

**THE INTERACTION BETWEEN LAND USE TRANSFORMATION AND
CRIME INCIDENCE IN DANDORA, NAIROBI, KENYA**

ROMANUS OTIENO OPIYO

A thesis submitted in fulfilment for the Award of the Degree of Doctor of Philosophy
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Declaration

I declare that this thesis is my original research work and it has not been submitted previously in part or whole to any university for award of any degree.

Romanus Otieno Opiyo

(Candidate)

Date:

This thesis has been submitted for examinations with our approval as Supervisors

Prof. Peter M. Ngau

Department of Urban and Regional Planning (DURP)

(Supervisor)

Date:

Prof. Winnie V. Mitullah

Institute for Development Studies (IDS)

(Supervisor)

Date:

Dedication

I would like to dedicate this work to my parents Aloys and Mary Opiyo for the unwavering support and care they have offered to me throughout my life. I owe my perseverance and humble pursuit of success in life to you.

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Abstract

The link between the social and physical environment and violent crime occurrence and response is a complex one, which is not well explored. This study examines the interaction between land use transformation and violent crime incidence in Dandora, Nairobi, which is one of the most crime ridden neighbourhoods in the City. This is done in order to explain how land use related transformation underlies the complex spatial-social interaction of a place in relation to crime incidence. Currently, there are conflicting theoretical standpoints which relate certain land uses and densities to creation or inhibition of natural surveillance and dilution of social capital which determine crime response. Multi-contextual theory which combines routine activity and social disorganization theories is applied in this study since it enhances understanding of crime in relation to the interaction of people. It links the changing characteristics of a place informed by the type of land use and associated dynamics guiding various activities in the area with people's behaviour either individually or collectively.

This study was guided by a quasi-experimental research design informed by the types of land use and subsequent changes in land use in relation to crime incidence in the area, and impact of land use on crime incidence and coping mechanisms. The study utilized secondary data and 144 systematic random sampled household interviews, 121 stratified sampled business person interviews, 10 Key informant interviews and 3 in-depth interviews with residents and one focus group discussion with the Community Policing Committee members purposively sampled. Multi-criteria analysis approach was adopted in data analysis and discussion of the findings.

The study findings indicate that infiltration of the Dandora neighbourhood project by speculative developers in the mid 1980s and the unregulated construction sector is the genesis of land use transformation. Other determinant factors and drivers since then are weak institutional capacity to manage and control development, housing demand and insecurity. Dandora Phase 4 is found to be the most transformed and Phase 1 the least transformed. The unregulated land use transformation serves to weaken the wider community cohesion and heighten socio-cultural and spatial segregation of residents. The study findings give credence to routine activity and social disorganization theories which are used to operationalize multi-contextual theory. This is based on the fact that transformation in Dandora is facilitating anonymity of

space use and weakening social capital. The transformation of the neighbourhood development does not support eye on the street and defensible space principle.

The study findings also indicate that transformation has negative implications on crime response mechanisms. The working and popular mechanisms of crime prevention were individually driven as opposed to communal. This may be attributed to perceptions and stereotypes of different ethnic groups, which leads to exclusion of others in community driven initiatives including community policing. The study concludes that land use transformation leads to variation in crime by 6.023 times. The study recommends mainstreaming of urban safety in planning, design and implementation of neighbourhood development. This may require that the City Planning Department expands its range of indicators and factors considered when approving plans to include safety measures. Land use planning and crime response mechanisms should take into account the unique features of crime distribution along land use by regularly profiling various land uses together with their designs and orientations and monitoring their functions in relation to crime incidence in neighbourhoods and in general urban spaces.

Keywords: *Transformation, crime incidence, land use, planning, social capital, and surveillance*

Table of Content

| | |
|--|-----------|
| Declaration | i |
| Dedication | ii |
| Acknowledgement..... | iii |
| Abstract..... | v |
| Table of Content..... | vii |
| LIST OF FIGURES | xi |
| LIST OF TABLES | xii |
| LIST OF PLATES..... | xii |
| LIST OF MAPS | xiii |
| LIST OF BOXES | xiv |
| LIST OF ACRONYMS AND ABBREVIATIONS | xv |
| CHAPTER ONE: INTRODUCTION..... | 1 |
| 1.1 Background to the study | 1 |
| 1.2 Statement of the Research Problem..... | 7 |
| 1.3 Overall Objectives | 9 |
| 1.3.1 Specific Objectives | 9 |
| 1.4 Research Questions..... | 9 |
| 1.5 Research Hypothesis..... | 9 |
| 1.5.1 Study Hypotheses, Variables and Respective Indicators: | 10 |
| 1.6 Significance and Justification of the Study..... | 10 |
| 1.6.1 Significance of the Study | 10 |
| 1.6.2 Justification of the Study..... | 12 |
| 1.7 Operationalization of Key Terms | 14 |
| 1.8 Organization of the Study | 21 |
| CHAPTER TWO: LITERATURE REVIEW | 25 |
| 2.0 Introduction | 25 |
| 2.1 Urban Crime..... | 25 |
| 2.2 Causes of Crime Incidences | 28 |
| 2.2.1 Economic Causes of Violence..... | 30 |
| 2.2.2 Political Causes of Violence..... | 31 |
| 2.2.3 Social Causes of Violence..... | 32 |
| 2.2.4 Institutional Causes of Violence..... | 33 |
| 2.2.5 Physical Causes of Violence | 34 |
| 2.3 Land Use Transformation..... | 34 |
| 2.3.1 Drivers of Land Use Transformation..... | 35 |
| 2.3.2 Land Use Transformation in Nairobi..... | 37 |
| 2.3.3 Drivers of Land Use Transformation in Nairobi | 42 |
| 2.4 Urban Planning Policy and Crime | 44 |

| | |
|--|-----------|
| 2.5 Legal and Policy Framework Guiding Land Use Planning and Development in Kenya..... | 48 |
| 2.5.1 Legal Framework Impacts on Land Use Transformation and Planning..... | 54 |
| 2.6 Crime Incidences and Impacts in Kenya..... | 56 |
| 2.6.1 Crime Incidences in Nairobi..... | 60 |
| 2.7 Crime Response Approaches and Initiatives..... | 65 |
| 2.7.1 Crime Response and Prevention in Kenya and Nairobi..... | 70 |
| 2.8 Reforms in Security Sector and Crime Intervention in Kenya..... | 74 |
| 2.9 Theoretical Framework..... | 76 |
| 2.9.1 Compositional Theories..... | 77 |
| 2.9.2 Routine Activity Theory..... | 78 |
| 2.9.3 Defensible Space and Crime Prevention Through Environmental Design (CPTED)..... | 79 |
| 2.9.4 Situational Crime Prevention and Social Disorganization Theory..... | 80 |
| 2.9.5 Space Syntax and Sociological Theories..... | 81 |
| 2.10 Conceptual Framework..... | 84 |
| CHAPTER THREE: METHODOLOGY..... | 89 |
| 3.0 Introduction..... | 89 |
| 3.1 Research Design..... | 89 |
| 3.1.1 Modified Quasi-Experimental Research Design..... | 92 |
| 3.2 Population and Sampling Design..... | 92 |
| 3.2.1. Population..... | 92 |
| 3.2.2. Sampling Design and Sample Size..... | 93 |
| 3.2.3 Sampling Procedure and Size..... | 93 |
| 3.2.4 Units of Observation and Analysis..... | 96 |
| 3.3 Data Collection Methods..... | 97 |
| 3.3.1 Structured Questionnaire..... | 98 |
| 3.3.2 In-depth Personal interviews..... | 99 |
| 3.3.3 Focus Group Discussion (FGD)..... | 100 |
| 3.3.4 Direct Observation..... | 100 |
| 3.3.5 Land Use Mapping..... | 100 |
| 3.3.6 Participatory Mapping and Transect walks..... | 101 |
| 3.3.7 Library research and documentation..... | 101 |
| 3.3.8 Photographs and Sketches..... | 101 |
| 3.4 Data Analysis..... | 103 |

| | |
|--|------------|
| 3.4.1 Spatial Data Analysis and presentation..... | 104 |
| 3.4.2 Content Analysis..... | 105 |
| 3.4.3 Historical Analysis..... | 105 |
| 3.4.4 Hypothesis Testing | 105 |
| CHAPTER FOUR: BACKGROUND ON DANDORA | 108 |
| 4.1 Historical Development of Dandora..... | 108 |
| 4.2 Objectives of the Project | 111 |
| 4.3 Institutional and Legal Framework..... | 112 |
| 4.3.1 Legal Framework | 114 |
| 4.4 Planning and Housing | 115 |
| 4.4.1 Housing Typology | 121 |
| 4.5 Target Group and Affordability..... | 122 |
| 4.6 Population and Demographic Characteristics..... | 124 |
| 4.6.1 Population Growth Trends | 124 |
| 4.6.2 Population Composition..... | 125 |
| 4.7 Public and Community Facilities and Services in Dandora..... | 127 |
| 4.7.1 Transportation..... | 127 |
| 4.7.2 Dandora Dumping Site..... | 129 |
| 4.7.3 Electricity Power Lines | 130 |
| 4.7.4 Educational Facilities | 130 |
| 4.7.5 Health Facilities..... | 131 |
| 4.7.6 Religious Facilities | 132 |
| 4.7.7 Social and Community Halls..... | 132 |
| 4.7.8 Police Station..... | 133 |
| 4.8 Land Use Transformations | 133 |
| 4.8.1 Land Use Transformation Determining Factors..... | 136 |
| 4.8.2 Summary on Land use Transformation..... | 137 |
| CHAPTER FIVE: RESIDENTIAL CHARACTER AND CONTEXT OF LAND USE TRANSFORMATION IN DANDORA | 139 |
| 5.1: Respondents Background..... | 139 |
| 5.1.1 Distribution of Household Respondents | 139 |
| 5.1.2 Entrepreneurs Characteristics | 147 |
| 5.2 LAND USE AND TRANSFORMATION..... | 154 |
| 5.3 Emerging Pattern of Land Use Types..... | 155 |
| 5.4 Nature of Land Use Transformation..... | 159 |

| | |
|--|------------|
| 5.5 Analysis of Land Use Transformation..... | 161 |
| 5.5.1 Phase One..... | 161 |
| 5.5.2 Dandora Phase Two (2)..... | 169 |
| 5.5.3 Dandora Phase Three (3)..... | 174 |
| 5.5.4 Dandora Phase Four (4)..... | 181 |
| 5.5.5 Dandora Phase Five (5)..... | 189 |
| 5.5.6 Dynamics of Land Use Transformation..... | 194 |
| 5.6 Zones of Land Use Transformation in Dandora..... | 196 |
| 5.7 Land Use Transformation Appropriateness..... | 199 |
| 5.8 Impact of Land Use Transformation..... | 202 |
| CHAPTER SIX: CRIME INCIDENCES AND RESPONSE MECHANISMS IN DANDORA | 206 |
| 6.1 Causes of Crime in Dandora..... | 207 |
| 6.2 Crime Statistics and Trends..... | 209 |
| 6.3 Crime Patterns and Trends in Dandora..... | 214 |
| 6.3.1 Frequency of Crime Victimization..... | 221 |
| 6.3.2 Crime Response and Coping Mechanisms..... | 226 |
| CHAPTER SEVEN: INTERACTION BETWEEN LAND USE TRANSFORMATION AND CRIME IN DANDORA | 234 |
| 7.1.1 Land Use and Crime Mapping in Dandora Phase One..... | 234 |
| 7.1.2 Land Use and Crime Mapping in Dandora Phase Two..... | 237 |
| 7.1.3 Land Use and Crime Mapping in Dandora Phase Three..... | 239 |
| 7.1.4 Land Use and Crime Mapping in Dandora Phase Four and Five..... | 241 |
| 7.2: Land Use- Crime Dynamics..... | 244 |
| 7.2.1 Land Use Transformation and Crime Reduction..... | 250 |
| 7.3 Development Control and Crime Mitigation in Dandora..... | 252 |
| 7.4 Land Use Transformation Impact on Crime..... | 256 |
| 7.4.1 Land Use-Crime Reduction Proposal..... | 258 |
| 7.5 Study's Hypothesis..... | 260 |
| 7.6 Socio-Spatial Analysis and Implications..... | 261 |
| CHAPTER EIGHT: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS..... | 264 |
| 8.1 Findings Summary..... | 264 |
| 8.1.1 Land Use Transformation Drivers and Impacts..... | 264 |
| 8.1.2 Land Use Transformation, Crime Incidences and Response..... | 265 |
| 8.1.3 Land Use Transformation and Response to Crime..... | 266 |

| | |
|---|------------|
| 8.2 Conclusion..... | 267 |
| 8.3 Recommendations..... | 269 |
| 8.4 Area for Further Research..... | 271 |
| References | 272 |
| APPENDIX 1: DATA COLLECTION INSTRUMENTS | 291 |
| Kenya Police Interview Guide | 291 |
| Housing Development Department Interview Guide | 294 |
| City Inspectorate Department Interview Guide | 297 |
| Community Policing FGD Guide..... | 298 |
| Dandora Chief Interview Guide | 300 |
| City Environment Department Key Informant Questionnaire | 301 |
| Household Questionnaire..... | 302 |
| Enterprises Questionnaire | 307 |
| APPENDIX 2: HYPOTHESIS TESTING TABLES | 313 |
| APPENDIX 3: COMMUNITY MAPPING PHOTOGRAPHS..... | 314 |
| APPENDIX 4: CRIME STATISTICS | 315 |
| NAIROBI DIVISIONAL CRIME DATA FOR THE YEAR 2010..... | 315 |

LIST OF FIGURES

| | |
|---|-----|
| Figure 1: Multi-Contextual Conceptual Framework Linking Land Use and Crime Incidences | 86 |
| Figure 2: Non-equivalent Group Pretest-Posttest Quasi-Experimental Design..... | 92 |
| Figure 3: Data Categories | 102 |
| Figure 4: Methodology Flow Chart..... | 102 |
| Figure 5: Housing Plans in Dandora | 120 |
| Figure 6: Section of the Railway..... | 129 |
| Figure 7: Household Respondents Education Level | 142 |
| Figure 8: Respondents Home Province | 146 |
| Figure 9: Location of Enterprises | 148 |
| Figure 10: Educational Level of Entrepreneurs | 150 |
| Figure 11: Perception of Households on Dandora Land Transformation..... | 159 |
| Figure 12: Initially Planned Land Use Purpose | 200 |
| Figure 13: Violent Crime Prone Areas in Dandora..... | 216 |
| Figure 14: Relative Safe Places in Dandora | 220 |
| Figure 15: Dandora Crime Frequency | 222 |
| Figure 16: How Crime Prevention is Transforming Dandora..... | 231 |
| Figure 17: Reasons for Crime in Different Land Uses | 247 |
| Figure 18: Types of Crime Reducible by Land Use Alterations | 251 |
| Figure 19: Sources of Development Permission in Dandora..... | 253 |
| Figure 20: Development Carried out by Respondents..... | 255 |
| Figure 21: Impact of New Land Development on Crime | 255 |

| | |
|--|-----|
| Figure 22: Implications of Land Use Changes on Crime | 259 |
|--|-----|

LIST OF TABLES

| | |
|---|-----|
| Table 1: Nairobi Comparative Land Use Cover for the Years 1976, 1988 and 2000 . | 38 |
| Table 2: Comparative Provincial Crime Figures for the Years 2004-2010..... | 57 |
| Table 3: Specific Areas Viewed as Insecure in Nairobi..... | 63 |
| Table 4: Sample Category and Sizes | 94 |
| Table 5: Sampled Businesses Design | 96 |
| Table 6: Dandora Population Dynamics..... | 125 |
| Table 7: Household Age Distribution..... | 140 |
| Table 8: Reasons for Preferring Living in Dandora | 144 |
| Table 9: Length of Stay in Dandora | 145 |
| Table 10: Reasons for Locating Businesses in Dandora | 151 |
| Table 11: Duration of Operation | 152 |
| Table 12: Land Use Changes | 160 |
| Table 13: Periods of Land Use Changes in Dandora | 194 |
| Table 14: Comparative Analysis of Land Use Transformation in Dandora | 199 |
| Table 15: Positive Impacts of Land Use Transformation | 202 |
| Table 16: Negative Impacts of land Use Transformation..... | 204 |
| Table 17: Major Problems Encountered Associated with Land Use Changes | 207 |
| Table 18: Causes of Crime..... | 208 |
| Table 19: Crime Statistics in Buruburu Police Division for the Period 2002-2006.. | 210 |
| Table 20: Crime Statistics in Kinyago Police Post for the Period 2002-2007..... | 210 |
| Table 21: Frequent Types of Crime in the Area..... | 211 |
| Table 22: Crime Dynamics in Nairobi..... | 213 |
| Table 23: Nature of Crime Occurrence | 214 |
| Table 24: Crime Experienced by Household Members..... | 221 |
| Table 25: The Last Crime Experienced by Household Member..... | 223 |
| Table 26: Crime Type and Crime Location Cross Tabulation..... | 225 |
| Table 27: Crime Reduction Solutions | 228 |
| Table 28: Comparative Crime Prevention Strategies | 229 |
| Table 29: Adequateness of Households Crime Prevention | 231 |
| Table 30: Proposed Solutions to Reduce Insecurity in Dandora..... | 233 |
| Table 31: Perceptions on Land Use and Crime..... | 245 |
| Table 32: Households Perceptions of Land Use in Relation to Crime Type..... | 249 |
| Table 33: Land Use Impact on Crime Incidences | 256 |
| Table 34: Symmetric Measures of Number of Floors and Crime Victimization..... | 261 |
| Table 35: Hypothesis Testing..... | 313 |
| Table 36: Modal Summary | 313 |

LIST OF PLATES

| | |
|---|-----|
| Plate 1: Proliferation of Many Rooms Per Floor..... | 122 |
| Plate 2: Schools in Dandora..... | 131 |
| Plate 3: Streetscape of Development in Dandora..... | 156 |
| Plate 4: Conformity with the Original Development Layout..... | 166 |
| Plate 5: Dandora Phase one Streetscape | 166 |
| Plate 6: Changing Character of Phase One | 167 |

| | |
|---|-----|
| Plate 7: Highrise Development in Dandora Phase Two | 172 |
| Plate 8: Juxtaposition: Original Development and the New Development Across the Road..... | 172 |
| Plate 9: School at the Centre of Residential Estate in Phase Three | 178 |
| Plate 10: Bank and Postal Services in Residential Quarters | 178 |
| Plate 11: Buildings almost Enjoined | 179 |
| Plate 12: Highrise Developments in Phase Three | 179 |
| Plate 13: Horizontal Densification | 179 |
| Plate 14: Dandora Stadium | 180 |
| Plate 15: Crime Hotspot Area near Nairobi-Nanyuki Railway Line..... | 180 |
| Plate 16: Streetscape of Phase Four..... | 183 |
| Plate 17: Horizontal Extensions to Accommodate Informal Economic Activities ... | 183 |
| Plate 18: Informal Developments along the Power Way Leave | 184 |
| Plate 19: Utilization of Open Spaces..... | 184 |
| Plate 20: Multiple use of Community Facilities (Halls and Community Centre).... | 185 |
| Plate 21: City County Market | 185 |
| Plate 22: Residential Flats next to Ushirika Primary School..... | 189 |
| Plate 23: Low rise Development in Phase 5 | 192 |
| Plate 24: Administration Police Camp Surrounding Development Pattern..... | 192 |
| Plate 25: Juxtaposition of Land Uses | 201 |
| Plate 26: Crime Ridden Area of Phase Four near Dandora Dumpsite | 241 |

LIST OF MAPS

| | |
|--|-----|
| Map 1: Land Use Cover of Nairobi in 1976 | 39 |
| Map 2: Nairobi City Land Use Map in the year 2000 | 40 |
| Map 3: Nairobi Land Use in 2008..... | 41 |
| Map 4: Kenya Crime Index..... | 60 |
| Map 5: Location of Dandora in Nairobi | 110 |
| Map 6: Dandora Neighbourhood..... | 116 |
| Map 7: Spatial Layout of Phases of Dandora | 117 |
| Map 8: Pattern of Dandora's Contemporary Land Uses | 158 |
| Map 9: Dandora Phase one Original Layout..... | 163 |
| Map 10: Land Use Transformation of Dandora Phase one..... | 165 |
| Map 11: Dandora Phase One vertical Transformation | 168 |
| Map 12: Original Layout of Dandora Phase Two | 170 |
| Map 13: Land Use Transformation of Dandora Phase Two | 171 |
| Map 14: Dandora Phase Two Vertical Transformation..... | 173 |
| Map 15: Dandora Phase Three Original Layout | 175 |
| Map 16: Land Use Transformation of Dandora Phase Three | 176 |
| Map 17: Vertical Transformation of Dandora Phase Three..... | 177 |
| Map 18: Dandora Phase Four Original Plan Layout | 182 |
| Map 19: Land Use Transformation of Dandora Phase Four..... | 186 |
| Map 20: Vertical Transformation of Dandora Phase Four | 188 |
| Map 21: Dandora Phase Five Original Layout Plan..... | 190 |
| Map 22: Land Use Transformation of Dandora Phase Five | 191 |
| Map 23: Vertical Transformation of Dandora Phase Five..... | 193 |
| Map 24: Dandora Crime Dandora Hotspot..... | 235 |
| Map 25: Mapping of Crime in Dandora Phase One | 235 |
| Map 26: Mapping of Crime in Dandora Phase Two | 238 |

Map 27: Mapping of Crime in Dandora Phase Three 240
Map 28: Mapping of Crime in Dandora Phase Four and Five..... 243

LIST OF BOXES

Box 1: Zoning Principles 16
Box 2: Crime Prevention Types 19
Box 3: Causes of Urban Crime 29
Box 4: Objectives and Components of the Dandora Project 111

LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-----------------------|---|
| AIC: | Australian Institute of Criminology |
| CBD: | Central Business District |
| CBOs: | Community Based Organizations |
| CBP: | Community Based Policing |
| CBS: | Central Bureau of Statistics (Kenya) |
| CCN: | City County of Nairobi |
| CCTV: | Closed Circuit Television |
| CHRI: | Commonwealth Human Rights Initiative |
| CIA: | Central Intelligence Agency |
| CIA/A: | Crime Impact Assessment and Auditing |
| CIPEV: | Commission of Inquiry into Post-Election Violence |
| COHRE: | Centre for Housing Rights and Evictions |
| CPTED: | Crime Prevention through Environmental Design |
| CSOs: | Civil Society Organizations |
| D.A.R.E: | Drugs Abuse Resistance Education |
| DFID: | Department for International Development (UK) |
| ECOSOC: | United Nations Economic and Social Council |
| EIA/A: | Environmental Impact Assessment and Auditing |
| EMCA: | Environmental Management Coordination Act |
| ENACUSCP: | European and North American Conference on Urban Safety and Crime Prevention |
| DPMF: | Development Policy Management Forum |
| FBOs: | Faith Based Organizations |
| GDP: | Gross Domestic Product |
| GJLOS-RP: | Governance, Justice, Law and Order-Reform Programme |
| GoK: | Government of Kenya |
| HDD: | Housing Development Department |
| HRDU: | Housing Research Development Unit (University of Nairobi) |
| ICPC: | International Centre for Prevention of Crime |
| KANU: | Kenya African National Union |
| KENSUP: | Kenya National Slum Upgrading Programme |
| KHRC: | Kenya Human Rights Commission |
| KIPPRA: | Kenya Institute for Public Policy Research and Analysis |
| KNBS: | Kenya National Bureau of Statistics |
| LAs: | Local Authorities |
| MDGs: | Millennium Development Gals |
| MoLG: | Ministry of Local Government |
| NACHU: | National Housing Cooperative Union (Kenya) |
| NARC: | National Rainbow Coalition |
| NCBDA: | Nairobi Central Business District Association |
| NCPI: | National Crime Prevention Institute |
| NEMA: | National Environment Management Authority |
| NGOs: | Non-Governmental Organizations |
| NHC: | National Housing Corporation (Kenya) |
| UNCHS-Habitat: | United National Centre for Human Settlements - Habitat |
| UNDP: | United Nations Development Programme |
| UN-Habitat: | United Nations Habitat |
| UNEP: | United Nations Environmental Programme |
| UNODC: | United Nations on Drugs and Crime |
| WB: | World Bank |

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

There is an increasing realization among architects and urban planning professionals that a particular land use and design of the built environment may influence the level of criminal activity at a particular building or locality. This essentially shows that crime incidences are not unique random events but rather occur in different types of land use and building designs following some crime patterning in terms of spatial distribution.

Literature shows that variations in land use create functional characteristics by configuring physical and symbolic conditions that evolve and create a complex context of inhabitants' everyday life experience and identity which contributes invariably to local reputations and local crime occurrence (Debarbieux, 2003; Taylor and Gottfredson, 1986; Morenoff *et al*, 2001). A number of studies have observed that high density developments attract high crime rates since they appear to reflect the absence, disruption or ineffectiveness of social networks that enable people to participate in the community and exert social control (Statistics Canada, 2008; Novick, 1979). Crime and the fear of crime in relation to land use is one of the threats of sustainable urban life that not only affects economic and social milieu but also limits people in their choice of space and time for all activities.

Past and recent research has emphasized the link between built environment and land uses and criminal occurrences (Jacobs, 1961; Felson, 1987; Brantingham and Brantingham, 2000; Robinson, 2008; Kinney et al., 2008). Criminology literature has firmly established the significance of the built environment in shaping the occurrence and distribution of criminal events (Brantingham and Brantingham, 1993; Jacobs, 1961; Felson, 1998). Environmental criminology, in particular, has stressed the importance of the physical environment in its effort to understand spatial patterns of crime occurrences (Wortley and Mazerolle, 2008). Various residents of a given place live, work, travel and interact within the limits of their structured physical surroundings, and accordingly, criminal opportunities present themselves within these same environmental boundaries.

A major fact about urban land use is that it changes in terms of the type of usage and the intensity of usage, which gives leeway and room for improvement, especially when change is due and necessary. The functions performed in any given location shift over time. These patterns of spatial change and land use may help in framing the context in which urban safety and security issues actually exist, thus emphasizing the importance of urban planning (Kitchen and Schneider, 2005:2). This may be important when looking at the situational crime prevention perspective where crime is related to the characteristics of the place¹ and not the offender. Since a planner has the opportunity of assigning new use conditions, the planner is in a good position to advise by recommending land use conditions and regulations which have the potential of reducing violent crime opportunities.

Space is the stage on which man's behaviour unfolds. Space provides the occasions for motives, the opportunities, temptations and pressures. Space conditions human relationships, brings people together and separates them. Space controls social climate, sets limits, inspires, beckons, frustrates, isolates, crowds, intrudes, liberates. It presents vistas and forecloses them, yields privacy and violates it (Toch, 1980: xi). This shows the importance of understanding an area, whether a hotspot or neighbourhoods like Dandora and its ability to shape human actions either in a negative or a positive way.

As many people migrate to urban areas, and more rural areas get urbanized, urban crime prevention becomes a major concern for researchers and policy makers. Crime has become one of the most visible areas of public concern in recent years (Maguire and Pasture, 1998; Lee, 2000; UN-Habitat, 2007). Crime results in people dying, being injured, losing their property and rights, becoming traumatized, having their quality of life reduced and facing the criminal justice system. This calls for efficient crime management regardless of its effect on development.

In analyzing the connection between place and criminal events, Lockwood (2007) observes that; "Neighbourhoods affect crime, and crime affects neighbourhoods. Analyses of community characteristics and neighbourhood crime rates may therefore

¹ Eck (1997) defines place as a small area containing a relatively restricted range of functions, often identifiable as a distinct physical entity within the community. In this concept, places range from small (micro) scale environments, such as street corner or bus stop, to medium (meso) scale areas, such as shopping centre or industrial park, to large (macro) scale areas, such as neighbourhood.

give useful information for developing crime prevention strategies matched to specific types of physical and social environments”.

Declining or changing neighbourhood offers an environment in which crime rates and levels of fear change (Skogan, 1986). According to Skogan, stability in a neighbourhood requires that neighbourhood as a social system reproduces itself. Neighbourhoods are stable if the housing stock is continually repaired and renewed, if people can sell and buy or rent homes at prices appropriate for the structures and the social class of the resident (Skogan, 1986). This study examines Dandora’s land use transformation over time to determine crime incidences. This is despite previous studies of low income urban housing projects in Africa which have shown that very few of such projects are stable by reproducing themselves. They are infiltrated by medium and high income earners at infancy stage (Nimpuno, 1987; Chana, 1984 and McInnes, 1984).

Changes in land use has been noted to change urban form leading to changes in the routine activities of people which in turn creates new opportunities or changes existing opportunities to commit crime (Suryavanshi, 2007:ii). Understanding of this link is crucial in developing strategies of reducing and preventing opportunities for committing crime.

Several strategies and theories have been developed to explain crime responses in relation to physical environment, for instance Brantingham and Brantingham (1993) have separated crime prevention approaches into legal, social, community, and situation categories. They have also recognized crime responses and approaches that use architecture and urban planning as place improvement processes that reduce crime by reducing crime attractiveness and crime generators in an area (Brantingham and Brantingham, 1998; 2000). These articles on crime response have emphasized situational design approaches to reducing crime. This has involved describing to criminologists how urban planners, health planners, and urban designers work towards reducing crime potential, nuisance behaviour, and fear in public and private spaces.

Jacobs (1961) was more certain about the nature and direction of the relationship between land use and crime. She focused on diverse land use, arguing that neighbourhoods with different functions (mixed-uses), that is a combination of residential, commercial, institutional, and leisure, may be safer than single functional areas. This was based on the belief that multi-functional areas attract a continual flow of people throughout the day and evening, ensuring informal surveillance. Contrary to Jacob's position, other studies have suggested that homogenous residential environments exhibit lower rates of crime than areas with mixed uses (Greenberg *et al.*, 1982; Greenberg and Rohe, 1984). These studies challenge the 'mixed use equals safety' assumption held by new Urbanist scholars (Duany *et al.* 2003; Cozens, 2008).

In linking land use and crime, Dietrick (1977) found that residential burglary is more frequent in properties close to commercial areas. Studies by Wilcox *et al* (2004) and Muchai (2003) reveal that businesses in residential areas exhibited an increased risk of burglary. Other set of literature (Pierce *et al.* 1988; Sherman et al. 1989; and Weisburd *et al.* 1994) have gone deeper in explaining the complex relationship between land use and crime prevention by pointing at the potential benefits of focusing crime prevention efforts on crime places. These categories of studies indicate that crime is not spread evenly across city landscapes. Rather, there is significant clustering of crime in small places, or "hot spots," that generate half of all criminal events.

Even within the most crime-ridden neighbourhoods, crime clusters at a few discrete locations and other areas are relatively crime free (Sherman *et al.* 1989). A number of researchers have argued that many crime problems can be reduced more efficiently if police officers focused their attention on these deviant places (Sherman and Weisburd 1995; Weisburd and Green, 1994). The approach of focusing limited resources on a small number of high-activity crime places is strategic resource wise and takes into consideration resource limitations. This approach has potential of reducing total crime.

Land use changes has transformed the scale of urban habitat from "living-side-by-side" in houses to "existence" in layers, one above the other in large scale high-rise housing blocks which also has implication on urban residents' lifestyles and security.

Schneider and Kitchen (2004:24) note that planners have a great influence in shaping comprehensive plans which lay out long-term community visions and in developing land use regulations, including zoning, subdivision regulations, landscaping ordinances and design guidelines that make comprehensive plan vision come alive. UN-Habitat (2007) has noted that such vision makes a lot of sense if safety is improved by reducing or preventing crime, especially the violent crime and more so if they benefit the target group.

Land use regulations such as zoning and subdivision among others have been noted to possess elements which can be useful in crime reduction. Their surrogates such as plot sizes, yard setbacks and dimensions have been related directly to Crime Prevention through Environmental Design (CPTED) principles dealing with surveillance, territorial perceptions and public-private definitions as propagated by Jacobs (1961).

The physical environment context in which crime occurs has historically been overlooked as an area of crime prevention by various stakeholders and researchers, with much more attention directed to offenders, victims, to community economic and social conditions and to the criminal justice system. Currently, in Kenya, the component of crime and security matters is not featuring anywhere as a condition of development approval and control within local authorities' regulations or, at a broader level, in the Physical Planning Act Cap (286), planning handbook, Local Government Act Cap (265) and Kenya Police Act Cap (84).

Criminological research has broadened its perspective from a primary focus on punishment of individuals by rediscovering the scholarship of sociologists from the 1940s and 1950s on the ways in which the physical and structural characteristics of local environments encourage and facilitate violent crime (Skogan, 1990; Brantingham and Brantingham, 1993; Zhu *et al*, 2004). This dual movement away from considering violence as entirely the result of individual characteristics has led to an increased emphasis on how aspects of the built environment influence crime occurrence (Bottoms and Wiles, 1997).

Planning and design of places such as neighbourhoods is paramount in defining the urban structure. The fabric and layout of cities has been noted to impact on the movement of offenders and victims and on opportunities for crime (UN-HABITAT, 2007). "Urban Space is by its very nature full of power and symbolism, a complex web of relations, of domination and subordination, of solidarity and co-operation" (Doreen Massey in Blomley, Delaney and Ford, 2001).

This study focuses on how land use and changes of the same ultimately influence crime incidence in Nairobi City's Dandora neighbourhood by examining the link between land use and opportunities for crime. In the 1990s, the UN rated Nairobi as one of the world's most crime ridden capital cities and as a result downgraded the City from class B to C in security status (KIPPRA, 2004). However, in January 2010 it reverted to class B. Even with this development, crime remains a major challenge to urban governors. In the KIPPRA report, Dandora is perceived to be one of the most unsafe residential neighbourhoods in Nairobi followed by Kayole.

Study Site

Dandora is located in Embakasi division in the South-eastern suburb in Nairobi East district forming part of the Embakasi North constituency. It is located in Embakasi which is among the eight original Nairobi constituencies as shown in Map 5 on page 111. Dandora was developed in 1977 under a site and service scheme partially financed by the World Bank with the aim of providing shelter for the urban poor who could not afford decent housing. However, as shown in some literature (Nimpuno, 1987; Chana, 1984; McInnes, 1984), the original allottees did not take full advantage of this opportunity because of their financial constraints. They ended up selling out their plots to richer entrepreneurial developers, who later invested heavily on the plots, by developing multi-storey blocks and mixed use land development.

In comparison to other contemporary estates facing similar challenges of rapid changing land use development in terms of population and outlook, Dandora has the third highest population in the Division with 142,046 as compared to Kayole's 175,949 persons (GoK, 2009). It covers an area of 3.9 sq. Km as compared to

Kayole's 5.5 Sq. Km. Dandora has a density of 36,254 as compared to Kayole's 58,655.

1.2 Statement of the Research Problem

It is increasingly becoming important to identify and examine the link between land use planning and opportunities for crime in order to create safer living environments in cities. Changes in land use have potential impact on changes in people's routine activities, which in turn create new opportunities or alter existing opportunities to commit crime. This has been supported by social disorganization theorists, routine activity theorists, situational crime prevention theorists and environmental criminologists. The combined approach of these scholars supports the notion that, as land use changes through new development and redevelopment, characteristics of neighbourhoods and routine activities also change. This can provide new opportunities for crime occurrence and crime response and understanding of the same.

Issues that have emerged as bottlenecks to the provision of quality security and policing service in Kenya include, but are not limited to, delayed response to the scene of crime, very low rate of prevention and detection of crime, poor management of scenes of crime, understaffed police service, with a police to population ratio of 1:1150 as opposed to recommended global standards of 1:450, lack of autonomy, poor terms and conditions of service, lack of adequate resources and long and bureaucratic purchasing processes in securing security equipment. These bottlenecks have heightened peoples' experiences of incivility and anti-social behaviour in their local neighbourhoods and fear of crime (Kenya Police, 2003).

The above shows the existence of security gaps which limit crime detection and prevention. Addressing crime challenges will therefore require various strategies and options hence recognition of other factors, sectors and players in security matters. The overall approach should not be limited to pure policing, community policing which has been blamed to be police-centred, enabling environment for private security services which does not cater for the urban poor, hiring of more police given that according to CHRI and KHRC (2006), for Kenya to reach international policing standards of 1:450 by the year 2014, the Country will need to recruit 3,999 personnel

per year from the year 2004 to 2014, which the economy may not easily afford within the stipulated time frame, thus creating more room for more victimization.

Given this bleak background, the key issue to be pursued in this study is the potential of land use planning decisions to alter the physical environment in seeking to change the structure of criminal opportunities that are perceived to lie in phenomena located within the physical environment. This is a research gap worth pursuing given that crime incidence is overlooked in Kenya's planning and architectural guidelines.

A growing body of literature maintains that planning and planning decisions will continue to play an important role in understanding security challenges facing urban neighbourhoods and urban areas in general. Land use planning is aimed at influencing future activities and events in a desirable manner. It should ideally be a promising process compatible with the notion of crime resilience places which should be result-oriented to the maximum extent possible. However, there is scarcity of literature on land use and changes thereof and the linkage with incidence of violent crime. Most literature highlights the relationship of land use and increased vulnerability of spaces to criminal activities, without much focus on land use transformation.

Land-use patterns have been noted to alter the routine activities of a community and influence opportunities for crime. However, the direction of influence is still contentious, hence need for a multi-contextual approach to unravel the framework under which the interaction can be understood. Profiling of land use changes in relation to crime incidences is still exceptional, as most studies focus on the causation aspects, without addressing the contextual part.

In addressing the contextual part, the study will seek to find answers to the following question: Does the type and nature of land use change(s) in a neighbourhood explain crime incidences and response? This will enable contextualization of land use changes in relation to neighbourhood crime occurrence, an area which is insufficiently explored by scholars. In line with this, the study examines and analyzes how land use and land use changes create opportunity for understanding violent crime incidences. This is significant in understanding the context of crime, which is considered

important in developing informed crime responsive policy capable of reducing crime in urban communities.

1.3 Overall Objectives

The overall objective of this study is to understand how land use and land use changes affect crime incidences using a case study of Nairobi's Dandora neighbourhood.

1.3.1 Specific Objectives

- i. To examine land use types and identify drivers of land use changes in Dandora
- ii. To examine crime patterns and trends in the area
- iii. To investigate the socio-spatial interaction between crime and land use types
- iv. To examine implications of land use transformation on crime coping mechanisms

1.4 Research Questions

- i. What is the nature of land use transformation in Dandora?
- ii. What is the crime pattern in the area?
- iii. What is the relationship between land use transformation and crime occurrence?
- iv. What are the existing crime coping mechanisms adopted?
- v. What is the implication of land use transformation on response to crime?

1.5 Research Hypothesis

Hypothesis: There is no relationship between land use changes and crime incidence.

The study hypotheses are supported by the following arguments:

The hypothesis will enable analysis of the micro-environment of crime, the social and spatial characteristics of the behaviour or settings in which crime occurs, including the interaction of offenders with their physical and social environment. The particular socio-physical characteristics of a place, such as the number of people present, the level of surveillance, its physical layout and environmental attributes can have positive or negative effects on crime.

1.5.1 Study Hypotheses, Variables and Respective Indicators:

Independent Variable: Land Use Changes

Measurements/Surrogates: Built up area analysis- Land use types, pace of changes, density and scale of changes

Dependent variable: Crime Occurrence

Measurements/Surrogates: Crime types, crime pattern, victimization rates

In understanding crime prevention and coping mechanisms, the study uses profiles of land use and qualitative analysis of respondents narratives to understand the context under which the prevention and coping mechanisms are related to land use changes. This cannot be brought out through pure quantitative techniques of analysis, and hence the triangulation of both quantitative and qualitative methods.

This study begins by an assumption that security of neighbourhoods can be improved through the knowledge of the security context created by changing land uses. Land use is a fundamental component of both the criminal event and creation of the neighbourhood environment and to a larger extent of cities too.

Dandora Neighbourhood is the geographic scope of this study, this is because neighbourhood level is the most immediate geographic contexts in which people live and the places where their lifestyles frequently situate them. Furthermore, Dandora is reported to be one of the most risky neighbourhoods in Nairobi according to literature and data on crime and security situation in Nairobi (CIPEV, 2008; KIPPRA, 2004).

1.6 Significance and Justification of the Study

1.6.1 Significance of the Study

The study of land use transformation and crime incidence is important for a number of reasons, as indicated below:

Linking Theory and Practice: Developing theoretical accounts explaining the connection between variations in crime levels and land use transformation. This

will aid in linking both the theoretical and practical approaches to planning and crime management by identifying the nature of land use and land use transformations that may explain crime generation and suppression.

Addressing Theoretical Limitation: - The study uses multi-contextual theory which supports situational² crime prevention, whose strength is in combination of people-oriented and place oriented crime prevention strategies. This looks at particular circumstances in which people interact with one another with regard to the built environment.

Generation of Knowledge: - Knowledge of the relationship between land-use and crime can help planners and developers find ways to minimize crime through knowledge-based proposals and development of appropriate land uses, especially in urban areas where application for transformations and alterations is overwhelming. In addition, knowing how and when land transformation is related to crime can inform users, potential users and security managers such as police on effective allocation of patrol resources. This can also be an important tool of forecasting crime by types based on the land use(s) anticipated.

Limitation of Formal Security System: - The complexity of violent crime shows that crime prevention cannot succeed solely on the basis of the action of the criminal justice system but on wider research geared towards understanding of crime in all aspects including how land use profiles and urban planning decisions contribute to crime generation and suppression. The study will thus address the limitation of previous approaches.

Safety Concerns as Cities continue to grow: - There is development concern with Planning and Safety as Cities continue to urbanize. Crime and crime prevention studies are and will become more important in urban areas, because the percentage of the population living in urban areas has been constantly increasing as shown by UN-Habitat (2002) which estimates that 60 per cent of the population will be living in urban areas by 2030. This increase will definitely come with various challenges including urban insecurity and crime incidences.

² Identifies particularly risky combinations and looks for solution specific to those situations. This is also important when doing a study at neighbourhood level, especially in crime-prone areas.

Inelasticity of land: - This has limited all future urban developments to land use transformation. Most development in future will be purely transformational in the name of redevelopment, densification, renewal or regeneration among others. This will be more pronounced in cities especially in Nairobi in the Kenyan context, hence the need for such a study.

Development Control: - Zoning or rezoning of urban areas seems to respond only to housing demand without addressing the holistic requirements of the area. Zoning provides for the division of an area such as a city or municipality into land use areas that are designated by height, building coverage, open space, or density of population. It takes into account the plot ratio, plot coverage and plot sizes in determining the kind of development suitable in an area. Density, which is one of the important sociological and planning legal elements and which will be used as a measure of transformation, has been misused in developing and reviewing amendments of zoning regulations. This is because they ignore the wider social and functional implications which are supposed to inform regulations and are narrowed down to addressing solely economic considerations. This creates a demand for development of a more pragmatic, dynamic and inclusive zoning and rezoning regulations. This is in realization that factors such as density are likely to influence security, privacy, and freedom of movement or social contact among people.

1.6.2 Justification of the Study

Safety Concerns: - Knowledge of land use in relation to crime is useful for planners in developing of strategies that lead to minimization of crime through intelligent development of land use thus enhanced safety.

Sustainable Urban Planning: - Land use Planners are mandated to plan for sustainable space use and insecurity is one of the most feared attributes of places and spaces. Taking into consideration that police coverage in most of Nairobi neighbourhood is inadequate, there is need to understand how other feasible crime prevention can be enhanced to supplement this shortfall. Implementation of planning has a high potential of changing the physical and environmental

conditions that generate crime and fear of crime through improved urban planning and design.

Land use transformation knowledge is important due to the fact that there is an increasing need for proper land use planning to control haphazard developments that characterize city systems in most developing countries. Urban neighbourhoods and centres are also expanding at an unprecedented rate due to rapid urbanization and this leads to various urban problems such as crime and insecurity, slums, obsolescence, traffic congestion, blight and overcrowding.

The continued lack of integration of crime prevention strategies within comprehensive city planning practices is a factor facilitating opportunities for urban crime which threatens achievement of various development agenda and targets such as the Millennium Development Goals (MDGs) and Kenya's Vision 2030 among others. The study will therefore shed light on how land use planning explains crime incidence and prevention in urban areas.

Despite having tips in regard to specific crimes, and having knowledge of crime-ridden areas, the police still face challenges in containing crime. This may be attributed to either lack of or inadequate analysis of crime trends in relation to changing land use development, to be able to understand the context of crime ridden areas and why they continue to attract crime, as suggested by the multi-contextual theoretical framework, which focuses on characteristics of the generators and attractors of crime by looking at both the socio-economic fabric of the residents, the social setting in which people interact, the physical environments, and the way the public deals with these conditions.

Even with the existence and operations of formal and traditional crime prevention mechanisms and strategies, criminals still continue to attack and rob unsuspecting citizens at home, work, on the streets and in all forms of land uses, including attacking security providers such as police and guards. There is thus need to examine and understand crime-prone places, by profiling their backcloth and how they are used and how this explains why they continue hosting crime.

States are responsible for the provision of security to their citizens. According to Olonisakin, Ikpe & Badong (2009:7), many developing countries' state security provision has largely been inadequate. Kenya is a case in point according to the Commonwealth Human Rights Initiative (2006). The ratio of police to population has declined over the last years: the ratio was 1 to 711 in 1991; 1 to 875 in 2001; and 1 to 1150 in the year 2004, which compares poorly to the United Nations recommended standard of 1:450. However, according to the Kenya Police Service Strategic Plan of 2003-2007, the target was to achieve a ratio of 1:650 by 2007 but what has been achieved so far is approximated to be 1:950. This scenario emphasises the importance of studies aimed at understanding the context of crime.

According to Olonisakin, Ikpe & Badong (2009:7) most of the developing countries focus mainly on using military, police and intelligence services for state preservation against external aggression and internal disorder. An inordinate focus on this form of security has resulted in the neglect of the physical and other socio-economic needs of a majority of citizens, who have consequently resorted to 'self-help' mechanisms using the private, non-state sector to address their security needs.

1.7 Operationalization of Key Terms

i. Land Use Transformation

Land-use transformation also known as land use change can be defined as a change of an existing land-use category or a change in the intensity of an existing land use (Turner and Meyer 1994). In this study, land use transformation will include the change(s) of existing land-use categories e.g. from residential to commercial and vice-versa, mixed-use development and intensity of land uses. Of particular interest are features of land use alterations and intensifications in Dandora neighbourhood.

ii. Density

Density in Development will be defined by Population size, Plot Coverage and the Number of Dwelling Units. The level of Density is determined by availability of services such as water, sewerage, size of roads, etc, and the zoning recommended. In recommending gross residential densities care should be taken that they create in spatial and functional meaning an independent system of the built-up area (both multi-

family and one family dwelling units) well provided with day-to-day services, recreation and communication network (GoK, 2007). Density may also be defined as floor area ratio or gross floor area covering the site, which will be adopted for this study.

Literature associate higher densities with crowding, housing type, social and economic characteristics such as renter and low-income households, and high crime neighbourhoods.

iii. Zoning

Refers to the segregation of land use into different areas for each type of use: agricultural, industrial, recreational, and residential (Thorsnes, 2000). It divides a jurisdiction into geographically contiguous 'zones'. The local zoning ordinance prescribes what may be done in each zone and what may not be done. The great majority of the population of cities and urban areas live in neighbourhoods that are zoned.

The Zonal Regulations and their enforcement ensure proper land use and development form an integral part of the Master Plan. It also ensures solutions to problems of development under local conditions (GoK, 2007). Zoning is the most important method of land use regulation undertaken by local governments. In order to promote good public health, safety and the general social welfare of the community, it is necessary to apply control and reasonable limitation on the development of land and buildings. This is to ensure that most appropriate, economical and healthy development of the town takes place in accordance with the land use plan, and its continued maintenance over the years. For this purpose, the town is divided into a number of land use zones, such as residential, commercial, industrial, public and semi public. Each zone has its own regulations, as the same set of regulations cannot be applied to the entire town (Siegan, 1972).

Zonal Regulations protect residential areas from the harmful invasions of commercial and industrial uses and at the same time promote the orderly development of industrial and commercial areas, by suitable regulations on spacing of buildings to provide adequate light, air, protection from fire, etc. It prevents overcrowding in buildings and on land to ensure adequate facilities and services (Kiefer, 2001).

Box 1: Zoning Principles

- ◆ That sufficient land should be zoned at appropriate locations throughout the city to accommodate the expected growth in population and other growth needs of a city within the lifetime of the Plan.
- ◆ That zoning should be designed to promote particular uses in appropriate locations, to reduce conflict of uses and to protect resources both natural and man-made resources.
- ◆ Where appropriate, zonings should be used as a tool for shaping the city and not solely reflect existing land uses.
- ◆ That development should be encouraged in established centres and the redevelopment of underutilized land should be promoted with a view to consolidating and adding vitality to existing centres, and ensuring the efficient use of urban lands.

Source: Kiefer (2001)

This specifies land uses, plot sizes and development densities in the urban areas development plan. The developer does not have a free hand to choose the type of development he would like on his piece of land, as witnessed in some neighbourhoods which are transforming rapidly.

iv. Site and Service Schemes

Site and Service scheme refers to the provision of land, either on ownership or land leases tenure, along with a bare minimum of essential infrastructure needed for habitation (UNCHS, 1985). In site-and-service, plots are marked out on a piece of land allocated for housing development. Each plot is provided with basic services such as running water and sewerage, while the construction of the house itself is left to the person assigned the plot (Glen Mills, 1993). The key components of site and service housing scheme are the plot of land, infrastructure (like roads, water supply, drainage, electricity or a sanitary network), and the house itself. Various inputs that go into them include finance, building materials/technology, and labour. Thus, the sites-and-services approach advocated the role of government agencies only in the preparation of land parcels or plots with certain basic infrastructure, which was to be sold or leased to the intended beneficiaries (Hasan, 1988; Peattie, 1968; Turner & Fichter, 1972).

The genesis behind sites-and-services schemes is not new: low-income people have always been housing themselves, albeit "illegally", in most urban areas of the developing world. The key departure from earlier housing schemes, like low-cost housing or subsidized high-rise housing units, is that it recognized the ability of the low-income households to build their own house, provided an opportunity was given. Dandora is a by-product of site and service scheme (Turner, 1972).

The practical implication of Turner's work is that governments should not provide those aspects of housing which people can provide for themselves. Consequently, Turner was a proponent of site-and-service schemes (referred to as "aided self-help" schemes) in terms of which governments had to take responsibility for the provision of basic services, and individual households were responsible for the construction of the housing unit (Pugh, 2001).

Particularly in face of the failure of conventional housing approaches, coupled with a number of studies that pointed out the ingenuity and perseverance of squatters to house themselves, providing sites and services only was touted as an answer to the problems of housing the poor in developing cities. Many countries in South America, Asia and Africa took up this concept, and with the World Bank strongly advocating this approach and providing key finance for a number of projects, the idea received widespread approval (Turner, 1976; Pugh, 2001 and Nientied *et al*, 1985).

Turner (1972) argued that governments should cease doing what they did badly, i.e., building and managing housing. He proposed that users should be the principal actors and they should have the *Freedom to Build*.

The next step of actual house building was left to the beneficiaries themselves to use their own resources, such as informal finance or family labour and various other types of community participation modes to build their house. The beneficiaries could also build the house at their own pace, depending on the availability of financial and other resources. This adopted the basic principle of the development of a squatter settlement but without the "squatting" aspect (Parnell, 1999). According to Turner (1972) Site and Service was to be a people-oriented strategy, in which individuals and communities could more efficiently control the outcomes.

v. Crime

Crime can simply be defined as a violation of criminal law. However, it is difficult to give a precise definition of crime, although crime can be roughly divided into two broad categories. The first is covert, less visible crime, which often comes under the rubric of corruption. This includes criminal activities such as embezzling public funds, filing false information, etc. Such crimes are mainly committed by the elite in society - the economically well-to-do - and the politically powerful. By the very covert nature of these crimes, their perpetrators mostly go free (Gimode, 2001).

The second category is overt crime, which is easily identifiable and involves the physical or psychological injury to other people. Physical criminal violence or physical assault includes homicide, armed robbery, car-jacking, attempted murder, manslaughter, rape, etc. Psychological violence includes lies, threats, brainwashing, etc. These serve to diminish mental potentialities (Galtung 1990:10-12). In addition, there is also violent crime against property - car-jacking, house breaking, etc.

Crime and fear of crime damage civic vitality and hinder movement and participation of residents in various forms of development. Violent crime causes direct harm (Chesnais, 1992:217). It is a big contributory factor that disturbs security in society. This study focuses on violent crime, that is, crime in which the offender uses or threatens to use violent force upon the victim or target. The crimes to be included are: robbery, sexual offences, assault, burglary, carjacking and malicious destruction of property, riot situation and disorder. Agostini *et al* (2008) defined violence as *the manifestation of distorted power relationships produced by the complex interaction between risk factors*. This study defines violence as the interaction of risk factors which may either be due to physical environment alterations and which has potential to the processes that lead to violent outcomes. Risk factors are viewed as *existing conditions that could potentially culminate in violence*.

vi. Crime Incidence

This refers to an act of crime happening or occurring. It gives a picture of how crime is either growing or slowing down in particular areas. This information is very important when decisions are being made to help control crime or when families and entrepreneurs are choosing safer environments for their homes and business location.

vii. Crime Prevention

Crime prevention is the anticipation, recognition and appraisal of a crime risk and the initiation of some action to remove or reduce it (National Crime Prevention Institute, 1972). The ability to predict and prevent crime before it occurs is what is given prominence in this study.

Crime prevention types can be categorized into the following;

Box 2: Crime Prevention Types

- ◆ Punitive- include use of criminal laws, law enforcement, Crime Stoppers, courts and jails and prisons
- ◆ Corrective- include employment, education, counselling, mentoring, Head Start and Drugs Abuse Resistance Education (D.A.R.E).
- ◆ Protective- Neighbourhood Watch, Community Policing, Public Education, Crime Prevention through Environmental Design (CPTED) and Homeland Security.
- ◆ Situational Crime Prevention- also referred to as opportunity reduction, or designing out of crime. It focuses on the manipulation, management and design of the built environment, in order to reduce the opportunity to commit crime and increase the danger of detection if deterrence fails

Source: Gilling (1997).

Crime prevention is faced with a multitude of challenges including high rates of delinquency, violence and insecurity; fears and concerns of the public; lack of faith in the efforts of the police to combat crime; frustrations with criminal justice systems; scarce government resources to cope with crime; and the inherent risk to democracy and economic development if sustainable solutions to crime are not found (http://www.unhabitat.org/downloads/docs/1902_96378_Conference_on_crime.pdf).

viii. Social Capital

The first systematic contemporary analysis of social capital was produced by Pierre Bourdieu, who defined the concept as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less

institutionalized relationships of mutual acquaintance or recognition” (Bourdieu, 1985).

According to Moser and McIlwaine (1999), social capital refers to rules, norms and obligations, reciprocity and trust embedded in social relations, social structures and societies’ institutional arrangements that enable its members to achieve their individual and community objectives. In this study, it is used to refer to ways in which individuals and Dandora community, create trust, maintain social networks and establish norms that enable residents to act cooperatively towards the pursuit of shared goals, such as collective crime prevention in Dandora neighbourhood.

Application of the concept in the sociological literature emphasizes its role in social control, in family support and in benefits mediated by extra-familial networks. As a social control mechanism, it creates a tight community network which is useful to parents, teachers and police authorities as they seek to discipline and promote compliance among those under their charge. Sources of this type of social capital are commonly found in bounded solidarity and enforceable trust, and its main result is to render formal or overt controls (Bankston, 1996; Portes, 1996).

People coming from disadvantaged families and living in disadvantaged neighbourhoods are less likely to feel family and community support and are more easily involved in criminal activities. Social capital is a source of benefits through networks of people and activities. This means that neighbourhoods in which people are involved in community activities face lower levels of crime because the opportunity cost of committing crime are higher, (Akcomak and Weel, 2008).

ix. Neighbourhood

The term neighbourhood is often used to describe the sub-divisions of locations such as cities, villages, and towns. In its purest definition, a neighbourhood is the vicinity in which people live. People live next to or near one another in sections of an area and form communities. Those sections have some particular physical or social characteristics that distinguish them from the rest of an area, be it a city or a town (Duncan *et al*, 1999). It is the immediate planning context or unit in which people live.

The neighbourhood size is limited so that a majority of the population is within walking distance of its centre where the needs of daily life are available. The centre of the neighbourhood provides facilities for transit stops, work places, retail, community events, and leisure activities. Due to incremental development there is a mixture of large and small houses, shops, restaurants, offices etc. Civic buildings such as schools, worship areas, clubs, etc, are often located in the centre, where open spaces, playgrounds, and parks are also provided (Duany, *et al.* 2003). This forms the basis of this study's assessment of Dandora as a neighbourhood. The concept of neighbourhood is closely linked to the understanding of community.

Neighbourhood is where individuals interact and exchange many life causes which may lead to people having profound influence on their life choices (Frohlich *et al.*, 2002). It can be an arena where the nexus between land use transformation and violent crime can be understood through individual experience and action both at individual and collective level. Dandora provides the study with the basis of analyzing the aggregate characteristics of individuals that happen to live and work in Dandora.

x. Community

For the purpose of this study, the term community will be used to refer to a geographically localized community within the larger Nairobi city. These are often social communities with considerable face-to face interaction among members. Community is typically generated by social interaction among people living near one another. In this sense they are local social units larger than households. This is borrowed from Amie and Rosenbaum (2006), who noted that neighbourhoods are spatial units in which face-to-face social interactions occur - the personal settings and situations where residents seek to realize common values, socialize youth, and maintain effective social control.

1.8 Organization of the Study

This study is divided into eight chapters, with each chapter focusing on a different aspect of the study but in a complementary manner.

Chapter 1: Introduction: This chapter introduces the study by providing the background, problem statement, study questions and objectives; hypothesis, significance, justification and operationalization of study's terminologies. In

particular, the chapter highlights why it is increasingly becoming important to identify and examine the link between land use and crime incidences and how changes in land use impact on changes in the routine activities of people, which in turn create new opportunities or alter existing opportunities to commit crime.

Chapter 2: Literature Review: This chapter provides an empirical, theoretical and conceptual synopsis of the state of knowledge on various aspects of land use planning and urban crime. It focuses on the significance of land use planning and related arguments in discussing the context of crime incidences in urban areas. It draws from arguments of Donna *et al*, (2010); Cohen and Felson, (1979); Clarke and Mayhew, (1998); Shaw and McKay, (1969) who shows that certain physical attributes such as specific land uses, street layouts, environmental disrepair and deterioration and physical features that block visibility and natural surveillance can encourage higher incidences of crime.

Chapter 3: Methodology: This chapter presents the research design, data collection and sampling techniques, units of observation, operationalization of the study's hypothesis and how data was analyzed. Variables such as changing land uses, scale and types, plot coverage, building heights, open spaces, infrastructure networks analysis, crime types and patterns and crime response mechanisms are used. The chapter provides a link between the study's objectives and the theoretical framework and how this informs multi-contextual crime analysis.

Methodology section articulates various information gathering strategies such as saturated surveys, archival records, structured observations, focus group discussions, interviews, safety audits and a geographically based and demographic analysis to identify distinctive features of human interaction with various land uses. Justification for the use of both quantitative and qualitative approaches through triangulation is informed by the insufficiency of each individual approach to give detailed analysis of the area in as far as crime and community crime prevention mechanisms in relation to land use changes are concerned. The research design viewed Dandora as a system, hence required mapping out the features of land use transformation related to crime and sought to understand how land use changes explain crime prevention.

Chapter 4: Background of Dandora Site and Service Scheme: This chapter gives an evolutionary account of Dandora by focusing on the neighbourhood's geographical setting, planning and drivers of land use changes, historical attributes, demographic and the neighbourhood's socio-economic development.

Chapter 5: Context of Land Use Transformation: This chapter links respondents' socio-economic backgrounds with land use types and changes. Attributes such as age, education level, occupational status, and length of stay or operation in Dandora and how these are related to crime. This fits well within the multi-contextual theoretical framework informing this study where neighbourhood land use and consequent changes are linked to socio-economic factors in explaining crime and its prevention. Earlier studies such as Taylor *et al* (1979) and Cahill (2005) had established that these factors are key determinants of land use changes and neighbourhood stability.

Land use transformation is considered important in setting the base for profiling crime in the neighbourhood. Scholars such as Taylor *et al* (1995); Sampson *et al*, (1997) noted that as land use changes through new development and redevelopment, the physical environment characteristics will contribute to changes in the social interaction and routine activities of residents and general space users.

Chapter 6: Crime Incidences and Response Mechanisms: The chapter discusses the crime types, patterns and crime prevention and coping mechanisms, with an aim of addressing the dependent variable of the study. The list of crime response strategies range from mechanical such as use of burglar proof, collective response, environmental alteration such as installation of security lights and non-admission of strangers into a residential court; however, the concern as noted by Jacobs (1961) and Newman (1972) is the sustainability of these strategies to create a sense of natural surveillance and "territoriality" of the neighbourhood.

Chapter 7: Interaction between Land Use Transformation and Crime: The chapter discusses the nexus of land use transformation and crime, and tests the study's hypothesis. This chapter is informed by the literature showing that variations in land use, like variations in housing types and density, are part of the fundamental fabric of neighbourhoods (Brower, 1996). They shape the quality of life for residents and

contribute to local reputations, housing market values (Miller, 1981), and local crime rates (McCord *et al*, 2007). The chapter findings confirm the anonymity and weakening of social cohesion associated with high residential density and crime incidences as explained by social disorganization theory.

Chapter 8: Conclusions and recommendations: The chapter makes conclusions based on the findings in line with the study objectives and hypothesis. It gives recommendations according to what has emerged in the study.

Violent crime and crime generally happens in some known locations, harbouring certain land uses and characteristics. The study concludes that land use planning and crime response mechanism should take into account the unique features of crime distribution along land uses by regularly monitoring various functions of land in relation to crime incidences in the neighbourhoods and in general urban spaces, which should inform new land uses, redevelopment and renewal programmes in urban areas.

CHAPTER TWO: LITERATURE REVIEW

This chapter provides empirical, theoretical and conceptual synopsis of the state of knowledge on various aspects of urban crime and land use transformation. It focuses on the significance of land use and related arguments in discussing the context of crime incidences in urban areas. It also highlights the diverse ways in which the national government and other agencies including community initiatives have responded to urban planning and crime in terms of policy and in practice. It ends by delineating the theoretical and conceptual scope of the study.

2.0 Introduction

Brantingham and Brantingham (1998) noted that most planning proceeds with little knowledge of crime patterns, crime attractors, crime generators, the importance of edges, paths and nodes or the site specific conditions that facilitate or encourage crime. This leads to land use developments and re-developments that are not sensitive to safety and security of consumers of land use planning services.

While urban areas are seen as engines for economic growth and centres of diversity and change, they also pose formidable challenges to Governments in ensuring the safety and security and the quality of life of citizens. It is the concern with the rising urban crime that led UN-Habitat in 2007 to dedicate its global report to urban safety and security. Shaw and Carli (2011) noted that levels of urban crime and violence differ from region to region, country to country, regions within a country and areas within a city. The root causes, drivers, risk and protective factors are locality-specific and influenced by historical, political, cultural and socioeconomic factors.

