

**SUSTAINABILITY IN MUNICIPAL SOLID WASTE
MANAGEMENT IN BAMENDA AND YAOUNDÉ,
CAMEROON**

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TABLE OF CONTENTS

TITLE PAGE	ii
TABLE OF CONTENTS	iii
LIST OF APPENDIXES	xiv
LISTS OF ILLUSTRATIONS	xv
LIST OF TABLES	xv
LIST OF FIGURES	xviii
LIST OF PLATES	xx
ABSTRACT	xxi
DECLARATION	xxiii
ACKNOWLEDGEMENTS	xxiv
SHORTENED FORMS	xxv

PART ONE

CHAPTER 1 Introduction and Background	1
1.1 Introduction	1
1.1.1 Global Significance of Municipal Solid Waste Management	2
1.1.2 Some Key Issues in Municipal Solid Waste Management in Developing Countries	7
1.1.3 Municipal Solid Waste Management in Cameroon	9
1.1.4 Research Aims and Objectives	10
1.1.5 Rationale/justification	11
1.2 Background: Limiting the Scope: Waste Terminologies and Research Area	11
1.2.1 Waste Terminologies	12
1.2.1.1 Waste	12
1.2.1.2 Solid Waste	12
1.2.1.3 Municipal Solid Waste, Management, other Urban Solid Waste Terms	13
1.2.2 Introduction to the Country of Research-Cameroon	14
1.2.2.1 A Brief History	14

1.2.2.2 The Geography, People and the Economy	17
1.2.3 Introduction to Bamenda and Yaoundé Cities	18
1.2.3.1 The Yaoundé City Council (<i>Communaute Urbaine de Yaoundé, CUY</i>)	18
1.2.3.2 The Bamenda Urban Council (BUC)	21
1.3 Organisation of the Thesis	22
CHAPTER 2 Major Concepts in Municipal Solid Waste Management	24
2.1 General Introduction	24
2.2 Concepts, Principles and Philosophies of Solid Waste Management	24
2.2.1 The Concept of Sustainable Development	24
2.2.2 Concept of Sustainable Urban Development	25
2.2.3 Sustainable Municipal Solid Waste Management (SMSWM)	26
2.2.4 Integrated and Sustainable Municipal Solid Waste Management	28
2.2.5 Policy Concepts Supporting Waste Strategic Options	32
2.2.5.1 The Concept of Waste Recognition	32
2.2.5.2 The Concept of the Waste Management Hierarchy	33
2.2.6 The Strategic Plan and Cultural Approaches	36
2.2.7 Decision-making	37
2.2.8 Concept of Waste Management Mode: Public Versus Private	38
2.3 Conclusion	40
CHAPTER 3 A Review of Municipal Solid Waste Management: Developed World, Developing Countries and Cameroon	41
3.1 A General Introduction	41
3.2 Municipal Solid Waste Management in the Developed World	41
3.2.1 Introduction	41
3.2.2 Municipal Solid Waste Characterisation	42

3.2.3 Trends in Waste Management Strategies and Outcomes	43
3.2.3.1 General Trend	43
3.2.3.2 Trends Within the European Union (EU)	45
3.2.3.3 Non-European OECD Member Countries	46
3.2.3.4 Waste Management Techniques	48
3.2.3.4 (i) Collection and Storage	48
3.2.3.4 (ii) Treatment	49
3.2.3.4 (iii) Disposal	49
3.2.3.5 Municipal Solid Waste Management Modes	51
3.2.3.6 Technological Innovations and Applications	51
3.2.3.7 Policy Tools Applied in Waste Management Practices	52
3.2.3.7 (i) General Aims and Principles	52
3.2.3.7 (ii) Manufacturer and Distributor-Targeted Policies	53
3.2.3.7 (iii) Consumer-targeted Policies	55
3.2.3.8 Environmental Impacts of MSW in the Developed World	56
3.3 An Overview of Municipal Solid Waste Management in the Developing World	56
3.3.1 Introduction	56
3.3.2 MSW Characterisation and Service Delivery	57
3.3.2.1 MSW Generation	57
3.3.2.2 Composition, Density and Humidity	57
3.3.2.3 Collection and Transportation	58
3.3.2.4 Disposal	58
3.3.3 MSW Minimisation Strategies	59
3.3.3.1 Introduction	59
3.3.3.2 Composting	60
3.3.3.3 Incineration	61
3.3.3.4 Solid Waste Recovery in Latin America and The Caribbean	61
3.3.3.4 (i) The Importance of Scavenger Cooperatives in Latin America: Some National Cases	62
3.3.3.5 Waste Recovery in Asia	63
3.3.3.6 Waste Minimisation in Africa	65

