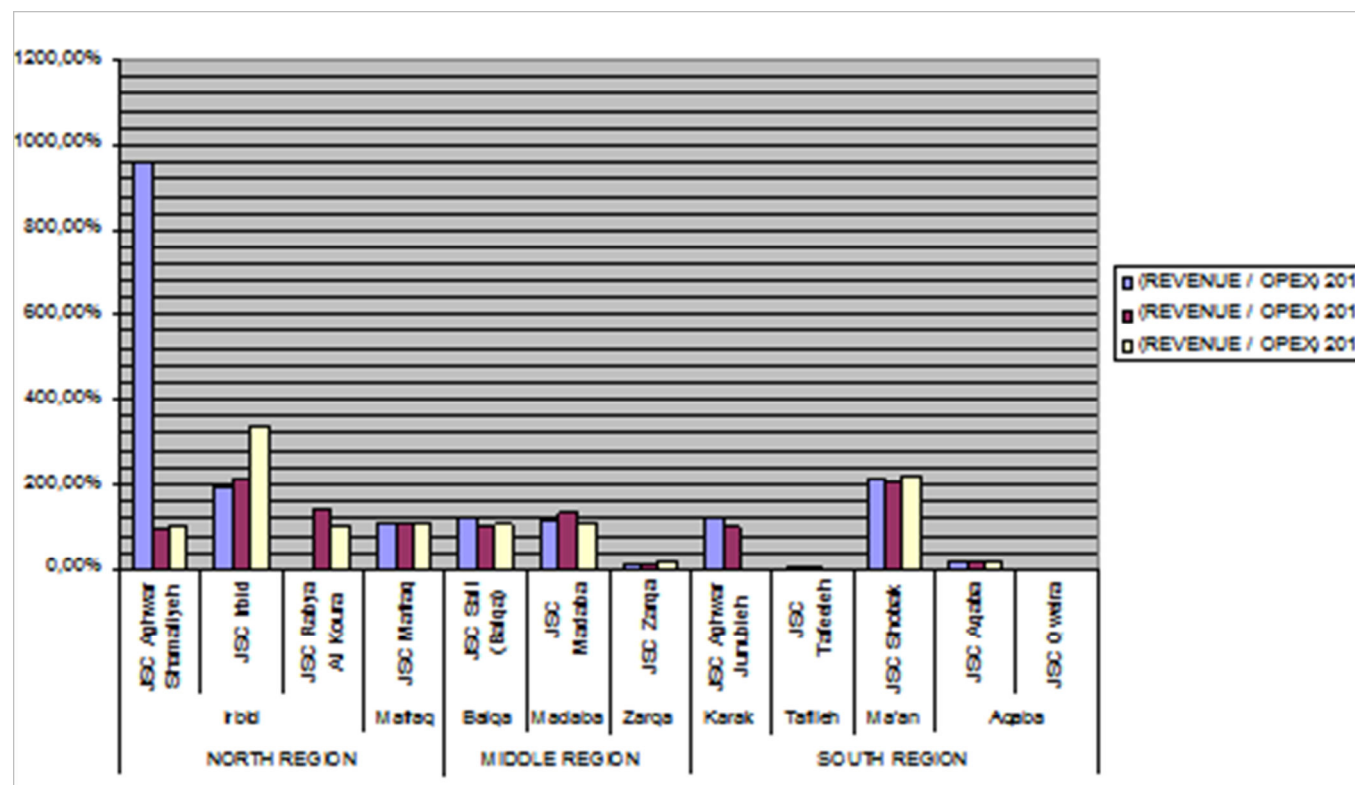


Figure 6-65: JSCs' cost recovery, 2011-2013

If the sum “**CAPEX + OPEX**” is taken into account (instead of only “OPEX”), the Financial Balance (FB) is shown as following:

- In the *Northern Region*: two JSCs appear negative FB only in 2013 (Mafraq, Ajloun) and one JSC appears slightly negative FB in 2012 and 2013 (Aghwar Shamaliyah).
- In *Central Region*: two JSCs appear negative FB in all years of considered period, and one JSC with negative FB only in 2013.
- In *Southern Region*: three JSCs appear negative FB in all years of considered period.

Six (6) JSCs cannot recover their OPEX, constantly through all years.

In the following diagrams, the FB and the respective **Cost Recovery** incl. “**CAPEX + OPEX**” is shown analytically per Municipality, grouped by region and governorate.

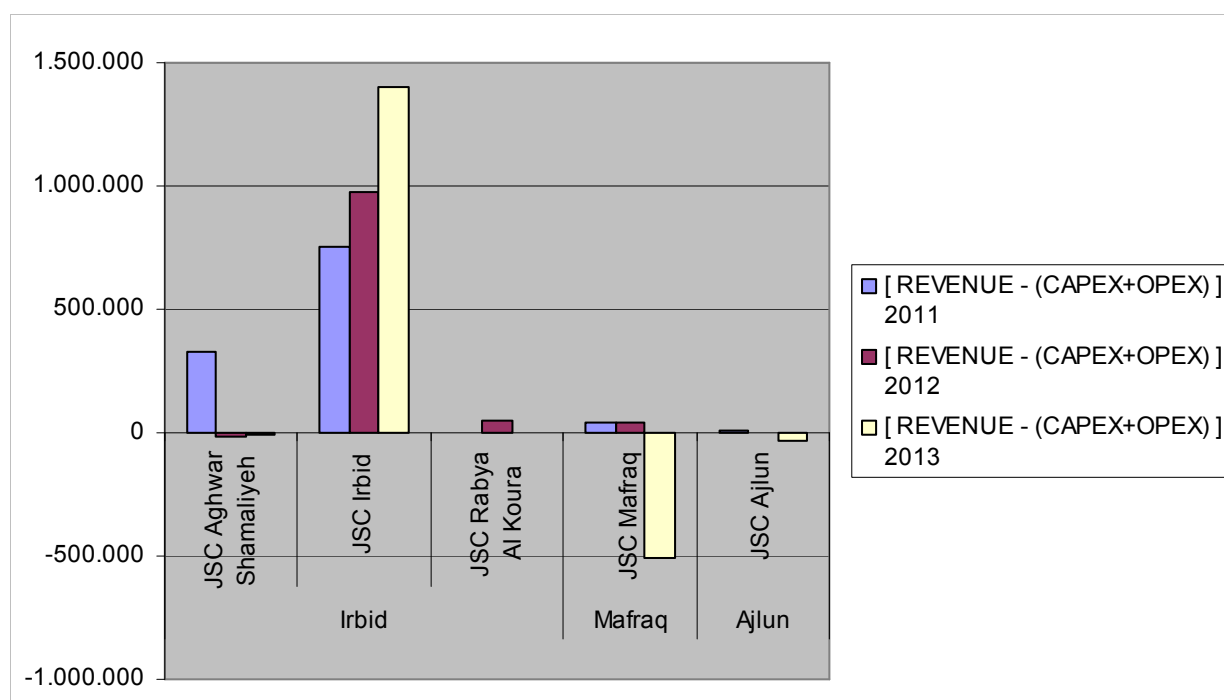


Figure 6-66: JSCs financial balance 2011-2013 – Northern Region

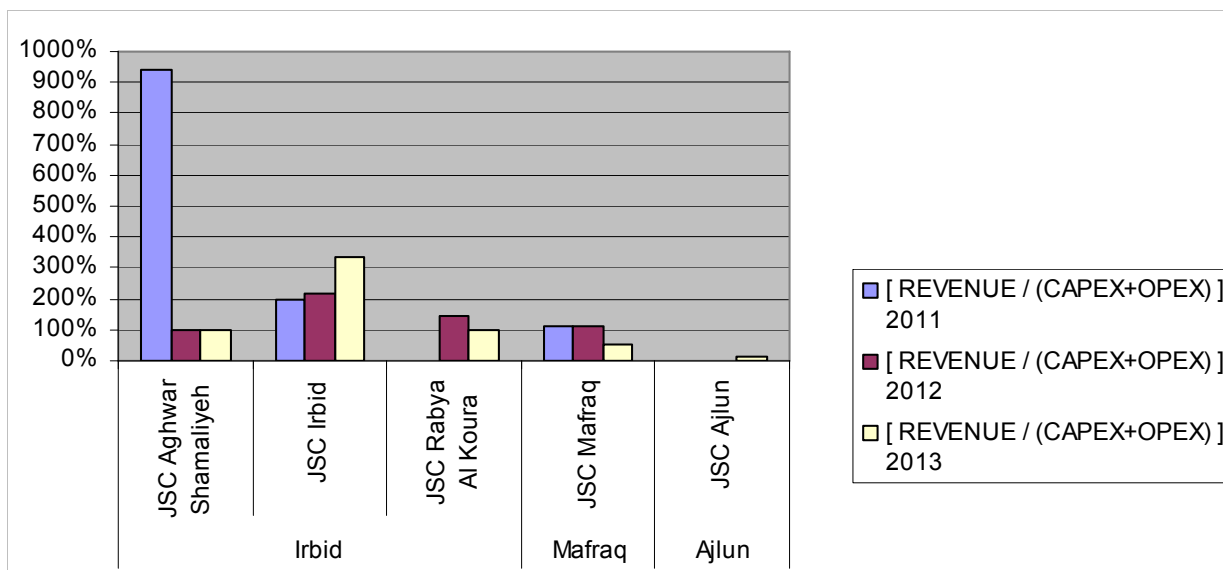


Figure 6-67: JSCs cost recovery 2011-2013 – Northern Region

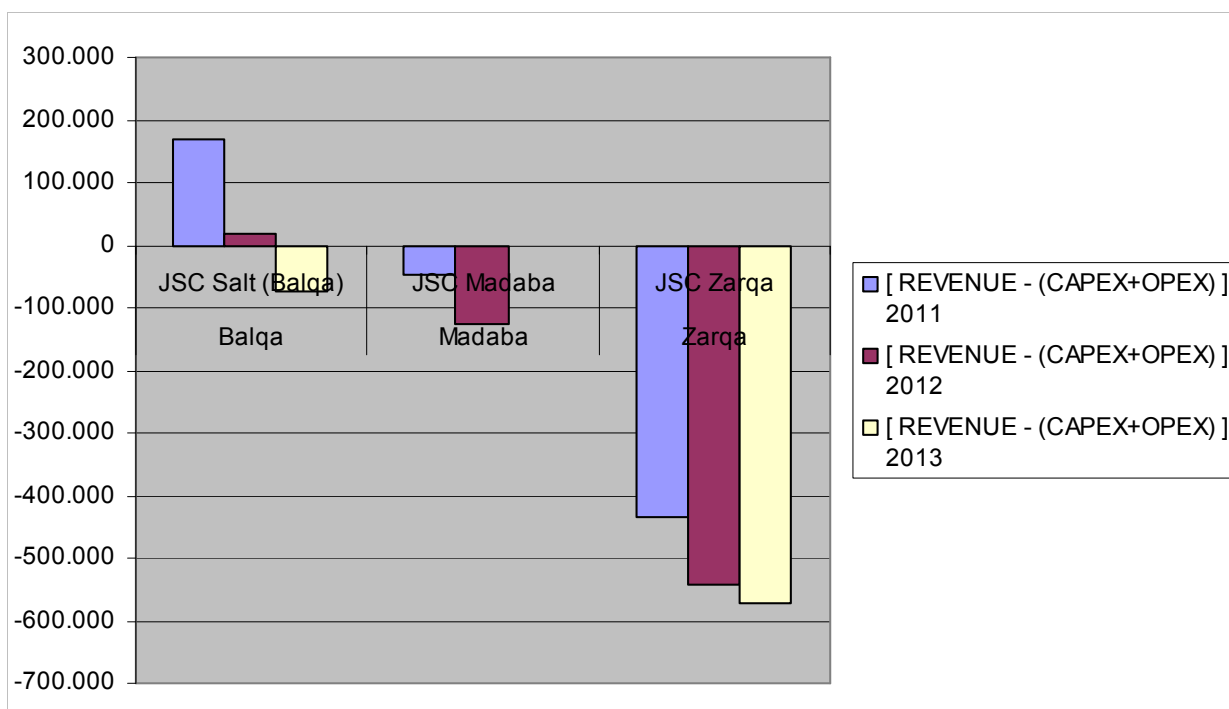


Figure 6-68: JSCs financial balance 2011-2013 – Central Region

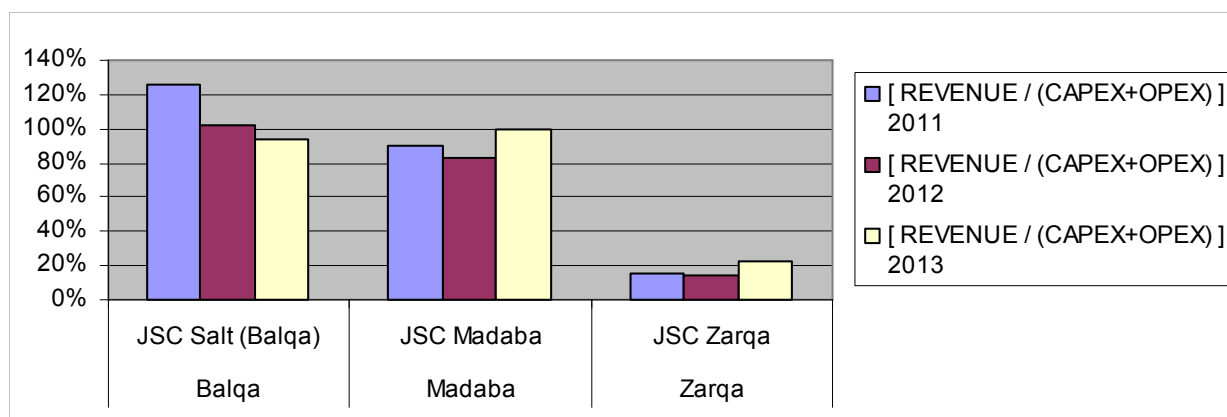


Figure 6-69: JSCs cost recovery 2011-2013 – Central Region

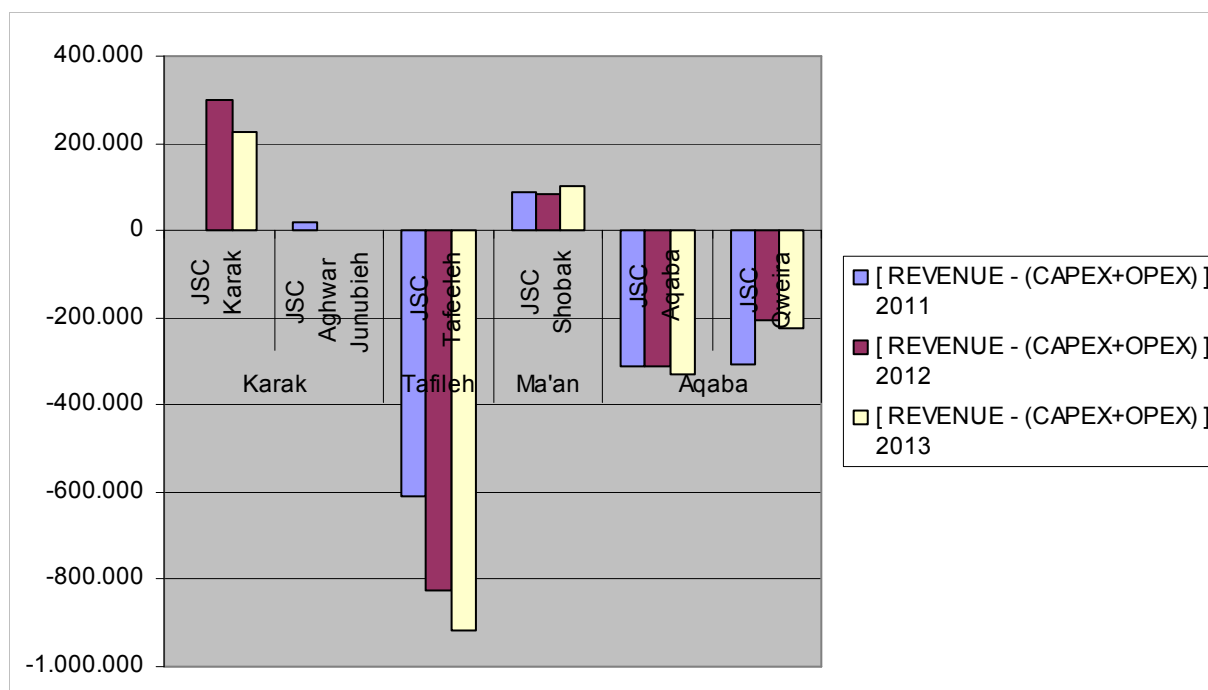


Figure 6-70: JSCs financial balance 2011-2013 – Southern Region

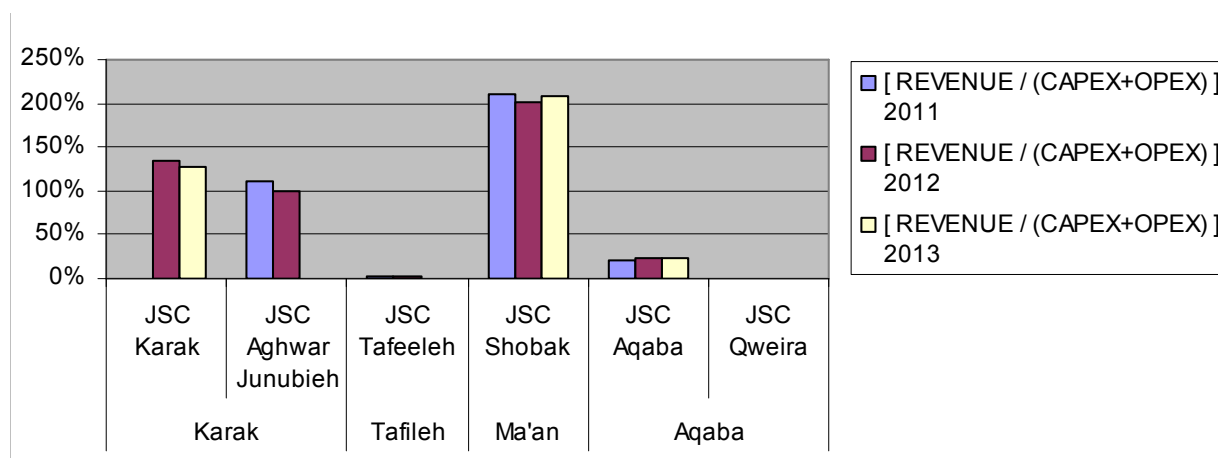


Figure 6-71: JSCs cost recovery 2011-2013 – Southern Region

Table 6-2: ` JSCs' financial balance incl. CAPEX+OPEX, 2011-2013

	NORTHERN REGION					CENTRAL REGION			SOUTHERN REGION					
	Irbid			Mafraq	Ajloun	Balqa	Madaba	Zarqa	Karak		Tafilah	Ma'an	Aqaba	
	JSC Aghwar Shamaliyah	JSC Irbid (Al Ekaider)	JSC Rabiet Al-Kura	JSC Mafraq	JSC Ajloun	JSC Balqa (Al Salt)	JSC Madaba	JSC Zarqa	JSC Karak	JSC Al-Agwar Al-Janobeiah	JSC Tafilah	JSC Shobak	JSC Aqaba	JSC Qawiera
[REVENUE - (CAPEX+OPEX)] 2011	330.076	755.000	N/A	43.500	8.596	167.493	-49.059	-434.630	N/A	17.956	-611.395	88.860	-310.000	-308.000
[REVENUE - (CAPEX+OPEX)] 2012	-12.395	978.000	50.000	43.500	3.187	19.182	-127.295	-543.836	301.008	636	-827.425	84.462	-310.000	-208.000
[REVENUE - (CAPEX+OPEX)] 2013	-4.363	1.400.000	2.000	-508.000	-34.179	-73.404	-39	-573.010	226.263	N/A	-915.611	100.882	-331.000	-223.000

Table 6-3: JSCs' cost recovery incl. CAPEX+OPEX, 2011-2013

	NORTHERN REGION					CENTRAL REGION			SOUTHERN REGION					
	Irbid			Mafraq	Ajloun	Balqa	Madaba	Zarqa	Karak		Tafilah	Ma'an	Aqaba	
	JSC Aghwar Shamaliyah	JSC Irbid (Al Ekaider)	JSC Rabiet Al-Kura	JSC Mafraq	JSC Ajloun	JSC Balqa (Al Salt)	JSC Madaba	JSC Zarqa	JSC Karak	JSC Al-Agwar Al-Janobeiah	JSC Tafilah	JSC Shobak	JSC Aqaba	JSC Qawiera
[REVENUE - (CAPEX+OPEX)] 2011	941%	198%	N/A	109%	N/A	126%	90%	16%	N/A	111%	3%	211%	22%	1%
[REVENUE - (CAPEX+OPEX)] 2012	97%	215%	142%	109%	N/A	102%	83%	14%	133%	100%	3%	202%	23%	1%
[REVENUE - (CAPEX+OPEX)] 2013	99%	338%	101%	52%	15%	93%	100%	23%	128%	N/A	1%	208%	22%	1%

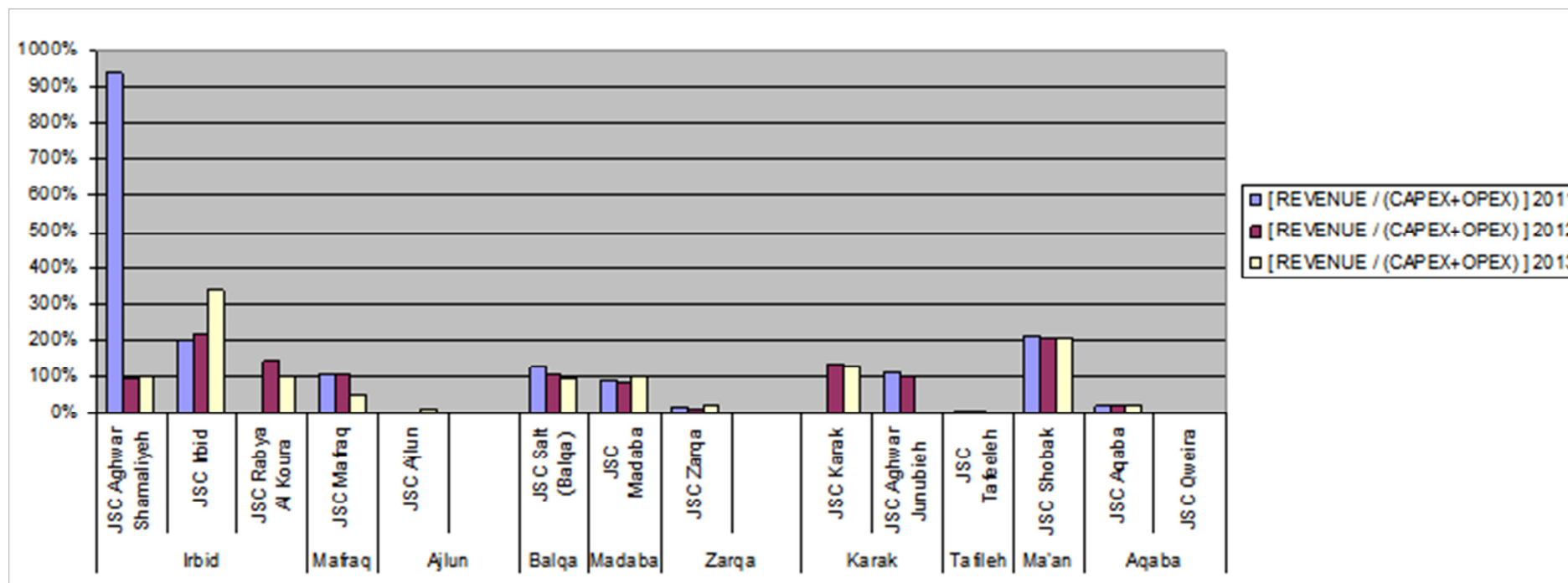


Figure 6-72: JSCs' cost recovery incl. CAPEX+OPEX, 2011-2013

The poor values of indices related to the JSCs revenue are due to inefficient tariff scheme that is applied for providing MSWM disposal services.

On the one hand the amount set by law for financial contributions of Municipalities against the service of SW disposal is not sufficient to recover the JSCs relevant costs. The problem is exacerbated due to financial weakness faced by the Municipalities which are liable to pay and the payables to JSCs are accumulated over the years.

Also, the payments of private entities for using the JSCs sites (for disposal of other -non MSWM-waste streams) are poor, non-institutionally fixed (fixed on a negotiation basis) and thus non controlled. A variety of waste types is disposed at the JSCs' sites by private and public waste producers, and a quantity-based tariff per waste type has been determined accordingly. Actually, many waste producers and haulers agree flat rate annual contracts with JSCs. Thus the quantity-based agreement is breached in practice, and despite the incoming waste is weighed and logged (quantity and type) at the site's truck scale, the relevant data is not archived or backed-up or monitored on a regular basis. Compared to JSCs' annual costs, the revenue collected from non-municipal waste are insignificant and would hardly contribute to full or even operational cost recovery (e.g. in Al Ekaider site revenues of that type varied between 73,762 JOD in 2011 and 23,600 JOD in 2012, revenue from zibar disposal in 2011 rose to JOD 21,780, each olive oil mill paid JOD 330 for each of its operational production lines and in 2011, there were 35 contracts with olive oil mills, resulting to the JOD 21,780 total revenue).

On the other hand, the **recycling concession** consist a significant revenue source for the JSCs. Indicatively, in Al-Ekaider JSC the contract's price value for 2011 was 195,000 JOD, achieving a substantial increase relatively to the preceding year's contract (55,100 JOD). The increased value was achieved due to holding a competitive open bidding process for all interested parties.

Concluding:

- The longer this non-payment scheme lasts the more the reliance of JSCs on MoMA's funding support deepens and the more the "cost recovery" target removes.
- Enlargement of recycling operations, under certain and sound contract schemes seems to be the most significant potential for revenue generation and could be crucially support the cost recovery.

6.4.5 EFFICIENCY & PRODUCTIVITY OF JSCS' SYSTEM

The examination of the indicator "tn/d per employee" revealed that three JSCs achieve the highest values 6.0-8.0 (Irbid, Salt, Karak), in two JSCs the indicator varies in the range 4.0-6.0 (Rabiet Al-

Kura, Madaba), and in other three JSCs in the range 2.0-3.0 (Aghwar Shamaliyah, Mafrag, Zarqa). In all the other JSCs the indicator ranges below 2.0 tn/d per employee.

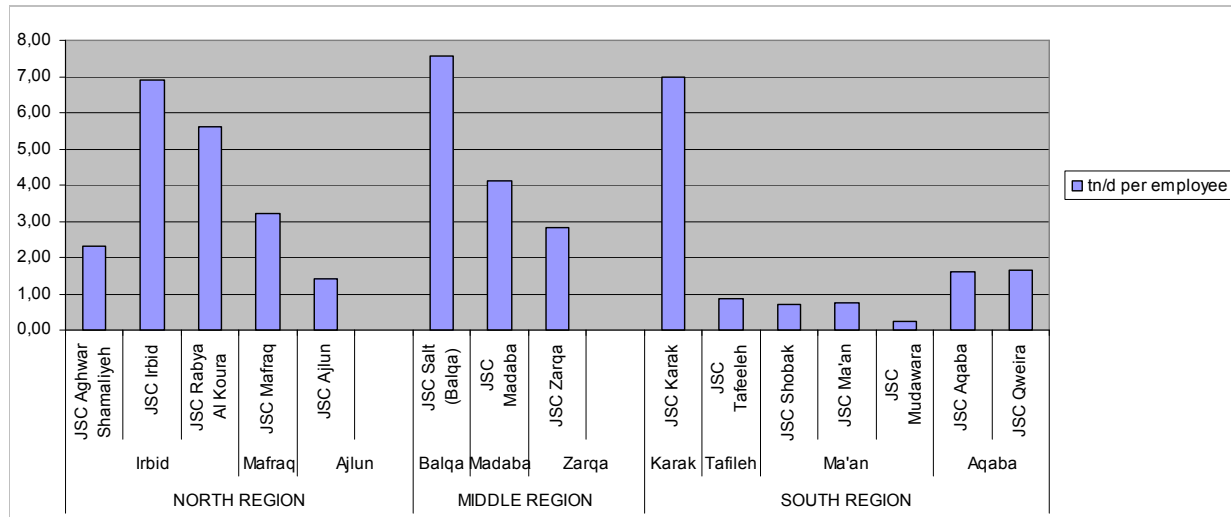


Figure 6-73: Efficiency – productivity of JSCs' system, tn/d per employee

The large differentiations in efficiency - effectiveness of MSWM are related to and explained by a combination of factors that includes:

- **Factors related to the location:**
 - Far distance between management and technical staff - Difficulty for staff to reach the station - Inconvenient location of the JSC - Landfill location is far from JSC's offices (Balqa)
 - Difficult topography for trucks to reach the landfill
 - Location of the landfill, too windy
- **Factors related to the infrastructures:**
 - Pavement of roads and yards within the landfill vicinity
 - No electricity available for maintenance works
 - Lack of infrastructure such as water, roads, suitable buildings, sewage)
 - No equipment available for rocky areas especially for disposal site
- **Factors related to the personnel:**
 - Lack of technical expertise - lack of technical training needed to improve expertise for both technical and managerial staff
 - Shortage in staff
 - Over Staff
 - Employee mostly are ladies which is not suitable for the nature of the Job SWM activities
 - Lack of truck drivers

- **Factors related to physical conditions which adversely affect the working environment:**
unsuitable work environment for drivers, supervisors, and workers - Direct impact on supervisors and workers on site
 - High temperatures during summer
 - Rocky and hard topography - Hard geology of the surface - rocky earth no equipment available for rocky areas especially for disposal site
 - Hard rocky earth top layer
 - Lack of water supply on site

6.5 RECOMMENDED EFFICIENCIES

The recommending efficiencies codified in this paragraph are composed on the basis of:

- the findings and results noted in the foregoing analysis; and
- the SWM and MSWM central directions that have been explicitly formulated by the GoJ in order to shift from an old, inefficient and cost ineffective system, that is based on management of mixed waste and dumping/landfilling, towards an integrated modern SWM system that will be based on the “Three R’s approach” (reduce-reuse-recycle) .

The structure of presentation is tabulated:

- in the first two columns, the Objectives (General, Specific) that must be serviced/achieved are set; and
- in the next three columns the Recommend Efficiencies are set, allocated per administrative level, in order to clarify the body that is recommended to undertake the responsibility of implementing the efficiencies.

Objectives		Recommend efficiencies		
General	Specific	National Level	Local Level (Municipalities)	JSCs Level
➤ Progressive abandonment of the mixed MSWM system ➤ Generation of new revenue sources	<i>Gradually move to a new MSWM system that will minimize the disposal in dumps / landfills</i>	• Draft new law for a national system of packaging waste recycling • Technical specifications of system • Investigation of feasibility on JSCs and Municipalities engagement in the system – Relevant Deciding • Developing a financial plan for the initial funding of establishing and operation of the system • Pilot Phase Planning	• Cooperation with authorized packaging waste recycling bodies / enterprises • Implementation of “blue” bins system (pilot phase in hotels, malls, public institutions etc.) • MRF establishments	• Cooperation with authorized packaging waste recycling bodies / enterprises • MRF establishments
		• Draft new law for a national system of collection of pre-selected at source organic waste and composting • technical specifications of system • Investigation of feasibility on JSCs and Municipalities engagement in the system – Relevant Deciding • developing a financial plan for the initial funding of establishing and operation of the system • Pilot Phase Planning	• Cooperation with authorized organics composting bodies / enterprises • Implementation of “brown” bins system (pilot phase in markets, hotels, restaurants etc.) • establish composting units • drawing of compost sales promotion system	• Cooperation with authorized organics composting bodies / enterprises • Implementation of “brown” bins system (pilot phase in markets, hotels, restaurants etc.) • establish composting units • drawing of compost sales promotion system
				• exploitation of LFG and biogas collected by landfills and biowaste digestion units respectively for energy production and sale

Objectives		Recommend efficiencies		
General	Specific	National Level	Local Level (Municipalities)	JSCs Level
➤ Efficiency-effectiveness of MSWM system cost reduction	<i>Planning Organization and Management</i>	Typology / Standardization of key magnitudes for Collection: ○ collection service areas design per urban and rural areas (population, density, routing, inhabitant served per km², etc.) ○ efficiency indicators (bins/inhabitant, vehicles/inhabitant, tn/d per vehicle, tn/d per employee, etc.)	Incorporation of Typology / Standardization of key magnitudes for Collection in the Municipal Operational SWM Program	
		Typology / Standardization of key magnitudes for Transfer Station location	Location of Transfer Stations according to the specifications	
		Typology / Standardization of key magnitudes for Landfills location		Location of Landfills according to the specifications
		Typology of key magnitudes for Treatment Plants location	Location of Treatment Plants according to the specifications	Location of Treatment Plants according to the specifications
		• Draw Specifications for Local (municipal) Operational MSWM Programs • Draw Specifications for JSCs Operational MSWM Programs	• Conduct regular measurements of waste quantity and composition • Draw Municipal Operational SWM Program according to the specifications: ○ Imprinting current situation ○ SWOT Analysis ○ Formulation of objectives in the short, medium, long term ○ Develop intervention plan (objectives, axes, measures, actions/projects) ○ budgeting by stage (temporary storage, collection, transfer, disposal) and work category ○ financial plan (charges, funding programs, loans, donations, fund allocation in the short, medium and long term) ○ operating accounts ○ cash flow analysis • Draw analytical budget incl. all categories of MSWM expenditure (staff, operational,	• Conduct regular measurements of waste quantity and composition • Draw JSC Operational MSWM Program according to the specifications: ○ Imprinting current situation ○ SWOT Analysis ○ Formulation of objectives in the short, medium, long term ○ Develop intervention plan (objectives, axes, measures, actions/projects) ○ budgeting by work category ○ financial plan (charges, funding programs, loans, donations, fund allocation in the short, medium and long term) ○ operating accounts ○ cash flow analysis • drawing analytical budget incl. all categories of MSWM expenditure (staff,

Objectives		Recommend efficiencies		
General	Specific	National Level	Local Level (Municipalities)	JSCs Level
			administrative, depreciations, maintenance etc.)	operational, administrative, depreciations, maintenance etc.)
			• Draw mapping of routes	
			• Draw location study for bins and containers	
			• Draw Maintenance Regulation (bins, vehicles, other equipment)	• Maintenance Regulation (machinery, vehicles, other equipment)
			• Draw organizational study for rational allocation of MSWM staff to different tasks per stage and work category	• Draw organizational study for rational allocation of JSC staff to different tasks per work category
	MSWM Data base	- Strengthening Municipalities to join JSC - Provide technical assistance for training of staff and guidance on establishing proper institutional conditions	Join Municipalities to JSC	In-close cooperation with Municipalities to join to JSC
			Installation – Operation of MSWM MIS	Installation – Operation of MSWM MIS
			Implementation of the Regulation	Implementation of the Regulation
	Clarity in responsibilities of bodies involved in planning and operation of MSWM system	Review and drawing new single Regulation with clear responsibilities per operator, without duplication, or full clarification of the involvement	Establish and organize a discrete MSWM Department in the municipal structure	
	Cost Saving Cost Reduction	Review of ceiling expenditure values imposed on Municipalities and JSCs, especially for maintenance activities	Purchase new special collection equipment for settlements sited on adverse terrain (hilly, mountainous, narrow streets) (part of Municipal Operational SWM Program) Purchase new bins (part of Municipal Operational SWM Program) Implement a program of regular maintenance of bins	
				Implement a program of regular maintenance of machinery and vehicles

Objectives		Recommend efficiencies		
General	Specific	National Level	Local Level (Municipalities)	JSCs Level
			Implement a program of regular maintenance of vehicles	
➤ Revenue and Cost Recovery	<i>Minimize the subsidies</i>	Prepare a Law for restructuring the fee system, on the basis of the “polluter-pays principles”, at least for bulk producers of solid waste	Implement the new tariff system	Implement the new tariff system
		Prepare a Law (or addition to the foregoing law) for restructuring the fees collection system, probably through disengagement by the Electricity Company	Implement the new fees collection system	
	<i>Involvement of private sector in MSWM operations</i>	• Prepare a Law for PPPs in MSWM operations • Provide Technical Assistance to Municipalities and JSCs for strengthening the capacity of staff to manage and supervise the relevant contracts	• Implement the Law for PPPs in MSWM operations • manage and supervise the relevant contracts	• Implement the Law for PPPs in MSWM operations • manage and supervise the relevant contracts
	<i>Integration of informal sector in MSWM</i>	Institutionalization of the framework for integration of informal sector in MSWM, in close cooperation with waste-pickers	• cooperation with waste-pickers for recycling under the institutionalized framework • training the waste-pickers to perform their work properly with minimal public health risks • support waste-pickers with technical assistance	• cooperation with waste-pickers for recycling under the institutionalized framework • training the waste-pickers to perform their work properly with minimal public health risks • support waste-pickers with technical assistance

6.6 SWOT ANALYSIS FOR MSWM FINANCIAL ISSUES



Figure 6-74: SWOT Analysis for MSWM financial issues in the MSWM sector in Jordan

7 EXISTING PUBLIC AWARENESS & EDUCATION PROGRAMS ON MSWM

7.1 INTRODUCTION

The issue of the environment is an international, regional, local and individual issue, that is linked to the sustainability of life and, therefore, the conservation of our natural surroundings must be considered as a complex and joint effort requiring broad participation across all sectors of society.