2.1 Urban Crime

As urban areas become larger, the rate of crime in these areas increases, hence the importance of understanding how urban planners, local authorities and urban residents address the issue of urban crime prevention and coping mechanisms (Galvin, 2002). Gaviria and Pagés, (2002) noted that households located in cities with more than one million inhabitants had a 70 per cent higher likelihood of experiencing violence than those in cities of between 50,000 and 100,000. There are many dimensions of urban crime. What is amazing about it is the violent dimension it is taking and its

widespread existence in countries in all regions and at different levels of development.

The anonymity provided by cities can allow organized crime to flourish and provide opportunities for corruption through the intersection of organized crime and the political and economic elite. Law enforcement “no-go” areas in some districts facilitate local and organized crime, and slums and informal settlements place their residents at high risk of exploitation and victimization (Shaw and Carli, 2011).

The National Crime Prevention Council of Finland noted that, “in general, there is a higher level of crime in large cities. This is attributed to the fact that there are more opportunities for crime in cities, and to the decrease in social control that follows urbanization (National Council for Crime Prevention Finland, 1999). Since cities are made up of neighbourhoods, it is important to understand the changing aspects of the neighbourhoods’ including land use profiles and impact on crime, since they eventually lead to understanding the security context of the entire city.

At least once every five years, more than half the world’s population living in cities with 100,000 or more inhabitants are victims of a crime of some kind (UNCHS, 1996). Most of these crimes (about 60 per cent) are against property- thefts, mainly of cars, and burglary- and affect not only the well-off urban districts but also the low-income areas, slums and irregular settlements. Violent crime-murder, infanticide, assault, rape, sexual abuse and domestic violence- have increased; it accounts for between 25 to 30 per cent of urban crime in many countries (UN-Habitat, 2002). Worldwide, urban violence is estimated to have grown by between 3 and 5 per cent a year over the last two decades, although there are remarkable variations between nations and among cities within nations (UNCHS, 1996).

Masih and Masih (1996) states that “at low levels of urbanization, crime may be high because of sparsely located residents; a further increase in urbanization may lead to decrease in crime because of closer proximity of residents; and finally, with even further increase in urbanization, crime may rise because individuals may not identify whether they are engaged in a legal or illegal activity”. Indeed, works of Gaviria and Pagés, (2002:190) established existence of a relationship between city size and

victimization. Thus, it can be noted that urbanization may have both negative and positive effects on crime in different urban settings at different levels, pace and stages of urban development.

In the U.S, the "Chicago School" of sociology in early 20th century carefully examined the location of crime in the city of Chicago. They concluded that characteristics of the urban environment are critical to explaining the emergence of crime in specific communities (Burgess, 1925; Thrasher, 1927; Shaw and McKay, 1942). As early as the 19th Century, studies had noted that urbanization creates social disorganization which, in turn, creates deviant behaviour since people do not have moral guide-lines for their behaviour (Shelley, 1981). It is, however not categorical that urbanization directly causes crime, but creates an environment in which a strong case may be build for relating urbanization to crime.

Violent crimes in urban areas primarily concern the poorest sections of the urban residents as the prosperous sections of the urban population tend to have access to private security services. UNCHS (1998) noted that the poor are the most vulnerable to urban crime and that they are more disadvantaged by their location, due to lack of basic urban infrastructure and public utilities which are often lacking. The poor are excluded from regular police protection in their neighbourhoods and they cannot afford private security services.

Crime is a menace that attacks the rights of individuals. "Urban space is by its very nature full of power and symbolism, a complex web of relations, of domination and subordination, of solidarity and co-operation" (Doreen Massey in Blomley, Delaney and Ford 2001). Urban space is characterized by conflict (Esser 2004; Graham 2004; Rodgers 2004 and 2006). This study is more interested in violent crime in relation to land use changes as an explanatory factor.

Common or conventional crimes and violence are socio-pathologies that are traditionally associated with cities. Most places in most cities are safe and most types of common street crimes tend to reoccur at certain locations- hotspots- that are venues known to citizens and public officials. They are therefore reasonably predictable events (UN- Habitat, 2007). According to KIPPRA, 2005; Kenya Police, 2009 and

press reports (Daily Nation, 17th June 2009), Dandora, Eastleigh and Kibera were identified as some of the notorious neighbourhoods where criminals are able to hire guns easily. This is informed by the fact that neighbours fear reporting those who engage in crime, which itself is a pointer to the challenges community policing is likely to face given that its strength is on the ability of community members to generate and communicate crime information to the police.

In the language of land use transformation this feeling is also in line with Taylor et al (1979) who noted that high density development seems to be related to feelings of alienation and powerlessness, given the density of development in Dandora, Eastleigh and Kibera, this may help in explaining why the residents are reluctant to report those who own guns illegally in their midst.

According to UN-HABITAT (2007), over the last two decades violent crimes such as armed robbery, carjacking, murder, mugging, physical and sexual assault have been on the increase in the cities. Firearms trafficking, largely a consequence of civil wars in various countries is a major contributor to crime and violence. Criminal youth gangs are also a growing phenomenon. UN-HABITAT notes that ‘While these groups are not necessarily criminal in all their interactions with the broader society, their association with crime, both real and perceived, is such that they warrant special attention.

2.2 Causes of Crime Incidences

In explaining causes of general crime in urban areas, the European and North America Conference on Urban Safety and Crime Prevention (ENACUSCP) in 1998 noted a number of causes of crime in urban areas which are socio-economic in nature as shown in Box 3;

Box 3: Causes of Urban Crime

- Poverty, unemployment, lack of affordable, decent housing and unresponsive education system,
- A growing underclass created by blocking opportunities for advancement
- The disintegration of communities and families, exacerbated by inadequate parenting,
- The problematic circumstances in which people migrate to urban areas and between countries
- The destruction of native cultures
- Changes in the physical environment of urban areas which contribute to crime, among them: bedroom communities which are abandoned during the working hours, and concentrated public housing inadequately linked to appropriate services,
- Modern societal problems, the difficulty that individuals have in connecting with the community, and that young people have in identifying with the culture, the family, the school or the society and lastly,
- Drug abuse, in part caused by other factors mentioned and drug trafficking.

Source: ENACUSCP (1998)

In urban areas, socioeconomic-demographic variables such as educational level, age structure of the city, level of urbanization, percentage of certain race in the society, percentage of population who are male or female in the labour force also determine crime (GÜMÜŞ, 2004: 102). Not all these variables can be used to explain violent crime satisfactorily. For instance, highly educated and highly enumerated members of society due to their connections may not directly engage in violent crime such as muggings, murders but may use their skills and resources to organize for such crimes to happen if they feel that their positions are threatened and this may explain why violent crimes are rampant during political seasons. In urban areas also due to weak social capital among urban residents as noted by McIlwaine and Moser (2001), they become gullible to be used by the elite members of the urban community.

Crime is complex not only because of its different categories, but also because of its multiple causes. Empirical evidence shows that individuals are not equally violent, that communities vary in their levels of violent conflict, and that violence tolerance levels differ across societies. Circumstances relating to the individual, the family, the

community, and the broader national context combine to play a role in violence perpetration or victimization (Moser, 1999).

Crime causes have been theoretically categorized into two broad categories by Weisburd (1999);

- a. Compositional - also known as non-ecological theorists- these categories of theories focus their attention on offenders, the people that commit crime. They argue that variation in urban crime rates can be adequately explained by the socio-demographic characteristics of urban residents (age, ethnicity, class, social mobility, etc) and economic factors affecting their neighbourhoods (e.g. poverty, unemployment, inequality)
- b. Ecological - cast attention to the context in which crime takes place. Their emphasis is concentrated on analyzing where, when and how crime occurs. They stress the role of interaction of offenders with their physical and social environment. The particular socio-physical characteristics of a place, such as the number of people present, the level of surveillance, environmental and physical layout can have positive or negative effects on crime.

Causes of violence can be categorized as economic, political, social, institutional and physical. The discussions to be pursued in this study are limited to violent crime causes which are as a result of spatial organization.

2.2.1 Economic Causes of Violence

In explaining economic causes, literature (Bourguignon 1999; Fajnzylber, Loayza and Lederman 2002; Muller 1985) acknowledges that urban inequality and poverty produce unequal access to economic opportunity and are significant determinants of crime and violence. According to Zaidi (1999) “due to frustration and insecurity and the presence of absolute and relative poverty, the urban poor are forced to resort to crime and violence due to raised expectations and a sense of moral outrage that some members of society are getting rich while others are denied even the most basic levels of existence has been a well known source of discontent in the poorest as well as richest countries”.

Syagga (2007) notes that the Dandora project was implemented at a time when the concept of basic needs was more pronounced than sustainable livelihoods. What was important was provision of affordable housing to the lower income groups. Its impact therefore was verifiable in terms of numbers of houses built and not how many low-income groups have improved their livelihoods in a sustainable manner. The project was donor-driven and was more concerned with cost recovery issues rather than whether the target population was better off than before the project. The inability to sustain their livelihoods has potential of pushing urban dwellers to crime.

The economic explanation of violence falls under compositional causes of crime since it focuses on defining vulnerability of the urban poor, especially when the Government does not have any welfare programme to protect and uplift the poor to live independently in the urban environment. Provision of a good investment environment is not enough to support the urban poor. Experience in urban housing projects has shown that the urban poor cannot benefit as owners of houses as most of them end up as tenants. As noted by McInnes, (1987) this may explain residents frustrations and insecurity. Gimode (2001) on his study on anatomy of violent crime and insecurity in Kenya noted that the urban poor were “diverted towards active crime by the socio-economic forces that do not provide them with a chance to earn a decent, gainful living”.

2.2.2 Political Causes of Violence

The consequences of political cum ethnic based violence can be dire, as noted by Peace and Development Network, “the response to the contested Kenya presidential election results in December 2007 demonstrated: violence took on an ethnic character and led to large numbers of fatalities, as well as the displacement and destruction of property and livelihoods. Kibera, Mathare and Dandora informal settlements were the conflict ‘hot spots’ on this occasion. Feelings of insecurity have considerably heightened since that time and, while there is not yet adequate research into the present situation, anecdotal evidence suggests that slums have become increasingly ethnically polarized” (2009: 10).

Ethnic allegiances can provide a source of cohesion within a community amongst those of the same group. However, as was evident in the post-election violence in

urban areas, ethnic identity – while capable of providing valuable social networks and reinforcing solidarity, can be used destructively and divisively (Oxfam, 2009:12). This is a reality affecting some low income settlements in Nairobi, where certain tribes tend to live in a certain section of a neighbourhood for both social capital including ensuring adequate protection and security.

Since most of the low income residential and informal settlements of urban areas are outside the gated areas, they form neighbourhood vigilante security arrangements, mostly tribal or neighbourhood gangs who occasionally transform into a source of insecurity to the residents who are supposedly part of their clientele base. As a neighbourhood transforms mainly through development and population density, the security dynamics become more complex just as the violence experienced changes.

2.2.3 Social Causes of Violence

Fajnzylber *et al* (2002) has shown that social causes of violence are: economic, selective justice/injustice, the efficacy of punishment, lack of social capital, spatial organization and exclusion, demographic and social capital which have earlier gotten support of Ehrlich (1975), Mathieson and Passel (1976). Other causes of social violence are; substance abuse, peer pressure, poor family environment and broken homes.

Spatial Organization

Social violence is due to the spatial organization of cities and the creation of gated communities as expressions of both social and political violence. They work towards the disintegration of public spaces enhancing social division and segregation (Beal 2002; Bollens 1998).

Neighbourhood Profile

It is noted that there is constant fear among residents of the marginal urban neighbourhoods. In most cases they are seen as hideouts and havens of illegal activities. They either lack access to public spaces or do not attract visitors for fear of being victimized. Residents therefore feel socially de-linked from the urban fabric and in most cases they end up forming their own vigilante group for security provision.

Social Capital

Relative to rural areas, 'social capital' is thought to be weak in Nairobi and consequently people do not have the same kinship support networks. Most slum dwellers feel at risk from crime and violence in their settlements. This sense of insecurity is exacerbated by insecurity of tenure and the threat of eviction under which many of the urban poor live. Another major aspect of vulnerability relates to the dramatic increase in the cost of food in recent years. This has led a majority of slum-dwellers to decrease the frequency and size of their meals as well as pushing people into high-risk livelihood activities in order to meet their basic needs.

In urban low-income areas, moving between settlements and changing dwellings within a settlement is common. This can lead to households becoming 'structurally isolated', with limited ties being formed with other households in the community. However, despite the widespread perception that social capital is relatively weak in urban low-income areas as noted by Robinson (2008), one study found that social interaction did not generally take place very frequently. Households' ties with their relatives and/or friends (kin and fictive kin connections) are nevertheless a vital coping resource since in densely-populated settlements friends do at least live in relatively close proximity and are accessible (Taylor and Maithya, 2007).

The social ties are very important in crime prevention and mobilizing members to take part in community policing. Studies have shown that crime messages can spread fast in tight-knit communities. Such communities also enjoy lower levels of victimization (Maxfield *et al*, 1984). Other surveys by Taylor *et al*, (1979) have shown that the strength of local ties is a strong and independent correlate of feelings of safety.

2.2.4 Institutional Causes of Violence

In Kenya, this is blamed on the inability of the criminal justice system (police, judiciary and prisons) to handle cases of minor delinquency which generate serious violent crime. According to Governance, Justice Law and Order Reform Programme (GJLOS-RP, 2006), there is need for the Government of Kenya to widen and link institutional reforms to other key sectors, since the genesis of violence as shown by the complexity of its causes are greater and not limited to reform of the criminal

justice system. Cases of hardcore criminals circumventing the justice system have led to ruthless, violent and fatal incidences involving the police and the criminals in equal measure.

2.2.5 Physical Causes of Violence

This is the only category that fits in ecological crime causation. This shows that urban planning and architectural designs and layouts have a great potential of reducing crime in urban areas. Poor management of the urbanization process, inadequate urban services, failure to incorporate security related issues in urban management policies, apparition of poorly protected semi-public spaces are key issues in determining incidences of violent crimes. Promiscuity and lawlessness of certain districts lead to the development of zones of lawlessness (UN-Habitat, 2007).

The causes of crime in urban spaces are complex and interrelated. For the sake of this study several elements such as unequal access to economic opportunities, ethnic polarization of urban spaces which enhances social division and segregation and the inability of the criminal justice system all play an important role in understanding crime dynamics especially in a fairly poor neighbourhood such as Dandora. Literature has shown that the poor segments of the urban residents are the most disadvantaged, since they are most visible in both sides of the continuum as both victims and perpetrators of urban violence (UN-Habitat, 2007).

Vanderschueren (1996) noted that violent crime affects individuals, families and communities. It contributes to the disintegration of the social fabric and slows down economic development. Within any city or city district with high rates of violent crime, public areas are used less and less, businesses fail, the value of property falls, services deteriorate, residents move more frequently and tourism declines. These factors, in turn, further undermine the cohesion of communities and seriously damage informal mechanisms of social control. The cost of private security rises, along with the risk of the public force being used in ways that contravene human rights.

2.3 Land Use Transformation

Land is used to meet a multiplicity and variety of human needs and to serve numerous and diverse purposes. When the users of land decide to employ its resources towards

different purposes, land use change occurs producing both desirable and undesirable impacts. The discussion of land use transformation is essentially the analysis of the relationship between people and land (Anthony, 2010; Briassoulis, 2000). Land use transformation traditionally has been the subject of spatial disciplines such as geography, planning, regional science, and ecology. Recently, according to Rimal, (2011); Oyinloye and Kufoniya (2011), it has attained special prominence in academic and policy circles because of its important role and strong linkages with the other components of urban development. Land use and land use transformation are thus important phenomena in understanding the interactions of human activities with its environment and consequences of the interactions.

Land use changes in urban areas have caused a variety of effects, including social impacts, such as increased cost of providing public services, the loss of open spaces, and increased traffic congestion (Bell and Irwin, 2002). Additionally, drivers of land use changes such as increased urban populations and city expansion cause new urban problems that, in general, reduce the quality of life for important sectors of the people (Marsh, 1991). This in essence shows the interdependence between the spatial and social processes and conditions which this study is pursuing.

2.3.1 Drivers of Land Use Transformation

Theories addressing land use changes have been offered by such diverse fields as economics, urban and regional planning, sociology, social physics, environmental history, environmental psychology, biology, ecology, and geography. One commonality about all these theories is their attribution of land use changes to certain causes which are seen as drivers of land use transformations. The causes are mainly socio-economic and bio-physical in nature.

The socio-economic drivers comprise demographic, social, economic, political and institutional factors and processes such as population and population change, industrial structure and change, technology and technological change, the family, the market, various public sector bodies and the related policies and rules, values, community organization and norms, and property regime. The *bio-physical drivers* include characteristics and processes of the natural environment such as: weather and

climate variations, landform, topography, and geomorphic processes, volcanic eruptions, plant succession, soil types and processes, drainage patterns and availability of natural resources (Briassolus, 2010).

The broad goal of managing land use and its change is to develop the land resources in ways that capitalize on their local potential and suitability, avoid negative impacts and respond to present and future societal demands within the limits of the carrying capacity of the local environment (FAO, 1995). The continuous and haphazard change in urban land use of cities especially in developing countries is the utmost concern of urban planners and decision-makers. This comes about as a result of rapid increase in urban population and the ever increasing demand on urban land which poses a great deal of challenge to various land uses.

Land use change results from direct or indirect decisions to alter the current uses of land at the level of an individual land owner, of a regional or national authority, of an international body, or of any other land-related interest. Whatever the form these decisions take, the important point is that they involve decision making units and decision making processes at particular levels of one or more scales. In other words, the analysis of land use change necessarily asks "who decides to change the use of land, where, when, and why". The factors which are taken into account in the analysis relate to the particular decision making units and processes as well as to those influences which impinge on the range of choices open to the decision making units (Blaikie and Brookfield, 1987)

The assessment of land use change and the evaluation of the resulting impacts as well as the decision to act are all related to the pertinent decision making units and processes. Land management and land use planning in response to land use change or with the purpose of effecting desirable land use change are tied to decision making units at various scales. The meaningful and useful analysis of land use change in support of these functions should, therefore, pay due attention to the different scales involved and to their relationships (Briassolus, 2010).

Land use change is caused by rapid increase in population and increase in socio economic activities. The growing need for land in rapidly urbanised cities exert pressure on available land resources thereby causing change in land use patterns. The

changing structure of the city is also caused by land tenure systems and rapid and uncontrolled physical developments which occur as a result of rapid urbanisation. Achievement of a balance in the demand and supply of land requires a system of landholding which must be dynamic so as to respond to changes from one era to another (Adarkwa and Post, 2001). This is reflected in the decrease of vacant dwellings and increase in accommodation density.

Aguilar and Ward (2003) indicate that rapid urban population growth has led not only to an increasing demand for urban land, particularly for housing, but also for other various urban uses. Information on land use transformation and possibilities for their optimal use especially in urban areas is essential for the selection, planning and implementation of land use schemes to meet the increasing demands for basic human needs and welfare.

2.3.2 Land Use Transformation in Nairobi

Nairobi is Kenya's principal economic and cultural centre and one of the largest and fastest growing cities in Africa (Lamba, 1994). For over the last 50 years, Nairobi has experienced rapid growth in terms of population and spatial extent compared to other major cities in the region (Stren *et al.*, 1994). The population has increased from 500,000 people in 1970 to the current 3,138,369 (KNBS, 2010). The process of urbanization has been characterized not only by population growth, but also by industrial expansion, increasing economic and social activities and intensified use of land resources (Thuo, 2010 and Karuga, 1993).

According to Mundia and Aniya (2006), the built-up areas of Nairobi have increased from 14 km² in 1976 to 62 km² in 2000. Agricultural fields occupied 49 km² in 1976 and have increased substantially to 88 km² in 2000. Forested lands have, however, decreased substantially from 100 km² in 1976 to a mere 23 km² in 2000, a record loss of 77 km². The rangelands, consisting of mixed rangeland and shrub/brush rangeland have decreased from 357 km² in 1976 to 237 km² in 2000. The rangelands have given way mainly to the expanding agriculture and urban sprawl.

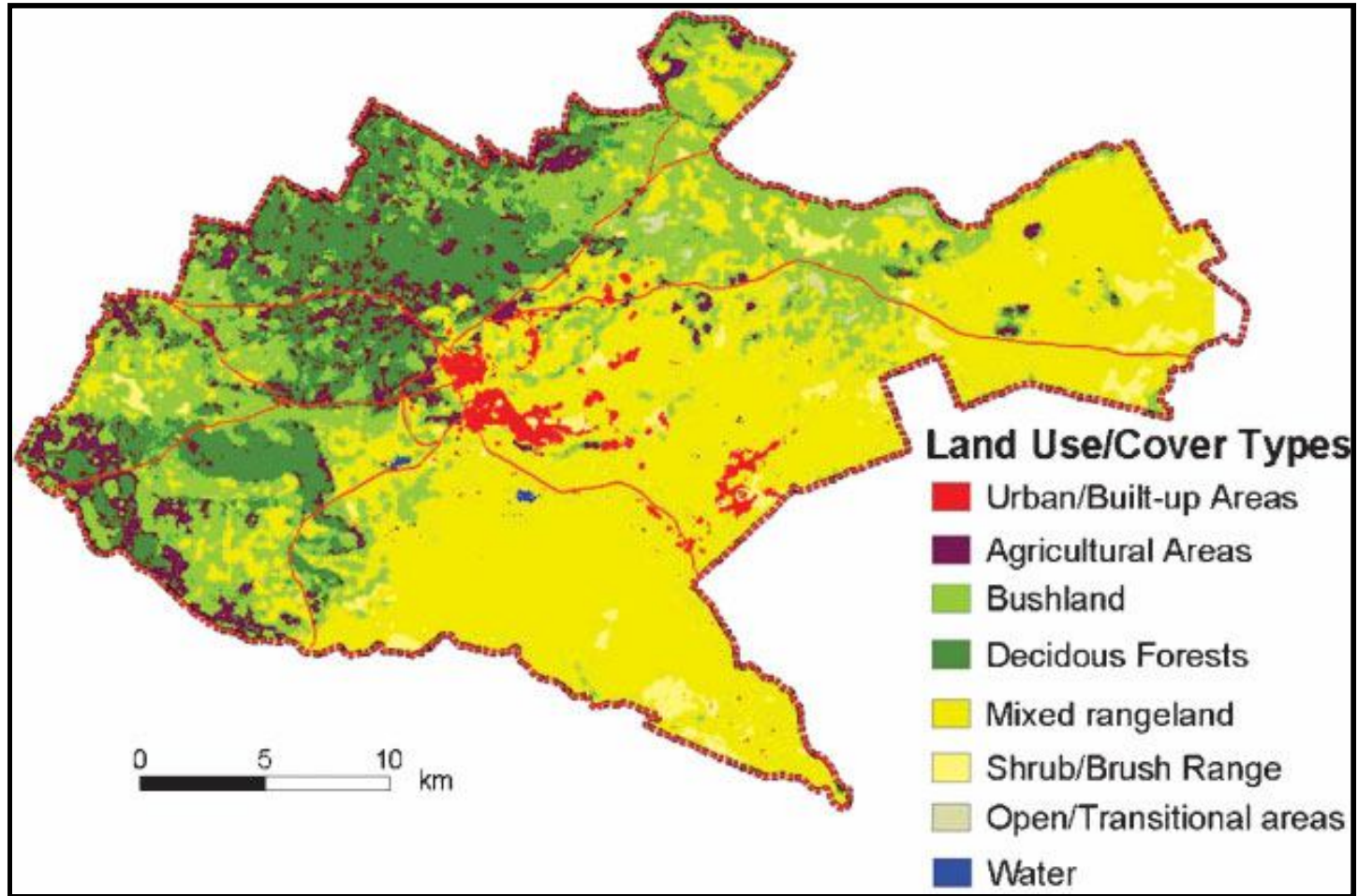
Spatial patterns of Nairobi's land use changes show temporal variations where growth has changed expansion directions in different time periods as shown in Map 1 as compared with Map 2. The change in expansion direction can be attributed to a number of factors including the *ad hoc* nature of land use planning, change of land use zoning regulations over time, and land speculation. The urban growth of Nairobi City shows some elements of both concentric and sector models of urban spatial structure. The expansion has not taken place evenly in all directions but has occurred much faster and further in certain directions. Nairobi shows a characteristic pattern of star-shaped urban sprawl where urban development has evolved along the main transport routes emanating from the city centre. The rate of transformations has been quite rapid with discontinuous patches of urban development characterizing the urban sprawl (Mundia and Aniya, 2006). Table 1 gives a summary of the major land use cover conversions that have taken place between 1976 and 2000.

Table 1: Nairobi Comparative Land Use Cover for the Years 1976, 1988 and 2000

| Year | 1976 | | 1988 | | 2000 | |
|-------------------|-------------------------|---------------|-------------------------|---------------|-------------------------|---------------|
| | Area in KM ² | % | Area in KM ² | % | Area in KM ² | % |
| Built-up areas | 13.99 | 1.90 | 41.18 | 5.77 | 61.23 | 8.58 |
| Agriculture | 49.83 | 6.98 | 57.83 | 8.10 | 87.78 | 12.30 |
| Forest | 100.15 | 14.04 | 29.09 | 4.08 | 23.56 | 3.30 |
| Bushlands | 154.48 | 22.35 | 101.49 | 14.22 | 95.98 | 13.45 |
| Mixed rangeland | 357.32 | 50.08 | 340.62 | 47.74 | 237.63 | 33.31 |
| Open/Transitional | 6.92 | 0.96 | 77.96 | 10.92 | 32.72 | 4.58 |
| Water | 0.50 | 0.07 | 1.09 | 0.15 | 3.77 | 0.53 |
| Total | 713.41 | 100.00 | 713.44 | 100.00 | 713.45 | 100.00 |

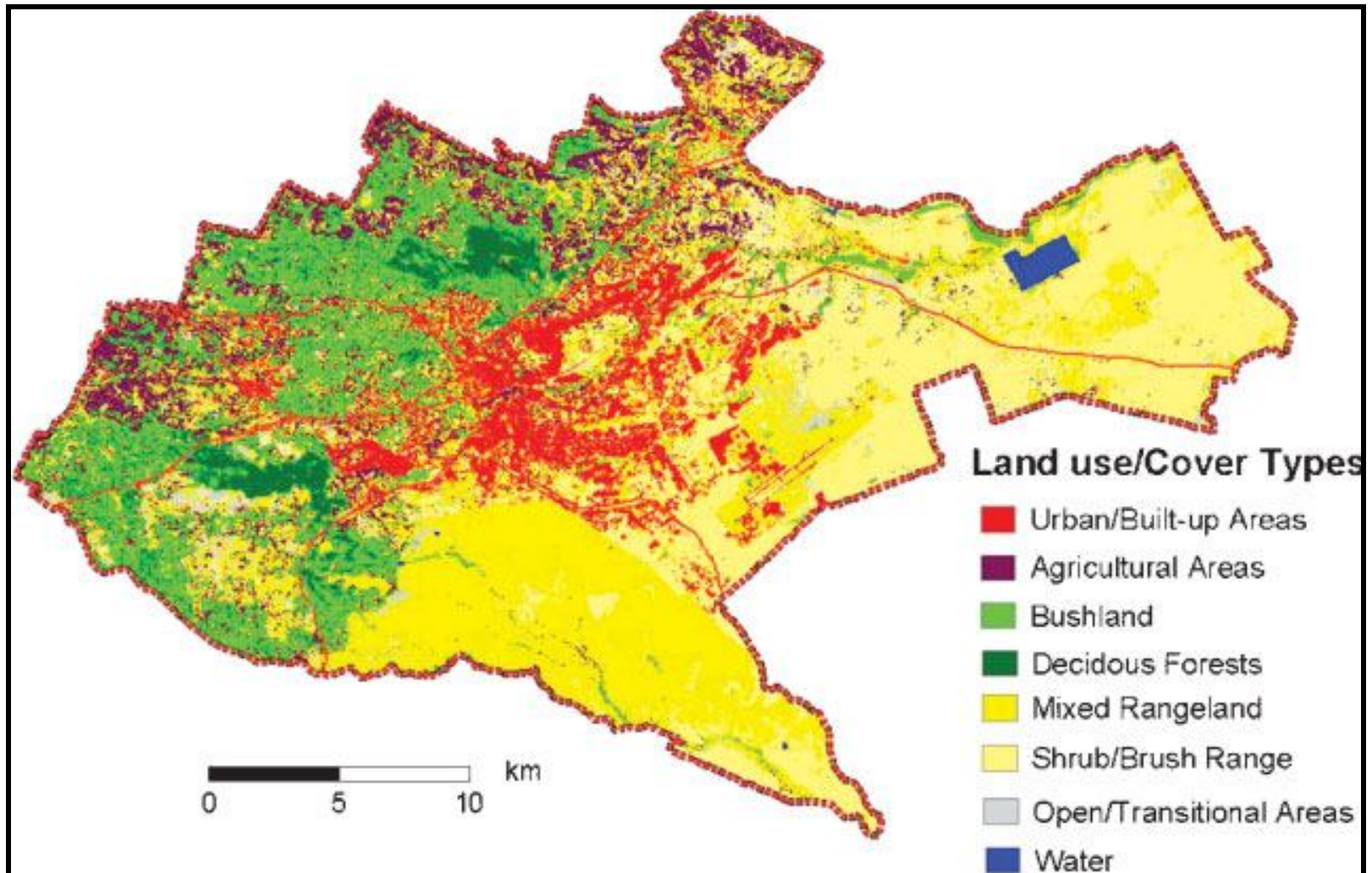
Source: Adopted from Mundia and Aniya, 2006

Map 1: Land Use Cover of Nairobi in 1976



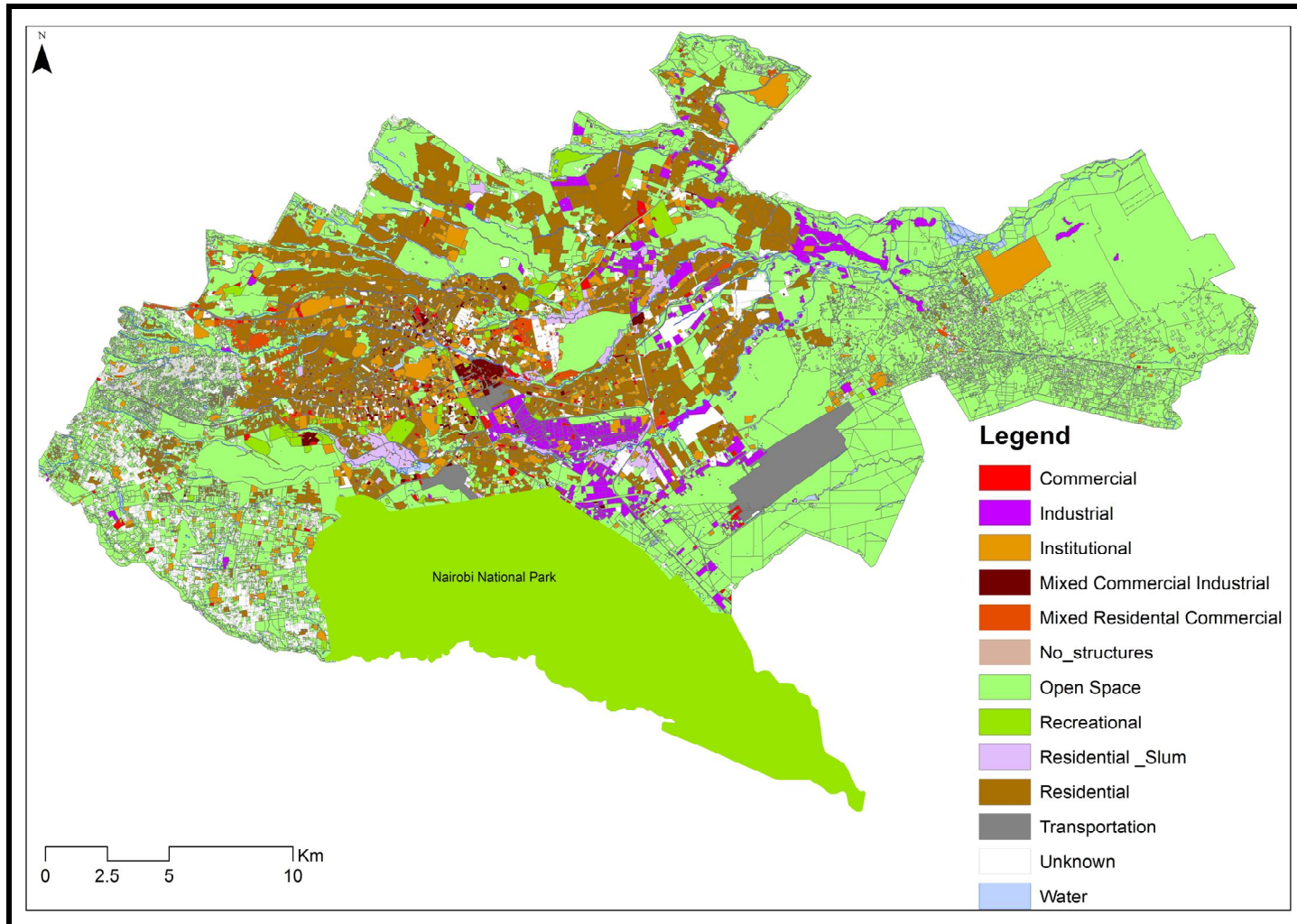
Source: Adopted from Mundia and Aniya, 2006

Map 2: Nairobi City Land Use Map in the year 2000



Source: Adopted from Mundia and Aniya, 2006

Map 3: Nairobi Land Use in 2008



Map 3 on Nairobi land uses in the year 2008, shows that Nairobi has various types of land uses with residential, recreational and open spaces being dominant land uses with pockets of industrial and commercial land uses.

Map 3 compared with map 1 and 2, shows a clear pattern of changes in land use from open spaces and greenery to built-up areas to accommodate growing residential, commercial and industrial functions in the city.

Source: Adopted from Spatial Information Design Lab, Columbia University, 2008

2.3.3 Drivers of Land Use Transformation in Nairobi

Changes in land use are driven by a host of factors including population and economic growth. The dynamics of land use change affect environmental and socioeconomic conditions. A better understanding of the causes of the land use changes is essential for land use management, formulating sustainable development strategies and in detecting environmental changes (Barnsley and Barr, 1996).

The land use changes for Nairobi have occurred as a result of interactions of a number of environmental as well as demographic and socio-economic forces. According to Mundia *et al* (2006) and Thuo (2010) Changes in land use in Nairobi can be attributed to economic development, population growth and physical factors. These are briefly discussed below.

i. Economic development

The economic development has led to the establishment of more industries, the boom of real estate and subsequently to the expansion of the built-up areas. The unregulated small-scale businesses have expanded rapidly and the employment in this sector was estimated at 500, 000 people (GoK, 2002). The increase in economic development as measured by the changes in the GDP values reflects in the change in urban expansion. Nairobi's gross domestic product (GDP) was about £254 million sterling in 1975, £645 million in 1985 and £1.1 billion in 1995. The economy, which grew much faster in the period 1975 to 1985 led to a cumulative growth of 153 per cent which also led to a higher rate of urban expansion. The period 1988–2000 had a lower rate of urban expansion, which can be explained by the slow economic growth (70 per cent) during the period 1985–1995 (Mundia *et al*, 2006).

Though it has been widely acknowledged that economic factors influence lands use transformation both across scale and through time (Zimmere and Basset, 2003). The economic development and pace of land use changes in Nairobi has not taken place evenly in all directions but has occurred much faster and further in certain direction, which can be attributed to ad hoc land use planning, zoning regulations and more importantly control of development in the City. This is supported by Hirst and Lamba (1994) who noted that with vibrant urban economy and lack of proper land use

planning and guidance urban areas are being developed only because of availability of space.

ii. Population growth

Nairobi's population has risen from slightly over half a million in 1969 to 3.14 million in 2009 (KNBS, 2009). This is a fivefold increase as compared to the 1969 population. This population has created demand for several goods and services which require space leading to change of various land uses to accommodate new functions at the expense of previous functions.

Nairobi's economy, public services and infrastructure have not managed to keep up with the increasing population. The city management has been unable to cope with the increasing demand for efficient city services since the rapid urban growth has outpaced the capacity of local authorities to provide and maintain infrastructure and basic services (Stren and White, 1989). The population, which has been growing at a rate of 4 per cent per annum, has contributed to shortage of decent residential housing leading to the mushrooming of slums, hence increased land use changes. Poor planning in addition to population increase has worsened the already appalling physical, social, economic and environmental problems Nairobi is experiencing.

Though there is some good attempt to link population and demographic factors to provision, upgrading and managing of urban oriented services and facilities traditionally through Human Settlements in Kenya's strategy for Urban and Rural Development (Purple Book) and recently through Kenya Physical Planning Handbook and Urban Areas and Cities Act. Not much has been seen implemented on the ground and more so in Nairobi where private sector have taken an active role in provision of competitive and traditionally purely public services such as education and health to those who are underserved population and hence cannot access these services due to either high population or quality of public service. This state of affair limits the role of institutions who are suppose to control development and hence end up rezoning different areas to accommodate these new developments which lead to changes in land uses in the City in a bid to serve better the growing urban population.

iii. Physical factors

General topographical features and volcanic characteristics have also played a major role in shaping and influencing the direction of Nairobi's expansion. According to Mundia *et al* (2006), the presence of the different volcanic rocks such as trachyte, phonolite, tuffs and basanite has provided cheap and easily available building materials and has contributed to the growth of Nairobi City. The tuffs are excellent building stones and are extensively used in Nairobi in the building and construction industry. Major constraints to the expansion of Nairobi City include the national park to the south of the built-up area, and the safety zone and noise corridor around the Nairobi international airport.

As noted in the Kenya Physical Planning Handbook;

“A regional plan should delineate areas covered by national parks and game reserves and identify other areas of significant bio-diversity and or endangered species, for purpose of protection and conservation” (GoK, 2007).

This condition limits development of Nairobi to a buffer zone of 50 meters around the Nairobi national park and also limits the variety of permissible land uses and heights of buildings adjacent to the airport for security reasons.

Just like many cities all over the world including African cities and urban areas generally, causes of land use changes seem to be uniform. Various literatures have shown that the changes in land uses in urban spaces are due to demographic, economic, social and more recently due to institutional factors. These are mainly related to regulatory factors focusing on the ability of various institutions mandated with the role of planning and managing urban land development satisfactorily. This state of affairs is giving urban planning a high profile in terms of addressing land use changes and related consequences, especially those threatening the life of urban residents such as crime incidences in Nairobi.

2.4 Urban Planning Policy and Crime

Poor urban planning, design and management are increasingly cited as playing a role in shaping of urban environments that put citizens and property at risk. Thus, the physical fabric and layout of cities have a bearing on the routine movements of offenders and victims and on opportunities for crime (Schneider and Kitchen, 2007).

African cities continue to grow in physical terms with accompanying problems. Spatially, cities continue to expand without proper forward planning for the carrying capacity of the existing housing, infrastructure and basic services. Lack of forward planning and development control puts the life of Africa urban dwellers at risk in terms of their security and ability to prevent crime.

Urban planning in Kenya is based on the British colonial concepts whose goals, though relevant in the past are currently obsolete. Consequently, rather than being a solution to urban problems, a restrictive urban planning code has in retrospect contributed to inadequate and sometimes inappropriate responses to emerging urban development challenges in the form of unaffordable housing and inadequate infrastructure development. By developing housing on their own, self-builders strive to fill the housing gap and even though playing a crucial role they have continued to face problems related to land-use tenure, lack of infrastructure and high cost of finance (Kariuki, 2005:5).

Enhancing urban safety and security through effective urban planning, starts from the proposition that there is a relationship between the characteristics of the built environment and the opportunity to commit crime. It therefore seeks to manipulate the built environment and the opportunity to commit crime. Key to this notion is the role of the planning system since it is through the planning system that most development is mediated.

Sherman et al, (2003) noted that there are many deliberate and non-direct efforts to prevent crime from happening within communities and these measures can be categorized as follows:

- a. Measures intended to produce a crime preventive effect but which fail to do so, and
- b. Crime prevention measures that produce crime preventive effects

In analyzing the above two levels of crime prevention, it can be analogically said that the first level best describes the concern of urban planning as it is being practiced currently in Kenya, where despite having the Safer Cities Programme in Nairobi, for

example, there seems to be no deliberate effort to mainstream crime prevention in planning. The first level can also be compared with the formal and legal systems put in place to fight and prevent crime. For example, the Kenya Police Service despite being mandated by the National Police Service Act No. 11A of 2011 to detect and prevent crime, are still unable to do so (GoK, 2011A). The second level can be said to be an ideal state, which is still non-existent in Kenya. This is a purposeful formulation of a crime prevention plan, which should be intertwined with space use, zoning regulations and enforcements of the planning standards which are geared towards crime reduction.

The lack of integration of crime prevention strategies within comprehensive city planning practices has been cited as a factor in facilitating opportunity for crime (Brantingham and Brantingham, 1991). According to Schneider and Kitchen (2002), creation of new land uses or changing of current uses can change traffic generation patterns and may provide increased economic opportunities that consequently may have both positive and negative impact on crime, since it brings new and strange people into the neighbourhood. This is a threat to social capital relevant for creating community ties.

Jacobs (1961) focused on diverse land use, arguing that neighbourhoods with different functions, that is, residential, commercial, and institutional and leisure may be safer than single functional areas. Multi-functional areas attract a constant flow of people throughout the day ensuring informal surveillance. In contrast, criminal activity is likely to occur in places that are quiet and deserted. This position is still debatable given the fact that Dandora, which is seen as the most unsafe residential area in Nairobi has different functions due to transformation (KIPPRA, 2004). What may be important to detail is whether there is certain level of different functions and designs of these uses which may be useful in reduction of crime, since mere multifunctional uses seem not to contain crime.

There is an indication that where crimes occur and how places are utilized, designed and managed provide niches for offenders to engage in crime. Urban redevelopment or new development projects are often considered with respect to the potential to

reduce criminal opportunities and incentives through site planning and the design of the proposed buildings and site operations (Eck, 2002).

The best planning effort in this epoch seems to be the Bradford Unitary Development Plan-Adopted in 2005 (Kitchen in UN-Habitat, 2007). It had a specific policy on planning for crime prevention, which states that; “Development proposals should be designed to ensure a safe and secure environment and reduce opportunities for crime”. What it seeks to do is to get developers to think about crime prevention as part of the proposed design process, rather than as a later add-on, so that when proposals are presented to the planning system for formal approval, crime prevention is already integral to them.

The study concurs with Lazarus (2004) and Platt (2004) who seems to be of the same view on the genesis and spirit of urban planning and regulation policy. They recognize that zoning emerged as a response to the need to contain the negative spill over by incompatible and “noxious” land uses, although of late zoning regulations have developed guidelines to control various undesirable effects of land use developments. Similarly, they see the genesis of modern environmental regulation as emanating from municipal efforts to curb particular excesses of urban life such as noise, waste and air pollution.

The following overarching urban policy questions continue to be relevant: are these the only visible problems in urban areas that require policy direction? Secondly, what guides the zoning and rezoning regulations for urban areas such as Nairobi? And thirdly, is crime a negative indicator worth noting or considering when rezoning and approving development and redevelopment or change of user plans?

As noted in the Global Report on Human Settlement dedicated to planning (2009), there are no models or standard recipes for urban planning that can be applied everywhere. The publication also notes that, while in some parts of the world, governments are using planning in positive ways to manage change in cities and towns, in other parts little attention has been paid to the functioning of the planning system. As such, legislation, regulations and processes are out of date, or are insufficiently reformed to be able to deal with major challenges of the 21st century.

The lack of integration of crime prevention strategies within comprehensive city planning practices is noted as a factor facilitating opportunities for urban crime.

Experience has shown that it is important for safety principles to be factored into all urban design and planning. UN-Habitat, as part of its Safer Cities Programme in African cities, has developed a number of planning and design models and suggestions. These include planning for mixed use and activity in public spaces; signage and lighting; CCTV surveillance and patrols particularly by communities (UN-Habitat, 2007).

The process of improving urban safety and security through effective urban planning, design and governance is in its infancy in many parts of the world, although it is more advanced in some countries such as the UK, USA and Canada. Focusing on the setting of crime, linking crime prevention and reduction to changes in physical design, is most advanced in the developed world. For instance, in the UK, police architectural liaison officers are available to advise planners and designers. There are also advisory documents available at both national and local government level, setting out the goals of planning system in relation to urban safety (http://www.unhabitat.org/downloads/docs/5203_99486_Bkper cent207.pdf).

2.5 Legal and Policy Framework Guiding Land Use Planning and Development in Kenya

Urban planning is about deciding in advance what to do, where, when, with what, how, on or under the land. It is a thought process that guides land use activities on space. This process has to be guided by a set of rules, regulations and standards. Demand for development in urban areas is rising at an alarming rate, thus requiring progressive urban planning policy to correct and contain the ills associated with haphazard urban development. This has led to development of various legal and policy documents with the aim of guiding urban development. Kenya has a number of legal provisions which inform urban planning and development. They include: The Constitution of Kenya 2010, The Urban Areas and Cities Act of 2011, The County Government Act of 2012, the Physical Planning Act (Cap 286) and Local Government Act (Cap 265). The last two are to be repealed to be in line with the

Constitution and other new acts such as the Environmental Management and Coordination Act of 1999 (EMCA) and Public Health Act. These are briefly outlined below.

a. The Constitution of Kenya, 2010

It is the supreme law governing the country. Chapter eleven on devolved government takes full cognition of urban areas. Section 184 (1) states that National legislation shall provide for the governance and management of urban areas and cities and shall, in particular—

- (a) establish criteria for classifying areas as urban areas and cities,
- (b) establish the principles of governance and management of urban areas and cities; and
- (c) provide for participation by residents in the governance of urban areas and cities.

(2) National legislation contemplated in clause (1) may include mechanisms for identifying different categories of urban areas and cities, and for their governance.

200. (1) Parliament shall enact legislation providing for all matters necessary or convenient to give effect to this Chapter.

(2) In particular, provision may be made with respect to—

- (a) the governance of the capital city, other cities and urban areas;

The provision of the constitution gives hope by acknowledging the importance of establishing principles of governance and management of urban areas, which is likely to lead to systematic development of urban areas, hence high probability of having future logical Land use transformation in urban areas and cities.

b. The Urban Areas and Cities Act of 2011

This is an Act of Parliament to give effect to Article 184 of the Constitution; to provide for the classification, governance and management of urban areas and cities; to provide for the criteria of establishing urban areas, to provide for the principle of governance and participation of residents and for connected purposes. Of importance to this study is section 36. (1) Which notes that every city and municipality established under this Act shall operate within the framework of integrated development planning which shall bind, guide and inform all planning development and decisions and ensure comprehensive inclusion of all functions.

In spelling out the functions of the cities and urban areas board, section 20 of the act mandates the board to control land use, land sub-division, land development and zoning by public and private sectors for any purpose, including industry, commerce, markets, shopping and other employment centres, residential areas, recreational areas, parks, entertainment, passenger transport, agriculture, and freight and transit stations within the framework of the spatial and master plans for the city or municipality as may be delegated by the county government. The board is also entrusted with the duty of promoting a safe and healthy environment. The spirit of the Act is good in promoting harmonious development which may reflect well in the way land uses are likely to change in many urban and cities landscape.

c. The County Governments Act of 2012

It is an Act of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments powers, functions, and responsibilities to deliver services and to provide for other connected purposes. More importantly and of relevance to this study, Section 38(1) of the Act spells out the role of the executive committee in an urban area or City planning as follows:

- (a) monitor the process of planning, formulation and adoption of the integrated development plan by a city or municipality within the county;
- (b) assist a city or municipality with the planning, formulation, adoption and review of its integrated development plan;
- (c) facilitate the coordination and alignment of integrated development plans of different cities or municipalities within the county and with the plans, strategies and programmes of national and county governments; and
- (d) take appropriate steps to resolve any disputes or differences in connection with the planning, formulation, adoption or review of an integrated development plan.

The provisions of these two Acts of Parliament provide a corrective oversight role with regard to land use planning where previously the role of preparation of physical plans was left to the Central Government. Implementation of the plans was a mandate of the Local Authorities, whose proximity to grassroots is commendable but often

lack resources to implement the plans and more so in enforcement of the zoning regulations needed to control development in urban areas.

d. The Transition to Devolved Government Act, 2012

The object and purpose of this Act is to provide a legal and institutional framework for a co-ordinated transition to the devolved system of government while ensuring continued delivery of services to citizens. This act together with the Constitution gives a systematic process of transferring functions and responsibilities to devolved units of Government. Part of the transition process shall involve repeal of various traditional land use planning Acts such as the Physical Planning Act (Cap 286) and Local Government Act (Cap 265). The Act shall therefore indirectly facilitate land use planning during the process of transition.

e. Physical Planning Act (Cap 286)

The Act is concerned with land use planning and development control matters. The statute stipulates the procedure for preparation of local and regional development plans.

Section 29 of this Act in pursuance of control of development stipulates that subject to the provision of the Act, each local authority shall have the power-

- (a) to prohibit or control use and development of land and buildings in the interests of proper and orderly development of its area;
- (b) to consider and approve all development applications and grant all development permissions;
- (c) to formulate By-laws to regulate zoning in respect of use and density of development; and
- (d) to reserve and maintain all the land planned for open spaces, parks, urban forests and green belts in accordance with the approved physical development plan.

Section 30 of the Act specifies that;

- (1) No person shall carry out development within the area of a local authority without a development permission granted by the local authority under section

- (2) Any person who contravenes Subsection (1) shall be guilty of an offence and shall be liable to a fine not exceeding one hundred thousand shillings or to imprisonment for a period not exceeding five years or both.

With regard to siting, amenities density and use zoning roles, Section 3(1) states that any person intending to erect a new building or re-erect an existing building shall comply with the provisions of the existing building code, local authority by-laws and the physical planning requirements and such conditions as may be imposed by the approving authority regarding the siting, size, height, shape and appearance of such building in order to safeguard, maintain or impose the dignity or preserve the amenity and general appearance of street, square, or public place or have effect on the complemented appearance of such street, square or public place.

Section 5(1) on siting (as above) of public building stipulate that no person shall erect a building on any site unless that site has been recommended by the Director of Physical Planning. Subsection 2 states that the Director of Physical planning may refuse to recommend the site mentioned in subsection (1) on the grounds that;

- (a) the site is not suitable for the purpose
- (b) the site does not sufficiently provide for the safety of persons frequenting such public building or the general public

The provision of this law to a large extent has not been adhered to in enhancing land use changes in urban areas including Dandora. This is evident from the mushrooming of various developments in such urban areas that do not follow the laid out procedures and laws. As noted by the Department of Planning of the City County of Nairobi, plan application is done by developers as a formality and whatever is presented and approved is not what most developers implement, this gives room for developers to ignore zoning regulations by going beyond approved building lines, which explains the physical building forms existing in Dandora.

The major challenge facing African cities like Nairobi is the ability to enforce developments that have both been approved and are therefore legal. This is attributed to scarcity of manpower to ensure that all developments conform to the plan and zoning regulations (UN-Habitat, 2009). Cases of corruption and political influence

occasionally also contribute to interference with the functions of Local Authority in as far as development control is concerned.

f. Local Government Act (Cap 265)

This is the only Act prior to implementation of Kenya's constitution of 2010 and more so devolution Act, governed Local Authorities' functions and modes of operations in Kenya. Local Authorities in Kenya formed part of what is referred as the local government system. According to Akivaga, et al., (1985); Smoke, (1994); Stamp, (1986) this is an elaborate system of public administration set up under an act of Parliament known as the Local Government Act Cap. 265 of the Laws of Kenya. These Local Authorities were charged with the responsibility of administering local jurisdictions as delegates of the central government.

This Act has now been repealed by several Acts such as The County Government Act of 2012 and The Urban Areas and Cities Act which are among devolution laws. Management of urban areas and cities shall now be overseen by provisions of The Urban Areas and Cities Act. The Local Government Act previously gave power to Local Authorities under Section 166 subject to other written laws relating thereto, to prohibit and control the development of the areas of their jurisdiction. The CCN are empowered by the Act to control land use development in Nairobi using zoning regulations.

According to Nairobi zoning regulations, Dandora is in Zone seven (7). The type of developments allowed in this zone include high residential flats not exceeding two storeys, a ground coverage of 50 per cent and a plot ratio of 75. The type of vertical densification in Dandora is a clear testimony that CCN has not been able to enforce development control in the area. Choguill *et al* (1996:84) confirms that this is a challenge which is facing many Local Authorities in developing countries, despite being charged with the responsibility of shaping the urban built environment. He blames this partly on the unbalanced power relationships between Central Government and Local Authorities. For instance, there is a mismatch between the office of the Director of Physical Planning (Under Ministry of Lands) and Local Authorities. Even though a lot of planning work is undertaken by the Local

Authorities, many planners are employed by the Central Government and not by Local Authorities.

g. Environmental Management and Coordination Act of 1999 (EMCA)

The statute provides for the proper management of the environment. It deems illegal all harmful activities on the environment thus making it possible to realize sustainable development. EMCA is the Act of Parliament that created the National Environmental Management Authority (NEMA), a body charged with the responsibility of coordinating environmental protection and conservation in the country.

This law has been rendered ineffective in Dandora. The location of various incompatible land uses such as schools next to bars and the dumping site, and new developments next to the railway line, power lines and road reserves mean that the provisions of the law are simply not being adhered to. The location of incompatible development such as the dumping site and new development is a clear testimony of poor enforcement of EMCA in Dandora.

h. Public Health Act

The Act is concerned with hygiene of eating places and other areas of human habitat. Part 9 of the Act deals with sanitation and housing, and it is of most significance for the control of polluting discharges. Section 116 imposes a duty on every Local Authority to maintain its area in clean and sanitary condition, to prevent nuisances and prosecute those responsible for nuisances. Nuisances include drains and sewers for the discharge of pollutants into watercourses and lakes. Similarly, under Section 126, Local Authorities have the power to make by-laws to regulate drainage and sewers. The Act also makes provision for protecting from pollution sources of drinking water supply. Section. 129 make it the duty of the Local Authorities to prevent such pollution, to purify a polluted supply and to prosecute the polluters.

2.5.1 Legal Framework Impacts on Land Use Transformation and Planning

From the analysis of the policy and legal framework guiding urban development, it is clear that urban local authorities in Kenya are legally empowered to assume responsibility over the shape of the built environment in urban areas. Local Authorities had powers over land, the built environment, informal development,

planning, and development control, the general welfare of the public, public and private works, and environmental maintenance and protection. However, the challenge in undertaking these roles as noted by Kiamba (1994) and Obudho (1994) is the supervisory role over Local Authorities by the Central Government, which is more visible in fiscal and space-related issues which essentially drive development activities. This is despite the Local Authorities having policies guided by By-laws.

Koti (2000) notes that Central Government is a significant actor in the activities that shapes the built environment. This is either through direct involvement or through influencing some key functions of local authorities. Murumba (1987) justifies the Central Government control over Local Authorities in Kenya by listing the following three points;

- ◆ Ensure even development in the country through equitable distribution of resources.
- ◆ Control is essential in a developing country with limited resources in order to obtain the maximum from money spent and to ensure close coordination between central and local government policies and services and,
- ◆ Many local authorities lack sufficient experience and capacity to operate efficiently.

Koti's and Murumba's analysis of urban development processes determinants shows the limitation and vulnerability of Local Authorities in initiating and controlling development, and determining local affairs. This position seems to disregard the vantage position and proximate location of Local Authorities in relation to their familiarity with circumstances surrounding their environment. With the new system of governance, it will be interesting to see how the County Executive Boards with the Boards of Urban Areas and Cities will manage the affairs previously handled by the Local Authorities.

This state of affairs led Koti (2000) to note that issues such as informal development whether housing or commercial sector, which is a local issue, becomes complicated due to this unbalanced power relationships between the Central Government and Local Authorities then, which is likely to be transferred to County Governments in the devolved system of governance. This is considered key for this study in understanding

and appreciating how this power-development control game is manifested in Dandora in determining land use patterns and changes in the neighbourhood.

Other legal framework issues which inhibit functioning of urban planning include outdated regulations such as the Physical Planning Act Cap 284, which seems to centralize planning powers by giving absolute planning powers to the office of Director of Physical Planning thus limiting the role of Local Authorities in participating effectively in planning in their areas of jurisdiction. Others are poor enforcement and non-compliance by citizens, but with the 2010 Constitution and more so with the enactment of the Urban Areas and Cities Act of 2011 and The County Governments Act of 2012, most of the challenges are likely to be addressed, and areas such as Dandora and other urban areas are likely to benefit from the new land use regulations, since they create clear structures and mandates of managing urban areas through integrated urban planning and management.

In the Urban Areas and Cities Act, population as one of the driver of transformation is used as a basis of classifying urban areas, hence taking cognisance of the role population play in defining human settlements. Other drivers of transformation such as economic development, physical and institutional factors are fairly addressed through Integrated Development Plan (IDP) which will be the sole basis for development control, bind, guide and inform all planning development and decisions and ensure comprehensive inclusion of all functions, nurture and promote development of informal commercial activities in an orderly manner which all have been key in explaining haphazard land use changes experienced in Nairobi including Dandora.

2.6 Crime Incidences and Impacts in Kenya

Kenya experienced political stability in the East African region from 1963 when it attained independence till mid 1980s. It emerged as a leading tourist destination with Nairobi as the hub of the region. However, from the Mid 1980s, the country began experiencing a wave of criminal violence which intensified with time. Violent crime and insecurity became the hallmarks of Kenya in the 1990s, connoting a whole complex of social themes reflecting the 'crisis besetting Kenya's society', namely political pluralism, economic hardships, insecurity in the countryside and in the city

including suburban and street crime. Crime and insecurity is a signifier of changed and hard times, which are characterized by unsafe streets, the breakdown of law and order, the criminalization of politics, economic equality and poverty (Gimode, 1999:297)

Crime and insecurity in Kenya as a whole has been increasing over the years except for the year 2007. According to police reports in 2007, the country experienced the largest reduction in crime since independence as crime trends reduced by 13per cent. This was the first time in the history of Kenya that the prevalence of crime decreased by double digits. This could be attributed to two things, either due to fear instilled by police ruthlessness in the late 2006 and 2007 “police extra-judicial killings” of criminal gangs or poor reporting of criminal incidences to the police. Table 2 shows that Rift Valley, Central, Eastern and Nairobi provinces were leading in terms of reported crime. The incidences of crime seem to fluctuate with the highest reported incidences in the entire country witnessed in 2004 and the lowest being 2008.

Table 2: Comparative Provincial Crime Figures for the Years 2004-2010

| Province | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|------------------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|
| Nairobi | 13,426 | 12,300 | 11,302 | 6,144 | 4,254 | 4202 | 5383 |
| Central | 13,187 | 12,237 | 10,900 | 12,590 | 11,108 | 8331 | 7584 |
| Coast | 8,735 | 8,629 | 8,601 | 7,665 | 8,736 | 7805 | 7357 |
| Eastern | 10,921 | 9,454 | 9,812 | 9,001 | 8,788 | 8431 | 7625 |
| R/valley | 17,478 | 15,320 | 14,730 | 12,590 | 8,743 | 16887 | 15790 |
| NEP | No Records | 605 | 949 | 786 | 808 | 872 | 1003 |
| Nyanza | No Records | 7913 | 7,962 | 7,221 | 7,776 | 7358 | 6354 |
| Western | No Records | 8546 | 7600 | 6551 | 6612 | 7805 | 7357 |
| Total Kenya | 83,841 | 75,400 | 72,225 | 59,379 | 57198 | 61120 | 57827 |

Source: Compiled from Kenya Police Website, 2012

Police sources indicate that in 2010, the country recorded a total of 57,827 criminal incidences down from 61,120 crimes committed in 2009. This translates to a decrease of 3,293 cases or a (5 per cent) reduction in national crime. In police comparative

provincial round up, Nyanza recorded the best improvement with 14 per cent reduction in crime, followed by Eastern (10 per cent) and Central Provinces (9 per cent). Increased trends of crime were only noted in Nairobi (28 per cent) and North Eastern Provinces (15 per cent) (Kenya Police 2011: pg16). This trend is also reflected in Kenya Crime Index map.

Kenya's official crime statistics as compared with other Sub-Saharan African countries is low. According to World Bank (2010) the number of murders captured in the Kenyan homicide statistics is comparatively low compared to many other Sub-Saharan African countries. The recorded homicide rate has remained roughly constant since 1987, at a level of 3 to 6 homicides per 100,000 people. Other types of crime and violence, particularly offences against people, including assault, creating disturbance, and affray and property (theft, burglary, and robbery) are also low by international standards but are believed to be pervasive issues throughout Kenya. Official records indicate that these types of offences accounted for 60 per cent of all crimes reported to the police. Of these crimes, assault increased the most in the past 15 years. Since 1995 it followed an upward trend to reach a rate of nine assaults per 100,000 people. In 2005, the rate of assault had increased markedly to 35 assaults per 100,000. The rate has remained significantly high in spite of a slight decrease in 2008 to 27 assaults per 100,000 people. Also, the rate of robbery has decreased substantially from a peak of 41 robberies per 100,000 people to a rate of nine per 100,000 in 2007.

Factors that influence incidences of crime and exacerbate insecurity in Kenya include economic and political circumstances that produce opportunities and incentives for criminal behaviour (DPMF, 2009). Insecurity has created a negative image of the country in the international community. According to the Economic Recovery Strategy for Wealth and Employment Creation (GoK, 2003), the Government of Kenya has taken cognizance of the problem of crime and insecurity as a major hindrance to rapid economic recovery; this led to identification of law and order as priority areas of reforms.

Though the crime statistics give the official reported crime, caution need to be taken when comparing them, since they are dependent on the following: (a) the rates at

which crimes are reported to the police and recorded, hence non reported crime are excluded; (b) consistency in the rules by which multiple offences are counted and; (c) differences in the list of offences that are included in the overall crime figures.