3.3.4	General Management Issues	65
3.3.5	Discussion and Conclusion to MSWM in the Developing World	66
3.4	Review of Municipal Solid Waste Management Literature on Cameroon	68
3.4.1	Introduction	68
3.4.2	Review of Related Literature on MSWM in Bamenda	69
3.4.3	Review of Related Literature on MSWM in Yaoundé	71
3.4.3.1	Early Research in Yaoundé	71
3.4.3.2	Review of Recent Literature on the State of MSWM in Yaoundé	73
3.5	General Conclusion	76
 CHAPTER 4 Research Methodology and Sources		77
4.1	Introduction	77
4.2	General Methodological Underpinnings: Research Scope, Type, and Context	77
4.3	The Case for Mixed Methods	80
4.4	Selection of City Cases And Sampling Procedures	81
4.4.1	City Cases-Purposeful	81
4.4.2	Sampling Procedure: Random	83
4.5	Sample Unit and Sample Size	85
4.6	Methods of Assessing MSW Quantities and Composition	86
4.6.1	Quantities	86
4.6.2	Composition	87
4.6.3	Mixed Quantity and Composition Assessment Methods	88
4.7	Data Collection and Assembly Techniques	88
4.7.1	Secondary Sources	89
4.7.1.1	Libraries	89
4.7.1.2	Administrative Sources	89
4.7.1.3	Map Sources	90
4.7.2	Primary Sources	91
4.7.2.1	Interviews	91
4.7.2.2	Pilot Studies	91

4.7.2.3 The Survey	92
4.7.2.4 The Survey Analytical Tool: SPSS for Windows	95
4.7.2.5 Household Solid Waste Collection Experiment	95
4.7.2.6 Observation	96
2.7.2.7 Personal Communication	96
4.8 Method Applications in Chapters	97
4.8.1 Chapters One, Two, Three and Four	97
4.8.2 Chapter Five	97
4.8.3 Chapter Six	98
4.8.3.1 Waste Characteristics	98
4.8.3.2 Analysis	99
4.8.4 Chapter Seven	101
4.8.5 Chapter Eight	101
4.8.6 Chapter Nine	102
4.8.7 Chapters Ten and Eleven	103
4.9 General Issues	103
4.10 General Problems	103
4.11 Conclusion	104

PART TWO

CHAPTER 5 Public Participation, Institutional Organisation and Governance in Municipal Solid Waste Management in Bamenda and Yaoundé	105
5.1 Introduction	105
5.2 The Case for Pubic Participation in Sustainable Environmental Management and Policy: -Conceptual Underpinnings	106
5.2.1 A General Perspective	106
5.2.2 Urban Environmental Management View and Governance	107
5.2.3 From Government to Governance with Participation	109

5.3 Concepts and Theories.	110
5.3.1 Philosophical and Psychological Underpinnings in Participation	113
5.4 Cases	114
5.5.1 Early and Mid 1990 Cases	114
5.5.2 Late 1990s and 2000s	117
5.5.3 Unit, Nature and Levels of Participation in MSWM	120
5.5 Conclusion	121
5.6 Governance and Participation in Waste Management in Cameroon	122
5.6.1 Introduction	122
5.6.2 The Institutional, Administrative and Political Structure of Cameroon	123
5.6.2.1 Institutional Responsibilities: Overlapping and Conflicting	124
5.6.2.2 Deliverers of MSW Services	126
5.6.2.3 Urban Councils and SWM Legislation: Responsibilities and Financing	127
5.6.3 Participants in MSWM in Yaoundé and Bamenda, Cameroon	130
5.6.3.1 Decision-Making	130
5.6.3.2 Education and Sensitisation	131
5.6.3.3 Solid Waste Financing	132
5.7 Conclusion	135

CHAPTER 6 Municipal Solid Waste Management in Bamenda City:

Generation, Storage, Collection and Transportation	137
6.1 General Introduction	137
6.2 Bamenda City	137
6.2.1 Population and Spatial Growth	139
6.2.2 Social, Cultural and Political Organisation	141
6.2.3 The Economy and Infrastructure	142
6.3 Introduction to Municipal Solid Waste Management in Bamenda	143
6.3.1 General MSW Flow	143
6.3.2 Solid waste Unit in BUC Administrative Flow Chart	144
6.3.3 History of MSWM in Bamenda	146