Many programs have been initiated to enhance broad public awareness and participation in these important endeavours, especially in maintaining a clean environment, controlling pollution and effectively managing waste. The environmental laws and regulations lay out the need to protect the environment and human health from adverse impacts, to conserve natural resources.

When Environmental Awareness is not enough

Protecting the environment, conserving natural resources, and maintaining a high quality of life is really about putting people first. This means listening to and working closely with the various societal groups whose behaviours must change if environmental improvements are to be realized and sustained over time. For that to happen, individuals must be actively engaged and willingly participating in the identification of the problem to reach the solutions, if there is to be any chance of a successful, positive and enduring environmental outcome.

What has become evident from numerous examples around the world is that awareness-raising by itself is not enough to evoke widespread change in the way a society interacts with the environment or uses its natural resources. Environmental programs routinely offer technological, economic incentives, policy or legislative solutions, but produce limited results or scale of impact. In many cases, communication and education plays minor, secondary roles. Study after study has shown that merely telling people what to do or not do (with the threat of penalty or punishment), has little impact on societal or environmental change.

What is often lacking is the understanding of the importance and influence that human behaviour plays in why a program is successful or not, as well as the failure to comprehend the complexity of the social system in which it operates, thus impeding, preventing, or hindering its success.

Strategic communication, social marketing and other tools can be used to help societies voluntarily replace environmentally unsustainable behaviours with environmentally benign ones and maintain

them over time. Only when specific barriers and obstacles that thwart voluntary adoption of new behaviours or compliance with new environmental regulations or ordinances are fully identified, understood, and removed, can appropriate programmatic responses be designed.

Individuals, communities, and entire societies can be engaged to find practical and sustainable solutions to a host of environmental challenges. Integrated and holistic approaches that combine the best behavioural change communication tools with a systems-based planning approach can harness the diverse resources, outlooks, and capabilities of national and municipal government, the religious community, academia, private sector, NGOs, and civil society.

Together they can develop a shared vision of the future. When working as one, these disparate groups increase the probability of finding sustainable solutions to vexing environmental threats and challenges as well as maintaining or improving overall quality of life.

But perhaps most of all, such an approach can unleash the power and the potential of various members of society. By helping them move beyond simply being aware of the state of their immediate environment and the circumstances that surround them, they can become active change agents for environmentally sustainable development at the local, national, and regional levels.

“What people think about waste” is a significantly important aspect of SWM. Several studies show that SWM programs associated with awareness campaigns had greater success. Therefore, awareness and educational campaigns are now an integral part of any SWMP around the world.

7.2 LIST OF EXISTING AWARENESS & EDUCATION PROGRAMS ON MSWM - ACTIVITIES CONDUCTED BY MUNICIPALITIES

Over the past several years, a number of initiatives, campaigns and programs have been implemented on public awareness to promote SWM systems in Jordan. The main stakeholders of these programs were Municipalities and NGO's.

In the framework of the horizontal analysis and the in-depth diagnosis surveys, relevant information on recent programs and campaigns been implemented by Municipalities have been collected through questionnaires and on-site inspections at their premises. Even though not many activities were noticed in this field – as anticipated – Table 7-1 includes a small list of sixteen (16) awareness programs/campaigns that have been identified.

Table 7-1: MSWM related awareness programs/campaigns in Jordan, 2009-2014

#	Organization	Title of Awareness Program/Campaign	Duration
1	GAM	Electronic Waste Project "Beware of it"	2011
2		Determination Campaign for the Times of Waste Disposal from Homes and Shops	4 th quarter of 2010
3		Project of Defining the Times for Waste Disposal of its Sources (Phase I)	2010
4		Project of Litter Separation and Sorting of Household Waste at Source (Phase II)	July - December 2010
5		Project of Training Volunteers for the Project of Litter Separation and Sorting of Waste at Source (Dahiet Al-Hussein – Phase II)	N/A
6		Designation of Environmental Awareness Program for Fourth Area	N/A
7	Greater Madaba Municipality	Awareness Campaign to Introduce the Concept of Source-Separation of Waste	2010
8		Preparing a Questionnaire to Assess People's Reaction to Waste Separation	2011
9		Conducting Lectures for School Students about the Environment and SWM	2012
10		Awareness Campaign to Introduce Environmental Awareness and Health Impacts from Environmental Pollution	2013
11	Greater Salt Municipality	Public Places and Street Cleaning Campaign	2013 (1-day activity)
12	New Deir Allah Municipality	Environmental, Health and Public Safety Protection Campaign in Jordan Valley	2009
13		Executing Public Hygiene Campaigns Repeatedly in Corporation with Relevant Authority	2013 (several events)
14		Preparing a brochure about the collection of domestic waste	2013
15	Swaymeh Municipality	Public Hygiene Campaign with Schools for the Collection of Waste	2011
16		Campaign for Collecting Tree Prunings to Convert it into Animal Feed	2013

In the following sections, the basic attributes of those 16 programs/campaigns are described.

7.2.1 PROJECTS / CAMPAIGNS CARRIED OUT BY GAM

7.2.1.1 ELECTRONIC WASTE PROJECT "BEWARE OF IT" (GAM, 2011)

This project was carried out by GAM in order to raise public awareness level in Amman about the hazardous impact of random disposal of electronic waste, due to the toxic chemicals contained in them. The campaign was carried out in Amman City.

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

Target Groups	General Public of Amman Commercial shops
Activities	Preparation of suitable scientific material Distribution of a message for general public throughout various audio-visual means to aware them about the hazardous Impacts of electronic waste, and the importance of dumping this kind of waste in the provided space for that Designing of a promotional letter in accordance with the logo applications of GAM Print out 300,000 copies of the promotional letter and brochure Distribution of the message via the employees of the libraries and information technology centres
Partners	Radio Hawa Amman
Produced awareness materials	Press releases Leaflets Radio signals Other promoting material: TV signals, SMS, GAM website
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.1.2 DETERMINATION CAMPAIGN FOR THE TIMES OF WASTE DISPOSAL FROM HOMES AND SHOPS (GAM, 2010)

This project was carried out by GAM to induce a behavioural change about the processes of waste disposal among the general public of Amman City, and introducing the concept of integrated SWM to them. The campaign was carried out in Basman and Tla' Al Ali suburbs (by media), as well as in all GAM districts (through field work).

Target Groups	General Public of Amman
Activities	Training workshops for the project staff Dissemination of project message through audio visual and audio means from Amman Municipality to General Public about the need to throw waste in time (7 am – 11 noon) Printing of stickers with the message “Amman is our house” Designing of a promotional letter in accordance with the logo applications of GAM
Partners	JES Abu Mahjoub Company MoENV
Produced awareness materials	Press releases Leaflets Radio signals Other promoting material: TV signals Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.1.3 PROJECT OF DEFINING THE TIMES FOR WASTE DISPOSAL OF ITS SOURCES – PHASE I (GAM, 2010)

This project was carried out by GAM to induce a behavioural change about the waste disposal among the general public of Amman City, and introducing the behaviour of stopping waste disposal on

Fridays. The campaign was carried out in Basman and Tla' Al Ali suburbs (by media), as well as in all GAM districts (through field work).

Target Groups	General Public of Amman
Activities	Formation of the working group Select the media messages Select executive teams Training of Heads of Commissions Advertising in newspapers Print media messages and bulletins
Partners	-
Produced awareness materials	Press releases Radio signals Other promoting material: TV signals, direct visits
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.1.4 PROJECT OF LITTER SEPARATION & SORTING OF HOUSEHOLD WASTE AT SOURCE - PHASE II (GAM, 2010)

This project was carried out by GAM to induce a behavioural change about the waste disposal among the general public of Amman City, introducing the concept of integrated SWM and the development of environmental services provided to general public. The campaign was carried out in Dahiet Al Hussein suburb.

Target Groups	General Public of the Dahiet Al Hussein suburb Staff of governmental and private departments, centres, associations and companies Schools
Activities	Formation of a team of 14 volunteers and training them Determination of the needs of the project Division of the Amman City suburbs to 4 clusters Selection of the nature of the media campaign and advertising (brochures, poster, rollers, Radio Hawa Amman, and Media Center) Measuring the impact of awareness Measuring the satisfaction of the people of the region Measuring response of the population
Partners	JES The local community Radio Hawa Amman Embassy of the Netherlands MoENV
Produced awareness materials	Press releases Leaflets Radio signals Other promoting material: TV signals, posters, etc. Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.1.5 PROJECT OF TRAINING VOLUNTEERS FOR THE PROJECT OF LITTER SEPARATION & SORTING OF WASTE AT SOURCE (DAHET AL-HUSSEIN – PHASE II) (GAM)

This project was carried out by GAM to induce a behavioural change about the waste disposal among the general public of Amman City, introducing the concept of integrated SWM and the development of environmental services provided to general public. The campaign was carried out in Dahiet Al Hussein, Tla' Al Ali, Khalda and Um Sumac suburbs, as well as in Al Salam (quarter).

The motto of the campaign was the “You Sort and We Recycle”.

Target Groups	General public Staff of Governmental and Private sectors Hospitals and medical centres Shops Cultural centres Charities and sport clubs
Activities	Gathering a group of volunteers Acquainting them to the environmental and SWM departments of GAM Elaboration of field work by the volunteers Assessment of the pros and cons of the first phase in Marka housing Discussing the problems of field work Explaining the materials that were provided for the volunteers
Partners	-
Produced awareness materials	Press releases Leaflets Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.1.6 DESIGNATION OF ENVIRONMENTAL AWARENESS PROGRAM FOR FOURTH AREA (GAM)

This project was carried out by GAM to improve the health and environmental status in Amman City by encouraging the target groups to reduce their uncontrolled disposal of waste, establishing environmental clubs. The campaign was carried out in Amman City.

Target Groups	Shops: restaurants and vegetables shops, groceries and supermarkets, clothing and shoes, and warehouses School students: different target groups for 6-8, 8-10, 10-12, 12-14, and 14-16 years old Crafts and Industries: oil change and tire repair, food and chemical factories General public of Amman City: apartments, houses, villas, other
Activities	Gathering a group of volunteers Acquainting them to the environmental and SWM departments of GAM Elaboration of field work by the volunteers Assessment of pros and cons of the first phase in Marka housing Discussing the problems of field work Explaining the materials that were provided for the volunteers
Partners	-

Produced awareness materials	Press releases Leaflets Radio signals Other promoting material: TV signals, direct visits
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2 PROJECTS / CAMPAIGNS CARRIED OUT BY OTHER ENTITIES

7.2.2.1 AWARENESS CAMPAIGN TO INTRODUCE THE CONCEPT OF SOURCE-SEPARATION OF WASTE (GREATER MADABA MUNICIPALITY, 2010)

This project was carried out by Greater Madaba Municipality to introduce the concept of integrated SWM, by raising the public awareness level of Madaba citizens on the importance of separating waste at source. The campaign was carried out in Madaba.

Target Groups	General public of Madaba
Activities	Preparation of suitable information for awareness material Design and printing the awareness materials Distribution of the awareness materials and conduction of awareness seminars
Partners	-
Produced awareness materials	Press releases Leaflets Awareness seminars
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.2 PREPARING A QUESTIONNAIRE TO ASSESS PEOPLE'S REACTION TO WASTE SEPARATION (GREATER MADABA MUNICIPALITY, 2011)

This project was carried out by Greater Madaba Municipality to assess the general public response and reaction to waste separation processes. The campaign was carried out in Madaba.

Target Groups	General public of Madaba
Activities	Preparation of suitable questionnaires Distribution of the awareness materials and conduction of awareness seminars Collection of data
Partners	-
Produced awareness materials	Press releases Leaflets Awareness seminars
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.3 CONDUCTING LECTURES FOR SCHOOL STUDENTS ABOUT THE ENVIRONMENT & SWM (GREATER MADABA MUNICIPALITY, 2012)

This project was carried out by Greater Madaba Municipality to raise the awareness level about environment and SWM among school's community (students and teachers) in Madaba.

Target Groups	School students School teachers
Activities	Preparation of suitable information and presentations for this project Conduction of awareness lectures in several schools in Madaba
Partners	-
Produced awareness materials	Other promoting material - presentations
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.4 AWARENESS CAMPAIGN TO INTRODUCE ENVIRONMENTAL AWARENESS & HEALTH IMPACTS FROM ENVIRONMENTAL POLLUTION (GREATER MADABA MUNICIPALITY, 2013)

This project was carried out by Greater Madaba Municipality to raise the public awareness level of citizens of Madaba on environmental issues and pollution problems, as well as on their impacts on the environmental and human health. The campaign was carried out in Madaba.

Target Groups	General public of Madaba
Activities	Preparation of suitable information for the awareness materials and workshops Design and production of the awareness materials Distribution of the awareness materials and conduction of awareness seminars
Partners	-
Produced awareness materials	Press releases Leaflets Radio signals Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.5 PUBLIC PLACES & STREET CLEANING CAMPAIGN (GREATER SALT MUNICIPALITY, 2013)

In cooperation with a group of students from Al Salt schools, this project was carried out by Greater Salt Municipality to raise environmental awareness level of the citizens of Al Salt City – especially the young generation – on SWM and the importance of keeping public places clean, by conveying these messages during the activity. The campaign was carried out in Al Salt City.

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

Target Groups	General public of Al Salt
Activities	Preparation of suitable information and selection of volunteers Design and production of the promotional materials Distribution of these materials among the volunteers and students participating in the campaign Conduction of the cleaning activity
Partners	-
Produced awareness materials	Press releases Leaflets
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.6 ENVIRONMENTAL, HEALTH & PUBLIC SAFETY PROTECTION CAMPAIGN IN JORDAN VALLEY (NEW DEIR ALLAH MUNICIPALITY, 2009)

This project was carried out by New Deir Allah Municipality to improve the environmental situation, health level and public safety among the general public of the Jordan Valley through raising their awareness level in the environmental, health and public safety issues. The campaign was carried out in the Jordan Valley.

Target Groups	General public of Jordan Valley
Activities	Preparation of suitable information for the awareness materials and workshops Design and production of awareness and promotional materials Distribution of the awareness and promotional materials Conduction of the awareness seminars
Partners	-
Produced awareness materials	Press releases Leaflets Other promoting material: TV signals Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.7 EXECUTING PUBLIC HYGIENE CAMPAIGNS REPEATEDLY IN CORPORATION WITH RELEVANT AUTHORITY (NEW DEIR ALLAH MUNICIPALITY, 2013)

This project was carried out by New Deir Allah Municipality in cooperation with the MoH, the Ministry of Education (MoEDU) and the general public, to improve the health level among the general public of New Deir Allah through raising their awareness level about the importance of public hygiene and environmental health through SWM. The campaign was carried out in New Deir Allah.

Target Groups	General public of New Deir Allah
Activities	Preparation of suitable information for the awareness materials and workshops Design and production of awareness and promotional materials Distribution of the awareness and promotional materials Conduction of the awareness seminars

Partners	MoH MoEDU General Public
Produced awareness materials	Leaflets Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.8 PREPARING A BROCHURE ABOUT THE COLLECTION OF DOMESTIC WASTE (NEW DEIR ALLAH MUNICIPALITY, 2013)

This project was carried out by New Deir Allah Municipality to improve the environmental conditions, health level and public safety among the general public of the Jordan Valley through raising their awareness level in the environmental, health and public safety issues. The campaign was carried out in the Jordan Valley.

Target Groups	General public of New Deir Allah
Activities	Preparation of suitable information for the brochures Design and production of brochures Distribution of brochures
Partners	-
Produced awareness materials	Press releases Leaflets Other promoting material: TV signals Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.9 PUBLIC HYGIENE CAMPAIGN WITH SCHOOLS FOR THE COLLECTION OF WASTE (SWAYMEH MUNICIPALITY, 2011)

This project was carried out by Swaymeh Municipality in cooperation with the MoH, the MoEDU and the general public, to improve the health level among the general public of Swaymeh through raising their awareness level about the importance of public hygiene and environmental health through SWM. The campaign was carried out in Swaymeh.

Target Groups	School community in Swaymeh (students, teachers, etc.)
Activities	Preparation of suitable information for the awareness materials and workshops Design and production of the awareness and promotional materials Distribution of the awareness and promotional materials Conduction of awareness seminars
Partners	MoPWH MoEDU General Public
Produced awareness materials	Leaflets Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.2.2.10 CAMPAIGN FOR COLLECTING TREE PRUNINGS TO CONVERT IT INTO ANIMAL FEED (SWAYMEH MUNICIPALITY, 2013)

This project was carried out by Swaymeh Municipality to improve the environmental condition of its territory, through introducing the concept of recycling, reuse and integrated management of tree prunings. The campaign was carried out in Swaymeh.

Target Groups	General public of Swaymeh
Activities	Preparation of suitable information for the awareness materials Design and production of awareness materials Distribution of the awareness materials Conduction of workshops on recycling of tree prunings
Partners	-
Produced awareness materials	Leaflets Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.3 LIST OF EXISTING AWARENESS & EDUCATION PROGRAMS ON MSWM - ACTIVITIES CONDUCTED BY NGOS

Environmental NGOs are sharing the responsibility of raising awareness of general public on environmental issues, including MSWM. Table 7-2 includes the projects and programs related with MSWM that have been recently conducted by NGOs in Jordan.

Table 7-2: MSWM related awareness programs/campaigns by NGOs in Jordan

#	Organization	Title of Awareness Program/Campaign	Duration
1	Royal Society for Conservation of Nature (RSCN)	Clean-up The World Campaign	1 day on a yearly basis
2	Royal Marine Conservation Society of Jordan (JREDS)	Clean-up The World Campaign	1 day on a yearly basis
3	Jordan Environment Society (JES)	Clean-up The World Campaign	1 day on a yearly basis
4		Training Course on Recycling for Scout Boys in Debden – Ajloun	2013 (10 days activity)
5		Keep it, Don't Throw it to Garbage Campaign - Amman Schools	2013
6		Bottom of the Sea Clean-up Campaign	1 day on a yearly basis
7		Don't Waste it, Reuse it Campaign	2014 (1-day activity)
8	Ahl Al-Balad	Amman is Clean by its People	2013-2014

In the following sections, the basic attributes of those 8 programs/campaigns are described.

7.3.1 CLEAN-UP THE WORLD CAMPAIGN (RSCN, JREDS, JES)

This campaign is being carried out by RSCN JREDS and JES on a yearly basis to help engaging the general public in the preservation of nature and improvement of the environmental condition in Jordan. Each NGO selects a waste hotspot each year to conduct cleaning activities through a group of volunteers that include all ages, genders and ethnicities of the Jordanian community. Especially the JREDS selects hotspots with interest on marine ecosystems. The campaign is being carried out in different sites each year.

Target Groups	General public of Jordan
Activities	Preparation of suitable information for the awareness materials Design and production of awareness and promotional materials Design of the event and training the volunteers Distribution of the awareness materials Conduction of the cleaning activities
Partners	Private sector (sponsors)
Produced awareness materials	Press releases Leaflets Radio signals Other promoting material: TV signals, etc. Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.3.2 TRAINING COURSE ON RECYCLING FOR SCOUT BOYS IN DEBBEN – AJLOUN (JES, 2013)

This course was carried out by JES in order to teach the scout boys the concept of SW recycling, as an introduction to raise their awareness level on the integrated SWM. The campaign was carried out in Debben (Ajloun Governorate).

Target Groups	Scout Boys in Debben
Activities	Preparation of suitable information for the training course Preparation of the training materials Conduction of the training course
Partners	The Environmental Student's Network MoEDU
Produced awareness materials	Radio signals Other promoting material: social media Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.3.3 KEEP IT, DON'T THROW IT TO GARBAGE CAMPAIGN - AMMAN SCHOOLS (JES, 2013)

This campaign was carried out by JES in order to teach a group of school's students in Amman the concept of SW recycling, as an introduction to raise their awareness level about the integrated SWM. The campaign was carried out in Amman.

Target Groups	School's Students in Amman City
Activities	Preparation of suitable information for the training course Preparation of the training materials Conduction of the training course
Partners	MoEDU
Produced awareness materials	Other promoting material: social media Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.3.4 BOTTOM OF THE SEA CLEANUP CAMPAIGN (JES, 2014)

This campaign started in 2014 and will be carried out by JES on a yearly basis to help engaging the general public in the preservation of nature and improving the environmental condition in Jordan, with focus on marine ecosystems, by selecting a waste hotspot each year to conduct cleaning activities through a group of volunteers that include all ages, genders and ethnicities of the Jordanian community. In 2014, the campaign was carried out in Aqaba.

Target Groups	General public of Jordan
Activities	Preparation of suitable information for the awareness materials Design and production of the awareness and promotional materials Conduction of the campaign
Partners	ASEZA
Produced awareness materials	Leaflets Other promoting material: social media, etc. Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.3.5 DON'T WASTE IT, REUSE IT CAMPAIGN (JES, 2014)

This campaign was carried out by JES in order to teach students of the University of Jordan in Amman the concept of SW recycling, as an introduction to raise their awareness level about the integrated SWM. The campaign was carried out in the University of Jordan premises, in Amman.

*Baseline Study on the Existing MSWM System in the
Hashemite Kingdom of Jordan (1st Draft Report)*

Target Groups	Students of the University of Jordan
Activities	Preparation of suitable information for the training course Preparation of the training materials Conduction of the training course
Partners	University of Jordan
Produced awareness materials	Press releases Leaflets Radio signals Other promoting material: social media, etc. Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.3.6 AMMAN IS CLEAN BY ITS PEOPLE (AHL AL-BALAD, 2013-2014)

This project was carried out by Ahl Al-Balad, a community-based organization aiming to keep Amman a clean city by the engagement of the general public of Amman in several activities that will yield in preserving the beauty of Amman and keep it clean. The campaign was carried out in Amman.

Target Groups	General public of Amman
Activities	Preparation of suitable information for the awareness materials Design and production of the awareness materials Associating with Amman artists to draw their creative art on suitable walls in public places (Graffiti Art) Conducting several interviews on radio and TV
Partners	General public of Amman JES GAM
Produced awareness materials	Press releases Leaflets Radio signals Other promoting material: social media, etc. Workshops
Efficiency and Impact	No studies have been carried out to measure the impact of this campaign.

7.4 THE IMPACT OF THE PROGRAMS/CAMPAIGNS

7.4.1 GENERAL

The actual impact of MSWM awareness programs and campaigns is measured by the program's ability in raising the awareness level, changing existing behaviours among the target group(s), or by measuring to what extent the program was able to support the target group(s) with skills and tools that will assist the community in being more active towards MSWM.

The absence of studies and reports about evaluating these factors for the implemented awareness programs and campaigns resulted in failing in measuring the actual impact of these programs and campaigns.

Although measuring the actual impacts of the studied programs and campaigns is not applicable, general observations are used to evaluate these impacts, which can be summarized in the following points:

- Most of the programs were/are implemented as short term campaigns.
- There has been no integration of these programs into the Municipality/NGOs activities.

However, the existing public awareness and education programs/campaigns were assessed and evaluated based on a set of criteria as per the following:

- Target Groups
- Geographical Coverage
- Social and Economic Context
- Design and activities
- Duration
- Partners
- Efficiency

7.4.2 TARGET GROUPS

Because people are different, a crucial element of an awareness strategy is selecting target audiences. Segmentation is the process of identifying groups with similar needs or preferences, who will respond in a similar way to a given set of stimuli and activities. Segmentation is a very important factor in determining the specific messages of the awareness campaign and in selecting the suitable and most effective media channels for delivering these messages.

The campaigns and programs assessed didn't show an analysis about the methodology of selecting the target groups. However, around 80% of the studied programs and campaigns were targeting the general public, whereas many of them were targeting the new generations.

7.4.3 GEOGRAPHICAL COVERAGE

The analysis shows that 44% of the programs/campaigns were implemented in Amman, and around 22% were implemented in Balqa region (Greater Al Salt, New Deir Allah, Swaymeh). On another hand, the absence of similar programs/campaigns in the North and South regions of Jordan has been

noticed, with the exception of some campaigns that have been implemented in Aqaba by JES and JREDS.

7.4.4 SOCIAL & ECONOMIC CONTEXT

Most of the programs/campaigns were implemented without proper planning, where social and economic context was not taken into consideration during the planning phase, which leads to a weak or complete absence of the social and their economic value.

7.4.5 DESIGN & ACTIVITIES

Raising awareness about a particular cause can be a challenging but rewarding experience. Campaigns and programs should be designed in a sustainable way to assist target groups with the acquisition of knowledge, skills, and attitudes that are necessary to solve actual and local environmental problems.

The analysis shows that the majority of the awareness programs/campaigns didn't have a clear design and activities framework except for the programs that involve international donors, who require designs and action plans, although there is no evidence that proves the implementation of the proposed designs and activities for these programs/campaigns.

7.4.6 DURATION

Several international studies show that any awareness or social marketing campaigns needs long time to have tangible results in behavioural change or raising awareness of a community. However, the findings of the analysis indicated that most of the programs/campaigns that have been implemented in respect of MSWM in Jordan were short-term, and in several cases they were just 1-day programs/campaigns.

7.4.7 PARTNERS

Public awareness programs are often so complex that no single agency can make a difference by itself. Building partnerships increases significantly the support of a program or issue, by harnessing the influence, credibility, and resources of profit, non-profit, or governmental organizations.

Most of the programs/campaigns implemented by Municipalities have been done without any types of partnerships, where Municipalities rely on their own capabilities in implementing these programs/campaigns.

On the other hand, programs/campaigns implemented by NGOs included several partners in most of the cases. In fact, two types of partnerships have been identified:

1. through *funding partners*, who provided financial support for the implementation of the programs/campaigns activities; and
2. through *implementing partners*, who helped in the elaboration of the awareness raising activities.

7.4.8 EFFICIENCY

Although it's a fundamental step to evaluate the effectiveness of any awareness program/campaign, none of the identified programs/campaigns in the MSWM sector included such an evaluation.

The analysis found that most of the campaigns/programs had an impact only during the implementation of activities (e.g. streets became clean during clean-up campaigns), whereas in most of the cases the efficiency was very limited even to short-term periods after the events. The majority of campaigns/programs had no long-term impacts.

7.5 ASSESSMENT OF PRODUCED AWARENESS MATERIALS

With regards to awareness materials used in the framework of awareness raising programs/campaigns mentioned before, they are classified in the following categories:

- Press releases
- Leaflets
- Radio signals
- Other promoting material
- Workshops

7.5.1 PRESS RELEASES

75% of the investigated programs/campaigns consider press releases in their action plan. However, these press releases were only to cover the activities of the campaigns and were not used as an awareness tool.

7.5.2 LEAFLETS

Leaflets and other publications are the most traditional component of the awareness campaigns/programs, and the studied programs/campaigns did not differ on that. In fact, the majority (83%) of programs/campaigns has used leaflets and other publications in their activities.

7.5.3 RADIO SIGNALS

Interestingly the study shows that 50% of the investigated programs/campaigns used radio channels during the implementation phase. However, this use was restricted to personal interviews with the project team during regular programs on these channels.

7.5.4 OTHER PROMOTING MATERIAL

Some of the implemented programs/campaigns included other types of awareness materials as per the following:

- 21% of the programs/campaigns used social media;
- 25% of the programs/campaigns produced promotional materials, such as t-shirts, caps, etc.;
- 42% of the programs/campaigns used TV channels through personal interviews with the project team during regular programs on the TV; and
- a very small fraction included direct visits, sending of SMS messages, and dissemination through the partners' websites.

7.5.5 WORKSHOPS

Workshops are considered as one of the most traditional tools in awareness programs, where 71% of the investigated programs/campaigns used workshops and seminars to deliver their awareness messages.

7.5.6 CONCLUSION

Although the above analysis shows that implemented awareness campaigns/programs in the MSWM sector during the last few years used a variety of awareness materials, samples of these materials were not made available to the Consultant by the campaigns'/programs' partners.

However, according to the Consultant's discussions with the stakeholders of these programs/campaigns, it can be concluded that the majority of the produced awareness materials had been made in a very traditional way that lacked creativity and effectiveness.

7.6 SWOT ANALYSIS

Figure 7-1 summarizes the Strengths, Weaknesses, Opportunities and Threats that have been identified as a result of the analysis of the already performed public awareness and education activities in the MSWM sector in Jordan.



Figure 7-1: SWOT Analysis for the already performed public awareness and education activities in the MSWM sector in Jordan

7.7 CONCLUSIONS & RECOMMENDATIONS

7.7.1 CONCLUSIONS

In conclusion, the analysis and assessment of current situation in Jordan with regards to public awareness and education on MSWM showed that such programs/campaigns that were implemented during the last few years were very limited, randomly located, flashy and not designed in professional way according to international standards.

Municipalities, JSCs and generally the local authorities have been generally proved to be technically underqualified to professionally design and implement awareness programs, situation which is also deteriorated by their weak financial capacity. Specific exceptions exist, such as GAM, the Greater Madaba Municipality, etc., but their efforts have not been occurred as a result of a national targeted strategy, being fragmentary. Added to this, programs/campaigns supported by the central government (MoH, MoENV, etc.) are also fragmentary and not widely applied.

Significant initiatives have been organised and implemented by NGOs, which are much more flexible and – in many cases – technically qualified than public authorities to play the role of the public awareness inspirer. However, the so far initiatives of NGOs were implemented in isolation from each other in most of the cases (the Clean-up The World Campaign could probably be considered as an exception) and without the participation or support of Municipalities/JSCs.

All this happen due to the absence of a national public awareness and education policy for the sector, deficiency that is to be resolved in the next steps of the current Project (Action 2.5: Definition of Public Awareness and Education Policy).

After precise guidelines are set in terms of public awareness on MSWM, the sector can be strongly revitalized, since there is an increasing interest of the general public, the GoJ and the private sector in proper MSWM. The public awareness and education policy can have great influence in the success of the MSWM strategy under development.

7.7.2 RECOMMENDATIONS

Based on what is mentioned above, the need for a national public awareness and education policy on MSWM is evident, which is going to be defined in the next steps of the Project. This policy will complement the MSWM Strategy in the long-term. It will focus on innovative community engagement concept and will be based on international criteria, the following included:

1. Involvement of the whole community and all public and private stakeholders who are not regular participants in the designing process in order to harness their support;
2. Review of current conditions of the sector;
3. Review of existing and potential impacts and influence of key stakeholder groups;
4. Survey of socio-cultural and socio-economic conditions;
5. Identification of cognitive and psychological traits of the target audience in respect of the target behaviour;
6. Identification of the information needs and habits of each identified target group;
7. Definition of the messages and construction of the communications lines;
8. Evaluation of the effectiveness of the program.

Different options for raising public awareness and education on MSWM issues will be proposed for different target groups, depending on their expected outcome in order to bring the best possible results.

Based on the policy, a series of public awareness and education programs/campaigns will need to be implemented in the following years in parallel with the finally accepted MSWM Strategy. Their guidelines and general attributes will be defined in the policy, but specific promotional activities and material will be a subject of future, specific projects.

Added to that, training programs should be designed and implemented for the staff of Municipalities, JSCs and other authorities dealing with MSWM, on the methodology for implementing awareness programs on their own means, based on their roles and positions. The awareness concept should be included in the job description of each one of them.

Further, new divisions for public awareness and public participation in MSWM campaign should be developed and created in local or central government level, and special budgets should be dedicated for their causes. Generally, financial support of local authorities to carry out public awareness campaigns should be allocated on a regular basis.

Finally, partnerships between the public sector, the private sector, academic institutions and NGOs should be established to ensure effective and successful implementation of public awareness and education programs. The private sector has a high potential of investing in public awareness campaigns in the framework of their CSR policy.

8 SOCIO-ECONOMIC SURVEY OF WASTE-PICKING ACTIVITIES

8.1 INTRODUCTION

Over the past half century, in-country migration and increased fertility rates have caused the population of cities in the developing world to mushroom. The global population of urban dwellers is expected to double between 1987 and 2015, with 90% of this growth occurring in developing countries. Much of the new population has settled in urban slums and squatter settlements, which have expanded rapidly with no central planning. The UN Habitat Report found that nearly one billion people worldwide live in slums, about a third of the world's urban dwellers.

The rapid urbanization greatly increased the demand for informal waste collecting services, as cities lacked the infrastructure and resources to collect the totality of waste generated by their inhabitants. Despite spending 30-50% of operation budgets on SWM, developing world cities today collect only 50-80% of refuse generated by inhabitants. Residents and businesses often resort to burning garbage or disposing it of in streets, rivers, vacant lots or open dumps. This is a source of air, land, and water pollution that threatens human health and the environment. Informal waste collectors help mitigate this harm by collecting recyclable materials by foot or in pushcarts, tricycles, donkey carts, horse carts, or pickup trucks.

On the supply side, urbanization has facilitated the expansion of waste-picking by creating a large pool of unemployed and underemployed residents with few alternative means of earning a livelihood. Known as “*the one industry that is always hiring*”, waste-picking provides a cushion for many who lose their jobs during times of war, crisis, and economic downturn in countries that do not have welfare systems. It is also one of the few work opportunities available to people who lack formal education or job experience.

Specific socio-economic conditions prevail in many economically developing countries including Jordan, that also include rapid population growth, migration to urban areas, lack of sufficient funds and affordable services and generally a low-skilled labour force. Added to that, the Syrian Crisis was a major addition of pressure on the SWM in Jordan. In such circumstances, all the economically valuable resources become a trade even if they are waste of primary or other levels. Although somewhat old but highly relevant, according to a UNDP survey of 151 mayors of cities from around the world, the second most serious problem that city dwellers face (after unemployment) is insufficient SW disposal (UNDP 1997).

Theoretically, three (3) features are typical in the waste management situation in developing cities: (a) the Municipalities in developing countries have insufficient means to manage the growing burden of SW, (b) the informal sector plays an important role in recovering significant quantities of SW at a zero cost to the public, and (c) despite the efforts of the formal and informal sectors, significant quantities of waste remain uncollected (Beukering, Schoon and Mani, 1996).

Figure 8-1 shows the structure of the waste-picking system in Jordan.

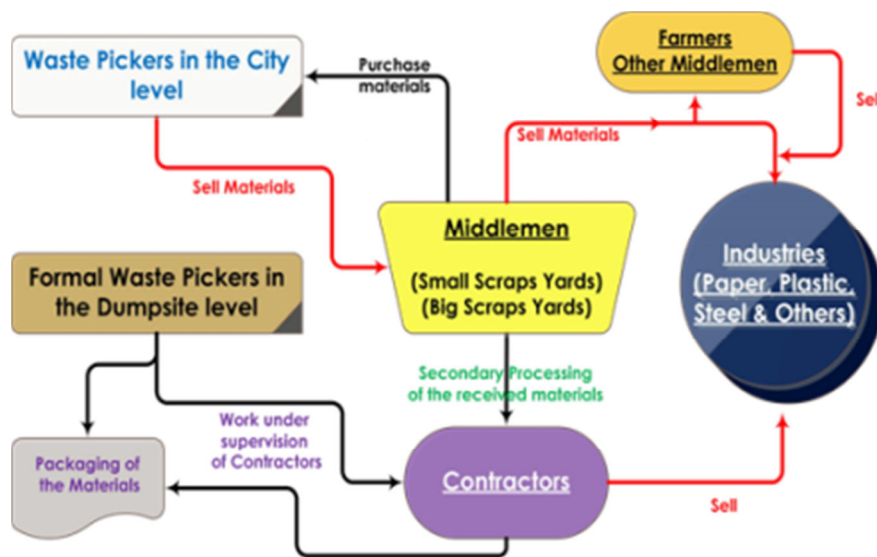


Figure 8-1: Structure of the waste-picking system and cycle in Jordan

For the Project's purposes, a socio-economic survey of the waste-picking activities in Jordan was conducted. It was divided into three (3) sections:

1. the first one referring to the "informal" waste-picking activities taking place in the "city level";
2. the second one referring to the "informal" waste-picking activities taking place in the "dumpsite level"; and
3. the third one referring to the "formal" waste-picking activities taking place in the "dumpsite level".