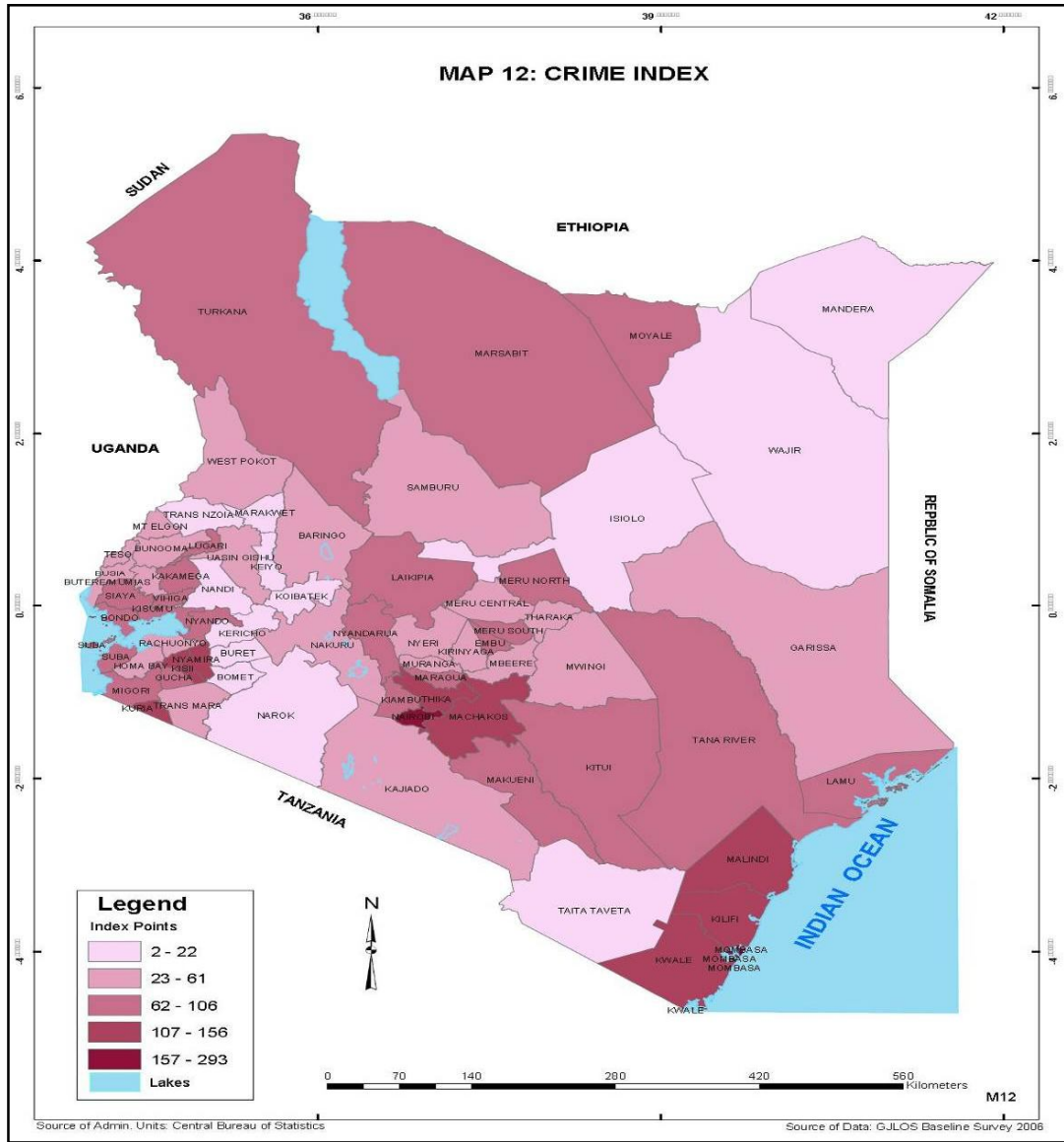
Table 2 confirms the spatial dimension discussion highlighted in Map 1, showing Kenya's crime index, where apart from regional disparities, the crime index seems to be high in urban areas as compared to rural areas. Most efforts are put in place to curb this, which may explain reduction of reported crime in Nairobi by 31 per cent, although this may raise some debates on whether reduction in reporting of crime is a reflection of crime incidences in an area. In terms of type of crime committed during the period of 2007-2008 it was found that violent crimes that include robbery, murder, car-jacking, thefts, offences against morality and offences against persons declined across the country while theft of stock, criminal damage, theft by servant and stealing increased.

Map 4 in page 60 shows an Overall Crime Index developed for the GJLOS 2006 survey, based on frequency, incidence, and severity of particular types of crime. The derived scores depict major contrasts in terms of both settings and provinces. "Urban areas were noted to be more than three times as dangerous as rural areas (197 to 62). At the provincial level, this crime-danger measure for Nairobi is roughly double (293) what it is everywhere else, with Coast Province taking second place (148). At the other extreme, North Eastern again ranks as the safest part of Kenya, its overall crime rating (16) constituting only half that of the next least dangerous province (Rift Valley, at 38), and only 1/18 that of Nairobi. Relevant here is the fact that those crimes with the highest incidence is in northern Kenya (i.e., livestock theft) entail relatively light sentences in terms of the Penal Code" (GJLOS, 2006: XVIII).

The overall reduction in crime was attributed to sustained police action to prevent criminal activities during and shortly after the Post Election violence. Construction of new Police Stations, Police Posts and Patrol bases in Rift Valley and other provinces increased Police presence and further helped to contain the situation. In addition, special operations in hot spot areas like Mt. Elgon, Mandera, Borabu and Trans Nzoia helped in returning normalcy (Kenya Police 2008: 2).

Kamenju *et al* (2004) attribute the fast growing private security industry to the high rate of insecurity in Kenya. They established that the private security industry was one of the fastest growing sectors in Kenya. This shows that more people and organizations are getting more concerned with their personal and property security.

Map 4: Kenya Crime Index



Source: Kenya National Bureau of Statistics

2.6.1 Crime Incidences in Nairobi

A number of explanations have been used to explain crime in urban areas. One of the issues gaining currency in Kenya is inequality and the widening gap between the rich

and the poor. In urban Kenya, the Gini coefficient rose from 0.426 in 1997 to 0.447 in 2006. By contrast, the rural Gini coefficient has fallen from 0.417 to 0.38 during the same period. This signifies that the urban areas are becoming more unequal than rural areas in terms of income distribution. With a Gini coefficient value currently above 0.40, the country has exceeded the 'international alert line -inequality threshold', indicating 'conditions conducive to social unrest and conflict' (UN-Habitat, 2008).

Sundquist *et al* (2006) and Sampson *et al* (1997) argue that as the number of people under the poverty line increases, the wealth of poor people declines and criminal behaviour increases. The income inequality gap also becomes larger. This confirms previous empirical studies where income inequality variables were used. Andrienko (2002) assessed the links between crime, wealth and inequality, using data from the International Crime Victim Survey of the UN Interregional Criminal Justice Research Institute and built on Becker's model of the relationship between crime and punishment. One of the major findings of his paper is that the wealth of an individual is closely related to the risk of becoming a victim of crime. In countries with higher income inequalities, the risk of individual victimization of crime is higher than in countries with less inequality.

A rising population with increasing urbanization and lack of employment opportunities aggravate the insecurity situation. A United Nations Street/household victimization survey found that in the year 2000, (37 per cent) of over 10,000 respondents in Nairobi had been mugged, (29 per cent) had been burgled and (18 per cent) assaulted. Moreover, violent confrontations between members of certain ethnic groups have taken place in the poorer areas of the capital city, much of which is perpetrated by members of what started as a religious sect under the name of Mungiki (UN, 2006). The police statistics for the year 2010 show that assault and burglary is still leading with assault accounting for 814 and burglary accounting for 501 cases out of 6102 total reported cases in Nairobi.

Feelings of insecurity, fear of crime and violence are often especially high in large cities, with women experiencing these concerns more than men due to their exposure to sex crimes. In Nairobi, the results of a survey on violence conducted in 2001 showed that one in every four women respondents had suffered at least one form of

gender-based abuse: economic, physical or emotional. Such violence occurred in all constituencies and across all socio-economic groups in the city (UN-Habitat, 2007).

The above statement also supports Glaeser and Sacerdote (1996). They highlight in their article that, when cities are getting larger, this makes the turnover on stolen goods higher, the probability of getting caught is adversely related with city size and finally, availability of resale market of stolen goods also increases with city size. This is also applicable to Nairobi, where stolen goods and hijacked persons are increasingly becoming hard to recover and trace respectively.

The impact of changing crime patterns and types in Nairobi has led to a rise in the cost of private expenditures on personal security precautions to become only second to rent as the consumer of household incomes in Nairobi. It accounts for between 9 and 18 per cent of the take home pay; this proportion of income is used to hire security guard services from private security firms. On the business front, the impact of insecurity on the economy has been significant, limiting the ability of firms to generate revenue by scaling down operations to certain areas and hours of the day (UN, 2006).

A study conducted by KIPPRA (2004:7) shows that insecurity is high and prevalent in Nairobi than in other urban centres and rural areas. It is also high among middle-income groups than other social classes. It also shows that the business community faces a much higher risk than any other social or economic group. These findings indicate that crime is not distributed evenly; they tend to occur and re-occur in certain places hosting certain land uses such as commercial uses being more prone to crime than residential land uses.

According to KIPPRA (2004:38), mugging is the most common type of crime in the city centre at (49 per cent), and in the estates (35 per cent). Violent robbery was found to be higher in the estates, (25 per cent) as compared to the rate in the city centre (10 per cent). This pattern of crime was attributed to the extra security measures put in place at the city centre, together with the presence of police as compared to the laxity and few patrols outside the city centre.

A study carried out by UN-HABITAT (2002:21) in Nairobi showed that robbery (at 37 per cent) is a crime in which threat of, or actual violence was used to dispossess a person of their belongings is the most prevalent crime committed against residents of Nairobi. It is followed by theft of personal belongings (22 per cent) and physical assault (18 per cent). The study further revealed that 30 per cent of all enterprises had been victims to a burglary during the year preceding the survey (2001). This relates crime to commercial land use.

The KIPPRA survey (2004:7), observed that there was a perceived high level of insecurity in the period 2001/2002 despite the reported cases showing a decline during the period. Furthermore, while the reported cases show an increase of (10 per cent) in 2003, respondents perceived the level of crime to be lower. A large portion (58 per cent) of firms in Nairobi still feels unsafe when conducting their businesses while (84 per cent) felt that crime posed a threat to their business operations. For the non-business community, (54 per cent) felt unsafe when conducting activities in Nairobi.

Table 3 shows specific areas where there is a concentration of criminal activities. KIPPRA found that Tom Mboya Street had the highest rate in the city followed by River Road. Across the Nairobi estates, Dandora was perceived to be the most insecure estate in the residential areas followed by Kayole.

Table 3: Specific Areas Viewed as Insecure in Nairobi

| | Specific Areas | Most Common Crimes (per cent) | | | | | | |
|--------------------------|---------------------|-------------------------------|-------------|-----------------|----------------|------------|--------|----------|
| | | Mugging | Petty Theft | Violent Robbery | Pick Pocketing | Carjacking | Murder | Burglary |
| In the City (CBD) | Tom Mboya | 56 | 3 | 8 | 32 | 1 | | |
| | River Road | 49 | 6 | 10 | 31 | 3 | | |
| | Ronald Ngala Street | 46 | 9 | 9 | 35 | | 1 | |
| | Moi Avenue | 35 | | 18 | 32 | 7 | | |
| In the Estates | Dandora | 39 | | 22 | 7 | 3 | | 21 |
| | Eastleigh | 28 | | 28 | 8 | 13 | | 8 |
| | Githurai | 20 | | 30 | | | 10 | 23 |
| | Huruma | 32 | | 31 | | 7 | 5 | 19 |
| | Kayole | 38 | 6 | 26 | 4 | | | |
| Outside the City | Thika Road | | 10 | 30 | 10 | 30 | 10 | |
| | Kiambu Road | 14 | | 29 | | 29 | 7 | 7 |
| | Githurai | 29 | | 14 | 14 | | 29 | 14 |
| | Ruiru | 20 | | 60 | | | | 20 |

Source: KIPPRA, 2004

Both the KIPPRA (2004) and UN-HABITAT (2002) surveys show that there were more criminal activities at night than during the day and more criminal activities during the weekend than during weekdays. There are more criminal activities during the end of the month, when most employees have received their salaries. Criminal activities also increase during the last quarter of the year as shown from their analysis.

The above pattern of crime was attributed to a number of factors. Criminals tend to do a cost benefit analysis before acting. It is hard to be detected and be seen at night than during the day, and they weigh the chances of getting what they want. This may explain why there seems to be a high rate of criminal activities during end month, which qualifies the rational choice theory argument.

Nairobi households were found to make a choice on where to reside based on security at (27 per cent) among other factors. Other factors that make them change residence are change in occupation at (16 per cent), moving to a more spacious residence at (15 per cent) and moving to own residence at (9 per cent). About (59 per cent) of Nairobi residents said that they make security arrangements before settling in new houses; (90 per cent) of households' rate general security of the residence as important when settling in a new neighbourhood. The physical planning of the area of residence was also found to be important at (62 per cent) in considering the location of residence (KIPPRA, 2004:57).

According to the 2006 World Bank study, feelings of insecurity ranked high in Nairobi city informal settlements. Nearly two-thirds (63 per cent) of the households concerned reported that they did not feel safe within their settlements. Surprisingly, this perception did not vary by gender. Just over a quarter (27 per cent) reported that a member of their household had actually experienced a criminal incident over the previous 12 months, with a higher proportion (31 per cent) of male than females (23 per cent) being affected (World Bank, 2006).

From this analysis, there seems to be some pattern of crime and crime prevention emerging; most crime tends to happen at night, crime threatens all types of land uses, different goods and categories of persons are targeted by criminals, most city residents are now spending their resources on crime prevention and the urban poor

have few options of preventing crime as they cannot move out of their neighbourhood easily due to financial constraints and at the same time they cannot afford to change jobs as they wish due to scarcity of jobs. In most cases their levels of education are low. These limitations explain their inability to hire private security.

These impacts are not felt uniformly. It is the lives of the poorest that are most affected by violence and crime. At the same time, they have fewer means to address and cope with these problems. This leaves the poor with little opportunity of enjoying the serenity of urban areas. They are pushed to either being part of a community initiative where people patrol in groups and in turns or face the cruelty of urban violence and crime. This makes them captive in terms of available urban security options.

There is evidence from a number of high crime cities that they have been able to develop viable and effective strategies to reduce crime levels, often working strategically with local communities. Among other things this requires cities to develop good data systems and information on which to plan their strategies. Good data collection is an important tool for identifying the main issues and needs of a city. Crime victimization surveys offer a base of knowledge for developing and updating urban management strategies, improving security methods, monitoring crime rates over time, and evaluating the efficiency of national policies (Shaw and Carli, 2011).

Though KIPPRA and UN-Habitat surveys of security and crime in the entire Nairobi city provide a glimpse of crime in the city, their findings lack spatial and geographical description and analysis of movements of crime, which explain areas of crime generation in relation to areas which are prone to crime. This is crucial in understanding how physical environment determines human behaviour within city neighbourhoods and how this can be relied on in explaining the crime-land use nexus.

2.7 Crime Response Approaches and Initiatives

Stakeholders are increasingly becoming aware that crime prevention is no longer the sole responsibility of the police but a joint venture requiring participation of various agencies, including professional bodies, private sector, community members and civil society organizations.

Countries which experience very high rates of crime and violence often resort, perhaps not surprisingly, to increasingly repressive measures. They are less likely to invest in crime prevention strategies than other countries. Yet there is considerable evidence that repressive approaches are both very costly, and ineffective, in increasing the safety and security of citizens (Van der Spuy and Röntsch 2008; Shaw and Carli, 2011).

Crime prevention literature has been concerned with two types of crime prevention strategies namely; (a) preventing crime and (b) preventing individuals from becoming offenders or continuing to commit crime. According to the Finland National Council for Crime Prevention the purpose of crime prevention is to seek;

(a) Decrease in the opportunity for crime and to have an impact on crime setting for crime so that; committing crime is made more difficult; involves greater risks (in particular risk of apprehension) or, results in lower benefits.

(b) Preventing or interrupting criminal careers is to seek to have an impact on those characteristics which lead some persons to be more likely than other persons to commit offences. In order to prevent recidivism, an attempt should be made to interrupt a developing criminal career at an early stage as possible (Finland National Council for Crime Prevention 1999:5).

Authors such as Linden (2007) have come up with different categories of crime prevention mechanisms, with some given different names but having similar meanings or sharing the same principles. There are mainly five categories of crime prevention strategies:

i. Social Development Programs – Such programs seek to reduce the number of motivated offenders by changing the social conditions that contribute to crime. Examples include programs that teach parenting skills, educational programs for at-risk youth, and employment programs for adults. These programs address the risk or protective factors that are predictive of individual involvement in delinquency and criminality.

ii. Situational Prevention – This approach turns our attention to the criminal event. Even if there are motivated offenders in a community, actions such as increasing the surveillance of potential targets or reducing their attractiveness can help reduce crime.

iii. Community Crime Prevention Programs – This category includes programs such as Neighbourhood Watch and Citizens on Patrol where community members actively become part of the crime prevention effort.

iv. Legislative/Administrative Programs – Changes in legislation and business practices may help to prevent crime. For example, zoning by-laws can keep undesirable businesses that may create problems away from residential neighbourhoods.

v. Police Programs – The police can work proactively to prevent crime. Visible police patrols in high crime areas, mandatory arrests of some types of domestic violence offenders, and curfew checks for young auto theft offenders are methods that have demonstrated some success in reducing crime.

From the list of the crime prevention programmes, the programmes can broadly be categorized based on mandates and intentions which falls into two categories namely traditional/conservative models and liberal models. The conservative model includes police, legislative and situational crime prevention programmes where the focus is on traditional crime prevention mandates and social exclusion. The liberal model includes community crime prevention and social development programmes where the focus is on shared consciousness and wider concerns about crime prevention.

At the organizational level, the traditional police response to such trouble spots typically includes heightened levels of patrol and increased opportunistic arrests and investigations. Until recently, police crime-prevention strategies did not focus systematically on crime hot spots and did not seek to address the underlying conditions that give rise to high-activity crime places (Braga, 2008).

Several researchers such as Brantingham and Faust (1976), Perlguti (1981) in Geason et al (1981: 4) identified 4 separate categories of crime and delinquency prevention. The categories are as follows;

- Corrective Prevention- This attempts to prevent crime by ameliorating social conditions which seem to lead to crime e.g. by creating viable neighbourhoods and reducing overcrowding
- Punitive Prevention- Uses police and the judicial system to deter crime
- Mechanical prevention- Emphasizes on hardware e.g. locks, doors, fences and grilles to put away criminals
- Environmental Prevention- Manipulation of building designs and the relationship between buildings and their environment to reduce opportunities for crime.

These four categories fit in well in the earlier programmes discussed. Punitive prevention goes hand in hand with police and legislative/administrative programmes, corrective prevention fits well in social development programme, whereas environmental and mechanical prevention is well taken care of the situational crime prevention programmes.

It is also possible to have three broad categories of crime prevention based on actors. Two major actors are involved as drivers of the process and a combination of these two actors is taken as a third approach. The actor based types of crime prevention can be categorized as follows:

- State driven crime prevention- e.g. police, judiciary, correction facilities etc
- Non State driven crime prevention- e.g. Vigilante and gangs, private security providers
- Public-Private Partnership- e.g. Community Policing

As crime turns violent, the control and regulation mechanisms also become harsh and ruthless so as to scare would be offenders not to dare engage in criminal activities. In an attempt to combine efforts, most governments are now working closely with the community and other stakeholders in popularizing community policing as a way of preventing crime (Davis, 2008). Crime prevention via land use has been praised as one of the most peaceful ways of preventing violent crime (Brantingham and

Brantingham, 1998; Van der Spuy and Röntsch 2008; World Bank, 2011). It is an approach that has less physical threat and harm to both the offenders and victims in equal measure.

The aim of this study is not to explain why a specific offender commits violent crime but to understand how land use and land use changes create opportunity for violent crime and crime coping mechanism. This is in line with the arguments of Donna *et al*, (2010); Cohen and Felson, (1979); Clarke and Mayhew, (1998); Shaw and McKay, (1969) who indicated that certain physical attributes such as specific land uses, street layouts, environmental disrepair and deterioration and physical features that block visibility and natural surveillance can encourage higher incidences of crime. In their studies they did not look at the analysis of the offenders but how the physical attributes explain crime occurrences as offenders go on with their routine activities within and around the physical environment.

Analysis of crime prevention approaches by Kriko and Peterson, (1996); Shaw and McKay, (1969) indicate that alteration of land use and physical space has a very important function in crime prevention, although caution need to be taken in conjunction with other socio-economic and cultural variables, hence solely altering the land use without linking it with other factors does not guarantee users security. It is for these reasons that the study borrows from Stucky and Ottensmann (2009) who advocates for Multi-contextual crime prevention theory which looks at particular circumstances in which people interact with one another and with the built environment, identifies particularly risky combinations, and looks for solutions specific to those situations. Solutions may include: Increasing the effort required to commit a crime, making it less attractive, increasing the risk of being caught, reducing the potential rewards of crime, reducing provocations and temptations and removing excuses for committing crime.

The aims of all categories are still either to prevent crime or prevent individuals from becoming offenders. The two are noble goals for any crime prevention but from a planning perspective, the study is concerned with how land use and changes of the same can be used to profile violent crime incidences and coping mechanisms whether individual or collective among the residents to protect their turf, and that is why the issue of community policing is taken as an important aspect in understanding the wider and available crime coping mechanisms in Dandora neighbourhood.

Community crime prevention is emerging as the strategy where communities take leading role in reducing and preventing criminal activities.

In Kenya, for a very long time issues related to crime management and prevention had been left to the government and it has been handled through the police, prisons department, provincial administration, judiciary and at times Local Authorities. Over reliance on the Government has not been very effective and the Government and community and other stakeholders such as the private sector have acknowledged the need for cooperation. This has led to several initiatives geared towards preventing crime. Some of the notable fruits of this change of tactic is: community policing and Public-Private Partnerships among others (GoK, 2006).

2.7.1 Crime Response and Prevention in Kenya and Nairobi

The security sector has witnessed a diversity of providers of the services. Apart from the Kenya police service, crime has made it imperative for consumers of security services to look for alternative provisions like private security companies and community security arrangements (CBOs). Inability of the state to provide adequate security, rampant inefficiencies in law enforcement agencies, expansion of property ownership and dwindling public confidence in the police force has contributed to the growth of private security providers (KIPPRA, 2004).

Private security is a major feature of urban Kenya. Kenyan businesses spend 7 per cent of their sales on security, infrastructure and personnel, another 4 per cent on insuring property and 2 per cent on neighbourhood security (Kpundeh 2008). Estimates on the number of private security firms vary from 400 to 2000, employing approximately 50,000 people (World Bank, 2010). In many sectors for example, the transport sector, these private security firms are better equipped than state police services. Moreover, upper class Kenyans make use of private security firms whereas poor urban dwellers are forced to rely on vigilante groups to enjoy minimum levels of security.

Commonwealth Human Rights Initiative (CHRI) and Kenya Human Rights Commission (KHRC) (2006) note that while a few vigilante groups strive genuinely to enhance public safety and security in their locales, a large majority are completely

unaccountable to any one or any institution and some Vigilante groups such as the Kuria-based SunguSungu, also perform controversial prosecutorial and judicial roles in which they conduct illegitimate trials and punish suspected criminals with heavy handedness and in blatantly unlawful ways. Given the unreliability of vigilante and their illegal modes of operation private security has grown exponentially in the last decade in Kenya and in other countries in Africa (Mkutu and Sabala 2007). Their growth is driven by the security concerns and ability of the rich and middle income earners to afford their services.

While the wealthy are able to afford the services of commercial security organizations, a majority of the population is unable to afford them, and is thus forced to turn to non-state and community based systems, which though not necessarily always legal, are still largely recognized as legitimate actors in these communities. In spite of this, they do not always provide equitable security and access to justice for all community members (Olonisakin et al, 2009:11). Innes and Jonnes (2006) have analysed the ways crime, disorder, fear of crime and social control impact on neighbourhood security, thereby influencing how places and the people in them change over time by analyzing the concepts of risk, resilience and recovery ('the 3Rs' of urban change) in the following manner.

- Risk factors are insecurity-generating conditions that increase the likelihood of an area decaying and declining. They are risk factors because, while crime and disorder can corrode security leading to decline in some localities, in other areas this does not happen because of the presence of resilience factors.
- Resilience factors enable some places to withstand and mitigate the risks and threats to which they are exposed. A neighbourhood's resilience capacity reflects the distribution of economic and social capital, and is connected to the presence or absence of collective efficacy.
- Recovery factors promote and propagate enhanced security and in the process contribute to an overall material improvement in a neighbourhood's situation.

The 3Rs have been applied though in a different manner by some neighbourhood associations in Nairobi such as Karengata, Kahawa Sukari and Imara Daima in management of their neighbourhoods though each having specific needs of neighbourhood rules they achieve the desires of neighbourhood security management

by controlling allowable development which to a larger extent restricts permissible activities in a neighbourhood. This is easily achieved when the neighbourhood residence are owners of their buildings.

One of the most noted changes in urban places in Nairobi over the last few decades in response to crime has been the growth of gated communities, a logical conclusion to the argument for defensible space. While these communities have, in part, been a response to growing urban crime and concerns about security, their impacts are far greater, leading to an increasing polarization of urban space and segregation between urban poor and middle-and upper-income groups (UN-Habitat, 2007).

The poor stratum of urban residents in places such as Dandora, Kayole, Riruta and Pipeline among others may not be in a position to match the structured organizational level of neighbourhood associations such as Karengata, given that most of them are low income earners, tenants with very few of owners living in their midst and in most cases are not in a position to hire reliable private security firms. These leave them with the option of relying on informal forms of protection such as vigilante groups. The problem as noted in literature of non-state actors is on how the non-state security providers can be made to equitably be responsive to security needs of all community members and also enhance their crime detection and prevention level without threatening the lives of the perceived criminals and general offenders.

Structured Community Crime Prevention is emerging as a crime prevention effort in Kenya. Community policing focus is enhancement of safety and security in public and private places. Communities have always organized themselves as vigilantes³ and other forms of neighbourhood watch groups in order to ensure security and safety for residents and occupiers of different neighbourhoods, but the structured community policing came into being in 2004 after National Rainbow Coalition (NARC) party took power in the year 2003 after 39 years of one party rule. This was mainly informed by the Governance, Justice, law and Order sector (GJLOS) reform programme, initiated in 2003.

³ The rapid expansion of Vigilantism in Kenya is perhaps the most illustrative expression of the nominal confidence the community has in Police. They are formed in response to a doubt that police can effectively secure the lives and property of community members. Generally, vigilante groups conduct day and night patrols in low-income urban neighbourhoods. (Commonwealth Human Rights Initiative, 2006)

As regards law and order reforms, government has prioritized respect for Rule of Law, situational crime prevention (dealing with opportunities for crime), social crime prevention, dealing with the context and motive for crime, drug and substance abuse, citizen participation through community policing, enhanced safety and security in public and private places among others (GoK, 2007:13).

Recognition of community crime prevention initiatives in Kenya were highly boosted by GJLOS and it clearly stated that the need to develop a public policy which addresses public safety and security policy, which should provide comprehensive measures to deter, detect and reduce crime. The programme relies on active Community involvement. It encompasses the community and police working together in partnership for public safety. The main goal of this form of policing is to reduce crime and disorder by applying appropriate problem-solving remedies. It accomplishes this goal by combining the efforts and resources of the police, the government at large and community members.

The main objective of community policing is to ensure partnership between the Community and the Police (<http://www.kenyapolice.go.ke/> ; Safeworld, 2008 and International Peace Academy, 2004). This is aimed at building and sustaining the structures that support police-community cooperation with a view of developing mutual trust and confidence at all levels. This is assumed to improve the level of crime reporting which culminates to reduction of crime. It is however important to note that despite encouraging partnership with community in crime prevention, community policing does not imply that police are no longer responsible or that the primary duty of their mandate is subordinated, section 14 of the Police Act, Chapter 84 Laws of Kenya, still gives police absolute mandate of fighting crime.

From the foregoing discussion, it is recognized that crime deterrence cannot be solely solved through criminal investigations which depend on gathering of factual information, without which no case would be solved, no stolen property recovered and no missing person located. Crimes are usually prevented because the perpetrator is immediately known or because a suspect is identified through information provided by members of the community or public.

2.8 Reforms in Security Sector and Crime Intervention in Kenya

Police reform in Kenya is a critical issue not only for community safety and economic development, but because there is intense popular demand for reduced crime and better police performance. Since 2003, Saferworld, in collaboration with its local partner PeaceNet, has developed and implemented a Community Based Policing (CBP) programme in Kenya. The programme aims to improve relations between the police and communities, and to enable them work together to seek solutions to community safety concerns. This has been achieved through the creation of inter-agency partnerships, community involvement and collaboration with key stakeholders, including the Office of the President, the Kenya Police and the Administration Police. The CBP approach has been tested and developed in two pilot sites in Nairobi's Kibera and Eastern province Isiolo supported by Saferworld (Saferworld, 2008: 13).

Given the crime situation in Kenya, the government in 2003 designed a five year programme; the GJLOS Reform Programme which is currently in its second phase under a four-year Medium Term Strategy (MTS). The focus for the MTS is deep, sustainable sector wide reforms in the priority areas of governance, ethics and integrity, including the fight against corruption; respect for human rights in Government institutions; access to justice, particularly for the poor, marginalized and vulnerable; crime prevention, police reforms and penal reforms; enhanced public prosecutions and legal services to the public; and reformist-led capacity building with a focus on attitude and culture change (GoK, 2003).

GJLOS vision is to realize a safe, secure, democratic, just, and corruption-free, human rights respecting and prosperous Kenya for all. This programme focuses on 3 areas namely; (a) better governance, (b) better justice and (c) better law and order. GJLOS mission is to reform and strengthen sector institutions for enhanced protection of human rights, efficient, accountable and transparent governance and justice. The programme aims at making the government more responsive to the needs and rights of society (GoK, 2007: VI). In order to realize its vision it was taken as the bedrock of reform, and given double focus, on improving the supply-side of laws, institutional service delivery and systems that enhance governance and justice, and are accessible

by all including the poor, marginalized and vulnerable; but also by creating the demand-led space for participatory governance, an important concept often ignored in governance reform (GoK, 2007:1).

The expected key results for the GJLOS reforms are : i) Responsive and enforceable policy, law and regulations; ii) More effective GJLOS institutions; iii) Reduced corruption related impunity; iv) Improved access to justice especially for the poor, marginalized and vulnerable; v) More informed and participative citizenry and non-state actors; and vi) Effective management and coordination of the GJLOS programme. For this to be achieved the reforms noted that there will be need to review and formulate laws and regulations to guide the desired institutional reforms.

The policy reforms envisaged in GJLOS have been achieved through the Constitution promulgated in 2010. This has led to enactment of 3 major Acts namely; The National Police Service Act No. 11A of 2011, The National Police Service Commission Act No. 30 of 2011 and The Independent Policing Oversight Act No. 35 of 2011 which have led to the establishment of the National Police Service Commission (GoK, 2011B) and Independent Policing Oversight Authority which provide for the terms and conditions of service and procedures for recruitment and disciplinary measures for civilian members of the service among others and giving room for civilians to hold the police accountable to the public in the performance of their functions (GoK, 2011C). These reforms are still new and their impact and functional relevance is yet to be fully understood and felt.

◆ **Safer Cities Programme**

Various crime prevention mechanisms have been developed so as to tackle possible causes of losing of lives and properties. One of the notable programmes, focusing on crime prevention is UN-Habitat Safer City Programme, which is geared towards promoting and addressing urban safety issues by promoting holistic crime prevention approaches in collaboration with central and local authorities, criminal justice system, the private sector and civil society. This programme has been undertaken in collaboration with various cities such as Nairobi in partnership with other stakeholders.

The Safer Cities Programme focuses on promoting holistic crime prevention is noble, but the big challenge lies in empowering various actors and stakeholders by coming up with a workable framework of preventing crime. In Nairobi, the initiative can be of benefit if the preparations of plans are done by the local authorities, but since planning in Kenya is centralized, which is slow and bureaucratic, much has not been achieved. This is worsened by the fact that some of the planning by-laws used by the City County of Nairobi are not dynamic enough to embrace crime prevention in relation to development application and approval.

2.9 Theoretical Framework

A number of theoretical approaches have sought to explain urban crime as it has long been an important area of interest for criminologists, sociologists, urban planners and geographers. Criminologists and sociologists believe that crime results from social stress and conflicts and the rates of crime in urban neighbourhood are highly affected by the demographic and socio-economic contexts (Reith, 1996).

This research contributes to the ecological theory of crime literature, which is geared towards understanding violent criminal event in relation to the physical backcloth against which crime occurs and how this impact on crime prevention mechanisms. The study focuses on how characteristics of changing land use(s) help in defining the criminal activities in Dandora neighbourhood and, how this knowledge can be useful in crime prevention. The study's focus is guided by a combination of complementary theories such as opportunity and situational crime theories which are key in understanding the structure of criminal opportunities that are perceived to be located within the physical environment, hence giving wider prominence to physical attributes of a place as a condition of understanding crime pattern and crime prevention mechanisms.

The theoretical frameworks explaining the interaction between land use and crime incidences can be divided into two categories namely:

- Compositional also known as non-ecological theories such as classical, formative and social control theories and

- Ecological such as positivists, place-based (Situational crime prevention), structural-functional, social-disorganization, broken windows, routine activity, rational choice and situational crime prevention theories.

These two broad categories use different units of analysis to explain crime.

2.9.1 Compositional Theories

This group of theories focus their attention on the offenders, which are the people who commit crime. They premise their arguments on the variation in crime rates in the intercity as a result of the existence of the socio-demographic characteristics of urban residents such as age, ethnicity, class and social mobility among others and economic factors affecting offenders' neighbourhoods such as poverty, unemployment and inequality among others.

Compositional theories tend to look at aggregate socio-demographic and economic data of neighbourhoods as independent variables of crime.

2.9.1 Ecological Theories

This category of theorists on the other hand focuses on the context in which a crime takes place. They give prominence to analysis of where, when and how crime occurs (Brantingham and Brantingham, 1981); focusing on analysis of the micro-environment of crime, the social and spatial characteristics of the behaviour settings in which crime takes place. They stress the role of opportunities in crime causation as well as the interaction of offenders with their physical and social environment (Cohen and Felson, 1979; Felson, 1994) which may influence their choice of targets (Eck and Weisburd, 1995).

The theories view criminals as rational individuals likely to act when opportunity arises, but reluctant to commit crimes when there is a likelihood of being apprehended (Cornish and Clarke, 1986). The motivation to commit or not to commit crime is influenced by different land uses attracting different calibre of people in most cases having different missions to accomplish.

What is clear in these theories is the significance and emphasis put on places as a setting of crime. The particular socio-physical characteristics of a place such as the number of people present, the level of surveilability, physical layout and environmental attributes have either positive or negative effects on crime incidences. As early as 1942 Shaw and McKay (1942:27) noted that neighbourhoods and communities that cannot solve commonly experienced problems will tend to have high crime rates.

Ecological theories place particular emphasis on the way various cultural or sub-cultural groups develop their own particular norms and values in a way that reflect both their physical and material circumstances or situations. This is quite useful in this study in terms of understanding how the land use transformation impact on violent crime incidences and at the same time in seeking explanation of community initiatives in developing of appropriate security or crime prevention norms and values.

2.9.2 Routine Activity Theory

Routine activity theory as part of ecological theory is important in explaining criminal opportunity theory focusing on the daily rhythms of life in a geographic area and how those rhythms, created by the activities of residents and visitors, create opportunities for crime. Central to the theory is the idea that the spatial and temporal variation of three key elements; offenders, targets, and guardians creates criminal opportunities. According to this theory, a motivated offender, a suitable target, and the absence of a capable guardian are necessary conditions for a criminal event. In this respect, the underlying motivation of individual offenders is not considered.

In giving a different but a progressive view in relation to urbanization and new urbanism, researchers have attempted to offer explanation that urban population size and density both contribute to the creation of crime cluster areas (Sampson and Groves, 1989; Stark, 1996; Wikstrom, 1991). Population size can affect the level of crime in an area by increasing the level of anonymity among residents of an area, which is in line with routine activity and to a certain extent with the ambit of social disorganization argument.

Sampson and Groves (1989) suggested that urbanization may thus decrease the ability of residents to form strong networks. Closely related to this, Stark (1996), noted that places with larger populations and higher densities can be expected to have a larger variety of land uses. In this way, more opportunities for crime may exist in an area than if it were simply residential, retail, or industrial. The mix of land uses may bring together opportunities and offenders who might not have otherwise met. By increasing the number of opportunities and offenders in an area, density can work to increase crime. Jacobs (1961) on the other hand argued that the circulation of people and appreciation of public space are crucial elements to the urban vitality and indicated that informal (natural) surveillance ("eye on the street") is a good deterrent to criminal activity.

Argument by Sampson and Grooves neutralizes Jacobs and Newman's arguments. They view population size and density as surrogates of intensity of land use and these have been used by planners in determining the carrying capacity of various places and zones to avoid social and environmental ills. Their argument is against the view propagated by new urbanist such as Jacobs who argues for mixed use development as a panacea to isolation and insecurity.

2.9.3 Defensible Space and Crime Prevention Through Environmental Design (CPTED)

In relation to land use planning the urban design is noted to contribute to crime occurrence, the most influential empirical study that examined the crime-environment connection was conducted by Oscar Newman (Newman, 1972). He elaborated the idea of defensible space and its most important elements of territoriality and natural surveillance. However, it is important to note that Newman did not look at the relationship of crime and land use *per se* but appreciated the built environment design perspective as a way of enhancing territoriality.

Place-based crime theories e.g. defensible space though important in appreciation of place condition and design in crime debate cannot solely be relied on to exhaustively explain causes of crime and prevention. Their relevance can only be viable when they take full cognizance of activities generating or attracting crime. Thus they need to be

superimposed on crime generators and attractors' explanatory factors for sustainable crime prevention in the neighbourhood.

Other arguments which are related to urban design are the prospect or refuge theory by Appleton (1995). This examines the physical and visual access and opportunity for escape and Space syntax by Hillier (2007) which is concerned with what is termed as configurational accessibility which basically looks at the layout of places and how this enhances permeability or accessibility of the area including interaction patterns in an area.

2.9.4 Situational Crime Prevention and Social Disorganization Theory

Brantingham and Brantingham (2005:272) described in more detail crime prevention approaches that use architecture and urban planning as place improvement processes that reduce crime by reducing the crime attractiveness of areas and by reducing crime generators. Earlier articles (Cahill and Mulligan, 2003; Santiago, 2003; Shaw and McKay, 1942) on crime prevention programs have also emphasized situational design approaches to reducing crime. This has involved linking the work of criminologists to other professionals' e.g. urban planners, health planners, and urban designers and their work help in reducing crime potential, nuisance behaviour, and fear in public and private spaces (Whin-Yates 1996; Brantingham and Brantingham 1998).

Substantial neighbourhood crime research has also documented that urban crime occurs most frequently in stressful and disadvantaged areas with disproportional concentration of poverty, unemployment, and minority populations (Ackerman, 1998; Anselin, 2000; Kershaw and Tseloni, 2005; Nagle, 1995; Osborn et al., 1992). Two predominant criminal justice theories -social disorganization theory (Shaw and McKay 1942) and the routine activity theory (Cohen and Felson 1979; Felson and Cohen, 1980; Hindelang et al., 1978) have been frequently cited to interpret the linkage between crime and the urban neighbourhood contexts.

The social disorganization theory argues that socio-economic stress (e.g., poverty, racial/ethnic issues, etc) undermines social control level and strikes the foundations of social cohesion, which results in occurrence of crime (Ackerman, 1998; Agnew, 1999; Bursik, 1988). The routine activity approach claims that criminal activities are

related to the characteristics of the social environment and the behaviour patterns of people who live in the neighbourhood or community. Three indispensable elements are related to the rate of occurrence of crimes: abundant opportunities, profitable targets, and least risk or lack of surveillance (Anselin et al., 2000; Roncek and Maier, 1991; Sherman et al., 1989). The two theories have been combined to link to express criminal opportunity perspectives as a result of both the neighbourhood conditions and its impact on routine activities.

2.9.5 Space Syntax and Sociological Theories

This is another theoretical argument explaining physical environment as a basis of understanding crime prevention. This is informed by Hillier (2007: 18) who came up with the concept of virtual community and noted that:

“Virtual community” concept refers to that feeling of security and belonging, where one is conscious of the presence of other inhabitants of the neighbourhood and the city that can be characteristic of urban space. It is “*virtual*” because it has not yet been manifested as a community, since co-presence does not imply community, but it is the first ingredient for its formation. In Space Syntax terms virtual community is understood as the potential field of encounter and co-presence product of the spatial configuration.

The challenge in operationalizing this theory is inability to get spatial data which can help in measuring the connectivity of spaces using grids of crime in the study area, however some of its principles can be achieved by analyzing the arguments of presence and absence of people as a natural surveillance, which is well conceptualized in the opportunity/Functional theory and wider social disorganization theories. These are explained later in the study’s theoretical schematic diagram. This is also related to positivists theories in the sociological arena namely Emile Durkheim and Ferdinand Tonnies who came up with the notion of “*anomie*” and “*arbitrary-will*” which they noted to be worse in urban areas, where informal social bonds tended to be weakened as societies begin to develop in both size and increasing number of social relationships (<http://www.sociology.org.uk/devteco.pdf>). This theoretical standpoint is supportive of social disorganization theory which is also concerned with the social control of areas.

This study utilizes two interrelated ecological theories namely; routine activity and social disorganization theories. The social control-disorganization theory focuses on the ability (or lack thereof) of residents of some spatial unit (e.g. a neighbourhood) to collectively come together to achieve a common goal, like reducing predatory crime and the routine activities theory on the other hand which focuses on the presence of opportunities for crime in an area, as shaped by residents' daily activities which is shaped by land uses. The interaction of the two theories harmonizes analysis of both individuals and community in relation to land use. The two theories suggest different levels of analysis: social control theory considers community explanations for crime, while routine activities theory is often interpreted as focusing on the individual, with three distinctive characteristics as either the offender, victim and a guardian.

The opportunity approach suggests that different land uses create different prospect structures for crime by influencing the mixture of motivated offenders, potential victims, and the presence or absence of capable guardians. So a church may create a different set of social interactions that seem less likely to place offenders and victims in proximity (in the absence of guardianship) than commercial activities. On the other hand, social disorganization theorists argue that mixed or non-residential land uses impede the ability of residents to maintain social control by increasing street traffic, which increases the number of strangers in an area; reducing residents' ability to differentiate locals from outsiders or by increasing actual or perceived neighbourhood deterioration, disorder, or incivility.

The strength of this research theoretical framework is its reliance on integration of these two theories despite having different levels of analysis. This theoretical framework requires the development and use of multilevel models of crime in relation to land use transformation which gives consideration to both individual, situation, and social context simultaneously. This will require using household measures of opportunity and neighbourhood contextual aspects measuring or documenting disorganization or disorganization attributed to land use transformation.

The spatial pattern of land use across an urban area is also an important consideration in any study of routine activities as the land uses in large part determine what kinds of human activities can and will take place in an area (Wikstrom, 1991). Morenoff *et al*

(2000) also identified land use patterns as an important element in determining routine activities of an area and whether certain types of crimes may be more likely to occur. For instance, if an area comprises mainly of retail space, certain types of theft, like shoplifting or motor vehicle theft are probably more likely. The number of bars in an area may cause an area to be particularly prone to crimes like assault. Residential areas may be prone to other types of crime, like burglary.

The land use patterns also have a temporal element: crimes in residential areas most likely occur during the day, while residents are at work. In retail spaces, crimes may also be more likely during the day. However, in areas with a large number of bars, crimes will be more likely to take place in the evening or night time hours as observed by Cornish and Clarke in their work on “Reasoning Criminal: Choice perspectives on offending” (Cornish and Clarke, 1986). In a neighbourhood undergoing changing land use, there is a production and reproduction of a mobile population, where residents are continuously moving in and out. Sampson and Groves (1989) noted this as a “barrier to the development of extensive friendship networks, kinship bonds, and local associational ties”. High levels of mobility lead to lower levels of control, both formal and informal.

Despite these indicators of land use and crime pattern, the organization and re-organization of human activities on land has not always sought to provide for the safety, security and the well being of both the current and potential land users. They have instead channelled their efforts in addressing land use compatibility, environmental sustainability and suitability and population growth. These are all done at the expense of all encompassing social goal, crime prevention and reduction which in itself enhance safety, security and well-being of land users.

Munda (2004:663) with reference to multi-contextual system noted that each theory can continuously add new relevant qualities/attributes that should be considered when explaining, describing or forecasting their behaviour (i.e. human systems are learning systems). The strength of multi-contextual theoretical framework in such a study is the inherent principle in it; that no single theory and theoretical analysis can optimally explain simultaneously crime incidences in relation to land use changes. This observation create room for adoption of various theories and theoretical explanations in a compromise and compensatory manner based on the strength and ability of each theory to clarify possible positions emerging from the evidence from the study. This

is a form of triangulation of theories whose operationalization is infused in the data collection and analysis.

2.10. Conceptual Framework

This study examines the context of crime by testing the socio-spatial relationships between crime and land use transformation. Various schools of thought have explored the relationship between land use and crime. They have developed different systematic explanations of the nature and direction of the relationship between land use and crime, with several of them noting the impact of land use on crime. Changes in land use increases or reduce the number of potential targets while separating them from the people who can protect them (handlers, guardians, and managers).

In relating land use and crime occurrence and prevention, this study is focusing on various forms of possible interventions such as examining the potential of waves of land use transformation in Dandora such as uncontrolled high rise development, informal developments in public spaces, and poorly managed waste dumpsite among others in creating forms of unsettling and disruptive effect upon established Dandora community. This consequently may affect the community synergy required to safeguard and protect the community from violent crime and other forms of crime. This relates with the arguments of social disorganization theory which focuses specifically upon the way in which general rapid urban development weakens the social bonds that tie people to one another.

From the perspective of spatial analysis, geographers and planners, crime is seen to have a geographic dimension and it is disproportionately distributed across different geographic scales (e.g., national, regional, and local). Within cities and metropolitan areas, crime is exceptionally concentrated in a relatively few, small areas sometimes referred to as crime hot spots (Anselin et al. 2000; Sherman 1992; Weisburd and Green 1994). Works of Shaw and McKay's on explaining the spatial disparities across neighbourhoods in the city of Chicago in early 1940s is also a pointer to this. Neighbourhood crime has been the most vibrant arena for research on the regional variability of crime (Cahill and Mulligan, 2003; Santiago, 2003; Shaw and McKay, 1942).

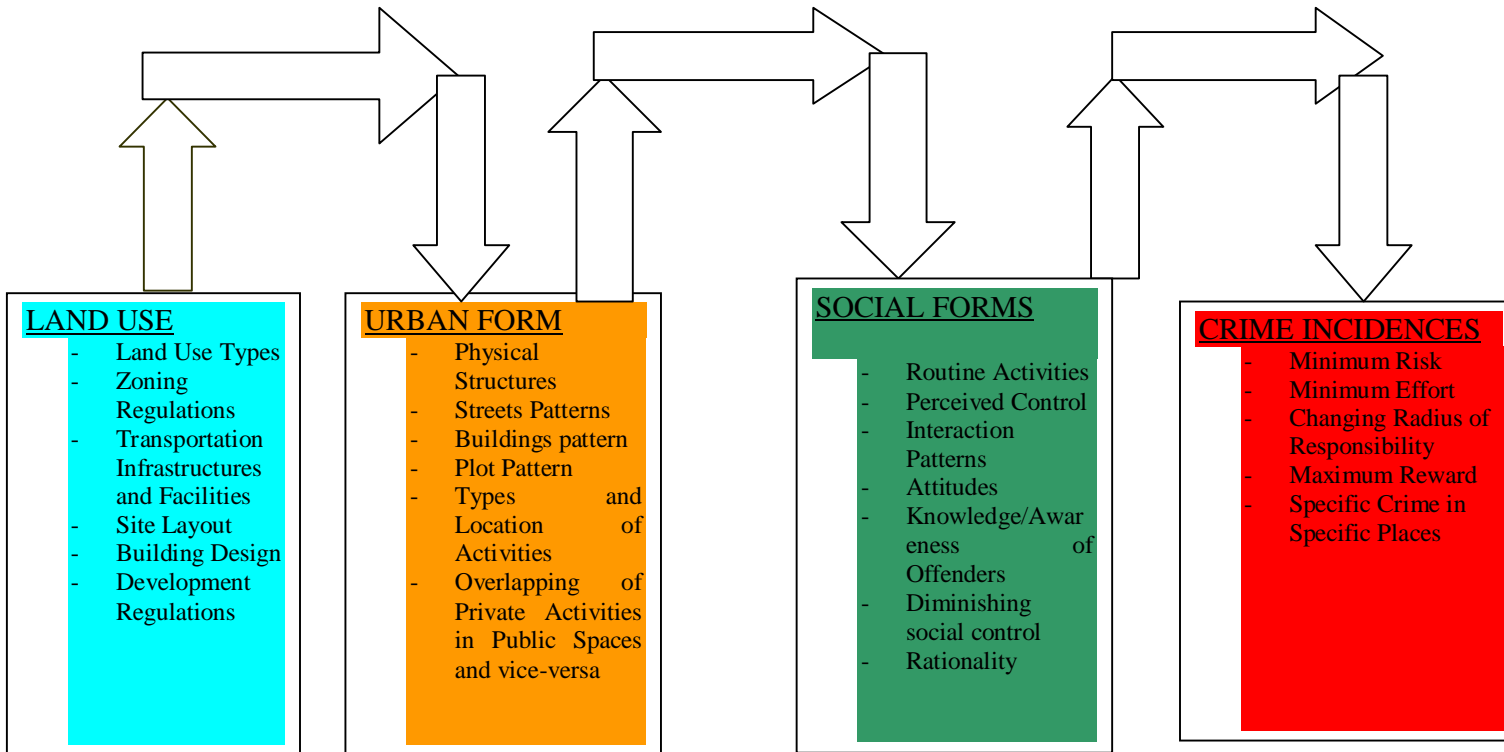
Environmental criminology as shown by Brantingham and Brantingham, (1991) has more direct application to crime prevention, problem-oriented policing, and urban planning than earlier ecological studies that sought to explain criminal motivation, motivation that functioned within a broad spatial framework rather than a place-based approach. It set the foundation argument of linking crime occurrence to land use; it has consistently shown that there is a relationship between land use, urban form, routine activities and crime.

Variations in land use, like variations in housing type, are part of the fundamental fabric of neighbourhoods (Brower 1996). They shape the quality of life for residents and contribute to local reputations, house market values (Miller 1981), and, local crime rates (Taylor and Gottfredson 1986). In the case of sizable and noxious land uses such as landfills or toxic sites, impacts on quality of life and psychological outcomes may extend well beyond a neighbourhood's boundary (Bullard 1994; Edelstein 1988). Different types and changing land uses are exhibited here as a possible explanatory factor of crime occurrence and prevention.

Calthorpe and Fulton (2001) perhaps provide the best conceptual nexus between land use dynamics and crime. They note that; "...understanding of this relationship increases the debate over the direction of urban regeneration and the role of developers and municipalities in shaping urban landscape". This is the concern which informs the study's interest by examining how the changing land uses and their nature and extent of these changes are of importance in explaining crime incidences and how this knowledge is of importance in defining urban planners and community role in making urban areas safer, sustainable and livable.

Though several issues have been mentioned, the study conceptualizes the land use and the alteration of physical environment as fundamental components of explaining violent criminal environment. Planned land use transformation has potential of being the most peaceful way of managing and preventing violent crime. This is deemed as an important feature in understanding crime incidences from land use planning perspective, since land use decisions informs the condition and use of spaces, which later influence the nature of activity generation, pace and intensity of space use.

Figure 1: Multi-Contextual Conceptual Framework Linking Land Use and Crime Incidences



Source: Adapted from Cahill, 2005

Figure 1 illustrates how Land use and the built environment plays a pivotal role in shaping the occurrence and patterning of criminal activities. Land use and land use changing patterns at individuals' neighbourhood can have impact on individuals various activity choices such as when and where to be engaged in which activity including possibility of being engaged in crime. It further shows that physical forms such as building enhances natural surveillance and, accessibility networks also produces and reproduces various social forms which lead to certain patterns of interaction. This informs the routine activities and the presence or absence of guardians watching over the users which may inhibit or promote incidences of crime in a neighbourhood.

Functions performed in any given location shift over time (Kiamba, 1986). These functions, whether residential, productive or administrative, depend on many factors, including both at the global and national levels (UN-Habitat, 2005). In the case of the intensification of land use development in Nairobi, Kiamba envisaged a continuous process of zoning and increasing the development capacity of existing land or land users by raising maximum allowable zoning and development densities. This process not only intensifies or increases the usage by increasing the amount of development that can be carried out on a given land area, or spatial unit, but provides opportunity for the land owners and developers to exploit instantly the increased-yielding capacity of the given spatial unit and consequently benefit from the social and economic process of urbanization (Kiamba, 1986).

A good intention and informed land use transformation can change vulnerability of an area to crime. According to *Kenya Crime Survey, (2001)*, a new trend has been emerging in urban centres with regard to location of businesses in residential areas. This was attributed to high rental fees in Central Business District, lack of parking space, noise and other types of pollution in main urban centres among other factors. As a result, some developers and families convert parts of their residential houses into business premises, while the remaining rooms are used for accommodation. As noted in the same report, this could explain, to some extent, why there is a new trend of high rate of crime such as robberies in residential areas that does not necessarily target household goods and personal valuables such as clothes, shoes and jewellery. This is a clear testimony of how changing functions of neighbourhoods is explaining crime incidences.

The study's credence is that human behaviour can be best viewed as being situated within a particular environment hosting certain land uses at different scales. The scale used in this study is neighbourhood which is known to be the most immediate planning context or unit in which people live and the places where their lifestyles frequently situate them. Neighbourhood gives wider spatial contexts, reflecting variation in both individual-level resources and society-wide norms, as determined by the different activities, both routine and non-routine, in which the residents engage. Neighbourhood within a "place" concept is a fundamental component of both the criminal event and the environment of cities which is also experiencing various land

use transformations. This approach is in contrast to solitude models such as social crime prevention, which advocates for change of criminal motivation which is perceived to lie in people rather than things and activities within the social environment.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

In this chapter, a procedure of data set collection and analysis is discussed in association with the framework determining how consistent the multi-contextual theory is linked with empirical observations. The chapter outlines the research methodology applied in this study by highlighting the data gathering phases and methods of analysis. Secondary database on land use changes and crime was complemented by primary data collected from various categories of respondents. Household and enterprise questionnaires were the main quantitative techniques used while key informant interviews, focus group discussions, photographs and direct observations were the qualitative data collection techniques used and lastly spatial techniques resulted to mapping of land uses and crime locations.

3.1 Research Design

Kothari (2004) defines research design as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is the conceptual structure within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of the data.

As noted by Marczyk et al, (2005) there are three general categories of research design and approaches namely; experimental, quasi experimental and non-experimental. Kothari (2004) also identifies three types of research designs which are different from Marczyk et al, namely; exploratory; descriptive and diagnostic; and hypothesis-testing research design. Experimental and Quasi experimental can be compared to hypothesis-testing and diagnostic research and non-experimental is used comparably to exploratory research designs. In comparing the above categories, it is clear that the two broad approaches of design can be formed emanating from the characteristics and nature of the approaches discussed by Marczyk et al (2005) and Kothari (2004). The broad categories are experimental and non-experimental.

This study's goal is to determine whether there is a relationship between the two variables namely; land use transformation (independent variable) and Violent Crime

Incidences (dependent variable) with social capital being an intervening variable. The analysis of the relationship was under the guise of multi-contextual theory which explains criminal perspectives as a product of routine activities and social disorganization arising from underlying land uses.

This is a co-relational research and the nature of the variables are not amenable to purely experimental design procedures, since the category of respondents cannot be strictly divided into control group and experimental group, given the timing and fluidity of the variables to be examined which measures land use transformation and crime prevention using two different scenarios i.e. crime incidences before transformation and crime incidences after transformation which is done when transformation has already taken place.

Given that the study is applying evidence-based approach that relies on direct observation and experiment in testing of the relationship of the variables to ensure that rigour of such a study design is upheld, especially during sampling. Efforts were made to have two categories of respondents i.e. the old residents/landlords who have been living in Dandora since the inception of the estate as a site and service scheme and fairly new residents who have been living there for less than 10 years. The study therefore employs quasi-experimental research design which borrows from experimental research design.

Experimental design is one in which study participants are randomly assigned to experimental and control groups (Graziano and Raulin, 2004). It is simply a carefully controlled study where there are at least two groups, random selection of participants to control group. It also requires that there should be no systematic differences between the groups and the main goal is to identify the effects of independent variable on both control and experimental groups.

If pure experimental design was to be adopted for crime study in Dandora, it could have been required that the study must randomly identify two groups that is; those who experienced crime before transformation (Control group) and those who experienced and were still experiencing crime after transformation (experimental group). There should also be no systematic difference between the groups, which is

quite challenging since the study was carried out when transformation had already taken place thus, it is totally impossible to assume that the study met this requirement, hence choice of quasi-experimental design.

Although random assignment is the best way to ensure the internal validity of a research study, it is often not feasible in real-world environments (Cook and Campbell, 1979). Quasi-experimental design becomes handy when one cannot do an experiment and yet want to infer causes and effects (typically ex-post). In this, one group (the experimental group) receives the intervention while the other group (the control group) does not.

In the theoretical framework, it is indicated that the study will make use of multi-contextual theory principles which borrow principles of ecological theory, where Dandora is viewed as an ecosystem/organicism/holism. This holistic view assumes that a change in one part of the system impacts all other parts of Dandora. This means that land uses by virtue of their ability to generate and deter routine movements are very important parts of the system. In operationalizing this, the quasi-experimental design enabled the study to interrogate and understand the interaction of the parts of the system by analyzing the transactionalism of the system's parts, which profiles how the changing and surrounding environment impact on criminal incidences.

The information collected was analyzed by determining the following; physical layout, such as type of land use, plot ratio, ground coverage, use of open spaces and locational attributes of the changes which enabled conducting of built up area analysis and how these impacts on crime types, patterns and prevention of crime in the neighbourhood. Such analysis basically conceptualized the person and environment as parts of a whole. This included action, perception and experience of crime in different sections with respect to various aspects of land uses and changing land uses in Dandora and how residents cope with crime individually and collectively as the community living in the area.

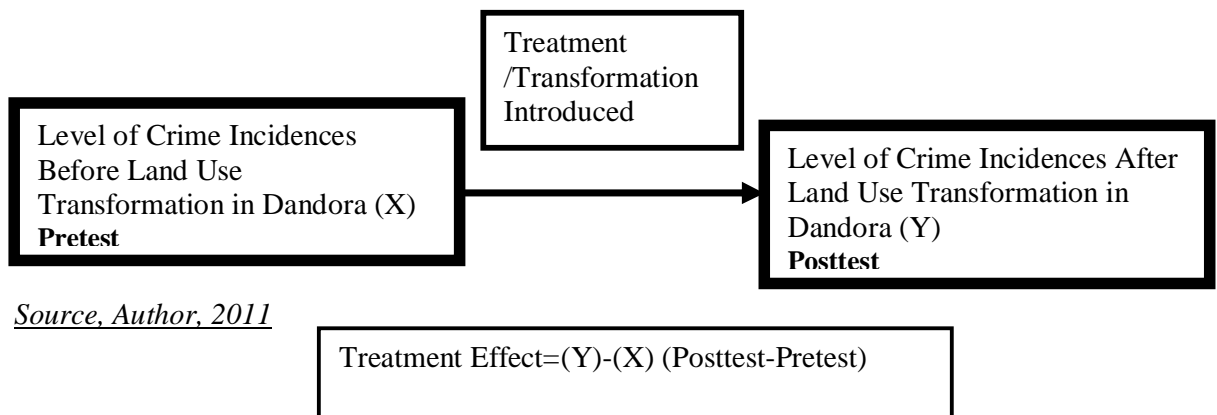
The study made use of some aspects of Safer Cities methodology where the data addressed the issue of situational prevention that is looking at how the physical and

environmental conditions generate or suppress crime by examining relevance of place based crime. This included identification and analysis of crime hotspots.

3.1.1 Modified Quasi-Experimental Research Design

The study applied modified Quasi-experimental design given the limitations of systematic randomization, which assumes non-existence of differences between groups. In operationalizing this design the study employed use of non-equivalent groups before (pre-test) and after (post-test) design. In this design the crime incidences (dependent variable) were measured both before and after transformation as depicted in Figure 2. The main difficulty of such a design as noted by Beins (2004) is that with the passage of time considerable extraneous variations may be there in its treatment effect. In minimizing extraneous variations effect, the study made use of interrupted time-series design, which makes use of numerous pretests-posttests. In this case as noted by Kazdin (2003), periodic measurements are made on a group prior to the interruption of the intervention (transformation) to establish a stable baseline.

Figure 2: Non-equivalent Group Pretest-Posttest Quasi-Experimental Design



Source, Author, 2011

3.2 Population and Sampling Design

3.2.1. Population

Since the study aims at understanding how crime incidences are attributed to planning of Dandora the target population was taken as all those who live or provide services and goods in Dandora, since they are potential victims or generators of land use

changes or have been affected by the land use changes and crime incidences experienced in the estate as tenants.

3.2.2. Sampling Design

The study used a **two-stage** sampling design involving the selection of a pre-determined primary sampling units known as “5 Phases of Dandora”, defined by spatial areas or units namely; Phase I, Phase II, Phase III, Phase IV and Phase V from which the desired number of subjects within a specific target group were chosen from. These included; residents, business operators, community and community policing members. Using identities such as land use type, nature of goods and services provided, business size, housing type and location as the primary and distinctive feature of stakeholders’ identification and categorization. The design ensured that there was appropriate representation of the following considerations per cluster:

- a. Ample geographic coverage of Dandora estate
- b. Proper representation of various land uses and those that have undergone changes
- c. Broad representation of all Phases of the estate
- d. Different categories of residents, developers especially the original allottees and various goods and service providers in the estate
- e. Different stakeholders in charge of land use regulation and security providers including the police and Nairobi City County Government, and neighbourhood watch group(s)

In order to give room for generalization to a larger population and replicability as demanded of studies employing hypothesis-testing techniques, the study adopted use of probability sampling to be in specific systematic random sampling in choosing its final subjects. This is allowed when using a quasi-experimental research, when there is need to infer the relationship to the general populous.

3.2.3 Sampling Procedure and Size

Sample size is a function of cost and precision factors. The larger the sample size, the larger the resources required for the collection, processing and analysis of data. There is likely to be reduced precision with reduced sample size. However, the two factors must be mitigated to optimize on both precision and cost. The most important thing to

note is that the study aims at sustaining reasonable precision in the population estimates to be developed.

Gay (1981) suggests that for co relational research, 30 cases or more are required; for descriptive studies, ten per cent of the accessible population is enough and for experimental studies, at least 30 cases are required per group. This sample size for this study was guided by Gay’s logic of co-relational research. This was attributed to lack of a sampling frame for various land uses in the area, since most of the developments are not approved. However, care was taken to ensure adequate ample sample for each phase and various categories of respondents to address the land use diversity of each phase, avoiding flouting rules of the study design as shown in (Table 4).

Table 4: Sample Category and Sizes

| Category | Sample | Total Sample |
|--|--|--------------|
| Residential Land Use (Tenants and Land Owners) | Phase 1- 30 Phase 2- 36 Phase 3- 28 Phase 4- 30 Phase 5- 23 | 144 |
| Commercial Land Use (Businesses) | Phase 1- 20 Phase 2- 25 Phase 3- 23 Phase 4- 30 Phase 5- 23 | 121 |
| Land use regulators and Security Providing institutions namely Nairobi City County Government, community crime prevention groups, police and old residents | Provincial, Divisional and Police Post police officers (commanders) 4 City County officers (planner, Environmentalist inspectorate and community development officer), 3 old residents ⁴ | 10 |
| Total | | 275 |

It is important to note that measuring of effect of transformation requires that there is ample representation of various land uses and interest groups within the area. It is for this reason that the 2 main land uses in the area were identified for the study. The land uses identified are: residential and commercial. Others added in the sampling are the regulators of development and security providers in the area. It is also important to

⁴ These were selected for in-depth interviews so as to further observe and explore in greater detail some of the issue that arose during the survey and could not be captured adequately by the survey.

note that in order to get the situational analysis of community crime prevention strategies; a Focus Group Discussion was conducted with the community policing members representing all the Phases of Dandora. This was done to understand how the incidences of land use-crime nexus contributes to the community initiatives and interventions, as it is not very clear from the other category of respondents whether there were any form of land use that explains joint efforts to address crime in the area.