6.3.3.1 Colonial Period (Before 1961)	146
6.3.3.2 Early Postcolonial Period (After 1961)	147
6.3.3.3 Private Sector Involvement	150
6.3.3.4 1980s-1995	151
6.3.4 Conclusion	153
6.4 Solid Waste Generation	153
6.4.1 Introduction	153
6.4.2 Types and Sources of MSW Generation in Bamenda	154
6.4.3 Generation of MSW in Bamenda	155
6.4.3.1 Quantities	155
6.4.3.2 Categories	157
6.4.3.2 (i) Biodegradable	158
6.4.3.2 (ii) Non-biodegradable Components	159
6.4.3.3 Variations	161
6.4.3.3 (i) Spatial Variations	161
6.4.3.3 (ii) Seasonal and Daily Variations	162
6.4.4 Waste Storage	163
6.4.5 Conclusion	164
6.5 Primary Solid Waste Collections and Transportation	164
6.5.1 Introduction	164
6.5.2 Location of Primary Collection	165
6.5.3 Methods, Frequency and Agents of Primary Collection	165
6.5.4 Problems of Primary Collection	170
6.5.5 Conclusion	170
6.6 Secondary Solid Waste Collections and Transportation	170
6.6.1 Introduction	170
6.6.2 Organisation	171
6.6.2.1 Solid Waste Management Equipment Pool	171
6.6.2.2 BUC Waste Management Team	174
6.6.2.3 Organisation of Collection and Transportation Routes	177

6.6.2.4 Special Activities: Periodic Clean-up Campaigns and itinerant Collections	179
6.6.2.5 Areas of Secondary Collection	180
6.6.3 Partners	183
6.6.4 Problems Associated with Secondary Waste Management	183
6.6.5 Conclusion	185
6.7 General Conclusion	186
CHAPTER 7 Municipal Solid Waste Management in Bamenda: Treatment, Disposals and the Environment	187
7.1 Introduction	187
7.2 Solid Waste Treatment in Bamenda	188
7.2.1 Introduction	188
7.2.2 Segregation of Solid Waste	189
7.2.3 Reuse	190
7.2.4 Municipal Solid Waste Reprocessing	192
7.2.4.1 Repairs	192
7.2.4.2 Transformation	193
7.2.4.3 Composting of MSW Fraction	195
7.2.4.3 (i) Introduction	195
7.2.4.3 (ii) Concepts and Debates	195
7.2.4.3 (iii) Types and Uses	197
7.2.4.3 (iv) Conclusion	197
7.2.5 Conclusion	198
7.3 Solid Waste Disposal Practices in Bamenda	198
7.3.1 Introduction	198
7.3.2 Illegal Disposal practices	199
7.3.3 Concept of Official Landfilling Facility	200
7.3.4 The Bamenda Official solid Waste Disposal Facility	202
7.3.5 Conclusion	206
7.4 Environmental Problems Associated with MSWM in Bamenda	207

7.4.1 Introduction	207
7.4.2 Environmental Problems Associated with Primary Solid Waste Management	208
7.4.2.1 Introduction	208
7.4.2.2 Vectors	209
7.4.2.3 Waste Burning	209
7.4.2.4 Illegal Dumping, Contamination and Floods	211
7.4.3 Transportation and Environment	215
7.4.4 BUC Official Waste Dump and Environmental Problem	215
7.4.4.1 Introduction	215
7.4.4.2 Landfill Odour	216
7.4.4.3 Landfill Gases	217
7.4.4.4 Landfill Fires	220
7.4.4.5 Landfill Leachate	221
7.4.4.6 Landfill Dust	223
7.4.5 Conclusion to the Environmental Impacts	223
7.5 Financial Costs Estimates for MSWM in Bamenda	223
7.6 General Conclusion	224

CHAPTER 8 Municipal Solid Waste Management in Yaoundé City: Generation, Storage, Collection and Transportation **226**

8.1 Introduction	226
8.2 The Organisation of Yaoundé City	227
8.2.1 The City, its Sub-divisions and Quarters	227
8.2.2 Classification of the Quarters	228
8.2.3 Population, the Economy and Spatial Growth of Yaoundé	231
8.2.4 Brief History MSWM in Yaoundé	234
8.3 Organisation of MSWM in Yaoundé	235
8.3.1 Introduction	235
8.3.2 The Organisation of MSWM Delivery in Yaoundé	237
8.4 Generation and Storage	238