The objectives of the above sections of the socio-economic survey were to estimate the following:

- a) numbers of waste-pickers;
- b) demographic characteristics of waste-pickers;
- c) educational and financial status of waste-pickers; and
- d) the waste-pickers willingness to participate in formal recycling programs.

Moreover, the waste-pickers' survey targeted to identify the recovered materials' attributes, such as: types, specifications, financial worth, market demand and annual economic impact.

To do so, three (3) types of questionnaires have been prepared with focus on the aforementioned issues; one for individual waste-pickers (type 1), one for middlemen (type 2) and one for the industry (type 3).

These questionnaires were designed and prepared to be as simple as possible, consisting of simply questions of arithmetic and multiple-choice format, so as to facilitate both the interviewed and the interviewer/reviewer.

The target groups of this survey were as follows:

- I. Formal and informal waste-pickers:
 - 80 waste-pickers in the city level;
 - 50 formal waste-pickers in the dumpsite level; and
 - 25 informal waste-pickers in the dumpsite level.
- II. Middlemen, or Contractors in case of having a formal agreement:
 - 5 middlemen in the city level; and
 - 2 contractors in the dumpsite level.
- III. Industry (final destination): 50-75% of the total number of recycling industries.

Different approaches have been used for reaching the aforementioned statistical samples:

1. face-to-face interviews, which mainly targeted the groups of waste-pickers and middlemen in the city level, as well as in the dumpsite level;
2. phone calls with relevant JSCs to arrange their support in carrying out the required interviews with their Contractors and waste-pickers in the dumpsite level (where applicable); and
3. correspondence via e-mails with the recycling industries, whereas in cases of not getting positive replies, door-to-door visits were held.

The aforementioned approaches resulted to a satisfactory level of replies from the target groups, as follows:

- I. Formal and Informal waste-pickers:
 - i. 74 waste-pickers in the city level (93% of the target);
 - ii. 50 formal waste-pickers in the dumpsite level; and
 - iii. 25 informal waste-pickers in the dumpsite level.
- II. Middlemen:
 - i. seven (7) Middlemen in the city level; and
 - ii. four (4) Contractors in the dumpsite level.
- III. Industry (final destination): 11 companies, which included paper and cardboards, plastic and steel manufacturers.

8.2 WASTE-PICKERS

Based on the collected field information, results were analysed and summarized in order to present the overview of the current social and economic conditions of the waste-pickers in the city and dumpsite levels. Table 8-1 shows the waste-pickers that have been interviewed, as well as the areas which have been covered for this purpose. A total of 149 face-to-face interviews were performed with 74 informal waste-pickers in the city level, 50 formal waste-pickers in the dumpsite level and 25 informal waste-pickers in the dumpsite level.

The direct interviews with informal waste-pickers in the city level were the most challenging assignment in this survey, due to the difficulties of tracking and convincing them to provide the required information. On the other hand, it was observed that some of them refused giving information about their life conditions and behaved aggressively in some cases.

Table 8-1: The Waste-pickers targeted in the survey

Waste-Pickers Group	Target Activities	Sample Size	Municipalities "Areas Covered"
Informal waste-pickers	City Level	74	GAM, Sahab, Almoaqr, Al-Fahis, Mahes, New Ain Al-Basha, Madaba, Karak, Al-Khaldieh, New Oum Al-Jemal, Al-Russeifeh and Greater Zarqa
	Dumpsite Level	25	GAM (Al-Russeifeh old dumpsite), Al Homra dumpsite (Balqa (Al Salt) JSC), New Deir Allah dumpsite (Al-Shoneh Al-Wsta JSC), Al Barkah and Al Samar dumpsites (Al-Agwar Al-Janobeiah JSC), Burma Transfer Station (Irbid (Al Ekaider) JSC), Zarqa Transfer Station (Zarqa JSC), Al-Russeifeh Transfer Station (Zarqa JSC)
Formal waste-pickers	Dumpsite Level	50	JES MRF (GAM), MRF plant (GAM), Al Homra dumpsite (Balqa (Al Salt) JSC), Al Ekaider dumpsite (Irbid (Al Ekaider) JSC), Al Lajoun dumpsite (Karak JSC), Madaba dumpsite (Madaba JSC), Huseyneyat dumpsite (Mafraq JSC), Zarqa Transfer Station (Zarqa JSC)

In the dumpsite level, the process of interviewing carried out smoothly due to the support and help of the relevant JSCs. Interviews with informal waste-pickers in the dumpsite level were of significance challenging due to the attitudes of waste-pickers at the targeted areas and the lack of governmental control at these target areas.

8.2.1 WASTE-PICKERS IN THE CITY LEVEL

As mentioned previously, 74 individual waste-pickers have been interviewed in 12 cities for the purpose of evaluating the social and economic conditions of this target as per the objective of this concerned survey. Annex 5 gives full image about information and data collected for that purpose.

a. Demographical aspects:

The analysis shows the following results:

- 35% of this group of waste-pickers ages are ranging between 26 to 35 and 23% are in the ages between 19 to 25. Less than 5% of them, their ages are from 16 to 18.
- All waste-pickers interviewed in the city level were males. Women were noticed but will not respond in any way for our purposes.
- Jordanians make up 88%, Palestinians are 8% and Syrians are 4%. It has been observed that Syrian waste-pickers are working actively in the northern cities covered by this survey.

Figure 8-2 shows the educational level of the waste-pickers at these target areas.

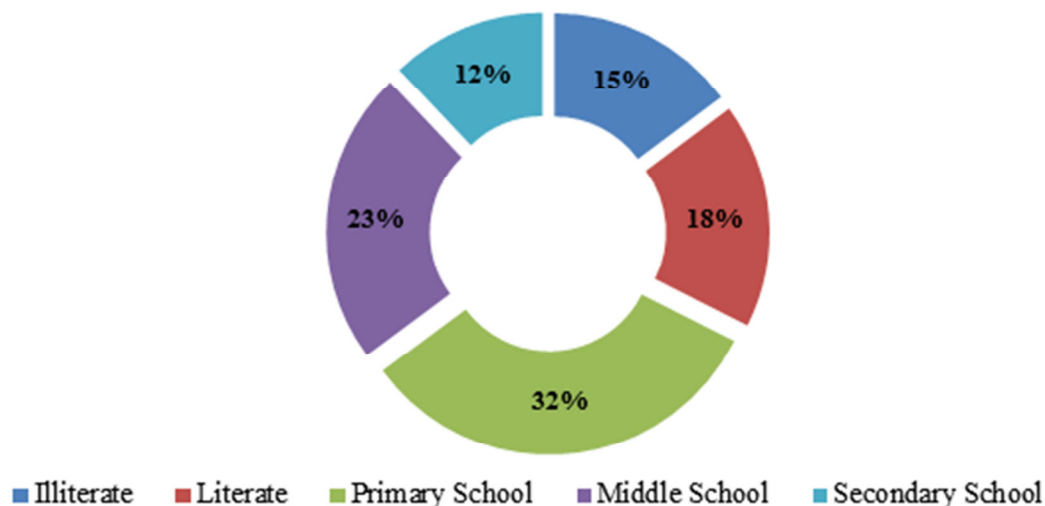


Figure 8-2: Education level of Waste-pickers in the city level

- With respect to their marital status, 61% of the waste-pickers are married, and 29% of married group have more than three children.

b. Hazards, health and living conditions of the waste-pickers

The waste-pickers in the city level expose the source of hazards facing because of their job nature, and the analysis showed:

- 3% of them arrested by police and 4% of the sample size have been facing hostile behaviour in the neighbourhood wherever they live.
- 23% of them suffer chronic health problem; such as diabetes, heart attack and high blood pressure. 92% have been vaccinated against diseases, and are fully immunized.
- Within the last six months, 36% of the waste-pickers examined by doctors, On the other hand, 7% of them has never been examined by doctors.
- 57% of the sample sizes live in houses, 39% live in slums and only 4% live in camp.

- All interviewed waste-pickers have at the areas where they live an access to electric current, water sanitation, health clinics and education.

In particular with social acceptance in the neighbourhood, 59% of waste-pickers have good social treatment from the neighbours, and only 9% suffer from unfriendly behaviour of their neighbours. Key behaviour indicators of the neighbours against waste-pickers:

- Not speaking respectfully with their family members.
- Kids on public areas speak barefacedly to them when passing through their gathering.
- Their children feel embarrassed at schools, because of their job nature.

c. Occupational characteristics, income and job satisfaction

The analysis showed:

- 9% of the waste-pickers are self-employed workers. Waste-pickers working full time make up 85% of the sample size.
- 27% of them are temporarily working as waste-pickers, and 73% of them have been working for a long time as waste-pickers.
- 32% have been working as waste-pickers for more than five years, and only 30% have been just starting the waste-picking activities in the city level.
- Income stability and the shortage of other job opportunities are the main reasons set behind working as waste-pickers.
- The majority of waste-pickers work nine hours a day. 70% of them prefer working from morning to afternoon. 64% of them spend six working days per week for waste-picking, collecting, storing and selling of the recyclable materials.
- The average daily income of 46% of the waste-pickers is ranging between 11 to 15 JOD per working day.
- 51% of the waste-pickers use picks up in order to collect the recycling materials, and they usually bring their food stuff and drinking water from home.
- 92% of the sample size has no place for rest or protection from bad weather at the workplace.
- 76% of the waste-pickers use safety shoes and only 24% use gloves for picking and collecting the waste from the points of collection or generation.
- 45% of the waste-pickers are aware about the other waste-pickers occupied at their areas "Living and working". The majority of waste-pickers live in Amman, particularly in the districts located at the border between Amman and Al-Russeifeh.
- 23% of the waste-pickers disclosed that an average of occupied children; at the areas where they live; in waste-picking activities is 20.

Figure 8-3 shows the points of collection targeted by waste-pickers in the city level. Table 8-2 demonstrates the average amount of collected materials, and its local prices.

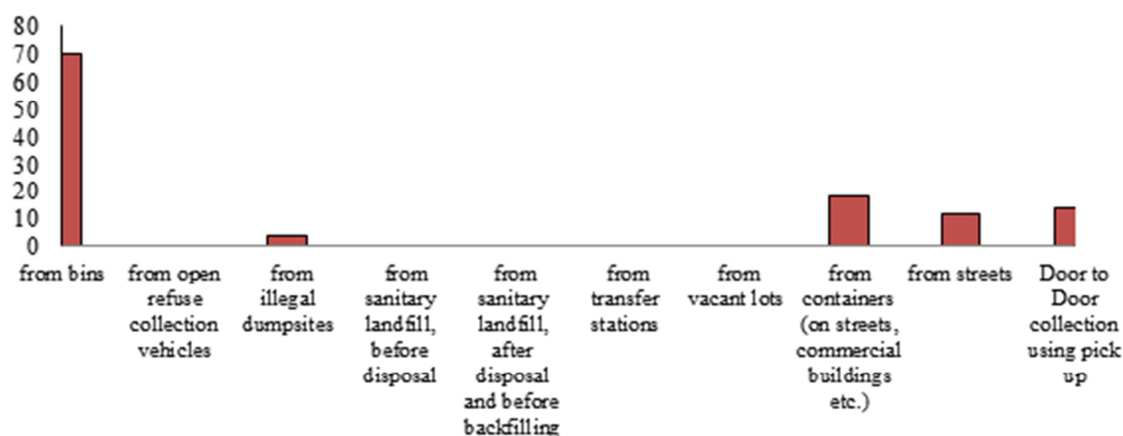


Figure 8-3: Points of collection targeted by waste-pickers in the city level

- 93% of the waste-pickers sell the collected scrap materials directly to middlemen, where 65% of the middlemen receiving and purchasing these materials having small scrap yards.
- 51% of the waste-pickers use big bags for storing and transporting the collected recyclable materials, 45% of them use pickups and 4% only use donkeys for the same purpose.
- 54% of the sample size show their high willingness to be involved in any proposed waste-pickers' cooperative, and the follows are some of their consideration on this regard:
 - To be integrated and incorporated in the social security program.
 - Issuing health insurance for them and their family members.
 - Giving better image about this business at the community level.
 - Controlling the market supply and demand of the recyclable materials prices.
 - Set out specifications and conditions for the vehicle uses for collecting the recyclable materials.
 - Issuing License "Work Permission" for waste-pickers to work legally in some areas at the cities

Table 8-2: The average collected amount of recyclable materials and its local prices

Materials Collected	Average Collected Amount (kg/d/ picker)	Average Selling Price (JOD/kg)
Paper	500-700	0.4
Glass	n/a	-
Aluminum cans	20-30	0.65
Ferrous cans	20-30	0.15
Copper wires	0.2-0.4	3.3
WEEE	3 items/ month	1-5/item
Other large Ferrous items	2-5 items/ month	0.15

Materials Collected	Average Collected Amount (kg/d/ picker)	Average Selling Price (JOD/kg)
Other large aluminum items	1-2 items/month	-
Other large Copper items	Rarely to be found	-
Plastics	200-300	0.25
Batteries	n/a	-
Clothes	36% of the waste-pickers collected clothes for personal uses	-
Organics	n/a	-
Nylon	5-10	0.75
Bread "Mold"	1-2 bags	1.75/bag

8.2.2 FORMAL WASTE-PICKERS IN THE DUMPSITE LEVEL

A total of 50 waste-pickers in the dumpsite level have been targeted in the field survey, and the cities visited for this purpose are shown Table 8-1. Five landfills and one transfer station were visited for the surveying purposes. Added to that, the "clean" MRF operated by JES has been considered as a final sorting plant of the recyclable materials. For that, it has been visited and targeted for gathering information by the waste-pickers working there.

a. Demographical aspects:

As shown in Figure 8-4 the ages of targeted waste-pickers in the dumpsite level are demonstrated. The detailed characteristics include:

- 58% of them are married, and those having more than three children make up 10% of the sample size.
- Males make up 74% of the sample size, while females make up only 26%. Syrians working as waste-pickers in the dumpsite level make up 20% of the sample size "Mainly Females" and Jordanians make up 70% of target group.

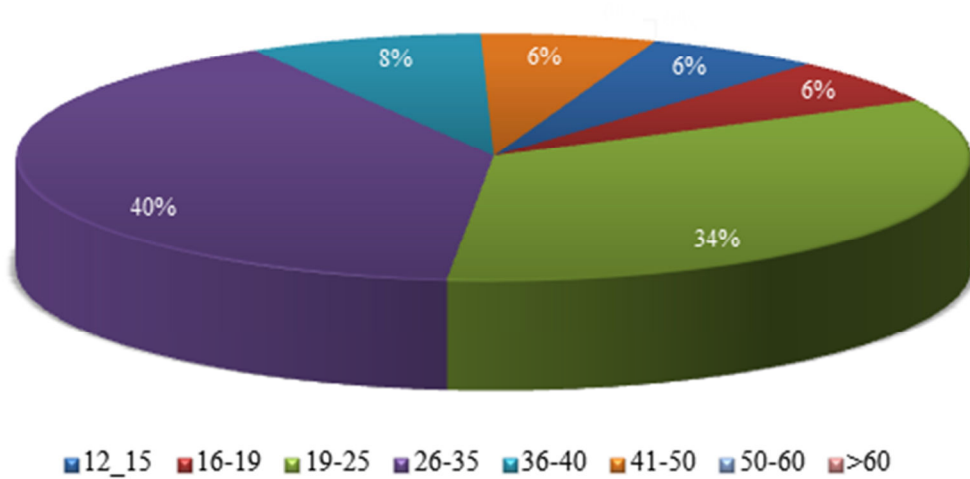


Figure 8-4: Ages of the formal waste-pickers in the dumpsite level

Figure 8-5 shows the educational level of the waste-pickers in the dumpsite level.

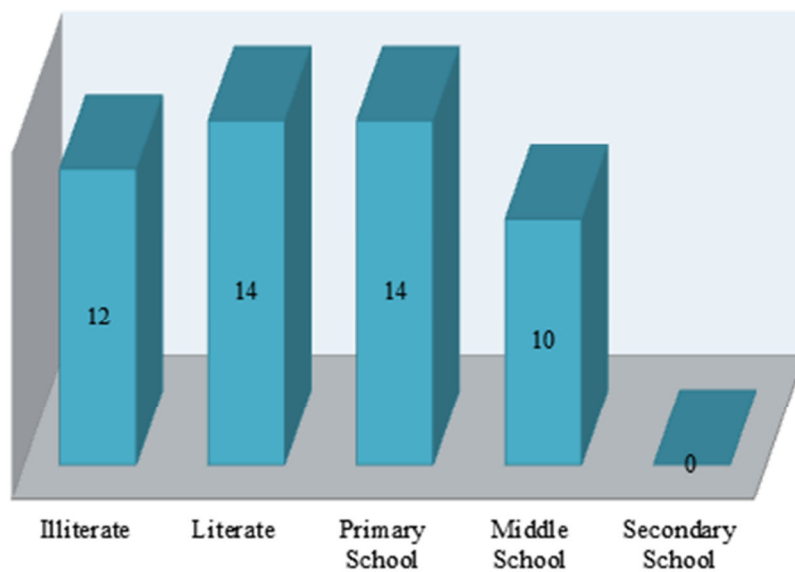


Figure 8-5: Educational level of waste-pickers

b. Hazards, health and living conditions of the waste-pickers

- With respect to the overall health status, 94% of the waste-pickers think that their overall health conditions are good. Only 3% of them suffer chronic health problems. 92% of the sample size is fully immunized against common diseases. 36% of them examined by doctors within last six months.

- The waste-pickers living in camps make up 52% of the total sample size. Mainly, in Karak, Salt and Irbid Landfills, the waste-pickers live in camps located at the same area. 64% of them have access to electric current, water, sanitation, clinics and education.
 - Only 72% of the waste-pickers live with no hostile behaviours against them from neighbours, while the others are suffering from some key behaviour such as calling them "Garbage boy". Some waste-pickers commented on the social acceptance at the neighbourhood by saying: "Living here temporarily, and no one of his/her family members know what his/her actual job is", Others said: "don't mind about being socially accepted or not"
- c. Occupational characteristics, income and job satisfaction
- All interviewed waste-pickers in the dumpsite level work under the supervision of landfill or transfer station contractors.
 - The reasons of working as waste-pickers were mainly; income stability and the shortage of job opportunities. In addition to the mentioned reasons, 8% of the waste-pickers work in this field because their parents used to do that.
 - Up to 90% of the waste-pickers work around nine hours daily, and from morning to afternoon. All of them work six days a week at the site of final sorting.
 - The daily remuneration of 92% of the waste-pickers is ranging between 11 to 15 JOD/ working day.
 - The contractors mainly provide transportation facility "Bus or pickup" to transfer the waste-pickers from area of living to the workplace. Only 26% go walking to the workplace.
 - Only 32% of the waste-pickers have place for rest or protection from bad weather at the workplace.
 - All waste-pickers interviewed at the sites of working use safety shoes during the collection and sorting of the recyclable materials. 72% use gloves, 52% put masks at their faces and 84% wear caps while working there.
 - 92% of the target group aware about the waste-picking activities carried out at their areas and the number of people doing the same job. The average number of the other known waste-pickers by target group is 52.
 - 34% of the waste-pickers know children who are involved in this job. While the average number of those children as mentioned by the target group is 9.
- d. Organizational structure and key actors
- Considering the source of waste "Recyclable Materials" collection, 74% of the waste-pickers collect the materials from landfills before burial, 20% of them collect the materials from transfer stations, while only 6% from the "clean" MRF of JES.
 - Paper, cardboard, aluminum cans, ferrous cans, copper wires, WEEE, large aluminum items, large ferrous items, large copper items, plastic, nylon and mould bread are the materials collected by waste-pickers in the dumpsite level. The waste-pickers in the dumpsite level work under the umbrella of the waste treatment facility contractors. They do final sorting of the receiving materials at specific working area allocated by the JSCs, then the separated and

collected materials picked out and stored at big bags to be transferred later by contractor fleet to the final destination or other secondary processing stations.

- 70% of the waste-pickers are willing to be involved in any proposed waste-pickers' cooperative. Their considerations and needs from such cooperative: are to be integrated with social security program, to get health insurance for his/her family members, to protect their life from any harm and support them to improve the work conditions at the site.
- None of them is interested to work at open municipal space ceded by the Municipality for gathering, picking and selling the recyclable materials legally. Their justification is: *"already working at the landfill or transfer station that belong to the Municipality"*.

8.2.3 INFORMAL WASTE-PICKERS IN THE DUMPSITE LEVEL

Informal waste-pickers in the dumpsite level have been targeted by interviewing them at their workplaces; their activities were concentrated and cantered in eight cities and areas in Jordan.

a. Demographical aspects:

- The majority of informal waste-pickers in the dumpsite level ages' are ranging from 26 to 35. 28% of them are in the age from 19 to 25.
- All informal waste-pickers in this level are males, while 88% of are Jordanians, 8% are Palestinians and only 1 waste-picker is a Pakistani (in Al-Agwar Al-Janobeiah).
- In respect with their education level, 36% of the sample size is Illiterate and 40% spent at least six years at school.
- With respect to their marital status, (52%) of the waste are married, with dependency rate of 1:4 and 1:5.

b. Hazards, health and living conditions of the waste-pickers

- The waste-pickers never faced any hazards, harms or sources of exposure during their job history.
- Diabetes and high blood pressure are the main chronic health problems suffered from as only 12% of the sample size mentioned. 84% of them have been vaccinated against common diseases and are fully immunized. While, 48% of this target group examined by doctors within last six months. On the other hand, 92% think that their overall health status is good.
- 40% of the informal waste-pickers in the dumpsite level live in houses, while 56% of them live in slums. 69% of them have access to sanitation and education services.
- Considering the social acceptance at the neighbourhoods where they live, 72% of them have good treatment and social relations with others, while only 8% of the sample size suffers from unfriendly social treatment of the neighbours.

c. Occupational characteristics, income and job satisfaction

- Regarding to the working time of the waste-pickers, 36% of them work seven days a week, where 52% work only six days every week. They mostly work from morning to afternoon and they spend nine hours a day in the field.
- Waste-picking considered as a Long term job by 80% of them. All the interviewed informal waste-pickers in this level areas self-employed workers. 56% of them justified the reason of doing this activity due to the income stability, where 84% of them are doing the same due to the shortage of job opportunities, and only 32% work as waste-pickers because their parents did the same job.
- In respect to their average income from waste-picking activities in this level, 48% of them get 16 to 20 JOD per each working day, where 36% get 11 to 15 JOD per working day.
- 60% of the informal waste-pickers in the dumpsite level walk to reach the workplace, while 36% use pickups to go to the workplace. 92% of them have no place to rest or protection in bad weather at the workplace.
- All waste-pickers use safety shoes at the workplace, while 72% use gloves for picking the waste materials and only 12% wear caps at the workplace.
- 80% of them are aware about the number of other people occupied on the same job at their areas. Where 52% of the interviewed waste-pickers in the target areas disclosed that they are aware about the number children occupied in the waste-picking jobs as the average number of those children are 10.

d. Organizational structure and key actors

- They informal waste-pickers in the dumpsite level collect the recyclable material from: from illegal dumpsites, from transfer stations, from vacant lots, Farms, constructional waste landfill.
- Table 8-3 shows the materials collected by waste-pickers and their local selling prices. Big bags are used for collecting and storing the materials from the points of collection.

Table 8-3: Average collected amount of recyclable Materials and its selling local prices by informal waste-pickers in the dumpsite level

Materials Collected	Average Collected Amount (kg/d/ picker)	Average Selling Price (JOD/kg)
Paper	500-600	0.4
Glass	n/a	-
Aluminum cans	25	0.7
Ferrous cans	25	0.15
Copper wires	0.3	3.35
WEEE	2-3 items/month	4/item
Other large Ferrous items	1-3 items/month	0.14

Materials Collected	Average Collected Amount (kg/d/ picker)	Average Selling Price (JOD/kg)
Other large aluminum items	1-2 items/month	0.75
Other large Copper items	Rarely to be found	3.25
Plastics	500-600	0.25
Batteries	n/a	-
Clothes	n/a	-
Organics	n/a	-
Nylon	20-30	0.85
Bread "Mold"	1-2 bags	1.75/bag

- Most of the target waste-pickers in this level are not willing to be involved in any proposed waste-pickers' cooperative. At the same time, they mostly suspect that it is better for them to continue working in the same procedure rather than working in any allocated land or municipal space by the Municipality, even though the difficulties might be had in the future.

8.3 MIDDLEMEN IN THE CITY LEVEL

Middlemen in the city level play significant role on controlling the flow of selling and purchasing materials from the waste-pickers to the final destinations "Industry", where they are considered as a key player on the process of recycling activities. For that, the interviews with this target group were of significance and helpful for the purposes of the concerned survey.

Seven middlemen have been targeted and visited in order to gather the required information about the waste-picking activities, the procedure of purchasing and selling the recyclable streams.

a. Demographical aspects:

- Five cities have been visited in order to do interview with seven middlemen in the city level.
- Middlemen ages are mainly ranging from 41 to 50, where 2 of them are in the ages between 36 and 40.
- One German middleman has been visited in this survey "Director of Bee'ty Recycling Facility", where the others were Jordanians. All interviewed middlemen are males, married, and 71% of them having more than three children.
- Two middlemen got higher education, and three of them just left school at secondary level.

b. Hazards facing on the job

- Having contracts with shops and key generators of waste in the absence of legal framework nor governmental control; and export fees imposed on recycling paper are the highest intensive hazards facing middlemen in the city level.
 - All middlemen live in houses, and they have access to electric current, water, sanitation, health clinics and education.
 - In respect with their social acceptance in the neighbourhood, all the middlemen have no any problems regarding the social behaviour of the neighbours due to their job.
- c. Occupational characteristics
- All interviewed middlemen are self-employed workers, and most of them have been engaged in this business for at least 5 years, 2 of them have been engaged in this job for about ten years.
 - They commonly work in the morning, where half of them work seven days a week. Their average daily work is 9 hours.
 - The average monthly income of four middlemen is ranging between 1500 and 2000 JOD, while it is about 2000 to 4000 of 2 targeted middlemen.
 - The middlemen in the city level know around 27 middlemen doing the same business.
 - The average number of waste-pickers acquainted by the target middlemen is around 55. And the number of children known as waste-pickers is 3 due to the target middlemen.
- d. Organizational structure and key actors
- All target middlemen in the city level purchase the recyclable materials from individual informal waste-pickers. Where the other sources of purchasing scrap materials are: other formal middlemen, Municipality workers and the materials received at their stations due to the contracts they have with some shops, hotels and malls.
 - Table 8-4 shows the average amount of collected materials, where Table 8-5 demonstrates the purchasing prices of the recyclable materials. On the other hand, Table 8-6 shows the selling prices of the recyclable materials.

Table 8-4: Average amount of collected materials

Materials Purchased by Middlemen	kg/d	tn/d	kg/w	tn /w	kg/m	tn/m	kg /yr	tn/yr
Paper		3-5						
Glass								
Aluminum cans	100-500							
Ferrous cans		1-1.5						
Copper wires	2-3							
WEEE				2-4				
Other large Ferrous items		1-2						

Materials Purchased by Middlemen	kg/d	tn/d	kg/w	tn /w	kg/m	tn/m	kg /yr	tn/yr
Other large aluminum items						1-2		
Other large Copper items						1--2		
Plastics		1-4						
Batteries								
Clothes								
Organics								
Nylon	80-100							
Bread	2-3 bags							

Table 8-5: Purchasing prices of scrap materials

Materials that are Sold	JOD/kg			JOD/item			JOD/bag		
	Lowest	Highest	Average	Lowest	Highest	Average	Lowest	Highest	Average
Paper	0.3	0.6	0.45						
Glass									
Aluminum cans	0.6	0.8	0.7						
Ferrous cans	0.14	0.16	0.15						
Copper wires	3.2	3.6	3.4						
WEEE	N/A								
Other large ferrous metal items	0.14	0.18	0.16						
Other large aluminum items	N/A								
Other large Copper items	N/A								
Plastics	0.2	0.4	0.3						
Bread							1.5	2	1.75
Nylon	0.7	0.9	0.8						

Table 8-6: Price of selling materials

Materials Sold by Middlemen	JOD/kg			JOD/item			JOD/bag		
	Lowest	Highest	Average	Lowest	Highest	Average	Lowest	Highest	Average
Paper	0.55	0.70	0.625						
Aluminum	0.70	0.80	0.75						
Ferrous	0.17	0.20	0.185						
Copper	3.40	3.70	3.55						
Plastics	0.30	0.55	0.425						
Nylon	0.90	1.00	0.95						

- The structure of the facility used for storing and doing the secondary processing of the recyclable receiving materials is almost open spaces, fenced and secured. Where only 2 middlemen have closed building for this purpose.
- Crushing and packaging are the most common processing methods used at the station of waste treatment of the middlemen.
- Most of the middlemen deliver the recyclable materials to the clients with their own transport means.

e. Towards an integration policy

- No one of the target middlemen is aware of any professional organization which engaged in improving the conditions of work and defending the interests of middlemen. Also, no one is aware of any respective professional organization of waste-pickers.
- Two of middlemen are members in the well-known Jordan Investors Association.
- “This needs legislative framework, new rules and laws should be issued to regulate and organize the recycling business in Jordan”. This is one key comment of the middlemen considering the establishment of waste-pickers’ cooperative.

8.4 MIDDLEMEN "CONTRACTORS" IN THE DUMPSITE LEVEL

Three dumpsites and one transfer station have been visited and targeted for the purpose of this concerned survey. It included the Zarqa Transfer Station, the Al Lajoun dumpsite in Karak, the Madaba dumpsite and the Al Huseyneyat dumpsite in Mafraq. This assignment has been carried out through support and help from the relevant JSCs. The following figures show the waste-picking activities in the dumpsite level.



Figure 8-6: Waste-picking activities at the Al Huseyneyat dumpsite



Figure 8-7: Waste-picking activities at Zarqa Transfer Station

a. Demographical aspects:

- Two contractors in the dumpsite level ages ranged between 41 and 50.
- All are male and Jordanians. Their educational background varied but all spent less than 10 years at schools. They are all married and the independency rate is ranging from 1:3 to 1:4.

b. Hazards facing on the job

- No one of the targeted contractors faces rivalries among the middlemen for the market control, threats due to illegal purchase of materials or hostile reactions from waste-pickers.
- They mostly live in houses, and have an access to electric current, water, sanitation, health clinics and education is available.
- In respect with their social acceptance in the neighbourhood, the contractors in the dumpsite level have never faced any hostile or unfriendly social treatment due to their job nature.

c. Occupational characteristics

- All are considered as self-employed workers.
- Morning (day-time) is the common working time for them with 9 hours per each working day and 6 days a week.
- The average monthly income of carrying out waste-picking activities in the dumpsite level is ranging from 2000 to 4000 JOD per month.
- As per their disclosure, the average number of other middlemen acquainted and known to them is around 19. While the average number of their acquainted waste-pickers is 80. And the average number of children working as waste-pickers; as per the contractor's disclosure; are about 13.

d. Organizational structure and key actors

- The contractors in the dumpsite level didn't disclose the amount of recyclable materials collected by their team. All sign contracts with relevant JSCs in order to extract and pick the recyclable stream of waste from other streams, which then sold to the final sorting "recycling" facilities.

- They mostly sell the collected and picked materials to the wholesalers "Larger middlemen", paper and cardboard factories, farmers and plastic industries.
 - The collected materials commonly deliver to client with the contractors' own transport means.
- e. Towards an integration policy
- Due to the stand point of the contractors, the integration of recycled / recovery / reused materials in a formally operated market probably would not change anything of the existing situation.
 - The key proposals suggested by contractors regarding to the establishment of waste-pickers' cooperative were the follows:
 - a. Organizing and supervising the work of waste-pickers and middlemen in the city and dumpsite level.
 - b. Playing a key role with all relevant governmental agencies to support people engaged in the waste-picking activities, due to their contribution on minimizing the amount of buried waste at the landfill sites.
 - c. Issuing license to the contractors and waste-pickers working at the dumpsites due to their compliance toward health, occupational safety and environment conditions.

8.5 FINAL DESTINATIONS (INDUSTRY)

Industries using the recyclable materials collected through waste-picking activities have been targeted and visited. Interviews were performed with a total of 11 manufacturers in order to gather the required information for the purpose of the concerned socio- economic survey. Table 8-7 shows the types and locations of the surveyed industries.

Table 8-7: Types and locations of the surveyed industries

Municipality	Industry	Coordinates	Number of interviewee
GAM	Paper	315329.64N 355836.97E	1
	Steel	1146624.593N 235206.785 E	1
Sahab	Paper	N/A	1
Almoaqr	Plastic	N/A	3
Ajeeza	Plastic	N/A	1
Al-Russeifeh	Plastic	N/A	1
Greater Zarqa	Paper	N/A	1
Total			11

a. Demographic and social features of the interviewees:

- Half of the Interviewees ages are ranging between 36 and 40, where 27% of them ages are from 41 to 50 and from 50 to 60 . All are males and have Jordanian nationality except one Syrian "owner of plastic factory at Almoaqr town". They mostly got higher education.
- Considering the positions of the interviewees at their respected companies, three of them are owners, 5 are directors, 1 is a finance manager, 1 is a quality manger and 1 is a safety officer.

b. Profile of the Targeted Companies:

- As clearly shown in Table 8-7, three paper, seven plastic and one steel company have been targeted in this survey.
- 45% of the companies have been operating for almost five years, where 18% of them have been operating for more than twenty years.
- 1 paper processor of the targeted companies has more than 50 employees, where the others mostly use less than 10 employees for their manufacturing activities.

c. Organizational Structure and Key Actors:

- All targeted companies receive the recyclable materials from large formal middlemen, where 73% of them receive the materials also from informal individual waste-pickers, directly. 3 of the targeted companies have contracts with hotels, private waste collection operators and NGOs for delivering the recyclable stream of their generated waste.
- The average monthly amount of paper delivered to the targeted paper manufacturers is about 550 tons per month for each company. Where the average amount of plastic received at the plants of plastic manufacturing is almost 50tons monthly for each plant. And the average amount of steel scrap transferred to the steel factories is about 2000 tons a month.
- Paper and cardboard usually received in bulk and tied pallets form. While the plastic and steel received in bulk form.
- The supplier of the recyclables commonly transfers the materials to the final destinations with his own mode.
- Table 8-8 shows the price of purchase scrap materials.

Table 8-8: Prices of purchase scrap materials

Materials that are Sold	JOD/kg		
	lowest	highest	average
Paper	0.3	0.7	0.5
Plastics	0.2	0.6	0.4
Steel	0.18	0.22	0.2

- All targeted companies store the scrap materials close buildings, while the final sorting of papers mostly done in secured and fenced open spaces.

- Figure 8-8 shows an overview of the manufacturing process of paper, the storage area of receiving shredded papers, shredding machines and the conveyor belts used for final sorting process at the targeted companies of the concerned survey.
- Table 9 demonstrates the number of middlemen deal with target recycling companies. It is obvious from Table 9 that the selling and purchasing of the recyclable materials are rather active in Amman governorate, and this is due to the intensive availability of the recycling industries in this region.