In collecting households data in Dandora a skip pattern of 9 plots was applied in order to cover a wider area per phase and also to avoid overlapping of respondents. For household⁵ sampling with a skip pattern of 9 plots and 4 households per plot alternating from ground floor and upper most floor and keeping right meaning that, every 10th plot in each phase based on the agreed starting point were interviewed. Each phase has a total of between 1025 to 1200 plots. An average of 20per cent was undeveloped. The Housing Development Department (HDD) officers noted that at least three out of ten developments are compliant to the required zoning regulations. The most compliant phase was noted as phase 1.

For commercial land use data collection, a listing of businesses was done per phase; each phase had between 250 to 300 business operators mostly micro and small enterprises operating full-time. Most businesses are similar in nature, which justified a sampling of 20 stratified, randomly picked per phase. This was considered adequate representation of the commercial land uses. In sampling of the business operators, factors such as location, type of business and size of the business were considered a useful basis of stratifying and balancing representation.

⁵ Refers to a person or group of persons who reside in the same house/dwelling unit, having some cooking arrangements and are answerable to the same household head

Table 5: Sampled Businesses Design

Phase _____

| Location | Type | | | Size |
|-------------------------------------|----------------|----------|------------|-----------------------------|
| | 1. Manufacture | 2. Trade | 3. Service | |
| 1. Residential | 20 | 22 | 24 | 1. Small/Micro ⁶ |
| 2. Market/Shopping Centre | 10 | 15 | 5 | 2. Medium ⁷ |
| 3. Mixed Residential Cum Commercial | 1 | 0 | 1 | 3. Large ⁸ |
| 4. Road Reserve | 3 | 12 | 13 | |

Phase 1 was found to have the least transformations, phase 5 was the least built area in terms of number of plots developed and phase 2, 3 and 4 had the highest transformations and this affected the distribution of sample size as shown in the sampling distribution table 4. Phase 1 and 2 had a mixture of ethnic groups, while phase 3 and 5 were dominated by Kikuyu ethnic group and phase 4 by Luos and Luhyas ethnic groups. For the sake of understanding of the areas changing land use profile in relation to crime and crime prevention, 3 in-depth interviews with residents who had lived in Dandora since its inception were conducted. This was aimed at getting information on the changing dynamics of the area.

3.2.4 Units of Observation and Analysis

Mugenda and Mugenda (2003) defines unit of observation as the subject, object, item or entity from which we measure characteristics or obtain the data required in the research study. This unit can be an individual person, a household, and all land uses in a neighbourhood. They also define unit of analysis as the units that we initially describe for the purpose of aggregating their characteristics in order to describe some larger group or abstract phenomenon.

The study's unit of observation is the entire Dandora where the study sought to understand how land use transformation in Dandora has impacted on crime. In terms

⁶ 1-10 employees

⁷ 11-20 employees

⁸ More than 20 employees

of unit of analysis, the study took specific number of respondents⁹ specifically targeting the residents and business persons and various institutional representatives including Nairobi City County, Kenya Police and Community policing representatives to document and measure how land use transformations had affected them in terms of crime.

Two major land uses in the area namely; residential and commercial were used to document land use types. For residential land use, household¹⁰ heads were sampled to represent the views of residential land use and for commercial land use business¹¹ operators were sampled.

3.3 Data Collection Methods

Data collection employed both secondary and primary methods. Secondary basically involved library search of relevant documents addressing urban crime and land use transformation issues. This mainly involved reading of books, journal articles, conference papers, previous thesis and various internet sources in order to understand the subject matter in detail. The primary data collection required development of various tools to enable collection of data by making direct observations and talking directly with various respondents sampled for the study.

The data collection design ensured that the study covered appropriate security service providers, land use regulators, developers/land owners, security provision institutions, business operators, and households in Nairobi's Dandora estate so as to capture all the elements and stakeholders living or providing various services in the area. The data collection methods and techniques applied were as follows; structured questionnaire, in-depth personal interviews, Focus Group Discussion (FGD), Direct Observation, Land use mapping, participatory mapping and transect walks, photographs and sketches.

⁹ This was in reference to the head of household, business owner or any other knowledgeable or responsible adult member of the household, worker or officer or community member having knowledge about his/her household, business or sector.

¹⁰ Household is defined here as a domestic unit consisting of the members of a family who live together along with non relatives such as servants.

¹¹ Business operators is defined here as those engaged in activities of providing goods and services with the aim of making profit or gaining commercially.

A total of six research assistants assisted in data collection, four from Dandora Community and two masters' students from University of Nairobi. The Gender breakdown of the research assistants were four males and two females. The reason for using local assistants was to gain confidence among the respondents and the community, increase acceptability and elicit residents' response, maximize on their familiarity of the area and for security reasons, as they are familiar with the area's security dynamics. The use of both genders was deemed important in addressing cultural, religious barriers and beliefs where certain people from certain parts of the country and religion cannot be interviewed or addressed directly by people of opposite gender. The Six assistants were also from six different ethnic groups for wider acceptability.

The data collection was preceded by various activities which included a reconnaissance visit to the site for familiarization and developing of rapport with stakeholders to minimize suspicion among potential respondents. During this period, the researcher and team of research assistants got a chance to interact with the "gate keepers" so as to facilitate smooth flow of information gathering. The research team also did a pre-test of the instruments, which helped in adjusting and preparing appropriate instruments necessary for the survey. The instruments needed for the study such as questionnaires, base maps, GPS units and photos were used to get a feel of the issues and the general Dandora neighbourhood environment.

3.3.1 Structured Questionnaire

Structured questionnaires were used for quantitative aspects of the study to collect information from the residents and commercial land users on their perception of land use and land use changes in relation to violent crime occurrence and prevention. This enabled documentation and comparison of various major land uses insights in relation to how they view land use changes and neighbourhood security, in line with the arguments of "*routinization*" of crime through land use as propagated within multi-contextual theory. A structured questionnaire helped in collecting the socio-economic data and focused on Dandora's existing interactions dynamics as well as the views by the residents and other stakeholders; and how this has been providing/not providing healthy environment for interaction, hence either social capital enhancement or discouragement.

It enabled the study to capture the available alternative systems of provision of goods and services of economic value. These include the land use transformation effect on economic opportunities. It informed the researcher on the land use which is most and least prone to crime since crime opportunity rationale theory stipulates that criminals always do a cost-benefit analysis before engaging in crime. This difference also helped in the identification of various coping mechanisms developed by the community and whether they were common or specific to various different land users for example whether the coping mechanisms developed by residents were similar or different to those developed by commercial entity operators.

3.3.2 In-depth Personal Interviews

These were used in getting information from the key informants and one-on-one meetings with selected individual community members having information which is useful in profiling the neighbourhood. A total of three (3) residents representing those who have lived in Dandora since the project began in the year 1972 were interviewed to give residential profile of the area by accounting how the area has changed over time and how this has impacted on security over time, given the cross-sectional nature of the study.

Under Key informant interviews a total of six key informant interviews were conducted with 6 officers from City County of Nairobi, Kenya Police, representing different departments and levels of commands. These interviews enabled collection of professional view of the possible linkage between land use transformation and crime occurrence and prevention.

Violent crime and land use transformation is a complex study of relationships requiring multiple stakeholders and actors to unmask. The study also separately interviewed a set of respondents so as to get their expert opinion about crime and planning in the neighbourhood. Those interviewed were the: Deputy Provincial Police Officer (DPPO), Officer Commanding Buruburu Police Division (OCPD), Officer Commanding Dandora Police Post (OCPD), Officer in charge of planning of Dandora based in Dandora's Housing Development Department, Community Development Officer (CDO), officer in-charge of Development Control (Nairobi City County), City

County Environmental Officer, Embakasi District Officer (DO), Dandora Chief¹² and assistant chief. The decision-making/institutional data provided the basis of understanding land use transformation *vis-à-vis* crime incidences in the area. It enabled the study to view Dandora as a unit where the interaction of the study's variables were tested.

3.3.3 Focus Group Discussion (FGD)

Powell (1996) defines focus groups as a group of individuals selected and assembled by researchers to discuss and comment on the topic that is the subject of research from personal and collective experiences. The study also conducted a focus group discussion with eight members of Dandora Community Policing Group. These interviews gave layers of ideas and opinions upon which multi-contextual arguments can be built. In order to triangulate various sources of data, one Focus Group Discussion was carried out with Dandora community policing members; given that they were already engaging in crime prevention and also that they live and understand the neighbourhood well and hence understand the dynamics of life in the area.

3.3.4 Direct Observation

Direct observation of the neighbourhood layout, use of spaces, space use conflict and the routine movements of people into different land uses was also undertaken.

3.3.5 Land Use Mapping

The mapping of land uses in relation to activities was carried out with the intention of getting the level of variation/change in the current development from the original development plan of 1974. The specific objectives of the mapping at this level were to:

- Examine the change in development densification levels; vertical and horizontal densification

¹² The law grants Chiefs and Sub-Chiefs the power to control a wide range of activities that easily lead to crime or a general breach of peace. Any Chief may, for example, issue orders to the residents of his jurisdiction prohibiting or restricting the consumption or possession of intoxicating liquor by, and the supply of such liquor to, young persons [Laws of Kenya, Chapter 128(10)]. In addition, Chiefs may issue orders prohibiting any act or conduct which, in their opinion, might cause a riot, a disturbance, or a breach of the peace (Mbumba, 2011).

- ✚ Examine changes in land use that do not comply with the original development plan
- ✚ To identify the crime hotspots and their distributions over space
- ✚ Identify the unique features of each phase, including dominant ethnic affiliations in each phases or specific areas

Tools and techniques used for the land use mapping included recording land use types, photography of activities and observed developments, Picking of points using GPS which was finally transferred to the maps. Interviews with the old residents also informed part of the transformative aspects of the data. The collected information was instrumental in understanding the drivers of change in land use in the area, which is vital in responding to the aim of the thesis of understanding how it relates to crime incidences and its prevention.

3.3.6 Participatory Mapping and Transect Walks

The researcher provided the Dandora community policing members with a base map so as to map areas within the neighbourhood considered to be prone to violent crime. Members of the community policing also walked the researcher around to share their experiences with what is happening in the neighbourhood with regard to violent crime. Types of crime associated with respective points were noted in the process. This was to identify and compare the area noted by the community policing members with key informants such as police officers, residents and business operators.

3.3.7 Library Research and Documentation

This entailed reviewing of relevant documents including previous researches. Since the study relied on historical information, the data collection ensured that the methodology used integrated archival data especially from public agencies such as City County of Nairobi (CCN) and police with contemporary data from the residents and other stakeholders in order to understand the dynamics of crime in Dandora. This kind of methodology is highly advocated for when carrying out place intensive crime analysis studies as advocated by Maltz (1995) and Sampson's (1993).

3.3.8 Photographs and Sketches

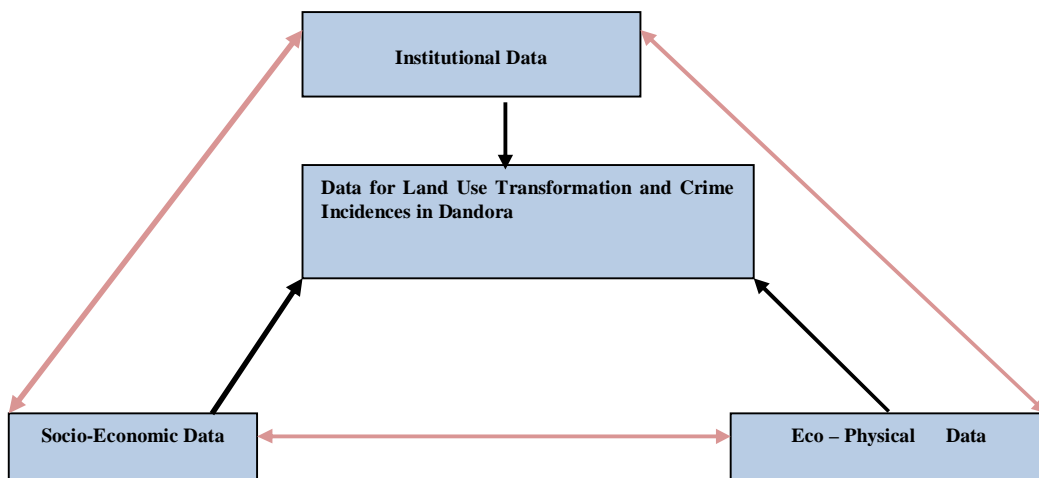
Photographs and sketches were made use of so as to ascertain some of the visible

traits in the neighbourhood explaining the phenomenon under study. All these data collection methods form appropriate data categories, whose combination is important in understanding the dynamics of land use in relation to crime prevention. The data can be collapsed into the following categories; (a) Eco-physical, (b) Socio-economic and (c) Institutional.

The eco-physical data views Dandora as interface of human activities showing the interaction of anthropogenic activities and the environment. Data collected for this purpose focused on respondents as actors and how their actions have impacted on the functioning of Dandora. This also included collection of maps, use of sketches and photographs to meet the objectives of the study. This is in line with Meyer (1995) who noted that “Land use transformation involves both the manner in which biophysical attributes of the land are manipulated and the intent underlying that manipulation”. The goal of this data was to link the spatial pattern of the land use activities to the functionality of Dandora as a system and how these (land use activities) affect connectivity of those living in the area, particularly in relation to violent crime incidences.

Figure 3 shows that the categories of data are interconnected. Accurate collection of data helps in understanding the dynamic nature of the phenomenon under study. The categories of data reflect the holistic approach envisioned in the theoretical framework and the study’s research design.

Figure 3: Data Categories



Source, Author, 2012

3.4 Data Analysis

Analysis of the data focused on two aspects, namely:

- The way people perceive the interaction between land use transformation and violent crime prevention- which mainly rely on people's narratives and the quantitative data
- What is observed or measured in terms of implications of land uses or physical analysis on crime occurrence and its prevention.

As envisioned by Cahill (2005), multi-contextual crime analysis require incorporation of various information gathering strategies such as saturated surveys, archival records, structured observations, focus group discussions, interviews, safety audits and a geographically based and demographic analyses to identify distinctive features of human interaction with various land uses. In justifying the use of qualitative techniques such as focus group discussion, Moser and McIlwaine (1999) noted that *“qualitative participatory approaches at the micro or community level provide insights into the experience of violence among low-income groups in a way that macro-level analysis cannot...furthermore, this approach can also facilitate identification of interventions from the perspective of the poor, rather than policy makers or scholars”*. Since the study is dealing with a neighbourhood, the quantitative data was deemed to be insufficient to give detailed analysis of the area in as far as crime and community crime prevention mechanisms are concerned.

The research design focused on the factors explaining violent crime incidences and how they are related to land alterations and land intensification. The estate was viewed as a system, hence required mapping out the features of land use transformation related to crime and sought to understand whether land use to understand crime prevention.

Data collected were handled differently based on their nature in terms of techniques used in their collection and the type of instrument used to collect them. Quantitative data were coded and analyzed using Statistical Package for Social Sciences (SPSS) and the qualitative data processed using Microsoft word and subjected to narrative analysis, where use of both content and historical analysis was applied. Aggregation procedures demanded for operationalization of multi-contextual theoretical

framework necessitated the study to adopt a multi-criteria analysis. This involves profiling and analysis of land use and its changing patterns, analysis of crime incidences and coping mechanisms, and analysis of emerging explanatory factors seeking to clarify the possible linkage of land use transformation and crime incidences in Dandora.

In multi-criteria analysis just like in multi-contextual theory, there is no single factor or indicator that can optimally explain simultaneously all criteria and perspective of issues, therefore there was need to consider usage of other compromise factors and explanations based on their strength in covering the inadequate details left by other factors (Munda, 2004). It is a democratic analytical procedure in the sense that it grants consideration for all the possible explanations and factors that may help in explanation of events such as responses. The aggregation of several criteria helps a researcher in taking a position on the fundamental issue of compensability¹³.

The multi-criteria analysis enabled analytical identification of factors and variables such as land use characterization, crime incidences location and frequency, socio-economic and demographic profile and weight attached to each in favour of explaining the interaction between land use transformation and crime incidences in Dandora. This is related to various theories used in contextualizing the study. In order to ensure that this is achieved, various analytical techniques such as spatial, quantitative and qualitative data analysis and triangulation of various data sets and information was undertaken.

3.4.1 Spatial Data Analysis and presentation

- a) For the spatial data, observations were related to the original Development Plan and interpretations made. This was presented in the form of maps with photographs overlaid on them.
- b) Using GIS software, overlay analysis was done for the mapping data and three major layers were created
 - i. The original plan

¹³ Compensability refers to the existence of trade-offs, i.e. the possibility of offsetting a disadvantage on some criteria by an advantage on another criterion (Munda, 2004).

- ii. The observed changes in density (roughly mapped in the base map and confirmed with the GPS points)
- iii. Satellite data showing horizontal expansion of the area

3.4.2 Content Analysis

This requires information to be collapsed into several relevant thematic categories and analyzed based on their appearances, frequency and intensity (Singleton, 1993). This enabled consistency in analysis through systematic triangulation and integration of various data sets gathered using different techniques and levels of analysis. This was important in harmonizing the views of key informants and FGDs on their perceptions on land use changes and crime.

3.4.3 Historical Analysis

This involves analysis of data with the view of reconstructing past events (Singleton, Straits and Straits, 1993). For this study this was done at two levels;

- Examination of documents on Dandora as a site and service scheme and documenting of transformation over time by previous researchers.
- Eye witness account of original residents giving account of how the places have changed including details of community experiences of violent crime in relation to land uses and the strategies developed to prevent crime over time.

3.4.4 Hypothesis Testing

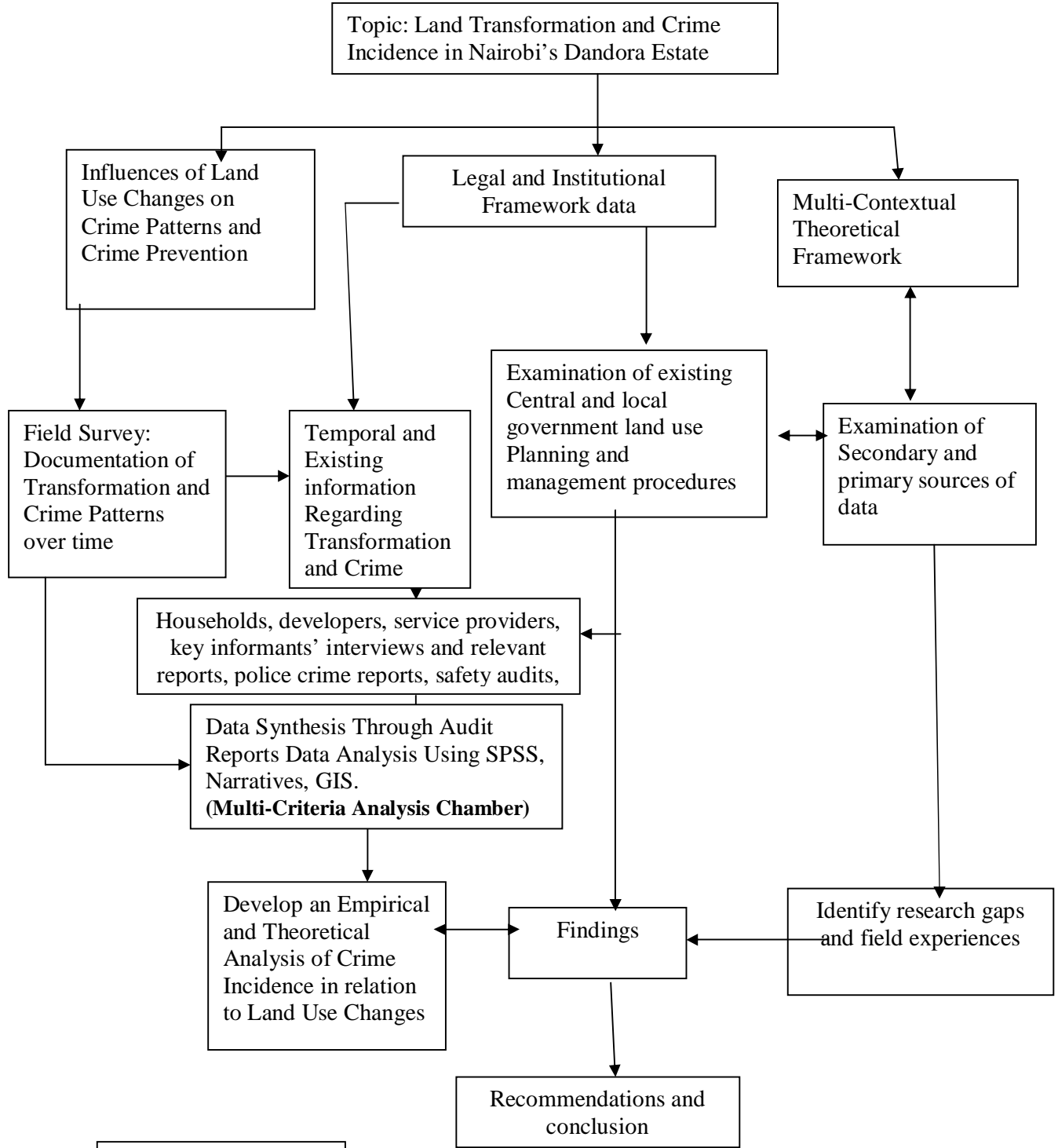
For the purpose of hypothesis testing, the study applied binary regression analysis to test the causal relationships between the variable Land Use transformation and Crime Prevention. In this case the variable, land use was treated, as independent variable and crime prevention as the dependent variable. In operationalization of this, the study attempted to understand a causal effect relationship between type(s) of land use namely; residential and commercial with regard to their respective density with incidence of crime which was measured by the type of crime and frequency of crime.

In contextualizing multi-contextual framework in methodological section, it enabled

analysis of Dandora neighbourhood form in relation to neighbourhood interaction. It did this by positing that the neighbourhood form exerts profound inflows on the flow of people and communication within different locations in the neighbourhood, which creates or diminish opportunity for crime occurrence and prevention of the same.

The summary of the entire methodology chapter is summarized in a flow chart in figure 4 in page 107.

Figure 4: Methodology Flow Chart



Source: Author, 2012

CHAPTER FOUR: BACKGROUND ON DANDORA

4.0 Introduction

The existing body of knowledge on land use-crime nexus has largely been generated by research in major cities and urban centres in the North, with perspectives on urban neighbourhood crime in Africa cities being under-represented. This study's focus on Dandora is part of the growing attempt at bridging this gap. This chapter provides evolutionary account of Dandora by focusing on the neighbourhood's geographical setting, planning and drivers of land use changes, historical attributes, demographic and the socio-economic development.

4.1 Historical Development of Dandora

The study area is located in Nairobi, the capital city of Kenya. The neighbourhood is approximately 12 km from Nairobi city centre, the trip often lasting 30 minutes. An important objective of the Dandora project was to eliminate future informal developments. The Dandora project was intended as the first phase in a long term strategy of providing serviced plots for more than 500,000 people in Eastern Nairobi (Kayole, Villa Franca, Mathare Valley North, and Riruta).

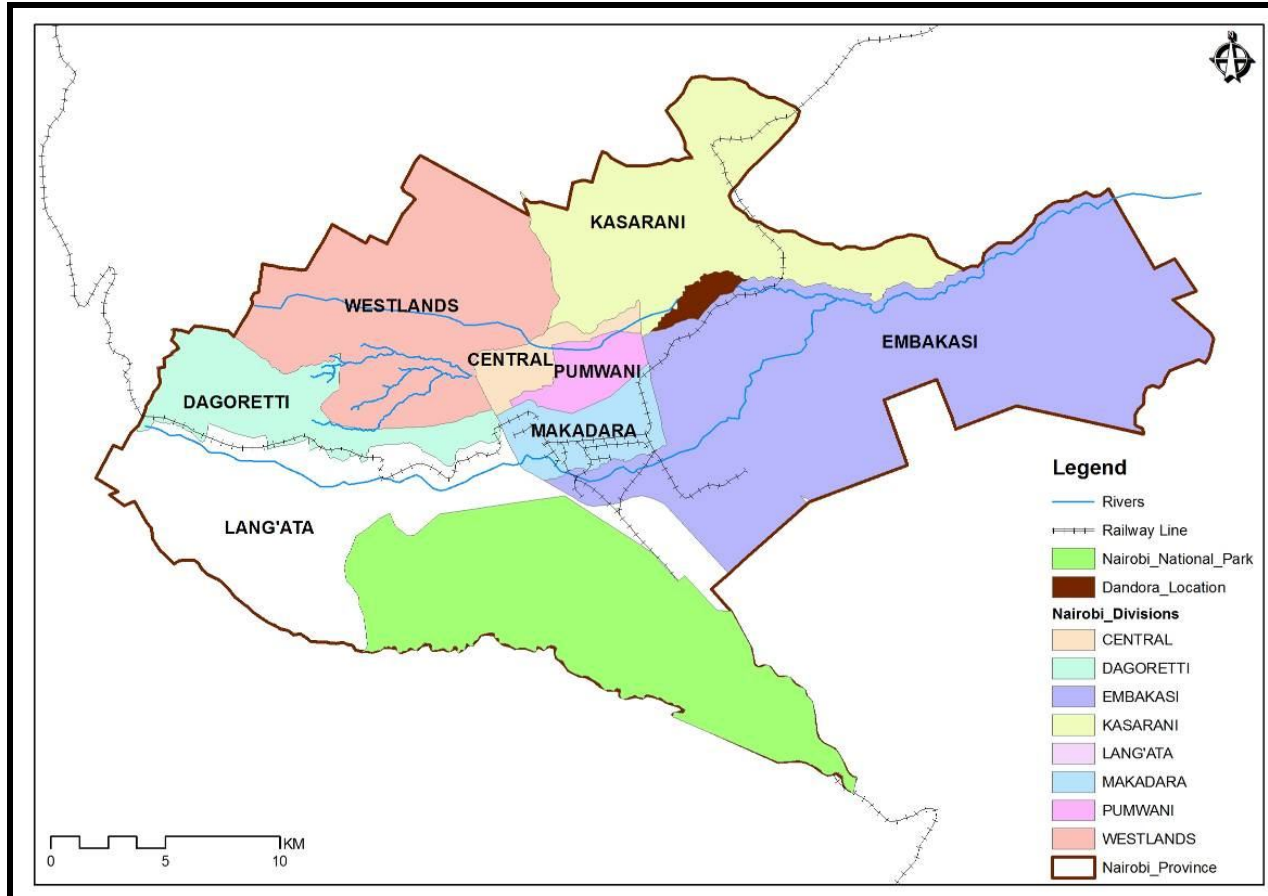
Dandora owes its origin to the World Bank's popular site and service schemes in 1970 in Nairobi. The idea of this project was as a result of the considerable efforts that had been made to encourage residents in the central city slums and intermediate zone to move to the periphery where Dandora is located (*Shihembetsa 1989:47*). The Dandora project was financed by the World Bank as the Bank's first urban project in Kenya. Though partly subsidized, the sites were allocated on a cost recovery basis. The original low-income allottees were expected to make loan repayments.

In 1974, contact was established between the Nairobi City County and the World Bank, to negotiate support for implementation of site and service schemes. The City County was supposed to bear the costs of infrastructure and these were eventually to be recovered through utility charges, user fees, property rates, and servicing costs. As part of the World Bank's initiative focus on urbanization and housing, the Bank

agreed to provide a loan for a project on an unprecedented scale comprising trunk infrastructure, i.e. sewers, stabilization ponds, drains, access roads and street lighting; and community facilities, i.e. 6 primary schools, 2 health centres, 2 multi-purpose community centres, 1 sports complex, 400 market stalls and a workshop cluster.

As noted by Huchzermeyer, Nairobi is a perfect case of a ‘tenement city’ which is largely associated with nineteenth and twentieth century rental investment in Europe and the US when cities were shaped by the profit-making interests of landlords. Though most of these high density developments are unapproved they have become a recognizable face of the city (Huchzermeyer, 2007). Nimpuno (1986) notes that, the Dandora project was initiated to test the legitimacy of the sites and services strategy in providing low-cost shelter for low-income households. The philosophy was to combine public investment in land and infrastructure with mobilization of the savings and labour of the individual family. Self-help housing was on the agenda of the international agencies, with much inspiration from Latin America.

Map 5: Location of Dandora in Nairobi



Dandora was the first community development housing project to the East of the city. Dandora as shown in Map 5 is located in the Eastern part of Nairobi in Embakasi Constituency which is the largest constituency in Nairobi city. It borders Kassarani to the North and Makadara to the West.

Source: Adapted from Survey of Kenya

4.2 Objectives of the Project

The project was planned for those earning income of between Kshs 280 and 650, and largely living within unplanned areas. In an attempt to match incomes to costs, three plot options were available (Chana, 1984: 24). These options spelt conditions under which the allottees were to construct their houses and also the amount of loan to be given. This shows that there were clear efforts from the beginning to control development in Dandora, by giving clear guidelines and conditions of occupation and housing. Box 4 provides the objectives and components of the project.

Box 4: Objectives and Components of the Dandora Project

Dandora project had a noble objective of availing serviced plots and loans to the beneficiaries. The objectives and components of the project were to:

- (a) Prepare and service 6,000 residential plots of 100 to 160 Sq. meters each with individual water and sewage connections, access to roads, security/street lighting and refuse collection services in the Dandora project site.
- (b) Construct the following wet core and demonstration houses for the serviced plots:
 - i. Type A: 3,870 plots with wet core (toilet and shower) on plot sizes of 100, 120 and 140 sq. metres. Allottees in this category were given a material loan of Kshs. 5,760, which had to be paid in a period of 30 years with 8.5 per cent interest rate.
 - ii. Type B: 1,800 plots with wet cores and one kitchen and store on plot size 100, 120 and 140 sq. metres. Allottees given Kshs. 2,880 intended for the construction of additional room.
 - iii. Type C: 330 plots with wet cores, kitchen, store and one room on 160 sq. meter plots and 30 demonstration houses to illustrate housing for type A and B plots. The type C plots to be sold at market prices. The utilization of the plot was free for the owner and no loan was given to these allottees.
- (c) Operate and administer a material loan fund to enable plot tenants type A and B plots were to borrow appropriate amount for building materials required to expand such plots to have two rooms through self-help or contracting “(Chana, 1984:21).

Sites and Services Scheme in Dandora was designed in 1974 and construction of houses started in 1976. Considerable foreign assistance and loans were involved in the

project. Over a five year period, Dandora was intended to cater for 5 per cent of Nairobi's total growth. The project was based on the idea of individual low income families building their own houses initially using simple materials, which could later be improved.

Dandora plot sizes were reduced, infrastructural services were provided to each individual plot and most importantly allocation procedures were changed in order to avoid allocation of plots to people who did not belong to the target group. In addition to the provision of plots, trunk infrastructure i.e. sewers, stabilization ponds, drains, access roads and street lighting and community facilities were to be provided. Project components further encompassed the formation of building groups and establishment of a Housing Development Department (HDD) under the City County, whose function was to supervise the project.

4.3 Institutional and Legal Framework

In 1978 the sites and services project had grown in size and responsibilities necessitating formation of a fully fledged department. Hence the formation of Housing Development Department (HDD) headed by a Director. The HDD was formed to assume responsibility for project implementation, answerable to a Housing Committee composed of the members of the Ministry of Local Government (MoLG), Ministry of Finance and Planning (MoF&P) and the National Housing Corporation (NHC), with the Nairobi Town Clerk as secretary.

HDD is divided into three divisions namely:

- Community Development Division- This is in charge of; publicizing the projects and performing related public relations duties, soliciting and processing plot applications, orienting and Counselling allottees prior to settlement, working with families during the settlement process, assisting residents develop viable community based institutions and programmes aimed at enabling formation of genuine community.

This seems not to be active currently, the new buyers are not taken through all the laid down procedures and the values imparted to them is totally different. This may be due to the fact that the original allottees side step the HDD officials when selling their plots. Otherwise in terms of enhancing community interaction, the idea of having a functional community development division was a noble one in crime detection and prevention.

- Finance Division- This division is in charge of; keeping project Accounts, developing accounting and management systems, preparing quarterly financial reports and annual project accounts audited by an independent auditor, operating and administering the building materials loan fund, and collection of monthly rents.

This may not have any direct impact on land use transformation, since when building materials loan funds are disbursed efficiently and effectively, the allottees are likely to adhere to laid down zoning regulations, which ultimately helped in maintaining the face of the original plan and which may have an impact on crime incidences.

- Technical Division- This is in charge of; supervising detailed planning, engineering works and preparation of tender documents for site infrastructure, wet cores and community facilities, ensuring the proper supervision of all construction stages, providing technical staff with specific building skills to enable them to improve performance and service.

The team's capacity to ensure that all allottees adhere to stipulated standards and regulations is a challenge. This is exhibited by the rapid pace of development of high rises, extensions and change of user in Dandora which negates what is provided in the original Dandora Development Plan layout.

HDD has been in operation since 1978 to the present. In 1990 the department was given more duties of managing Nairobi's Tenant Purchase Housing Schemes besides its earlier portfolio of sites and service projects. The aim of the founder, World Bank was to make HDD semi-autonomous from CCN by having its own technical, finance, legal and community development division. However the legal operations of the Council were not amended to reflect this

http://www.eukn.org/binaries/susta/bulk/research/building-sustainable-cities/aud_kenya_casestudyofsites-services.pdf).

The major challenge facing HDD is its capacity to implement its mandate (MacInnes, 1987). For example being unable to control development adequately, has led to massive transformation of land use in areas such as Dandora which consequently has led to numerous social, economic and environmental ills such as crime, poverty and pollution among others.

4.3.1 Legal Framework

Since the mid-1960s and particularly after 1970, a significant contribution to housing production was achieved under the name of sites and services schemes. Four consecutive five-year Development Plans spelt out the focus on sites and services as a means of providing housing for the poor, and preventing unauthorized housing construction (GoK, 2004). Dandora was part of the Kenya's government policy applying site and services scheme to combat unauthorized housing development in Nairobi.

Sites and Services Schemes are mixed public and private projects, the public sector developing the serviced sites and private individuals erecting the housing units. The sites and services schemes are designed to cater for the low-income population. In the 1970-1974 Development Plan, sites and services schemes were planned to meet 43 per cent of all demand in Nairobi. In the 1974-1978 Plan, this was increased to 56 per cent. In the 1984-1988 Development Plan, sites and services units planned for Nairobi constituted 80 per cent of total planned output (UNCHS-Habitat, 1987).

In the 1974-1978 Plan, objectives and policies of site and services schemes were tightened and it was stated that "Housing design and construction had to conform to Government standards" and that "each housing unit in urban areas should have at least two rooms plus its own kitchen and toilet". The plan further stated that a prime objective was "to ensure that: a) no additional unauthorized housing settlements were erected; and b) slums are removed when satisfactory alternative housing has been found; and c) substandard housing has been improved". The change in policy had a profound impact in relation to the definition of development standards. The previous

grade II bye-laws which had permitted lower standards, such as the use of pit latrines, were dropped (UNCHS-Habitat, 1987).

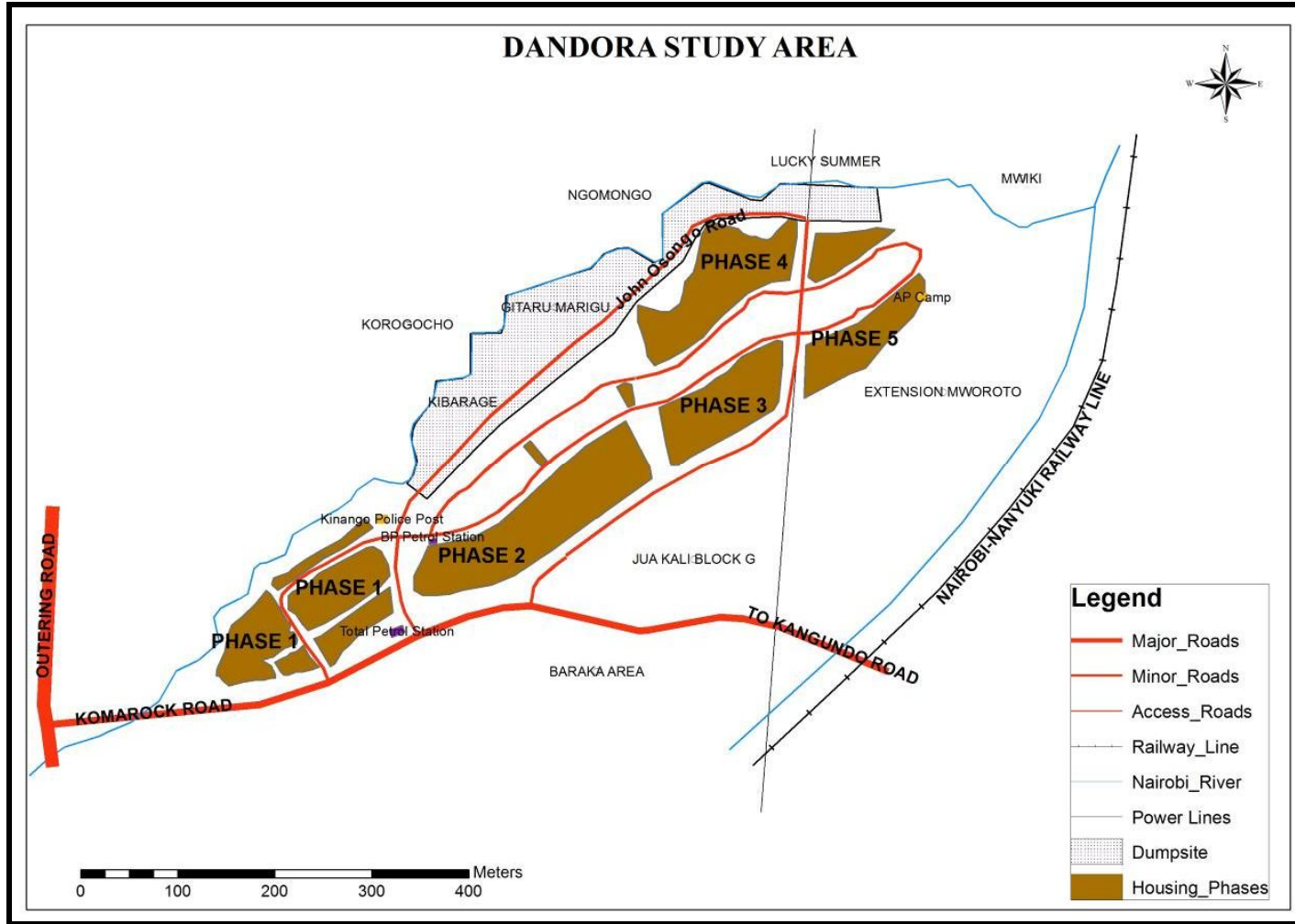
Sites and services plots were intended to accommodate low-standard single-family units, in some cases using pit latrines on fairly big plots. Plot owners were to provide a substantial share of the labour input required to construct their houses. Several studies have shown that a large proportion of the population cannot afford the cost of a rented room in a sites and services scheme and has no other option than sub-standard accommodation in the informal sector, hence questioning the ability of site and service scheme as basis for provision of houses for urban poor given their special legal provisions whose applications and benefits are limited in scope.

4.4 Planning and Housing

Dandora is divided into five Phases. The first phase of the project was implemented between 1975 and 1978. The project included community facilities such as primary schools, health centres, multi-purpose community centres, and market stalls. The beneficiaries were intended to be poor households, but, although some low-income families were allocated plots, many allottees were not in the lowest income group, many plots had absentee landlords, and many residents were tenants (UNCHS, 1987; Lee-Smith and Memon, 1988; Syagga and Kiamba, 1988). However, the estate has turned into a high-density slum with high unemployment. This is due to uncontrolled development worsened by infiltration of the project by the rich segment of the society who are keen on high-density development as a way of recouping back their capital investments, hence compromising the main aim of solving slum development and owning of housing by the poor.

With about 6000 plots, Dandora is the biggest single sites and services project in Kenya to date. In addition to this, Dandora has 6 primary schools, 2 health centres, 5 local markets, 2 community halls and 1 sports centre.

Map 6: Dandora Neighbourhood

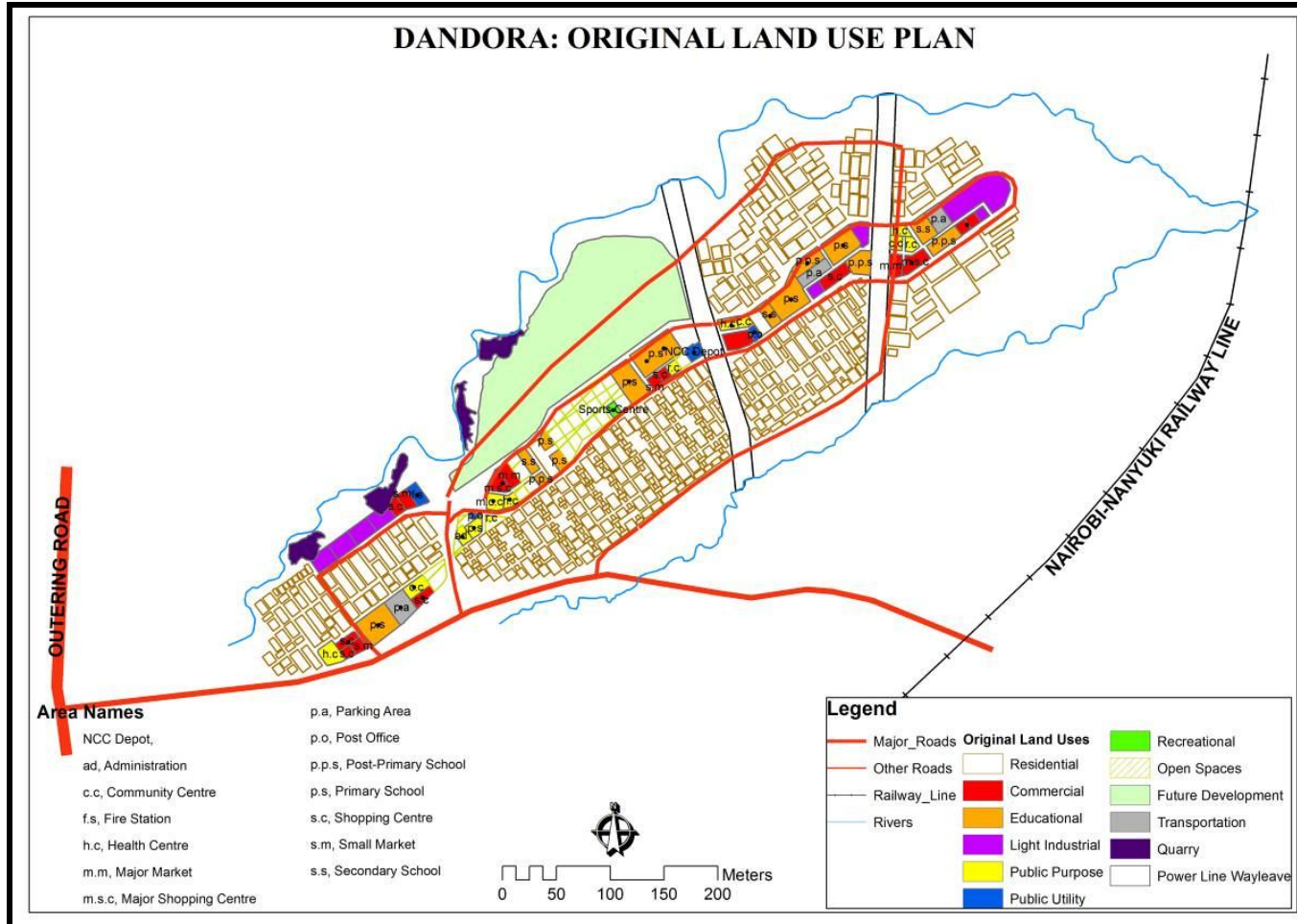


Map 6 shows the layout of Dandora Neighbourhood, which is in 5 built phases with phase 1 bordering Kariobangi Estate and phase four bordering Ngomongo and Lucky Summer.

The major road passing through Dandora is Komarock road which connects Outer-Ring and Kangundo road.

Source: Adapted from HDD Original Map of Dandora, 1976

Map 7: Spatial Layout of Phases of Dandora



Source: Adapted from HDD Original Map of Dandora

The Dandora community Development Plan as shown in Map 7 was planned around a central core of public facilities and amenities. It was divided into six residential areas.

There are corner shops located in various strategic locations. However, the central core is the major centre for various community facilities and services which include, primary schools, health centres, multi-purpose community centre incorporating day care facilities, sports facilities and markets (Soni, 1981; DPU, 1983; UNCHS, 1987).

From the original layout, it is clear that the original plan layout applied the principle of separation of uses. Location of social infrastructure such as health, schools, community centres and administrative centres were centrally and strategically located and not mixed with residential uses. This has been neglected and schools and day-care centres are springing up in all corners of the estate disregarding the original plan as discussed later in the study.

The Dandora sites and services scheme Plan of 1974 had provided 6000 plots demarcated and provided with wet cores (toilet and shower). According to this plan, 6000 units should have been completed in the period 1974-1978. Construction of houses did not start until 1977/78 and still by 1980 less than 1,000 units had been constructed. The delay was mainly attributed to administrative weaknesses. The process took almost two decades as opposed to the five years originally intended (Chana et al, 1979).

The project in Dandora allowed allottees to build and occupy temporary houses until a permanent house with at least one room had been completed. The original low-income allottees were expected to make loan repayments. According to Syagga in Huchzermeyer (2007) the allottees were formally permitted to construct several rooms in their yard, to assist them with financing their loan repayments. Sixty-five per cent of the plots were allocated with only a wet core (toilet and shower) and no formal room to occupy, and the City County discouraged construction of temporary structures. Shihembetsa (1989) explains that many of the low-income allottees did not have the resources, beyond servicing their loans, to purchase building materials for a room for themselves, let alone additional rooms to rent. Ironically, in addition to servicing their loans, they were paying rent elsewhere (Shihembetsa, 1989). Part of the original scheme was to sell 5per cent of the plots at market prices to cross-subsidize the low-income plots.

This gave room to the high income earners to come into the project. Outsiders recognized the rental investment potential of the undeveloped plots, and plots allocated to qualifying households were sold to richer individuals, able to construct rooms. Thus the project attracted 'the more established members of the working class, leaving the others behind' (Shihembetsa, 1989). MacInnes (1987) reports that in

Dandora Phase II, some allottees 'had become real estate agents, visiting vulnerable neighbours and asking if they wanted to sell'. Investment in multi-storey rental blocks began to be noted in the 1980s. This marked the beginning of commercialization of housing development in Dandora ignoring development regulations. Most buildings in the neighbourhood go beyond approved building lines, thus encroaching on road reserves meant for public utilities. The City County of Nairobi place Dandora in zone seven (7) together with other low income residential Nairobi neighbourhoods such as Kayole. The type of developments allowed include high residential flats not exceeding two (2) storeys, plot ratio of 75per cent, a ground coverage of (50 per cent). The remaining (50 per cent) was to be utilized as an open space for ventilation and passage (*UNCHS-HABITAT, 1985*). This ground coverage is rarely adhered to and most developers optimize on the available space and in most cases coverage of over (75 per cent) is usually what most developers go for.

Planning and Building By-laws have been violated in this area. For instance the maximum permitted storey height for residential development without a lift is Five (5) levels. Allowable maximum plot coverage for zoned low income settlements is (70 per cent) allowable number of dwellings per hectare is 133 dwellings with a minimum space per dwelling of 75m² inclusive of circulation. Studies shows that these have been adhered to and it is a wonder whether the Dandora's case should be embraced through regularization or corrected by reviewing laws to accommodate certain extra-development and demolish others. Tipple (2002) noted that by planning for transformation, early dwellings can be sited and shaped suitably. Rather than enforcing planning controls that require building an initial small dwelling centrally on a plot, they should encourage building on one side, at the front or rear, or on one corner. All of these allow more useful space, and suggest directions, for extensions. Plot lay-out and sizes are likely to affect the amount of transformation.

The design of the dwellings targeted nuclear families as users, but did not consider the very high population currently living in Dandora. According to Nimpuno (1986:64), the open space planned for fully developed plots did not reflect the high per cent and size of families that would use each room within the plots. The immediate effect was the excessive load on the plot infrastructure causing frequent breakdowns. This also resulted in overcrowding and room utilization for a variety of purposes, e.g. kitchens used as dwellings and all the rooms doubling as kitchens. This overcrowding within

the plots, the poor infrastructural conditions, as well as the plot lay-out hampered the development of basic social networks in the area.

- **Plot size**

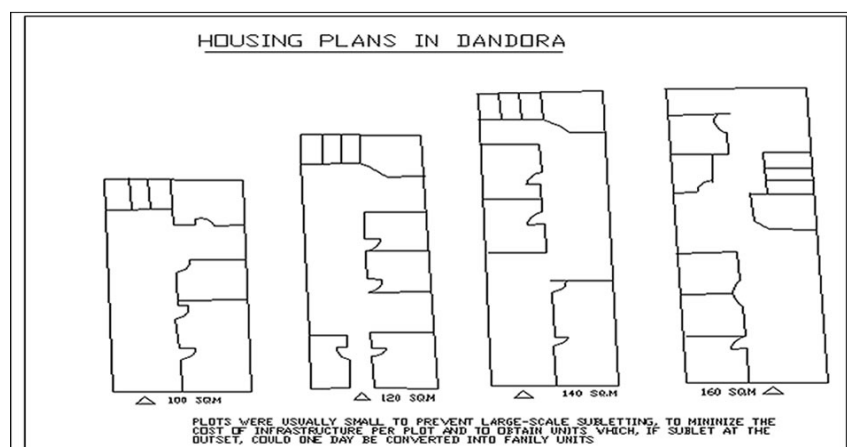
Plot sizes were reduced considerably from the common 250- 450 m² to only 100m²- 160m². The main aims of reducing the plot sizes were:

- To reduce the infrastructure costs
- To limit the maximum possible number of rooms per plot to five or six.
- To obtain units which if sublet at the outset could one day be converted into family units.

These variations in plot sizes were commensurate with the rates charged on such plots, thus the larger the plot the higher the rates to be charged on that plot. What is important to note is that the size of plots were not envisaged to hold the type of the current development in Dandora.

A considerable number of layout options were made available to developers, most of them very suitable for subletting. The design of the Dandora dwellings was meant to offer a considerable range of options and flexibility in choice of shelter types suitable for all allottees. In practice, however this flexibility still proved inadequate. As noted by Shihembetsa (1995), the precise required construction technology forced many allottees to reduce their labour inputs and resort to hired labour for skilled construction work. Some of the standard plans are illustrated in Figure 5.

Figure 5: Housing Plans in Dandora



Source: UNCHS, 1987

4.4.1 Housing Typology

The 1974 plan for Dandora proposed single storied houses on each site and service plot. The design alternatives of the residential units were responsive to the plot sizes. The allottees had to accept the type of plot they got which dictated the type of house and size. The configuration of spaces was not to create variations that meet users' socio-cultural needs but to satisfy their economic capacity. The first option had 65 per cent of the plots in three different sizes- 100, 120 and 140 square metres and participants were offered a construction material loan (Ksh 4,800). The second option had 30 per cent in three different sizes of 100, 120 and 140 square metres and plot owners were offered a construction material loan of (Ksh. 2400) and the third option had 5 per cent of the plots, all of them 160 square metres in area and no material loan was offered to the allottees of this option (Shihembetsa, 1995:141)

However, this was not adhered to. The HDD official¹⁴ said that less than 40 per cent of the Estate complied with the stipulated regulations. The original typology of houses proposed in the sites and services scheme plan were unable to meet the growing housing demand in Dandora in the later years. This resulted to plots changing hands from the original allottees of the plots to local investors who in turn built high density flat type. In most of these flats, especially within the central spine the ground floor is mainly for commercial purposes hosting mainly retail shops, chemists, video libraries and supermarkets, while the upper floors are mainly for residential use.

The high demand for affordable low income earners housing has led to the flouting of zoning regulations and subsequent development of high density housing witnessed in Dandora. The concern though is the proliferation of many rooms per floor as shown in plate 1, usually sharing common toilet and wash-up area facilities that are stashed at one corner. These are accompanied by poor quality of space design, narrow corridors and balconies with washing rails, poor lighting and ventilation. Such kind of housing development was not anticipated and has generated a housing character with potential for sparking violence among others, since space for privacy and expression is very limited.

¹⁴ Interview with HDD Engineer in charge of technical department and planning, 20th May 2009

Plate 1: Proliferation of Many Rooms Per Floor



4.5 Target Group and Affordability

The Dandora Community Development Project is an example of a large scale attempt by the City County of Nairobi (CCN), funded by the Government of Kenya and the World Bank to programme, plan and implement low-income housing solutions for households earning as little as Kshs. 280 per month (Chana, 1984:20) . Dandora was intended to cater for 5 per cent of Nairobi's total growth, falling between the 20th and 40th percentile income group. Shihembetsa (1989) explains that many of the low-income allottees did not have the resources, beyond servicing their rooms, let alone additional rooms to rent. Ironically, in addition to servicing their loans, they were paying rent elsewhere. This killed the spirit of eliminating future informal housing development and housing the poor, who were supposed to build and own decent houses.

In the 1974-1978 National Development Plan a decent home was defined as a housing unit of at least two habitable rooms, a kitchen, bath and toilet. These components of this definition are yet to be met in Nairobi and in indeed in most urban areas. Public housing programmes were based on the relation between cost and affordability. Nimpuno (1986) noted that affordability criteria which had been an important component in the design of the project, proved to be of only academic value because incomes from sub-letting made the venture a very good business for the allottees,

regardless of how low their income was. It should not therefore have been necessary to exclude the bottom (20 per cent) of households on the basis of affordability, although there could have been other implicit objectives, such as the intention to benefit workers in permanent employment. Syagga *et al* (2001) note that affordability has been a major problem for the urban poor citing the development of sites and services schemes, where affordability is determined before development begins.

The inadequacy of social infrastructure such as schools and health has led to emergence of private service providers to tap on the overwhelming demand for such services in the area. This privatization of services may financially strain the needs of the target population who according to Nimpuno (1986) had a median household income in 1983 of KSh 2,300 which would hardly cover even the cost of two rooms and basic infrastructure. With a monthly income of KSh 1,500 such a household could only afford one room with shared facilities. Monitoring studies by Chana (1984) and Nimpuno (1986) suggested that many people understated their incomes in order to be eligible. A small sample of 53 households studied, suggests that 45 per cent of the allottees were within the target group. Before coming to Dandora, the majority of allottees lived in informal settlements, such as Kibera, Kawangware and Mathare Valley.

Nairobi City County's Planning Department together with the World Bank had agreed to lower the planning and building standards so as to accommodate fully the low-income group. This did not go well with other council department such as public health and engineering. This resulted in complete redesigning of phase 2, which led to further delay of construction for three years (Shihembetsa, 1995). The beneficiaries not only ended up paying more for the serviced plots, but even the material loans could not be sufficient to complete the houses (Malombe, 1990; Lee-Smith and Memon, 1988; Syagga *et al*, 1989).

Cross-subsidized plots (5 per cent) as pointed out by Shihembetsa (1989) could have given the original allottees an opportunity to sneak out of the project and sell their plots to those who were outside the targeted income bracket. As earlier discussed, the prime objective of Dandora was to eliminate future informal developments, apparently this failed as it led to the formation of slums neighbouring it, such as Korogocho which developed and are growing faster than Dandora and which is

attributed to high rental returns. There is a high level of investment in slum rental housing in informal settlements in Kenya due to high returns and short pay back periods (Dafe, 2008). Amis (1984) and Mwangi (1997) variously reported high tenancy rates in the informal settlements in Nairobi. This may explain infiltration of the project by those who are financially stable and thus can purchase the land and put up massive developments which partly explain the changing face of the neighbourhood.

4.6 Population and Demographic Characteristics

Population dynamics are salient features and integral part in planning process. This is due to the fact that plans are made to serve, guide and enhance people's activities in a given space and people are the main agents of development. Dandora population has experienced an exponential growth since 1977 when the project was initiated. According to Kenya Population and Housing Census reports (1980 and 2010) the population grew from 22,672 in 1979 to 142,046 by 2009.

The population influx into Dandora is mainly attributed to the high rate of urbanization. This coupled with other factors such as low rents charged in Dandora compared to other parts of Nairobi. High population densities and high unemployment levels have resulted in a large per cent of the city of Nairobi's population living in deplorable conditions. The population influx coupled with high density development has been shown by Cahill (2005) to have a potential of alienating community members, thus inhibiting information sharing on issues such as crime, which can lead to high levels of victimization. This is an important pointer as to how changing population density can impact on crime incidences.

4.6.1 Population Growth Trends

Dandora's population has risen from 6,140 in 1969 to 142,046 in 2009. As shown in Table 6, the population more than tripled between 1969 to 1979 and 1979 to 1989. The rate of population growth in the area reduced to slightly over 50per cent between 1989 and 1999 and finally to around 30per cent between 1999 and 2009. The numbers of households have also risen from 6,253 in 1979 to 47,808 in 2009. The densities have also changed from 17,960 in 1989 to 36,254 in 2009. The planning implication of population changes is that it puts pressure on existing facilities and services as it is changing rapidly.

Table 6: Dandora Population Dynamics

| Year | 1969 | 1979 | 1989 | 1999 | 2009 |
|----------------------|---------------|--------|--------|---------|---------|
| Population Size | 6,140 | 22,672 | 71,838 | 110,164 | 142,046 |
| Density | 51 | 139 | 17,960 | 27,541 | 36,254 |
| Number of Households | Not specified | 6,253 | 24,638 | 36,691 | 47,808 |

Source: Compiled from 1969, 1979, 1989, 1999 and 2009 Kenya Population and Housing Census Reports

Rise in population in urban areas, ultimately creates housing demand and in developing cities such as Nairobi, the provision of housing is not in tandem with the demand, which has given room to private developers and investors to provide for housing at times ignoring the development rules and procedures which leads to major transformations of land uses and neighbourhoods in the cities.

In discussion of the population dynamics in relation to possible impact on land use transformation, there is an emerging trend of influx of people from the period between 1979 immediately after the launch of Dandora Community project and the year 1989 and 1999, when most of the original allottees had moved in to their premises, this is shown by the absolute population size and increase in the household sizes. Skogan (1986) noted that a stable neighbourhood as a social system reproduces itself.

In comparison of “movers and stayers” in a neighbourhood, Taylor et al (1979) argues that rapid change in a neighbourhood as a result of development and population increase may lead to feelings of alienation and powerlessness as it brings in unpredictable people into an area which worsens interaction pattern through the effect of dense social relationships on fear. This may describe the genesis of insecurity in any neighbourhood including Dandora.

4.6.2 Population Composition

Dandora is divided into 5 Phases and each Phase is occupied by a dominant ethnic group. According to an HDD officer¹⁵, during implementation of the scheme, majority

¹⁵ Interview with Community Development Officer on 25th of June 2011

of the beneficiaries estimated at about 60 per cent were people who came from the neighbouring areas of Nairobi, mainly from Central Province of Kenya.

This ethnic composition does not wholly reflect the general Nairobi picture where the Kikuyu ethnic group makes up approximately (32 per cent) of the city's population, the Luo (18 per cent), Luhya (16 per cent) and the Kamba (13 per cent). The Maasai, the original inhabitants of the region before the establishment of the city, constitute less than 1er cent (Oxfam, 2009:8). Ethnic composition is an important aspect of understanding security in urban areas especially in relation to vigilantism. As noted by Anderson (2002) one of the principal reasons for the existence of urban vigilantes in Nairobi is to be found in public anxiety about the levels of crime within the city and a perception of the incapacity of the police to tackle criminality. As noted by Kingoina (2010) the prevalence of vigilante groups such as Mungiki, Kamjeshi and Taliban is mainly due to the State's inability to protect its citizens. When the citizens do not feel secure from state agencies, they are likely to turn to such informal groups for protection.

Specific ethnic groups dominate sections of neighbourhoods in Dandora, although Kikuyus were found to dominate most phases of Dandora, with Luos and Luhyias dominating phase 4. Ethnic allegiances may be used as a mechanism of social cohesion within the community among those of the same ethnic group. Of importance to this study, is how the planned space use is ethnically balkanized and how this explains crime dynamics in the area.

In terms of crime, police records also show that more males are involved in crime than female and more so in violent crime, where use of force and energy is necessary. Composition in terms of gender has changed so much, the number of males have been consistently higher than females since 1979 (GoK, 2009). There were 12,523 males and 10,149 females in 1979 compared to 71,452 males and 70, 594 females in 2009. The ratio has been 1:1, with men having a marginal advantage in terms of absolute number.

4.7 Public and Community Facilities and Services in Dandora

This section focuses on the range and status of public and community goods and services in Dandora such as transportation, electricity, schools, health, religion and police facility.

4.7.1 Transportation

According to Nimpuno (1987) Many Dandora residents complain of the burden of transport costs. The major form of transportation in the area is road transport. Dandora is served by both public and private transport companies. This is mainly manifested in the form of both public and private means. In the late 70s till around 2002 Kenya Bus Services Number 36, 41 and 42 used to be the major means of public transport together with ‘*Matatus*’ (14 seater vans) and other mini-buses which have a capacity of 22-33 passengers. Currently the major operators are the matatus and mini-buses (Mutuma, 2008).

Land use planning and development should propose public transport routes in locations which will optimize population catchments and service viability by allowing for direct routes and easy access between key destinations. In addition planning should provide for bus stops in convenient locations and public transport and pedestrian access at and within key destinations such as modal interchanges and activity centres that is suitable for high volume and high frequency passenger movements. The provision of a well-connected and frequent public transport service increases opportunities for non-car owners to access employment and other activities (Sharifi *et al*, 2006).

The roads along the main corridors in Dandora are in good condition. However, commuters and transport providers experience a major hitch due to lack of adequate designated public bus stops/stages, the main terminus in Phase Two known as “*Dunia*” has partly been allocated to a private developer and fenced off. Komarock road is the only notable primary road in the area. It links Dandora to other parts of the city. It is a 14Km road and has a 40m road reserve.

In relation to road transport and crime, most *matatu*¹⁶ terminus are managed by cartels who extort money from the operators on daily basis. King' oina (2010) noted that the operators have to pay the gangs for protection fee and failure to pay can lead to violent attack which at times leads to loss of life. These terminuses as a land use are in most cases used as territory or base of crime, not only in Dandora but in most parts of the city and other parts of the country¹⁷. However, the Government has on several occasions cracked the bases of the gang, but the relationship between the gang and the Government is on and off and very unpredictable¹⁸.

Nairobi-Nanyuki railway passes through Dandora, transporting both cargo and commuters. Quite a number of residents use the commuter train services especially those working in Industrial area because it is cheaper than using *Matatu* or bus and also they don't have to be kept waiting in the jam as it is commonly experienced by those using cars and *Matatus* during peak hours. Despite being a popular and a cheaper means of transport, it faces challenges of congestion and risky commuter boarding behaviour, where occasionally they board on top of the train, endangering their lives. There is on-going rehabilitation of railway lines in Nairobi and this is changing the behaviour of commuters who were used to the habit of hanging on the train dangerously.

Apart from the morning and evening hours, the railway line is normally a deserted area and most people avoid walking along or near the railway line for fear of mugging and other crimes, as there are plantations near the railway way leave as shown in plate 6. There is also a station office which may explain absence of settlements encroachment the reserve as it is the case in other areas of the city such as Kibera. The railway line is also used by drug abusers such as bhang and it also gives thugs space where they can plan their crime before execution¹⁹.