8.4.1 Generation	238
8.4.2 Methods of Waste Collection and Storage	240
8.4.3 Primary Waste Transfer	241
8.4.4 Problems Associated with Primary Collection	247
8.4.5 Conclusion	247
8.5 Secondary	247
8.5.1 Introduction	247
8.5.2 Complementary and Supportive Partners	248
8.5.2.1 An Example of 'GIC': Tam Tam Mobile	251
8.5.3 External Support Agencies (ESAs)	252
8.5.4 Secondary Waste Management Company-HYSACAM	253
8.5.4.1 Introduction	253
8.5.4.2 Organisation and Management	253
8.5.4.3 HYSACAM's Waste Collection and Transportation Vans	258
8.5.4.4. HYSACAM's Waste Management Team and Operations	262
8.5.4.5 Zones of Secondary Waste Collection	262
8.5.5 Problems Associated with Secondary Collection	264
8.6 General Conclusion	264
CHAPTER 9 Municipal Solid Waste Treatment, Disposal and the Environment in Yaoundé	265
9.1 Introduction	265
9.2 MSW Treatment in Yaoundé	266
9.2.1 Introduction	266
9.2.1.1 Separation	266
9.2.1.2 Informal Waste Recovery and Recycling	267
9.2.1.3 Formal Recycling and Transformation	269
9.2.1.4 Conclusion	273
9.3 MSW Disposal	274
9.3.1 Introduction	274
9.3.2 Illegal Disposal Methods	274

9.3.3 The Official Landfill for Yaoundé	275
9.3.4 Conclusion	281
9.4 Environmental and Health Problems Associated with MSWM in Yaoundé	282
9.4.1 Introduction	282
9.4.2 Environmental and Health Problems at Generation Points and the Public Skips	282
9.4.3 Environmental and Health Problems at Illegal Dumps	284
9.4.3.1 Introduction	284
9.4.3.2 Flooding	286
9.4.3.3 Illnesses	267
9.4.4 MSW Transportation, the Environment and Human Health	288
9.4.5 Recovery, Recycling and Environmental and Health Concerns	290
9.4.5.1 Introduction	290
9.4.5.2 The Yaoundé Experience	291
9.4.6 Environmental and Health Problems at the Yaoundé Landfill	292
9.4.6.1 Introduction	292
9.4.6.2 The Law, Environment and Landfills in Cameroon	292
9.4.6.3 Field Experiences	294
9.4.6.4 Landfill Recycling	298
9.4.7 Conclusion	298
9.5 General Conclusion	299
CHAPTER 10 Comparisons and Discussions	301
10.1 Introduction	301
10.1.1 General Factors that Drive MSWM in Bamenda and Yaoundé	302
10.2 Waste Generation and Characteristics	302
10.2.1 Generation	302
10.2.2 Characteristics	303
10.3 Waste Management Strategies and Practices	304
10.3.1 Primary Level Management	304
10.3.2 Recovery and Recycling	306
10.3.3 Municipal Solid Waste Management at the Secondary Level	307

10.3.3.1 Collection and Transportation	307
10.3.3.2 Disposal of Municipal Solid Waste	309
10.4 Institutional Issues	310
10.4.1 Organisation and Service-Delivery Mode	310
10.4.2 Financing Municipal Solid Waste	311
10.4.3 Participation	313
10.4.4 Socio-Cultural Dimension of Waste Management Sustainability	314
10.4.5 Waste Management Policy and Application	316
10.5 Environmental Concerns	318
10.6 Conclusion	318
CHAPTER 11 Recommendations and Conclusions	321
11.1 Introduction	321
11.2 Major Objectives Achieved	322
11.3 Implications for MSWM Policy and Strategy	328
11.4 Recommendations for Further Research	331
11.5 Conclusion	332
LIST OF APPENDIXES	334
Appendix 1: General Classification of Municipal Solid Waste (Refuse Materials)	334
Appendix 2: Household Survey Questionnaires for Bamenda and Yaoundé	335
Appendix 3: An Example of Institution Questionnaire, Bamenda 2003	341
Appendix 4: Public Health Ordinances, West Cameroon, 1958	342
Appendix 5: Functions of the Municipal Hygiene Service Decision, 1987	343
Appendix 6: Clean-Up Campaign Appeal Letter to the DO Bamenda	345
Appendix 7: An Example of a Clean-up Campaign Decision for Bamenda...	346
Appendix 8: Municipal Solid Waste Strategic Planning Guide	348
Appendix 9: Examples of Adapted and Low-cost Vehicles for Solid Waste Transportation	350
BIBLIOGRAPHY	351