Figure 8-8: Overview of the manufacturing process of paper, the storage area and shredding machines

Table 8-9: Number of middlemen deal with target recycling companies

Municipalities	Estimation								
	a. Small middlemen businesses			b. Large middlemen businesses			c. Total middlemen businesses		
	lowest number referred in:	Leading (biggest)* number referred in:	Ave.	L	B	Ave.	L	B	Ave.
GAM	50	150	100	5	10	7.5	27.5	80	54
Sahab	50	100	75	5	10	7.5	27.5	55	41
Almoaqr	3	5	4	1	3	2	2	4	3
Ajeeza	3	3	3	1	1	1	2	2	2

Municipalities	Estimation								
	a. Small middlemen businesses			b. Large middlemen businesses			c. Total middlemen businesses		
	lowest number referred in:	Leading (biggest)* number referred in:	Ave.	L	B	Ave.	L	B	Ave.
Al-Russeifeh	10	10	10	3	3	3	6.5	6.5	6.5
Greater Zarqa	20	20	20	5	5	5	12.5	12.5	13
Total	136	288	212	20	32	26	78	160	119

- Due to the information gathered and analysed from the targeted sample, the average income of small middlemen is ranging between 500 to 700 JOD monthly with 50% to 80% profit margin, where the average income of the large middlemen is ranging from 1000 to 1500 per month with 50% to 80% profit margin.
- Export fees on recycling paper and the prices of the Chinese product at the local market are of significance key hazards and risks facing the recycling industries in Jordan.

8.6 SWOT ANALYSIS

The Strengths, Weaknesses, Opportunities and Threats deriving of the current MSWM system in Jordan in terms of the socio-economic view, are summarized hereunder.

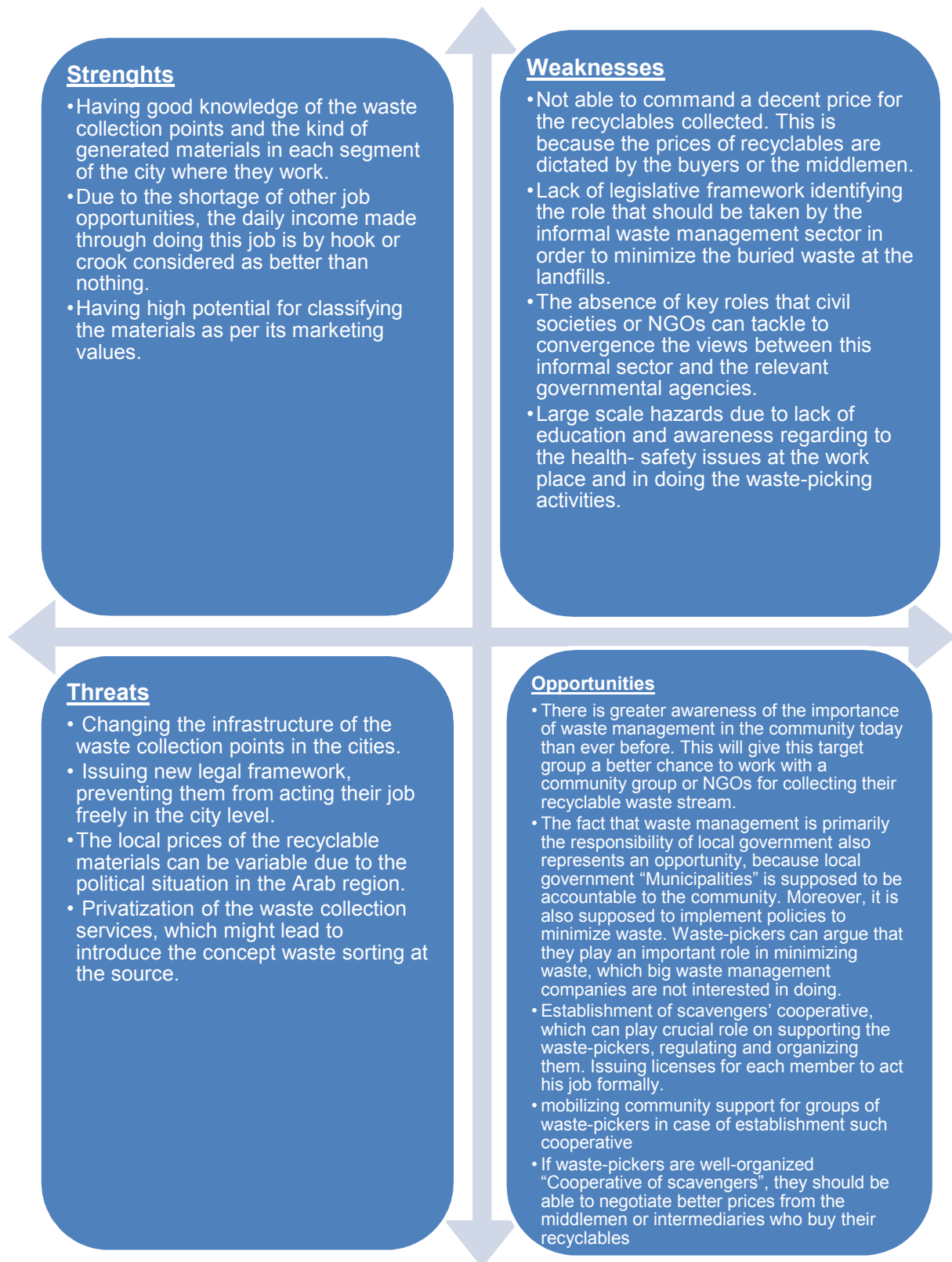


Figure 8-9: SWOT for informal waste-pickers in the City level

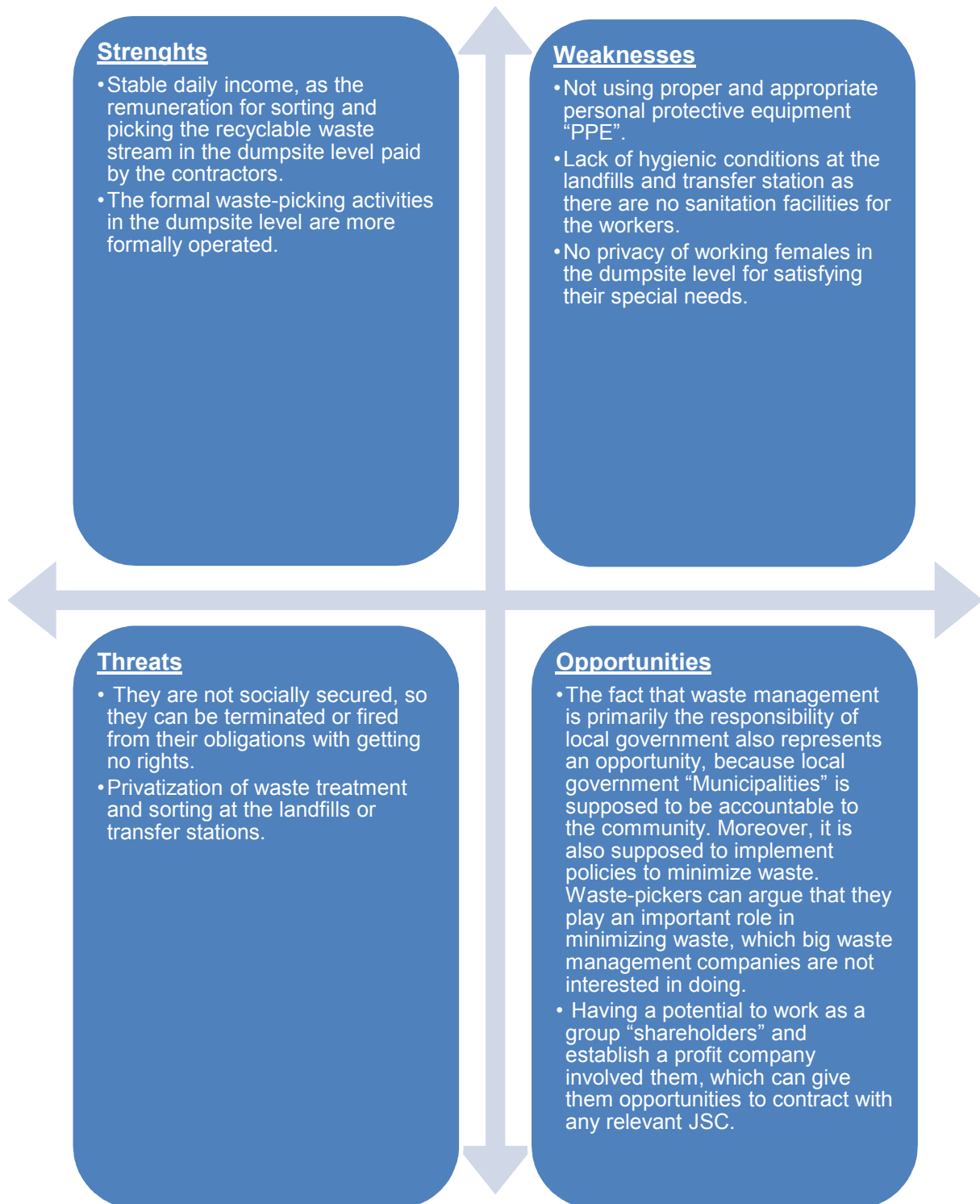


Figure 8-10: SWOT for formal waste-pickers in the Dumpsite level

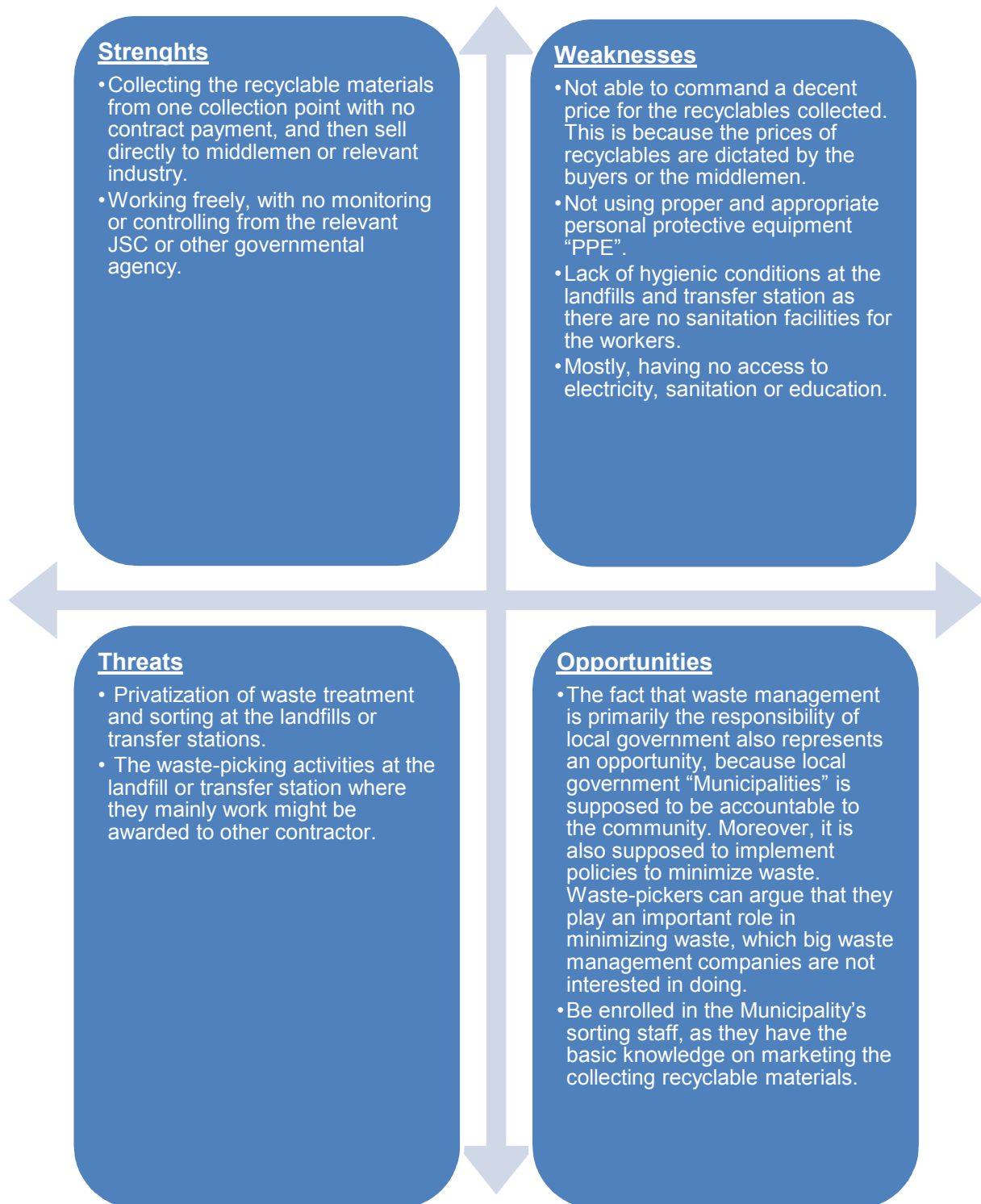


Figure 8-11: SWOT for Informal waste-pickers in the Dumpsite level

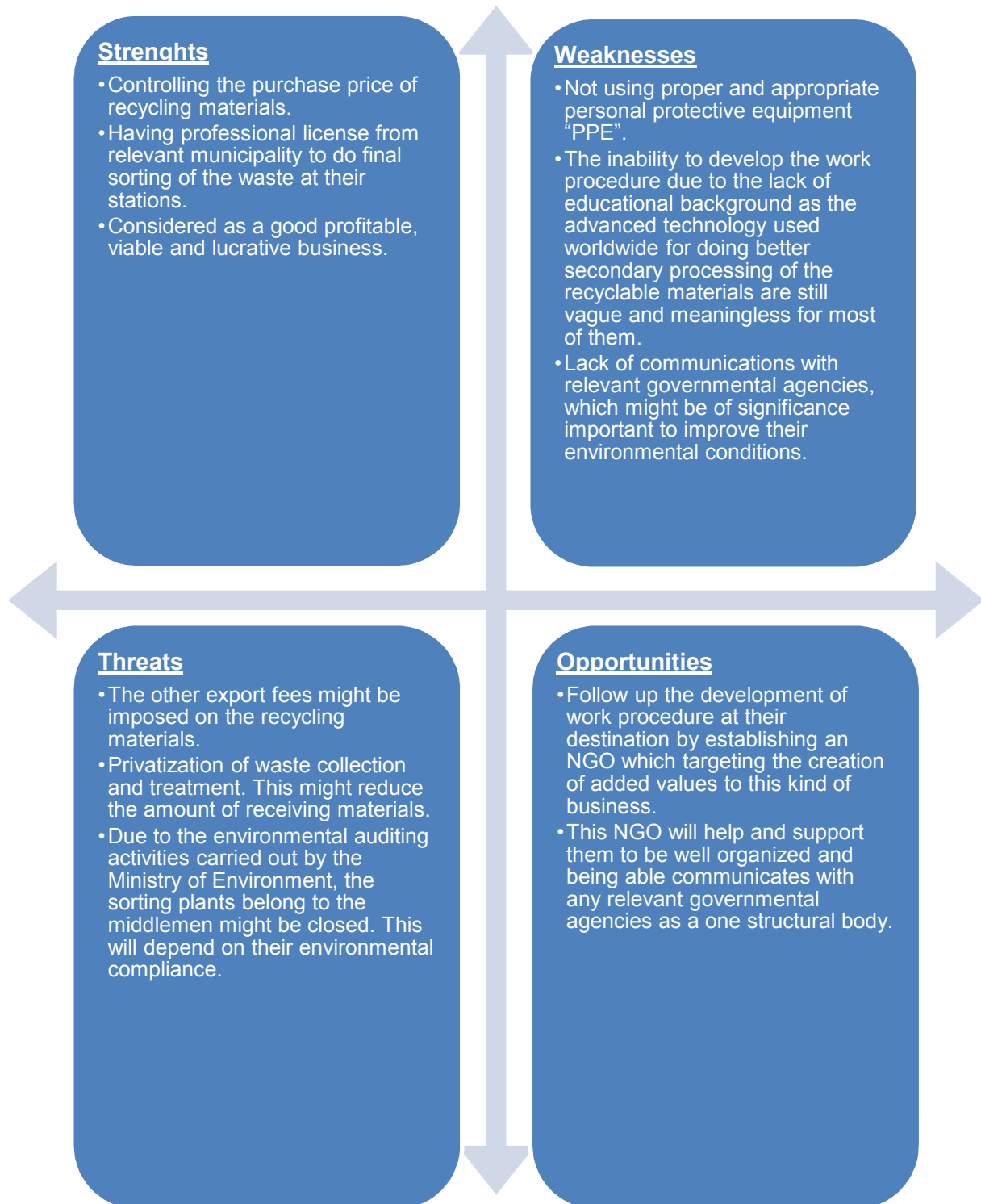


Figure 8-12: SWOT for Middlemen in the city level

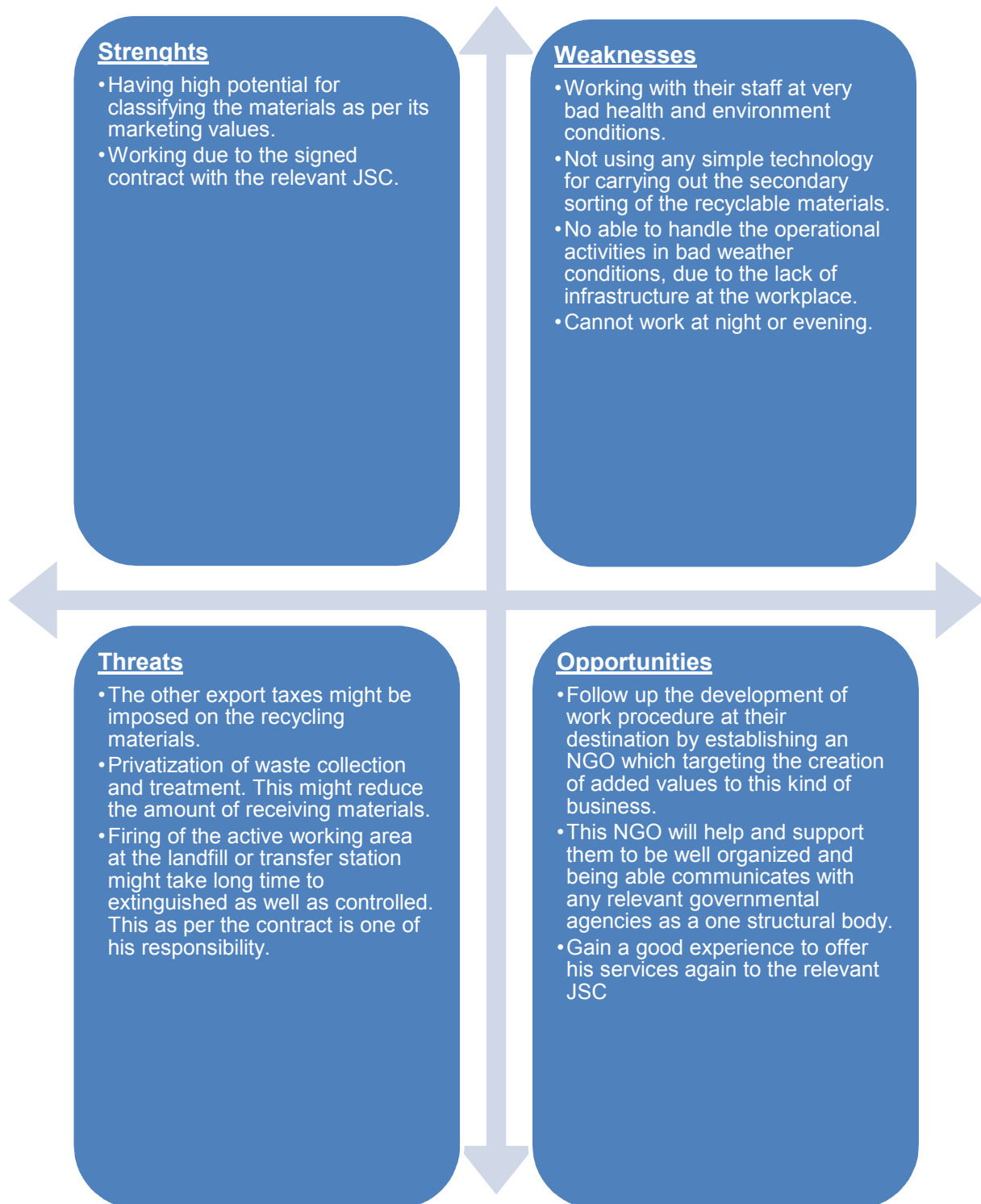


Figure 8-13: SWOT for Contractors in the Dumpsite level

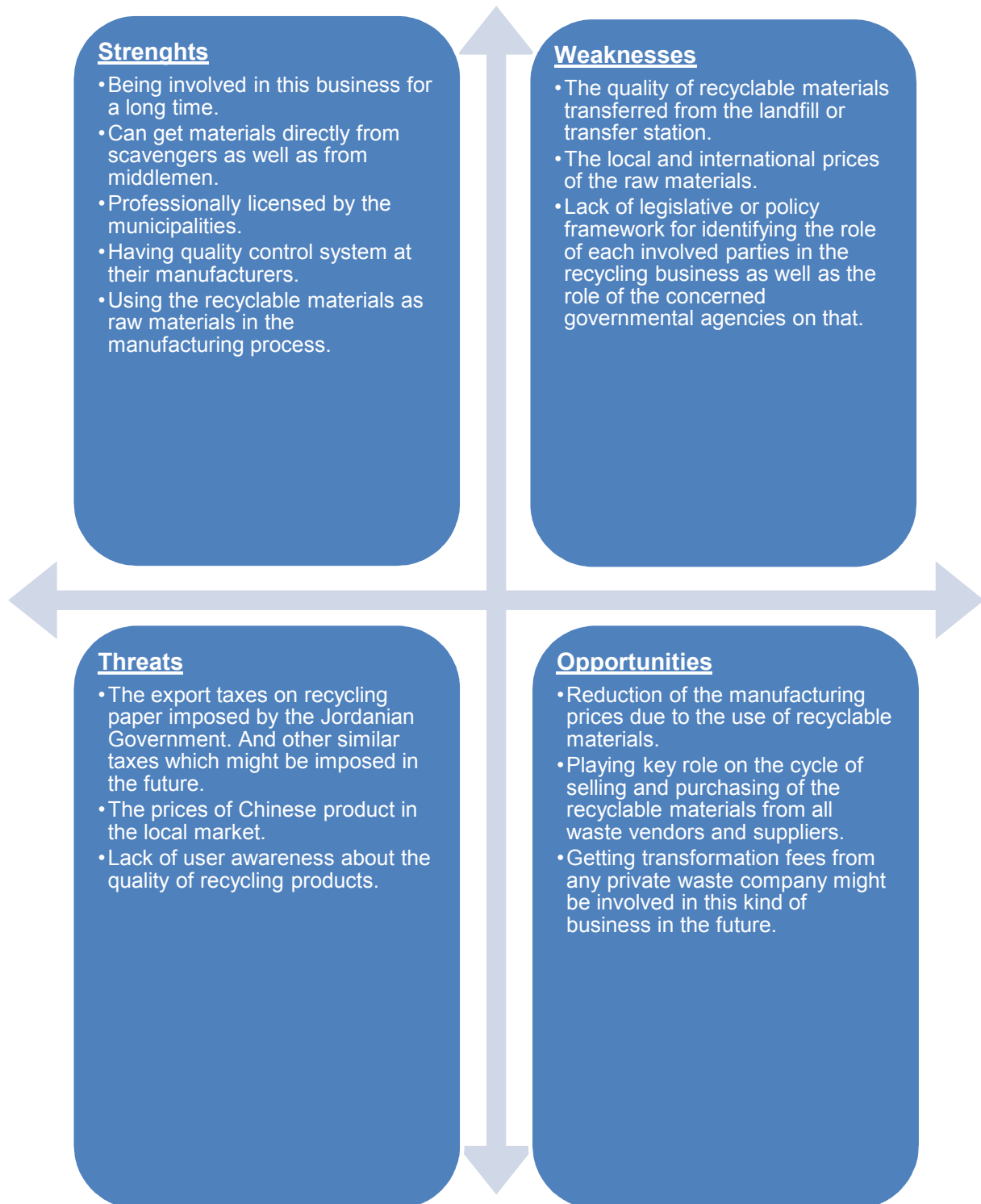


Figure 8-14: SWOT for Final destinations (industry)

8.7 RECOMMENDATIONS

- Special efforts should be made to promote integration of waste-pickers in the new proposed MSWM facilities deriving from the Strategy
- A database should be prepared about the recycling business in Jordan, for their involvement in any relevant stakeholder's consultation purposes in the future
- Controlling the informal waste-picking activities in the dumpsite level is an essential action to be taken by relevant JSCs to reduce the expected negative impacts of such kind of activities.
- Establishment of a waste-pickers' cooperative would be helpful for organizing waste-picking activities.
- NGOs might probably play key role on developing the manual procedure of the waste-pickers in case of establishment such cooperative.
- Issuing instructions considering the waste-picking activities in the city level and dumpsite would be a key step to integrate the formal as well as informal sectors in the field of waste management (condition: RECYCLING CANNOT BE APPLIED differently).
- Stakeholders' consultation should be a top priority for making governmental decision considering the recycling business in Jordan.

9 EXISTING PUBLIC-PRIVATE PARTNERSHIPS IN MSWM

9.1 INTRODUCTION

Public-Private Partnership (PPP) is widely recognized as a venture between a public governmental institution and one or more private entities that may assume substantial financial, technical and operational risk in a project. In most of the times, PPP is needed to support the public sector technically and/or financially in executing/managing a project.

Definition of PPP may vary between countries or even counties. Regulation No.80/2008 provides a generic definition of PPP, which is similar to a concession agreement; PPP is defined as a relatively long-term written agreement between the public and private sectors for the purpose of implementing a project. Moreover, it is generally accepted that a concession contract is one of the three main forms: permit, license or lease. However, in this report, all kinds of private sector involvement in public sector activities related to the SW sector will be considered as PPP.

As described in our proposal and Inception Report, the Consultant was supposed to arrange meetings with the EPC for the purpose of collecting necessary information on the strategies of Jordan with regards to privatization. Unfortunately, as the EPC was dismantled on May 2014, this step could not be performed. The Consultant attempted to contact some of the key staff in charge of the EPC but contact was not possible. Therefore, this section has been based on desk review based on available documentations provided by the Client or other sources, as well as on the outcomes from the analysis of the questionnaires filled by the Municipalities and JSCs during the horizontal analysis and the in-depth diagnosis surveys.

9.2 EXISTING MAJOR MSWM PPP CONTRACTS IN JORDAN

Based on available documents and reports, it was noted that some PPP initiatives were adopted in the past in the SWM sector (*Alhyasat and Al-Nsour, 2013*). Furthermore, several PPP projects were noted by the Municipalities and JSCs in the framework of the horizontal analysis and the in-depth diagnosis surveys. Table 9-1 summarizes those projects.

Table 9-1: Summary of adopted PPP initiatives in in the SWM sector in Jordan

#	Contract	Contracting Authority	Status 2014
From Desk Review			
1	BOT for a "dirty" MRF in Al Ghabawi (capacity: 600 tn/d)	GAM	Delayed, dispute
2	DBOT for a 6 MW LFG recovery and power generation system at Al Ghabawi landfill	GAM	Active (2012-2017)
3	Jordan Biogas Plant (50% by GAM and 50% by CEGCO) at Al-Russeifeh old dumpsite	GAM	Active
4	Service Contract for municipal cleaning of Aqaba City (2.5 million JOD/yr)	ASEZA	Active
5	Service Contract for municipal cleaning of the Petra Archaeological Park (PAP) (250,000 JOD/yr)	PDTRA	Active (2009-today, yearly contracts)
6	BOOT for a hazardous waste treatment centres in Al Ghabawi and Swaqa	MoENV	Terminated
From Horizontal Analysis & In-Depth Diagnosis			
7	Service Contract for the operation of the Wadi Al-Osh Transfer Station (3.25 JOD/tn)	Greater Zarqa Municipality	Active (2006-today, yearly contracts)
8	Service Contract for recycling (by hand-picking) in the Al Lajoun dumpsite	Karak JSC	Active (yearly contracts)
9	Service Contract for recycling (by hand-picking) in the New Deir Allah dumpsite (2,500 JOD/yr for 2014)	Al-Shoneh Al-Wsta JSC	Active (2010-today, yearly contracts)
10	Service Contract for recycling (by hand-picking) in Al Homra dumpsite	Balqa JSC	Active (yearly contracts)
11	Service Contract for recycling (by hand-picking) in Al-Duleil dumpsite	Zarqa JSC	Active (yearly contracts)
12	Service Contract for recycling (by hand-picking) in Al Barkah and Al Samar dumpsites	Al-Agwar Al-Janobeiah JSC	Active (yearly contracts)
13	Service Contract for recycling (by hand-picking) in the Al Ekaider dumpsite (110,000 JOD/yr for 2013)	Irbid (Al Ekaider) JSC	Active (yearly contracts)
14	Service Contract for recycling (by hand-picking) in the Al Huseyneyat dumpsite (50,000 JOD/yr for 2013)	Mafraq JSC	Active (yearly contracts)

As noted in the above table, most PPP interventions in MSWM are through the local authorities entitled with MSWM (Municipalities, JSCs, GAM, ASEZA, PDTRA). The contracts that refer to street cleaning, SW collection and transfer are being contracted by local authorities (ASEZA, PDTRA, Greater Zarqa Municipality), whereas those that include more sophisticated facilities (recycling, anaerobic digestion, WtE, disposal, etc.) are being contracted by the JSCs or GAM.

GAM has also been considering involving the private sector in street cleaning and SWM collection services. A pilot PPP project had been conducted in the neighbourhood of Hay Al Joron in Basman municipal district during the year 2007. The contractor was “CITY CLEAN”, a Jordanian Emirate partnership with a Jordanian partner “Al-Nasser Group”, which is one of the main companies in Jordan dealing with SW. The contract was summed at about 150,000 JOD/yr and finally lasted for one (1) year and included MSW collection, transportation to the Al Ghabawi landfill, as well as cleaning and maintenance of MSW containers. The contractor used his own equipment and vehicles with drivers hired from GAM. Open spaces were excluded from the work scope. The production of solid waste at the time was estimated to be between 18-20 tn/d. However, this pilot project has not been implemented in the optimum way, due to small contract area, short duration of contract, other contractual issues, etc., and was found economically not feasible, even though technical efficiency was rated as 89% by GAM. Thenceforth, no other PPP attempt for street cleaning and MSW collection has been made by GAM.

The only PPP that is under the umbrella of the Central Government (MoENV) is the BOOT for hazardous waste treatment centres in Al Ghabawi and Swaqa, which is not dealing with MSW and is out of the scope of this Project.

Most of the contracts are active, with the exception of the BOT contract for the “dirty” MRF in Al Ghabawi landfill.

According to *Alhyasat and Al-Nsour* (2013), no private involvement is evidenced in large-scale projects operated by the private sector.

9.3 AUTHORITIES' CAPACITY FOR CONTRACTING AND MONITORING PPP CONTRACTS

The public authorities (Municipalities and JSCs) in Jordan are still in charge for the provision of SWM services and they would definitely need extensive support to execute and monitor PPP contracts. The PPP contracts shall be detailed to the extent where the role of the private sector is well defined in a manner to protect the rights of the public authorities and serve the public purpose of the contracts to improving the quality of services. The main concern remains the cost that shall be paid by the authorities and their capacity to recover this cost to ensure sustainability. Accordingly, it is essential to conduct a detailed feasibility study for every project before being considered for the PPP approach. The feasibility study should consider costs and benefits of the project for the local administration, the residents and the environment. In addition, it should include a comparative assessment with the current and future conditions of the project considering various scenarios (with and without PPP intervention).

Overall, as stated in Article (4) of the Environment Protection Law, the Ministry of Environment will be monitoring the public and private cooperation to confirm that the environment is being protected.

9.4 SWOT ANALYSIS

Figure 9-1 summarizes the Strengths, Weaknesses, Opportunities and Threats for the application of the PPP approach in the MSWM sector in Jordan.



Figure 9-1: SWOT Analysis for the application of PPP approach in the MSWM sector in Jordan

9.5 CONCLUSIONS & RECOMMENDATIONS

In conclusion, it seems that there is high potential for PPP projects in Jordan, provided that the increase of the MSWM fees paid by the Jordanian citizens would be affordable. Generally, fees and costs are a major obstacle towards proper MSWM in Jordan.

In social terms, it may be difficult for the GoJ to pose higher fees. However, privatisation could be a good way to proceed to fees' increase in environmentally friendly societies, avoiding pressure on the Government, provided that privatisation eventually leads to higher efficiency.

Environmental awareness campaigns can also play a very significant role in this, by raising the sensibility of the public for sharing the responsibility with their local authorities for proper SWM. This could result in raising of the citizen's willingness to pay for better living conditions and for a safer environment, thus increasing the PPP potential in MSWM.

The types of PPP projects that seem to be more easily realised in the MSWM sector in Jordan are the following:

- Contracting MSW collection and transport activities. The benefits would be to improve the quality of services, to optimize the MSW collection routing, as well to ensure appropriate maintenance or replacement of the waste collection means (vehicles, bins, etc.) when damaged. The level of investments is relative low in relation to the operational costs.
- Contracting treatment or disposal of collected MSW in order to ensure protection of the environment and of natural resources, as well as decreased risks to the public health. The level of investments is considerable and can be provided by the private sector.

10 LIST OF REFERENCES

1. Abu Qdais H. (2007). ***Environmental Impact Assessment of Municipal Solid Waste Landfills: a Case Study from Jordan***, Sardinia 2007 – 11th International Waste Management and Landfill Symposium, Cagliari, Italy.
2. Abu Qdais H., K. El-Fayez (2012). **Country Report on the Solid Waste Management in Jordan**, SWEEP-NET.
3. Alhyasat A.G., Z. Al-Nsour (2013). **Country Report of the Solid Waste Management Situation in Jordan**.
4. Alhyasat A.G. (2012). **Waste and Wealth: Lessons Learned from World Bank Solid Waste Management Projects**, Amman Solid Waste Management Project: Project Implementation Issues and Lessons Learned, presentation, March 1st, 2012.
5. Aljaradin M., K.M. Persson (2011). ***Current situation of municipal solid waste management in Jordan***, Waste Management Journal, Vol.31, pp. 1897-1900.
6. Aljaradin M., K.M. Persson (2012). ***Environmental Impact of Municipal Solid Waste Landfills in Semi-Arid Climates - Case Study – Jordan***, The Open Waste Management Journal, Vol. 5, pp. 28-39.
7. Al-Khatib I.A., H.A. Arafat, T. Basheer, H. Shawahneh, A. Salahat, J. Eid, W. Ali (2007). ***Trends and problems of solid waste management in developing countries: A case study in seven Palestinian districts***, Waste Management 27, pp.1910–1919.
8. CCM (May 2014). **Local Solid Waste Master Plans for Irbid, Ramtha and Mafraq**, FWC Beneficiaries 2009 – LOT 6, RfS 2013/334-543/1, on behalf of the European Delegation in Amman & the Ministry of Municipal Affairs.
9. CCM and Greater Irbid Municipality (May 2014). **Local Solid Waste Master Plan for Greater Irbid Municipality**, FWC Beneficiaries 2009 – LOT 6, RfS 2013/334-543/1, on behalf of the European Delegation in Amman & the Ministry of Municipal Affairs.
10. CCM and Greater Mafraq Municipality (April 2014). **Local Solid Waste Master Plan for Greater Mafraq Municipality**, FWC Beneficiaries 2009 – LOT 6, RfS 2013/334-543/1, on behalf of the European Delegation in Amman & the Ministry of Municipal Affairs.
11. CDM – Executive Board (2011). **Project Design Document Form (CDM PDD) of the project “Amman Ghabawi Landfill Gas to Energy Project”**, version 3.
12. Chopra M., D. Reinhart and W. Abu-El-Shaar (2001). **US-Jordan Municipal Solid Waste Management Collaborative Research**, The National Science Foundation, Wilson Boulevard, Arlington, 2001.
13. Consolidated Consultants (December 2011). **Development of a Public Awareness and Communication Program in Amman–Amman Solid Waste Management Project**, revised 1st draft report, GAM.