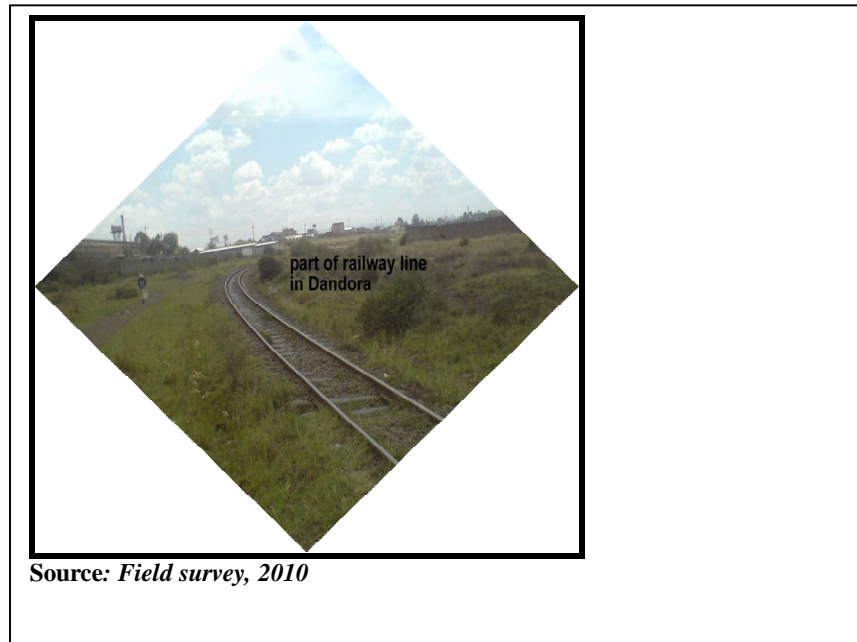
¹⁶ Is a public service vehicle carrying between 14-33 passengers

¹⁷ Interview with the Buruburu OCPD

¹⁸ In the year 2006, the Government formed a special unit to deal with Mungiki and other gangs in the country. The squad was later disbanded due to human rights outcry.

¹⁹ This was noted by the Officer Commanding Dandora Police Post (OCPD) with reference to the emerging uses of the railway line by criminals, on 26th March 2009

Figure 6: Section of the Railway



From the above discussion, there are indications that transport routes and terminus can be places of crime planning and execution. Fear of violence in these areas has led to isolation of certain transport nodes during certain hours and days of the week. This has transformed the areas through the conversion of some areas of the neighbourhood into “no-go zones” in which law enforcement agencies are also reluctant to patrol and intervene.

4.7.2 Dandora Dumping Site

The Dandora dumping site is run by the City County of Nairobi which collects levies from the trucks that dump inside the site daily. There is a weighbridge at the entrance to the site and the amount to be paid depends on the weight of the garbage in the truck. There is unrestricted dumping of domestic, industrial, hospital and agricultural waste. The garbage is then sorted out according to the type by other persons commonly known as “scavengers” inside the site. The site is also a “no go zone”. Some scavengers also engage in criminal activities.

The state of the dumping site clearly fits in the explanation given by the broken windows theory that posits that dilapidated infrastructure and physical disorder facilitate crime by signalling to would-be criminals that there is little consequence to

crime in the area (Kelling and Coles, 1996). It was reported that during Kenya's post election violence in 2008, *Mungiki* militia men used to plan their attack mission in the dumping site (CIPEV, 2008). The Dumpsite was also noted to provide a safe escape route for criminals. Very few are likely to chase a criminal beyond the gate of the dumpsite for fear of being attacked by fellow criminals who hide in the site, it also provides an escape route to the neighbouring Korogocho Slum.

4.7.3 Electricity Power Lines

The main energy source in Dandora for lighting is electricity. A major Kenya Power and Lighting Company (KPLC) sub-station is situated in Dandora. There are some illegal developments under these high voltage power lines, which are blamed for insecurity in the area. Cases of muggings and rapes have been reported numerously in this area. However, it is important to note that it took almost five years before Dandora got electricity supply and this could have been linked to poor anticipation of the connectivity of the neighbourhood to the grid by the technical committee in relation to the perceived humble background of the original allottees and misunderstanding on who to pay for the service which may have also contributed to the origin of insecurity in the area.

4.7.4 Educational Facilities

The Dandora sites and services plan had proposed 6 primary schools. Some of the schools were constructed while others were not. Currently, there are a number of primary and secondary schools in Dandora. A number of private schools are located on residential plots. Others which are church based are located on church compounds. This was not envisaged in the original plan. According to the planning handbook of 2007, there should be one primary school for every catchment's population of 4000. Given that the total population of 142,046 rely on 6 public primary schools, Dandora has a shortfall of approximately 30 schools, if the planning standard is to be fully achieved, however private schools have come up to try and address this shortage.

Schools do not attract much of the violent crime but in some cases students are lured to drugs by drug peddlers. Other crimes that target students and staff such as mugging, rape and general way-laying mostly happen outside school between school

and home. There is also possible explanation of youths missing school attendance due to gang violence, where they grow admiring the existing gangs and easy way of making money, especially when their parents and guardians are unable to provide for them.

Plate 2, shows the location of private schools, which had not been envisaged in Dandora's original plan. This is also part of the transformation the area is experiencing.

Plate 2: Schools in Dandora



Source: Field Survey, 2009

4.7.5 Health Facilities

The 1974 plan proposed two health centres. One of the health centres with a maternity wing is located in Phase I and the other centre with a child welfare clinic and a dispensary is located within the central spine. Each health centre occupies about 0.2 Ha of land. A number of private run dispensaries within the residential estates and within the central spine have cropped up perhaps due to the increasing demand for the services and inability of the two initially developed by the Government to meet the ever growing demand.

4.7.6 Religious Facilities

The proposed plan had provided land for churches. However many churches have sprouted in the last decade in Dandora. Literally, every street in Dandora has an average of 3-4 churches of various denominations. Some are built of permanent materials while others are temporary structures. Church has been noted to be a unifying force and effective provider of services (World Bank, 2010). In terms of violent crime prevention, the network of churches in Dandora neighbourhood plays an important role in bringing the community together any time there is some flare ups in the neighbourhood. This was witnessed during the post election violence in 2008 where churches also turned to be places of refuge for those who feared for their lives, although in some isolated cases like in Eldoret in 2007 post election violence they became targets of violent crime.

Religious institutions are seen as sacred places which offer counselling, dispute resolution and arbitration services to their congregations. From this perspective, it can be assumed that as a land use they are inversely related to crime incidences, hence an asset in crime prevention, though occasionally depending on the size of the congregation they can attract serious non-violent crimes such as car theft and break-ins and pick-pocketing. They rarely attract violent crime. Few instances where factions of church leaders fight over management of church affairs may lead to commitment of violent crime, especially when members of a congregation take sides and violently struggle to take charge of a given church as witnessed in many churches nowadays with a perfect example of Buruburu Church of God in Nairobi among many others.

4.7.7 Social and Community Halls

According to the 1974 plan, two-multi purpose community centres and three social halls were to be provided. These were planned for social activities such as parties, weddings, in-door games and other social gatherings. These facilities are important for bringing members of the community together and also for engaging the youths in the neighbourhood. This potentially has positive transformative effect of bringing people together and enhancing territoriality.

The plan had proposed two recreational grounds and other open spaces. In addition to this, the Plan proposed one sports complex. Presently, there is one playing field for two primary schools and one for the secondary school. These play grounds are available for public use outside school hours. There is also one large sports complex consisting of two pitches within the central spine.

Open space encourages legitimate users to interact and ensure their mutual safety (ICPC, 2008). Designing public spaces to attract people of different generations and backgrounds invites potential users and increases the sense of belonging and ownership (World Bank, 2010). A number of open spaces have been allocated to private developers, thus denying the community opportunities of interacting and controlling their space. Depending on how the open space is managed and designed, open spaces can also allow perpetrators of violent crime to hide easily. This increases if the residents are reluctant to report crime.

4.7.8 Police Station

Perceptions of security can shift dramatically based on events—such as the establishment of a police station nearby (ICPC, 2008). The original plan had proposed land for police station. Despite having a large population of almost 200,000 persons, Dandora has only a police post (Kinyago police post) and not a station as was originally planned. Police station as a symbol of authority in crime prevention and management is a land use which can have greater impact in management of crime in the neighbourhood.

Nimpuno (1985) noted that there are problems of infrastructure maintenance, which is attributed to the higher than anticipated population density. In relation to the low standard of infrastructure which is not appropriate in an area dominated by private rental housing and where nobody feels responsible for the environment.

4.8 Land Use Transformations

Under the supervision of the HDD, majority of lower income groups formed building groups in which they saved money to develop two rooms on each member's plot. The very poor allottees who could not raise money through the building groups borrowed money from a Revolving Welfare Fund in which they repaid the loans at a given

interest rate once they started collecting rents. Those who were totally unable to repay the loans were forced to sell their plots to those who could finance the loan after five years. This change of ownership could perhaps be the foundation of transformation being witnessed in Dandora. Tipple (2002) on home-based enterprises in Bolivia, India, Indonesia and South Africa shows that user-participation in constructing and modifying dwellings and neighbourhoods should be accepted as both inevitable and positive.

Shihembetsa (1995: 140) Dandora Site and Service Scheme was done and designed according to World Bank appointed experts' perception of the lifestyles of the low-income people. He further notes that there was no research carried out to find out the cultural and socio-economic characteristics of the envisaged users. Amis (1996) on Nairobi's informal housing market noted that market mechanisms dominate the low income housing scene both for rent and owner occupation and that most residents in informal settlements are renters and that the construction of informal buildings is indeed a lucrative business. This may explain why the allottees and various developers are changing the original housing structures and land uses in the area so as to maximize on their investments.

According to Syagga *et al* (2001) another drawback faced in upgrading programmes is the high standards set for housing, infrastructure and service provision. Although lower standards were applied, they were still beyond the means of the poor. To complicate matters even further, upgrading was permeated by political interests that distorted the allocation of infill plots. Rather than being allocated to the displaced poor, the plots found their way into the hands of non-target groups that had political influence. Moreover, upgrading during the 1970s and 1980s was premised on the false belief that most residents of informal settlements owned the plots on which the structures were built. The policy focused on the wrong group - the owners of the structures who did not live in the settlement.

The procedures for allocation proposed by the Project Unit were to depend upon an impartial computerized balloting. Thus the usual 'right' of the Council to select beneficiaries was rejected, although a serious struggle took place on this point. Some people of middle and upper income appear to have penetrated the upper limit for allottees. Plot allocation in phase 1 reached the target group. This perhaps gives a

useful explanation of the low pace of transformation in Dandora phase one as compared to other phases.

Allocation in later phases shows a higher degree of penetration of the higher income groups. The subsequent bias in allocation was caused by a variety of factors. In 1980, the Nairobi City Councillors, among others, began interfering with plot allocation. Firstly, allottees who were in arrears (the normal limit being six months) had their plots repossessed and sold to individuals in league with Councillors and others. These actions among others contributed to the Government decision to dissolve the Nairobi City County and to appoint a Commission to oversee the operations of City Hall in 1983. Secondly, delays in plot allocation resulted in increased building materials and labour costs, compelling many to sell off their undeveloped plots (Chana, 1984 and MacInnes, 1986).

Dandora has totally transformed over years with booming commercial activities located in non planned areas. A large number of people engaged in commercial activities in Dandora mainly operate small scale businesses which include retail shops, butcheries, hardware shops, bars, wholesale shops, cyber café, telephone bureaus and video libraries among others²⁰. According to the Dandora sites and services plan of 1974, commercial activities were confined to the central spine which was bounded by the residential fringe. The original plan proposed 400 market stalls and workshop clusters in the area. However, this has changed as many small scale businesses are now operating within the residential zone, as the market stalls cannot accommodate all commercial activities.

This is in line with Majale (2002), who argued for recognition and acceptance of realities on the ground. By acceptance that many households living in poverty are *bound* to extend their dwellings and/or use their dwellings for economically profitable activities if they possibly can. This may mean walling in a veranda or balcony, or adding new rooms. There is also active transport sector serving the high population generated by the commercial and housing in the area. The section below examines these activities and related services available in the area.

²⁰ Interview with the HDD's Community Development Officer

Many commercial activities have sprung up and most of established commercial enterprises are located within the main transport corridors of the area. Some kiosks are suspected to be hideouts for criminals'. The mushrooming of these commercial activities have changed the physical character of the neighbourhood limiting accessibility to certain places due to buildings going beyond approved building lines, thus encroaching on road reserves meant for public utilities as shown in the study's findings section.

The Kenya Government was to retain ownership of the land, providing all allottees with 50 year renewable leases. If plot-holders wanted to transfer or sell their plots, the Nairobi City County was supposed to mediate and pay compensation to the plot owner for investments such as building materials and imputed labour costs. Plots would be reallocated by the NCC at prices covering all costs. This seems to have been ignored by both the buyers and purchasers facilitated by weak enforcement by the City County.

4.8.1 Land Use Transformation Determining Factors

The first turning point came as a result of the stiff opposition to World Bank's insistence on impartial plot allocation by the local politicians but major turning point which had a significant impact on land use came out of a policy decision by a committee formed by the Nairobi City County (NCC) in the 1982 which brought up to 1000 the number of plots sold to or reallocated to higher income purchasers and developers in Phase two of the project. According to MacInnes (1986), this decision proved to be the single most important new variable determining future patterns of settlement and social organization of the space and relationship among the owner population and the renters in the second Phase of Dandora project.

Study carried out by Mazingira (1982) noted that Phase I of Dandora project gained reputation of being poorly designed, under subsidized and unattractive to outside investors, while Phase II was evaluated as well designed, over subsidized for the requirements of its target population and highly attractive to outside investors. The study further noted that the real paradox was that Phase I was ultimately successful in

sheltering 90 per cent of its target population, while Phase II managed to shelter less than 65 per cent of its original allottees²¹.

According to UN-Habitat (1987:8) Almost 80 per cent of Dandora residents are tenants. More than half of the original allottees preferred to sublet the entire house and remain in substandard housing areas in order to give priority to other basic needs. This means that a large proportion of the Dandora landlords are themselves tenants elsewhere.

There are also cases of those who sold off their plots on a willing seller-willing buyer basis, which in most cases led to commoditization of the plots. The study by UN-Habitat of (1987:10) revealed that the forward planning of urban growth in which sites and services development was to play key role in ensuring well organized environments, has been overtaken by events. It further noted that the infiltration of the project will lead to massive long-term problems of regularization and upgrading, because the development has been entirely uncoordinated and implemented without development control.

4.8.2 Summary on Land Use Transformation

The factors explaining Dandora's land use transformation, are in themselves multi-contextual, and can be summarized as follows:

- Penetration of the plots allocation by the higher income groups both as landlords and tenants.
- Lack of development control such as on-plot economic activities for example beer halls and the nuisance created by drinking places.
- Interference in allocation by the Nairobi City Councillors and council officials.
- Recovering of plots for those who were in arrears or unable to service the plots- this was blamed on shifts in priorities, such as investing in children's education, business or purchase of land in their rural home areas.
- Many allottees living elsewhere and letting their entire houses for renting.

²¹ This was also mentioned by the technical officer at HDD, as an explanatory factor of considerations when comparing transformations in Dandora phase one with other phases. He noted that the poor design of phase one slowed down the interests of the well-off investors, keen on quick returns.

- As rent increases in other parts of the town, people move to lower-income housing units such as Dandora to allow for other needs (UNCHS, 1987:63).
- As pressure on rented accommodation in Dandora increased, a number of allottees moved from Dandora to informal settlements in Mathare Valley and Korogocho. Many found the income from renting to be more important than being accommodated there (UNCHS, 1987:65).
- Delays in completion of the commercial centres and markets in Dandora led to flourishing and consolidation of small businesses on the plot which is related to insecurity reputation (UNCHS: 1987:68).
- Increase in building materials and labour costs due to delays in plots allocations, which compelled many allottees to sell off their undeveloped land.

This section has highlighted the original idea behind the Dandora site and service scheme. It has revealed that although the housing scheme was planned for low-income households, the scheme has been infiltrated by high income groups due to commercialization of housing. It further shows that the idea of having Dandora as a neighbourhood came as a result of concern with the housing problems the poor were facing, it was crafted as a panacea to slums by providing decent shelter to the poor who were unable to afford the rent given their financial background. The project was, however hijacked midway, when some of the poor were unable to service the loans. These led to infiltration of the project which later led to rapid development of high rise development which has changed the image, aesthetics and dream of the estate. Apart from crime, the estate is also suffering from other problems such as the population density which has become higher than anticipated. The standard of infrastructure and community facilities provided is not appropriate in an area like Dandora which is dominated by private high density rental housing, where nobody feels responsible for the environment they are living and working in.

CHAPTER FIVE: RESIDENTIAL CHARACTER AND CONTEXT OF LAND USE TRANSFORMATION IN DANDORA

Socio-economic status of a neighbourhood can impact on an area's crime pattern and general feelings of insecurity for other members of community including school children and adolescents (South *et al*, 2003). The first section of this chapter discusses the study findings in the light of the socio-demographic characteristics, to enable better understanding of the social and economic backcloth of Dandora as a neighbourhood. The section will discuss various attributes of the residents such as their gender, age, education level among others to contextualize crime in relation to the land use transformation experienced in Dandora. The second section of the chapter will discuss the nature, typologies, zones and appropriateness of land use transformations. This fits well within the multi-contextual theoretical framework informing this study where neighbourhood land use and consequent changes are linked to socio-economic factors in explanation of crime incidences. This approach is also informed by Bessa (2006) who noted that neighbourhood system is a dynamic entity with its spatial structure and character that evolve over time.

5.1: Respondents Background

In discussing respondents' attributes, the study relies on information collected from two major sets of quantitative instruments, targeting households and enterprises operating in the area since they are the dominant category of land uses in the area. The other category of respondents which is mainly qualitative, informing the study are: key informants which include police officers, Officers based at the City Hall and at the Dandora's HDD; the area Chief, three original allottees and Focus Group Discussion (FGD) participants conducted with the Dandora Community Policing members.

5.1.1 Distribution of Household Respondents

Stability of a neighbourhood is significantly determined by the socio-economic characteristics of a neighbourhood. In linking sampling distribution to crime and land use literature, the socio-economic characteristics discussion in relation to the sampled respondents is deemed useful basis of understanding Skogan (1986) who argues that

crime thrives in unstable neighbourhoods since changing neighbourhood offers an environment in which crime rates and levels of fear change.

The gender distribution of household respondents was (60 per cent) male and (40 per cent) female with age distribution ranging from 18 to over 45 years. The gender breakdown of the respondents does not match exactly with the area's 2009 population census record which is given as 71,452 for male and 70,594 for female giving an almost 50-50 per cent for the gender breakdown, which compares well with Nairobi City and Embakasi Constituency, which have 1,605,230 for male and 1,533,139 for female and 468,097 for male and 457,678 for female respectively. The reason for not having the same gender breakdown was because of the study's definition of the household respondent as either the head of the household or any other knowledgeable adult and responsible member of the household. Some female respondents preferred the questions to be directed to their male spouses, mainly for fear of being reprimanded by their spouses and this partly contributed to high male representation.

Literature on gender and crime has shown that most men are the perpetrators of violent crime as women are found to be leading victims and are more vulnerable to violent crime as compared to men. Males commit more serious offences and are more likely to be arrested for doing so (Hindelang 1979; Steffensmeier et al 1995). Landau and Freemantle (2010) have also raised the gender composition issue as a contentious component of crime, by noting that women are excluded in crime prevention efforts in many communities, despite being the favourite target of perpetrators of violent crime.

The modal age category as shown in Table 7 was found to be 25-29 years accounting for 27.8 per cent, which is in line with the Nairobi East District and Embakasi Constituency which shows that age 25-29 is the leading age category catering for about 16 per cent of the population (Kenya, 2010). This also confirms the fact that Dandora fits well in Kenya's population pyramid where the country is dominated by a youthful population. The least represented age category being 40-45 and over 45 years each accounting for (8.3 per cent). Up to (79.2 per cent) of the respondents were found to be less than 40 years.

Table 7: Household Age Distribution

| Age Category | Frequency | Per cent | Cumulative Per cent |
|--------------------|------------|------------|---------------------|
| 18-24 | 37 | 25.7 | 25.7 |
| 25-29 | 40 | 27.8 | 53.5 |
| 30-34 | 24 | 16.7 | 70.1 |
| 35-39 | 13 | 9.0 | 79.2 |
| 40-45 | 12 | 8.3 | 87.5 |
| Above 45 | 12 | 8.3 | 95.8 |
| Refused to respond | 6 | 4.2 | 100 |
| Total | 144 | 100 | |

Source: Field Survey, 2009

Age is one factor that reflects on the debate of inclusion and exclusion. Youths are inherently considered as the prime perpetrators of crime in communities, yet paradoxically they play an important role in the collective crime prevention practices by operating as community protectors (Kirsten, 2008; Jefthas and Artz, 2007; Winlow and Hall, 2006). Age composition has been one of the strongest predictors of crime, especially burglary (Martin 2002; Smith & Jarjoura 1989; Van Wilsem, et al 2006) because of the well documented age-crime curve (Farrington 1986; Hirschi & Gottfredson 1983). It will be interesting to see how youth take the advantage of their numbers in analysis of their role in crime prevention in relation to the older citizens who are also seen within the multi-contextual theoretical frame as investors and owners of development thus taking keen interests in security matters due to their stake.

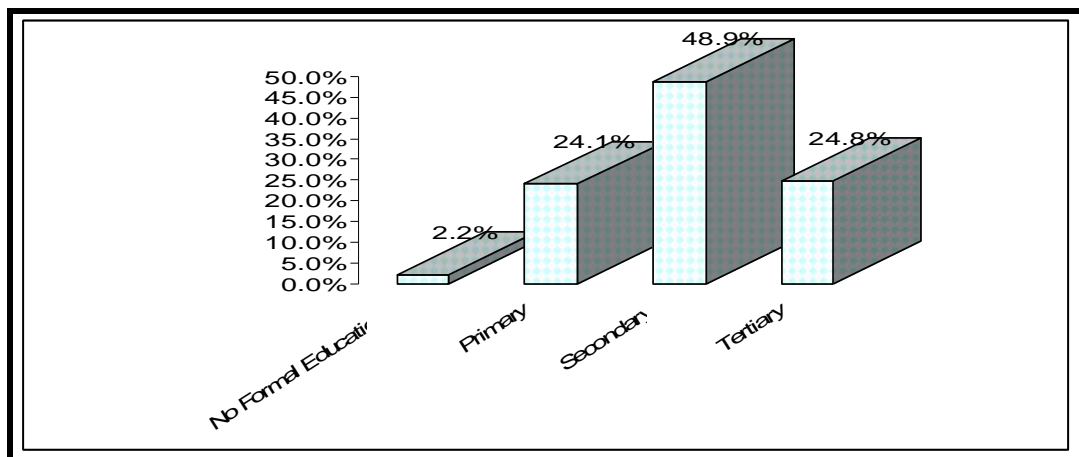
Youth are associated with unemployment with youth in much crime literature. World Bank notes that high unemployment and limited access to education increase the pressure on urban youth, prompting many to rely on illicit means of making a living. Given the overall gloomy employment situation, many youth are now the breadwinners for their families. This has disrupted family relationships and weakened parents' influence over their children. When family subsistence depends on youth, parents may turn a blind eye to criminal activities by their children (World Bank, 2010).

Household sizes varied from 1 to 11, with an average household size of 5, which is slightly higher than the average of 4 for Nairobi's City, but within the range of most

low income neighbourhoods of Nairobi. According to Nimpuno (1986:64), the open space planned for fully developed plots did not reflect the high percentage and size of families that would use each room within the plots. The family size is mainly related to overcrowding which has potential of leading to other social ills and not necessarily crime *per se*. Studies conducted by Natasha (2008) have shown that competition for resources in a large family can lead to irrational means of livelihoods achievements which may include engagement in crime to meet basic needs.

As shown in Figure 7 the highest education level of respondents vary. Education data shows that majority of the households had some literacy levels which is very essential in employment and also in running of business where some basic numeric skills are required. Majority of them (48.9 per cent) had attained secondary education, (24.8 per cent) tertiary and (24.1 per cent) had completed primary. A paltry (2.2 per cent) had not attained any formal education. Primary education attainment is higher than Nairobi, where (37.5 per cent) have primary education but secondary is lower, where Nairobi is said to have (32.1 per cent).

Figure 7: Household Respondents Education Level



Source: Field Survey, 2009

Mudege *et al* (2008) and Mugisha (2006) point out that majority of those living in low income settlements and slums suffer from varying degrees of violence that can also negatively influence educational attainment and schooling outcomes. Magadi *et al* (2003) compares levels of feelings of insecurity among school-going children in low income and slums on one side, and among school-going children in medium and high

income, and concludes that it is higher among low-income and school-going children living in slums. Williams (2000) listed factors contributing to high insecurity in the disadvantaged neighbourhoods which contributes to low educational attainment and attendance as; low presence of law enforcements agents, high levels of unemployment among youth leading to idleness, alcohol and drug abuse and crime.

In linking violence and education attainment, Irwin (2004) observed that school children who are confronted with regular violence can stop attending school as a way of avoiding violence, hence impacting negatively on educational attainment. On a positive note, higher rates of educational attainment have been related to lower rates of juvenile delinquency (Reynolds *et al* 2004).

In terms of respondents' occupation, it was found that the majority (49.6 per cent) were working in the informal sector, (21.9 per cent) in the formal sector, (12.4 per cent) each accounting for students and unemployed respectively and lastly 3.6per cent were housewives. World Bank (2010) study shows that unemployment can lead to boredom and depression, which, in turn, are linked to substance abuse and perpetration of violence. Youth unemployment is noted in various literatures as the main source of problems various residents in urban areas face including violent crime victimization. In Nairobi, the youth unemployment rate is high and accounts for (46 per cent) of the total unemployed population. As a result, youths tend to spend long periods idling in their communities and are easily lured into criminal activities (Government of Kenya 2006) In fact, many of the youth involved in 2007 post-election violence in Kenya were unemployed (CIPEV 2008).

Sizeable portion of the respondents (81.4 per cent) have lived in Dandora for more than 5 years. Up to (18.6 per cent) have lived there for a maximum of 5 years, whereas 10.7per cent have stayed for over 25 years. This shows that a reasonable percentage (10.7 per cent) of the household respondents have experienced development changes which have occurred in the area.

Some of the old residents could be the original beneficiaries who were part of the allottees targeted by the project. However, this was not raised in the questionnaire but there is a possibility that some of those who may have stayed for less than twenty

years were still the original allottees who did not manage to build immediately and also did not sell out their plots as earlier indicated. Findings also reveal that (38 per cent) of the household respondents had moved within Dandora. The reasons for moving were given as changing family size hence requiring larger room (28.7 per cent), insecurity (27.4 per cent), home ownership (18.3 per cent) give way for construction of more units (9.7 per cent). Others had different reasons including eviction by the landlord, lost job, increment in rent, proximity to school, work place and business premise all accounting for (15.9 per cent).

Residents had different reasons for preferring to live in the estate, (18.4 per cent) gave cheap and affordable housing rents as their major attraction, and (15.5per cent) said better security in comparison to other areas such as Korogocho and Kariobangi. This is lower than the KIPPRA findings of 2004 which found that (27 per cent) of Nairobians make a choice on where to reside based on security of the place of residence among other factors. Other reasons include born and bred in the area (9.5 per cent) and reliable transportation services (12.3 per cent). They also mentioned commuter train as one of the unique and attractive services available to the residents.

Table 8: Reasons for Preferring Living in Dandora

| Reasons | Responses | |
|---|------------|------------|
| | N | Per cent |
| Cheap/ affordable rent | 52 | 18.4 |
| Better security | 44 | 15.5 |
| Availability of reliable transport | 35 | 12.3 |
| Moved in with parents/birth place | 27 | 9.5 |
| Availability of cheap food/cost of living | 20 | 7.1 |
| Closeness to the market/customers | 17 | 6.0 |
| Relatives and friends live | 17 | 6.0 |
| Nearness to children's school and clinics | 16 | 5.7 |
| Living quarters double as work place | 15 | 5.3 |
| Better planned/better housing/quiet neighbourhood | 12 | 4.2 |
| Cleaner/less polluted | 10 | 3.5 |
| Availability of water and other utilities | 9 | 3.2 |
| Parents own the house | 6 | 2.1 |
| Better community socialization and cohesion | 3 | 1.1 |
| Total | 283 | 100 |

Source: Field Survey, 2009

Some of the reasons given such as born in the area, parents owning the house, closeness to market/customers, living next to relatives and friends all accounting for

(24.7 per cent). These are surrogates of what Narayan (1997:50) refers to as social capital. The factors explain the trust and reciprocity embedded in social relations and social structures that enable households achieve their individual and community objectives. Moser and McIlwaine (2001) pointed that in terms of addressing insecurity, cognitive social capital²² is a necessary requirement and the erosion of the same has far-reaching insecurity consequences.

In revisiting the literature on stable neighbourhoods in relation to crime and fear of crime, Taylor *et al* (1979) noted that rapid change in a neighbourhood may lead to feelings of alienation and powerlessness as it brings in unpredictable people into an area. This reduces interaction pattern through the effect of dense social relationships on fear. Three key informants who have lived in Dandora for over 25 years were interviewed to get how land use changes is impacting on violent crime and fear of the same in the Area over time. Cahill (2005) notes that neighbourhood stability based on moderate changes is an important ingredient of social control and crime prevention mechanism. As shown in table 9, 81.6 per cent of the residents have stayed for more than 5 years, which is an indicator that most residents have lived there for a good period of time as noted by Taylor *et al*.

Table 9: Length of Stay in Dandora

| Number of Years | Frequency | Per cent | Valid cent | Per cent | Cumulative Per cent |
|-----------------|------------|-------------|------------|----------|---------------------|
| 0-5 years | 26 | 18.1 | 18.6 | | 18.6 |
| 6-10 years | 25 | 17.4 | 17.9 | | 36.4 |
| 11-15 years | 31 | 21.5 | 22.1 | | 58.6 |
| 16-20 years | 22 | 15.3 | 15.7 | | 74.3 |
| 21-25 years | 21 | 14.6 | 15 | | 89.3 |
| Over 25 years | 15 | 10.4 | 10.7 | | 100 |
| Total | 140 | 97.2 | 100 | | |
| No response | 4 | 2.8 | | | |
| Total | 144 | 100 | | | |

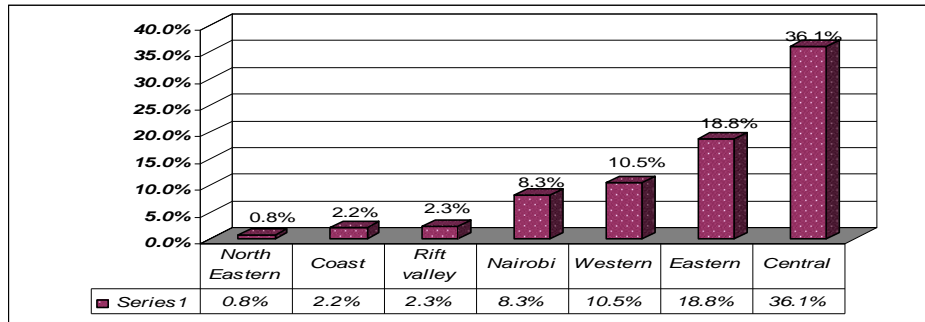
Source: Field Survey, 2009

Central province as shown in Figure 8 was found to be the leading home province of the household respondents with (36.1 per cent), this was followed by Nyanza and

²² Cognitive social capital refers to the norms and attitudes that manifest themselves in trust and collaboration among neighbours

eastern with (21.1 per cent) and (18.8 per cent) respectively while North Eastern province was least represented with (0.8 per cent).

Figure 8: Respondents Home Province



Source: Field Survey, 2009

In relation to ethnic²³ group and service provision in particular to security service, there is an emergence of organizing use or territory along ethnic groupings' which are supported by vigilante groups such as "Mungiki" (a Kikuyu word for multitude), Taliban, Chinkororo and, Kamjeshi which originally were seen as substituting for lack of public services in the slums and low income neighbourhoods. Later, they started harassing individuals and businesses, including Matatus and owners of real estate, into making payments for services which they would provide, including connecting electricity, providing pit latrines, and meting out justice (King'oina, 2010). According to CIPEV (2008) these gangs have grown and multiplied within the context of a political culture that both used and tolerated extra judicial violence, where Dandora has not been spared.

Sections of some Phases in Dandora are dominated by people from certain ethnic groups which in some literature is related to building of social capital which as noted by Jacobs (1961) are important in provision of security and identity. In bringing the existence of these groups and possible connection to violent crime in Dandora, CIPEV (2008) note that National Security Intelligence System (NSIS) had taken note of "Mungiki" taking advantage to settle their differences with the Taliban largely composed of Luo and predicted violent confrontations to occur with devastating effects. NSIS further indicated that Mungiki adherents were assembling at Dandora

²³ Ethnic allegiances can provide a source of cohesion within the community amongst those of the same tribe

Dumpsite in preparation to attack residents of surrounding neighbourhoods which are dominantly settled by a different ethnic group²⁴.

Bretherton & Pleace (2008) noted that ethnically diverse social housing developments have emerged from the literature as contexts in which neighbourliness and community satisfaction have been particularly problematic due to different expectations, lifestyles and stereotypes. A Canadian study found that there tended to be a lack of interaction or limited interaction between people from different ethnic groups and very few examples of familiarity and neighbourliness in ethnically diverse higher density social housing (Séguin (1997 in Easthope *et al*, 2011).

Perceptions and stereotypes of different ethnic and socio-economic groups could also contribute to other barriers to community cohesion in public housing, including fear of crime, which may prevent residents from interacting with neighbours of different ethnic and religious backgrounds (Hopkins 2007; Meredyth *et al* 2002; Thompson *et al* 2007). This mistrust is not healthy for any collaborative response to crime as a neighbourhood as it is likely to ethnicize security and fragment crime reduction efforts in favour of certain groups which lead to exclusion of the minority ethnic groups such as Somali and Maasai, who are also, part of the neighbourhood.

5.1.2 Entrepreneurs Characteristics

This section will discuss the characteristics of the entrepreneurs so as to better understanding how these affect their experience with crime and coping mechanisms. Most of the enterprises in Dandora neighbourhood are micro in nature, employing between one to less than 3 employees. In analyzing commercial land use in the context of a neighbourhood and crime incidences, the study is informed by literature showing that there is an increasing recognition of the relationship between 'safe' communities and thriving business precincts. This shows that commercial land uses within a neighbourhood are also part and parcel of the area and plays an important role in the sustainance of the neighbourhood, hence its importance in understanding crime dynamics within that setting.

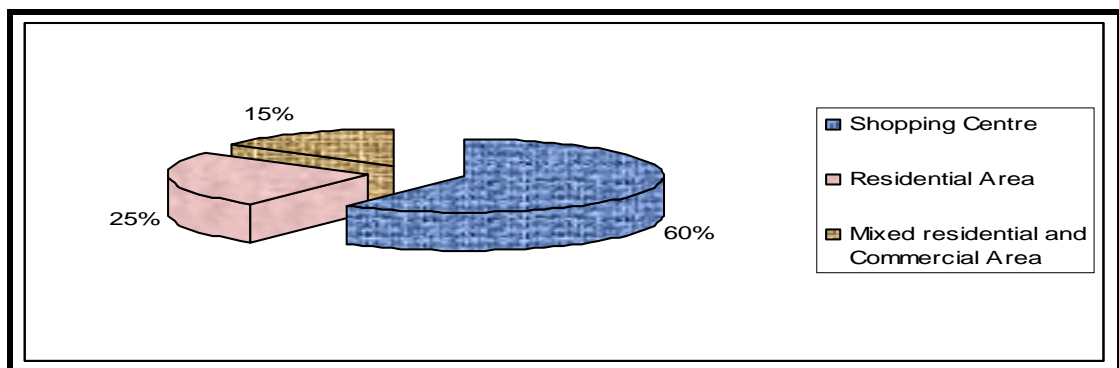
²⁴ According to a village elder in Dandora interviewed on 14th of May 2012, this "ethnic balkanization" of the neighbourhood was originally based on welfare and kinship support system, but of late issues of fear of crime and organized violent attack as witnessed in 2008, has made it go beyond pure welfare concerns and it is now being used as away of protection of turfs.

The study covered a sample of 121 enterprises. The distribution of the sampled enterprises in Dandora shows that Phase 1 had the least number (16.5 per cent) and Phase 4 had the highest number (24.8 per cent) of the sampled enterprises. Phase 4 had highest number of heterogeneous business activities as compared with other Phases. Various research findings such as Hopkins (2002) have shown that business crime is not uniformly spread but highly concentrated, with a fraction disproportionately shouldering majority of the crime.

Enterprises Location

Figure 9 shows that (60 per cent) of the enterprises were located at the shopping centres, (25 per cent) at the residential areas and (15 per cent) a mixed environment, where with both commercial and residential areas. This confirms Muchai's (2003) emerging business location in Nairobi, that there are a number of commercial activities going on in the residential areas, especially the micro-enterprises, where individuals work in the house to avoid paying rental charges which was noted to change crime pattern.

Figure 9: Location of Enterprises



Source: Field Survey, 2009

In discussing the location of enterprises within residential areas, the study borrows from Bernasco and Block (2009) who argued that mixed land use and their consequential activities may attract potential offenders seeking opportunities for robbery. In linking this to Dandora, this also qualified by Felson (2002); Taylor (1988); Taylor *et al* (1995), who noted that clustering of potential victims and

offenders brought about by concentrated mixed land use may outweigh the benefit of increasing guardianship due to pedestrian traffic.

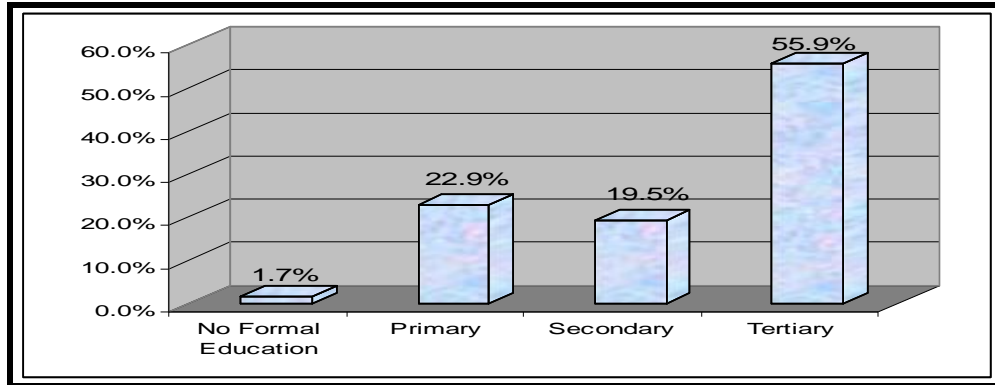
It is important to point out that not all enterprises found to be operating at the shopping centre were operating in the planned shopping centre. Some were operating on the road reserves and others in open spaces around the shopping centre. Location of enterprises in most cases is affected by crime. Models by various researchers for example Epple and Romano (1998), Epple *et al* (2001) is based on the idea that safe location of an enterprise is occupied by the highest bidder, bids decline repetitively with violent crime, and the bid-rent functions of two given enterprises cross only once. This shows that the safest place which is ideal for business location will likely be expensive than relatively safer areas, since the entrepreneurs are mindful of their business and life. Apart from security, other locational factors demand for retail opportunities also varies across locations with proximity to potential customers, including the residential population, local employment, and the attributes of these groups such as income and education.

Large proportions of the urban poor derive all or part of their income from small or informal enterprises which may be classified into four main groups: retailing and wholesale; craft, manufacturing and production; services; and transport and construction (Rakodi and Lloyds-Jones, 2002). Their interaction with urban space is not well documented. Many small businesses draw most of their customers from other poor households, but those which successfully attract a middle or high income clientele make a significant cash contribution to the low-income economy (Islam and Khan, 1988). According to Musyoka *et al* (2010) location tends to be of major importance to small scale operators. Brown in (2002), states that the access to the concentration of people and their assets and services are important to the urban poor. Urban planners need therefore to take into account the locational dynamics when setting a side area for commercial activities.

Figure 10 shows that (55.9 per cent) of the entrepreneurs had attained secondary education, (22.9 per cent) primary, (19.5 per cent) tertiary and (1.7 per cent) had no formal education. This shows that (98.3 per cent) of those conducting business had

basic education which is a necessary requirement to transact business, since some knowledge of basic numeric skills is required.

Figure 10: Educational Level of Entrepreneurs



Source: Field Survey, 2009

Table 10 shows reasons for business persons locating their businesses in Dandora. They include closeness to customers (22.7 per cent), ideal site for conducting business (14.4 per cent), affordable rents (13.4 per cent), and reliable transport and better security, each accounting for (12.4 per cent). Muchai (2003) found that most of the robbery incidences (29per cent) occurred in business premises, mainly in urban centres. Location plays a significant role in siting of businesses. As earlier discussed in the literature review, in particular Majale (2002) revealed that many households living in poverty are *bound* to extend their dwellings and/or use their dwellings for economically profitable uses if they possibly can. UNODC (2010) argued that what should concern policy makers is the fact that there were more robbery incidences targeted at businesses, despite the heavy investment by businesses in private security. This may be attributed to the availability of cash associated with businesses. Of interest is that a sizeable percentage (12.4 per cent) locates business based on security availability.

Table 10: Reasons for Locating Businesses in Dandora

| Reasons | Responses | |
|---|------------|------------|
| | N | Per cent |
| Closeness to the market/customers/it is a shopping centre | 44 | 22.7 |
| Availability of reliable transport/bus station | 29 | 15.0 |
| Availability of space/good site for business | 28 | 14.4 |
| Cheap/ affordable rents for business premises | 26 | 13.4 |
| Better security | 24 | 12.4 |
| Availability of water and other utilities | 12 | 6.2 |
| Proximity of living quarters | 11 | 5.7 |
| Nearness to children's school and clinics | 8 | 4.1 |
| Relatives and friends live | 5 | 2.6 |
| Cheap/low cost of conducting business | 3 | 1.5 |
| It is cleaner/less polluted | 2 | 1.0 |
| good lighting | 2 | 1.0 |
| Total | 194 | 100 |

Source: Field Survey, 2009

According to the Africa Competitiveness Report (ACR, 2009), most of the competitive disadvantage of African enterprises is due to the invisible costs including lack of security. The cost of crime and violence on business and the sense that the police are unable to provide protection from crime are particular concerns for African entrepreneurs. The ACR disaggregates security into costs of terrorism, crime and violence, organized crime and the perceived reliability of police services. The Kenya Association of Manufacturers (KAM, 2009) survey discovered that, on average businesses allocate (3 per cent) of their operating budgets to private security services and security upgrades to their businesses. Violent crime pose a great challenge to businesses and many business owners and managers employ various means to help prevent or deter would-be criminals.

Table 11 summarizes the duration enterprises have been in operation in Dandora up to the time of the study. More than half (54.3 per cent) of the enterprises had been in operation for a maximum of 5 years with only (5.2 per cent) having been in operation for over 15 years. Most of these enterprises were found to be micro, whereby the operator was also the sole owner and their lifespan was found to be short, hence the findings. A number of them were located in residential quarters.

Table 11: Duration of Operation

| Duration | Frequency | Per cent | Valid Per cent | Cumulative Per cent |
|-----------------|------------------|-----------------|-----------------------|----------------------------|
| 0-5 years | 63 | 52.1 | 54.3 | 54.3 |
| 6-10 years | 32 | 26.4 | 27.6 | 81.9 |
| 11-15 years | 11 | 9.1 | 9.5 | 91.4 |
| Over 15 years | 6 | 5.0 | 5.2 | 96.6 |
| Don't Know | 4 | 3.3 | 3.4 | 100 |
| Total | 116 | 95.9 | 100 | |
| No response | 5 | 4.1 | | |
| Total | 121 | 100 | | |

Source: Field Survey, 2009

Enterprises in Dandora were found to be at high risk of collapsing when they become victims of criminal attacks since they were found to be lacking any insurance covers as is the case with most medium and other large established firms and given that they operate from residential quarters or on way leave²⁵.

As concerns ownership of business premises, majority (56.7 per cent) was renting, (22.5 per cent) fully owned the premises they were operating in, 10per cent were partially owned and (10.8 per cent) were owned by Nairobi City County. Most of the businesses operating at the City County markets were operating in planned area, though some are operating in the same premises in an unplanned manner, where business operations extended to the market corridors.

Previous findings have consistently shown that commercial premises face a greater risk of criminal victimization and revictimization than their residential counterparts (Bamfield 1994; FBI 1996; Bowers, Hirschfield & Johnson 1998). This is especially true of small business enterprises, where multiple or chronic victimization is common (Ekblom & Simon 1988; Fisher 1991; British Chamber of Commerce 1997; Ellingworth *et al.* 1997; Wood, Wheelwright & Burrows 1997; Gill 1998; Litton 2000; Perrone 2000). Other empirical research which has been conducted in the area of business crime supports the thesis that a substantial proportion of businesses suffer from crime. Often, surveys report that approximately half of businesses surveyed had experienced crime (Burrows *et al.* 1999; Gill 1998a; Perrone 2000). Sometimes this

²⁵ Noted by the Community Development Officer

figure can be higher reaching (76 per cent) as was found in study by Wood *et al.* (1997).

Literature has shown that crime and violence impact the economy negatively. Businesses incur significant losses as a result of crime and violence. For example, data from the World Bank's enterprise survey shows that Kenyan firms lost close to 4 per cent of their total sales in 2007 due to crime. This is slightly higher than the average for Sub-Saharan Africa at (3.7 per cent). Moreover, the overall cost of crime and violence on the economy is estimated to be (4.6 per cent) of GDP (Alda 2009). This explains the importance of focussing on enterprises operating in Dandora.

In summary, the socio-economic characteristics of the respondents such as the age distribution, household size, enterprises location and ownership as shown in this section play an important role in shaping the state of people's lives which in turn influence their behaviour in a given area. This may also lead to modifying land use in Dandora neighbourhood to suit developers and users needs. These lead to land use change which may initially start at the level of individual land parcels when developers or owners decide that a change towards another land use type is desirable. Cumulatively, such individual decisions generate land use changes at higher spatial level such a neighbourhood or a zone and depending on the quality of what is generated and the nature of socio-economic attribute associated with the neighbourhood or zone, issues of crime driven by socio-economic factors discussed in this first section of the work cannot be underestimated.

5.2 LAND USE AND TRANSFORMATION

This section presents findings and outcomes with regards to nature and typologies of land use transformation, zones of land use transformation and their appropriateness and impacts of land use transformation. The respondents' perceptions about the contribution of land use transformation to the neighbourhood's security are also discussed. This sets the pace for undertaking of Dandora's built area analysis in relation to experienced and perceived crime incidences. As noted by the Government of Ireland (2009) "all built developments, from small to large, make an impact on their surroundings. The qualities of these developments and of residential developments in particular, have long-term impacts, both on the communities they house and on the surrounding neighbourhoods. New developments are far more than simply bricks and mortar. Where they are, how well designed, built and how well they knit into the fabric of existing or new communities, are factors which can colour the lives of people on a daily basis and for future generations".

This section also seeks to relate the empirical findings with various literature propagated by findings of McCord and Ratcliffe (2009) who explains crime rates difference using the physical environment and how it can influence crime. These researchers have suggested that the way land is used can affect crime rates. They note that crime tends to cluster around certain categories of land uses; for example, assaults group around bars and thefts and vandalism in neighbourhoods bordering high schools and shopping centres. These shows that as land use changes the dynamics of crime and safety is affected.

Environmental criminology which informs the study's multi-contextual theoretical frame explains the criminogenic propensities of these places as the result of increased crime opportunities and activities that attract higher numbers of potential offenders. These works indicate that land use can explain criminal incidences. Studies and experience have shown that the amounts of land used for each activity are constantly changing and the nature and extent of these changes are of crucial importance for those developing, implementing or monitoring planning policies. Changes in land use patterns across an area is an important consideration in any study of activities in an area since the land uses partly determine what kinds of human activities take place in an area.

In discussion of land use transformation, the chapter mainly discusses Dandora's neighbourhood current land use in relation to changes it has experienced over time. Skole (1994), notes that for one to appreciate land use and subsequent changes, one has to:

- a. Document the land use type(s) - This is well documented in the study area's background chapter, but some analytical aspects will be highlighted in this section in comparing the original land uses with the current land uses
- b. The pattern of arrangements of these land use type(s)
- c. The aerial and horizontal extent of the land uses and
- d. The intensity of use associated with each type of land use(s)
- e. Document the land tenure status

In operationalizing Skole (1994) ideas, Briassoulis (2000) note that land use change may entail (a) conversion from one type of use to another; (b) modification of a certain type of land use within a given space limit and (c) altering land coverage in most cases exceeding allowable permissible development area. This study borrows Briassoulis notion of land use changes parameters in analysis of Dandora's land use transformation.

5.3 Emerging Pattern of Land Use Types

The original planned land use pattern of Dandora had commercial, public purpose and community facilities and services centrally located with a strip of land left for light industries separated from the residential quarters by a railway line. This line was also used as a buffer zone to break these different land uses. The dominant land use in the area was and is still residential, followed by commercial. The design alternatives of the residential units were meant to be responsive to the plot sizes. However, over the years this has changed and the design and density of developments is determined by every individual's capacity to finance the development. Zoning regulations, notwithstanding the fact that Dandora falls in Zone Seven (7), where the type of developments allowed include high residential flats not exceeding two storeys with ground coverage of (50 per cent) and a plot ratio of (75 per cent). As shown in plate 3,

the zoning regulations are flouted and there are many cases where developments have gone more than two storeys.

Plate 3: Streetscape of Development in Dandora



Plate 3: The photo at the top showing the original proposed density of development and the photo below showing the emerging development density in the area

As shown in Map 8, several patterns of development are emerging. Some areas reserved for light industrial development are now under residential development. Land for community facilities have been sold to private developers, and public purposes development such as churches and schools are emerging everywhere in response to their rising demand but ignoring stipulated planning and development regulations for the area. It was, however noted that the area's land use transformation highly favours high density residential which attracts high tenancy rates and short pay back periods referred to as commercialization by Amis (1984).

Map 8: Pattern of Dandora's Contemporary Land Uses



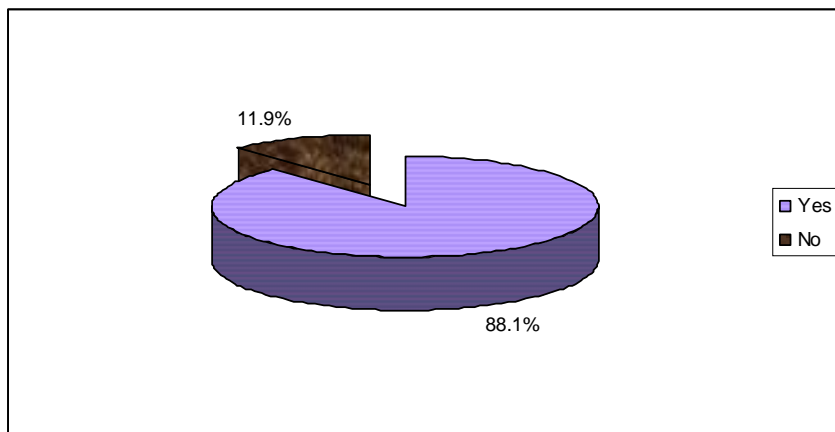
Source: Field Survey, 2011

5.4 Nature of Land Use Transformation

This section discusses the land use changes in Dandora over time and also identifies the particular areas where the changes have occurred, since it may not be uniform in all Phases of the estate. The discussion also compares the findings with previous literature in locating the findings within the dominant land use transformation explanatory literature and factors.

As shown in Figure 11, majority of the household respondents (88.1 per cent) acknowledged that there have been changes in the area's land use over time. In the same context, it was found that (37.3 per cent) of the enterprises had also changed the location of their businesses. Reasons for changing were given as; increased insecurity (40 per cent), few customers in the former site (25.7 per cent), long distance from residential quarters (14.3 per cent) and better business prospects (14.3 per cent). The study's findings seem to support Bessa's perception of land use changes and its impact on the neighbourhood.

Figure 11: Perception of Households on Dandora Land Transformation



Source: Field Survey, 2009

Bessa (2006) in describing land use changes notes that neighbourhood system is a dynamic entity with its spatial structure and character evolving over time. These changes are explained by the behaviour of the actors that operate in the system because of their locational decisions they shape neighbourhood and their trips and decisions influence urban interaction, which consequently is closely related to their organizing principles including their collective actions.

Table 12 shows the type of changes witnessed by household respondents. The most noted change was high rise buildings commonly known as vertical or aerial transformation accounting for (38.1 per cent), followed by sporadic erection of kiosks and shanties on road reserves and open spaces at (17.9 per cent), rapid emergence of mixed uses (10.4 per cent) in areas previously meant for pure residential development, increasing extension quarters commonly known as horizontal transformations and emergence of public purpose developments within the residential areas each accounting for (9.7 per cent) respectively. Others are major conversion of land uses mainly from residential to other forms e.g. commercial use and dumping site (public utility) taking (9 per cent). Other factors mentioned are demolition of kiosks and conversion of agricultural land use to residential especially along the riparian reserve.

Table 12: Land Use Changes

| Transformation Type | Response | Per cent |
|--|----------|----------|
| | N | |
| Densification/High Rise buildings | 51 | 38.1 |
| Erection of Kiosks and Shanties | 18 | 19.5 |
| Emergence of Mixed Land uses | 14 | 10.4 |
| Increased number of extensions | 13 | 9.7 |
| Proliferation of Public Purpose Centres | 13 | 9.7 |
| Conversion of Land uses | 11 | 9.0 |
| Construction of recreational facility | 4 | 3.0 |
| Installation of Underground cables | 4 | 3.0 |
| Rehabilitation of Educational facilities | 3 | 2.2 |
| Others | 3 | 2.2 |
| Total | 134 | 100.0 |

Source: Field Survey, 2009

As shown in Map 8, all Phases of Dandora are experiencing some form of transformation which is different in terms of types and scale. Phase one and two are the least transformed and had the highest number of the originally planned housing with few high rise buildings and horizontal extensions on the building frontages. Most of them were found to be housing businesses. Phase three; four and five were leading in transformation. New developments were found to be still coming up in Phases 4 and 5, with one notable feature of high-rise buildings in response to high demand for rentals hence commercialization of housing. Some land which was earmarked for open spaces had been sold to private developers who have turned them to multi-level mixed-use buildings.

According to the technical officer in charge of planning and engineering in Dandora's Housing Design and Development²⁶, official documentation of land use changes in the area is not easy since approximately (60 per cent) of new development and redevelopment in the area are not approved. Since developers do not apply for any approval. The official noted that (40 per cent) of new development, annually including conversions of buildings from commercial to residential and vice-versa are built on previously-developed land. This trend has been going on for more than ten years.

In terms of location of those who rarely apply for development approval, the officer noted, those building around Gitare Marigu, dump site and encroachers of road and riparian reserves rarely apply for development approval. These areas also face rapid development as compared to other parts of Dandora. The developers initially use sub-standard and not approved building materials but later change to approved building materials. Some of these areas are shown in Map 8. The challenge of development control in the area, he noted as lack of political goodwill, since most of these illegal developers are supporters of politicians who are very influential in the area and in most cases the area chief and provincial administration collude with the developers and politicians.

5.5 Analysis of Land Use Transformation

This section analyses land use transformation in each phase. It compares the original layout with transformation witnessed in each phase, location and scale of the transformation across the phases.

5.5.1 Phase One

Phase one original plan, had an elaborate location of different land uses as shown in Map 9. The layout had specific location for residential, public purpose, commercial and industrial land uses. The Council Officers and the area chief noted that most of the developments in this phase are according to the stipulated regulations. The ones which are beyond the zoning regulations have not been approved by the Council and their development history is complex²⁷ to handle due to invisible forces.

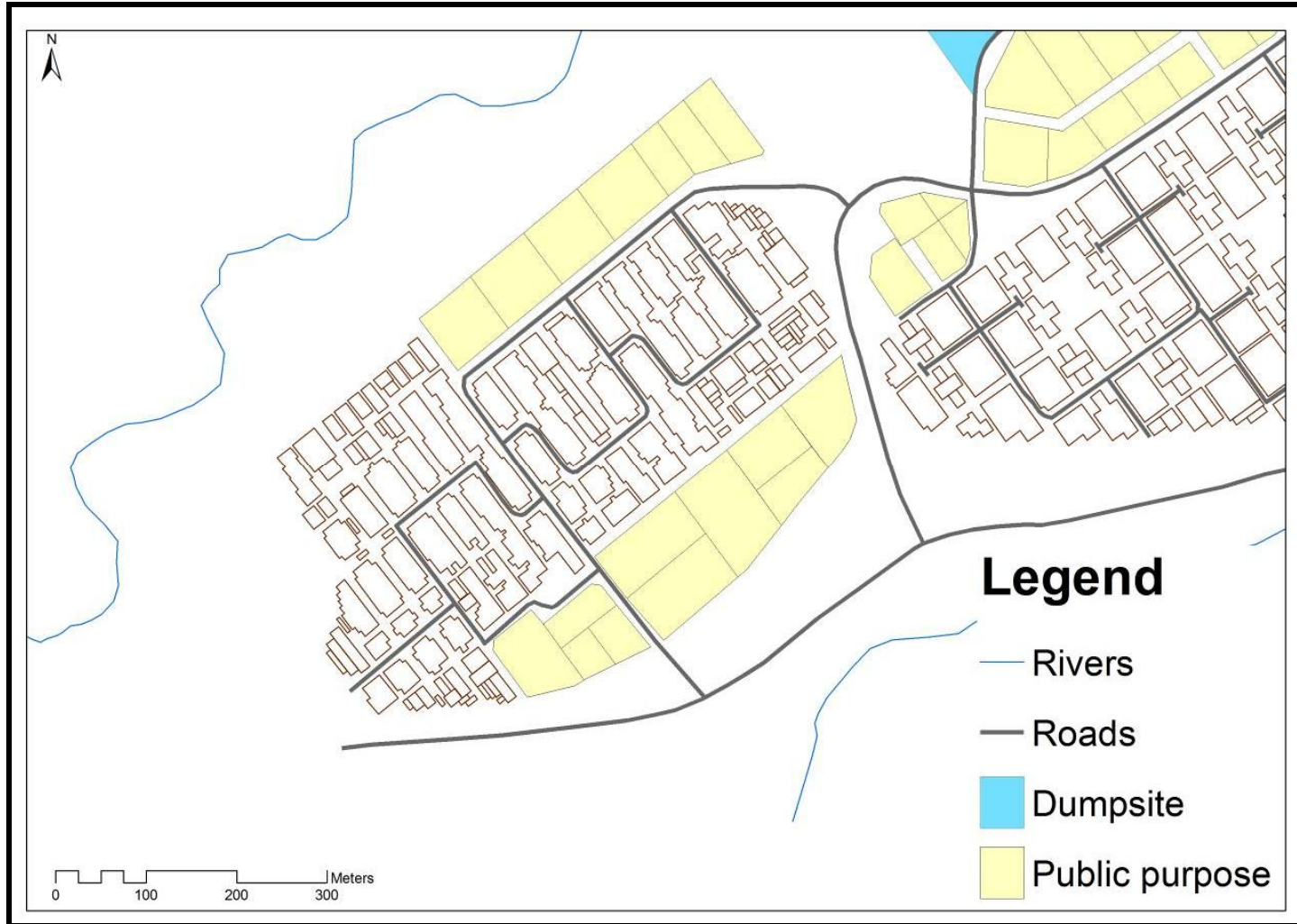
²⁶ Key informant Interview conducted on 20th of May 2009

²⁷ The complexity of development history is in reference to powerful politicians and well connected individuals who are using their positions and wealth to ignore zoning regulations in attempt to

Phase one is still the most intact section of Dandora Site and Services Scheme in comparison with other phases. About (80 per cent) of the buildings conform to the original land use and housing design typology. Existence of new developments in form of high rise buildings is rare and only exists in pockets. The streets are also relatively intact especially the streets within. The section that was allocated for light industrial activities has some industrial activities going on.

commercialize development with the aim of getting quick returns. In some cases the plans they submit for approval are not the exact developed on the ground.

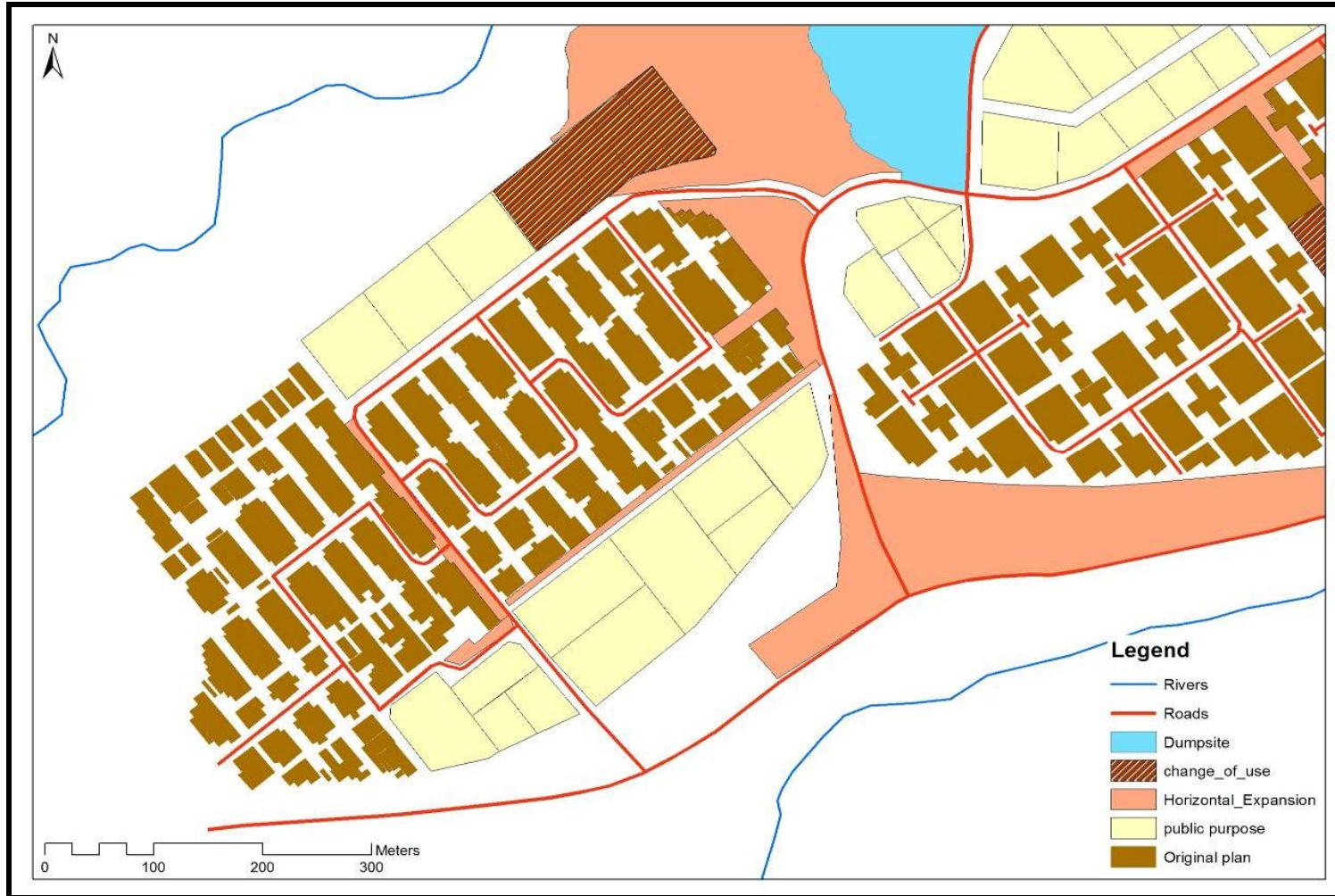
Map 9: Dandora Phase one Original Layout



Source: Adapted from HDD Plan, 1976

As shown in Map 10, most sections of phase one still maintain the original planned land use, however there are few concerns which need to be highlighted with regard to horizontal transformation, where a lot of plots bordering streets have extensions, mostly made of non-permanent building materials such as iron sheet walls. These extensions mainly house commercial activities such as hair salons and barber shops, furniture workshops among others, which are also common features in other phases. The notable transformation in the area is to a case where an originally earmarked land for light industrial development near Wamware stage has been encroached by residential and commercial land uses.