LISTS OF ILLUSTRATIONS

LIST OF TABLES

Table 1.1: Global Dimension of Solid Waste Problem	2
Table 4.1: Survey Activities in Yaoundé and Bamenda	93
Table 5.1: Cross Tabulation Results on who Decided the Location of Public Skip	131
Table 5.2: Fiscal Revenue and the Part Contributed from Garbage Collection Tax From 1987 to 1991 (in Million FCFA). (Yaoundé City)	132
Table 5.3: Garbage and other Direct Council Taxes in BUC Revenue 1999/2000 and 2001/2002	133
Table 5.4: City. Proposed Monthly Waste Service Payment Cross-Tabulation	134
Table 5.5: Quarter Proposed Monthly Waste Service Payment Cross Tabulation Counts	134
Table 5.6: State, City and Urban Sub-Divisional Council Contributions Towards Household Waste Collection in Yaoundé, 1998-02 Budgetary Year	135
Table 6.1: Annual Average Rates of Population Growth (AARPG) in (%) For Bamenda 1934-2002	140
Table 6.2: Solid Waste Generation in Sampled Household in Bamenda	155
Table 6.3: Frequency of Occurrence, Biodegradable Solid Waste Types in Sampled Households in Bamenda	158
Table 6.4: Distribution of Household Waste Containers by Quarter & Types, Bamenda	163
Table 6.5: Remover of Household Waste by Quarters in Bamenda	165
Table 6.6: Estimates of Distances from House to Waste Depot in Bamenda	167
Table 6.7: Disposal Sites for Household Waste	168
Table 6.8: Bamenda Central Zone Circuit	177
Table 6.9: Nkwen Zone Circuit	178
Table 6.10: Capacity of Bin at the Time of Deposit Cross Tabulation	184
Table 7.1: Cross Tabulation on 'Whether Like to Separate Waste' Bamenda & Quarters	189
Table 7.2: Summaries from Reuse Cross Tabulations, Bamenda	191
Table 7.3: Landfill Classifications	202

Table 7.4: Environmental Concerns Around Public Waste Skips	209
Table 7.5: Some Chemical and Physical Parameters along Two Stream Points in Bamenda City	212
Table 7.6: Waste Related Health Concerns in Bamenda	213
Table 7.7: Health Effects of Landfill Gases-the VOCs	218
Table 7.8: Potential Health Effects Attributed to Chemicals	222
Table 7.9: Financial Cost Estimates of MSWM by BUC	224
Table 8.1: Population Growth in Yaoundé 1960-2002	231
Table 8.2: Sample Quarters and Access Roads, Streets and Paths Conditions in Yaoundé	233
Table 8.3: Household Waste Collection Containers in Yaoundé	240
Table 8.4: Methods of Household Waste Transportation in Yaoundé	242
Table 8.5: Persons Responsible for Removing Household Waste Cross Tabulation, Yaoundé	243
Table 8.6: Distances Travelled in Yaoundé to Dispose of Waste & Calculation of the Mean Distance	243
Table 8.7: Primary Disposal Sites for Household Waste in Yaoundé	245
Table 8.8: List of Different Organisations Involved in Solid Waste Management in Yaoundé	249
Table 8.9: Distribution of Public Skips and Waste Collection Circuits in Yaoundé by Urban Subdivisions	256
Table 8.10: Summary of Estimated Cost of MSWM by HYSACAM in Yaoundé	263
Table 9.1: Cross Tabulation on Willingness to Separate Waste in Sampled Quarters of Yaoundé	266
Table 9.2: Household Waste Disposal Destinations	274
Table 9.3: Environmental and Health Concerns Around Public Waste Skips in Yaoundé	283
Table 9.4: Prevalent Illnesses Reported by Respondents, Yaoundé	287
Table 10 1: Some General Factors that Drive MSWM in Bamenda and Yaoundé	302

Table 10.2: City Regularity of Emptying Household Waste Container Cross tabulation Count & Percentages	305
Table 10.3: City Recycling/Reuse/Recovery Cross Tabulation ‘Yes’ Counts & Percentages	306
Table 10.4: Waste Collection and Transportation	308
Table 10.5: City Proposed Monthly Waste Service Payment Cross tabulation- Count & Percentages	312
Table 10.6: Average Monthly-Proposed Amounts For Waste Service Payment in Yaoundé and Bamenda	312
Table 10.7: Waste Workers Attitude Towards Waste Generators in Yaoundé & Bamenda	315