14. DOS (1994). **General Census of Population and Housing of Jordan 1994.**
15. DOS (2004). **Population and Housing Census 2004.**
16. DOS (2007). **Population and Housing Census - Aqaba City 2007.**
17. DOS (2012). **Jordan Statistical Yearbook 2012**, Issue No. 63.
18. EEA (2013). **Managing municipal solid waste - review of achievements in 32 European countries.**
19. ERM Ltd. (2010). **Red Sea-Dead Sea: Water Conveyance Study - Environmental and Social Assessment**, Initial Assessment Report, prepared for World Bank, pp. 407.
20. Eurostat (2012). **Reference Metadata in Euro SDMX Metadata Structure (ESMS).**
21. Jaradat A., O. Al-Khashman (April 2013). **Evaluation of Potential use of Municipal Solid Waste for Recovery Options: A Case Study of Ma'an City, Jordan**, Jordan Journal of Earth and Environmental Sciences, Vol. 5, No. 1, pp. 9-15.
22. LDK Consultants, Pescares ATKINS (2012). **Assessment of Current Situation Report**, Project "Integrated Solid Waste Management in Al-Ekaider – Jordan", MeHSIP-PPIF Programme - Phase II, Horizon 2020.
23. LDK Consultants, Pescares ATKINS (2012). **Scoping & Options Analysis Report**, Project "Integrated Solid Waste Management in Al-Ekaider – Jordan", MeHSIP-PPIF Programme - Phase II, Horizon 2020.
24. LDK Consultants, Pescares ATKINS (2012). **Feasibility Study**, Project "Integrated Solid Waste Management in Al-Ekaider – Jordan", MeHSIP-PPIF Programme - Phase II, Horizon 2020.
25. Melloni G., A. Nguyen, D. Tonea (2013). **WASH in Host Communities in Jordan – An Interagency Assessment**, UNICEF – ACTED – Mercy Corps – Oxfam – Relief International.
26. MoTA (2010). Jordan – National Tourism Strategy 2011-2015.
27. PEEREA (2010). **The Hashemite Kingdom of Jordan: Regular Review 2010 – Part I: Trends in energy and energy efficiency policies, instruments and actors**, Energy Charter Secretariat, Brussels, pp. 62.
28. QRACEST/JUST (2012). **Solid Waste Characteristics at Al-Ekaider Landfill**, MeHSIP-PPIF - Al-Ekaider Solid Waste Management Project.
29. Royer A (2011). **Reduce, Reuse, Recycle: Informal Sector Recycling in Amman, Jordan**, National Conference on Undergraduate Research (NCUR) 2011, Ithaca College, New York.
30. SOGREAH (March 2011). **The Development of a Long Term Strategic Plan Improving Amman Municipal Solid Waste Management System**, 1st draft report, N°1310162, GAM.
31. SWEEP-NET (2010). **Country Profile on the Solid Waste Management Situation in Jordan.**
32. UNEP (2009). **Developing Integrated Solid Waste Management Plan – Training Manual, Volume 4: ISWM Plan**, Division of Technology, Industry and Economics, International Environmental Technology Centre, Osaka/Shiga, Japan, pp. 172.
33. UNHCR (April 2014). **UNHCR Jordan Overview (as of end April, 2014).**

34. Hoornweg D., P. Bhada-Tata (March 2012). **WHAT A WASTE - A Global Review of Solid Waste Management**, Urban Development Series Knowledge Papers, No. 15, The World Bank - Urban Development & Local Government Unit.

Electronic references:

1. Eurostat: <http://epp.eurostat.ec.europa.eu>
2. Development & Free Zones Commission: <http://www.dfzc.jo>
3. Jordanian Department of Statistics: <http://www.dos.gov.jo>
4. Official website of King Hussein I: www.kinghussein.gov.jo
5. Sasaki Associates: <http://www.sasaki.com>
6. UNHCR: <http://www.unhcr.org>
7. UNRWA: <http://www.unrwa.org>
8. Wikipedia - the Free Encyclopaedia: <http://en.wikipedia.org>



ANNEXES

ANNEX 1: QUESTIONNAIRES FOR HORIZONTAL ANALYSIS

PART I: QUESTIONNAIRES FOR HORIZONTAL ANALYSIS WITH FOCUS ON THE MUNICIPALITIES

PART II: QUESTIONNAIRES FOR HORIZONTAL ANALYSIS WITH FOCUS ON THE JSCS



ANNEX 2: QUESTIONNAIRES FOR IN-DEPTH DIAGNOSIS

PART I: QUESTIONNAIRES FOR IN-DEPTH DIAGNOSIS WITH FOCUS ON THE MUNICIPALITIES

PART II: QUESTIONNAIRES FOR IN-DEPTH DIAGNOSIS WITH FOCUS ON THE JSCS



ANNEX 3: REPLIES OF MUNICIPALITIES & JSCS TO THE HORIZONTAL ANALYSIS & IN-DEPTH DIAGNOSIS QUESTIONNAIRES

PART I: REPLIES OF MUNICIPALITIES TO THE HORIZONTAL ANALYSIS QUESTIONNAIRES

PART II: REPLIES OF MUNICIPALITIES TO THE IN-DEPTH DIAGNOSIS QUESTIONNAIRES

PART III: REPLIES OF JSCs TO THE HORIZONTAL ANALYSIS QUESTIONNAIRES

PART IV: REPLIES OF JSCs TO THE IN-DEPTH DIAGNOSIS QUESTIONNAIRES



ANNEX 4: QUESTIONNAIRES USED FOR THE SOCIO-ECONOMIC SURVEY

PART I: QUESTIONNAIRES FOR INDIVIDUAL WASTE-PICKERS

PART II: QUESTIONNAIRES FOR MIDDLEMEN/CONTRACTORS

PART III: QUESTIONNAIRES FOR THE INDUSTRY



ANNEX 5: REPLIES TO QUESTIONNAIRES OF THE SOCIO-ECONOMIC SURVEY

PART I: REPLIES OF INDIVIDUAL WASTE-PICKERS AT THE CITY LEVEL

PART II: REPLIES OF INDIVIDUAL WASTE-PICKERS (FORMAL) AT THE DUMPSITE LEVEL

PART III: REPLIES OF INDIVIDUAL WASTE-PICKERS (INFORMAL) AT THE DUMPSITE LEVEL

PART IV: REPLIES OF MIDDLEMEN AT THE CITY LEVEL

PART V: REPLIES OF CONTRACTORS AT THE DUMPSITE LEVEL

PART VI: REPLIES OF THE INDUSTRY



ANNEX 6: EXPECTED TOTAL, URBAN & RURAL PERMANENT POPULATION OF JORDAN, BY DISTRICT

Table A6-1: Expected total permanent population of Jordan, by District, years 2015-2040

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NORTHERN REGION																											
Irbid Governorate																											
1	Greater Irbid District	491,538	502,286	513,019	523,731	534,420	545,078	555,701	566,286	576,826	587,319	597,760	608,144	618,469	628,731	638,925	649,049	659,100	669,075	678,970	688,783	698,511	708,153	717,706	727,167	736,535	745,808
2	Bani Obeid District	122,444	125,121	127,795	130,463	133,126	135,781	138,427	141,064	143,689	146,303	148,904	151,491	154,063	156,619	159,158	161,680	164,184	166,669	169,134	171,578	174,002	176,403	178,783	181,140	183,473	185,783
3	Wastiyyah District	31,463	32,151	32,838	33,524	34,208	34,890	35,570	36,247	36,922	37,594	38,262	38,927	39,588	40,245	40,897	41,545	42,188	42,827	43,460	44,088	44,711	45,328	45,940	46,545	47,145	47,739
4	Tayba District	38,119	38,952	39,785	40,615	41,444	42,271	43,095	43,915	44,733	45,547	46,356	47,162	47,962	48,758	49,549	50,334	51,113	51,887	52,654	53,415	54,170	54,917	55,658	56,392	57,118	57,837
5	Mazar Shamali District	57,798	59,062	60,324	61,583	62,840	64,093	65,343	66,587	67,827	69,060	70,288	71,509	72,723	73,930	75,128	76,319	77,501	78,674	79,837	80,991	82,135	83,269	84,392	85,504	86,606	87,696
6	Kura District	119,153	121,759	124,360	126,957	129,548	132,132	134,707	137,273	139,828	142,371	144,902	147,420	149,923	152,410	154,881	157,335	159,772	162,190	164,588	166,967	169,326	171,663	173,978	176,272	178,543	180,791
7	Bani Knenanah District	99,976	102,162	104,345	106,524	108,698	110,866	113,027	115,180	117,324	119,458	121,581	123,694	125,794	127,881	129,954	132,013	134,058	136,086	138,099	140,095	142,074	144,035	145,978	147,902	149,807	151,694
8	Al-Ramtha District	142,828	145,951	149,070	152,183	155,288	158,385	161,472	164,548	167,610	170,659	173,693	176,711	179,711	182,693	185,655	188,597	191,517	194,415	197,291	200,142	202,969	205,771	208,546	211,295	214,018	216,712
9	Aghwar Shamaliyah District	111,504	113,942	116,377	118,807	121,231	123,649	126,059	128,460	130,851	133,231	135,600	137,956	140,298	142,626	144,938	147,235	149,515	151,778	154,022	156,248	158,455	160,642	162,809	164,956	167,081	169,184
SUM of Irbid Governorate		1,214,823	1,241,385	1,267,911	1,294,388	1,320,803	1,347,145	1,373,400	1,399,559	1,425,610	1,451,543	1,477,347	1,503,012	1,528,530	1,553,891	1,579,086	1,604,108	1,628,948	1,653,600	1,678,055	1,702,308	1,726,352	1,750,181	1,773,790	1,797,173	1,820,326	1,843,244
Mafrq Governorate																											
1	Greater Mafrq District	133,629	136,551	139,469	142,382	145,287	148,185	151,073	153,950	156,816	159,668	162,507	165,330	168,137	170,927	173,698	176,450	179,183	181,895	184,585	187,252	189,897	192,518	195,115	197,687	200,234	202,755
2	Badiyah Shamaliyah District	75,821	77,479	79,134	80,787	82,436	84,080	85,718	87,351	88,977	90,595	92,206	93,808	95,400	96,983	98,556	100,117	101,668	103,206	104,733	106,246	107,747	109,234	110,708	112,167	113,612	115,043
3	Badiyah Shamaliyah Gharbiyah District	98,491	100,645	102,795	104,942	107,084	109,219	111,348	113,469	115,581	117,683	119,775	121,856	123,925	125,981	128,024	130,053	132,066	134,065	136,048	138,014	139,963	141,895	143,809	145,705	147,582	149,440
4	Al-Rouaishad District	12,884	13,166	13,447	13,728	14,008	14,288	14,566	14,844	15,120	15,395	15,669	15,941	16,211	16,480	16,748	17,013	17,277	17,538	17,797	18,055	18,310	18,562	18,813	19,061	19,306	19,549
SUM of Mafrq Governorate		320,826	327,841	334,846	341,839	348,815	355,771	362,705	369,614	376,494	383,342	390,157	396,935	403,674	410,371	417,025	423,633	430,194	436,704	443,162	449,567	455,917	462,210	468,445	474,621	480,735	486,788
Ajloun Governorate																											
1	Greater Ajloun District	121,108	123,756	126,401	129,040	131,674	134,300	136,917	139,525	142,122	144,708	147,280	149,839	152,383	154,911	157,423	159,917	162,393	164,851	167,289	169,707	172,104	174,479	176,833	179,164	181,472	183,757
2	Kofranjah District	35,833	36,616	37,398	38,179	38,959	39,735	40,510	41,282	42,050	42,815	43,576	44,333	45,086	45,834	46,577	47,315	48,048	48,775	49,496	50,211	50,921	51,623	52,320	53,010	53,692	54,368
SUM of Ajloun Governorate		156,941	160,372	163,799	167,220	170,632	174,035	177,427	180,807	184,172	187,522	190,856	194,172	197,468	200,744	203,999	207,232	210,441	213,626	216,785	219,918	223,024	226,103	229,153	232,174	235,165	238,125
Jerash Governorate																											
1	Greater Jerash District	204,803	209,281	213,753	218,217	222,670	227,111	231,537	235,947	240,339	244,711	249,061	253,388	257,690	261,965	266,213	270,431	274,619	278,775	282,898	286,987	291,040	295,057	299,037	302,980	306,883	310,746
SUM of Jerash Governorate		204,803	209,281	213,753	218,217	222,670	227,111	231,537	235,947	240,339	244,711	249,061	253,388	257,690	261,965	266,213	270,431	274,619	278,775	282,898	286,987	291,040	295,057	299,037	302,980	306,883	310,746
SUM OF NORTHERN REGION		1,897,393	1,938,880	1,980,310	2,021,663	2,062,920	2,104,062	2,145,070	2,185,927	2,226,615	2,267,118	2,307,421	2,347,507	2,387,362	2,426,972	2,466,324	2,505,405	2,544,202	2,582,704	2,620,900	2,658,780	2,696,334	2,733,552	2,770,426	2,806,947	2,843,109	2,878,903
CENTRAL REGION																											
Amman Governorate																											
1	Greater Amman District	751,767	768,205	784,620	801,004	817,351	833,652	849,899	866,087	882,208	898,256	914,224	930,107	945,898	961,592	977,184	992,668	1,008,040	1,023,295	1,038,429	1,053,437	1,068,316	1,083,062	1,097,672	1,112,142	1,126,470	1,140,652
2	Marka District	658,308	672,702	687,076	701,424	715,738	730,012	744,240	758,416	772,533	786,585	800,568	814,476	828,304	842,047	855,701	869,260	882,721	896,079	909,331	922,474	935,503	948,416	961,210	973,881	986,427	998,846
3	Quaismeh District	350,035	357,688	365,332	372,960	380,572	388,162	395,727	403,264	410,770	418,242	425,678	433,073	440,425	447,733	454,992	462,202	469,359	476,462	483,509	490,497	497,425	504,291	511,094	517,831	524,502	531,106
4	Al-Jami'ah District	380,109	388,420	396,720	405,004	413,269	421,511	429,727	437,912	446,063	454,177	462,251	470,281	478,265	486,201	494,084	501,913	509,686	517,399	525,051	532,639	540,162	547,618	555,005	562,322	569,566	576,737
5	Wadi Essier District	236,469	241,639	246,803	251,957	257,098	262,226	267,337	272,429	277,499	282,547	287,570	292,566	297,533	302,470	307,374	312,245	317,080	321,878	326,639	331,359	336,040	340,678	345,274	349,825	354,332	358,793



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
6	Sahab District	77,605	79,302	80,996	82,688	84,375	86,058	87,735	89,406	91,071	92,727	94,376	96,015	97,645	99,265	100,875	102,473	104,060	105,635	107,197	108,747	110,282	111,805	113,313	114,807	116,286	117,750
7	Ajeeza District	57,221	58,472	59,722	60,969	62,213	63,454	64,690	65,922	67,149	68,371	69,586	70,795	71,997	73,192	74,379	75,557	76,727	77,888	79,040	80,183	81,315	82,438	83,550	84,651	85,741	86,821
8	Almoaqr District	40,843	41,736	42,628	43,518	44,406	45,292	46,175	47,054	47,930	48,802	49,669	50,532	51,390	52,243	53,090	53,931	54,766	55,595	56,417	57,233	58,041	58,842	59,636	60,422	61,200	61,971
9	Naor District	90,105	92,075	94,042	96,006	97,965	99,919	101,867	103,807	105,739	107,663	109,576	111,480	113,373	115,254	117,123	118,979	120,821	122,649	124,463	126,262	128,045	129,813	131,564	133,298	135,016	136,715
SUM of Amman Governorate		2,642,462	2,700,240	2,757,939	2,815,531	2,872,988	2,930,286	2,987,397	3,044,297	3,100,963	3,157,371	3,213,499	3,269,326	3,324,832	3,379,996	3,434,801	3,489,228	3,543,260	3,596,881	3,650,076	3,702,831	3,755,131	3,806,963	3,858,317	3,909,179	3,959,541	4,009,391
Madaba Governorate																											
1	Madaba District	133,095	136,005	138,912	141,812	144,706	147,592	150,469	153,335	156,189	159,030	161,857	164,669	167,465	170,243	173,004	175,745	178,467	181,167	183,847	186,504	189,138	191,749	194,335	196,897	199,434	201,945
2	Theban District	37,521	38,341	39,160	39,978	40,794	41,607	42,418	43,226	44,031	44,832	45,629	46,421	47,210	47,993	48,771	49,544	50,311	51,072	51,828	52,577	53,319	54,055	54,785	55,507	56,222	56,930
SUM of Madaba Governorate		170,616	174,346	178,072	181,790	185,500	189,200	192,887	196,561	200,220	203,862	207,486	211,091	214,674	218,236	221,775	225,289	228,778	232,240	235,674	239,081	242,457	245,804	249,120	252,404	255,656	258,874
Balqa Governorate																											
1	Greater Balqa (Salt) District	145,061	148,233	151,400	154,562	157,716	160,861	163,996	167,120	170,231	173,327	176,409	179,473	182,520	185,549	188,557	191,545	194,511	197,455	200,375	203,271	206,142	208,987	211,807	214,599	217,363	220,100
2	New Deir Allah District	61,366	62,708	64,048	65,385	66,720	68,050	69,377	70,698	72,014	73,324	74,627	75,924	77,213	78,494	79,767	81,031	82,285	83,531	84,766	85,991	87,206	88,409	89,602	90,783	91,953	93,110
3	Shouna Janoobiyyeh District	51,163	52,282	53,399	54,514	55,627	56,736	57,842	58,944	60,041	61,133	62,220	63,301	64,375	65,444	66,505	67,558	68,605	69,643	70,673	71,694	72,707	73,710	74,705	75,690	76,665	77,630
4	New Ain Al-Basha District	170,242	173,964	177,682	181,392	185,094	188,785	192,464	196,130	199,781	203,415	207,031	210,628	214,204	217,758	221,289	224,795	228,276	231,731	235,158	238,557	241,926	245,265	248,574	251,851	255,095	258,307
5	Mahes & Al-Fahis District	29,422	30,066	30,708	31,349	31,989	32,627	33,263	33,897	34,528	35,156	35,781	36,402	37,020	37,634	38,245	38,851	39,452	40,049	40,642	41,229	41,811	42,389	42,960	43,527	44,087	44,642
SUM of Balqa Governorate		457,255	467,253	477,237	487,203	497,145	507,060	516,943	526,789	536,594	546,355	556,068	565,728	575,333	584,878	594,362	603,780	613,130	622,408	631,613	640,742	649,792	658,761	667,648	676,449	685,164	693,790
Zarqa Governorate																											
1	Greater Zarqa District	598,555	611,642	624,712	637,757	650,772	663,751	676,687	689,576	702,412	715,189	727,903	740,548	753,121	765,617	778,031	790,359	802,598	814,744	826,794	838,743	850,590	862,331	873,963	885,484	896,892	908,184
2	Russeifeh District	356,712	364,512	372,301	380,075	387,831	395,566	403,276	410,957	418,606	426,221	433,798	441,334	448,827	456,274	463,672	471,019	478,313	485,551	492,732	499,854	506,914	513,911	520,843	527,709	534,508	541,237
3	Hashimiya District	61,590	62,937	64,282	65,624	66,964	68,299	69,630	70,956	72,277	73,592	74,900	76,201	77,495	78,781	80,058	81,327	82,586	83,836	85,076	86,306	87,525	88,733	89,930	91,115	92,289	93,451
SUM of Zarqa Governorate		1,016,857	1,039,091	1,061,295	1,083,457	1,105,567	1,127,616	1,149,593	1,171,489	1,193,295	1,215,002	1,236,601	1,258,084	1,279,443	1,300,671	1,321,761	1,342,705	1,363,497	1,384,132	1,404,602	1,424,903	1,445,028	1,464,974	1,484,736	1,504,309	1,523,688	1,542,872
SUM OF CENTRAL REGION		4,287,189	4,380,930	4,474,542	4,567,980	4,661,201	4,754,161	4,846,820	4,939,136	5,031,072	5,122,590	5,213,653	5,304,229	5,394,282	5,483,782	5,572,698	5,661,002	5,748,665	5,835,661	5,921,966	6,007,556	6,092,409	6,176,503	6,259,820	6,342,341	6,424,049	6,504,927
SOUTHERN REGION																											
Aqaba Governorate																											
1	Greater Aqaba District	123,758	126,464	129,166	131,863	134,554	137,238	139,913	142,578	145,231	147,873	150,502	153,117	155,716	158,300	160,867	163,416	165,946	168,457	170,949	173,420	175,869	178,297	180,702	183,084	185,442	187,777
2	Qawiera District	24,957	25,502	26,047	26,591	27,134	27,675	28,214	28,752	29,287	29,820	30,350	30,877	31,401	31,922	32,440	32,954	33,464	33,971	34,473	34,971	35,465	35,955	36,440	36,920	37,396	37,867
SUM of Aqaba Governorate		148,715	151,966	155,213	158,455	161,688	164,913	168,127	171,329	174,518	177,693	180,852	183,994	187,118	190,222	193,306	196,370	199,410	202,428	205,422	208,391	211,334	214,251	217,141	220,004	222,838	225,644
Ma'an Governorate																											
1	Greater Ma'an District	70,201	71,736	73,269	74,799	76,326	77,848	79,365	80,877	82,382	83,881	85,372	86,855	88,330	89,795	91,251	92,697	94,133	95,557	96,970	98,372	99,761	101,138	102,503	103,854	105,192	106,516
2	Greater Petra District	32,809	33,526	34,243	34,958	35,671	36,383	37,092	37,798	38,502	39,202	39,899	40,592	41,281	41,966	42,647	43,323	43,993	44,659	45,320	45,975	46,624	47,268	47,905	48,537	49,162	49,781
3	Greater Shobak District	15,256	15,590	15,923	16,255	16,587	16,918	17,248	17,576	17,903	18,229	18,553	18,875	19,196	19,514	19,831	20,145	20,457	20,766	21,073	21,378	21,680	21,979	22,276	22,569	22,860	23,148
4	Husseinieh District	11,431	11,681	11,931	12,180	12,429	12,677	12,924	13,170	13,415	13,659	13,902	14,143	14,383	14,622	14,859	15,094	15,328	15,560	15,790	16,019	16,245	16,469	16,691	16,911	17,129	17,345
SUM of Ma'an Governorate		129,698	132,534	135,366	138,193	141,013	143,825	146,628	149,421	152,202	154,971	157,726	160,466	163,190	165,898	168,588	171,259	173,911	176,543	179,154	181,743	184,310	186,854	189,375	191,871	194,343	196,790
Karak Governorate																											
1	Greater Karak District	84,517	86,365	88,211	90,053	91,891	93,723	95,550	97,370	99,182	100,986	102,782	104,567	106,342	108,107	109,860	111,601	113,329	115,044	116,745	118,432	120,105	121,763	123,406	125,032	126,643	128,238
2	Mazar Janoobiyyeh District	74,539	76,169	77,796	79,421	81,042	82,658	84,269	85,874	87,472	89,064	90,647	92,222	93,787	95,343	96,889	98,425	99,949	101,461	102,962	104,450	105,925	107,387	108,836	110,271	111,691	113,097
3	Qasr District	27,190	27,784	28,378	28,970	29,562	30,151	30,739	31,324	31,907	32,488	33,065	33,640	34,211	34,778	35,342	35,902	36,458	37,010	37,557	38,100	38,638	39,172	39,700	40,223	40,742	41,255
4	Al-Agwar Al-Janobeiah District	42,285	43,210	44,133	45,055	45,974	46,891	47,805	48,716	49,622	50,525	51,423	52,317	53,205	54,088	54,965	55,836	56,700	57,558	58,409	59,254	60,091	60,920	61,742	62,556	63,362	64,159



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
5	Ai District	12,660	12,937	13,213	13,489	13,764	14,039	14,313	14,585	14,857	15,127	15,396	15,663	15,929	16,193	16,456	16,717	16,976	17,233	17,487	17,740	17,991	18,239	18,485	18,729	18,970	19,209
6	Faqo'e District	15,876	16,223	16,569	16,915	17,261	17,605	17,948	18,290	18,630	18,969	19,306	19,642	19,975	20,307	20,636	20,963	21,288	21,610	21,929	22,246	22,561	22,872	23,180	23,486	23,789	24,088
7	Al-Qatraneh District	9,060	9,258	9,456	9,653	9,850	10,046	10,242	10,437	10,632	10,825	11,017	11,209	11,399	11,588	11,776	11,963	12,148	12,332	12,514	12,695	12,874	13,052	13,228	13,403	13,575	13,746
SUM of Karak Governorate		266,126	271,945	277,756	283,557	289,343	295,114	300,865	306,596	312,303	317,984	323,637	329,259	334,849	340,405	345,924	351,406	356,847	362,248	367,605	372,918	378,185	383,405	388,577	393,700	398,772	403,792
Tafilah Governorate																											
1	Tafilah District	59,497	60,797	62,097	63,393	64,687	65,977	67,263	68,544	69,820	71,090	72,354	73,611	74,860	76,103	77,336	78,562	79,778	80,986	82,184	83,371	84,549	85,716	86,872	88,017	89,151	90,274
2	Al-Hassa District	11,463	11,714	11,964	12,214	12,463	12,712	12,960	13,207	13,452	13,697	13,941	14,183	14,424	14,663	14,901	15,137	15,371	15,604	15,835	16,063	16,290	16,515	16,738	16,959	17,177	17,393
3	Besara District	24,551	25,088	25,624	26,159	26,693	27,225	27,755	28,284	28,811	29,335	29,856	30,375	30,891	31,403	31,912	32,418	32,920	33,418	33,912	34,402	34,888	35,370	35,847	36,320	36,788	37,251
SUM of Tafilah Governorate		95,511	97,599	99,685	101,766	103,843	105,914	107,978	110,035	112,083	114,122	116,151	118,168	120,175	122,169	124,149	126,117	128,070	130,008	131,930	133,837	135,728	137,601	139,457	141,296	143,116	144,918
SUM OF SOUTHERN REGION		640,050	654,044	668,020	681,970	695,887	709,766	723,599	737,381	751,106	764,769	778,365	791,887	805,331	818,693	831,968	845,151	858,238	871,226	884,111	896,889	909,557	922,112	934,551	946,870	959,069	971,144
SUM OF JORDAN		6,824,632	6,973,854	7,122,872	7,271,614	7,420,009	7,567,989	7,715,489	7,862,444	8,008,794	8,154,477	8,299,439	8,443,622	8,586,975	8,729,447	8,870,990	9,011,557	9,151,105	9,289,592	9,426,978	9,563,225	9,698,300	9,832,167	9,964,796	10,096,158	10,226,226	10,354,974

Table A6-2: Expected permanent population of Jordan residing in urban areas, by District, years 2015-2040

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NORTHERN REGION																											
Irbid Governorate																											
1	Greater Irbid District	407,634	416,547	425,448	434,332	443,195	452,034	460,844	469,622	478,363	487,065	495,724	504,336	512,898	521,408	529,862	538,258	546,593	554,865	563,071	571,209	579,277	587,273	595,195	603,041	610,810	618,500
2	Bani Obeid District	101,543	103,763	105,980	108,194	110,402	112,603	114,798	116,984	119,162	121,330	123,486	125,632	127,765	129,885	131,991	134,082	136,158	138,219	140,263	142,290	144,300	146,292	148,265	150,220	152,155	154,071
3	Wastiyyah District	26,092	26,663	27,233	27,801	28,369	28,934	29,498	30,060	30,620	31,177	31,731	32,282	32,830	33,375	33,916	34,453	34,987	35,516	36,042	36,563	37,079	37,591	38,098	38,600	39,097	39,590
4	Tayba District	31,612	32,303	32,993	33,682	34,370	35,055	35,739	36,419	37,097	37,772	38,443	39,111	39,775	40,435	41,091	41,742	42,388	43,030	43,666	44,297	44,923	45,543	46,157	46,766	47,368	47,965
5	Mazar Shamali District	47,932	48,980	50,027	51,071	52,113	53,153	54,189	55,221	56,249	57,272	58,290	59,303	60,309	61,310	62,304	63,291	64,272	65,244	66,209	67,166	68,115	69,055	69,986	70,909	71,823	72,727
6	Kura District	98,814	100,975	103,132	105,286	107,435	109,577	111,713	113,841	115,960	118,069	120,168	122,256	124,331	126,394	128,443	130,479	132,499	134,504	136,494	138,466	140,422	142,360	144,281	146,183	148,066	149,930
7	Bani Knenanah District	82,911	84,724	86,534	88,341	90,144	91,942	93,733	95,519	97,297	99,067	100,828	102,579	104,321	106,052	107,771	109,479	111,174	112,857	114,526	116,181	117,822	119,448	121,060	122,656	124,236	125,800
8	Al-Ramtha District	118,448	121,037	123,624	126,205	128,781	131,349	133,909	136,460	139,000	141,528	144,044	146,547	149,035	151,507	153,964	156,404	158,826	161,229	163,614	165,978	168,323	170,646	172,948	175,228	177,485	179,720
9	Aghwar Shamaliyah District	92,470	94,492	96,511	98,527	100,538	102,543	104,541	106,532	108,515	110,489	112,453	114,407	116,349	118,280	120,198	122,102	123,993	125,869	127,731	129,577	131,407	133,221	135,018	136,798	138,560	140,305
SUM of Irbid Governorate		1,007,456	1,029,484	1,051,482	1,073,440	1,095,346	1,117,191	1,138,965	1,160,658	1,182,262	1,203,768	1,225,168	1,246,452	1,267,614	1,288,646	1,309,540	1,330,291	1,350,891	1,371,335	1,391,616	1,411,728	1,431,668	1,451,430	1,471,009	1,490,400	1,509,601	1,528,607
Mafrq Governorate																											
1	Greater Mafrq District	52,419	53,566	54,710	55,853	56,992	58,129	59,262	60,391	61,515	62,634	63,747	64,855	65,956	67,050	68,137	69,217	70,289	71,353	72,408	73,454	74,492	75,520	76,539	77,548	78,547	79,536
2	Badiah Shamaliyah District	29,743	30,393	31,042	31,691	32,337	32,982	33,625	34,266	34,903	35,538	36,170	36,798	37,423	38,044	38,661	39,274	39,882	40,485	41,084	41,678	42,266	42,850	43,428	44,000	44,567	45,128
3	Badiyah Shamaliyah Gharbiyah District	38,636	39,480	40,324	41,166	42,006	42,844	43,679	44,511	45,339	46,164	46,985	47,801	48,613	49,419	50,220	51,016	51,806	52,590	53,368	54,139	54,904	55,662	56,413	57,156	57,893	58,622
4	Al-Rouaishad District	5,054	5,165	5,275	5,385	5,495	5,605	5,714	5,823	5,931	6,039	6,146	6,253	6,359	6,465	6,570	6,674	6,777	6,880	6,981	7,082	7,182	7,282	7,380	7,477	7,573	7,669
SUM of Mafrq Governorate		125,852	128,604	131,352	134,095	136,831	139,560	142,280	144,990	147,689	150,375	153,049	155,707	158,351	160,978	163,588	166,181	168,754	171,308	173,841	176,354	178,845	181,313	183,759	186,182	188,580	190,954
Ajloun Governorate																											
1	Greater Ajloun District	91,924	93,934	95,941	97,944	99,943	101,936	103,923	105,902	107,874	109,836	111,788	113,730	115,661	117,580	119,487	121,380	123,260	125,125	126,976	128,811	130,630	132,433	134,220	135,989	137,741	139,475
2	Kofranjah District	27,198	27,792	28,386	28,979	29,570	30,160	30,748	31,333	31,917	32,497	33,075	33,650	34,221	34,789	35,353	35,913	36,469	37,021	37,568	38,111	38,650	39,183	39,712	40,235	40,754	41,267
SUM of Ajloun Governorate		119,121	121,726	124,327	126,923	129,513	132,096	134,671	137,236	139,790	142,333	144,863	147,380	149,882	152,369	154,840	157,293	159,729	162,146	164,544	166,922	169,280	171,617	173,932	176,224	178,495	180,742
Jerash Governorate																											
1	Greater Jerash District	128,309	131,115	133,916	136,713	139,503	142,285	145,058	147,821	150,572	153,311	156,037	158,748	161,443	164,121	166,782	169,425	172,049	174,652	177,235	179,797	182,337	184,853	187,347	189,817	192,262	194,683
SUM of Jerash Governorate		128,309	131,115	133,916	136,713	139,503	142,285	145,058	147,821	150,572	153,311	156,037	158,748	161,443	164,121	166,782	169,425	172,049	174,652	177,235	179,797	182,337	184,853	187,347	189,817	192,262	194,683
SUM OF NORTHERN REGION		1,380,738	1,410,928	1,441,077	1,471,170	1,501,193	1,531,132	1,560,973	1,590,705	1,620,314	1,649,788	1,679,116	1,708,287	1,737,290	1,766,114	1,794,751	1,823,190	1,851,423	1,879,441	1,907,236	1,934,802	1,962,129	1,989,213	2,016,046	2,042,623	2,068,938	2,094,986