Map 10: Land Use Transformation of Dandora Phase one



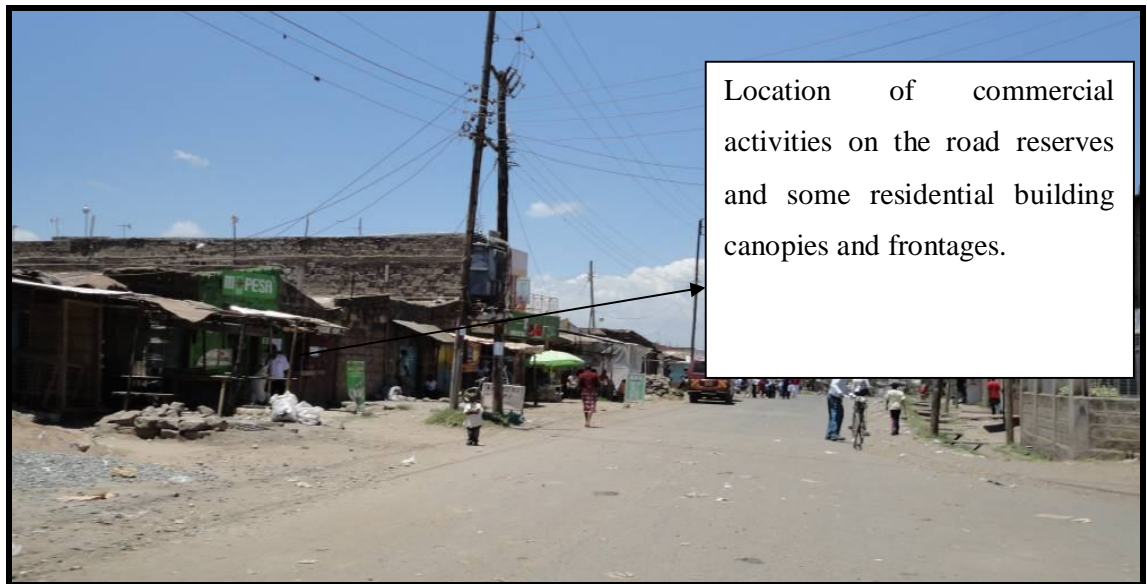
Source: Field Survey, 2011

Plate 4: Conformity with the Original Development Layout



Plate 5 shows both vertical and horizontal transformations in Dandora phase one.

Plate 5: Dandora Phase one Streetscape



Source: Field Survey, 2011

Plate 6: Changing Character of Phase One

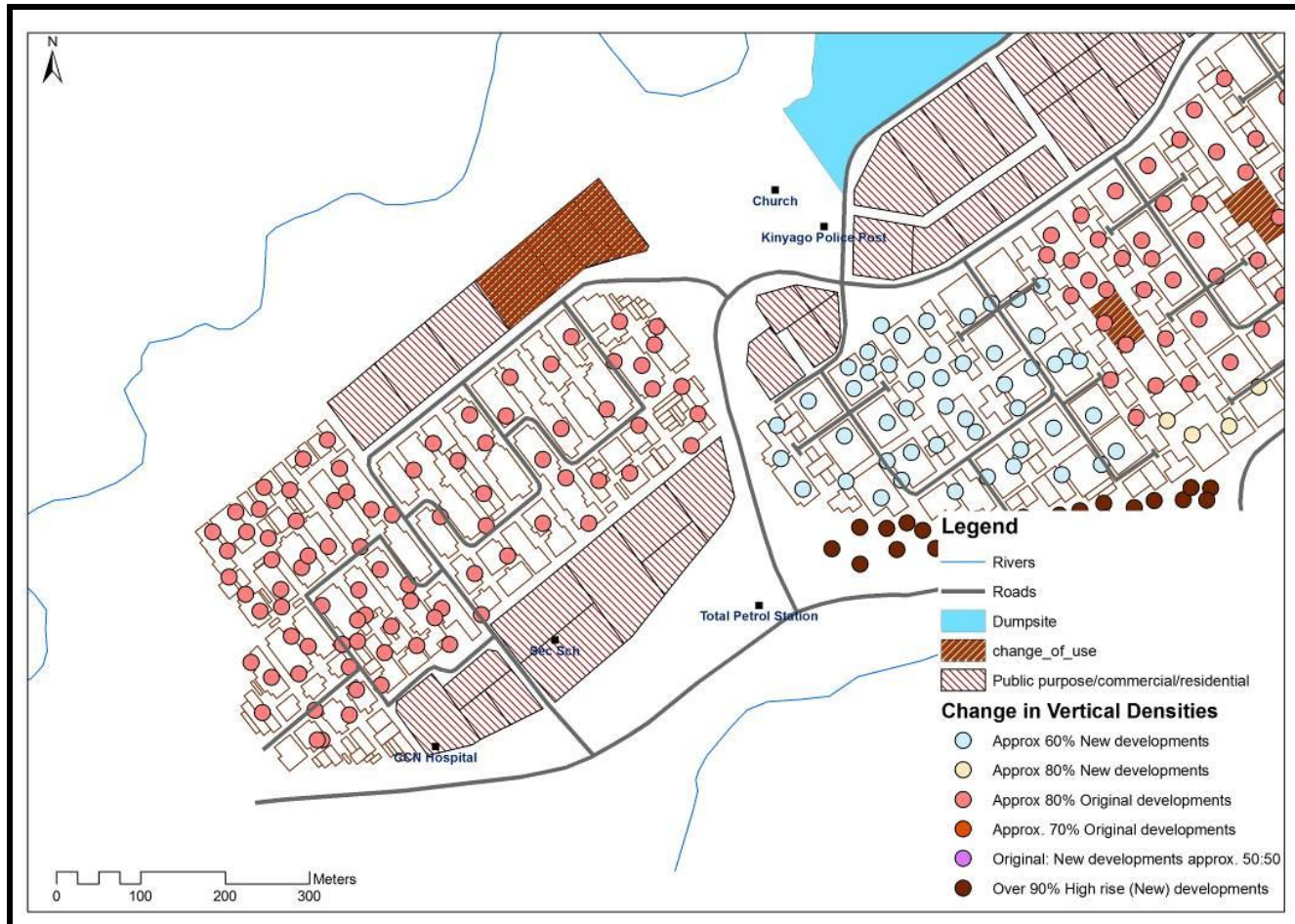


Source: Field Survey, 2011

The location and distribution of business premises such as butcheries as shown in Plate 6, though not illegal as provided in the physical planning handbook was not part of the original plan. They seem to be emerging to serve the demand created by the rising population in the area. This shows that the demand for services in the area surpass the quantity of services provided, hence purely relying on market forces which ignore the area's planning and development control tools and mechanisms.

As shown in Map 11, some sections of phase one are currently experiencing vertical expansions. The area bordering the Komarock road was leading as 90 per cent of the new developments were noted to be high rise developments.

Map 11: Dandora Phase One vertical Transformation



Source: Field Survey, 2011

Phase one experiences the least transformation and its development for a very long time has largely been confined to fit into the original layout, though it was noted by the council officers²⁸ that there is emerging trend where some developers are buying off old buildings and putting up high rises. This is likely to change the area physically, socially and aesthetically. This may lead to what Saville (1996) noted as a tipping point or what Stark (1986) noted as unstable neighbourhood which are associated with social ills attributed to redevelopment.

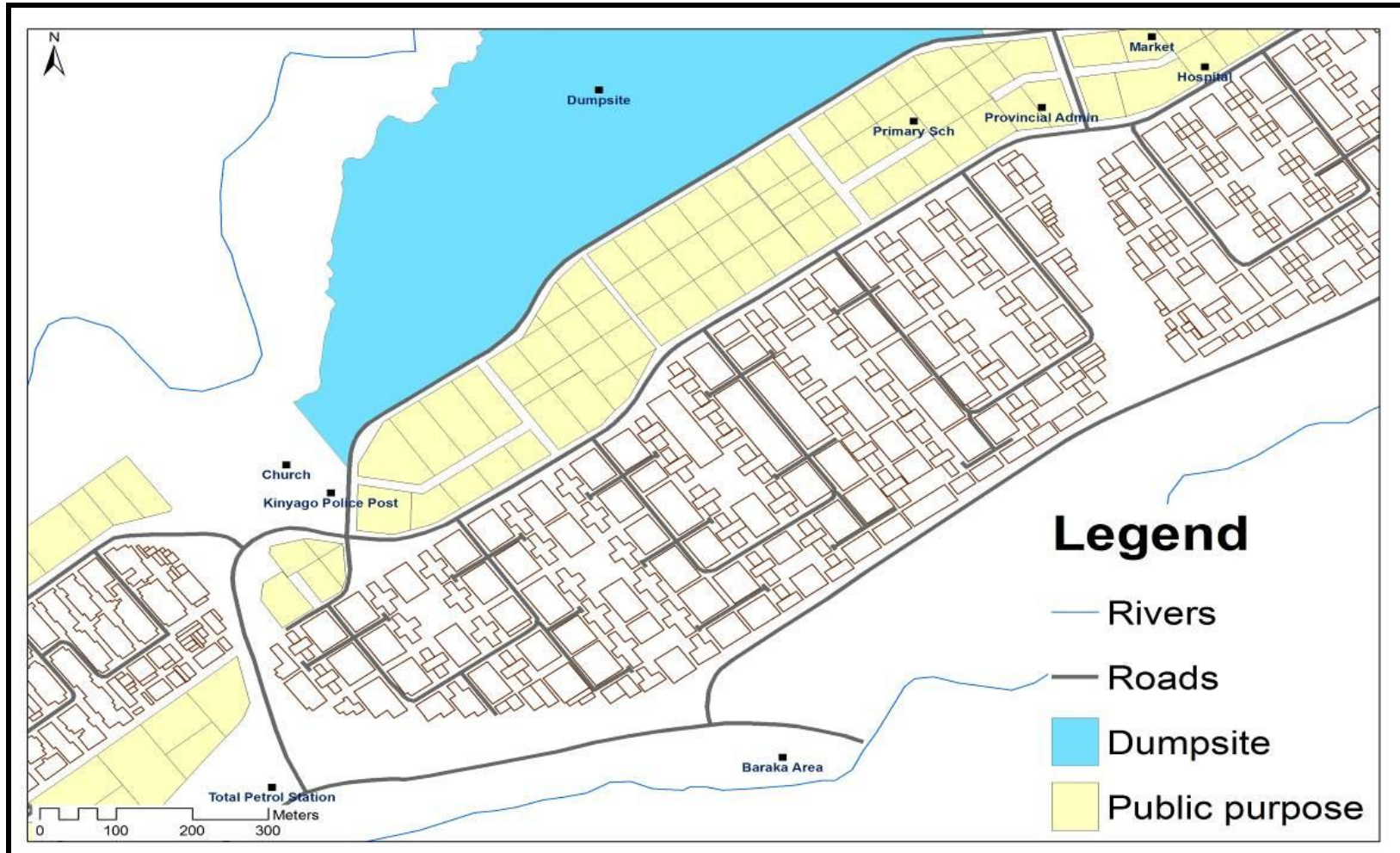
5.5.2 Dandora Phase Two (2)

Map 12 shows the original land uses in Phase two. As compared to Map 13 it has also not changed much. However, there are some pockets where some change in land uses have occurred and all of them were found to have changed from purely residential to residential-commercial mixed use, which was originally not anticipated as shown in the original layout in Map 12. Most horizontal land uses tend to border major streets and like in Phase one, most of them host micro and small scale businesses.

This is a relatively low density section of Dandora compared to Phase 3, 4 and 5 with minimal vertical densification of development. The main challenge, like the other phases is the growth of shacks which have so far occupied a substantive percentage of the open spaces. Extension of structures for informal commercial enterprises is very popular in this phase. The spatial layout of the original phase two is shown in Map 12.

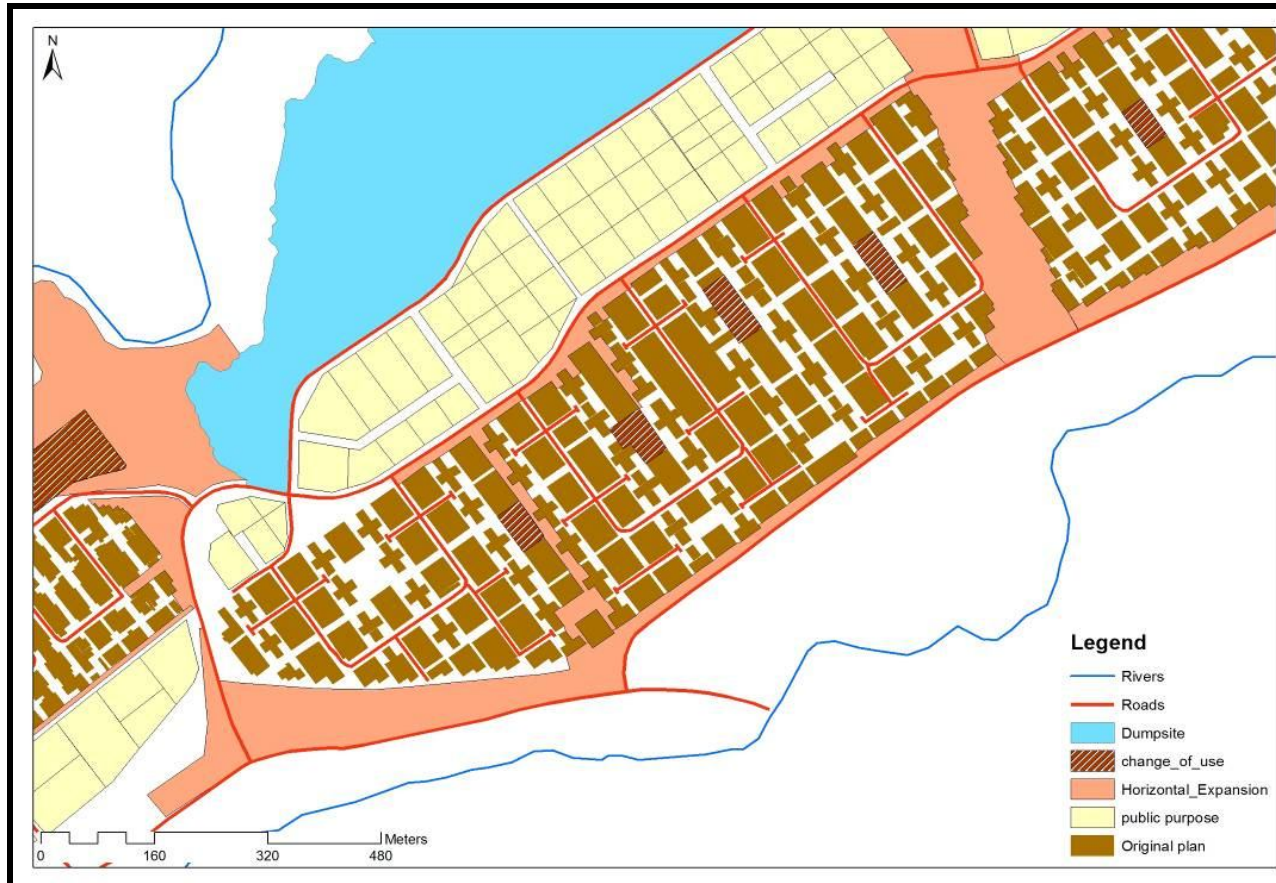
²⁸ Key informant discussions with City Planning Department Officer on 17th of February 2009

Map 12: Original Layout of Dandora Phase Two



Source: Adapted from HDD Plan, 1976

Map 13: Land Use Transformation of Dandora Phase Two



Phase 2 has a mix of the old and new developments. The new developments are found in pockets within the section while the old developments average about 80 per cent. There is a section which has about (60 per cent) new developments as shown in map 13.

Source: Field Survey, 2011

As shown in plate 7 and 8, the new developments are changing the face of phase two. The plates are an indication of flouting of development regulations by the new developers, whereby high rise buildings of more than five floors are coming up, ignoring the stipulated zoning regulation, which provides for ground coverage of (50 per cent) and a plot ratio of 75.

Plate 7: Highrise Development in Dandora Phase Two



Plate 8: Juxtaposition: Original Development and the New Development Across the Road



Map 14: Dandora Phase Two Vertical Transformation



Source: Field Survey, 2011

Map 14 shows the vertical transformation in phase two which confirms that most new developments are going beyond stipulated zoning regulations.

It also shows that approximately 90 per cent of new developments along the road are high rise developments.

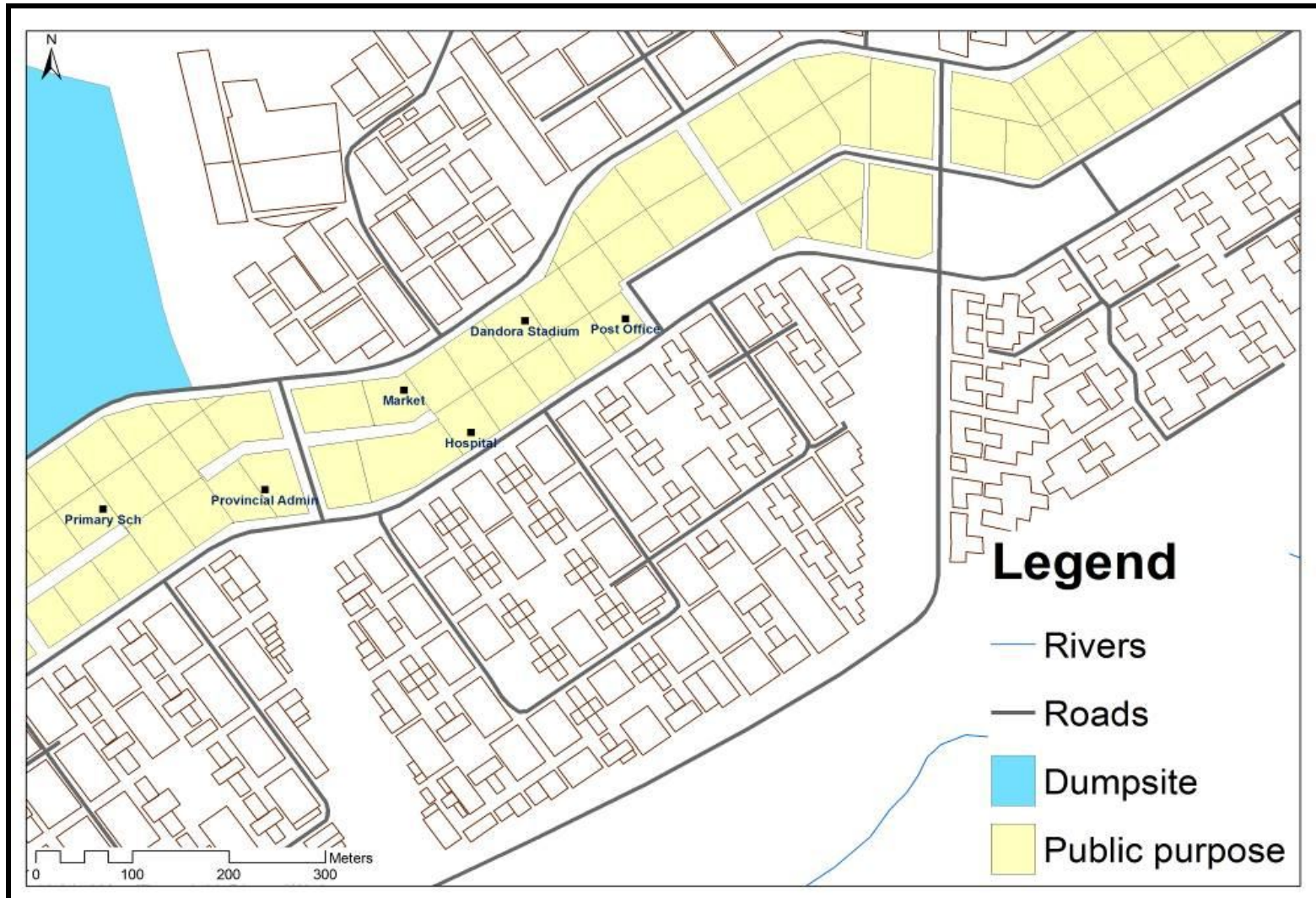
5.5.3 Dandora Phase Three (3)

Phase three is characterized by mostly old developments but very few without horizontal extensions. The new developments in the phase are high rise residential flats that are recognizable when viewing the vertical alignment of the phase. On average, these new developments account for about (20 per cent) of the developments in the area. The narrow strip along the main road (Komarock road) consists of (10 per cent) new developments with no reference to the old housing designs. These developments came up recently when the original allottees, who are unable to finance such kind of development, felt misplaced and sold their parcels to well-off developers.

The section that was solely allocated for the development of community facilities is hosting a mixture of land uses that include; community facilities, residential flats including high rise and commercial premises. Just like in other phases of Dandora notably, Phase 4 and 5, the high-rises in Phase 3 bear certain common building forms and attributes. The buildings are over-developed; they surpass the recommended plot ratio and ground coverage averagely by a (100 per cent). Most of them have many rooms per floor,²⁹ with most of them having around (85 per cent) of the built units sharing common toilet and wash-up area. The balconies are mostly used for hanging clothes.

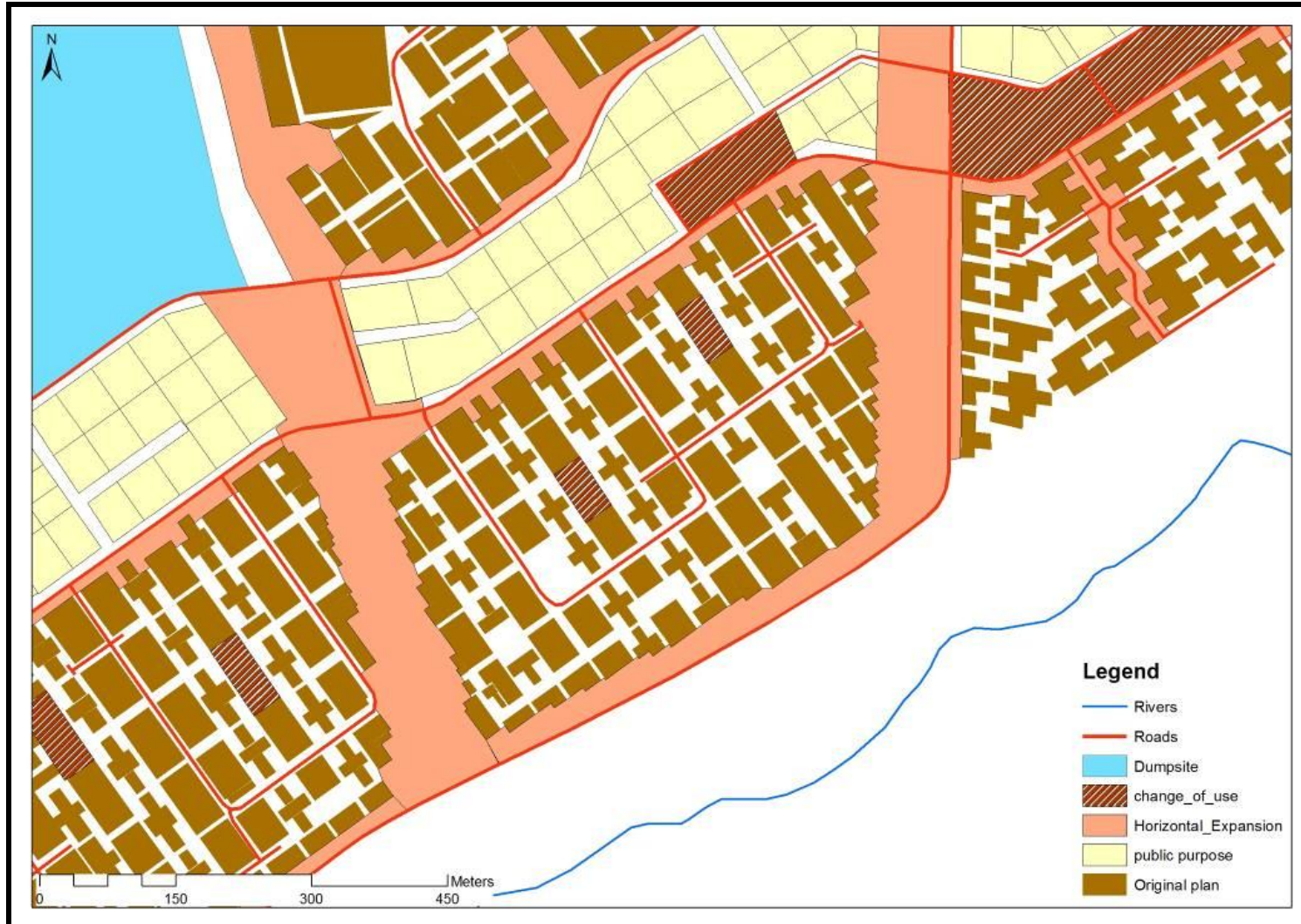
²⁹ As noted by one of the old resident, the corridors of these buildings are narrow and the space designs are poorly done. Interview dated 6th of May 2012.

Map 15: Dandora Phase Three Original Layout



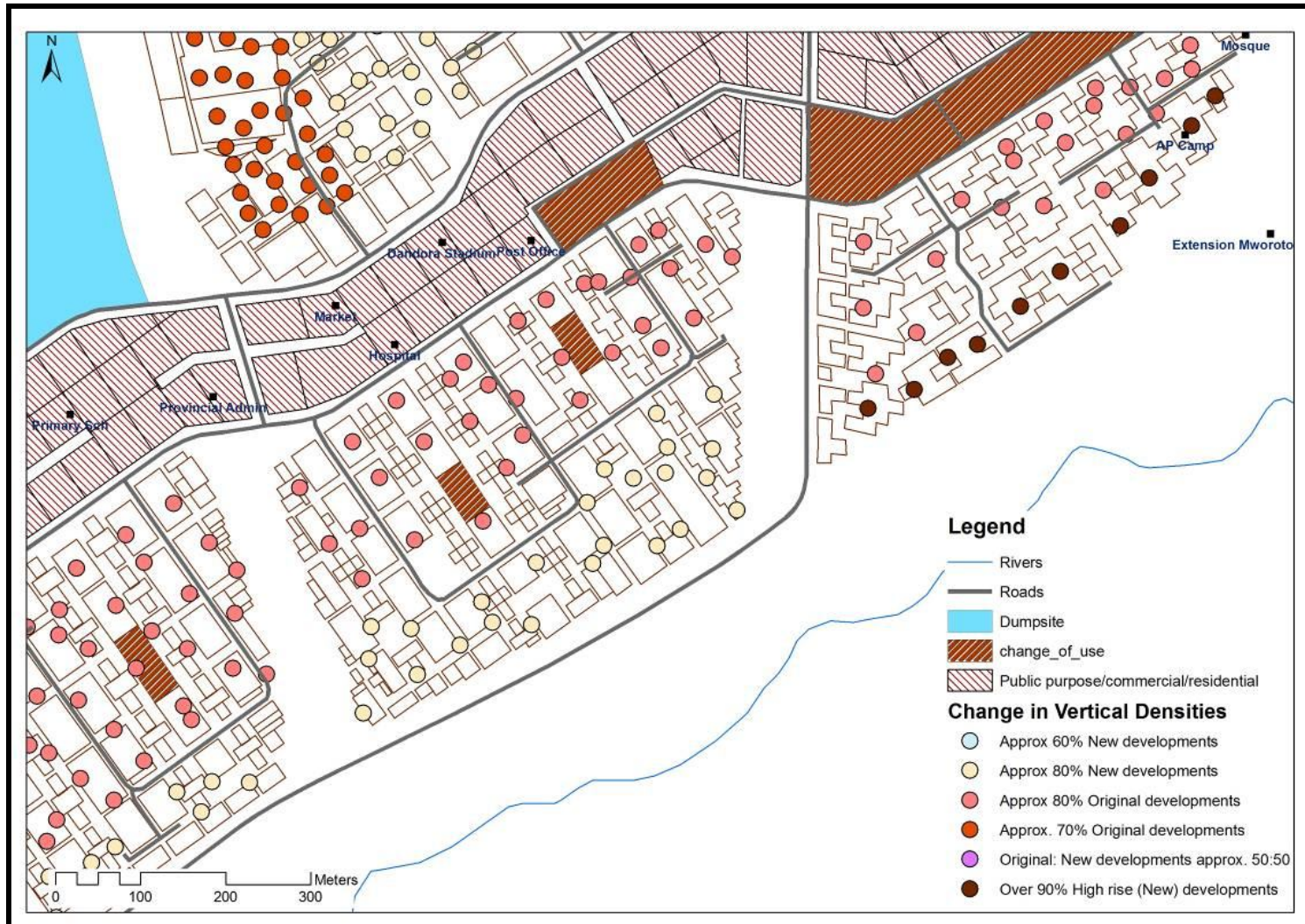
Source: Adapted from HDD Plan, 1976

Map 16: Land Use Transformation of Dandora Phase Three



Source: Field Survey, 2011

Map 17: Vertical Transformation of Dandora Phase Three



Source: Field Survey, 2011

As compared to Phase One and Two, both the vertical and horizontal expansion of phase three is high. Another notable feature is the location of secondary school as shown in Plate 9, in a plot measuring less than half hectares flouting planning handbook provision of a minimum of 3.4 hectare for one stream secondary school and 3.5 hectare for double stream with an assumption that the principle of storey building will be applied.

Plate 9: School at the Centre of Residential Estate in Phase Three



Phase three had postal services located on a private building which has mixed use and part of the building was used for residential and other commercial activities, as shown in Plate 10. The case shows that some functions such as postal services were not anticipated hence not catered for in the plan, but demand for such services in the area has resulted to their provision in private quarters, despite being public functions.

Plate 10: Bank and Postal Services in Residential Quarters



Source: Field Survey, 2011

The Phase 3 also had problem of developing almost the entire ground coverage of the plot. As shown in Plate 11, the different buildings appear as if it is one continuous development. This can be risky especially during disaster and emergencies. The picture shows almost joined buildings ignoring the observance of offsets.

Plate 11: Buildings almost Enjoined



Plate 12: Highrise Developments in Phase Three



With close to (60 per cent) of the old developments in the phase being the planned development, the main challenge facing the old developments and the public spaces (streets and open spaces) is the horizontal extension of structures as portrayed in Plate 13.



**Plate 13:
Horizontal
Densification**

One of the major land uses that has not been encroached by developers in phase 3 as shown in Plate 14, is the Dandora Stadium. This stadium is a major community recreational space offering a space where the community youth can engage in sports. On a positive note, and as shown in Plate 14, Phase Three was the only part of the neighbourhood which had an elaborate playground. As noted by World Bank (2010) open spaces such as playgrounds encourage legitimate users to interact and ensure mutual safety.

Plate 14: Dandora Stadium



Source: Field survey (2011)

Plate 15: Crime Hotspot Area near Nairobi-Nanyuki Railway Line



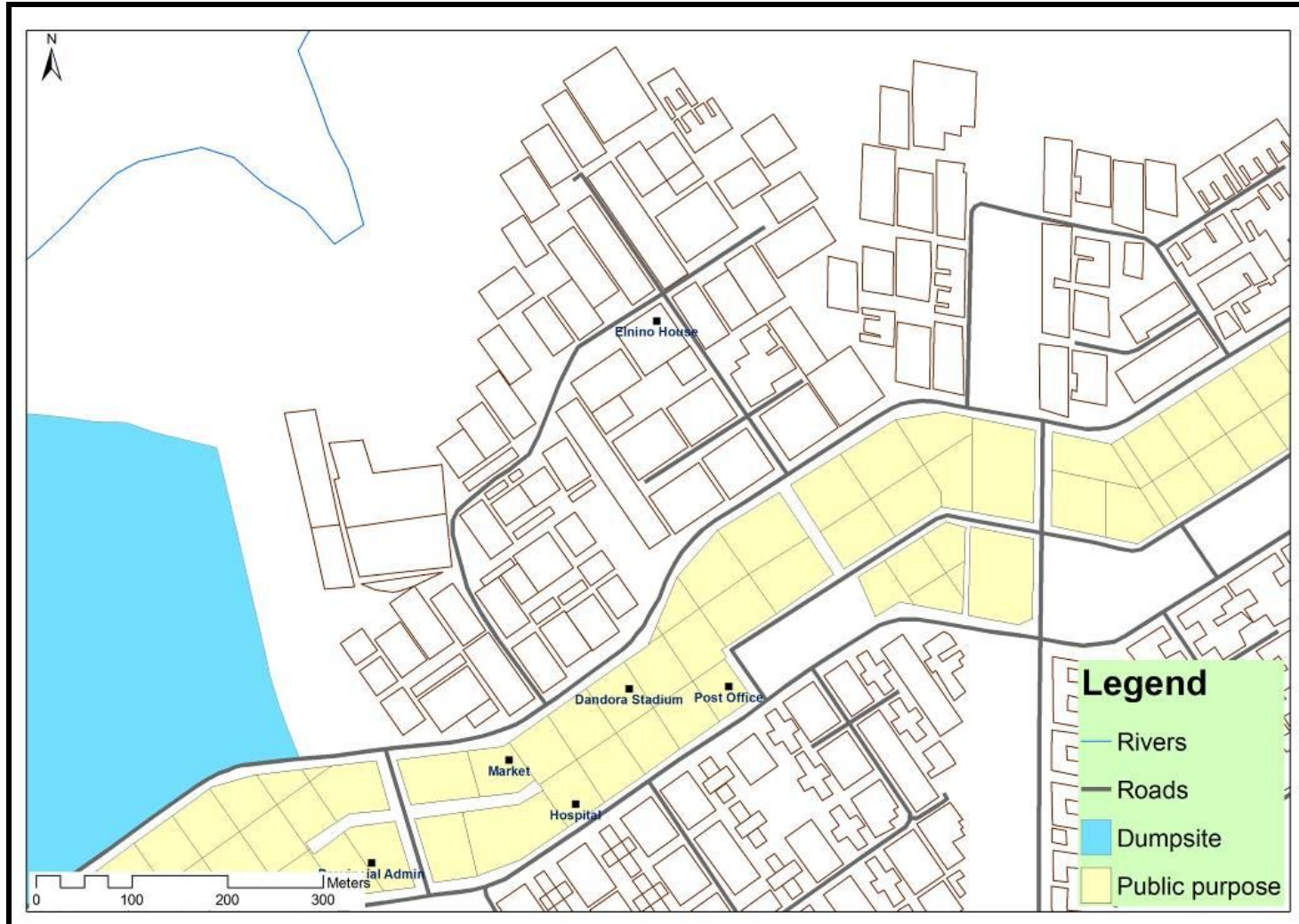
The area around railway as shown in plate 15 which is also part of phase 3, is bushy and unkempt and was noted by the community policing members and the officer³⁰ commanding Kinyago Police post and household respondents to be a crime hotspot

5.5.4 Dandora Phase Four (4)

Phase 4 is a highly densified section of the neighbourhood with close to 75 per cent of the developments being new buildings with designs that do not correspond to the original land use plans and designs of the Dandora housing scheme. However, there are some pockets of the planned housing development but very few are without horizontal extensions.

³⁰ Interview with the Kinyago OCCPP dated 26th of March 2009

Map 18: Dandora Phase Four Original Plan Layout



Source: Adapted from HDD Plan, 1976

Plate 16: Streetscape of Phase Four



With the new developments maximizing on the space, majority of the high rise buildings have a plot coverage exceeding the (90 per cent) mark and going up to 4-5 floors

Plate 17: Horizontal Extensions to Accommodate Informal Economic Activities



Plate 18: Informal Developments along the Power Way Leave



Another area of concern in Phase 4 is the power way leave. Informal developments have sprung up along the way leave with presence of permanent stone buildings on the way leave. Informal community facilities such as schools and religious facilities have occupied this disaster prone strip of the neighbourhood.

Plate 19: Utilization of Open Spaces



There are sections of the neighbourhood that have close to 85 per cent of the new buildings. Like the section displayed in Plate 19, only a few old buildings exist in some of these areas.

Plate 20: Multiple use of Community Facilities (Halls and Community Centre)



Some of the original planned land uses such as Social halls and markets as shown in plate 20 and 21 were developed, but their current intensity and multiplicity of their use was not envisaged.

Plate 21: City County Market

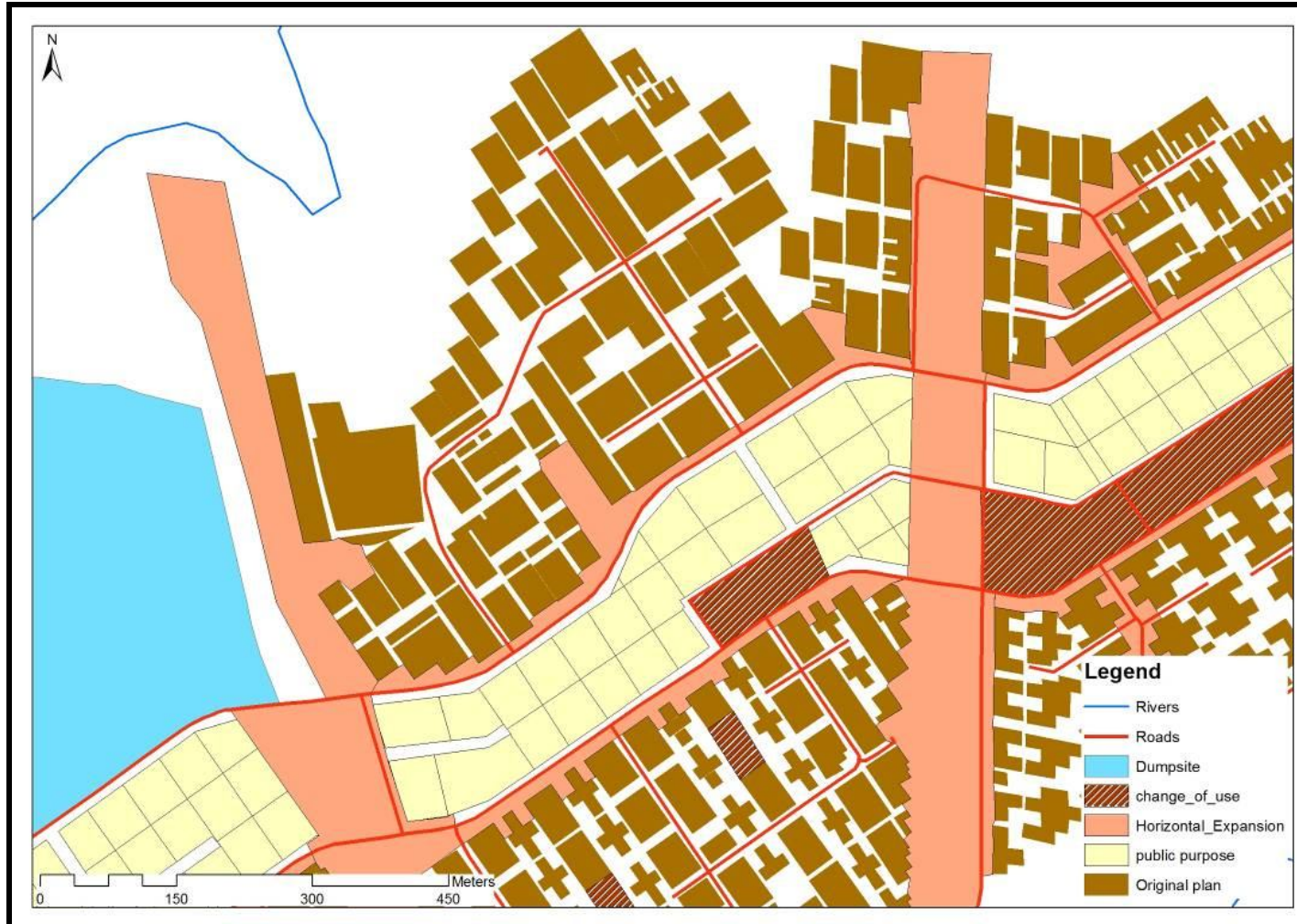


The market is Part of the original plan

The open spaces that were provided in the plan have been occupied by illegal developments. The dominant activities in these open spaces are mainly religious facilities. Some are used for informal economic activities.

Phase four was noted to have the most heterogeneous forms and types of transformations as compared to other phases. As shown in Map 19, areas around main streets had changed use, ranging from residential to commercial, health and educational facilities, totally ignoring the planning regulations guiding location of such activities.

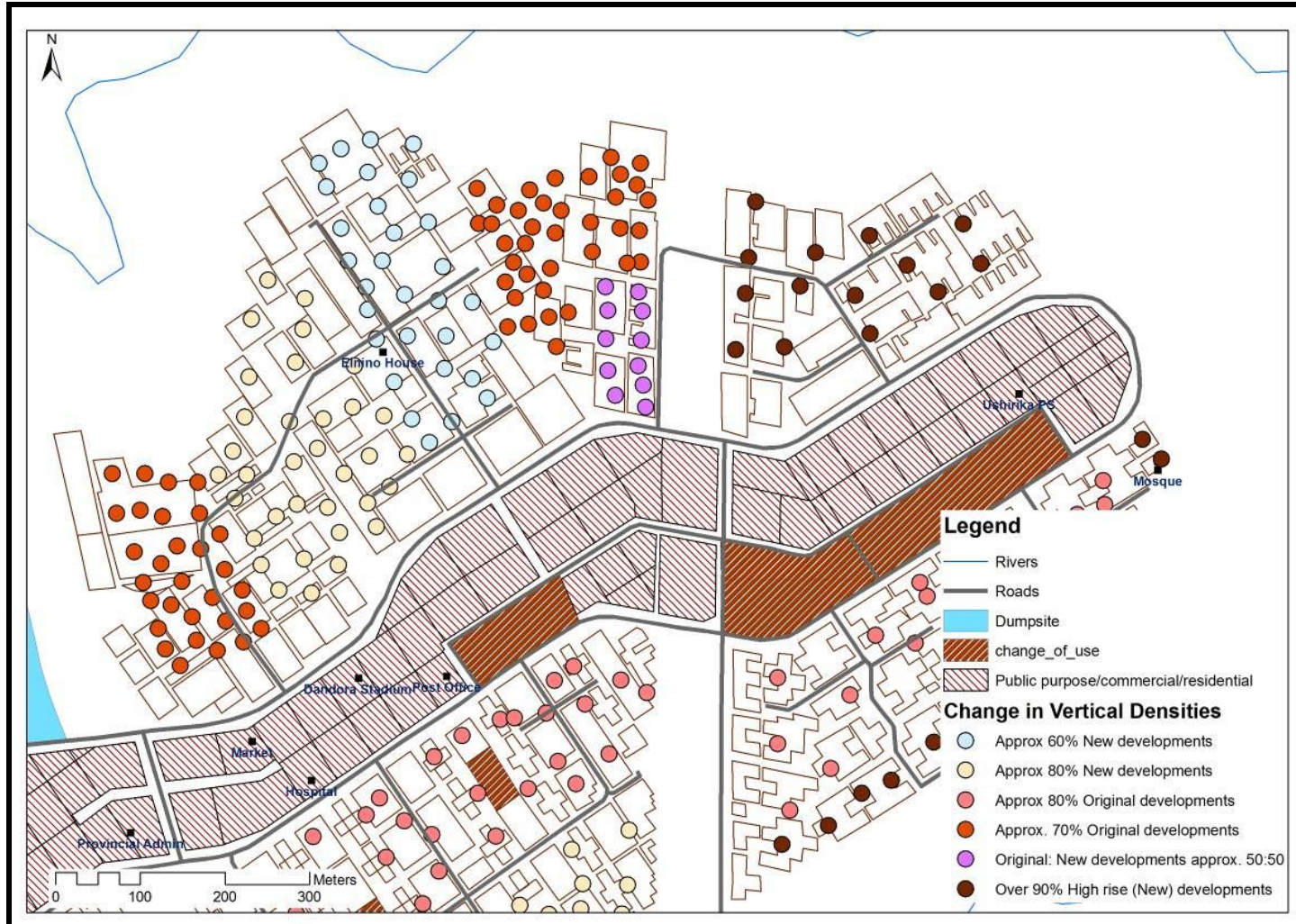
Map 19: Land Use Transformation of Dandora Phase Four



Source: Field Survey, 2011

Over 90 per cent of new developments in Phase 4 are high rise developments (see Map 20). It was observed that the area was leading in terms of new development coming up. During fieldwork it was observed that building activities were more visible in this Phase than other Phases. The reason given by the HDD officials is that quite a number of original allottees had sold off their plots after realizing that the area was gradually turning to informal high rise development and they were financially incapable of building high rises. It is unfortunate that the HDD is not in control of the massive high rise development due to their incapacity to monitor all developments, hoping that such development will be regularized in future to conform to anticipated new zoning regulations. These states of affairs shows that most of the transformations in the area are not planned and that they are spontaneous and are mainly responsive to market forces.

Map 20: Vertical Transformation of Dandora Phase Four



Source: Field Survey, 2011

5.5.5 Dandora Phase Five (5)

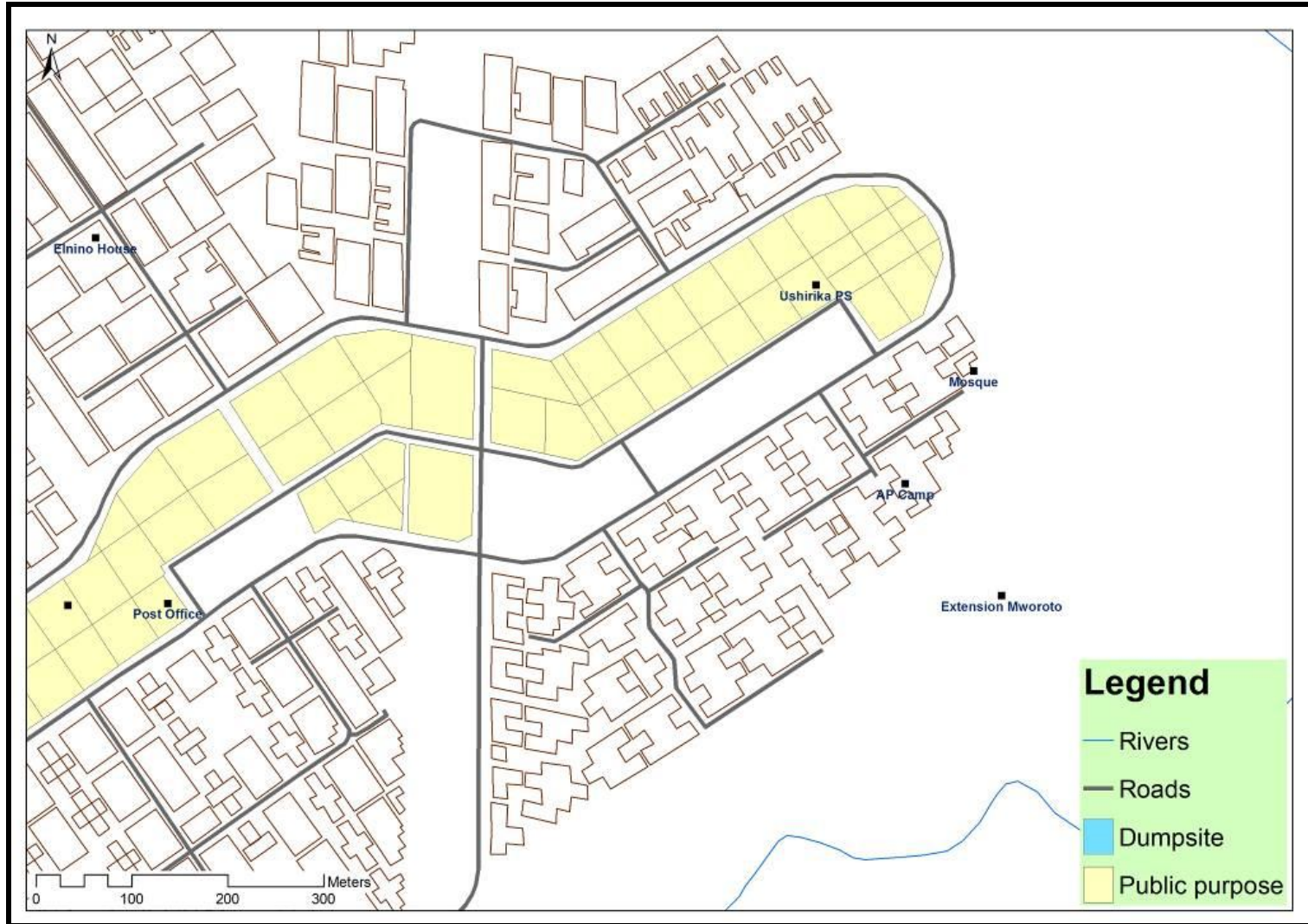
Dandora Phase 5 is one of the sections of the Study Area which is highly densified with regards to horizontal and vertical extensions of development as shown in Maps 21 and 22 respectively. Apart from the housing densifications, the middle strip of the section which was allocated for community facilities is currently characterized by high rise residential flats development. A case in hand is the Ushirika Primary school which is shown in Plate 22, where a residential flat has been developed on land allocated for a school.

Plate 22: Residential Flats next to Ushirika Primary School



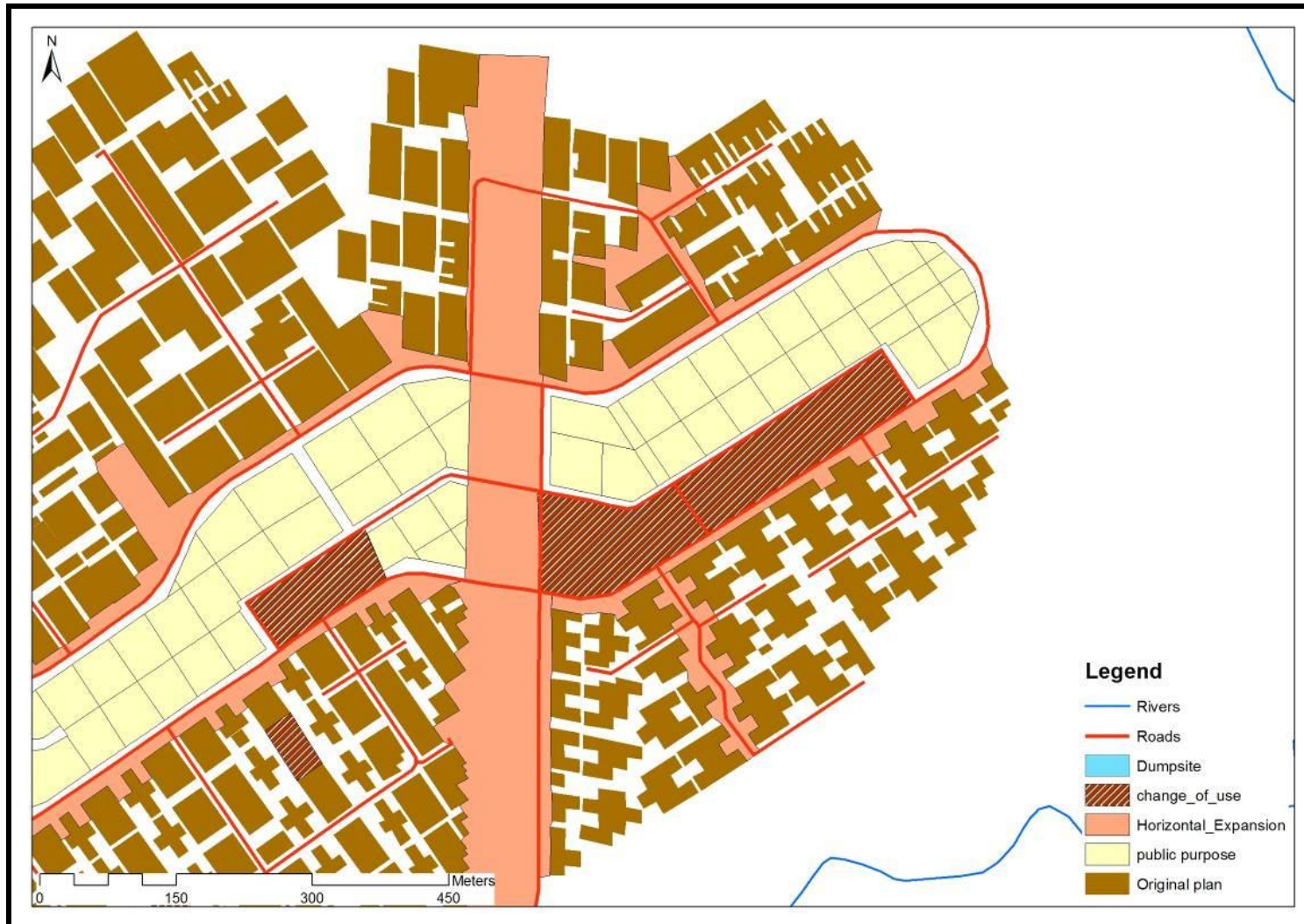
The middle strip which was reserved for community facilities development has faced a lot of uncontrolled high rise development with no regard to the plan provisions.

Map 21: Dandora Phase Five Original Layout Plan



Source: Adopted from HDD Map, 1976

Map 22: Land Use Transformation of Dandora Phase Five



Source: Field Survey, 2011

Plate 23: Low rise Development in Phase 5



Plate 24: Administration Police Camp Surrounding Development Pattern

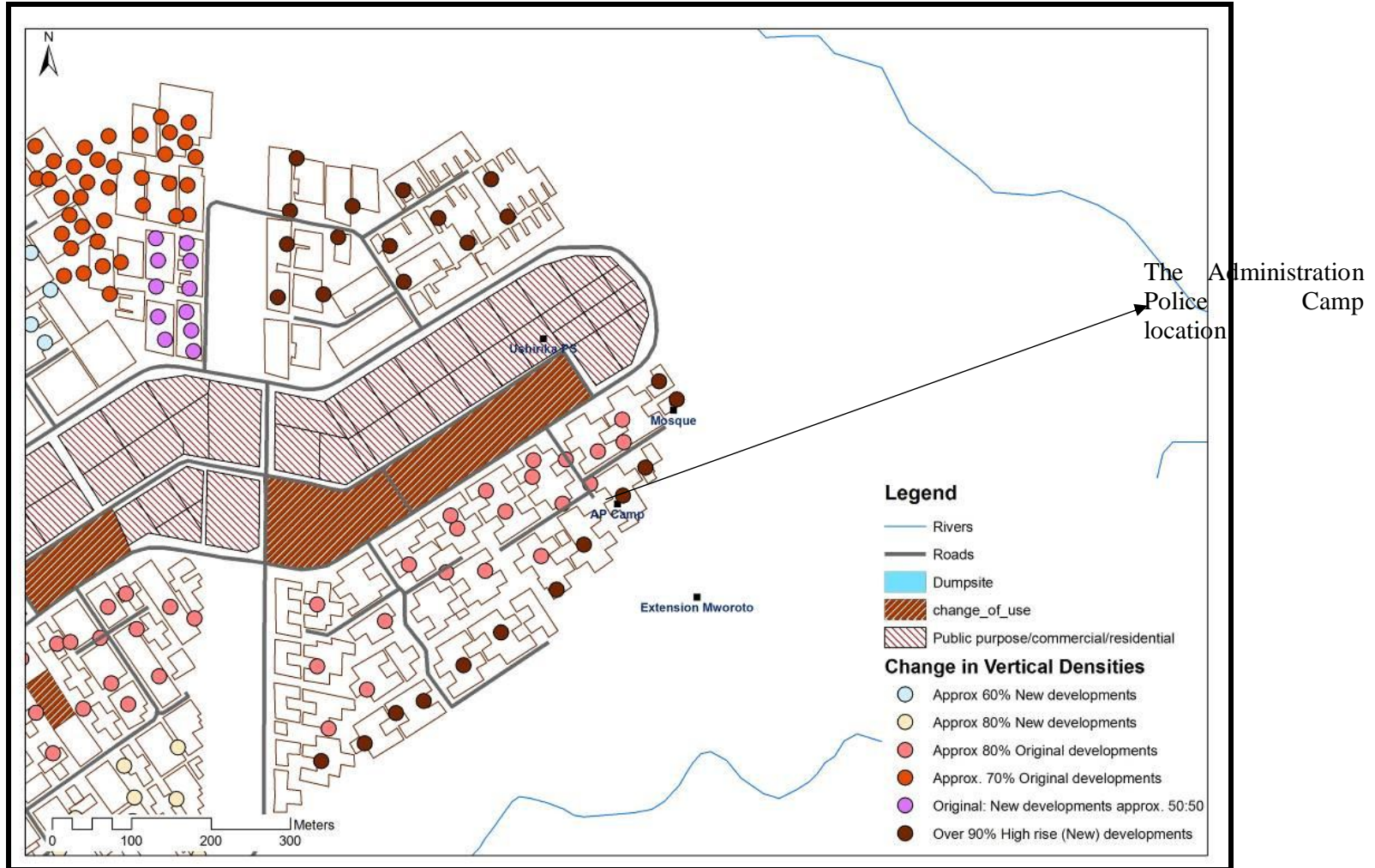


The Location of Administration Police Camp

High-rise building overlooking the AP Camp- This can be used by criminals for surveillance of the APs activities

The AP camp area as shown in Plate 24 has pockets of undeveloped land and a mix of new developments mainly characterized by low rise row housing and high rise residential flats. The AP camp is located in a previously deferred land. Horizontal extensions along the main streets are popular with an approximate 80 per cent of the old typologies along the streets having informal extensions for commercial use which is a similar trend in the whole of Dandora

Map 23: Vertical Transformation of Dandora Phase Five



Source: Field Survey, 2011

Phase 5 is also developing rapidly just like phase 4, but one unique pattern of development is high-rise developments at the middle of the strip and around Komarock road and low dense development around Mworoto area. There is also selling and purchasing of plots around the AP Camp Area as shown in Map 23, which creates opportunity for well-off developers to put up more high-rise development in the area.

5.5.6 Dynamics of Land Use Transformation

There were several indicators and timelines in which transformation in Dandora took place. This part of the study highlights some of the timelines and various indicators used as surrogates of land use change in the area as identified by the respondents. Table 13 shows that the first era of transformations was seen in the period 1986-1999 (4.0 per cent), most transformations were witnessed between 1991 and 2005 accounting for (57.3 per cent).

Table 13: Periods of Land Use Changes in Dandora

| Period | Frequency | Valid Per cent | Cumulative Per cent |
|-------------------|------------|----------------|---------------------|
| Between 1986-1990 | 5 | 4.0 | 4.0 |
| Between 1991-1995 | 17 | 13.7 | 17.7 |
| Between 1996-2000 | 28 | 22.6 | 40.3 |
| Between 2001-2005 | 26 | 21.0 | 61.3 |
| After 2005 | 28 | 22.6 | 83.9 |
| Don't know | 3 | 2.4 | 86.3 |
| Not applicable | 17 | 13.7 | 100 |
| Total | 124 | 100 | |
| No response | 20 | | |
| Total | 144 | | |

Source: Field Survey, 2009

This finding compares well with the opinion of the Council Officer³¹ who noted that the origin of transformation can be traced back to the late 1980s which is also supported by Chana, 1984 and MacInnes, 1987. The elapse of the grace period for

³¹ Interview with City Planning officer on 17th of February 2009

loan repayment forced those who were unable to develop and pay their loans surrendering their plots. Other phases of transformation has mainly been driven by institutional influences and political influences coated with economic interests and pressures which were noted to be influential between 1991 and 2002.

Political explanations by various respondents also qualify the electioneering years as a determinant of land use transformation. An original allottee-cum resident³² reported that the period before 2002 elections also led to “grabbing” of more land and building of high rise buildings. It was suspected that those who were close to the former president were maximizing on the fact that they may not have another opportunity to get land and invest in high rise development ignoring the rules, especially in relation to building regulations. With the coming in of a new government (NARC Government) after 2002 elections, Council Officers³³ said that things stabilized in the year 2003 till around late 2004. One noted that most officers and politicians feared the power of the people but it did not last long, and the politicians started colluding with the Council Officers to amass wealth and appease their voters. In most cases the Council Officers who tried to block any development application risked being fired or if lucky transferred to a different work station.

The study found that nothing much had changed since the coming of NARC government in the year 2003. The political forces seem to be superior to any form of regulation governing planning of the estate. It is therefore hard to undertake development control³⁴. It was also noted that occasionally the community members come together to resist grabbing of public land. The most notable was when land meant for a police post was grabbed, members of the community successfully resisted and the private developer had to surrender the land³⁵.

The use of land to generate political support has received considerable attention, as many African countries have adopted multiparty democracy (Klopp, 2000:82; Addison and Laakso, 2003:458–59). The conditions under which use of political

³² In-depth interview with the old resident on 18th of September 2011

³³ Interview with City Planning and HDD Officer on 17th of February 2009 and 20th of May 2009 respectively

³⁴ ³⁴ Interview with HDD officer on 20th of May 2009 and interview with the area’s chief on 12th of September 2011

³⁵ Interview with HDD officer on 20th of May 2009 and interview with the area’s chief on 12th of September 2011

events to allocate land to supporters and developers can be attributed to what Onoma (2008) termed an environment where the security of property rights ceases to depend on the workings and decisions of autonomous institutions that determine the location and extent of rights, adjudicate disputes over rights and enforce decisions concerning rights to land. This is also elaborated by Ball, (1983), and Duncan, (1986) who noted that excessive market deregulation and over reliance on the formal market for solving low income housing provision in developing countries can seriously undermine efforts for the stated objectives of the enabling housing strategy (i.e. to enhance better quality low income housing provision and to make housing markets more efficient in developing countries). This is because given the opportunity the private sector will tend to choose the easiest route towards profit maximization which is speculative profiteering.

5.6 Zones of Land Use Transformation in Dandora

In discussion of land use transformation for the five phases of Dandora, various indicators such as new housing development, redevelopment and conversion of existing structures, changing neighbourhood density, open spaces conversions and availability have been used to determine the level of transformation witnessed in the area.

In terms of new housing, interview with the HDD officers³⁶ confirmed that the scale of new developments is high in Phase Four and Five, but other phases are also experiencing modest new land use development with Phase One experiencing the least. Redevelopment was found to be rampant in Phases Three and Two and to a smaller scale in Phase one. Phase one was noted by the council officials to be conservative, which was also explained by the proximity and location of HDD offices in phase one, hence hard to engage in any unusual or unapproved development.