LIST OF FIGURES

Figure 1.1: World and Urban Population Growth (Millions), 1950-2020	4
Figure 1.2: Relationship between Urban Growth and Development	6
Figure 1.3: Map of Cameroon, Bamenda and Yaoundé in its Urban System	16
Figure 1.4: The Situation of Yaoundé and Bamenda	19
Figure 2.1: Structure of the Framework of an Integrated MSWM	27
Figure 2.2: Dimensions of Integrated Sustainable Waste Management	31
Figure 2.3: Framework for Analysing the Concept of Integrated MSWM	34
Figure 2.4: The Waste Management Hierarchy	34
Figure 3.1: Municipal Solid Waste Management in OECD Member Countries 1995 & 2000	45
Figure 3.2: Waste Management in Europe 1993-99	46
Figure 4.1: General Plan for Multi-staged Cluster Sampling in Yaoundé and Bamenda	84
Figure 4.2: Rank Correlation between MSW Categories by Survey and Experiment Results in Bamenda	93
Figure 5.1: Conceptual Hierarchy of Public Participation in Governance	111
Figure 5.2: Institutional Organisation of Waste Management in Cameroon	123
Figure 5.3: Responsibilities of the City and Sub-divisional Councils (1987 Law)	129
Figure 6.1: General Map of Bamenda City	138
Figure 6.2: Urban Population Growth in Bamenda-1934-2002	140
Figure 6.3: Schematic MSW Flow Diagram	143
Figure 6.4: MSW Unit in the Administrative Flow Chart of BUC	145
Figure 6.5: Biodegradable and Non-biodegradable MSW Generation in Bamenda	157
Figure 6.6: Categories of Non-biodegradable MSW in Bamenda (percentages)	159
Figure 6.7: Households Solid Waste Generation Categories in Bamenda	160
Figure 6.8: Categorisation of Non-Biodegradable MSW into Quarters	162
Figure 6.9: Frequency of Waste Removal from Households in Bamenda	166
Figure 6.10: Distances from Households to Waste Disposal Sites in Bamenda	167
Figure 6.11: Location of Public Skips in Bamenda.	175

Figure 6.12: Organisation of Waste Collection Circuits in Bamenda	176
Figure 6.13: Map Showing Areas of Secondary Waste Management Collection in Bamenda-Circular Catchment Perspective	181
Figure 6.14: Map Showing Areas of Secondary Waste Management Collection in Bamenda-Linear Perspective	182
Figure 6.15: Situation of Waste Skip Capacity in Bamenda	185
Figure 7.1: Old Official Waste Dumps in Bamenda	205
Figure 8.1: Map of the Yaoundé City, Sub-divisions and Quarters	230
Figure 8.2: Graph Showing the Evolution of Yaoundé City population 1960-2002	232
Figure 8.3: The Organisational Structure of MSWM in Yaoundé	237
Figure 8.4: Categorization of MSW in Yaoundé by Residential Status, Markets & Percentage	239
Figure 8.5: Household and Waste Disposal Distances in Quarters of Yaoundé	244
Figure 8.6: Distribution of Public Skips by Type & Sub division, Yaoundé	256
Figure 8.7: Comparison of Public Skips and Waste Collection circuits with Contract Specifications and Field Experience	257
Figure 8.8: Public Waste Skips Capacity in Yaoundé	257
Figure 9.1: General Recovery Flow Diagram for Yaoundé	267
Figure 9.2: Household Non-biodegradable Solid Waste Recycling in Yaoundé	268
Figure 9.3: Map Showing the Location of Nkolfoulou Landfill and the Sampling Quarters in Yaoundé	277
Figure 9.4: The Site Plan of Nkolfoulou Landfill, for Yaoundé City	278