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
CENTRAL REGION																											
Amman Governorate																											
1	Greater Amman District	706,814	722,269	737,703	753,107	768,476	783,802	799,079	814,299	829,456	844,544	859,557	874,490	889,337	904,093	918,752	933,310	947,763	962,106	976,334	990,445	1,004,435	1,018,299	1,032,035	1,045,640	1,059,111	1,072,445
2	Marka District	618,943	632,477	645,992	659,481	672,940	686,360	699,738	713,065	726,338	739,551	752,697	765,774	778,775	791,696	804,533	817,281	829,937	842,497	854,957	867,314	879,564	891,705	903,733	915,647	927,443	939,119
3	Quaismeh District	329,104	336,300	343,486	350,659	357,815	364,951	372,064	379,150	386,208	393,233	400,224	407,177	414,089	420,960	427,786	434,564	441,294	447,972	454,597	461,167	467,681	474,136	480,532	486,867	493,139	499,348
4	Al-Jami'ah District	357,380	365,194	372,998	380,787	388,557	396,307	404,031	411,726	419,390	427,019	434,610	442,160	449,667	457,128	464,540	471,901	479,208	486,460	493,655	500,789	507,863	514,873	521,818	528,697	535,508	542,250
5	Wadi Essier District	222,329	227,190	232,045	236,891	241,725	246,546	251,351	256,138	260,906	265,652	270,374	275,072	279,742	284,383	288,994	293,573	298,120	302,631	307,107	311,545	315,946	320,307	324,628	328,907	333,144	337,339
6	Sahab District	72,965	74,560	76,153	77,743	79,330	80,912	82,489	84,060	85,625	87,182	88,732	90,274	91,806	93,330	94,843	96,346	97,838	99,318	100,787	102,244	103,688	105,119	106,537	107,942	109,332	110,709
7	Ajeeza District	53,799	54,976	56,150	57,323	58,493	59,659	60,822	61,981	63,134	64,283	65,425	66,562	67,692	68,815	69,931	71,039	72,139	73,231	74,314	75,388	76,453	77,508	78,554	79,589	80,614	81,629
8	Almoaqr District	38,401	39,240	40,079	40,916	41,751	42,584	43,414	44,240	45,064	45,884	46,699	47,511	48,317	49,119	49,915	50,706	51,491	52,271	53,044	53,810	54,570	55,324	56,070	56,809	57,541	58,265
9	Naor District	84,717	86,569	88,419	90,265	92,108	93,944	95,775	97,600	99,416	101,225	103,024	104,814	106,594	108,362	110,119	111,864	113,596	115,315	117,021	118,712	120,389	122,051	123,697	125,328	126,942	128,540
SUM of Amman Governorate		2,484,452	2,538,775	2,593,024	2,647,172	2,701,194	2,755,066	2,808,762	2,862,260	2,915,537	2,968,572	3,021,344	3,073,833	3,126,019	3,177,885	3,229,413	3,280,585	3,331,386	3,381,801	3,431,815	3,481,415	3,530,588	3,579,321	3,627,604	3,675,425	3,722,775	3,769,645
Madaba Governorate																											
1	Madaba District	95,009	97,086	99,160	101,231	103,297	105,357	107,411	109,456	111,494	113,522	115,540	117,547	119,543	121,526	123,497	125,454	127,396	129,324	131,237	133,134	135,014	136,878	138,724	140,553	142,364	144,156
2	Theban District	26,784	27,369	27,954	28,538	29,120	29,701	30,280	30,857	31,431	32,003	32,572	33,137	33,700	34,259	34,815	35,366	35,914	36,457	36,997	37,531	38,061	38,587	39,107	39,623	40,133	40,639
SUM of Madaba Governorate		121,792	124,455	127,114	129,769	132,417	135,058	137,690	140,313	142,925	145,524	148,111	150,685	153,243	155,785	158,311	160,820	163,310	165,782	168,233	170,665	173,075	175,464	177,831	180,176	182,497	184,794
Balqa Governorate																											
1	Greater Balqa (Salt) District	104,186	106,464	108,739	111,010	113,275	115,534	117,786	120,030	122,264	124,488	126,701	128,902	131,090	133,266	135,426	137,572	139,703	141,817	143,914	145,994	148,056	150,100	152,125	154,130	156,116	158,081
2	New Deir Allah District	44,075	45,038	46,001	46,961	47,920	48,875	49,828	50,777	51,722	52,663	53,599	54,530	55,456	56,376	57,290	58,198	59,099	59,994	60,881	61,761	62,633	63,498	64,354	65,203	66,043	66,874
3	Shouna Janoobiyyeh District	36,747	37,550	38,353	39,154	39,953	40,749	41,544	42,335	43,123	43,907	44,688	45,464	46,236	47,003	47,765	48,522	49,274	50,019	50,759	51,493	52,220	52,941	53,655	54,362	55,062	55,756
4	New Ain Al-Basha District	122,272	124,945	127,615	130,280	132,939	135,590	138,233	140,866	143,488	146,098	148,695	151,278	153,846	156,399	158,935	161,453	163,954	166,435	168,896	171,337	173,757	176,156	178,532	180,885	183,216	185,522
5	Mahes & Al-Fahis District	21,132	21,594	22,055	22,516	22,975	23,434	23,890	24,345	24,799	25,250	25,699	26,145	26,589	27,030	27,468	27,904	28,336	28,764	29,190	29,612	30,030	30,444	30,855	31,262	31,665	32,063
SUM of Balqa Governorate		328,411	335,592	342,763	349,921	357,062	364,183	371,281	378,352	385,395	392,406	399,381	406,320	413,218	420,074	426,885	433,649	440,365	447,029	453,640	460,197	466,697	473,138	479,521	485,842	492,101	498,297
Zarqa Governorate																											
1	Greater Zarqa District	565,854	578,226	590,582	602,915	615,219	627,488	639,718	651,902	664,037	676,116	688,135	700,090	711,976	723,789	735,524	747,179	758,750	770,232	781,623	792,920	804,119	815,219	826,216	837,107	847,892	858,567
2	Russeifeh District	337,224	344,597	351,961	359,310	366,643	373,955	381,243	388,505	395,736	402,935	410,098	417,222	424,306	431,346	438,340	445,286	452,181	459,024	465,813	472,545	479,219	485,834	492,388	498,879	505,306	511,667
3	Hashimiya District	58,226	59,499	60,770	62,039	63,305	64,568	65,826	67,080	68,328	69,571	70,808	72,038	73,261	74,477	75,684	76,884	78,074	79,256	80,428	81,590	82,743	83,885	85,016	86,137	87,247	88,345
SUM of Zarqa Governorate		961,303	982,322	1,003,313	1,024,264	1,045,167	1,066,011	1,086,787	1,107,487	1,128,102	1,148,622	1,169,041	1,189,351	1,209,543	1,229,611	1,249,549	1,269,349	1,289,005	1,308,512	1,327,864	1,347,055	1,366,082	1,384,938	1,403,620	1,422,123	1,440,444	1,458,579
SUM OF CENTRAL REGION		3,895,959	3,981,145	4,066,214	4,151,126	4,235,840	4,320,317	4,404,520	4,488,412	4,571,958	4,655,124	4,737,878	4,820,187	4,902,023	4,983,356	5,064,158	5,144,403	5,224,066	5,303,124	5,381,553	5,459,332	5,536,442	5,612,862	5,688,576	5,763,566	5,837,818	5,911,315
SOUTHERN REGION																											
Aqaba Governorate																											
1	Greater Aqaba District	106,421	108,748	111,072	113,391	115,705	118,013	120,313	122,604	124,887	127,158	129,419	131,667	133,903	136,124	138,331	140,523	142,699	144,859	147,001	149,126	151,232	153,320	155,388	157,436	159,464	161,472
2	Qawiera District	21,461	21,930	22,398	22,866	23,333	23,798	24,262	24,724	25,184	25,642	26,098	26,552	27,002	27,450	27,896	28,338	28,776	29,212	29,644	30,072	30,497	30,918	31,335	31,748	32,157	32,562
SUM of Aqaba Governorate		127,882	130,678	133,470	136,257	139,038	141,811	144,575	147,329	150,071	152,801	155,517	158,219	160,905	163,575	166,227	168,861	171,476	174,071	176,645	179,198	181,729	184,238	186,723	189,184	191,622	194,034
Ma'an Governorate																											
1	Greater Ma'an District	38,512	39,355	40,195	41,035	41,872	42,707	43,540	44,369	45,195	46,017	46,835	47,649	48,458	49,262	50,060	50,854	51,641	52,423	53,198	53,967	54,729	55,484	56,233	56,974	57,708	58,435
2	Greater Petra District	17,999	18,393	18,786	19,178	19,569	19,960	20,349	20,736	21,122	21,506	21,889	22,269	22,647	23,023	23,396	23,767	24,135	24,500	24,862	25,222	25,578	25,931	26,281	26,627	26,970	27



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1	Greater Karak District	29,586	30,233	30,879	31,524	32,167	32,809	33,448	34,085	34,720	35,351	35,980	36,605	37,226	37,844	38,458	39,067	39,672	40,272	40,868	41,459	42,044	42,624	43,199	43,769	44,333	44,891
2	Mazar Janoobiyyeh District	26,093	26,664	27,233	27,802	28,369	28,935	29,499	30,061	30,621	31,178	31,732	32,283	32,831	33,376	33,917	34,455	34,988	35,518	36,043	36,564	37,080	37,592	38,099	38,601	39,099	39,591
3	Qasr District	9,518	9,726	9,934	10,141	10,348	10,555	10,760	10,965	11,169	11,373	11,575	11,776	11,976	12,175	12,372	12,568	12,763	12,956	13,147	13,337	13,526	13,712	13,897	14,081	14,262	14,442
4	Al-Agwar Al-Janobeiah District	14,802	15,126	15,449	15,772	16,094	16,415	16,735	17,053	17,371	17,687	18,001	18,314	18,625	18,934	19,241	19,546	19,848	20,149	20,447	20,742	21,035	21,326	21,613	21,898	22,180	22,460
5	Ai District	4,432	4,529	4,625	4,722	4,818	4,914	5,010	5,106	5,201	5,295	5,389	5,483	5,576	5,669	5,761	5,852	5,943	6,032	6,122	6,210	6,298	6,385	6,471	6,556	6,641	6,724
6	Faqo'e District	5,557	5,679	5,800	5,921	6,042	6,163	6,283	6,403	6,522	6,640	6,758	6,876	6,993	7,109	7,224	7,338	7,452	7,565	7,677	7,788	7,898	8,007	8,115	8,222	8,327	8,432
7	Al-Qatraneh District	3,171	3,241	3,310	3,379	3,448	3,517	3,585	3,654	3,722	3,789	3,857	3,924	3,990	4,057	4,122	4,188	4,253	4,317	4,381	4,444	4,507	4,569	4,631	4,692	4,752	4,812
SUM of Karak Governorate		93,160	95,197	97,231	99,262	101,288	103,308	105,321	107,327	109,325	111,313	113,292	115,260	117,217	119,162	121,094	123,013	124,918	126,808	128,684	130,544	132,388	134,215	136,025	137,819	139,594	141,352
Tafilah Governorate																											
1	Tafilah District	42,459	43,388	44,315	45,240	46,164	47,084	48,002	48,916	49,827	50,733	51,635	52,532	53,424	54,310	55,191	56,065	56,934	57,795	58,650	59,498	60,338	61,171	61,996	62,813	63,623	64,424
2	Al-Hassa District	8,181	8,360	8,538	8,717	8,895	9,072	9,249	9,425	9,600	9,775	9,949	10,122	10,293	10,464	10,634	10,802	10,970	11,136	11,300	11,464	11,626	11,786	11,945	12,102	12,258	12,413
3	Besara District	17,521	17,904	18,286	18,668	19,049	19,429	19,808	20,185	20,561	20,935	21,307	21,677	22,045	22,411	22,774	23,135	23,493	23,849	24,201	24,551	24,898	25,242	25,582	25,919	26,253	26,584
SUM of Tafilah Governorate		68,161	69,651	71,140	72,625	74,107	75,585	77,058	78,526	79,988	81,443	82,890	84,330	85,762	87,185	88,599	90,003	91,396	92,780	94,152	95,512	96,862	98,199	99,523	100,835	102,134	103,420
SUM of SOUTHERN REGION		360,355	368,234	376,103	383,957	391,792	399,606	407,394	415,154	422,881	430,574	438,228	445,841	453,411	460,933	468,407	475,829	483,198	490,510	497,764	504,959	512,091	519,159	526,162	533,099	539,967	546,765
SUM OF JORDAN		5,637,052	5,760,307	5,883,394	6,006,253	6,128,825	6,251,055	6,372,887	6,494,271	6,615,153	6,735,486	6,855,222	6,974,316	7,092,723	7,210,403	7,327,316	7,443,422	7,558,687	7,673,075	7,786,554	7,899,092	8,010,662	8,121,234	8,230,784	8,339,288	8,446,722	8,553,066

Table A6-3: Expected permanent population of Jordan residing in rural areas, by District, years 2015-2040

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NORTHERN REGION																											
Irbid Governorate																											
1	Greater Irbid District	83,904	85,739	87,571	89,400	91,224	93,043	94,857	96,663	98,463	100,254	102,036	103,809	105,571	107,323	109,063	110,791	112,507	114,209	115,898	117,573	119,234	120,880	122,510	124,125	125,725	127,307
2	Bani Obeid District	20,901	21,358	21,814	22,270	22,724	23,177	23,629	24,079	24,527	24,974	25,418	25,859	26,298	26,734	27,168	27,598	28,026	28,450	28,871	29,288	29,702	30,112	30,518	30,920	31,318	31,713
3	Wastiyyah District	5,371	5,488	5,605	5,722	5,839	5,956	6,072	6,187	6,303	6,417	6,531	6,645	6,758	6,870	6,981	7,092	7,201	7,310	7,419	7,526	7,632	7,737	7,842	7,945	8,048	8,149
4	Tayba District	6,507	6,649	6,791	6,933	7,074	7,216	7,356	7,496	7,636	7,775	7,913	8,050	8,187	8,323	8,458	8,592	8,725	8,857	8,988	9,118	9,247	9,374	9,501	9,626	9,750	9,873
5	Mazar Shamali District	9,866	10,082	10,297	10,512	10,727	10,941	11,154	11,366	11,578	11,788	11,998	12,206	12,414	12,620	12,824	13,027	13,229	13,429	13,628	13,825	14,020	14,214	14,405	14,595	14,783	14,970
6	Kura District	20,339	20,784	21,228	21,671	22,114	22,555	22,994	23,432	23,868	24,302	24,734	25,164	25,591	26,016	26,438	26,857	27,273	27,685	28,095	28,501	28,903	29,302	29,698	30,089	30,477	30,860
7	Bani Knenanah District	17,066	17,439	17,811	18,183	18,555	18,925	19,293	19,661	20,027	20,391	20,754	21,114	21,473	21,829	22,183	22,534	22,883	23,230	23,573	23,914	24,252	24,586	24,918	25,246	25,572	25,894
8	Al-Ramtha District	24,380	24,913	25,446	25,977	26,507	27,036	27,563	28,088	28,611	29,131	29,649	30,164	30,676	31,185	31,691	32,193	32,691	33,186	33,677	34,164	34,646	35,124	35,598	36,068	36,532	36,992
9	Aghwar Shamaliyah District	19,033	19,450	19,865	20,280	20,694	21,107	21,518	21,928	22,336	22,742	23,147	23,549	23,948	24,346	24,741	25,133	25,522	25,908	26,291	26,671	27,048	27,421	27,791	28,157	28,520	28,879
SUM of Irbid Governorate		207,367	211,901	216,429	220,949	225,458	229,954	234,436	238,901	243,348	247,775	252,179	256,560	260,916	265,245	269,546	273,817	278,057	282,265	286,440	290,580	294,684	298,751	302,781	306,773	310,725	314,637
Mafrq Governorate																											
1	Greater Mafrq District	81,210	82,986	84,759	86,529	88,295	90,056	91,811	93,560	95,301	97,035	98,760	100,475	102,181	103,876	105,561	107,233	108,894	110,542	112,177	113,798	115,405	116,998	118,577	120,140	121,687	123,220
2	Badiah Shamaliyah District	46,078	47,086	48,092	49,096	50,098	51,097	52,093	53,085	54,074	55,057	56,036	57,009	57,977	58,939	59,895	60,844	61,786	62,721	63,649	64,569	65,481	66,384	67,280	68,167	69,045	69,914
3	Badiah Shamaliyah Gharbiyah District	59,856	61,164	62,471	63,776	65,077	66,375	67,669	68,958	70,241	71,519	72,791	74,055	75,312	76,562	77,803	79,036	80,260	81,475	82,680	83,875	85,059	86,233	87,397	88,549	89,690	90,819
4	Al-Rouaishad District	7,830	8,001	8,172	8,343	8,513	8,683	8,852	9,021	9,189	9,356	9,522	9,688	9,852	10,016	10,178	10,339	10,499	10,658	10,816	10,972	11,127	11,281	11,433	11,584	11,733	11,881
SUM of Mafrq Governorate		194,974	199,237	203,495	207,744	211,984	216,211	220,425	224,624	228,805	232,967	237,108	241,227	245,323	249,393	253,437	257,453	261,440	265,396	269,321	273,214	277,073	280,897	284,686	288,439	292,155	295,833
Ajloun Governorate																											
1	Greater Ajloun District	29,185	29,823	30,460	31,096	31,731	32,364	32,994	33,623	34,249	34,872	35,492	36,108	36,721	37,330	37,936	38,537	39,134	39,726	40,313	40,896	41,474	42,046	42,613	43,175	43,731	44,282
2	Kofranjah District	8,635	8,824	9,012	9,200	9,388	9,575	9,762	9,948	10,133	10,318	10,501	10,683	10,865	11,045	11,224	11,402	11,579	11,754	11,928	12,100	12,271	12,440	12,608	12,774	12,939	13,102
SUM of Ajloun Governorate		37,820	38,647	39,472	40,297	41,119	41,939	42,756	43,571	44,382	45,189	45,993	46,792	47,586	48,375	49,160	49,939	50,712	51,480	52,241	52,996	53,744	54,486	55,221	55,949	56,670	57,384



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Jerash Governorate																											
1	Greater Jerash District	76,494	78,167	79,837	81,504	83,167	84,826	86,479	88,126	89,767	91,400	93,024	94,640	96,247	97,844	99,431	101,006	102,570	104,123	105,662	107,190	108,704	110,204	111,691	113,163	114,621	116,064
SUM of Jerash Governorate		76,494	78,167	79,837	81,504	83,167	84,826	86,479	88,126	89,767	91,400	93,024	94,640	96,247	97,844	99,431	101,006	102,570	104,123	105,662	107,190	108,704	110,204	111,691	113,163	114,621	116,064
SUM OF NORTHERN REGION		516,655	527,952	539,233	550,493	561,728	572,930	584,097	595,222	606,301	617,330	628,304	639,220	650,072	660,858	671,573	682,215	692,779	703,263	713,664	723,979	734,204	744,339	754,379	764,324	774,171	783,918
CENTRAL REGION																											
Amman Governorate																											
1	Greater Amman District	44,953	45,936	46,917	47,897	48,875	49,849	50,821	51,789	52,753	53,712	54,667	55,617	56,561	57,500	58,432	59,358	60,277	61,189	62,094	62,992	63,881	64,763	65,637	66,502	67,359	68,207
2	Marka District	39,364	40,225	41,085	41,943	42,798	43,652	44,503	45,350	46,195	47,035	47,871	48,703	49,529	50,351	51,168	51,978	52,783	53,582	54,375	55,160	55,940	56,712	57,477	58,234	58,985	59,727
3	Quaismeh District	20,931	21,388	21,845	22,302	22,757	23,211	23,663	24,114	24,563	25,009	25,454	25,896	26,336	26,773	27,207	27,638	28,066	28,491	28,912	29,330	29,744	30,155	30,561	30,964	31,363	31,758
4	Al-Jami'ah District	22,729	23,226	23,722	24,218	24,712	25,205	25,696	26,185	26,673	27,158	27,641	28,121	28,598	29,073	29,544	30,013	30,477	30,939	31,396	31,850	32,300	32,746	33,187	33,625	34,058	34,487
5	Wadi Essier District	14,140	14,449	14,758	15,066	15,374	15,680	15,986	16,290	16,593	16,895	17,196	17,494	17,791	18,087	18,380	18,671	18,960	19,247	19,532	19,814	20,094	20,371	20,646	20,918	21,188	21,454
6	Sahab District	4,640	4,742	4,843	4,944	5,045	5,146	5,246	5,346	5,446	5,545	5,643	5,741	5,839	5,936	6,032	6,128	6,222	6,317	6,410	6,503	6,594	6,686	6,776	6,865	6,953	7,041
7	Ajeeza District	3,422	3,496	3,571	3,646	3,720	3,794	3,868	3,942	4,015	4,088	4,161	4,233	4,305	4,377	4,448	4,518	4,588	4,657	4,726	4,795	4,862	4,929	4,996	5,062	5,127	5,192
8	Almoaqr District	2,442	2,496	2,549	2,602	2,655	2,708	2,761	2,814	2,866	2,918	2,970	3,022	3,073	3,124	3,175	3,225	3,275	3,324	3,374	3,422	3,471	3,519	3,566	3,613	3,660	3,706
9	Naor District	5,388	5,506	5,623	5,741	5,858	5,975	6,091	6,207	6,323	6,438	6,552	6,666	6,779	6,892	7,003	7,114	7,225	7,334	7,442	7,550	7,657	7,762	7,867	7,971	8,073	8,175
SUM of Amman Governorate		158,009	161,464	164,914	168,358	171,794	175,220	178,635	182,037	185,426	188,799	192,155	195,493	198,812	202,111	205,388	208,643	211,874	215,080	218,261	221,415	224,543	227,642	230,713	233,754	236,766	239,746
Madaba Governorate																											
1	Madaba District	38,087	38,920	39,751	40,581	41,409	42,235	43,058	43,879	44,695	45,508	46,317	47,122	47,922	48,717	49,507	50,291	51,070	51,843	52,610	53,370	54,124	54,871	55,611	56,344	57,070	57,789
2	Theban District	10,737	10,972	11,206	11,440	11,674	11,906	12,138	12,370	12,600	12,829	13,057	13,284	13,510	13,734	13,956	14,178	14,397	14,615	14,831	15,045	15,258	15,469	15,677	15,884	16,089	16,291
SUM of Madaba Governorate		48,824	49,891	50,957	52,021	53,083	54,142	55,197	56,248	57,295	58,337	59,375	60,406	61,432	62,451	63,463	64,469	65,467	66,458	67,441	68,416	69,382	70,340	71,289	72,228	73,159	74,080
Balqa Governorate																											
1	Greater Balqa (Salt) District	40,875	41,768	42,661	43,552	44,440	45,327	46,210	47,090	47,967	48,839	49,708	50,571	51,430	52,283	53,131	53,973	54,809	55,638	56,461	57,277	58,086	58,888	59,682	60,469	61,248	62,019
2	New Deir Allah District	17,291	17,670	18,047	18,424	18,800	19,175	19,549	19,921	20,292	20,661	21,028	21,394	21,757	22,118	22,476	22,832	23,186	23,537	23,885	24,230	24,572	24,912	25,248	25,581	25,910	26,236
3	Shouna Janoobiyyeh District	14,417	14,732	15,047	15,361	15,674	15,987	16,298	16,609	16,918	17,226	17,532	17,837	18,139	18,440	18,739	19,036	19,331	19,624	19,914	20,202	20,487	20,770	21,050	21,327	21,602	21,874
4	New Ain Al-Basha District	47,970	49,019	50,066	51,112	52,155	53,195	54,232	55,265	56,293	57,317	58,336	59,350	60,357	61,359	62,354	63,342	64,323	65,296	66,262	67,219	68,169	69,110	70,042	70,965	71,880	72,785
5	Mahes & Al-Fahis District	8,291	8,472	8,653	8,834	9,014	9,194	9,373	9,551	9,729	9,906	10,082	10,257	10,431	10,604	10,776	10,947	11,117	11,285	11,452	11,617	11,781	11,944	12,105	12,265	12,423	12,579
SUM of Balqa Governorate		128,843	131,660	134,474	137,282	140,083	142,877	145,662	148,436	151,199	153,950	156,686	159,408	162,115	164,805	167,477	170,131	172,765	175,380	177,973	180,546	183,096	185,623	188,127	190,607	193,062	195,493
Zarqa Governorate																											
1	Greater Zarqa District	32,701	33,416	34,130	34,843	35,554	36,263	36,970	37,674	38,375	39,073	39,768	40,459	41,146	41,828	42,506	43,180	43,849	44,512	45,170	45,823	46,471	47,112	47,748	48,377	49,000	49,617
2	Russeifeh District	19,488	19,914	20,340	20,765	21,189	21,611	22,032	22,452	22,870	23,286	23,700	24,112	24,521	24,928	25,332	25,733	26,132	26,527	26,920	27,309	27,694	28,077	28,455	28,831	29,202	29,570
3	Hashimiya District	3,365	3,438	3,512	3,585	3,658	3,731	3,804	3,877	3,949	4,021	4,092	4,163	4,234	4,304	4,374	4,443	4,512	4,580	4,648	4,715	4,782	4,848	4,913	4,978	5,042	5,106
SUM of Zarqa Governorate		55,554	56,769	57,982	59,193	60,401	61,605	62,806	64,002	65,194	66,380	67,560	68,733	69,900	71,060	72,212	73,356	74,492	75,620	76,738	77,847	78,947	80,036	81,116	82,185	83,244	84,292
SUM OF CENTRAL REGION		391,230	399,785	408,327	416,854	425,361	433,844	442,300	450,724	459,114	467,466	475,776	484,041	492,259	500,426	508,540	516,599	524,598	532,537	540,413	548,224	555,967	563,641	571,244	578,775	586,231	593,612
SOUTHERN REGION																											
Aqaba Governorate																											
1	Greater Aqaba District	17,337	17,716	18,094	18,472	18,849	19,225	19,600	19,973	20,345	20,715	21,083	21,450	21,814	22,176	22,535	22,892	23,247	23,599	23,948	24,294	24,637	24,977	25,314	25,648	25,978	26,305
2	Qawiera District	3,496	3,573	3,649	3,725	3,801	3,877	3,952	4,028	4,103	4,177	4,252	4,325	4,399	4,472	4,544	4,616	4,688	4,759	4,829	4,899	4,968	5,037	5,105	5,172	5,239	5,305
SUM of Aqaba Governorate		20,833	21,288	21,743	22,197	22,650	23,102	23,552	24,001	24,448	24,892	25,335	25,775	26,213	26,647	27,080	27,509	27,935	28,357	28,777	29,193	29,605	30,014	30,419	30,820	31,217	31,610
Ma'an Governorate																											
1	Greater Ma'an District	31,689	32,382	33,074	33,764	34,453	35,141	35,825	36,508	37,187	37,864	38,537	39,206	39,872	40,534	41,191	41,844	42,491	43,135	43,772	44,405	45,032	45,654	46,270	46,880	47,484	48,081
2	Greater Petra District	14,810	15,134	15,457	15,780	16,102	16,423	16,743	17,062	17,380	17,696	18,010	18,323	18,634	18,944	19,251	19,51										



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
3	Greater Shobak District	6,887	7,037	7,188	7,338	7,487	7,637	7,786	7,934	8,082	8,229	8,375	8,520	8,665	8,809	8,952	9,093	9,234	9,374	9,513	9,650	9,786	9,921	10,055	10,188	10,319	10,449
4	Husseinieh District	5,160	5,273	5,386	5,498	5,610	5,722	5,834	5,945	6,055	6,166	6,275	6,384	6,493	6,600	6,707	6,814	6,919	7,024	7,128	7,231	7,333	7,434	7,534	7,634	7,732	7,829
SUM of Ma'an Governorate		58,546	59,826	61,104	62,380	63,653	64,923	66,188	67,449	68,704	69,954	71,197	72,434	73,664	74,886	76,101	77,306	78,504	79,692	80,870	82,039	83,198	84,346	85,484	86,611	87,727	88,831
Karak Governorate																											
1	Greater Karak District	54,931	56,132	57,332	58,529	59,723	60,914	62,102	63,284	64,462	65,635	66,802	67,962	69,116	70,263	71,402	72,534	73,657	74,772	75,877	76,974	78,061	79,139	80,206	81,264	82,310	83,347
2	Mazar Janoobiyyeh District	48,446	49,505	50,563	51,619	52,672	53,723	54,770	55,813	56,852	57,886	58,915	59,938	60,956	61,967	62,972	63,970	64,961	65,944	66,919	67,886	68,845	69,795	70,737	71,669	72,593	73,507
3	Qasr District	17,672	18,058	18,444	18,829	19,213	19,596	19,978	20,359	20,738	21,115	21,490	21,864	22,235	22,604	22,970	23,334	23,696	24,054	24,410	24,763	25,113	25,459	25,803	26,143	26,480	26,813
4	Al-Agwar Al-Janobeiah District	27,483	28,084	28,684	29,283	29,881	30,476	31,070	31,662	32,252	32,838	33,422	34,003	34,580	35,154	35,724	36,290	36,852	37,409	37,963	38,511	39,055	39,594	40,128	40,657	41,181	41,700
5	Ai District	8,228	8,408	8,588	8,767	8,946	9,124	9,302	9,479	9,656	9,832	10,006	10,180	10,353	10,525	10,695	10,865	11,033	11,200	11,366	11,530	11,693	11,854	12,014	12,173	12,329	12,485
6	Faqo'e District	10,318	10,544	10,769	10,994	11,218	11,442	11,665	11,887	12,109	12,329	12,548	12,766	12,983	13,198	13,412	13,625	13,836	14,045	14,253	14,459	14,663	14,865	15,066	15,265	15,461	15,656
7	Al-Qatraneh District	5,888	6,017	6,146	6,274	6,402	6,530	6,657	6,784	6,910	7,036	7,161	7,285	7,409	7,532	7,654	7,775	7,895	8,015	8,133	8,251	8,368	8,483	8,598	8,711	8,823	8,934
SUM of Karak Governorate		172,966	176,748	180,525	184,295	188,056	191,806	195,544	199,269	202,978	206,670	210,344	213,999	217,632	221,243	224,830	228,392	231,929	235,439	238,921	242,374	245,798	249,190	252,552	255,881	259,178	262,441
Tafilah Governorate																											
1	Tafilah District	17,037	17,410	17,782	18,153	18,523	18,893	19,261	19,628	19,993	20,357	20,719	21,079	21,437	21,792	22,146	22,496	22,845	23,191	23,534	23,874	24,211	24,545	24,876	25,204	25,529	25,850
2	Al-Hassa District	3,283	3,354	3,426	3,498	3,569	3,640	3,711	3,782	3,852	3,922	3,992	4,061	4,130	4,199	4,267	4,334	4,402	4,468	4,534	4,600	4,665	4,729	4,793	4,856	4,919	4,981
3	Besara District	7,030	7,184	7,337	7,491	7,643	7,796	7,948	8,099	8,250	8,400	8,549	8,698	8,846	8,992	9,138	9,283	9,427	9,569	9,711	9,851	9,990	10,128	10,265	10,400	10,534	10,667
SUM of Tafilah Governorate		27,350	27,948	28,545	29,141	29,736	30,329	30,920	31,509	32,095	32,679	33,260	33,838	34,412	34,983	35,551	36,114	36,673	37,228	37,779	38,325	38,866	39,403	39,934	40,460	40,982	41,498
SUM OF SOUTHERN REGION		279,695	285,810	291,917	298,013	304,095	310,160	316,205	322,227	328,225	334,196	340,137	346,046	351,921	357,760	363,561	369,321	375,041	380,716	386,347	391,931	397,466	402,953	408,388	413,772	419,102	424,379
SUM OF JORDAN		1,187,580	1,213,547	1,239,478	1,265,361	1,291,184	1,316,934	1,342,601	1,368,174	1,393,640	1,418,991	1,444,217	1,469,307	1,494,252	1,519,044	1,543,674	1,568,135	1,592,418	1,616,517	1,640,424	1,664,133	1,687,638	1,710,932	1,734,012	1,756,871	1,779,504	1,801,908



ANNEX 7: EXPECTED NON-PALESTINIAN REFUGEES OF JORDAN, BY DISTRICT (TOTAL, URBAN & RURAL)

Table A7-1: Expected total population of non-Palestinian refugees of Jordan, by District, years 2015-2040

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NORTHERN REGION																											
Irbid Governorate																											
1	Greater Irbid District	59,333	65,266	71,793	71,793	71,793	64,614	58,152	52,337	49,720	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234	47,234
2	Bani Obeid District	14,780	16,258	17,884	17,884	17,884	16,095	14,486	13,037	12,385	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766	11,766
3	Wastiyyah District	3,798	4,178	4,595	4,595	4,595	4,136	3,722	3,350	3,183	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023	3,023
4	Tayba District	4,601	5,061	5,568	5,568	5,568	5,011	4,510	4,059	3,856	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663	3,663
5	Mazar Shamali District	6,977	7,674	8,442	8,442	8,442	7,598	6,838	6,154	5,846	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554	5,554
6	Kura District	14,383	15,821	17,403	17,403	17,403	15,663	14,097	12,687	12,053	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450	11,450
7	Bani Knenanah District	12,068	13,275	14,602	14,602	14,602	13,142	11,828	10,645	10,113	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607	9,607
8	Al-Ramtha District	17,241	18,965	20,861	20,861	20,861	18,775	16,898	15,208	14,447	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725	13,725
9	Aghwar Shamaliyah District	13,460	14,805	16,286	16,286	16,286	14,657	13,192	11,872	11,279	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715	10,715
SUM of Irbid Governorate		146,640	161,304	177,434	177,434	177,434	159,691	143,722	129,350	122,882	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738	116,738
Mafrq Governorate																											
1	Greater Mafrq District	136,307	149,938	164,931	164,931	164,931	148,438	133,594	120,235	114,223	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512	108,512
2	Badiah Shamaliyah District	17,330	19,063	20,969	20,969	20,969	18,872	16,985	15,286	14,522	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796	13,796
3	Badiyah Shamaliyah Gharbiyah District	22,511	24,762	27,239	27,239	27,239	24,515	22,063	19,857	18,864	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921	17,921
4	Al-Rouaishad District	2,945	3,239	3,563	3,563	3,563	3,207	2,886	2,598	2,468	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344	2,344
SUM of Mafrq Governorate		179,093	197,002	216,702	216,702	216,702	195,032	175,529	157,976	150,077	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573	142,573
Ajloun Governorate																											
1	Greater Ajloun District	8,624	9,487	10,435	10,435	10,435	9,392	8,453	7,607	7,227	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866	6,866
2	Kofranjah District	2,552	2,807	3,088	3,088	3,088	2,779	2,501	2,251	2,138	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031	2,031
SUM of Ajloun Governorate		11,176	12,294	13,523	13,523	13,523	12,171	10,954	9,858	9,365	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897	8,897
Jerash Governorate																											
1	Greater Jerash District	12,378	13,616	14,977	14,977	14,977	13,480	12,132	10,919	10,373	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854
SUM of Jerash Governorate		12,378	13,616	14,977	14,977	14,977	13,480	12,132	10,919	10,373	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854	9,854
SUM OF NORTHERN REGION		349,287	384,215	422,637	422,637	422,637	380,373	342,336	308,102	292,697	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062	278,062
CENTRAL REGION																											
Amman Governorate																											
1	Greater Amman District	49,868	54,855	60,340	60,340	60,340	54,306	48,875	43,988	41,788	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699	39,699
2	Marka District	43,668	48,035	52,839	52,839	52,839	47,555	42,799	38,519	36,593	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764	34,764
3	Quaismeh District	23,219	25,541	28,095	28,095	28,095	25,286	22,757	20,481	19,457	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485	18,485
4	Al-Jami'ah District	25,214	27,736	30,509	30,509	30,509	27,458	24,712	22,241	21,129	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073	20,073
5	Wadi Essier District	15,686	17,255	18,980	18,980	18,980	17,082	15,374	13,836	13,145	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487	12,487
6	Sahab District	5,148	5,663	6,229	6,229	6,229	5,606	5,045	4,541	4,314	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098	4,098
7	Ajeeza District	3,796	4,175	4,593	4,593	4,593	4,134	3,720	3,348	3,181	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022	3,022
8	Almoaqr District	2,709	2,980	3,278	3,278	3,278	2,950	2,655	2,390	2,270	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157	2,157



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
9	Naor District	5,977	6,575	7,232	7,232	7,232	6,509	5,858	5,272	5,009	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	4,758	
SUM of Amman Governorate		175,285	192,814	212,095	212,095	212,095	190,886	171,797	154,617	146,886	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	139,542	
Madaba Governorate																											
1	Madaba District	7,864	8,651	9,516	9,516	9,516	8,564	7,708	6,937	6,590	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	6,261	
2	Theban District	2,217	2,439	2,683	2,683	2,683	2,414	2,173	1,956	1,858	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	1,765	
SUM of Madaba Governorate		10,081	11,090	12,199	12,199	12,199	10,979	9,881	8,893	8,448	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	8,026	
Balqa Governorate																											
1	Greater Balqa (Salt) District	6,540	7,194	7,914	7,914	7,914	7,122	6,410	5,769	5,481	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	5,207	
2	New Deir Allah District	2,767	3,043	3,348	3,348	3,348	3,013	2,712	2,441	2,319	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	2,203	
3	Shouna Janoobiyyeh District	2,307	2,537	2,791	2,791	2,791	2,512	2,261	2,035	1,933	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	1,836	
4	New Ain Al-Basha District	7,676	8,443	9,288	9,288	9,288	8,359	7,523	6,771	6,432	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	6,111	
5	Mahes & Al-Fahis District	1,327	1,459	1,605	1,605	1,605	1,445	1,300	1,170	1,112	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	
SUM of Balqa Governorate		20,616	22,678	24,946	24,946	24,946	22,451	20,206	18,185	17,276	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	16,412	
Zarqa Governorate																											
1	Greater Zarqa District	36,895	40,584	44,643	44,643	44,643	40,178	36,161	32,545	30,917	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	29,371	
2	Russeifeh District	19,401	21,341	23,475	23,475	23,475	21,127	19,015	17,113	16,257	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	15,445	
3	Hashimiya District	3,350	3,685	4,053	4,053	4,053	3,648	3,283	2,955	2,807	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	2,667	
SUM of Zarqa Governorate		59,645	65,610	72,171	72,171	72,171	64,954	58,458	52,612	49,982	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	47,483	
SUM OF CENTRAL REGION		265,628	292,191	321,410	321,410	321,410	289,269	260,342	234,308	222,592	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	211,463	
SOUTHERN REGION																											
Aqaba Governorate																											
1	Greater Aqaba District	2,961	3,257	3,582	3,582	3,582	3,224	2,902	2,611	2,481	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	
2	Qawiera District	597	657	722	722	722	650	585	527	500	475	475	475	475	475	475	475	475	475	475	475	475	475	475	475	475	
SUM of Aqaba Governorate		3,558	3,913	4,305	4,305	4,305	3,874	3,487	3,138	2,981	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	2,832	
Ma'an Governorate																											
1	Greater Ma'an District	4,038	4,442	4,886	4,886	4,886	4,397	3,958	3,562	3,384	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	3,215	
2	Greater Petra District	1,887	2,076	2,283	2,283	2,283	2,055	1,850	1,665	1,581	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	1,502	
3	Greater Shobak District	878	965	1,062	1,062	1,062	956	860	774	735	699	699	699	699	699	699	699	699	699	699	699	699	699	699	699	699	
4	Husseinieh District	658	723	796	796	796	716	644	580	551	523	523	523	523	523	523	523	523	523	523	523	523	523	523	523	523	
SUM of Ma'an Governorate		7,460	8,206	9,027	9,027	9,027	8,124	7,312	6,580	6,251	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	5,939	
Karak Governorate																											
1	Greater Karak District	3,435	3,778	4,156	4,156	4,156	3,740	3,366	3,030	2,878	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	2,734	
2	Mazar Janoobiyyeh District	3,029	3,332	3,665	3,665	3,665	3,299	2,969	2,672	2,538	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	2,411	
3	Qasr District	1,105	1,215	1,337	1,337	1,337	1,203	1,083	975	926	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	
4	Al-Agwar Al-Janobeiah District	1,718	1,890	2,079	2,079	2,079	1,871	1,684	1,516	1,440	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368	
5	Ai District	514	566	623	623	623	560	504	454	431	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	
6	Faqo'e District	645	710	781	781	781	703	632	569	541	514	514	514	514	514	514	514	514	514	514	514	514	514	514	514	514	
7	Al-Qatraneh District	368	405	445	445	445	401	361	325	309	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	293	
SUM of Karak Governorate		10,815	11,897	13,086	13,086	13,086	11,778	10,600	9,540	9,063	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	8,610	
Tafilah Governorate																											
1	Tafilah District	1,896	2,086	2,295	2,295	2,295	2,065	1,859	1,673	1,589	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
2	Al-Hassa District	365	402	442	442	442	398	358	322	306	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	
3	Besara District	782	861	947	947	947	852	767	690	656	623	623	623	623	623	623	623	623	623	623	623	623	623	623	623	623	
SUM of Tafilah Governorate		3,044	3,349	3,683	3,683	3,683	3,315	2,984	2,685	2,551	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	2,423	
SUM OF SOUTHERN REGION		24,877	27,365	30,101	30,101	30,101	27,091	24,382	21,944	20,847	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	19,804	
SUM OF JORDAN		639,791	703,771	774,148	774,148	774,148	696,733	627,060	564,354	536,136	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	509,329	