Neighbourhood development density was found to be high in phase Four and Three, with most new developments and redevelopments preferring high density developments which exceedingly raise the number of Dwelling Units (DU) in the area hence increasing the gross and net residential density of the area. The challenge with such kind of development as pointed by Pont and Haupt (2007) is that such density

³⁶ Interview held on 20th May 2009

eats into children play areas, parking areas for users and incidental open spaces. Though Shaw and Carli (2011) noted that high density development helps cities to achieve their housing targets without using all available land, reaching maximum density in zones with higher allowed density is particularly desirable; the experience of Dandora is that most of the developments are unplanned and spontaneous. They are beyond what can be considered desirable as they are far-off the zoning regulation, especially in Phase Four and Three.

Playgrounds in public primary and secondary schools and Phase Three playground are still intact and are used as public open spaces in hosting public functions such as weddings, sports and community meetings. Road reserves which form part of circulation paths in all phases are used by micro and small scale traders which inhibit movement especially of pedestrians. The space is also always contested and attempts to remove the traders as noted by HDD officials normally turns violent and bloody.

Open spaces between buildings, riparian reserves and railway line in some areas such as Phase Three, Four and Five are narrow or deserted and are seen as unsafe paths and in most cases are unwatched spaces. This problem can be addressed by changing the nature of the part of the public space nearest to the private land or property, by reorganizing e.g. widening of the streets and landscaping it so that residents/property owners are able to exercise a degree of control over it. In effect creating a buffer between the wider public space and the private space which produces active and self policing spaces.

As pointed out by World Bank (2010), designing public open spaces to attract people of different generation and backgrounds invites potential users and increase the sense of belonging and ownership. Once the users have the sense of ownership, they are more likely to defend their environment against unwanted behaviours and activities. This notion was also confirmed by the Dandora community policing members who noted that the Dandora Stadium in Phase Three is used by all generations for community benefit and all peace forums for the entire Dandora are normally held there. This has also made residents to guard and protect the stadium, which confirms Shaw and Carli (2011) observations that high densities of people in public spaces

helps to avoid negative appropriation of open spaces or vacant plots by certain groups excluding other members of society.

Vertical transformations were also found to be conspicuous along the main street and highways for all phases including Phase One which is the most conservative. This is also supported by the households' survey whose findings show that the changes were most pronounced near highways or main bus stops such as Wamware, Stage 41, Dunia stage (34.5 per cent) and Mworoto (10.8 per cent). Other areas exhibiting vertical changes were scattered mainly where other commercial and public purpose activities are located near schools, churches and recreational areas such as Dandora cinema, bars and shopping centres.

Changes in Dandora apart from the infiltration of the allocation of plots and subsequent development by wealthy investors can also be attributed to institutional capacity of the institutions mandated to control development in the area and socio-economic setting which shapes the market economy and ability to invest in housing development and other economic activities.

The main land use transformation argument which is emerging from the analysis of land use transformation of different Phases of Dandora, is that the neighbourhood is facing changes though at different levels and pace. This is important in explaining the argument fronted by scholars such as Taylor et al (1995) and Sampson et al, (1997) who pointed out that, as land use changes through new development and redevelopment; the physical environment characteristics change the social interaction and routine activities of residents and general space users. The concern of this study is to understand how the changes impact on crime incidences and crime prevention. In this respect, the profiling of land use transformation is important in understanding the contextual part of this explanation which helps in responding to the multi-contextual framework adopted in this study.

Given this summary of transformation of Dandora phases, the ranking of Dandora phases in terms of magnitude of transformation is summarized in Table 14, which shows that Dandora phase one is the least transformed phase followed by phase two, phase 3, phase 5 and the most transformed is Dandora Phase 4.

Table 14: Comparative Analysis of Land Use Transformation in Dandora

| Location | Land Use Transformation Yardstick | | | Total | Rank in terms of the Most Transformed |
|--------------|-----------------------------------|--------------|--------------|--------------|---------------------------------------|
| | Vertical | Horizontal | Mixed Use | | |
| Phase 1 | 5 | 4 | 4 | 13 | 5 |
| Phase 2 | 4 | 3 | 3 | 10 | 4 |
| Phase 3 | 3 | 2 | 3 | 8 | 3 |
| Phase 4 | 1 | 1 | 2 | 4 | 1 |
| Phase 5 | 2 | 2 | 1 | 5 | 2 |
| Total | 15/25 | 12/25 | 13/25 | 40/75 | |

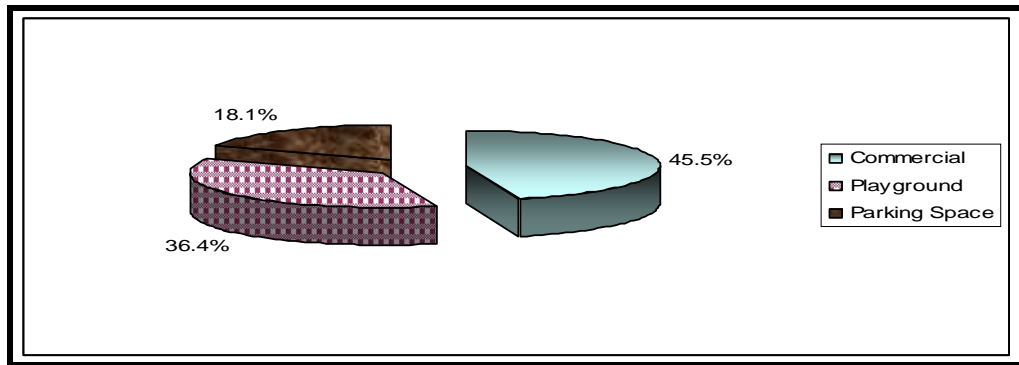
Key for Land Use Transformation Yardstick: 1. Very High 2. High 3. Medium 4. Low 5. Least

Rank: 1. Most transformed 2-3 Medium transformation 4-5. Low Transformation

5.7 Land Use Transformation Appropriateness

The study found that (25 per cent) and (44.2 per cent) of the households and businesses respectively were living or operating in an area previously planned for different land use. The originally planned uses for households respondents were found to be commercial (45.5 per cent), playground (36.4 per cent) and public parking (18.2 per cent), while for businesses respondents it was found to be residential (70.4 per cent) and public open spaces (18.3 per cent). The findings show that the transformations are spontaneous and mainly in response to various factors such as economic needs, security and demands for services rather than organization of space with respect to zoning regulations

Figure 12: Initially Planned Land Use Purpose



Source: Field Survey, 2009

It is important to clarify that with reference to commercial area, this was a case where the plot owners transformed shops to living rooms, especially due to crime and target by criminals which make such businesses not profitable. Another problem making developers to change from commercial to residential is increased cases of extortion by Mungiki, who regularly demand for protection fee from the business operators and those who are unwilling are either kidnapped or their relatives threatened and occasionally killed³⁷. This for a long time has transformed the manner in which businesses are conducted and direction of land transformation in the area. Business persons are living under constant fear, though the OCPP said that this is changing and the criminals are being dealt with accordingly.

The causes and drivers of land use change can be summarized to be; economic, political and institutional. Economically the original allottees who were unable to repay the loan acted rationally by selling their serviced land which is scarce in Nairobi lost their plots to well-off developers. These entrepreneurs later used their financial power to develop high-rise buildings. Politicians also used their influence to grab and dish out public land to their supporters leading to private development in places meant for public utilities lastly, institutional incapacity to control development in line with the stipulated zoning regulations for the area also had an effect (Field Survey, 2009). It is also emerging that factors such as response to insecurity and demand for certain services such as education, health and other goods have also driven land use transformation in all phases of Dandora with some areas such as Phase Three and Four leading other Phases.

³⁷ Interview with Kinyago OCPP on 26th of March 2009

The nature of transformation in the area tends to favour high rise development, mixed use development and emergence of public purpose development such as schools within residential areas. Conversion of land use mainly from residential to commercial tend not to be very common in the area, but new developments tend to flout the planning rules and it is becoming normal occurrence to have new residential developments having commercial facilities such as bars or shops. These changes are in response to demand created by the population bulge, insecurity especially in relation to extortion and demand for protection money by the militia operating in the area.

Dwelling Units Analysis

Plate 25: Juxtaposition of Land Uses



Plate 25 shows different densities of development in one area. The front section of the photo on the left shows the initial residential plan while the background on the right, has a high rise development of 4 floors which came in later. The latter has contributed to the changing face of Dandora estate with increase in the number of dwelling units (DU). These densifications have changed immensely Dandora's Floor Area Ratio (FAR), by more than 100 per cent. A higher FAR signifies a higher intensity of land use, and a lower FAR likewise signifies a lower intensity of land use. FAR is

increased as a building occupies a greater portion of the parcel, or when additional floors are added.

It was also noted that most of the developments do not follow building and development regulations, requiring the developers to observe setbacks, offsets (sides and rear) and some open spaces provided per dwelling units. Most buildings footprints were almost 100 per cent, which is more than (75 per cent) stipulated in the zoning regulations. This means that the amount of floor space cover almost the entire total site area, which leads to poor and inadequate internal space for building users.

5.8 Impact of Land Use Transformation

The study found that there were several impacts associated with land use changes. Table 15 gives a summary of the positive impacts identified by the households and enterprises. The most pronounced ones were noted to be increment in housing supply (20.5 per cent) by households and (27.3 per cent) by enterprises which confirms Shaw and Carli (2011) notion of land use transformation as helping cities achieve housing targets, additional business opportunities due to growth of market-demand (20.1 per cent) households and (22.3 per cent) enterprises and creation of employment opportunities for the masons, welders and hardware shops (16.7 per cent) of households and (9.9 per cent) of enterprises. Others were proximity of public purpose facilities e.g. schools and health facilities (21.3 per cent) among others noted by households.

Table 15: Positive Impacts of Land Use Transformation

| Positive Impact | Residents | Enterprises |
|---|------------------|--------------------|
| Increased housing supply | 20.5 | 27.3 |
| Increased business opportunities | 20.1 | 22.3 |
| Creation of employment opportunities | 16.7 | 13.0 |
| Public purpose facilities proximity | 21.3 | 14.9 |
| Enhanced security | 5.6 | 6.6 |
| Improved social interaction | 5.6 | 2.5 |
| None in particular | 3 | 0.8 |
| Increased accessibility of transport means | 2.6 | 9.9 |
| Keep idle youths occupied (Recreational facility) | 2.1 | 0.8 |
| Closeness of workplace to residential area | 1.7 | 2.7 |
| Controlled land grabbing | 0.9 | 0.0 |
| Total | 100 | 100 |

Of importance to this study enhanced security noted by (5.6 per cent) of households and (6.6 per cent) enterprises, and improved social interaction accounting for (5.6 per cent) and (2.5 per cent) for households and enterprises respectively. The argument being that when there are very many people in an area, there is also a likelihood of enhancing surveillance through increased number of eyes in a place, which is assumed to deter certain type of crime such as rape and murder. The business people saw transformations as opportunities due to availability of a ready market (22.3 per cent).

These advantages do not really consider security highly as a positive factor as earlier proposed by Jacobs (1961), who noted that; “The ecological dynamics generated by concentrated, mixed use neighbourhoods provide a foundation for effective informal social control of public space by encouraging a steady stream of “eyes on the street.” The most effective monitoring of street space comes from what Jacobs calls the “natural proprietors” of neighbourhoods—residents and local business owners. Regardless of who is on the street, residents and business owners will always have an interest in active streets, with increased monitoring as a by-product.”

Several negative impacts were also identified (Table 16). The key ones were reported as; increased pollution (28.1 per cent) and (29.2 per cent) of the households and enterprises respectively and increased insecurity (27.3 per cent) and (31 per cent) of households and enterprises respectively. This is due to proliferation of many businesses. Congestion of spaces was reported by households (18.6 per cent) and enterprises (22.1 per cent). This encourages robbery, muggings and petty crime such as pick-pocketing. Other noted negative impacts mentioned by households are unplanned developments (8.7 per cent) and grabbing of public spaces by private developers (6.7 per cent).

Table 16: Negative Impacts of land Use Transformation

| Negative Impact | Residents | Enterprises |
|---|------------------|--------------------|
| Increased pollution/sewerages blockage | 28.1 | 29.2 |
| Increased insecurity/soaring crime rates | 27.3 | 31.0 |
| Congestion | 18.6 | 22.1 |
| Unplanned development | 8.7 | 6.6 |
| Grabbing of public spaces e.g. playground and road reserves | 6.7 | 3.3 |
| Increased incidences of social ills e.g. prostitution | 5.5 | 7.1 |
| Increased rental prices | 2.4 | 3.3 |
| Tribal clashes | 1.2 | 3.3 |
| Strain on social services | 0.8 | 0.5 |
| None | 0.8 | 0.9 |
| Total | 100 | 100 |

Source: Field Survey, 2009

The negative impacts listed confirm arguments fronted by Pont and Haupt (2007) whereby land use transformations were noted to eat into spaces meant for other uses such as open spaces and children play areas. Findings also confirm Taylor et al (1995) who found that highly transformed neighbourhoods are negatively associated with residents' willingness to manage nearby outdoor space. This is partly consistent with broken windows theory of associating high density development with social ills. This is important in understanding the multi-contextual theory where socio-spatial interaction of the area is used as a yardstick of unravelling the perceived connection between land use transformation and crime. As noted by Rappoport (1975) and Chan (1998) such studies take cognizant of spatial density and social density to explain how physical space, impacts on social interaction.

Spatial density discussed as land use transformation helps in appreciation of perception of density with respect to the relationship among spatial elements such as height, spacing and juxtaposition of buildings. High spatial density is related to environmental qualities such as high degree of enclosures and high activities levels, in which all these qualities tend to result in higher rates of information from the environment itself. Social density on the other hand, which is a product of spatial density, describes the interaction between people. It involves the various sensory

modalities, the mechanisms for controlling interaction levels such as spacing, physical elements, territorial boundaries, hierarchy, the size and nature of the group involved, its homogeneity and rules for behaviour in which all of these qualities affect the rates of social interaction (Chan, 1998).

Application of land use transformation as a context of understanding crime incidences has been noted to be reliable in understanding socio-physical nexus characteristics of communities which is based on how physical environment explains dynamics of communities' such as reciprocal exchange, trust and informal social control norms which are important in explaining the study's multi-contextual framework.

From the land use transformation findings chapter, it is clear that the changing land uses are also changing routine activities of residents. The emerging pattern and location of previously centrally located services such as health, education and commercial markets, is also changing the social-network and interaction patterns of the residents. The high density is also increasing anonymity of neighbours and creating a carefree environment, which destroys collective efficacy and building individualism in the process as noted by some old residents that they no longer know their neighbours.

CHAPTER SIX: CRIME INCIDENCES AND RESPONSE MECHANISMS IN DANDORA

This chapter discusses crime types and patterns in Dandora and existing coping and reaction mechanisms, both at individual and communal level. Several studies (Brantingham and Brantingham, 2000); World Bank, (2010) and Zaidi (1999) have shown that crime is not random. This chapter acknowledges that urban communities themselves are an integral part of understanding the causes and impacts of urban crime and for generating sustainable crime response initiatives as spelt out by World Bank (2010).

Crime is a major threat to neighbourhood sacredness (Geis and Ross, 1998; Parkes *et al.*, 2002). It is therefore important to discuss and understand its genesis. As noted by Weisburd (1999) and for ease of comprehension, crime causes are categorized as either ecological or compositional. The socio-economic, political and institutional factors explaining crime are seen as compositional while the socio-physical condition of the environment is associated with ecological causes. From the analysis of causes of crime in Dandora, the prevailing causes are mainly compositional such as unemployment and poverty.

Urban neighbourhoods offer the space for both collusion and conflict among violent actors with different social, political and economic motivations, which in turn, transforms the physical and social landscape of urban communities (World Bank, 2010). This explains the variety associated with numerous causes of crime, which contextualizes the theoretical framework adopted in this study.

Several problems associated with land use changes in Dandora were identified (see Table 17). They include: high levels of insecurity, especially harassment by Mungiki gang (28.1 per cent) and (33.1 per cent) for residents and business persons respectively. This creates fear among the residents as they are unable to move and work freely. Other problems identified are poor sanitation (22.2 per cent) as noted by residents and (7.2 per cent) by enterprises, this was found to be in relation to blocked drainages which occasionally lead to contamination of food leading to cholera and other diseases, strain on available services (19.8 per cent) for residents and (26.6 per cent) for enterprises mainly associated with the population pressure experienced in the

area in relation to existing services and facilities provided, congestion (7.1 per cent) for residents and (18.7 per cent) for enterprises.

Table 17: Major Problems Encountered Associated with Land Use Changes

| Problems | Residents | Enterprises |
|--|------------------|--------------------|
| High levels of insecurity/harassment by Mungiki | 28.1 | 33.1 |
| Pollution/Poor sanitation/health risks | 22.2 | 7.2 |
| Strain on available services and utilities e.g. sewer line | 19.8 | 26.6 |
| Congestion resulting from overpopulation | 7.1 | 18.7 |
| High house rents/Business Premise rents | 6.8 | 4.2 |
| Poverty and unemployment | 5.1 | 0.0 |
| Inaccessibility due to congestion/bad roads | 2.1 | 0.0 |
| Harassment by Police | 1.5 | 0.0 |
| Noise pollution by bars and Public Transport vehicles | 1.5 | 1.5 |
| High fares | 1.5 | 0.0 |
| Poor planning/housing provision | 1.2 | 2.4 |
| Lack/ inadequate street-lighting | 1.2 | 0.0 |
| Inadequate recreational spaces | 0.9 | 1.8 |
| Tribal clashes | 0.9 | 0.0 |
| Increased prostitution | 0.3 | 1.5 |
| Total | 100.0 | 100.0 |

Source: Field Survey, 2009

In relation to housing demand it was noted that Dandora is one of the estates which is attractive to those who have just moved to Nairobi but do not have stable income and hence are in “captive mode”. The business persons also noted that Mungiki harassment is their leading problem (33.1 per cent) as they regularly demand payment of protection fee.

High levels of insecurity in Dandora (Table 16) has potential of falling under what Power (2004) saw as intimidation of the residents as it creates a difficult situation of preventing crime, which was associated with the likelihood of driving law-abiding residents away, especially those whose income can enable them to do so. This is further explained by Taylor, (2001); Sampson and Raudenbesh, (2004), who argue that such situations make neighbourhood less stable and prone to higher crime as this is the perceived status and identity of the neighbourhood.

6.1 Causes of Crime in Dandora

As shown in Table 18, most of the leading causes of crime as identified by Dandora community are; unemployment (30.1 per cent), poverty (17.2 per cent) and idleness among the youth fall under the compositional causes of crime. Other causes such as

activities at the dumpsite (5 per cent) and lack of development control is part of ecological causes of crime. As noted in the theoretical framework section, the interactions between the compositional and ecological factors are important in understanding the context of crime and response to the same.

Table 18: Causes of Crime

| Causes of crime | Responses | |
|--|------------|------------|
| | N | Per cent |
| Unemployment of the youth | 125 | 41.4 |
| Poverty | 52 | 17.2 |
| Drug/substance abuse among the youth& Increase in drug peddling | 23 | 7.7 |
| Collusion of criminals with the local police/corruption of police/laxity of police | 22 | 7.3 |
| Fear by residents to report crime | 21 | 7.0 |
| Peer pressure among the youth | 20 | 6.6 |
| The dumpsite as criminals hideout | 15 | 5.0 |
| Lack of proper Development Control | 6 | 2.0 |
| Outlawed groups like Mungiki | 5 | 1.7 |
| Dark Alleys& lack of security lights | 6 | 2.0 |
| Tribalism | 3 | 1.0 |
| Lack of security gates in some courts | 2 | 0.7 |
| Presence of Vigilante | 2 | 0.7 |
| Total | 302 | 100 |

Source: Field Survey, 2009

Focus group discussion with the community policing members blamed residents for rarely reporting crime to the police, hence giving a wrong impression that there is a reduction of crime in the area. Community policing members and police officers sentiments match with the households and business people's feelings about the causes of crime. Community policing members³⁸ and the area chief³⁹ noted that "Criminals

³⁸ Community Policing Focus Group Discussion conducted on 29th November 2009, at Holy Cross Catholic Church in Dandora phase four.

³⁹ Key Informant Interview with the Dandora chief conducted in the Chief's camp on 15th of March 2009, at the Chief's camp in Dandora phase four

Exchange Programme” is an emerging wave of crime pattern in Dandora. In this brand of crime criminals living in Dandora give criminals living in Korogocho, Kayole and vice versa the details of their targets. In such cases the criminal(s) seem to have a lot of intelligence about the area and their target(s), since crime is organized along reliable information. This makes it very difficult to contain such forms of crime, since their genesis is complex and well calculated.

6.2 Crime Statistics and Trends

Crime statistics relied on criminal statistics as given by the police crime records supported also by the households and entrepreneurs responses. Discussion of crime patterns and trend relies on the type of crime, geographic location of crime, time of crime occurrence and frequency of occurrence. Peeters and Elffers (2010:38-50) noted that understanding of crime patterns is important in characterizing of the intensity of criminal traffic in an area.

Kinyago Police Post which covers Dandora neighbourhood is under Buruburu Police Division. This section will begin with analysis of official crime statistics from Buruburu and Kinyago police post despite their shortcoming related to under reporting as noted by World Bank (2010) report on Violence in the City. Tables 19 and 20 reveal that crime incidences keep fluctuating in general and in specific crimes. The year of highest crime incidences over the period between 2002 and 2006 is 2004 where there were reported cases of 1989 crime incidences at the divisional and 246 at police post level and the lowest is 2005 with 1285 cases at divisional and 133 cases at police post level. It was also noted that the crime with the highest reporting in the Division is assault and the lowest is rape. There is also a general reduction in the reporting pattern of certain crime such as murder, rape, robbery and breakings in the division.

Table 19: Crime Statistics in Buruburu Police Division for the Period 2002-2006

| Crime Type | 2002 | 2003 | 2004 | 2005 | 2006 | Mean |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------|
| Murder | 69 | 65 | 57 | 32 | 14 | 47.4 |
| Rape | 43 | 51 | 53 | 41 | 14 | 40.4 |
| Robbery | 43 | 86 | 179 | 54 | 51 | 82.6 |
| Breakings | 121 | 115 | 171 | 124 | 81 | 122.4 |
| Assault | 351 | 386 | 358 | 319 | 419 | 366.6 |
| General Stealing | 189 | 201 | 125 | 115 | 221 | 170.2 |
| Total Crime | 1862 | 1405 | 1989 | 1285 | 1559 | 1620 |

Source: Compiled from Buruburu Police Division records, 2009

Table 19 shows that robbery was the leading type of crime over the six years period, followed by general stealing and assault. This is also supported by households and enterprises findings as shown in Table 20.

Table 20: Crime Statistics in Kinyago Police Post for the Period 2002-2007

| Crime Type | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Mean |
|--------------------|------------|------------|------------|-----------|------------|------------|-------|
| Murder | 11 | 10 | 8 | 0 | 11 | 4 | 7.3 |
| Rape | 1 | 1 | 2 | 3 | 1 | 0 | 1.3 |
| Robbery | 1 | 22 | 44 | 26 | 55 | 81 | 38.2 |
| Breakings | 2 | 10 | 51 | 19 | 17 | 3 | 17.0 |
| Assault | 14 | 15 | 36 | 9 | 23 | 21 | 19.7 |
| General Stealing | 28 | 45 | 35 | 16 | 20 | 2 | 24.3 |
| Total Crime | 151 | 177 | 246 | 33 | 219 | 251 | 179.5 |

Source: Compiled from Buruburu Police Division records, 2009

The police records from Kinyago Police Post seem to conform to residents and business people perceptions of crime type. The area police records shows that robbery, general stealing and assault are the leading crime types in the area.

Robbery was found to be the leading type of crime in the area as reported by (18.9 per cent) of the business persons and (57.5per cent) of the residents. This was followed by burglary (18.1 per cent) and (15 per cent) for business persons and residents respectively, assault (17.9 per cent) and (15 per cent) respectively, car jacking (16.2 per cent) for business persons and a paltry (1.3 per cent) for residents. Others are rape (15.8 per cent) and kidnapping (11.7 per cent). As shown by crime incidences in (Table 21). Violent crime types such as robbery, assault, rape and car-jacking seem to dominate list of crime as opposed to non-life threatening types of crime such as pick-pocketing. The findings seem to confirm the official police crime record indicating that robbery is the leading crime in the area and also that the area experiences violent crime.

Table 21: Frequent Types of Crime in the Area

| Crime type in this area(a) | Percentage Responses per cent | |
|---|-------------------------------|--------------|
| | Business Persons | Residents |
| Robbery | 18.9per cent | 57.5per cent |
| Burglary | 18.1per cent | 15per cent |
| Assault | 17.9per cent | 15per cent |
| Car jacking | 16.2per cent | 1.3per cent |
| Rape | 15.8per cent | 1.2per cent |
| Kidnapping | 11.7per cent | 2.5per cent |
| Drug peddling/selling of illegal brew | 0.5per cent | 1.2per cent |
| Extortion | 0.3per cent | |
| Murder | 0.3per cent | 5per cent |
| Corruption of public institutions like police | 0.3per cent | 1.3per cent |
| Total | 100 | 100 |

Source: Field Survey, 2009

The official crime records in Buruburu and Kinyago shows that cases of violent crime exist in the study area and there is no clear trend indicating whether they are reducing or increasing, which can be used as a basis of recognizing their existence as a challenge in the area. On average, cases of robbery, assault and breakings seems to have been highly reported as shown by their means both at Buruburu Divisional

offices and Kinyago police post level over the 6 years period. The official crime data forms a useful building block of understanding the multi-contextual framework of crime incidences in Dandora, since it can be used as a surrogate of analysing and understanding crime generators and attractors and also important in appreciating how the public deal with the conditions generating crime.

Projecting the crime statistics to the year 2015 using regression analysis basing on the current crime total for the six years as bases and points of projections, Buruburu⁴⁰ Police Division will experience a total of 1647 violent crime cases, while Kinyago⁴¹ Police Post will report 233 violent crime cases. The equation results that crime in the area will continue to fluctuate but as time goes-by it will increase marginally which will eventually change the base of the totals used to predict future crime incidences.

Limitation of the crime trend analysis is informed by the fact that an ideal analysis of neighbourhood crime patterns and trends require that there is use of neighbourhood crime data, with distinctive geographical location and time, which enable one to analyze crime-specific patterns for a specific neighbourhood or across many neighbourhoods as given by the International Association of Crime Analysts (2011). Getting such data set is a challenge in Kenya. Police data is always recorded as aggregate data and data available to public is not neighbourhood specific. In discussing crime pattern and trend, the study makes use of residents and community policing members to fill in the inadequacy of police data.

In Africa cities including Nairobi, crime takes different patterns and trends. According to the Institute of Security Studies, (2004) and Starvrou (2002), crime in Kenya, especially in the city of Nairobi, is fluctuating but seems to be rising generally. Table 22 provides crime pattern in relation to seasonality and time of their occurrence. Crime was noted to be high during electioneering years. It was noted by the police that virtually all types of crime are high during these periods. This was noted to have started with the first multi party elections in 1992 and the worst

⁴⁰ **Buruburu Police Division Regression Equation= $Y=1837.8-72.6X$**

⁴¹ **Kinyago Police Post Regression Equation= $Y=138.2+11.8x$**

experienced in 2002, when militiamen with support of prominent politicians took over control of the city (Muchai, 2003). Crime is also high during January, April, August and November. The police attributed this to the demand to pay fees and money for shopping by parents for their school-going children who normally close for holidays⁴². He added that during this time even the white-collar crime is high, with professionals and the employed alike seeking to get money in all ways including shoplifting.

Table 22: Crime Dynamics in Nairobi

| Periods of High Crime (Year) | Periods of Low Crime (Year) | Months of High Crime | Months of Low Crime | Time of High Crime | Time of Low Crime |
|------------------------------|-----------------------------|----------------------|---------------------|---|-------------------------|
| 1.1992 | 2000 | January | December | At night and wee hours of morning and night | Daytime 7:00 a.m-6:00pm |
| 2.1997 | 2006 | April | | At night and wee hours of morning and night | Daytime 7:00 a.m-6:00pm |
| 3. 2002 | 2008 | August | | At night and wee hours of morning and night | Daytime 7:00 a.m-6:00pm |
| 4.2007 | 1999 | November | | At night and wee hours of morning and night | Daytime 7:00 a.m-6:00pm |

Source: Kenya Police, 2009

The police officers in supporting the periodic nature of crime observed that criminals are people with responsibilities of supporting their families. In December most people travel home including the criminals hence crime in Nairobi always reduces. Another pattern of crime was that it tends to be high at night and the wee hours of morning. These arguments are in line with the economic causes of crime, especially by Zaidi

⁴² Interview with Mr. Julius Ndegwa the former Nairobi Deputy Provincial Police Officer (DPPO) on 27th May 2009

(1999) who noted that people are likely to engage in crime in response to rising expectations and moral responsibilities. The prevalence of crime at wee hours and at night is consistent with the KIPPRA (2004) findings on crime occurrence timings and generally qualified by routine activity theory and rationale theory with regard to absence of guardian.

6.3 Crime Patterns and Trends in Dandora

In Dandora and as shown in Table 23, crime incidences were reported to be changing by (67.4 per cent) of the respondents. Various descriptions of crime incidences were given. About (41.2 per cent) of respondents said that increased visibility and ruthlessness of security personnel commonly known as “Kwekwe Squad” had led to the change in crime type and criminals are engaging in less violent crimes than before. About Twenty eight per cent (28.2 per cent) of those interviewed reported that cases of crime had increased. Increased cases of extortion especially by Mungiki members were reported by (17.6 per cent) of the respondents. Burglaries were reported to have increased by (11.8 per cent) of the respondents. Community policing members⁴³ noted that frequencies of certain types of crime such as mugging, house breaking and petty crime including snatching of mobile phones are reducing. The police officers⁴⁴ interviewed also reported that extortion is an emerging serious crime in the area.

Table 23: Nature of Crime Occurrence

| Factors | Responses | |
|--|-----------|------------|
| | N | Per cent |
| Ruthlessness of security officers “Kwekwe squad” has led to reduction of violent crime | 35 | 41.2 |
| Increased cases of crime | 24 | 28.2 |
| Increased cases of extortion | 15 | 17.6 |
| Robberies are on the decrease while burglaries are increasing | 10 | 11.8 |
| Land-grabbing is being curtailed | 1 | 1.2 |
| Total | 85 | 100 |

Source: Field Survey, 2009

⁴³ Community Policing Focus Group Discussion held on 29th of November 2009

⁴⁴ Key Informant interviews held with PPO, OCPD and OCPP on 27th May 2009, 27th March 2009 and 26th March 2009 respectively

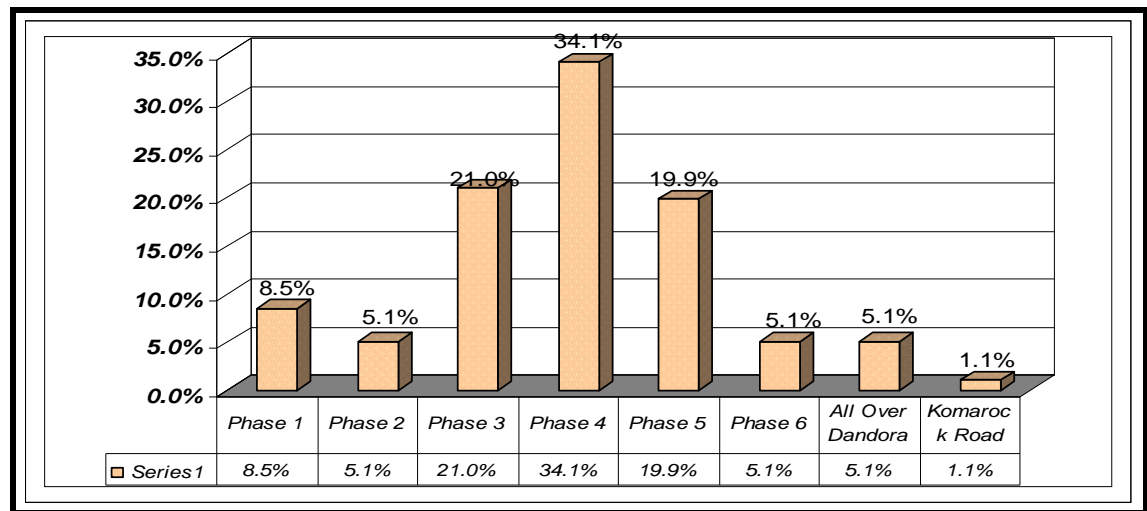
The analysis of crime occurrence shows that certain action by the state and community can act as a barrier to crime and this can change the state of the environment but perceived differently. With reference to Community policing in Dandora, the Community Policing members revealed that high crime incidences experienced in Dandora have left members of the community with little choice or option of protecting their neighbourhood but to deliberately form a group which can be relied on for crime prevention. Crime occurrence has brought them together as neighbours in ensuring that crime is prevented. It was however noted that the current community policing has a long historical background which is similar to most of low income neighbourhoods of Nairobi where members of a neighbourhood come together to form informal policing structure commonly known as ‘vigilantes’ so as to battle common threats to their safety and security. They noted that when the community sit back and wait for police the crime levels is likely to rise.

This is in line with the rational choice theory, Bernasco and Nieuwebeerta (2005) in their analysis of criminal location choice, explained the target choice of an individual offender as being governed by a comparison of the attraction level of all potential target area in relation to the consequences of attacking the offender. This is useful in explanation of reduction of crime associated with the presence of security officers, changing incidences of certain types of crime in the area.

As shown in Figure 13, (34.1 per cent) of residents felt that Dandora Phase 4 was leading in terms of the risky places in Dandora. This was followed by Phase 3 with (21 per cent) and thirdly Phase 5 with (19.9 per cent). The reasons given for making these places prone to crime included: bus and *matatu* terminus located in Phase 4 and that it hosts most of the idle youths and *Mungiki* (17.6 per cent). The area is deserted and dark at night (14.8 per cent), proximity to drug peddling points (13.4 per cent) and proximity to the dumping site (12 per cent). These areas were also noted by the police and the community policing groups as crime hotspots. The observation fits well with arguments of Newman (1972) and other scholars who subscribe to crime-physical environment connection theoretical discussion and who have consistently noted that certain place characteristics can affect the incidence of crime, depending on how they create “territoriality”, natural surveillance and how this makes the space defensible.

Stark (1996) noted that mix of land uses may bring together opportunities for victims and offenders who might not have otherwise met. Study findings with regard to Phase four, by the nature of mix of activities within and surrounding may fit in Stark’s argument. The area is perceived by residents and key informants as a leading generator of violent crime and the reaction to this is also violent as noted by residents who at times are forced to engage in mob⁴⁵ justice and the cycle of revenge is created in the process.

Figure 13: Violent Crime Prone Areas in Dandora



Source: Field Survey, 2009

The violence witnessed has led to a lot of out-migration to other areas of Dandora and the landlords at times have been forced to change from residential to commercial and vice-versa in order to attract tenants. This leads to what Skogan (1986) referred to as unstable neighbourhood which is created by declining or rapid changing of the composition of the neighbourhood residents, which offers an environment in which crime rates and levels of fear are high. In such a case, it is hard to have a sustainable and tranquil environment.

According to police records and the community policing group, the crime occurrence was said to be dictated by the following factors; land use activities, time of the year, month, day, political campaigns, knowledge of the neighbourhood, unemployed

⁴⁵ Mob justice is also common when citizen's patience with slow police response runs out or where police response is completely unavailable (Kole, 1999).

youth, nature or status of the building, availability of crime deterrent such as gates, perimeter wall, security personnel visibility and location of various uses. These findings partially support Brantingham and Brantingham (1993) who noted that crime events occur at a specific site in a specific situation. However their complex interaction as comprehensive explanatory argument can possibly be explained by the multi-contextual framework which was noted by Stucky and Ottensmann (2009) who related land use patterns with alteration of routine activities over time and how these potentially influence opportunities for crime.

In comparison to issues raised by the officer⁴⁶ in charge of planning and engineering in Dandora's HDD offices, the areas where there are unapproved and illegal developments such as Mworoto, around the dumpsite are noted to be prone to crime. The community policing members also noted that these places seem to provide cheap rent which seems to attract all manner of people including the unemployed and those who engage in criminal activities and hence find them to be suitable hideouts. The HDD officer also noted that as these places transform from their slum outlook to formal development which can be regularized by the council, which can potentially change the character of these places, the challenge is that some developments occur on road or riparian reserve hence cannot be regularized. The arguments have been supported by works of Jacobs (1971) and many new urbanism scholars who have propagated for renewal of urban spaces related to social ills such as crime.

Crime Hotspots/Zones

Map 24 shows the crime hotspots identified by both the households and community policing members. Crime hotspots and violent crime prone areas will be used interchangeably in this work. In discussing the crime hotspots, it is notable that the crime patterns are associated with the different land uses and their location, which consequently dictates the pattern of movements in the area. The land uses related to crime hotspots in Dandora range from residential, commercial, transportation and public utility. Areas associated with crime are;

- (1) Residential- Jua-Kali Block G and Phase 5 Extensions (Mworoto)
- (2) Commercial- Between Wamware Stage and Total Petrol Station
- (3) Transportation- Along the Railway line and Wamware Bus Stage

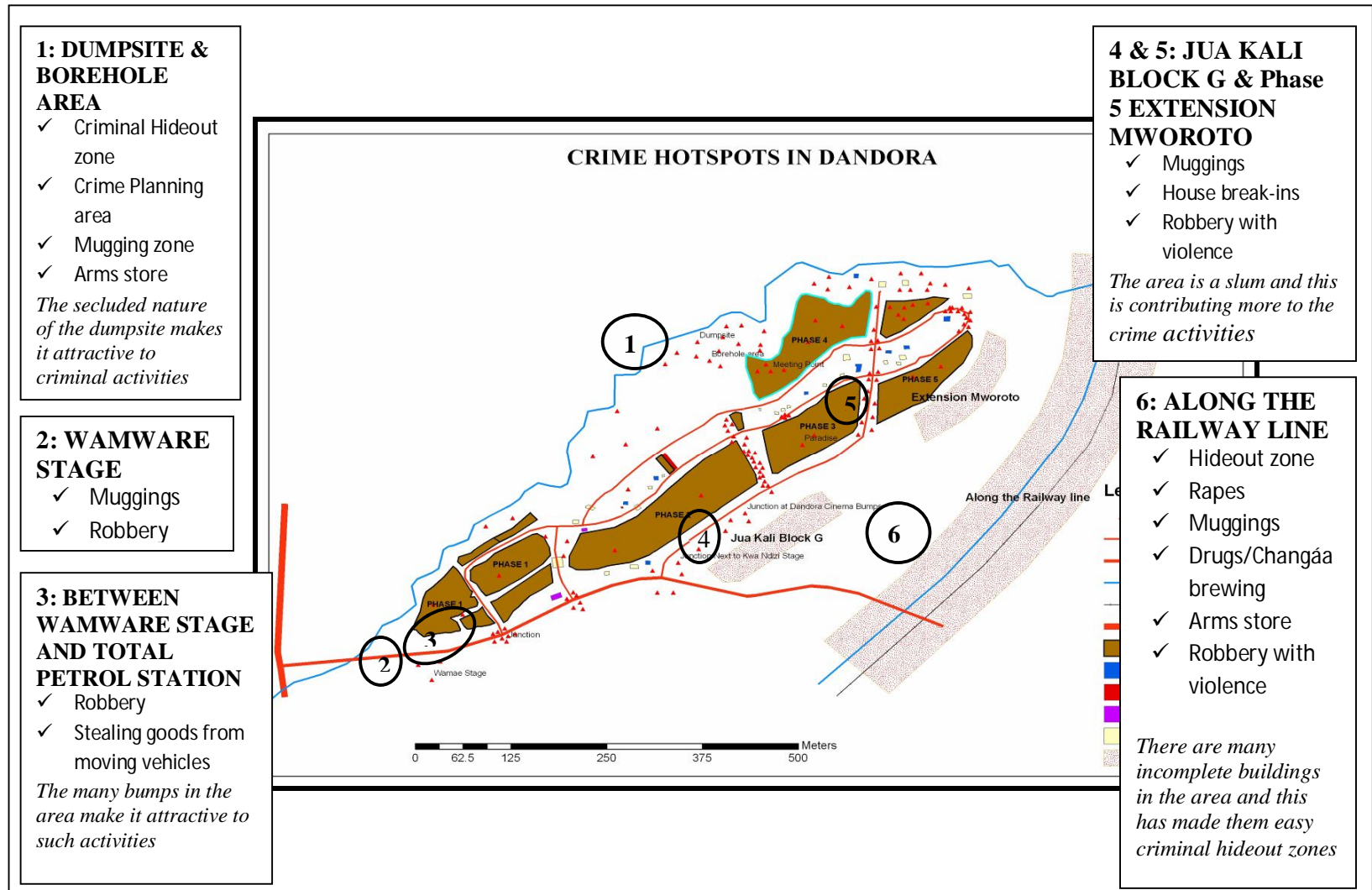
⁴⁶ Key informant interview held on 20th of May 2009, in their Dandora offices

(4) Public Utility- Dandora dumpsite and Borehole area

In discussing crime hotspots, one notable observation is that most of the places marked as hotspots are public spaces, which are poorly managed. The Dandora dump site, the railway line and bus stages are all public spaces hosting different activities. There is a clear linkage and concurrence between crime hotspots and the earlier observed land use transformation zones as they are located near public spaces such as highway and railway lines and dumpsite among others. Generally, literature relates poorly managed public spaces with crime. As noted by Shaw and Carli (2011) offences occur more in spaces that are more public. This is due to their extreme “publicness” and low sense of community ownership.

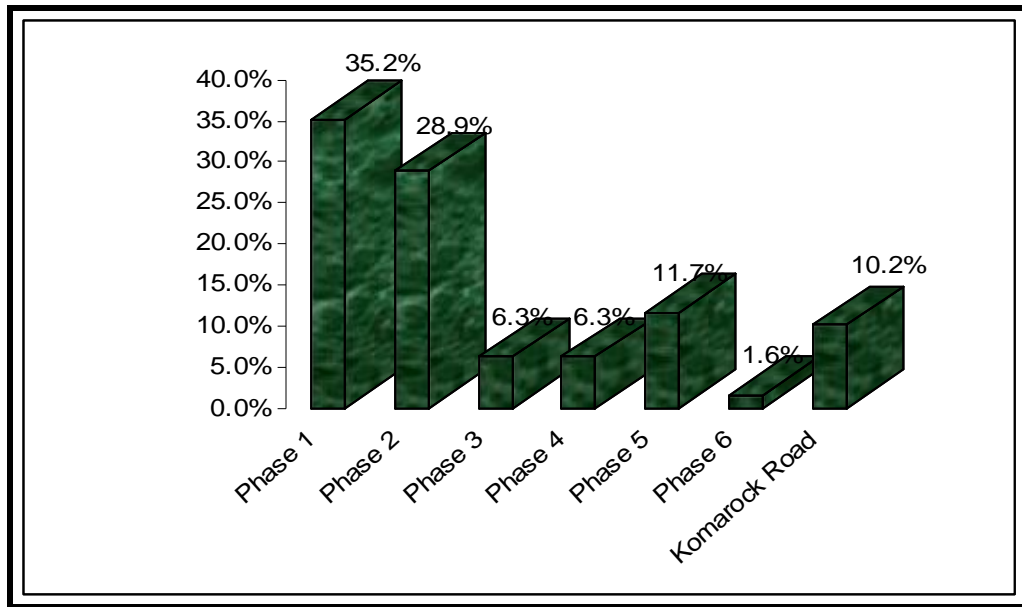
The characteristics of the residential area associated with crime was noted to be of high density and mixed use, most of the developments in this area have not been formally approved by the HDD and also incomplete buildings are used by criminals. Saville (1996) in associating crime incidences with high density noted that a neighbourhood, just like a natural ecosystem, had the capacity to hold only a certain number of things. Additional immense and unregulated development in an area may lead to the collapse of the system because it is likely to exceed its carrying capacity. It would overrun the tipping point. Saville (1996) further observed that abandoned buildings and spaces in neighbourhoods constitute magnets for crime, which may explain why some abandoned public spaces such as dump sites and railway areas among others are prone to crime, hence constitute crime hotspot.

Map 24: Dandora Crime Hotspots



Source: Author, 2009

Figure 14: Relative Safe Places in Dandora



Source: Field Survey, 2009

Safe areas in Dandora were reported to be Phase 1 by (35.2 per cent) of respondents, Phase 2 (28.9 per cent) and Phase 5 (11.7 per cent). The reasons making the above areas safe were given as the presence of police or nearness to police post (52 per cent), mob justice on suspected criminals (10 per cent), proximity to Chief’s camp and operations of commercial activities till late, each accounting for 8 per cent and lastly good community policing (7 per cent).

Phase 1 and 2 were noted to have the least transformation and more than (70 per cent) of the original allottees managed to build and stay in their plots. This has led to development of a sense of community among neighbours, save for public areas such as bus stages such as Wamware which seems to attract crime. The transformation argument is already qualified by Saville (1996) argument of tipping point and fits well in Skogan (1986) argument on changing neighbourhood and social instability it creates anonymity which weakens the social capital, which is seen as critical in understanding routine activity and rational choice theory in implementing Newman’s defensible space and “territoriality”. These arguments may be useful in explaining why Dandora phase 1 is considered relatively safe as compared to other phases.

6.3.1 Frequency of Crime Victimization

Crime victimization shows that (55per cent) of business persons and their employees on one hand and (56.2 per cent) of residents and their families on the other hand reported to have been victim of crime in Dandora. As indicated in Table 24, the leading crime experienced or witnessed by residents in the area are mugging (57.5 per cent), assault and burglary each accounting for (15 per cent), murder (5 per cent) and kidnapping (2.5 per cent). For enterprises the key crime experienced or witnessed are, robbery (49.2 per cent), assault (18.6 per cent), murder (6.8 per cent) and theft (5.1 per cent).

Table 24: Crime Experienced by Household Members

| Crime experienced by households | Responses | |
|---|-----------|------------|
| | N | Per cent |
| Mugging | 46 | 57.5 |
| Assault | 12 | 15.0 |
| Burglary | 12 | 15.0 |
| Murder | 4 | 5.0 |
| Kidnapping | 2 | 2.5 |
| Robbery | 1 | 1.3 |
| Car jacking | 1 | 1.3 |
| Corruption of public institutions like the police | 1 | 1.3 |
| Land grabbing | 1 | 1.3 |
| Total | 80 | 100 |

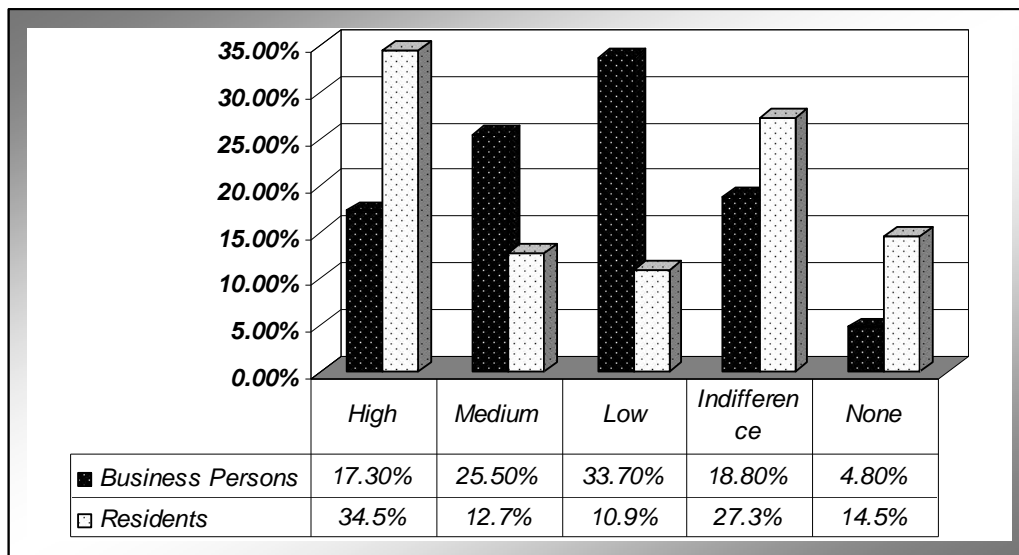
Source: Field Survey, 2009

The analysis of crime incidences experienced by households and business enterprises show that statistically there is no significant difference of crime experienced by these two types of land uses, i.e. residential and commercial. Most businesses in Dandora operate at micro-scale level, mostly operated by owners and cannot fit in Shaw and Carli's (2011) argument of uneven policing, with intensive policing of business and extensive security in wealthy areas. However, murder was found to be rampant among business people than household residents. They were basically attributed to business rivalry and refusal to pay protection fee to certain militia groups.

Figure 15, shows respondents' opinions on frequency of crime in the area. (33.7 per cent) of the business persons as compared to (10.9 per cent) of residents reported that

the crime frequency is low, (25.7 per cent) of business persons as compared to (12.7 per cent) of residents said it was medium, (18.8 per cent) were indifferent hence could not give their own decisive judgment, (17.3 per cent) of business persons as compared to (34.5 per cent) of the residents who felt the crime was high and only (4.8 per cent) of business persons as compared to (14.5 per cent) of the residents said there were no crime incidences in the area.

Figure 15: Dandora Crime Frequency



Source: Field Survey, 2009

Findings as noted in Table 25, generally shows that the crime tend to fluctuate, for instance many residents and businesses in the area were victims of crime in the year 2008 as compared to previous years. It seems that residents and business persons’ perceptions of crime frequency is not significantly different. This may be attributed to the similarity of the environment they live and work in which largely informs all activities including crime incidences.

From Table 25, the last period of the residents’ crime victimization was noted to be in 2008 for (46.1 per cent) of them. Post election violence, in 2007 accounted for (25 per cent). Between 2003 and 2006 (18.4per cent) and between 2000 and 2002 it was (10.5 per cent). It was also found that (49.3 per cent) of the victims of these crimes were injured and that majority (59.7 per cent) reported the crime to the police. Of those who reported, (59.3 per cent) said that no action was taken by the police only (10.2per

cent) of the cases had the suspects arrested and (6.8 per cent) ended up as unsuccessful investigations.

Table 25: The Last Crime Experienced by Household Member

| Crime Experience | Frequency | Valid Per cent | Cumulative Per cent |
|-------------------------|------------------|-----------------------|----------------------------|
| Between 2000-2002 | 8 | 10.5 | 10.5 |
| Between 2003-2006 | 14 | 18.4 | 28.9 |
| 2007 | 19 | 25.0 | 53.9 |
| 2008 | 35 | 46.1 | 100 |
| Total | 76 | 100 | |
| No response | 11 | | |
| Not applicable | 57 | | |
| Total | 68 | | |
| Total | 144 | | |

Source: Field Survey, 2009

The study findings in relation to victimization and crime reporting shows that there is an increase of violent crime incidences in Dandora over the period 2007 to 2008, mostly attributed to the political campaigns in 2007 and post election violence. The business enterprises were the major causality. The findings also show that the neighbourhood also suffers from under-reporting of crime with (42 per cent) and (41 per cent) of business persons and residents not reporting crime. 58 per cent blame the police for not taking action on previous reported crime. The reasons are in line with Shaw and Carli (2011) notion of basing crime reporting on the effectiveness of police response which consequently leads to the lack of community trust in the police and the legal system to effectively apply justice.

For enterprises it was found that (74.6 per cent) of the crime happened in the year 2008 and that (38.3 per cent) were injured and of the crime which occurred, (58.6 per cent) of the incidences reported the case to the police. It was also found that (58.3 per cent) said that no action was taken despite reporting the matter. This makes most people who have been victims before to loose faith in crime reporting. This can encourage criminals or make community members to harden and deal with criminals ruthlessly for example by engaging in mob justice.

Table 26 revealed that assault was highly rated in Phase 4, 5 and Phase 3 respectively with (38.3 per cent), (24.3 per cent) and (23.4 per cent) respectively. Burglary was also rated as a problem in three Phases with Phase 4 leading with (35.5 per cent), Phase 5 (26.2 per cent) and Phase 3 (24.3 per cent). Other crimes such as rape, car jacking and kidnapping were all rated highly in the three areas. The Table 26 summarizes the fact that the three Phases are leading in terms of crime incidences in Dandora, they accumulatively account for (75.1 per cent) of crime in the area.

Land use, density, conversions and crime are related. Phase 4 as noted earlier is leading in terms of land use diversity in the area. It also leads in terms of land use conversions and high density development. The survey findings as shown in Table 23 also show that it is leading in terms of violent crime incidences. This confirms arguments by Stark, (1986); Saville, (1996); Skogan, (1996) who argued in favour of crime incidences in relation to heterogeneity of activities, tipping point and unstable neighbourhood as a result of rapid changes and high density developments. These arguments justify explanations given by routine activity and social disorganization theories which combine well to form the bedrock of multi-contextual theoretical framework adopted in this study.

Table 26 also shows that in terms of cumulative contribution of each phase to places considered risky, Dandora phase 4 is leading with (33.1 per cent), followed by phase 3 at (21.6 per cent), phase 5 with (20.4 per cent). Phase one and phase two are at (9.6 per cent) and (5.1 per cent) respectively. This cumulative contribution and effect is partially indicative and confirmation of the study's focus of unravelling possible linkage of land use transformation and crime incidences, since phase 4 was found to be the most transformed neighbourhood.

Table 26: Crime Type and Crime Location Cross Tabulation

| Crime type in this area | | Risky places in Dandora | | | | | | | | Total |
|-------------------------|-------------------|-------------------------|---------|---------|---------|---------|---------|-------------|------------------|-------|
| | | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 | Phase 6 | All Dandora | of Komarock Road | Total |
| Assault | Count | 9 | 6 | 25 | 41 | 26 | 6 | 7 | 2 | 90 |
| | per cent of Total | 8.4 | 5.6 | 23.4 | 38.3 | 24.3 | 5.6 | 6.5 | 1.9 | 84.1 |
| Burglary | Count | 10 | 7 | 26 | 38 | 28 | 5 | 7 | 2 | 90 |
| | per cent of Total | 9.3 | 6.5 | 24.3 | 35.5 | 26.2 | 4.7 | 6.5 | 1.9 | 84.1 |
| Robbery | Count | 12 | 7 | 31 | 46 | 29 | 6 | 6 | 2 | 96 |
| | per cent of Total | 11.2 | 6.5 | 29.0 | 43.0 | 27.1 | 5.6 | 5.6 | 1.9 | 89.7 |
| Car jacking | Count | 8 | 5 | 23 | 36 | 25 | 4 | 6 | 2 | 82 |
| | per cent of Total | 7.5 | 4.7 | 21.5 | 33.6 | 23.4 | 3.7 | 5.6 | 1.9 | 76.6 |
| Rape | Count | 9 | 4 | 24 | 36 | 23 | 3 | 6 | 2 | 80 |
| | per cent of Total | 8.4 | 3.7 | 22.4 | 33.6 | 21.5 | 2.8 | 5.6 | 1.9 | 74.8 |
| Kidnapping | Count | 5 | 4 | 13 | 29 | 13 | 1 | 6 | 2 | 58 |
| | per cent of Total | 4.7 | 3.7 | 12.1 | 27.1 | 12.1 | 0.9 | 5.6 | 1.9 | 54.2 |
| Extortion | Count | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| | per cent of Total | 0 | 0.0 | 0.9 | 0.0 | 0.9 | 0.0 | 0.0 | 0.0 | 1.9 |
| Total | Count | 15 | 8 | 34 | 52 | 32 | 6 | 8 | 2 | 157 |
| | per cent of Total | 9.6 | 5.1 | 21.6 | 33.1 | 20.4 | 3.8 | 5.1 | 1.3 | 100 |

Source: Field Survey, 2009

6.3.2 Crime Response and Coping Mechanisms

Crime response and coping mechanisms were identified as; reporting to the police/community support centre as reported by (30.2 per cent) of the respondents, going home early (19.8per cent), avoiding danger spots (12.4 per cent), community policing (9.9 per cent), walking in trusted company at late hours (7.9 per cent), hiring watchmen (7.4 per cent), having gates and closing of gates early (5 per cent) and finally mob justice (3.7 per cent). A closer look of the crime response shows that (79.5 per cent) of the mechanisms are individual oriented which confirms World Bank (2010) report which found that crime coping mechanisms in many urban areas tend to be individual rather than collective.

According to World Bank (2010) coping mechanisms may range from individual strategies, such as changing one's work or study routine to avoid victimization, to collective strategies that involve formal institutions such as community-based policing, to reliance on traditional or alternative dispute fora. Some coping mechanisms such as forming extralegal security groups can be negative and undermine the bases for long-term violence prevention. According to Foster (1995) violent crime tends to work against collective efficacy and erode working trust in urban communities.

The collective strategies adopted in Dandora such as the community policing aim at taking charge of their security communally. In operationalization of this objective, members of community policing partner with other organizations such as YARD, DYMES, Dandora Women Forum, Dandora Uprising, Vision, Wafraha, Faith Based Organizations, Hope Worldwide and Goal International Kenya among others in organizing activities and functions that bring the community together. This provide forum for meeting and knowing one another and give them opportunity to encourage residents on importance of engaging in community activities and spreading the word of peace, which is vital in reducing crime and violence in the area. Members observed that through the support of Ministry of Youth Affairs together with groups such as Dandora Women Forum and Dandora Neighbourhood Volunteer Self Help Group (DANSEG) they have organized several peace forums aimed at preventing and reducing violence and crime in the neighbourhood

A neighbourhood community perception on crime and security issues has been used in research to gauge residents, investors and public confidence. According to Sampson and Wilson (1995) in their discussion of social disorganization, when residents commonly perceive their neighbourhood as crime-ridden, the ability of such neighbourhood to support even commonly held values is diminished. This leads to what Ross et al (2001) refer to as cultural disorganization, which in turn has a direct effect on neighbourhood crime rates. This has potential of leading to cultural adaptations, which normally start with the individual who has a variety of emotional and behavioural strategies for dealing with the disorder and threat of the situation. Merry (1981) noted that the strategies adopted can be one or a combination of the following three; cognitive mapping⁴⁷, defensive withdrawal⁴⁸ and offensive strategies⁴⁹. Some of these behavioural strategies and their genesis may explain why some members of Dandora community at times resort to physical beating of criminals, commonly known as mob justice.

Community policing members noted that mob justice was occasionally meted on hardcore criminals in cases where the community had reported or arrested the criminals several times and the police kept on releasing them. They noted that mob justice was necessitated by some police officers who were reluctant to act after being given information and complaints from the residents. This was also done to scare other criminals but intermittently the criminals also revenge by killing some members of community noted to be key in organizing for mob justice.

The initiative of the Dandora community waters down World Bank (2010) report which notes that, there is a sense that trust both in neighbours and institutions in urban areas has broken down to the extent that taking collective action involves too much risk compared to the perceived potential benefits. This lack of trust seems to be

⁴⁷ Cognitive mapping refers to an individual's identification of some people and places as safe, and others as not.

⁴⁸ Defensive withdrawal refers to the 'retreat into homes fortified by locks, bars and dogs, from which one ventures only in the glare of daylight, armed with guns and accompanied by allies' (Merry, 1981: 167).

⁴⁹ Offensive strategies involve such activities as developing a reputation that prevents attacks. Sometimes simply taking a particular posture may do this, while at other times specific action may be required (Anderson, 1999).

driven, first, by fear of victimization, or of retaliation with further violence if one takes action. The fear of retaliation however was confirmed by the community policing members as a major challenge facing the effectiveness of community policing in the area.

As indicated in Table 27, the priority proposed crime reduction solution in the area is increasing police patrols and presence (51.9 per cent), avoiding risky places (12.3 per cent), erection of gates and fencing of residence courts (8.2 per cent) street lighting (7.3 per cent) and improving of community policing (6.6 per cent). Apart from increasing of police patrols as a proposed solution, most of the proposals still qualify the individualistic orientation discussed above as only (6.6 per cent) see collective response in the name of community policing as a viable mechanism of reducing crime. The range of solutions listed covers the multiplicity of strategies propagated by the multi-contextual framework.

Table 27: Crime Reduction Solutions

| Suggested Solutions | Responses | |
|--|------------------|-----------------|
| | N | Per cent |
| Increased police patrols and presence | 164 | 51.9 |
| Being careful to avoid risky places | 39 | 12.3 |
| Installation of gates and fencing out of courts and burglar-proof doors. | 26 | 8.2 |
| Street lighting | 23 | 7.3 |
| Improve community policing | 21 | 6.6 |
| Demolition of kiosks on road reserves/shanties on riparian areas | 12 | 3.8 |
| Banning bars in residential areas. | 10 | 3.2 |
| Relocation of the dumping site | 9 | 2.8 |
| Provision of employment opportunities to the youth | 7 | 2.2 |
| Campaigns to change people's attitudes against involvement in crimes | 5 | 1.6 |
| Total | 316 | 100 |

Source: Field Survey, 2009

The type of Community policing existing in Dandora is not fully developed in the strict sense of a formal policing group discussed in the literature review section. Their structures and mode of operation do not adhere completely to what is stipulated in the policing guidelines. However, they play an important role in collaborating with police in order to share information on criminals and criminal activities in the area.

Households and businesses were found to have developed various strategies of keeping crime at bay. The most notable ones were: installation of burglar-proof doors

and windows (30.3 per cent) for households and (14.1 per cent) for enterprises, getting into the house before night falls (24.7 per cent) and (19 per cent) for enterprises, hiring security guards/watchmen (11.6 per cent) for households and (27.5 per cent) for enterprises, community policing (9.1 per cent) and (8.5 per cent) for households and businesses respectively and installation of security lights (7.6 per cent) for households and (4.9 per cent) for businesses. From the range of strategies listed in table 28, it is clear that the strategies range from physical alteration, institutional dynamics and behavioural change which are a combination of both the social, technological adoption and environmental alteration. This is in response to the complexity of causes of crime which is complex and varied as the preventive measures adopted.