LIST OF PLATES

Plate 4.1: Field Laboratory Scene of Household MSW Sample Analysis	100
Plate 6.1: Variety of Biodegradable Household Waste in Bamenda	159
Plate 6.2: Illegal Dumps at a Valley (A) and Streamside (B) in Bamenda	169
Plate 6.3: BUC Rear-Loader Waste Compactor Truck	172
Plate 6.4: Waste Rear-Loader Compactor at Work	172
Plate 6.5: Front-End Loader (Left) and Tipper Truck (Right) at Work in Bamenda	173
Plate 6.6: Public Waste Skips in Bamenda	174
Plate 6.7: Overfull and Over Spilling Skips	184
Plate 7.1: Household Goods Repair Workplace in Bamenda	193
Plate 7.2: A Display of Goods from Recycled Metal Waste “For Sale”	194
Plate 7.3: Recycled Vehicle Tyre Products in Bamenda	194
Plate 7.4: The BUC “Landfill”	204
Plate 7.5: Burning of MSW in Bamenda at an Illegal Dump	211
Plate 7.6: Environmental Problems Associated with Waste and Drainage	214-15
Plate 7.7: Environmental Problems at Bamenda Landfill	221
Plate 8.1: Waste Collection Containers at Households & Public Institutions	241
Plate 8.2: Open-Space Illegal Dumps at Efulan Quarter, Yaoundé	246
Plate 8.3: Tam Tam Mobile (CIG) at Work in Melen Quarter, Yaoundé	251
Plate 8.4: Types of Public Skips in Yaoundé	254
Plate 8.5: Rear Loader Compactor Truck	259
Plate 8.6: Lift Tipper Truck Swapping 6m ³ Skips	260
Plate 8.7: 16m ³ Tipper Fitted with Crane and Waste Grabbing Device	261
Plate 8.8: 20m ³ Tipper Fitted with Crane and Waste Grabbing Equipment	261
Plate 9.1: Tipping Of Waste at Nkolfoulou Landfill, Yaoundé	280
Plate 9.2: Nkolfoulou Landfill: Caterpillar and Two Scavengers at Work	280
Plate 9.3: Environmental Problems Around the Public Skips	283-84
Plate 9.4: Illegal Solid Waste Dumps in Efulan, Yaoundé	285
Plate 9.5: Decaying Public Skips	289

ABSTRACT

In Cameroon, and most other developing countries, the problem of inefficient municipal solid waste management (MSWM) is endemic. This is easily identified by persistent heaps of uncollected waste found on street sides or ubiquitous illegal dumps. This thesis examines the sustainability of MSWM in Cameroon using two contrasting city cases of Yaoundé (1.5m people) and Bamenda (300 000 people). As major contributions the thesis generates the much-needed basic original data, critically examines and compares the sustainability of MSWM in both cities' systems, evaluates the environmental impacts and uses these findings to suggest valuable research, policy and strategic-planning recommendations needed to make both systems, and others in similar situations, sustainable.

To achieve these goals multiple triangulated methods were used. In Bamenda, where reliable basic data are non-existent, solid waste from sampled households was collected and analysed for generation rates, quantities and characteristics. In both cities questionnaire were administered to sampled household units selected from four stratified quarters. The survey questions addressed waste management issues and sustainability indicators that were needed to study, compare and evaluate the systems within the wider concept of the waste management hierarchy. The statistical programme for social sciences (SPSS) computer software was used to analyse the survey results. Field observations, interviews and a review of secondary sources complemented the data.

New findings show that Bamenda city generates 120-160 tonnes of municipal solid waste daily (0.40-0.54 kg per capita), 76% of which is biodegradable and 24% non-biodegradable. About 90% of all solid waste comes from households. Bamenda Urban Council (BUC) regularly covers only 1/20th of the city area and collects and transports 20-30 tonnes of waste from its skips, accounting for only 17-25% of the total daily waste generation. The waste is disposed of at an uncontrolled dump on the Mezam River flood plain. The citizens illegally dump the rest. Skips are crucial to the system but their total capacity and access are grossly inadequate (37m³ over 28 sites), with a further 465m³ needed. Citizens move an average of 105 m to waste disposal sites.

This suggests a sustainable inter-skip distance of 210 m for Bamenda city, far from the present 700 m.

Yaoundé's daily per capita MSW generation rate is estimated at 0.79 kgs or 1200 tonnes for the entire city, three-quarters of which is biodegradable. Only one-third of the city area is regularly served with about 40-50% (~540 tonnes) of the waste collected and disposed of at the sanitary landfill on the Nfoulou River valley. Total available skip capacity is 1440m³ with 3048m³ lacking. The primary waste disposal average distance is 87 m.

Yaoundé and Bamenda cities are unique in physical conditions and status but neither is able to deal adequately with the increasing waste generation rates, quantities and varieties that are driven by rapid urban population growth, spatial expansion and improved affluence and consumption among selected groups. Yaoundé's management has an edge over Bamenda's in terms of performance rates but leaves behind five times more uncollected and illegally dumped waste than Bamenda. Though Yaoundé's system is private and Bamenda's is public, both systems apply the same conventional approach that concentrates on imported technologies while neglecting waste prevention, recycling, safe disposal, involvement and integration of citizens and other stakeholders. This limited and monopolistic approach makes the system unworkable and equally creates huge environmental and health-related problems present at all the stages of the waste management cycle. Government devolves the waste function to urban councils but centralises funds and power. Its waste policies are limited, fragmented and confusing. The garbage tax law yields only 5% in Bamenda and 7% in Yaoundé, making both cities rely heavily on extra financial support from Cameroon and abroad. In all, neither city in the study demonstrates sustainability in any aspects of its MSWM system.