Table A7-2: Expected urban population of non-Palestinian refugees of Jordan, by District, years 2015-2040

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NORTHERN REGION																											
Irbid Governorate																											
1	Greater Irbid District	49,205	54,125	59,538	59,538	59,538	53,584	48,226	43,403	41,233	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171	39,171
2	Bani Obeid District	12,257	13,483	14,831	14,831	14,831	13,348	12,013	10,812	10,271	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758	9,758
3	Wastiyyah District	3,150	3,465	3,811	3,811	3,811	3,430	3,087	2,778	2,639	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507	2,507
4	Tayba District	3,816	4,197	4,617	4,617	4,617	4,155	3,740	3,366	3,198	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038	3,038
5	Mazar Shamali District	5,786	6,364	7,001	7,001	7,001	6,301	5,671	5,104	4,848	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606	4,606
6	Kura District	11,928	13,121	14,433	14,433	14,433	12,989	11,690	10,521	9,995	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496	9,496
7	Bani Knenanah District	10,008	11,009	12,110	12,110	12,110	10,899	9,809	8,828	8,387	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967	7,967
8	Al-Ramtha District	14,298	15,727	17,300	17,300	17,300	15,570	14,013	12,612	11,981	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382	11,382
9	Aghwar Shamaliyah District	11,162	12,278	13,506	13,506	13,506	12,155	10,940	9,846	9,354	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886	8,886
SUM of Irbid Governorate		121,609	133,770	147,147	147,147	147,147	132,432	119,189	107,270	101,906	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811	96,811
Mafrq Governorate																											
1	Greater Mafrq District	117,746	129,520	142,472	142,472	142,472	128,225	115,402	103,862	98,669	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736	93,736
2	Badiah Shamaliyah District	6,798	7,478	8,226	8,226	8,226	7,403	6,663	5,996	5,697	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412	5,412
3	Badiyah Shamaliyah Gharbiyah District	8,831	9,714	10,685	10,685	10,685	9,617	8,655	7,789	7,400	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030	7,030
4	Al-Rouaishad District	1,155	1,271	1,398	1,398	1,398	1,258	1,132	1,019	968	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920
SUM of Mafrq Governorate		134,529	147,982	162,781	162,781	162,781	146,502	131,852	118,667	112,734	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097	107,097
Ajloun Governorate																											
1	Greater Ajloun District	6,546	7,201	7,921	7,921	7,921	7,129	6,416	5,774	5,485	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211	5,211
2	Kofranjah District	1,937	2,130	2,343	2,343	2,343	2,109	1,898	1,708	1,623	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542
SUM of Ajloun Governorate		8,483	9,331	10,264	10,264	10,264	9,238	8,314	7,483	7,108	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753	6,753
Jerash Governorate																											
1	Greater Jerash District	7,755	8,530	9,383	9,383	9,383	8,445	7,600	6,840	6,498	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173
SUM of Jerash Governorate		7,755	8,530	9,383	9,383	9,383	8,445	7,600	6,840	6,498	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173	6,173
SUM OF NORTHERN REGION		272,376	299,613	329,575	329,575	329,575	296,617	266,955	240,260	228,247	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835	216,835
CENTRAL REGION																											
Amman Governorate																											
1	Greater Amman District	46,886	51,574	56,732	56,732	56,732	51,059	45,953	41,358	39,290	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325	37,325
2	Marka District	41,057	45,163	49,679	49,679	49,679	44,711	40,240	36,216	34,405	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685	32,685
3	Quaismeh District	21,831	24,014	26,415	26,415	26,415	23,774	21,396	19,257	18,294	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379	17,379
4	Al-Jami'ah District	23,706	26,077	28,685	28,685	28,685	25,816	23,235	20,911	19,866	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872	18,872
5	Wadi Essier District	14,748	16,223	17,845	17,845	17,845	16,061	14,454	13,009	12,359	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741	11,741



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
6	Sahab District	4,840	5,324	5,856	5,856	5,856	5,271	4,744	4,269	4,056	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	3,853	
7	Ajeeza District	3,569	3,926	4,318	4,318	4,318	3,886	3,498	3,148	2,991	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	
8	Almoaqr District	2,547	2,802	3,082	3,082	3,082	2,774	2,497	2,247	2,135	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	2,028	
9	Naor District	5,620	6,182	6,800	6,800	6,800	6,120	5,508	4,957	4,709	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	
SUM of Amman Governorate		164,804	181,284	199,413	199,413	199,413	179,471	161,524	145,372	138,103	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	131,198	
Madaba Governorate																											
1	Madaba District	5,614	6,175	6,793	6,793	6,793	6,114	5,502	4,952	4,704	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	
2	Theban District	1,583	1,741	1,915	1,915	1,915	1,723	1,551	1,396	1,326	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	
SUM of Madaba Governorate		7,197	7,916	8,708	8,708	8,708	7,837	7,053	6,348	6,031	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	5,729	
Balqa Governorate																											
1	Greater Balqa (Salt) District	4,697	5,167	5,684	5,684	5,684	5,116	4,604	4,144	3,936	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	
2	New Deir Allah District	1,987	2,186	2,404	2,404	2,404	2,164	1,948	1,753	1,665	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	1,582	
3	Shouna Janoobiyyeh District	1,657	1,822	2,005	2,005	2,005	1,804	1,624	1,461	1,388	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	1,319	
4	New Ain Al-Basha District	5,513	6,064	6,671	6,671	6,671	6,004	5,403	4,863	4,620	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	4,389	
5	Mahes & Al-Fahis District	953	1,048	1,153	1,153	1,153	1,038	934	840	798	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	758	
SUM of Balqa Governorate		14,807	16,288	17,917	17,917	17,917	16,125	14,512	13,061	12,408	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	11,788	
Zarqa Governorate																											
1	Greater Zarqa District	30,775	33,853	37,238	37,238	37,238	33,514	30,163	27,147	25,789	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	24,500	
2	Russeifeh District	18,341	20,175	22,192	22,192	22,192	19,973	17,976	16,178	15,369	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	14,601	
3	Hashimiya District	3,167	3,483	3,832	3,832	3,832	3,449	3,104	2,793	2,654	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	2,521	
SUM of Zarqa Governorate		52,283	57,511	63,262	63,262	63,262	56,936	51,242	46,118	43,812	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	41,622	
SUM OF CENTRAL REGION		239,090	262,999	289,299	289,299	289,299	260,369	234,332	210,899	200,354	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	190,336	
SOUTHERN REGION																											
Aqaba Governorate																											
1	Greater Aqaba District	2,546	2,800	3,080	3,080	3,080	2,772	2,495	2,246	2,133	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	
2	Qawiera District	513	565	621	621	621	559	503	453	430	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	
SUM of Aqaba Governorate		3,059	3,365	3,702	3,702	3,702	3,332	2,998	2,699	2,564	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	2,435	
Ma'an Governorate																											
1	Greater Ma'an District	2,215	2,437	2,680	2,680	2,680	2,412	2,171	1,954	1,856	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	1,763	
2	Greater Petra District	1,035	1,139	1,253	1,253	1,253	1,127	1,015	913	868	824	824	824	824	824	824	824	824	824	824	824	824	824	824	824	824	
3	Greater Shobak District	481	530	582	582	582	524	472	425	403	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	
4	Husseinieh District	361	397	436	436	436	393	354	318	302	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	287	
SUM of Ma'an Governorate		4,093	4,502	4,952	4,952	4,952	4,457	4,011	3,610	3,430	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	3,258	
Karak Governorate																											
1	Greater Karak District	1,202	1,323	1,455	1,455	1,455	1,309	1,178	1,061	1,008	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	957	
2	Mazar Janoobiyyeh District	1,060	1,166	1,283	1,283	1,283	1,155	1,039	935	889	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844	
3	Qasr District	387	425	468	468	468	421	379	341	324	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	308	
4	Al-Agwar Al-Janobeiah District	602	662	728	728	728	655	590	531	504	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479	
5	Ai District	180	198	218	218	218	196	177	159	151	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	
6	Faqo'e District	226	248	273	273	273	246	221	199	189	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	
7	Al-Qatraneh District	129	142	156	156	156	140	126	114	108	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
SUM of Karak Governorate		3,786	4,165	4,581	4,581	4,581	4,123	3,711	3,340	3,173	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014	3,014
Tafilah Governorate																											
1	Tafilah District	1,353	1,489	1,637	1,637	1,637	1,474	1,326	1,194	1,134	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077
2	Al-Hassa District	261	287	316	316	316	284	256	230	219	208	208	208	208	208	208	208	208	208	208	208	208	208	208	208	208	208
3	Besara District	558	614	676	676	676	608	547	493	468	445	445	445	445	445	445	445	445	445	445	445	445	445	445	445	445	445
SUM of Tafilah Governorate		2,172	2,390	2,629	2,629	2,629	2,366	2,129	1,916	1,820	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729	1,729
SUM OF SOUTHERN REGION		13,110	14,421	15,863	15,863	15,863	14,277	12,849	11,564	10,986	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437	10,437
SUM OF JORDAN		524,576	577,034	634,737	634,737	634,737	571,263	514,137	462,723	439,587	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608	417,608

Table A7-3: Expected rural population of non-Palestinian refugees of Jordan, by District, years 2015-2039

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
NORTHERN REGION																											
Irbid Governorate																											
1	Greater Irbid District	10,128	11,141	12,255	12,255	12,255	11,029	9,926	8,934	8,487	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,063	
2	Bani Obeid District	2,523	2,775	3,053	3,053	3,053	2,747	2,473	2,225	2,114	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	2,008	
3	Wastiyyah District	648	713	784	784	784	706	635	572	543	516	516	516	516	516	516	516	516	516	516	516	516	516	516	516	516	
4	Tayba District	785	864	950	950	950	855	770	693	658	625	625	625	625	625	625	625	625	625	625	625	625	625	625	625	625	
5	Mazar Shamali District	1,191	1,310	1,441	1,441	1,441	1,297	1,167	1,050	998	948	948	948	948	948	948	948	948	948	948	948	948	948	948	948	948	
6	Kura District	2,455	2,701	2,971	2,971	2,971	2,674	2,406	2,166	2,057	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	1,954	
7	Bani Knenanah District	2,060	2,266	2,493	2,493	2,493	2,243	2,019	1,817	1,726	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	1,640	
8	Al-Ramtha District	2,943	3,237	3,561	3,561	3,561	3,205	2,884	2,596	2,466	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	2,343	
9	Aghwar Shamaliyah District	2,298	2,527	2,780	2,780	2,780	2,502	2,252	2,027	1,925	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	1,829	
SUM of Irbid Governorate		25,031	27,534	30,288	30,288	30,288	27,259	24,533	22,080	20,976	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	19,927	
Mafrq Governorate																											
1	Greater Mafrq District	18,561	20,418	22,459	22,459	22,459	20,213	18,192	16,373	15,554	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	14,776	
2	Badiah Shamaliyah District	10,532	11,585	12,743	12,743	12,743	11,469	10,322	9,290	8,825	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	8,384	
3	Badiyah Shamaliyah Gharbiyah District	13,681	15,049	16,554	16,554	16,554	14,898	13,408	12,068	11,464	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	10,891	
4	Al-Rouaishad District	1,790	1,969	2,165	2,165	2,165	1,949	1,754	1,579	1,500	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	
SUM of Mafrq Governorate		44,563	49,020	53,922	53,922	53,922	48,530	43,677	39,309	37,343	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	35,476	
Ajloun Governorate																											
1	Greater Ajloun District	2,078	2,286	2,515	2,515	2,515	2,263	2,037	1,833	1,742	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	1,654	
2	Kofranjah District	615	676	744	744	744	670	603	542	515	490	490	490	490	490	490	490	490	490	490	490	490	490	490	490	490	
SUM of Ajloun Governorate		2,693	2,962	3,259	3,259	3,259	2,933	2,640	2,376	2,257	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	2,144	
Jerash Governorate																											
1	Greater Jerash District	4,623	5,086	5,594	5,594	5,594	5,035	4,531	4,078	3,874	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	
SUM of Jerash Governorate		4,623	5,086	5,594	5,594	5,594	5,035	4,531	4,078	3,874	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	
SUM OF NORTHERN REGION		76,911	84,602	93,062	93,062	93,062	83,756	75,380	67,842	64,450	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	61,228	
CENTRAL REGION																											
Amman Governorate																											
1	Greater Amman District	2,982	3,280	3,608	3,608	3,608	3,247	2,923	2,630	2,499	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	
2	Marka District	2,611	2,872	3,160	3,160	3,160	2,844	2,559	2,303	2,188	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	2,079	



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
3	Quaismeh District	1,388	1,527	1,680	1,680	1,680	1,512	1,361	1,225	1,163	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105
4	Al-Jami'ah District	1,508	1,658	1,824	1,824	1,824	1,642	1,478	1,330	1,263	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
5	Wadi Essier District	938	1,032	1,135	1,135	1,135	1,021	919	827	786	747	747	747	747	747	747	747	747	747	747	747	747	747	747	747	747
6	Sahab District	308	339	372	372	372	335	302	272	258	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245	245
7	Ajeeza District	227	250	275	275	275	247	222	200	190	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181	181
8	Almoaqr District	162	178	196	196	196	176	159	143	136	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129
9	Naor District	357	393	432	432	432	389	350	315	299	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285
SUM of Amman Governorate		10,481	11,530	12,682	12,682	12,682	11,414	10,273	9,246	8,783	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344	8,344
Madaba Governorate																										
1	Madaba District	2,250	2,476	2,723	2,723	2,723	2,451	2,206	1,985	1,886	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,792
2	Theban District	634	698	768	768	768	691	622	560	532	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
SUM of Madaba Governorate		2,885	3,173	3,491	3,491	3,491	3,142	2,828	2,545	2,418	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297
Balqa Governorate																										
1	Greater Balqa (Salt) District	1,843	2,027	2,230	2,230	2,230	2,007	1,806	1,626	1,544	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467	1,467
2	New Deir Allah District	780	858	943	943	943	849	764	688	653	621	621	621	621	621	621	621	621	621	621	621	621	621	621	621	621
3	Shouna Janoobiyyeh District	650	715	786	786	786	708	637	573	545	517	517	517	517	517	517	517	517	517	517	517	517	517	517	517	517
4	New Ain Al-Basha District	2,163	2,379	2,617	2,617	2,617	2,355	2,120	1,908	1,812	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722	1,722
5	Mahes & Al-Fahis District	374	411	452	452	452	407	366	330	313	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298
SUM of Balqa Governorate		5,809	6,390	7,029	7,029	7,029	6,326	5,694	5,124	4,868	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625
Zarqa Governorate																										
1	Greater Zarqa District	6,120	6,731	7,405	7,405	7,405	6,664	5,998	5,398	5,128	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872	4,872
2	Russeifeh District	1,060	1,166	1,283	1,283	1,283	1,154	1,039	935	888	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844	844
3	Hashimiya District	183	201	221	221	221	199	179	161	153	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
SUM of Zarqa Governorate		7,362	8,099	8,909	8,909	8,909	8,018	7,216	6,494	6,170	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861	5,861
SUM OF CENTRAL REGION		26,538	29,192	32,111	32,111	32,111	28,900	26,010	23,409	22,238	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126	21,126
SOUTHERN REGION																										
Aqaba Governorate																										
1	Greater Aqaba District	415	456	502	502	502	452	406	366	348	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330	330
2	Qawiera District	84	92	101	101	101	91	82	74	70	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
SUM of Aqaba Governorate		498	548	603	603	603	543	488	440	418	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397	397
Ma'an Governorate																										
1	Greater Ma'an District	1,823	2,005	2,205	2,205	2,205	1,985	1,786	1,608	1,527	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451
2	Greater Petra District	852	937	1,031	1,031	1,031	928	835	751	714	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678
3	Greater Shobak District	396	436	479	479	479	431	388	349	332	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315	315
4	Husseinieh District	297	326	359	359	359	323	291	262	249	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236
SUM of Ma'an Governorate		3,367	3,704	4,075	4,075	4,075	3,667	3,300	2,970	2,822	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681
Karak Governorate																										
1	Greater Karak District	2,232	2,456	2,701	2,701	2,701	2,431	2,188	1,969	1,871	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777	1,777
2	Mazar Janoobiyyeh District	1,969	2,166	2,382	2,382	2,382	2,144	1,930	1,737	1,650	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
3	Qasr District	718	790	869	869	869	782	704	633	602	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572
4	Al-Agwar Al-Janobeliah District	1,117	1,229	1,351	1,351	1,351	1,216	1,095	985	936	889	889	889	889	889	889	889	889	889	889	889	889	889	889	889	889



#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
5	Ai District	334	368	405	405	405	364	328	295	280	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266	266
6	Faqo'e District	419	461	507	507	507	457	411	370	351	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334	334
7	Al-Qatraneh District	239	263	290	290	290	261	235	211	201	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
SUM of Karak Governorate		7,029	7,732	8,505	8,505	8,505	7,655	6,889	6,200	5,890	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596	5,596
Tafilah Governorate																										
1	Tafilah District	543	597	657	657	657	591	532	479	455	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432
2	Al-Hassa District	105	115	127	127	127	114	103	92	88	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
3	Besara District	224	246	271	271	271	244	220	198	188	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178	178
SUM of Tafilah Governorate		872	959	1,055	1,055	1,055	949	854	769	730	694	694	694	694	694	694	694	694	694	694	694	694	694	694	694	694
SUM OF SOUTHERN REGION		11,767	12,943	14,238	14,238	14,238	12,814	11,533	10,379	9,860	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367	9,367
SUM OF JORDAN		115,215	126,737	139,411	139,411	139,411	125,470	112,923	101,630	96,549	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721	91,721



ANNEX 8: EXPECTED OVERALL RESIDENTIAL POPULATION OF JORDAN, BY DISTRICT (TOTAL, URBAN & RURAL)

Table A8-1: Expected total residential population of Jordan, by District, years 2015-2039

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
NORTHERN REGION																										
Irbid Governorate																										
1	Greater Irbid District	571,871	588,552	605,811	616,524	627,212	630,691	634,853	639,623	647,546	655,553	665,994	676,379	686,703	696,965	707,159	717,284	727,334	737,309	747,204	757,017	766,746	776,387	785,940	795,401	804,769
2	Bani Obeid District	137,224	141,379	145,679	148,347	151,010	151,876	152,913	154,101	156,075	158,069	160,670	163,257	165,829	168,385	170,925	173,447	175,950	178,435	180,900	183,344	185,768	188,170	190,549	192,906	195,240
3	Wastiyyah District	35,261	36,329	37,433	38,119	38,803	39,026	39,292	39,598	40,105	40,617	41,286	41,950	42,611	43,268	43,921	44,569	45,212	45,850	46,484	47,112	47,735	48,352	48,963	49,569	50,168
4	Tayba District	42,720	44,014	45,352	46,183	47,012	47,282	47,604	47,974	48,589	49,210	50,019	50,825	51,625	52,421	53,212	53,997	54,776	55,550	56,317	57,078	57,833	58,580	59,321	60,055	60,781
5	Mazar Shamali District	64,775	66,736	68,765	70,025	71,282	71,691	72,180	72,741	73,673	74,614	75,842	77,063	78,277	79,484	80,683	81,873	83,055	84,228	85,391	86,545	87,689	88,823	89,946	91,058	92,160
6	Kura District	133,536	137,580	141,764	144,361	146,951	147,795	148,804	149,960	151,881	153,821	156,352	158,870	161,373	163,860	166,331	168,785	171,222	173,640	176,038	178,417	180,775	183,113	185,428	187,722	189,993
7	Bani Knenanah District	112,044	115,437	118,948	121,127	123,301	124,008	124,855	125,825	127,436	129,065	131,189	133,301	135,401	137,488	139,561	141,621	143,665	145,694	147,706	149,702	151,681	153,642	155,585	157,509	159,415
8	Al-Ramtha District	209,069	213,916	218,931	222,044	225,149	226,160	227,370	228,755	231,058	233,384	236,418	239,436	242,436	245,418	248,380	251,322	254,242	257,140	260,016	262,867	265,694	268,496	271,271	274,020	276,743
9	Aghwar Shamaliyah District	124,963	128,747	132,663	135,093	137,517	138,307	139,251	140,333	142,130	143,946	146,315	148,671	151,013	153,341	155,653	157,950	160,230	162,492	164,737	166,963	169,170	171,357	173,524	175,670	177,796
SUM of Irbid Governorate		1,431,463	1,472,689	1,515,346	1,541,822	1,568,238	1,576,835	1,587,122	1,598,909	1,618,492	1,638,281	1,664,085	1,689,750	1,715,268	1,740,629	1,765,824	1,790,846	1,815,686	1,840,338	1,864,793	1,889,046	1,913,090	1,936,919	1,960,528	1,983,911	2,007,064
Mafrq Governorate																										
1	Greater Mafrq District	269,936	286,489	304,401	307,313	310,219	296,623	284,667	274,185	271,039	268,181	271,019	273,842	276,649	279,439	282,210	284,963	287,695	290,407	293,097	295,765	298,409	301,031	303,627	306,200	308,746
2	Badiah Shamaliyah District	93,151	96,541	100,103	101,756	103,404	102,952	102,703	102,637	103,499	104,391	106,002	107,604	109,196	110,779	112,352	113,913	115,464	117,002	118,529	120,042	121,543	123,030	124,504	125,963	127,408
3	Badiah Shamaliyah Gharbiyah District	121,003	125,407	130,034	132,181	134,322	133,734	133,411	133,326	134,445	135,604	137,696	139,777	141,846	143,902	145,945	147,973	149,987	151,986	153,969	155,935	157,884	159,816	161,730	163,626	165,503
4	Al-Rouaishad District	15,829	16,405	17,011	17,291	17,572	17,495	17,452	17,441	17,588	17,739	18,013	18,285	18,556	18,825	19,092	19,357	19,621	19,882	20,142	20,399	20,654	20,907	21,157	21,405	21,651
SUM of Mafrq Governorate		499,919	524,843	551,549	558,541	565,517	550,803	538,234	527,590	526,571	525,915	532,730	539,508	546,247	552,945	559,599	566,207	572,767	579,277	585,736	592,141	598,491	604,784	611,019	617,194	623,308
Ajloun Governorate																										
1	Greater Ajloun District	129,733	133,243	136,836	139,476	142,109	143,692	145,370	147,133	149,349	151,573	154,146	156,704	159,248	161,776	164,288	166,783	169,259	171,717	174,155	176,572	178,969	181,345	183,699	186,030	188,338
2	Kofranjah District	38,384	39,423	40,486	41,267	42,046	42,514	43,011	43,532	44,188	44,846	45,607	46,364	47,117	47,865	48,608	49,346	50,079	50,806	51,527	52,243	52,952	53,655	54,351	55,041	55,724
SUM of Ajloun Governorate		168,117	172,666	177,322	180,743	184,155	186,206	188,381	190,665	193,537	196,419	199,753	203,069	206,365	209,641	212,896	216,129	219,338	222,523	225,682	228,815	231,921	235,000	238,050	241,071	244,062
Jerash Governorate																										
1	Greater Jerash District	242,181	247,897	253,730	258,194	262,647	265,590	268,669	271,866	275,712	279,565	283,915	288,242	292,544	296,819	301,067	305,285	309,473	313,629	317,752	321,841	325,894	329,911	333,891	337,834	341,737
SUM of Jerash Governorate		242,181	247,897	253,730	258,194	262,647	265,590	268,669	271,866	275,712	279,565	283,915	288,242	292,544	296,819	301,067	305,285	309,473	313,629	317,752	321,841	325,894	329,911	333,891	337,834	341,737
SUM OF NORTHERN REGION		2,341,679	2,418,095	2,497,947	2,539,300	2,580,557	2,579,435	2,582,406	2,589,029	2,614,312	2,640,181	2,680,483	2,720,569	2,760,424	2,800,034	2,839,386	2,878,467	2,917,264	2,955,766	2,993,963	3,031,842	3,069,396	3,106,614	3,143,488	3,180,009	3,216,171
CENTRAL REGION																										
Amman Governorate																										
1	Greater Amman District	801,635	823,059	844,960	861,344	877,691	887,958	898,775	910,075	923,997	937,955	953,924	969,806	985,597	1,001,291	1,016,883	1,032,367	1,047,739	1,062,994	1,078,128	1,093,136	1,108,015	1,122,761	1,137,371	1,151,841	1,166,169
2	Marka District	755,976	774,737	793,915	808,262	822,577	831,567	841,040	850,935	863,126	875,349	889,332	903,240	917,068	930,811	944,464	958,023	971,484	984,843	998,095	1,011,238	1,024,267	1,037,180	1,049,973	1,062,645	1,075,191
3	Quaismeh District	373,254	383,230	393,427	401,056	408,667	413,447	418,484	423,746	430,228	436,727	444,162	451,557	458,910	466,217	473,477	480,687	487,844	494,947	501,993	508,982	515,909	522,776	529,578	536,316	542,987
4	Al-Jami'ah District	405,323	416,156	427,229	435,513	443,779	448,970	454,439	460,153	467,192	474,249	482,323	490,354	498,338	506,273	514,157	521,986	529,758	537,471	545,123	552,712	560,235	567,691	575,078	582,395	589,639
5	Wadi Essier District	252,155	258,894	265,783	270,937	276,078	279,308	282,710	286,265	290,644	295,035	300,057	305,053	310,020	314,957	319,861	324,732	329,567	334,366	339,126	343,847	348,527	353,165	357,761	362,313	366,819
6	Sahab District	82,753	84,965	87,225	88,917	90,604	91,664	92,781	93,947	95,384	96,825	98,474	100,113	101,743	103,363	104,973	106,571	108,158	109,733	111,295	112,845	114,381	115,903	117,411	118,905	120,384
7	Ajeeza District	151,017	152,647	154,314	155,561	156,806	157,587	158,410	159,271	160,330	161,393	162,608	163,817	165,019	166,213	167,400	168,579	169,749	170,910	172,062	173,204	174,337	175,459	176,571	177,673	178,763
8	Almoaqr District	43,552	44,716	45,906	46,796	47,684	48,242	48,830	49,444	50,200	50,959	51,826	52,689	53,547	54,400	55,247	56,088	56,923	57,752	58,574	59,389	60,198	60,999	61,793	62,579	63,357



LDK
CONSULTANTS

 **MOSTAQBAL**
ENGINEERING & ENVIRONMENTAL CONSULTANTS



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
2	Al-Hassa District	11,829	12,116	12,406	12,656	12,906	13,110	13,318	13,529	13,759	13,988	14,232	14,474	14,715	14,954	15,192	15,428	15,662	15,895	16,125	16,354	16,581	16,806	17,029	17,250	17,468
3	Besara District	25,333	25,948	26,570	27,106	27,639	28,077	28,522	28,974	29,466	29,958	30,479	30,998	31,513	32,026	32,535	33,041	33,543	34,041	34,535	35,025	35,511	35,993	36,470	36,943	37,410
SUM of Tafilah Governorate		98,555	100,948	103,368	105,450	107,526	109,229	110,962	112,720	114,634	116,545	118,574	120,592	122,598	124,592	126,573	128,540	130,493	132,431	134,354	136,261	138,151	140,025	141,881	143,719	145,539
SUM OF SOUTHERN REGION		664,927	681,409	698,121	712,071	725,988	736,857	747,981	759,325	771,953	784,574	798,169	811,691	825,136	838,497	851,772	864,955	878,043	891,031	903,915	916,693	929,361	941,916	954,355	966,675	978,873
SUM OF JORDAN		7,829,423	8,042,625	8,262,020	8,410,761	8,559,156	8,629,722	8,707,548	8,791,798	8,909,929	9,028,807	9,173,768	9,317,951	9,461,304	9,603,777	9,745,319	9,885,886	10,025,434	10,163,921	10,301,307	10,437,554	10,572,629	10,706,496	10,839,125	10,970,488	11,100,555

Table A8-2: Expected urban residential population of Jordan, by District, years 2015-2039

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
NORTHERN REGION																										
Irbid Governorate																										
1	Greater Irbid District	477.839	491.672	505.986	514.870	523.734	526.619	530.070	534.025	540.597	547.237	555.895	564.507	573.070	581.579	590.034	598.430	606.765	615.037	623.243	631.381	639.449	647.445	655.367	663.213	670.982
2	Bani Obeid District	113.800	117.246	120.812	123.025	125.233	125.951	126.811	127.796	129.433	131.087	133.244	135.389	137.522	139.642	141.748	143.840	145.916	147.977	150.021	152.048	154.058	156.049	158.023	159.977	161.913
3	Wastiyyah District	29.242	30.127	31.044	31.612	32.180	32.364	32.585	32.838	33.259	33.684	34.238	34.789	35.338	35.882	36.423	36.961	37.494	38.024	38.549	39.070	39.586	40.098	40.605	41.108	41.605
4	Tayba District	35.428	36.501	37.611	38.300	38.987	39.211	39.478	39.785	40.295	40.810	41.481	42.149	42.813	43.473	44.129	44.780	45.426	46.068	46.704	47.335	47.961	48.581	49.195	49.804	50.406
5	Mazar Shamali District	53.718	55.344	57.027	58.072	59.114	59.454	59.859	60.324	61.097	61.878	62.896	63.909	64.915	65.916	66.910	67.897	68.878	69.850	70.815	71.772	72.721	73.661	74.592	75.515	76.429
6	Kura District	110.742	114.095	117.565	119.719	121.867	122.567	123.403	124.362	125.955	127.565	129.663	131.751	133.827	135.890	137.939	139.974	141.995	144.000	145.989	147.962	149.918	151.856	153.776	155.678	157.561
7	Bani Knenanah District	92.919	95.732	98.644	100.451	102.253	102.840	103.542	104.347	105.683	107.034	108.795	110.547	112.288	114.019	115.739	117.446	119.142	120.824	122.493	124.148	125.789	127.416	129.027	130.623	132.203
8	Al-Ramtha District	181.745	185.765	189.924	192.506	195.081	195.919	196.922	198.072	199.981	201.910	204.426	206.929	209.417	211.890	214.346	216.786	219.208	221.611	223.996	226.361	228.705	231.028	233.330	235.610	237.867
9	Aghwar Shamaliyah District	103.632	106.771	110.017	112.033	114.044	114.698	115.481	116.378	117.869	119.375	121.339	123.293	125.235	127.166	129.084	130.988	132.879	134.755	136.617	138.463	140.293	142.107	143.904	145.684	147.446
SUM of Irbid Governorate		1.199.065	1.233.254	1.268.629	1.290.586	1.312.492	1.319.623	1.328.153	1.337.928	1.354.169	1.370.579	1.391.979	1.413.263	1.434.425	1.455.457	1.476.351	1.497.102	1.517.702	1.538.146	1.558.427	1.578.540	1.598.479	1.618.241	1.637.820	1.657.211	1.676.412
Mafrq Governorate																										
1	Greater Mafrq District	170.165	183.086	197.182	198.325	199.465	186.354	174.664	164.253	160.184	156.369	157.483	158.590	159.691	160.786	161.873	162.953	164.025	165.088	166.143	167.190	168.227	169.256	170.274	171.283	172.282
2	Badiah Shamaliyah District	36.541	37.871	39.268	39.916	40.563	40.385	40.288	40.262	40.600	40.950	41.582	42.210	42.835	43.456	44.073	44.685	45.293	45.897	46.496	47.090	47.678	48.262	48.840	49.412	49.979
3	Badiyah Shamaliyah Gharbiyah District	47.466	49.194	51.009	51.851	52.691	52.460	52.334	52.300	52.739	53.194	54.015	54.831	55.643	56.449	57.250	58.046	58.836	59.620	60.398	61.169	61.934	62.692	63.443	64.186	64.923
4	Al-Rouaishad District	6.209	6.435	6.673	6.783	6.893	6.863	6.846	6.842	6.899	6.959	7.066	7.173	7.279	7.384	7.489	7.593	7.697	7.799	7.901	8.002	8.102	8.201	8.299	8.397	8.493
SUM of Mafrq Governorate		260.381	276.586	294.132	296.875	299.612	286.062	274.132	263.657	260.422	257.472	260.145	262.804	265.448	268.075	270.685	273.278	275.851	278.405	280.938	283.451	285.942	288.410	290.856	293.278	295.677
Ajloun Governorate																										
1	Greater Ajloun District	98.470	101.134	103.861	105.865	107.864	109.065	110.339	111.676	113.359	115.047	117.000	118.942	120.873	122.792	124.698	126.591	128.471	130.336	132.187	134.022	135.841	137.644	139.431	141.200	142.952
2	Kofranjah District	29.134	29.923	30.730	31.322	31.914	32.269	32.646	33.042	33.540	34.039	34.617	35.191	35.763	36.331	36.895	37.455	38.011	38.563	39.110	39.653	40.192	40.725	41.254	41.777	42.295
SUM of Ajloun Governorate		127.604	131.057	134.591	137.187	139.777	141.334	142.985	144.718	146.899	149.086	151.616	154.133	156.635	159.122	161.593	164.046	166.482	168.899	171.297	173.675	176.033	178.370	180.685	182.977	185.248
Jerash Governorate																										
1	Greater Jerash District	161.064	164.645	168.300	171.096	173.886	175.730	177.658	179.661	182.071	184.485	187.210	189.921	192.616	195.295	197.956	200.599	203.222	205.826	208.409	210.971	213.510	216.027	218.520	220.990	223.436
SUM of Jerash Governorate		161.064	164.645	168.300	171.096	173.886	175.730	177.658	179.661	182.071	184.485	187.210	189.921	192.616	195.295	197.956	200.599	203.222	205.826	208.409	210.971	213.510	216.027	218.520	220.990	223.436
SUM OF NORTHERN REGION		1.748.114	1.805.541	1.865.652	1.895.745	1.925.767	1.922.749	1.922.929	1.925.965	1.943.561	1.961.623	1.990.951	2.020.122	2.049.124	2.077.949	2.106.585	2.135.024	2.163.257	2.191.275	2.219.071	2.246.636	2.273.964	2.301.048	2.327.881	2.354.457	2.380.772
CENTRAL REGION																										
Amman Governorate																										
1	Greater Amman District	753.700	773.843	794.434	809.839	825.208	834.861	845.032	855.656	868.745	881.869	896.882	911.815	926.662	941.418	956.077	970.635	985.088	999.431	1.013.660	1.027.771	1.041.760	1.055.624	1.069.360	1.082.965	1.096.436
2	Marka District	714.000	731.639	749.671	763.160	776.619	785.071	793.978	803.281	814.743	826.235	839.382	852.459	865.460	878.381	891.218	903.966	916.622	929.182	941.642	953.998	966.249	978.389	990.418	1.002.332	1.014.128
3	Quaismeh District	350.935	360.314	369.901	377.074	384.230	388.725	393.460	398.407	404.502	410.612	417.603	424.556	431.469	438.339	445.165	451.943	458.673	465.351	471.976	478.546	485.060	491.516	497.911	504.246	510.518
4	Al-Jami'ah District	381.086	391.271	401.682	409.471	417.242	422.123	427.265	432.637	439.256	445.891	453.482	461.033	468.539	476.000	483.412	490.773	498.081	505.333	512.527	519.662	526.735	533.745	540.691	547.570	554.381
5	Wadi Essier District	237.077	243.413	249.890	254.736	259.570	262.606	265.805	269.147	273.265	277.393	282.115	286.812	291.482	296.124	300.735	305.314	309.860	314.372	318.847	323.286	327.686	332.048	336.368	340.648	344.885



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
6	Sahab District	77.805	79.884	82.010	83.600	85.186	86.183	87.233	88.330	89.681	91.036	92.585	94.127	95.660	97.183	98.696	100.199	101.691	103.171	104.640	106.097	107.541	108.972	110.390	111.795	113.185	
7	Ajeeza District	147.368	148.901	150.469	151.641	152.811	153.546	154.320	155.128	156.125	157.124	158.266	159.403	160.533	161.656	162.772	163.880	164.980	166.072	167.155	168.229	169.294	170.349	171.395	172.430	173.455	
8	Almoaqr District	40.948	42.042	43.161	43.998	44.833	45.358	45.910	46.487	47.198	47.911	48.727	49.538	50.345	51.147	51.943	52.734	53.519	54.299	55.072	55.838	56.598	57.351	58.098	58.837	59.569	
9	Naor District	90.336	92.751	95.219	97.065	98.907	100.064	101.283	102.557	104.125	105.698	107.498	109.288	111.067	112.836	114.593	116.338	118.070	119.789	121.495	123.186	124.863	126.524	128.171	129.801	131.416	
SUM of Amman Governorate		2.793.256	2.864.060	2.936.437	2.990.585	3.044.607	3.078.537	3.114.286	3.151.631	3.197.640	3.243.770	3.296.542	3.349.031	3.401.217	3.453.083	3.504.611	3.555.783	3.606.584	3.656.999	3.707.013	3.756.613	3.805.786	3.854.519	3.902.802	3.950.623	3.997.973	
Madaba Governorate																											
1	Madaba District	100.622	103.261	105.953	108.024	110.090	111.471	112.913	114.408	116.198	117.991	120.009	122.016	124.012	125.995	127.966	129.923	131.866	133.793	135.706	137.603	139.483	141.347	143.193	145.022	146.833	
2	Theban District	28.366	29.110	29.869	30.453	31.035	31.424	31.831	32.253	32.757	33.263	33.831	34.397	34.960	35.519	36.075	36.626	37.174	37.717	38.257	38.791	39.321	39.847	40.367	40.883	41.393	
SUM of Madaba Governorate		128.989	132.371	135.822	138.477	141.125	142.895	144.744	146.661	148.955	151.254	153.841	156.414	158.972	161.514	164.040	166.549	169.039	171.511	173.963	176.394	178.805	181.194	183.560	185.905	188.226	
Balqa Governorate																											
1	Greater Balqa (Salt) District	108.884	111.631	114.423	116.694	118.959	120.650	122.390	124.173	126.200	128.227	130.440	132.642	134.830	137.005	139.166	141.312	143.442	145.556	147.654	149.734	151.796	153.839	155.864	157.870	159.855	
2	New Deir Allah District	46.062	47.224	48.405	49.366	50.324	51.039	51.776	52.530	53.387	54.245	55.181	56.112	57.038	57.958	58.872	59.780	60.681	61.576	62.463	63.343	64.215	65.080	65.936	66.785	67.625	
3	Shouna Janoobiyyeh District	38.404	39.373	40.357	41.158	41.957	42.554	43.167	43.796	44.511	45.226	46.007	46.783	47.555	48.322	49.084	49.841	50.592	51.338	52.078	52.812	53.539	54.260	54.974	55.681	56.381	
4	New Ain Al-Basha District	127.785	131.009	134.286	136.951	139.609	141.594	143.636	145.728	148.107	150.486	153.084	155.667	158.235	160.788	163.324	165.842	168.342	170.823	173.285	175.726	178.146	180.544	182.921	185.274	187.604	
5	Mahes & Al-Fahis District	22.085	22.642	23.208	23.669	24.128	24.471	24.824	25.186	25.597	26.008	26.457	26.903	27.347	27.788	28.227	28.662	29.094	29.523	29.948	30.370	30.788	31.203	31.614	32.020	32.423	
SUM of Balqa Governorate		343.218	351.880	360.680	367.837	374.978	380.308	385.793	391.414	397.803	404.193	411.169	418.107	425.006	431.862	438.673	445.437	452.152	458.817	465.428	471.984	478.484	484.926	491.308	497.630	503.889	
Zarqa Governorate																											
1	Greater Zarqa District	722.629	738.079	753.820	766.153	778.457	787.002	795.881	805.049	815.826	826.616	838.635	850.590	862.476	874.288	886.024	897.679	909.249	920.732	932.123	943.420	954.619	965.719	976.715	987.607	998.391	
2	Russeifeh District	355.564	364.772	374.153	381.502	388.835	393.928	399.219	404.683	411.106	417.536	424.699	431.823	438.907	445.947	452.941	459.886	466.782	473.625	480.413	487.146	493.820	500.435	506.988	513.479	519.906	
3	Hashimiya District	61.392	62.982	64.602	65.871	67.137	68.016	68.930	69.873	70.982	72.092	73.329	74.559	75.782	76.998	78.205	79.405	80.595	81.777	82.949	84.111	85.264	86.406	87.537	88.658	89.768	
SUM of Zarqa Governorate		1.139.586	1.165.833	1.192.575	1.213.526	1.234.429	1.248.947	1.264.029	1.279.605	1.297.914	1.316.244	1.336.663	1.356.972	1.377.164	1.397.233	1.417.170	1.436.970	1.456.627	1.476.134	1.495.485	1.514.677	1.533.703	1.552.560	1.571.241	1.589.745	1.608.066	
SUM OF CENTRAL REGION		4.405.049	4.514.144	4.625.513	4.710.425	4.795.139	4.850.686	4.908.852	4.969.311	5.042.312	5.115.460	5.198.214	5.280.524	5.362.359	5.443.692	5.524.494	5.604.739	5.684.402	5.763.460	5.841.889	5.919.668	5.996.778	6.073.198	6.148.912	6.223.903	6.298.154	
SOUTHERN REGION																											
Aqaba Governorate																											
1	Greater Aqaba District	108.967	111.548	114.152	116.472	118.786	120.785	122.808	124.850	127.020	129.185	131.445	133.694	135.929	138.151	140.358	142.550	144.726	146.886	149.028	151.153	153.259	155.346	157.415	159.463	161.491	
2	Qawiera District	21.974	22.495	23.020	23.487	23.954	24.357	24.765	25.177	25.615	26.051	26.507	26.960	27.411	27.859	28.304	28.746	29.185	29.621	30.053	30.481	30.906	31.327	31.744	32.157	32.566	
SUM of Aqaba Governorate		130.941	134.043	137.172	139.959	142.740	145.142	147.573	150.027	152.634	155.236	157.952	160.654	163.340	166.010	168.662	171.296	173.911	176.506	179.081	181.634	184.165	186.673	189.158	191.620	194.057	
Ma'an Governorate																											
1	Greater Ma'an District	40.728	41.791	42.876	43.715	44.553	45.120	45.711	46.323	47.051	47.780	48.599	49.412	50.221	51.025	51.824	52.617	53.405	54.186	54.961	55.730	56.493	57.248	57.996	58.738	59.472	
2	Greater Petra District	19.034	19.531	20.038	20.431	20.822	21.087	21.363	21.649	21.990	22.331	22.713	23.093	23.471	23.847	24.220	24.591	24.959	25.324	25.687	26.046	26.402	26.755	27.105	27.451	27.794	
3	Greater Shobak District	8.851	9.082	9.318	9.500	9.682	9.805	9.934	10.067	10.225	10.384	10.561	10.738	10.914	11.089	11.262	11.435	11.606	11.776	11.944	12.111	12.277	12.441	12.604	12.765	12.924	
4	Husseinieh District	6.632	6.805	6.982	7.118	7.255	7.347	7.443	7.543	7.662	7.780	7.914	8.046	8.178	8.309	8.439	8.568	8.696	8.823	8.950	9.075	9.199	9.322	9.444	9.565	9.684	
SUM of Ma'an Governorate		75.245	77.210	79.214	80.764	82.312	83.359	84.451	85.582	86.928	88.275	89.786	91.290	92.784	94.270	95.745	97.211	98.666	100.109	101.542	102.962	104.371	105.766	107.149	108.519	109.875	
Karak Governorate																											
1	Greater Karak District	30.788	31.556	32.334	32.979	33.622	34.118	34.627	35.146	35.727	36.308	36.937	37.562	38.183	38.801	39.415	40.024	40.629	41.229	41.825	42.416	43.001	43.582	44.157	44.726	45.290	
2	Mazar Janoobiyyeh District	27.154	27.830	28.516	29.085	29.653	30.090	30.538	30.996	31.509	32.022	32.576	33.127	33.675	34.220	34.761	35.299	35.832	36.362	36.887	37.408	37.924	38.436	38.943	39.446	39.943	
3	Qasr District	9.905	10.152	10.402	10.609	10.816	10.976	11.140	11.307	11.494	11.681	11.883	12.084	12.284	12.482	12.680	12.876	13.071	13.264	13.455	13.645	13.834	14.020	14.205	14.389	14.570	
4	Al-Agwar Al-Janobeiah District	15.404	15.788</																								



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
SUM of Karak Governorate		96.946	99.362	101.812	103.843	105.869	107.430	109.032	110.667	112.497	114.327	116.306	118.274	120.231	122.176	124.108	126.027	127.932	129.822	131.698	133.558	135.401	137.229	139.039	140.832	142.608
Tafilah Governorate																										
1	Tafilah District	43.813	44.876	45.952	46.878	47.801	48.558	49.328	50.110	50.961	51.810	52.712	53.609	54.501	55.388	56.268	57.143	58.011	58.873	59.727	60.575	61.415	62.248	63.073	63.891	64.700
2	Al-Hassa District	8.442	8.647	8.854	9.032	9.210	9.356	9.504	9.655	9.819	9.983	10.156	10.329	10.501	10.672	10.841	11.010	11.177	11.343	11.508	11.671	11.833	11.994	12.153	12.310	12.466
3	Besara District	18.079	18.518	18.962	19.344	19.725	20.037	20.355	20.677	21.029	21.379	21.751	22.121	22.489	22.855	23.219	23.579	23.938	24.293	24.646	24.996	25.343	25.686	26.027	26.364	26.698
SUM of Tafilah Governorate		70.333	72.041	73.768	75.254	76.736	77.951	79.187	80.442	81.808	83.172	84.620	86.060	87.492	88.915	90.328	91.732	93.126	94.509	95.881	97.242	98.591	99.928	101.253	102.565	103.864
SUM OF SOUTHERN REGION		373.465	382.656	391.966	399.820	407.656	413.883	420.244	426.718	433.868	441.011	448.665	456.278	463.847	471.370	478.844	486.266	493.635	500.947	508.201	515.396	522.528	529.596	536.599	543.536	550.403
SUM OF JORDAN		6.526.628	6.702.341	6.883.131	7.005.990	7.128.562	7.187.318	7.252.024	7.321.994	7.419.740	7.518.094	7.637.830	7.756.923	7.875.331	7.993.011	8.109.923	8.226.030	8.341.294	8.455.682	8.569.161	8.681.700	8.793.270	8.903.842	9.013.392	9.121.896	9.229.330

Table A8-3: Expected rural residential population of Jordan, by District, years 2015-2039

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
NORTHERN REGION																										
Irbid Governorate																										
1	Greater Irbid District	94.032	96.880	99.826	101.654	103.479	104.073	104.783	105.597	106.950	108.317	110.099	111.871	113.634	115.385	117.126	118.854	120.569	122.272	123.961	125.636	127.297	128.943	130.573	132.188	133.787
2	Bani Obeid District	23.424	24.133	24.867	25.322	25.777	25.925	26.102	26.305	26.642	26.982	27.426	27.868	28.307	28.743	29.176	29.607	30.034	30.458	30.879	31.296	31.710	32.120	32.526	32.929	33.327
3	Wastiyyah District	6.019	6.201	6.390	6.507	6.624	6.662	6.707	6.759	6.846	6.933	7.047	7.161	7.274	7.386	7.497	7.608	7.718	7.827	7.935	8.042	8.148	8.254	8.358	8.461	8.564
4	Tayba District	7.292	7.513	7.741	7.883	8.025	8.071	8.126	8.189	8.294	8.400	8.538	8.676	8.812	8.948	9.083	9.217	9.350	9.482	9.613	9.743	9.872	10.000	10.126	10.251	10.375
5	Mazar Shamali District	11.057	11.392	11.738	11.953	12.168	12.237	12.321	12.417	12.576	12.736	12.946	13.154	13.362	13.568	13.772	13.976	14.177	14.377	14.576	14.773	14.968	15.162	15.354	15.543	15.731
6	Kura District	22.794	23.485	24.199	24.642	25.084	25.228	25.400	25.598	25.926	26.257	26.689	27.119	27.546	27.970	28.392	28.811	29.227	29.640	30.049	30.455	30.858	31.257	31.652	32.044	32.431
7	Bani Knenanah District	19.126	19.705	20.304	20.676	21.047	21.168	21.312	21.478	21.753	22.031	22.394	22.754	23.113	23.469	23.823	24.174	24.523	24.870	25.213	25.554	25.892	26.226	26.558	26.886	27.212
8	Al-Ramtha District	27.323	28.151	29.007	29.538	30.068	30.241	30.447	30.684	31.077	31.474	31.992	32.507	33.019	33.528	34.034	34.536	35.034	35.529	36.020	36.507	36.989	37.467	37.941	38.410	38.875
9	Aghwar Shamaliyah District	21.331	21.977	22.645	23.060	23.474	23.609	23.770	23.954	24.261	24.571	24.976	25.378	25.777	26.175	26.570	26.962	27.351	27.737	28.120	28.500	28.877	29.250	29.620	29.986	30.349
SUM of Irbid Governorate		232.398	239.435	246.717	251.236	255.745	257.213	258.969	260.981	264.324	267.701	272.106	276.487	280.843	285.172	289.473	293.744	297.984	302.192	306.366	310.506	314.611	318.678	322.708	326.700	330.652
Mafrq Governorate																										
1	Greater Mafrq District	99.771	103.403	107.218	108.988	110.754	110.269	110.003	109.932	110.855	111.811	113.536	115.252	116.958	118.653	120.337	122.010	123.671	125.318	126.953	128.575	130.182	131.775	133.353	134.916	136.464
2	Badiah Shamaliyah District	56.610	58.671	60.835	61.840	62.842	62.566	62.415	62.375	62.899	63.441	64.420	65.393	66.361	67.323	68.279	69.228	70.170	71.105	72.033	72.953	73.865	74.769	75.664	76.551	77.429
3	Badiyah Shamaliyah Gharbiyah District	73.536	76.213	79.025	80.330	81.631	81.274	81.077	81.025	81.706	82.410	83.682	84.946	86.203	87.453	88.694	89.927	91.151	92.366	93.571	94.766	95.950	97.124	98.288	99.440	100.581
4	Al-Rouaishad District	9.620	9.970	10.338	10.508	10.679	10.632	10.606	10.599	10.688	10.781	10.947	11.112	11.277	11.440	11.603	11.764	11.924	12.083	12.241	12.397	12.552	12.706	12.858	13.008	13.158
SUM of Mafrq Governorate		239.538	248.257	257.416	261.666	265.905	264.741	264.102	263.933	266.148	268.443	272.585	276.704	280.799	284.870	288.913	292.929	296.916	300.872	304.797	308.690	312.549	316.373	320.162	323.915	327.631
Ajloun Governorate																										
1	Greater Ajloun District	31.263	32.109	32.975	33.611	34.245	34.627	35.031	35.456	35.990	36.526	37.146	37.763	38.376	38.985	39.590	40.191	40.788	41.380	41.968	42.550	43.128	43.701	44.268	44.830	45.386
2	Kofranjah District	9.250	9.500	9.756	9.945	10.132	10.245	10.365	10.490	10.648	10.807	10.990	11.173	11.354	11.535	11.714	11.891	12.068	12.243	12.417	12.589	12.760	12.930	13.098	13.264	13.428
SUM of Ajloun Governorate		40.513	41.609	42.731	43.555	44.378	44.872	45.396	45.946	46.639	47.333	48.137	48.936	49.730	50.519	51.304	52.083	52.856	53.624	54.385	55.140	55.888	56.630	57.365	58.093	58.814
Jerash Governorate																										
1	Greater Jerash District	81.117	83.252	85.431	87.098	88.761	89.861	91.010	92.204	93.641	95.080	96.705	98.321	99.928	101.525	103.111	104.687	106.251	107.803	109.343	110.870	112.384	113.884	115.371	116.843	118.301
SUM of Jerash Governorate		81.117	83.252	85.431	87.098	88.761	89.861	91.010	92.204	93.641	95.080	96.705	98.321	99.928	101.525	103.111	104.687	106.251	107.803	109.343	110.870	112.384	113.884	115.371	116.843	118.301
SUM OF NORTHERN REGION		593.566	612.554	632.295	643.556	654.790	656.686	659.477	663.064	670.751	678.558	689.532	700.447	711.300	722.086	732.801	743.443	754.007	764.491	774.892	785.206	795.432	805.566	815.607	825.552	835.398
CENTRAL REGION																										
Amman Governorate																										
1	Greater Amman District	47.935	49.216	50.525	51.505	52.483	53.097	53.743	54.419	55.252	56.086	57.041	57.991	58.935	59.873	60.806	61.732	62.651	63.563	64.468	65.365	66.255	67.137	68.010	68.876	69.732
2	Marka District	41.976	43.097	44.244	45.102	45.958	46.496	47.062	47.654	48.383	49.114	49.950	50.781	51.608	52.430	53.246	54.057	54.862	55.661	56.453	57.239	58.018	58.790	59.555	60.313	61.063



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
3	Quaismeh District	22.319	22.916	23.525	23.982	24.437	24.723	25.024	25.338	25.726	26.115	26.559	27.001	27.441	27.878	28.312	28.743	29.171	29.596	30.017	30.435	30.849	31.260	31.667	32.070	32.469
4	Al-Jami'ah District	24.237	24.885	25.547	26.042	26.536	26.847	27.174	27.515	27.936	28.358	28.841	29.321	29.799	30.273	30.745	31.213	31.678	32.139	32.596	33.050	33.500	33.946	34.388	34.825	35.258
5	Wadi Essier District	15.078	15.481	15.893	16.201	16.508	16.702	16.905	17.118	17.379	17.642	17.942	18.241	18.538	18.833	19.127	19.418	19.707	19.994	20.278	20.561	20.841	21.118	21.393	21.665	21.934
6	Sahab District	4.948	5.081	5.216	5.317	5.418	5.481	5.548	5.618	5.704	5.790	5.888	5.986	6.084	6.181	6.277	6.373	6.467	6.562	6.655	6.748	6.840	6.931	7.021	7.110	7.199
7	Ajeeza District	3.649	3.746	3.846	3.920	3.995	4.041	4.091	4.142	4.205	4.269	4.342	4.414	4.486	4.557	4.628	4.699	4.769	4.838	4.907	4.975	5.043	5.110	5.177	5.242	5.308
8	Almoaqr District	2.604	2.674	2.745	2.798	2.851	2.885	2.920	2.957	3.002	3.047	3.099	3.151	3.202	3.253	3.304	3.354	3.404	3.453	3.503	3.551	3.600	3.648	3.695	3.742	3.789
9	Naor District	5.745	5.899	6.056	6.173	6.290	6.364	6.442	6.523	6.622	6.722	6.837	6.951	7.064	7.176	7.288	7.399	7.509	7.618	7.727	7.835	7.941	8.047	8.152	8.255	8.358
SUM of Amman Governorate		168.491	172.994	177.597	181.041	184.476	186.634	188.908	191.283	194.209	197.143	200.499	203.837	207.156	210.455	213.732	216.987	220.218	223.424	226.605	229.759	232.887	235.986	239.057	242.098	245.110
Madaba Governorate																										
1	Madaba District	40.337	41.395	42.474	43.304	44.133	44.686	45.264	45.864	46.581	47.300	48.109	48.914	49.714	50.509	51.299	52.083	52.862	53.635	54.401	55.162	55.916	56.663	57.403	58.136	58.862
2	Theban District	11.371	11.670	11.974	12.208	12.441	12.597	12.760	12.929	13.132	13.334	13.562	13.789	14.015	14.239	14.461	14.683	14.902	15.120	15.336	15.551	15.763	15.974	16.182	16.389	16.594
SUM of Madaba Governorate		51.709	53.065	54.448	55.512	56.574	57.283	58.024	58.793	59.713	60.634	61.671	62.703	63.728	64.747	65.760	66.766	67.764	68.755	69.738	70.712	71.679	72.636	73.585	74.525	75.455
Balqa Governorate																										
1	Greater Balqa (Salt) District	42.718	43.796	44.891	45.782	46.670	47.334	48.016	48.716	49.511	50.307	51.175	52.038	52.897	53.750	54.598	55.440	56.276	57.105	57.928	58.744	59.553	60.355	61.149	61.936	62.715
2	New Deir Allah District	18.071	18.527	18.990	19.367	19.743	20.024	20.313	20.609	20.945	21.282	21.649	22.014	22.377	22.738	23.097	23.453	23.807	24.158	24.506	24.851	25.193	25.532	25.868	26.201	26.531
3	Shouna Janoobiyyeh District	15.067	15.447	15.833	16.147	16.461	16.695	16.936	17.182	17.463	17.743	18.049	18.354	18.657	18.958	19.257	19.554	19.849	20.141	20.431	20.719	21.004	21.287	21.567	21.845	22.120
4	New Ain Al-Basha District	50.133	51.398	52.683	53.729	54.772	55.550	56.352	57.173	58.106	59.039	60.058	61.072	62.079	63.081	64.076	65.064	66.044	67.018	67.984	68.941	69.891	70.832	71.764	72.687	73.601
5	Mahes & Al-Fahis District	8.664	8.883	9.105	9.286	9.466	9.601	9.739	9.881	10.042	10.204	10.380	10.555	10.729	10.902	11.074	11.245	11.414	11.583	11.749	11.915	12.079	12.242	12.403	12.562	12.720
SUM of Balqa Governorate		134.652	138.050	141.503	144.311	147.113	149.203	151.355	153.560	156.067	158.574	161.311	164.033	166.739	169.429	172.101	174.755	177.390	180.004	182.598	185.170	187.720	190.248	192.751	195.231	197.687
Zarqa Governorate																										
1	Greater Zarqa District	38.821	40.148	41.535	42.247	42.958	42.927	42.967	43.072	43.503	43.945	44.639	45.330	46.017	46.700	47.378	48.052	48.720	49.384	50.042	50.695	51.342	51.984	52.619	53.249	53.872
2	Russeifeh District	20.548	21.080	21.623	22.047	22.471	22.765	23.071	23.387	23.758	24.130	24.544	24.955	25.365	25.772	26.176	26.577	26.976	27.371	27.763	28.152	28.538	28.920	29.299	29.674	30.046
3	Hashimiya District	3.548	3.640	3.733	3.807	3.880	3.931	3.983	4.038	4.102	4.166	4.238	4.309	4.380	4.450	4.520	4.589	4.658	4.726	4.794	4.861	4.927	4.993	5.059	5.124	5.188
SUM of Zarqa Governorate		62.917	64.868	66.891	68.101	69.309	69.623	70.022	70.497	71.363	72.241	73.421	74.594	75.761	76.921	78.073	79.218	80.354	81.481	82.599	83.708	84.808	85.898	86.977	88.047	89.105
SUM OF CENTRAL REGION		417.768	428.977	440.438	448.965	457.472	462.744	468.310	474.133	481.352	488.592	496.902	505.168	513.385	521.553	529.667	537.725	545.725	553.664	561.540	569.350	577.093	584.768	592.371	599.901	607.358
SOUTHERN REGION																										
Aqaba Governorate																										
1	Greater Aqaba District	17.752	18.172	18.596	18.974	19.351	19.677	20.006	20.339	20.692	21.045	21.413	21.780	22.144	22.506	22.865	23.222	23.577	23.929	24.278	24.624	24.967	25.307	25.644	25.978	26.308
2	Qawiera District	3.580	3.665	3.750	3.826	3.902	3.968	4.034	4.102	4.173	4.244	4.318	4.392	4.465	4.538	4.611	4.683	4.754	4.825	4.896	4.966	5.035	5.103	5.171	5.239	5.305
SUM of Aqaba Governorate		21.331	21.837	22.346	22.800	23.253	23.645	24.041	24.440	24.865	25.289	25.732	26.172	26.609	27.044	27.476	27.905	28.331	28.754	29.174	29.589	30.002	30.410	30.815	31.216	31.613
Ma'an Governorate																										
1	Greater Ma'an District	33.512	34.387	35.279	35.970	36.659	37.126	37.612	38.116	38.715	39.315	39.988	40.657	41.323	41.985	42.642	43.295	43.943	44.586	45.223	45.856	46.483	47.105	47.721	48.331	48.935
2	Greater Petra District	15.662	16.071	16.488	16.811	17.133	17.351	17.578	17.814	18.094	18.374	18.689	19.002	19.313	19.622	19.929	20.234	20.537	20.837	21.135	21.431	21.724	22.015	22.303	22.588	22.870
3	Greater Shobak District	7.283	7.473	7.667	7.817	7.967	8.068	8.174	8.283	8.413	8.544	8.690	8.836	8.980	9.124	9.267	9.409	9.550	9.689	9.828	9.965	10.102	10.237	10.371	10.503	10.634
4	Husseinieh District	5.457	5.599	5.745	5.857	5.969	6.045	6.125	6.207	6.304	6.402	6.512	6.621	6.729	6.837	6.944	7.050	7.155	7.260	7.364	7.467	7.569	7.670	7.771	7.870	7.968
SUM of Ma'an Governorate		61.913	63.530	65.179	66.455	67.728	68.590	69.488	70.419	71.526	72.635	73.878	75.115	76.345	77.567	78.781	79.987	81.184	82.372	83.551	84.720	85.878	87.027	88.165	89.292	90.407
Karak Governorate																										
1	Greater Karak District	57.164	58.588	60.033	61.230	62.424	63.345	64.290	65.254	66.333	67.412	68.579	69.739	70.893	72.040	73.179	74.311	75.434	76.549	77.654	78.751	79.838	80.916	81.983	83.041	84.088
2	Mazar Janoobiyyeh District	50.415	51.671	52.945	54.001	55.054	55.867	56.699	57.550	58.502	59.453	60.482	61.506	62.523	63.535	64.540	65.537	66.528	67.511	68.486	69.453	70.412	71.363	72.304	73.237	74.160
3	Qasr District	18.390	18.848	19.313	19.698	20.082	20.378	20.682	20.992	21.340	21.687	22.062	22.435	22.807	23.176	23.542	23.906	24.267	24.626	24.982	25.335	25.684	26.031	26.374	26.715	27.051
4	Al-Agwar Al-Janobeiah District	28.600	29.312	30.035	30.634	31.232	31.693	32.165	32.647	33.188	33.727	34.311	34.892	35.469	36.043	36.613	37.179	37.741	38.299	38.852	39.400	39.944	40.483	41.018	41.547	42.070



Regional and Local Development Project (RLDP)

Baseline Study on the Existing MSWM System in the Hashemite Kingdom of Jordan (1st Draft Report)

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
5	Ai District	8.563	8.776	8.992	9.172	9.351	9.489	9.630	9.774	9.936	10.098	10.273	10.446	10.619	10.791	10.962	11.131	11.299	11.466	11.632	11.796	11.959	12.120	12.280	12.439	12.596
6	Faqo'e District	10.738	11.005	11.277	11.501	11.726	11.899	12.076	12.257	12.460	12.663	12.882	13.100	13.317	13.532	13.746	13.959	14.169	14.379	14.587	14.793	14.997	15.199	15.400	15.598	15.795
7	Al-Qatraneh District	6.128	6.280	6.435	6.563	6.691	6.790	6.891	6.995	7.110	7.226	7.351	7.476	7.599	7.722	7.844	7.966	8.086	8.205	8.324	8.442	8.558	8.674	8.788	8.901	9.014
SUM of Karak Governorate		179.995	184.480	189.030	192.800	196.561	199.461	202.434	205.469	208.868	212.266	215.940	219.594	223.228	226.838	230.426	233.988	237.525	241.035	244.517	247.970	251.393	254.786	258.148	261.477	264.773
Tafilah Governorate																										
1	Tafilah District	17.580	18.007	18.439	18.810	19.180	19.484	19.793	20.107	20.448	20.789	21.151	21.511	21.869	22.225	22.578	22.929	23.277	23.623	23.966	24.306	24.643	24.977	25.308	25.636	25.961
2	Al-Hassa District	3.387	3.469	3.553	3.624	3.696	3.754	3.814	3.874	3.940	4.006	4.075	4.145	4.214	4.282	4.350	4.418	4.485	4.552	4.618	4.683	4.748	4.812	4.876	4.939	5.002
3	Besara District	7.254	7.430	7.609	7.762	7.915	8.040	8.167	8.297	8.438	8.578	8.728	8.876	9.024	9.171	9.317	9.461	9.605	9.748	9.889	10.030	10.169	10.307	10.443	10.579	10.713
SUM of Tafilah Governorate		28.222	28.907	29.600	30.196	30.791	31.278	31.774	32.278	32.826	33.373	33.954	34.532	35.106	35.677	36.245	36.808	37.367	37.922	38.473	39.019	39.560	40.097	40.628	41.154	41.676
SUM OF SOUTHERN REGION		291.461	298.754	306.155	312.251	318.333	322.974	327.737	332.607	338.085	343.563	349.504	355.413	361.288	367.127	372.928	378.689	384.408	390.084	395.714	401.298	406.834	412.320	417.756	423.139	428.470
SUM OF JORDAN		1.302.795	1.340.284	1.378.889	1.404.772	1.430.594	1.442.404	1.455.524	1.469.804	1.490.189	1.510.713	1.535.938	1.561.028	1.585.973	1.610.766	1.635.396	1.659.857	1.684.140	1.708.238	1.732.145	1.755.854	1.779.359	1.802.654	1.825.733	1.848.592	1.871.226



ANNEX 9: EXPECTED TOURIST POPULATION OF JORDAN, BY GOVERNORATE

Table A9-1: Expected overnights of tourists in Jordan, by Governorate, years 2015-2040

#	Administrative Division	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
NORTHERN REGION																											
1	Irbid Governorate	19,525	20,501	21,526	22,602	23,732	24,919	26,165	27,473	28,847	30,289	31,046	31,823	32,618	33,434	34,269	35,126	36,004	36,904	37,827	38,773	39,742	40,736	41,754	42,798	43,868	44,964
2	Mafraq Governorate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Ajloun Governorate	424	445	468	491	516	541	568	597	627	658	675	691	709	726	745	763	782	802	822	842	863	885	907	930	953	977
4	Jerash Governorate	5,039	5,291	5,556	5,834	6,126	6,432	6,753	7,091	7,446	7,818	8,013	8,214	8,419	8,630	8,845	9,066	9,293	9,525	9,763	10,008	10,258	10,514	10,777	11,046	11,323	11,606
SUM OF NORTHERN REGION		24,988	26,238	27,550	28,927	30,374	31,892	33,487	35,161	36,919	38,765	39,734	40,728	41,746	42,789	43,859	44,956	46,080	47,232	48,412	49,623	50,863	52,135	53,438	54,774	56,144	57,547
CENTRAL REGION																											
5	Amman Governorate	3,023,562	3,174,740	3,333,477	3,500,151	3,675,159	3,858,917	4,051,862	4,254,455	4,467,178	4,690,537	4,807,801	4,927,996	5,051,195	5,177,475	5,306,912	5,439,585	5,575,575	5,714,964	5,857,838	6,004,284	6,154,391	6,308,251	6,465,957	6,627,606	6,793,296	6,963,129
6	Madaba Governorate	169,995	178,495	187,419	196,790	206,630	216,961	227,809	239,200	251,160	263,718	270,311	277,069	283,995	291,095	298,373	305,832	313,478	321,315	329,347	337,581	346,021	354,671	363,538	372,626	381,942	391,491
7	Balqa Governorate	67,729	71,115	74,671	78,404	82,325	86,441	90,763	95,301	100,066	105,070	107,696	110,389	113,148	115,977	118,876	121,848	124,895	128,017	131,217	134,498	137,860	141,307	144,839	148,460	152,172	155,976
8	Zarqa Governorate	1,073	1,127	1,183	1,242	1,305	1,370	1,438	1,510	1,586	1,665	1,707	1,749	1,793	1,838	1,884	1,931	1,979	2,029	2,079	2,131	2,185	2,239	2,295	2,353	2,411	2,472
SUM OF CENTRAL REGION		3,262,359	3,425,477	3,596,751	3,776,588	3,965,418	4,163,689	4,371,873	4,590,467	4,819,990	5,060,990	5,187,514	5,317,202	5,450,132	5,586,385	5,726,045	5,869,196	6,015,926	6,166,324	6,320,482	6,478,494	6,640,457	6,806,468	6,976,630	7,151,046	7,329,822	7,513,067
SOUTHERN REGION																											
9	Aqaba Governorate	693,009	727,659	764,042	802,244	842,356	884,474	928,698	975,133	1,023,890	1,075,084	1,101,961	1,129,510	1,157,748	1,186,692	1,216,359	1,246,768	1,277,937	1,309,885	1,342,633	1,376,198	1,410,603	1,445,868	1,482,015	1,519,066	1,557,042	1,595,968
10	Ma'an Governorate	355,454	373,227	391,888	411,483	432,057	453,660	476,343	500,160	525,168	551,426	565,212	579,342	593,826	608,671	623,888	639,485	655,472	671,859	688,656	705,872	723,519	741,607	760,147	779,151	798,629	818,595
11	Karak Governorate	137,490	144,364	151,583	159,162	167,120	175,476	184,249	193,462	203,135	213,292	218,624	224,090	229,692	235,434	241,320	247,353	253,537	259,875	266,372	273,032	279,857	286,854	294,025	301,376	308,910	316,633
12	Tafilah Governorate	6,264	6,577	6,906	7,251	7,613	7,994	8,394	8,813	9,254	9,717	9,960	10,209	10,464	10,725	10,994	11,268	11,550	11,839	12,135	12,438	12,749	13,068	13,395	13,730	14,073	14,425
SUM OF SOUTHERN REGION		1,192,216	1,251,827	1,314,418	1,380,139	1,449,146	1,521,604	1,597,684	1,677,568	1,761,446	1,849,519	1,895,757	1,943,150	1,991,729	2,041,522	2,092,561	2,144,875	2,198,496	2,253,459	2,309,795	2,367,540	2,426,729	2,487,397	2,549,582	2,613,321	2,678,654	2,745,621
SUM OF JORDAN		4,479,564	4,703,542	4,938,719	5,185,655	5,444,937	5,717,184	6,003,044	6,303,196	6,618,356	6,949,273	7,123,005	7,301,080	7,483,607	7,670,697	7,862,465	8,059,027	8,260,502	8,467,015	8,678,690	8,895,657	9,118,049	9,346,000	9,579,650	9,819,141	10,064,620	10,316,235



ANNEX 10: MAPS & DRAWINGS

#	Title	Scale
01	JSCs: Member Municipalities	1:1,000,000
02	JSCs: Catchment areas (served Municipalities)	1:1,000,000