The existing systems are not sustainable. A new system based on an integrated sustainable model operated within the context of good urban governance is proposed. This model accommodates the uniqueness of cities and is recommended for other cities in the country, Africa and the developing world.

DECLARATION

This work contains no material that has been accepted for the award of any other degree or diploma in any other university or tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference is made.

I give consent to this copy of my thesis being available for photocopying and loan.

Signed _____ Date _____

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**SHORTENED FORMS:
ABBREVIATIONS, CONTRACTIONS, ACRONYMS, INITIALISMS AND
SYMBOLS**

ADF	Advanced Deposit Refund
3Rs	Reduce, Reuse, Recycle
ADS	Advanced Deposit System
BUC	Bamenda Urban Council
CBO	Community-based Organisation
CFA	Central African Franc
CIG/GIC	Common Initiative Group/Groupe d'Initiative Commune
CIPRE	Centre International de Promotion de la Recuperation /International Centre for the Promotion of Waste Recovery,
CPDM	Cameroon Democratic Movement Party
CUY	Communauté Urbaine de Yaoundé/YCC: Yaoundé City Council
CWG	Collaborative Working Group
DO	Divisional Officer
DRS	Deposit Refund System
DSCN	Direction de la Statistique et de la Comptabilité Nationale/National Statistics and Accounts Department
DSS	Decision Support System
DSW	Domiciliary Solid Waste
EEA	European Environment Agency
ENCAPAFRICA	Environmental Assessment Capacity Building Programme for Africa
ENDA	Netherlands Directorate for Development Assistance
ENS	Ecole Normale Supérieure/Advanced School of Education
ENSP	Ecole National Supérieure Polytechnique/National Advanced School of Engineering
EPA	Environmental Protection Agency
EPR	Extended Producers Responsibility
ERA	Environnement Action Recherche au Cameroun
ESA	External Support Agency
EU	European Union

FOCARFE	Fondation Camerounaise pour une Action Rationalisée des Femmes sur l'Environnement
FOURMI	Fonds aux Organisations Urbaines et aux Micro Initiatives/Urban Organisations and Micro Initiatives Funds
FSD	Fonds Sociale de developpement / Social Development Funds,
GOC	Government of Cameroon
GOSA	Government of South Australia
GRET	Groupe de Recherche et d'Echange Technologique/ Research and Technological Exchange Group.
HABITAT	United Nations Centre for Human Settlement
HDI	Human Development Index
HYSACAM	Hygiène et Salubrité du Cameroun/Cameroon Hygiene and Sanitation Company.
IBRD	The International Bank for Reconstruction and Development
IMSWM	Integrated Municipal Solid Waste Management
ISMSWM	Integrated Sustainable Municipal Solid Waste Management
LEMP	Landfill Environmental Management Plan
LULU	Locally Unaccepted Land Use
LWMA	Lagos Waste Management Authority
MAETUR	Mission d'Aménagement et d'Equipement des Terrains Urbains et Ruraux/ Urban and Rural lands Development Authority
MSW	Municipal Solid Waste,
MSWM	Municipal Solid Waste Management
MTC	Marginal Trash Collection Charge
NGO	Non-Governmental Organisation
NIMBY	Not In My Backyard
NIMTO	Not In My Term Of Office
OECD:	Organisation of Economic Co-operation and Development
PDM	Programme de Developpement Municipal/City Development Programme
PR0	Producers' Responsibility Organisation
QA	Association de Quartier/Quarter Association
RDF	Refuse Derived Fuel
RECEUP	Programme d'Economie Environnementale Urbaine et Populaire
RSW	Residential Solid Waste

SAP	Structural Adjustment Programmes
SDF	Social Democratic Front
SIC	Société Immobilière du Cameroun/Cameroon Real Estate Corporation
SKAT	Swiss Centre for Development Cooperation in Technology and Management
SME	Small and Medium-size Enterprise
UBS	Unit-Based-pricing System
UMP	Urban Management Programmes
UNCHS	United Nations Centre for Human Settlements (HABITAT)
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
USW	Urban Solid Waste
UWEP	Urban Waste Expertise Program
WASTE	A waste management consultancy group funded of the Netherlands Development Assistance for the Dutch Ministry of Foreign Affaires.
WCED	World Commission on Environment and Development
WHO	World Health Organisation
WRI	World Resources Institute
YA	Youths' Association