Table 28: Comparative Crime Prevention Strategies

| Strategies | Residents percentage | Business Persons percentage |
|--|-----------------------------|------------------------------------|
| Installation of burglar-proof doors/windows/locks | 30.3 | 14.1 |
| Getting into the house before darkness | 24.7 | 19.0 |
| Hiring of /contributing to neighbourhood kitty for hiring watchmen | 11.6 | 27.5 |
| Community policing | 9.1 | 8.5 |
| Installation of security lights | 7.6 | 4.9 |
| Reporting of criminals to the police | 3.5 | 8.5 |
| Not admitting strangers into the house/court | 3.5 | 9.2 |
| Volunteering to the neighbourhood watch team | 3 | 1.4 |
| Participating in mob justice | 1 | 0.7 |
| Nothing | 0 | 1.4 |
| Frequent Banking with Mpesa | 0 | 3.5 |
| Total | 100.0 | 100.0 |

Source: Field Survey, 2009

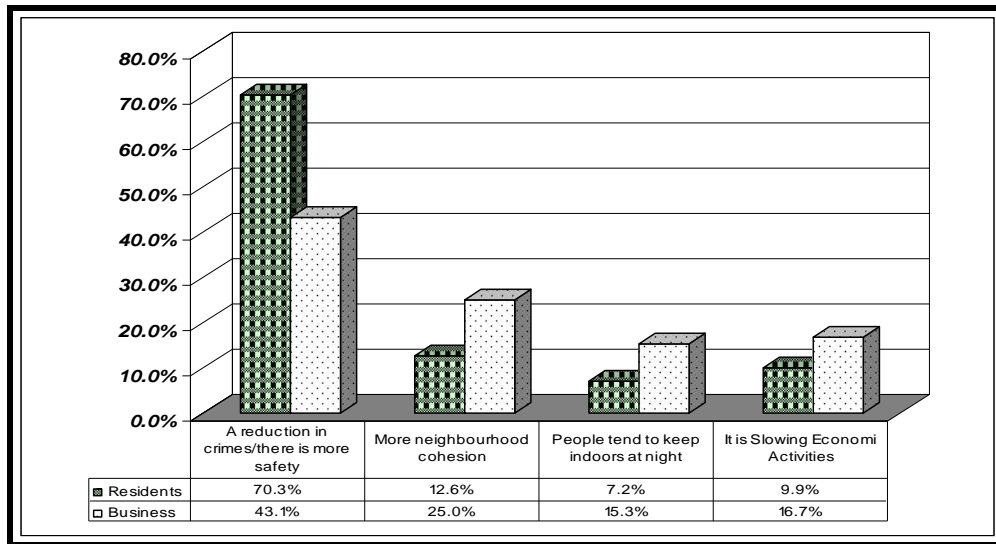
The list of crime prevention strategies shown in (Table 28) range from mechanical such as using of burglar proof, community crime prevention, environmental prevention such as installation of security lights and non-admissal of strangers into the court. Burglar proofing is a popular crime prevention and deterrent in urban areas as shown by findings (30.3 per cent) of residents and (14.1 per cent) of business persons. Significant percentage of business persons (19 per cent) and residents (24.7 per cent) prefer getting back to the house before darkness to avoid being crime target. This is supported by Stravou (2002) who noted that (72 per cent) of Nairobi residents avoid travelling and working after dark for fear of crime victimization.

There is no significant difference between strategies employed by households and enterprises, but observation can be made on the high value given to watchmen by enterprises as compared to households, which supports KIPPRA (2004) study which found that Nairobi businesses invest between 10-25 per cent of their proceeds on security and most of them hire security personnel to watch over their premises at all times.

The main concern with the prevention mechanisms is on whether they are sustainable. The other concern as noted by Jacobs (1961) and Newman (1972) is the ability of these strategies to enhance natural surveillance and “territoriality” of the neighbourhood. The scattering and coordination of crime prevention activities in the area may dilute the effectiveness of crime prevention mechanisms in the area. Despite being multiple or it may have succumbed to what Stravou (2002) described as social ‘paralysis’ with reference to the extent at which high levels of crime have come to be accepted as a way of life by Nairobi residents. Stravou (2002) noted that this limits the society’s ability to participate in crime reduction initiatives.

As shown in Figure 16, the crime prevention strategies by residents and enterprises were found to be transforming the estate in the following manner: Reduction in crime (70.3 per cent) and (43.1 per cent) for residents and enterprises respectively, bringing neighbours closer to one another regardless of tribe and other status (12.6 per cent) and (25 per cent) for residents and enterprises, slowing of economic activities, since most residents cannot afford to conduct their businesses till late (9.9 per cent) for residents and (16.7 per cent) for enterprises and keeping people indoors at night (7.2 per cent) for residents and (15.3 per cent) for businesses, which was highly welcome by parents who were worried of the security of their adolescent sons and daughters.

Figure 16: How Crime Prevention is Transforming Dandora



Source: Field Survey, 2009

Majority of the residents (87.2 per cent) felt that the strategies they have developed were working well and sustainable. From Table 29, the explanations given for sustainability of the strategies are: crime has reduced in the neighbourhood (69.4 per cent), community members willingness to contribute to neighbourhood security kitty (10.2 per cent), avoiding crime prone spots (8.2 per cent), limiting of strangers movement by manning gates by security personnel and also fear of mob justice by potential criminals each accounting for (6.1 per cent).

Table 29: Adequateness of Households Crime Prevention

| Crime Prevention adequateness | Responses | |
|---|-----------|------------|
| | N | Per cent |
| Crime is reduced in the neighbourhood | 68 | 69.4 |
| The community members contribute willingly to neighbourhood security kitty and patrol | 10 | 10.2 |
| Criminal black spots are avoided at the dangerous times | 8 | 8.2 |
| Criminals are killed/fear to commit crime in fear of being killed | 6 | 6.1 |
| The security personnel and gates limit people's movement at night/ensure security | 6 | 6.1 |
| Total | 98 | 100 |

Source: Field Survey, 2009

The positive achievement is the creation of a prevention culture as shown by 10.2 per cent of community members' contribution towards neighbourhood security kitty. This has been noted as a positive feature of attitudinal change in crime prevention which can be built on to inculcate proper and responsible crime prevention in the neighbourhood by encouraging more residents to take proactive role in crime prevention which is likely to help in addressing social 'paralysis' associated with Nairobi residents, where crime is seen as a normal part of life.

Majority of the residents (70.3 per cent) note that the strategies adopted to address crime in the neighbourhood seems to be working well, hence successful. A sizeable portion (43.1 per cent) of the business persons reported to have experienced crime reduction. One inconsistency to note in crime prevention in Dandora is the argument by the community policing members that some of the strategies such as hiring of security guards who are stationed strategically at the neighbourhood gates to ensure that they block suspicious characters from accessing the estate and also monitor movements within the neighbourhood generate a lot of effort and interest among criminals.

Their experience shows that there is more curiosity and interest to attack the protected areas than open areas, since the potential victims seem to be supported by the situational crime prevention logic that concerns itself with reducing crime incidence opportunities, but unfortunately in this case, the motivation to commit crime by criminals remain unattended. The argument complicates the explanation given by the rationale choice with regard to effort of offender in relation to criminal act, since what is protected is considered by criminals to be valuable and hence worth of taking a risk.

Several solutions were proposed by the residents, as shown in Table 30. The leading were; engaging youth in income generating opportunities (16.1 per cent), construction of a police station (15.5per cent), encouraging community policing (14.2 per cent) provision of street lighting and increase frequency of police patrols each accounting for (13.9 per cent). The leading solutions are mainly geared towards containing crime. The residents and enterprises proposed solutions are supported by the community policing members and old residents who have encouraged the leaders and various organizations to support the youth groups by giving them training and capital

to start some income generating activities. This has led to formation of groups such as DYMES which collects waste in the area, YARD which has car washing business. These interventions are informed by their assessment that most criminals are youthful and in most cases they are not in employment, hence end up being criminals.

Table 30: Proposed Solutions to Reduce Insecurity in Dandora

| Solutions | Responses | |
|--|------------------|-----------------|
| | N | Per cent |
| Provide employment/income generating opportunities for the youth | 50 | 16.1 |
| Construct a police station/more police posts | 48 | 15.5 |
| Encourage community policing | 44 | 14.2 |
| Increase frequency of police patrols | 43 | 13.9 |
| Provision of street/estate lighting | 43 | 13.9 |
| Counselling of the youth | 15 | 4.8 |
| Initiate proper land use planning | 12 | 3.9 |
| Construction of gates into the courts, burglar-proof doors and metal-grill windows | 11 | 3.5 |
| Relocate the dumping site | 10 | 3.2 |
| Employment of watchmen | 10 | 3.2 |
| Constructing more recreational areas | 7 | 2.3 |
| Creation of Phase-based security committees | 5 | 1.6 |
| Arresting all law-breakers | 4 | 1.3 |
| Conducting a crackdown on all illegal/outlawed groups like Mungiki | 3 | 1.0 |
| Encourage ethnic cohesion/nationalism | 3 | 1.0 |
| Individual carefulness in avoiding unsafe areas | 2 | 0.6 |
| Total | 310 | 100 |

Source: Field Survey, 2009

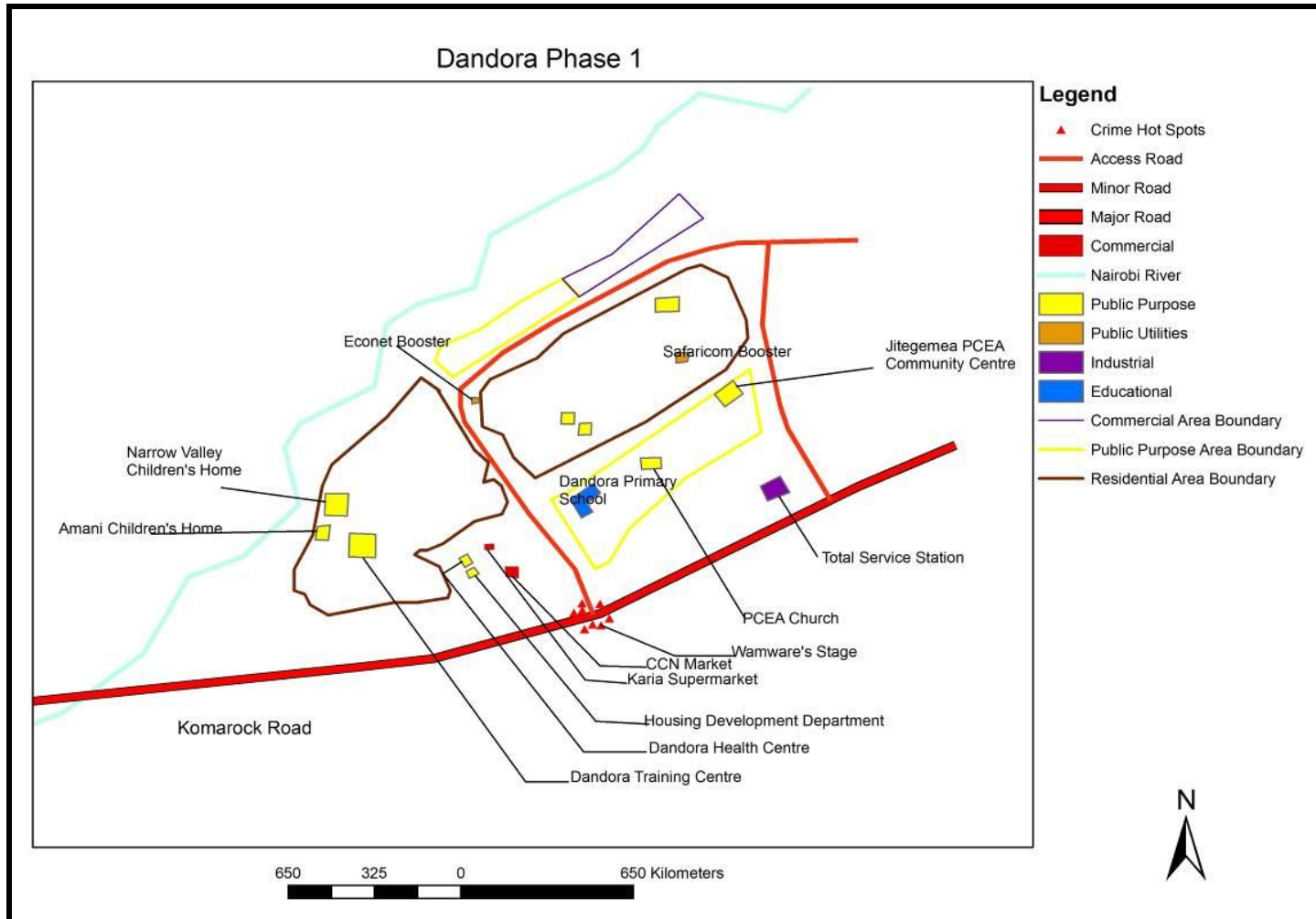
CHAPTER SEVEN: INTERACTION BETWEEN LAND USE TRANSFORMATION AND CRIME IN DANDORA

This chapter discusses aspects of land use and transformations of land use that explain crime incidences and response to the same. This was done by profiling the location where crimes occur by highlighting the characteristics of the identified crime places in relation to land uses. This is deemed useful in understanding the context of crime incidences and response. Variations in land use, like variations in housing types and density, are part of the fundamental fabric of neighbourhoods (Brower, 1996). They shape the quality of life for residents and contribute to local reputations, housing market values (Miller, 1981), and of course, local crime rates (McCord *et al*, 2007).

7.1.1 Land Use and Crime Mapping in Dandora Phase One

As shown in Map 25, crime in Dandora phase one was concentrated mainly around Wamware's bus terminal which is adjacent to Komarock road, the main highway connecting Dandora with other neighbourhoods such as Kariobangi, Komarock and Kayole.

Map 25: Mapping of Crime in Dandora Phase One



Source: Field Survey, 2009

According to the community policing members and Officer Commanding Kinyago Police post⁵⁰, the type of commonly committed crime in the area are; pick-pocketing especially during rush hour when there is congestion at the stage, mugging and assault especially at night and wee hours in the morning and also when the traffic flow is low. It was further observed that the place look safe for most unsuspecting victims, since it is just adjacent to Komarock road which is always busy with vehicular traffic throughout, with a number of high-rise buildings with many occupants. Many victims are children and women who either wake up early to board public means to school or work or coming back late in the evening from school or work.

Experience of Dandora phase one is not unique and previous studies have raised similar concerns Ligget *et al* (2001), noted that a limited number of city bus stops tend to attract excessive amount of crime incidences. According to Pearlstein and Wachs (1982) a disproportionate number of crime occur during the rush hours of late afternoon and early evening, yet the serious crimes take place mostly at night, when there is little pedestrian presence at the bus stop. Other studies have also shown that women, children, the elderly, and the physically handicapped are typically found to be the most fearful of bus stops (Wekerle and Whitzman, 1995; Patterson and Ralston, 1983).

In analyzing further the land use-crime connections in Dandora phase one. It is important to bring in the argument of Jacobs, (1971); Brantingham and Brantingham, (2004) in analyzing the association of crime with automobiles which lead to detachment as opposed to pedestrian whose walking enhances security even without knowing which is likely to change the routine activity of the would-be offender. With regard to high-rise development around Wamware stage in Phase one, it can be noted that Jacobs argument of natural surveillance would hold and make the place safe, but that is not the case and subsequent phases, correcting misconception of simply basing safety solely on high density and eyes on the street. Perhaps issues dealing with building designs and orientations may have more impact than relying only on high density equal to natural surveillance logic.

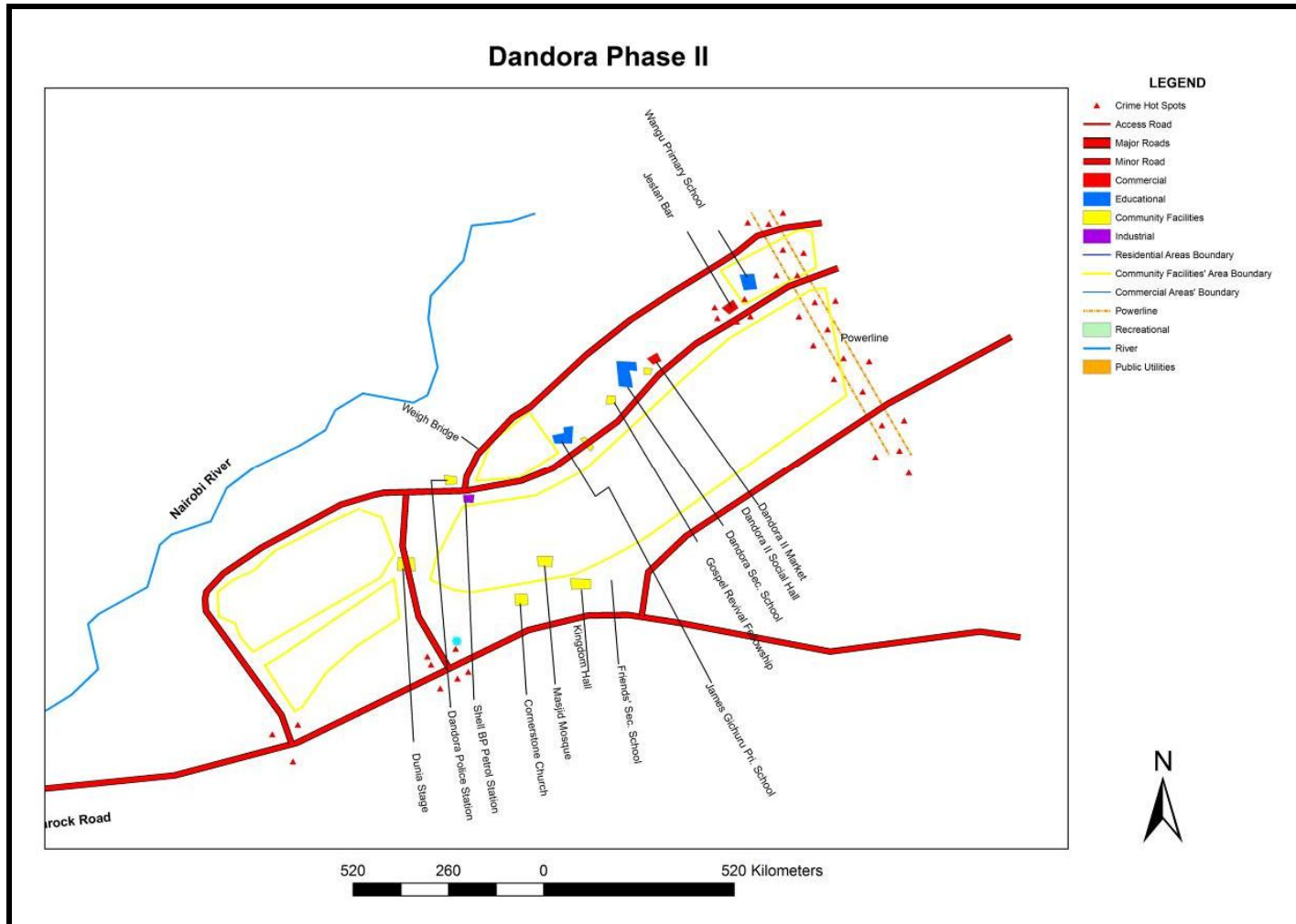
⁵⁰ Samson Ogero interviewed on 26th of March 2009 at Kinyago Police Post in Dandora

7.1.2 Land Use and Crime Mapping in Dandora Phase Two

Map 26 shows that crime in phase two is concentrated under the power way leaves running through Phase Two past the dumpsite, near junction bar and along the major streets including part of phase two area bordering the dumpsite. The crime in this phase was mainly attributed by the Police and the Council Officer to proximity to dumpsite which is an easy escape route to criminals since it is porous and is not fully fenced. This is despite the main dumpsite gate being close to Kinyago police station. Scavengers⁵¹ in the dumpsite were reported to be accomplice to the criminals. For the power line area it is because it is deserted most of the time and a few illegal structures built under the power way-leave at times are used by criminals as hideouts. The types of crime common in the places mapped are; assault, mugging and rape especially in the deserted area under the power way leave which is bushy and unkempt.

⁵¹ Term used to refer to those collecting waste for recycling and trading at the dumpsite

Map 26: Mapping of Crime in Dandora Phase Two



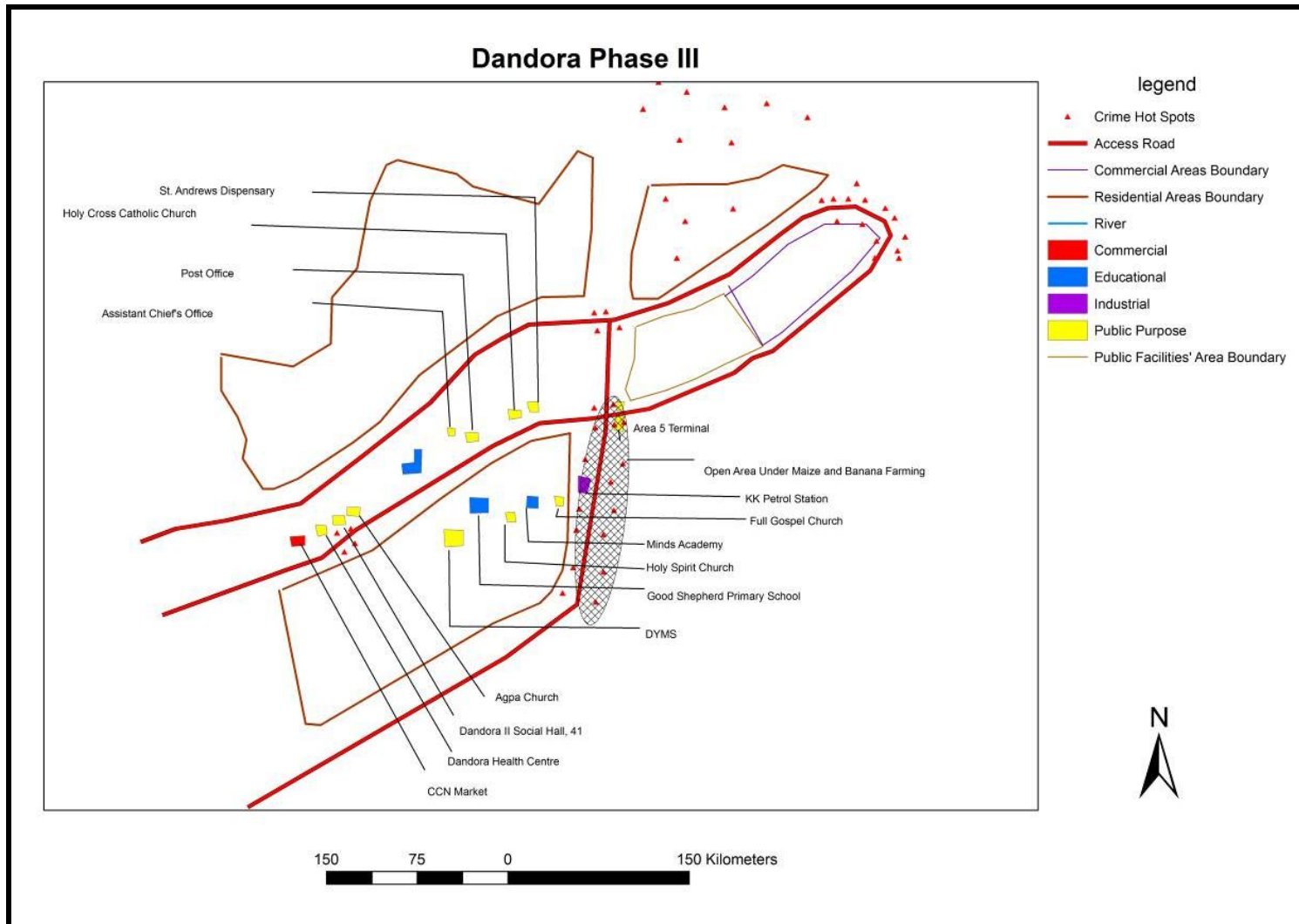
Source: Field Survey, 2009

One similarity of Phase Two to Phase one, is clustering of crime along the main streets, road reserves which ideally should be public spaces which are known to generate movement throughout despite some studies assuring safety in such areas. Browning et al (2005) Pointed out that regardless of who is on the street, residents and business owners take an interest in active streets, with increased monitoring as a by-product.

7.1.3 Land Use and Crime Mapping in Dandora Phase Three

Incidences of crime were rampant in vacant plots, railway line way-leaves which were found to be bushy and unkempt. The area bordering Area 5 bus terminal was mapped as a crime hotspot. The type of crime mostly reported in phase three were revealed to be assault and rape. Robbery was also observed to be rampant in residential and commercial premises bordering these spots. A number of buildings in Phase three ignored building lines and were built very closely contributing to darkening of alleys and mid-block passages.

Map 27: Mapping of Crime in Dandora Phase Three



Source: Field Survey, 2009

The reason for crime patterns in Dandora Phase 3 are not very different from phase one and two, apart from the fact that land uses surrounding the hotspots are also targets of robbery. Felson (2008) in analysis of travel habits of offenders noted that offenders are equally unlikely to travel far from their area of normal or criminal operations to fulfil their criminal purposes. He further clarified that offenders travel decisions are contingent on the awareness of opportunities that are developed through regular, non-criminal behaviour. In distance decay sense, the shorter the distance the higher the likelihood of offender committing crime.

In relation to dark alleys, and corroborating Felson (2008) idea that crime is high where there are avenues for escape, Phase Three land use design is a potential contributor to crime, by designing unknowingly these “crime escape highways”, by denying good visibility and clear sightlines that allow people to see and be seen.

7.1.4 Land Use and Crime Mapping in Dandora Phase Four and Five

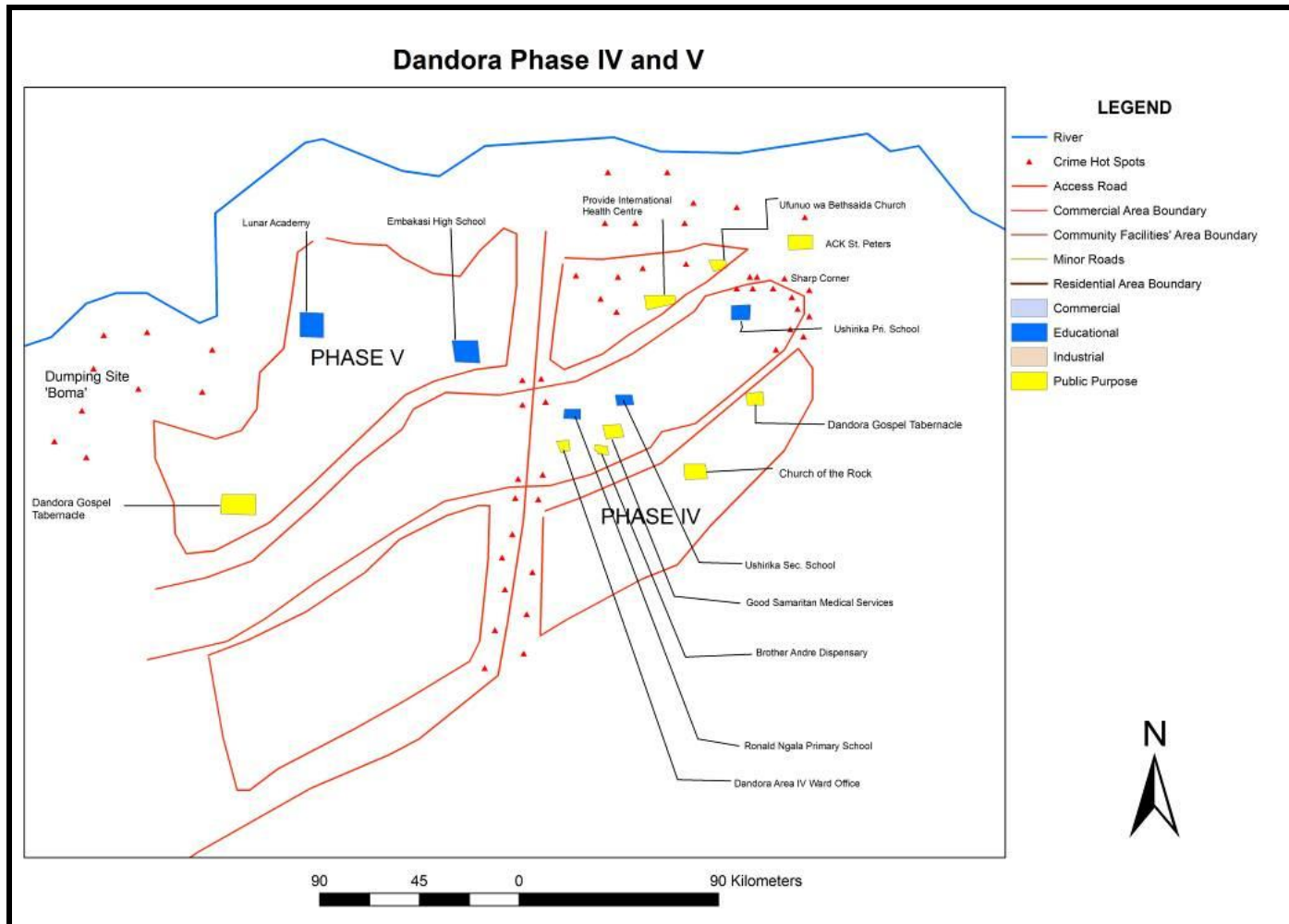
Crime in Phase Four was found to be concentrated near dumpsite as shown in plate 26. For phase four areas around Sharp Corner, railway line and Mworoto area were found to be prone to crime. Another unique feature related to crime as noted by police and community police members is the high number of incomplete and vacant buildings which they noted to be hideouts for criminals. The crimes committed in these phases include assault and robbery. The police also noted few cases of rape especially in the incomplete buildings, but this should be managed once construction of phase five is complete.

Plate 26: Crime Ridden Area of Phase Four near Dandora Dumpsite



Considering crime in Phase Four and Five, It tended to be concentrated at the dumpsite, which in most cases is deserted by the general public. The common factor of vacant buildings were discussed earlier in relation to their role as crime-refuge area and their role as physical variables which create spaces that are conducive as hiding places for offenders. This consequently increase the perception of risk of victimization and fear of the same all the time.

Map 28: Mapping of Crime in Dandora Phase Four and Five



Source: Field Survey, 2009

In comparison, all the five phases experience almost the same type of crime, although due to the different land use conditions, the intensity of crime committed in some areas is different from each other. For instance Dandora has more than ten bus stops, but only two of them namely Wamware located in phase One and Area Five were associated with criminal incidences. Their siting and distance from other support activities such as police station and market was noted as a key factor. Dunia bus stop in Phase Two used to experience similar problems but since the siting of Kinyago police station and Petrol station next to it, the crime problem got solved.

Analysis also point at the possibility of generation of negative environmental attributes in abundance. This contributes to a general lack of defensible space elements as noted by Newman (1972) in reference to ignoring of building lines in Phase Three. This is further supported by Saville (1996) by linking land use transformation and high density development with the tipping point of neighbourhoods. This assists in explaining the possible linkage of environmental design of spaces to social capital to qualify the multi-contextual notion of different land use and how transformation tends to shape nature and occurrence of crime.

7.2: Land Use- Crime Dynamics

Key informant interview with three Kenya police officers pointed to a possible relationship between land use and crime type, and this also tended to differ with time. As shown in Table 31; in low residential areas theft by servants was high at daytime and robbery at night though this was rare since most of the houses are guarded and also have alarm systems. In high density residential areas waylaying was common during daytime and robbery, breakings and muggings at night. In most transportation nodes, petty theft such as snatching of mobile phones and pick pocketing were common during daytime but at night carjacking, assault and robbery with violence were common.

Table 31: Perceptions on Land Use and Crime⁵²

| Land Use | Crime Type | |
|--|---|---|
| | Daytime | At Night |
| Residential- Low density e.g. Runda, Karen etc | <i>Theft by servants</i> | <i>Robbery (rare)</i> |
| Residential- High density e.g. Kayole, Dandora etc | <i>Waylaying, offences against persons</i> | <i>Robbery, breakings, mugging</i> |
| Industrial | <i>Muggings-Hovering/roaming robbers from adjacent residences</i> | <i>Muggings</i> |
| Educational e.g. Schools, colleges | <i>Corruption, Economic crimes, Violent Crime Not Common</i> | <i>Breakings, Theft by servants e.g. Watchmen</i> |
| Recreational e.g. Uhuru Park, National Park | <i>Muggings, Offences targeting tourists</i> | <i>Rape, Assault</i> |
| Public Purpose e.g. Churches, Social halls | <i>Theft of vehicle parts in the parking</i> | <i>Breakings</i> |
| Commercial | <i>Stealing, Theft by servants</i> | <i>Theft by servants</i> |
| Public Utilities e.g. dump site, road reserves | <i>Muggings</i> | <i>Rape</i> |
| Transportation e.g. bus stop, roads | <i>Petty theft, pick pocketing</i> | <i>Assault, robbery with violence, carjacking</i> |
| Undeveloped/Deferred-Open spaces | <i>Waylaying, assault and rape</i> | <i>Rape (offences against morality)</i> |
| Mixed Use e.g. Shop and Residential | | <i>Public nuisance</i> |

Issues of crime propensity and time have elicited a lot of debate; Osgood *et al* (1996) noted that variation in crime is more a function of differing opportunities for crime across situations than of differing individual propensities for criminal involvement. Individuals who spend more time in situations that reward crime will have higher rates of crime. This may be important in explaining the ecology of crime as summarized in Table 31.

Police have learned from experience that there are particular environments where concentration of crimes is larger-than-expected. Sometimes these hot spot areas are defined by particular activities (e.g., burglary), other times by specific concentrations of land uses such as bus station, and sometimes by interactions between activities and land uses, such as shoplifting in commercial areas or pick-pocketing in bus or bus stop (Ahmadi, 2003).

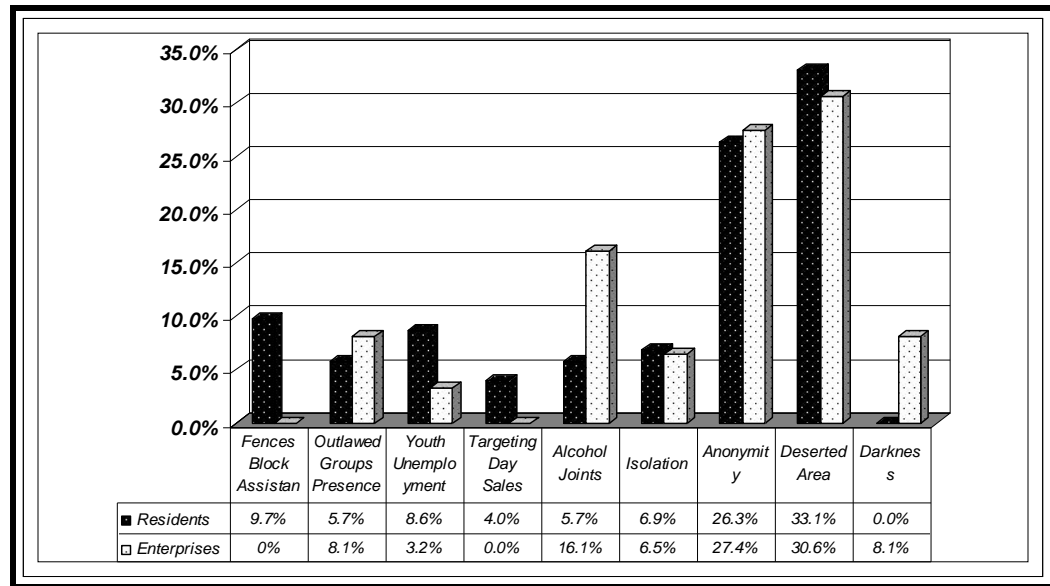
⁵² Based on the interviews with the Nairobi PPO, Buruburu OCPD and Dandora OCPP on 27th of May 2009, 25th of March 2009 and 26th of March 2009 respectively

These findings indicate that there are some manifestations of crime incidences attributed to land use and land use transformation. In appreciating the crime mapping, incident time and land use it is evident from the police crime profiling that most violent crimes are at night, in high density areas, industrial areas, recreational facilities, public facilities and undeveloped land. With regard to time, most land uses in Nairobi such as high-density, parks, dump sites and undeveloped land negates well-lit principle, creating pockets of darkness at night which restrict visual control of space and rationalized favourably by offenders as explained by Cornish and Clarke (1986) in their rational choice theory. Land use seems to generate situational factors that vary by time of the day which is important for explaining variation in crime. The influence of these situational factors also varies by crime type.

In relating land use and crime in Dandora, majority of the respondents (59 per cent) said that there are certain types of crime that are attributable to land use changes in the area. Crimes attributable to land use change in the area were listed by households as robbery (36.9 per cent), burglary (23.4 per cent) and assault (9 per cent). Others were land grabbing (7.2 per cent), extortion (6.3 per cent) and car jacking (4.5 per cent). The enterprises listed robbery slightly higher at (37.9 per cent), burglary (18.4 per cent) and assault (17.2 per cent). Others are land grabbing (8.0 per cent), extortion (3.4 per cent) and car jacking (6.9 per cent).

Figure 17 shows that the reasons for having crime in certain land uses such as agriculture or deferred land is because they are in most cases deserted, which makes it hard to detect any crime (33.1 per cent) for residents and (30.6 per cent) for business persons, congestion in high density areas aid criminals to get away without being detected (26.3 per cent) and (27.4 per cent) for households and enterprises respectively. Fences especially in low density areas prevent neighbours to respond efficiently to ones distress call (9.7 per cent), idleness of unemployed youth wreck havoc to most unsuspecting people in different land uses (8.6 per cent) for residents and (3.2 per cent) for enterprises.

Figure 17: Reasons for Crime in Different Land Uses



Source: Field Survey, 2009

Other reasons by households are that most people keeping to themselves within low density residents makes them prone to crime since they cannot differentiate between criminals and residents (6.9 per cent). In transportation sector, extortion was high and this was attributed to presence of outlawed sects manning most terminuses (5.7 per cent). Another cause of crime was proliferation of bars and illegal alcohol brew dens which was perceived to act as criminal hideouts (5.7 per cent). Crime in business areas was that it was easy to get cash from the business person’s day’s earnings (4.0 per cent).

Most of the reasons given for crime with regard to land use support previous findings, for example Chamlin and Sanders (2008) noted that undeveloped land are crime-ridden because they are usually covered with overgrown and unkempt vegetation and therefore, they become physical barriers that create spaces that may be used by offenders as hiding place. As qualified by Government of Chile (2003) given that community does not make active use of these areas, their illumination is often quite poor, increasing the perception of risk and fear all the time.

High residential density development and crime incidences explanation also confirms the anonymity and weakening of social cohesion associated with social disorganization theory. Fences as a contributing factor has also been confirmed by

Mazza and Acierno (2009) who note that neighbourhood characteristics such as fencing can create many opportunities to hide if they are designed without any opportunities for surveillance from the facilities they serve, making them good locations for theft or assault. Newman (1972) with regard to fencing, was keen on the material used and design, he maintained that the material used and design should enable a clear sightlines that allow people to see and be seen.

Robbery and mugging in high density areas as shown in Table 32 can also be linked to what Saville (1996) associated with neighbourhood tipping point and threshold of activities pointed out as a key driver of crime in neighbourhoods. The explanation given is that a neighbourhood has a limit in terms of the density of development and number of activities it can sustain, beyond which the neighbourhood will be susceptible to crime, the findings show that Dandora may have surpassed this threshold. This finding however counters the natural surveillance and eye on the street philosophy associated with high density and its ability to generate continuous traffic as noted by Jacobs.

Table 32, confirms perceptions on crime related to land use, especially the link between robbery and high density development and rape and deferred land and extortion linkage with transportation oriented businesses.

Table 32: Households Perceptions of Land Use in Relation to Crime Type

| Land Use | Crime Type (per cent) | | | | | | | | | Total |
|--------------------------|-----------------------|----------|---------|------------|------|-----------|----------|---------------------|--------|-------|
| | Assault | Burglary | Robbery | Carjacking | Rape | Extortion | No Crime | Drug Peddling/Abuse | Others | |
| Low-Density Residential | 23.8 | 23.8 | 31.3 | 7.5 | 5 | 1.3 | 1.3 | 2.2 | 3.8 | 100 |
| High-Density Residential | 11 | 24.2 | 51.6 | 1.1 | 2.2 | | | 6.3 | 3.6 | 100 |
| Industrial | 4.1 | 6.1 | 36.7 | 10.2 | 6.1 | 2 | 14.3 | 2 | 18.4 | 100 |
| Educational | 10 | 2 | 10 | | 6 | 2 | 12 | 46 | 12 | 100 |
| Recreational | 17 | | 10.6 | | 17 | | 17 | 23.4 | 15 | 100 |
| Public Purpose | 4.1 | 10.2 | 26.6 | | 4.1 | 2 | 14.3 | | 38.7 | 100 |
| Commercial | 3.1 | 3.4 | 44.6 | 1.5 | 1.5 | 9.2 | 6.2 | 7.7 | 22.8 | 100 |
| Public Utilities | 15.4 | 4.6 | 26.2 | 3.1 | 1.5 | 3.1 | 12.3 | 3.1 | 30.7 | 100 |
| Transportation | 7.4 | 1.5 | 29.4 | 10.3 | 1.5 | 14.7 | | 2.9 | 32.3 | 100 |
| Undeveloped/Deferred | 9.8 | | 15.7 | | 11.8 | 7.8 | 11.8 | 2 | 41.1 | 100 |
| Agriculture | 5.4 | | 13.5 | | 24.3 | 5.4 | 16.2 | 2.7 | 32.5 | 100 |

Source: Field Survey, 2009

Table 32 summarizes the crime type by land use. Robbery was found to be the most common crime in various land uses, it was found to exist in all land uses, but it was noted to be more serious in the following land uses; high-density residential (51.6 per cent) and commercial entities (44.6 per cent). Drug abuse and peddling was found to be common in educational facilities (46 per cent) and

recreational facilities (23.4 per cent). Drug abuse has a high probability of leading to committing of serious crime. In undeveloped land the major crime noted was land grabbing (31.4 per cent) but in terms of real crime happening in that given space robbery (15.7 per cent), especially mugging was seen as the leading type of crime. Agricultural land was associated with rape cases (24.3 per cent). It was also found that there were no worries of crime in industrial and public purpose uses (14.3 per cent) each respectively, in public utilities (12.3 per cent) and undeveloped land (11.8 per cent).

The study findings show that incidences of robbery were high in high density residential and commercial land uses which draws a contrasting interpretation in relation to the tenets of what Jacobs (1961) labelled “orthodox planning theory,” where she offered an optimistic assessment of the traditional urban street and its diverse uses. In her view, densely populated, mixed use neighbourhoods draw pedestrians onto the street. She assumed that neighbourhoods with high residential density and diverse, evenly distributed commerce will tend to draw foot traffic across a large proportion of neighbourhood streets.

7.2.1 Land Use Transformation and Crime Reduction

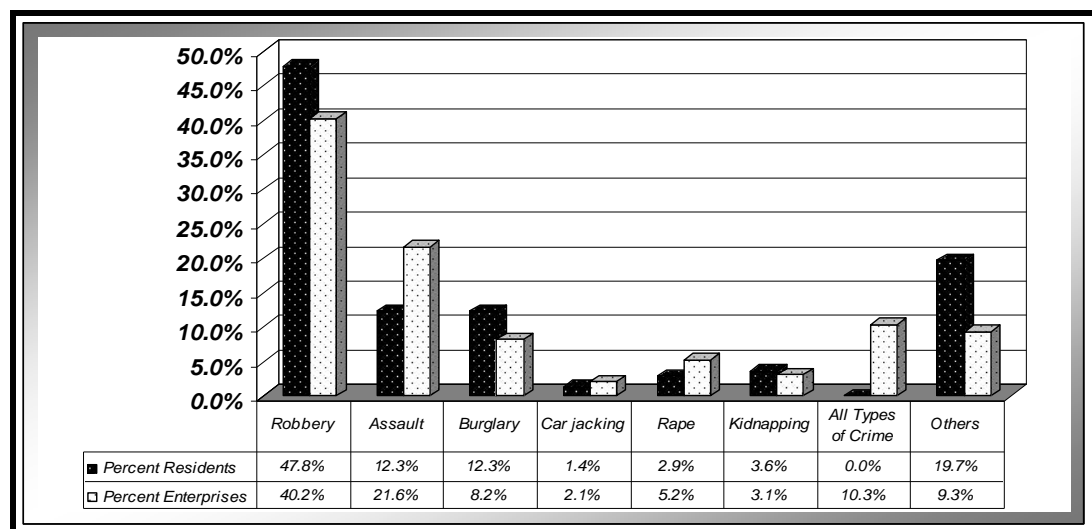
Land use and transformation shape quality of life for residents and contribute to local reputation and local crime rates (Miller, 1981; Taylor and Gottfredson, 1986). This means that changes of land use transformation can deliberately be used in reduction of crime. The study findings support this argument as shown by majority (75.2 per cent) of households and (70.5 per cent) of business persons. The description of land transformations which could lead to reduction in crime in the area are: provision of more communal spaces to enhance interaction of all community members (22.1 per cent), building of a police station (19.5 per cent), demolition of illegal structures on open spaces and reserves which will help in widening of alleys (15 per cent), conversion of most bars into residential areas (10.6 per cent), fencing of the dumping site to contain movements of criminals who hide their after committing crime (4.4 per cent).

There is also a growing fracture between user and urban land use siting and designing which is normally missed out when analysing land use and crime incidence

relationship. According to Mazza and Acierno (2009), this fracture is becoming a barrier in the new urban landscape, resulting in accelerated social decline especially in popular residential estates which by themselves are unable to produce new processes of renewal. In relating land use to crime incidences, and reduction as noted that many land uses are sited or designed without any opportunities for surveillance from facilities they serve. This explains most of the land uses and transformations of the same in Dandora which are not in response to crime *per se* but in response to housing demand and high returns accruing from such houses.

Figure 18 shows that households noted robbery (47.8 per cent) as the leading type of crime which can be reduced by altering land use. Others are assault and burglary (12.3 per cent) each respectively. Business persons also noted robbery (40.2 per cent) followed by assault (21.6 per cent) as types of crime which are amenable to land use transformation. The transformations were perceived to reduce crime because of the following attributes; they decrease number of criminal hiding places or dens (26.7 per cent), likelihood of increasing police visibility (23.8 per cent). Engagement of more youths in recreational activities (23.8 per cent) and fencing (6.9 per cent) has deterring effect (6.9 per cent). Improved accessibility was noted to have potential of enhancing surveillance of the neighbourhood (6 per cent).

Figure 18: Types of Crime Reducible by Land Use Alterations



Source: Field Survey, 2009

The above findings give credence to arguments by Mazerolle *et al* (1999) who noted that range of land use and patterns of the same across a neighborhood (businesses, single family homes, multi-dwellings) creates more complex rhythms of social activity; and the diversity of people living and working in neighborhoods leads to more complex and diverse patterns of social behavior which has impact on crime incidences.

7.3 Development Control and Crime Mitigation in Dandora

Koti (2000) observed that although the legal framework empowers Local Authorities to control the nature and character of the urban built environment, innumerable central controls imposed by the same legislation undermine local authority to assume this function. The resulting shape of the urban environment is finally largely influenced by this unbalanced relationship.

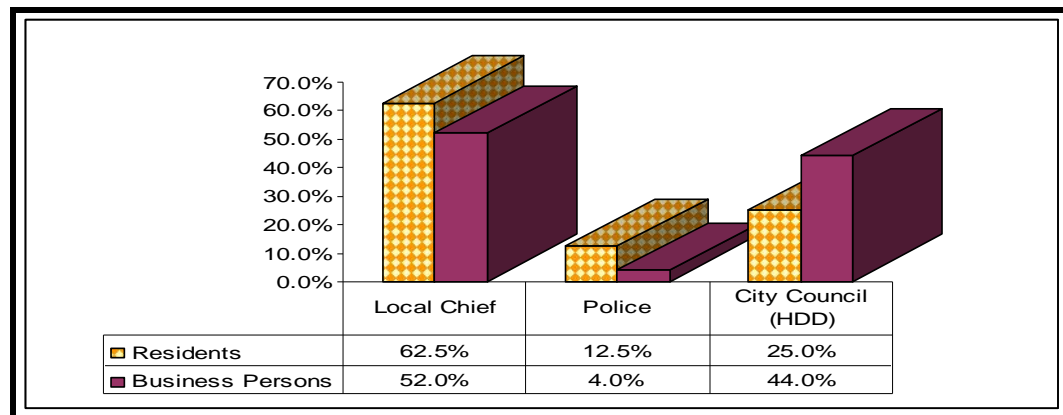
In Kenya, the Physical Planning Act provides for the preparation of land use plans. This is done by the Ministry of Lands through the Director of Physical Planning. It also provides and in concurrence with Local Government Act, that all local authorities ensure implementation of the plan through use of development control. In Dandora, the City County of Nairobi through HDD are mandated to undertake development control by ensuring that all land use development in the area are approved by the Council. Since the year 2000, with the crafting of Environmental Management and Coordination Act of 1999, it is also a requirement that all development applications have to be approved by the National Environmental Management Authority (NEMA). Other specialized land use developments such as health and education must be approved by other relevant Government Ministries and agencies so as to ensure that they operate within the stipulated regulations and standards.

The study found that only (25 per cent) of the residents and (23.7 per cent) of business persons had ever been involved with any form of development in the area. On a positive note it was found that approximately (70 per cent) of residents had sought permission prior to development. As shown in Figure 19, majority (62.5 per cent) of residents as compared to (52 per cent) of business persons had sought permission from the area Chief, another (25 per cent) of residents as compared to (44 per cent) of

business persons from Nairobi City County and (12.5 per cent) of residents as compared to (4 per cent) of business persons from police.

As shown by the findings in Figure 19, the local authority which is mandated to control development is rarely consulted by both business persons and residents during development, but the business persons are slightly more aware of the requirements as compared to residents. This was attributed to their numerous interactions with the council in relation to business licenses and public health issues. This can be explained by the rapid nature of transformation witnessed in the area, especially the mushrooming of kiosks and extensions. Developers seem only to seek permission when coming up with massive development and in most cases it is done as a formality and not as a statutory requirement as they start development before approval as noted by the council officers⁵³.

Figure 19: Sources of Development Permission in Dandora



Source: Field Survey, 2009

The City County and Housing Development Department Officers observed that many developers consider their investment negligible and thus do not see the need of applying for development permission. Once they have built what they consider simple structures, they develop solid structures incrementally and this is the point where they seek development permission to protect their investments through regularization which is not allowed by the Acts governing development.

The Physical Planning Act Cap 286 Fourth Schedule on development application states that: any person requiring development permission shall make an application in

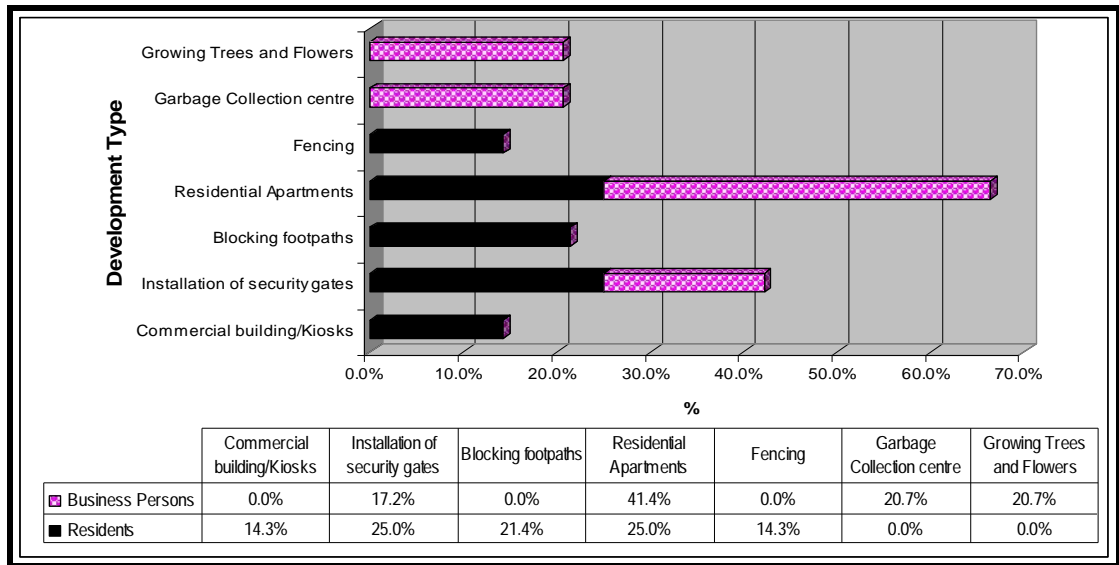
⁵³ Nairobi City Planning Department on 24th of April 2010

the form prescribed in the Fourth Schedule, to the clerk of the local authority responsible for the area in which the land concerned is situated. The application shall be accompanied by such plans and particulars as are necessary to indicate the purposes of the development, and in particular shall show the proposed use and density, and the land which the applicant is intending to develop. The local authority shall notify the applicant in writing of its decision within thirty days of the decision being made by it and shall specify the conditions, if any, attached to the development permission granted, or in the case of refusal to grant the permission, the grounds for refusal (GoK, 1996). In most cases in Dandora, few developers follow the legal development process route as shown in Figure 19.

Figure 20, shows that the residents undertook installation of security gates (25 per cent), blocking of footpaths between houses (21.4 per cent), construction of residential apartments (17.9 per cent), fencing and construction of commercial structures each accounting for (14.3 per cent). Business persons engaged in construction of residential housing (41.4 per cent), garbage collection facility, growing of trees and flower seedlings and fixing of gates. From these breakdown, it is clear that most of the developers are responding to insecurity or enhancing security of their area by installing gates and fencing.

As concerns development control, the situation in Dandora confirms experience of most low income informal settlements in Kenya as noted by Koti (2000). Power play between Central Government and Local Authorities had led most urban growth to degenerate into informal settlements. In Dandora this is shown by the immense influence of provincial administration through the area chief in controlling development and percentage of developments that have not been approved by the City County of Nairobi, which has contributed significantly to the neighbourhood development and the pace of change experienced. In an optimistic perspective Hentic (1997:369) notes that: until local governments possess the legitimacy, credibility, and ability to perform their functions effectively, administration reform will remain theoretical and cannot have any positive impact on the living conditions of citizens.

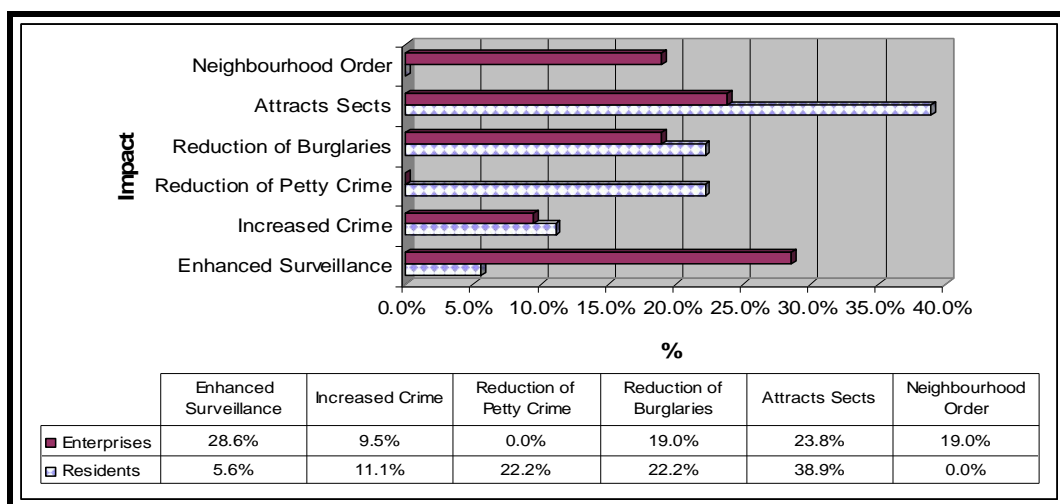
Figure 20: Development Carried out by Respondents



Source: Field Survey, 2009

It was found that the new land developments were attracting extortion from sects such as Mungiki especially during construction stage by (23.8 per cent) of business operators and (38.9 per cent) of households. Others were noted as reduction of burglaries and petty crime each accounting for (22.2 per cent) and (19.0 per cent) of households and business operators respectively as shown in (figure 21).

Figure 21: Impact of New Land Development on Crime



Source: Field Survey, 2009

7.4 Land Use Transformation Impact on Crime

As noted by routine activity theorists, change in land use changes the movements and general behaviour of offenders and victims. This is supported by rationale choice theory which shows how transformation can change the environment in such a way that it is harder for the offender to engage in crime. Other arguments which will be considered in analysis is the broken window by Wilson and Kelling (1980), the defensible space arguments by Newman (1972) and Jacobs social capital and eyes on the street philosophy related to mix of various land uses and lastly the social disorganization theory which is also related to social cohesion.

Table 33 shows households responses, with regard to their perception of land use transformation in relation to crime. Findings indicate that the new development on the land had no effect on crime (30.2 per cent), make it easy for criminals to escape due to congestion brought by new development (17.5 per cent), increased cases of crime (17.5 per cent), sophisticated crime and use of guns and master-keys (23.8 per cent) and that potential offenders mostly youth are preoccupied with recreational facilities (11.1 per cent). Enterprises findings show that new land use development has led to; reduction of illegal dumping in open spaces (28.6 per cent), emergence of outlawed sects to demand money for protection (23.8 per cent), reduction in cases of burglaries (19 per cent) orderly development due to demolition of mushrooming shanties and reclaiming of space (19 per cent) and increased incidences of crime (9.5 per cent).

Table 33: Land Use Impact on Crime Incidences

| Crime Land use impact | Responses | |
|---|-----------|------------|
| | N | Per cent |
| No transformation on crime | 19 | 30.2 |
| Criminals have adopted robbery using guns and burglary using master-keys | 9 | 14.3 |
| Congestion makes it difficult to trace the thugs | 11 | 17.5 |
| Recreational facilities keep youths engaged and away from criminal activities | 7 | 11.1 |
| Different forms of crime emerge | 6 | 9.5 |
| Crimes have increased | 11 | 17.5 |
| Total | 63 | 100 |

Source: Field Survey, 2009

Household findings indicate that adjacent land uses have some influence on crime. Illegal structures at times harbour criminals and are also known for drug peddling (22.5 per cent). Adjacent commercial activities were also seen as attractors of criminals and are more prone to crime (19.7 per cent), adjacent land uses e.g. churches and social halls were perceived to lower crime rates in an area (22.5 per cent). A sizeable portion of households (21.1 per cent) however observed that adjacent land uses had no impact on crime. Enterprises also noted that fencing had reduced cases of burglary and robbery (28.3 per cent) and also that illegal structures have contributed in congesting the estates (15.2 per cent).

Discussion of the findings relating to land use transformation sends mixed signals in terms of the real attribute of land use transformation as a crime explanatory factor. The analysis touches on the key factors which have been used by scholars in linking physical environment changes with crime. The factors related to the findings are as follows:

- ◆ Anonymity and tipping point - This is related with the findings showing that changing land uses make it easy for criminals to attack and escape undetected due to congestion.
- ◆ Target hardening - this is attributed to findings related to sophisticated crime and reduction in cases of burglaries.
- ◆ Enhanced surveillance - related to reduction of illegal dumping, demolition of mushrooming shanties and reclamation of space. This also leads to reduction of physical barriers by making spaces useful and thereby enabling the achievement of clear sightlines that allow people to see and to be seen.
- ◆ Absentee guardian and Social capital - this is related to increased cases of crime since the changes do not necessarily enhance social cohesion or inculcate ethics of natural surveillance and eyes on the street.

In stretching further the above listed factors attributed to the study findings and linking them with land use transformation-crime incidences theoretical frames, anonymity, social capital and tipping point, fits well with the arguments pursued by social disorganization theorists, where rapid changes in an environment leads to disjointed social networks and social cohesion, which breaks the community to

individual members, thus destroying the communal action and concern needed to support each other.

Anonymity, target hardening, enhanced surveillance and absentee guardian factors are important in understanding routine activity theory, broken window theory and rational choice theory. Explanation of routine theory is embraced by anonymity factor in the sense that due to land use transformation and related activities such as commercial and public purpose bring into the neighbourhood the offender and victim who may have never met, thus creating conducive environment to commit crime. Enhanced surveillance and absentee guardian is associated with broken window, rationale choice theory and routine activity theory, that the condition of the environment will motivate or discourage the potential offender to commit crime.

7.4.1 Land Use-Crime Reduction Proposal

From the analysis of land use transformation and crime reduction, there are pointers such as ability to generate surveillance, create social cohesion among others that give prominence to land use transformation as a tool that can be used to reduce crime in Dandora neighbourhood given that the neighbourhood is still transforming in terms of new developments and redevelopments.

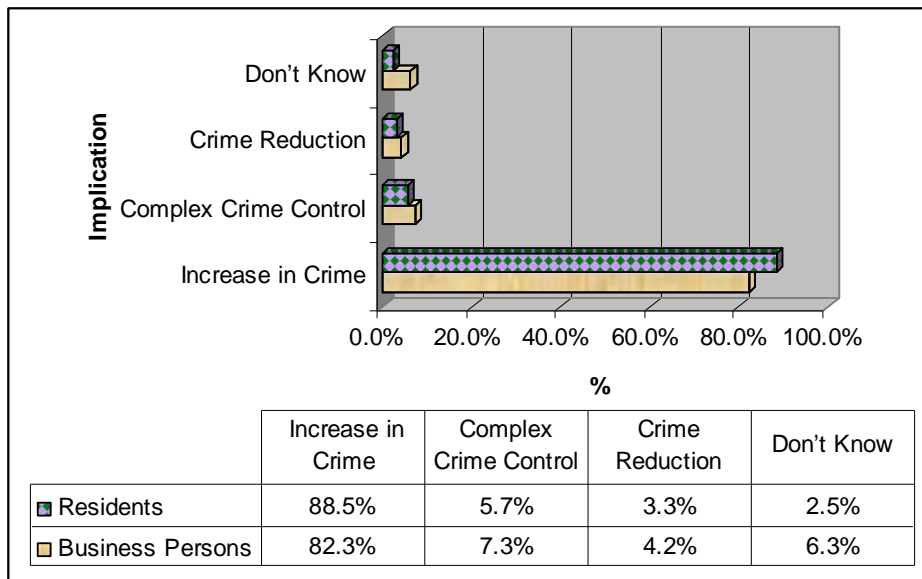
Residents listed several crime reduction proposals. The leading proposal was construction of more police bases (20.4 per cent), increase police presence in form of patrols (16.7 per cent), creation of more employment opportunities (16.7 per cent), encouraging community policing (13 per cent), and having functional street lights (10.6 per cent). The proposals generally support issues associated with land use transformation for example surveillance and increased visibility can be achieved by increasing police patrols, demolition of illegal structures and installation of street lights. Social cohesion can be attained by encouraging community policing.

Although most of the listed proposals are focused on individual and institutional approaches of crime reduction, there is recognition of linking of land use and collaborative effort as shown by proposal of community policing by the respondents. It was also noted in the community policing forum that prior to community policing,

members of the community used to organize themselves in small neighbourhood watch units to watch over their courts. This still goes on in some areas, but it is hard in certain areas where the buildings layout and consequent population they carry cannot allow them to form such units. This is further complicated by the fact that most residents are tenants and are reluctant to participate or contribute to the security provision or services of the area. This can also be attributed to tipping point effect, since the areas carrying capacity is overloaded which weakens the neighbourhood's social capital.

It was felt among residents that if no attempt is made to control development and land use change in the area, crime incidences will continue to increase (88.5 per cent), crime control will become complex (5.7 per cent), crime incidences will reduce (3.3 per cent) and (2.5 per cent) had no idea as to what is likely to happen when land use changes are left to continue taking the shape they have taken. The feeling seem to be mutual as it was also found among business persons that crime incidences were likely to increase (82.3 per cent). This is acknowledgement that the residents are concerned with the direction and pace of change in regard to neighbourhood development.

Figure 22: Implications of Land Use Changes on Crime



Source: Field Survey, 2009

Analysis of land use transformation and crime given the genesis and drivers of land use change in Dandora and the shape it is taking, Foth and Sanders (2005:3-4) work's fit in well with what is happening in Dandora , they stated that:

“High density buildings provide the immediate surroundings in which location based interactions with other residents would occur and communicative ecologies and social networks could emerge. However, their architectural design and layout (beyond issues of market demand, scope and scale) is rarely informed by societal developments and sociological insights and has hitherto been guided more by the functional requirements of the individual resident and by rental and investment returns than by the resident community at large and their need for public space and interaction”.

7.5 Study's Hypothesis

The study made use of enterprises data set, with Q17 taken as the dependent and Q21 treated as the independent variable

As indicated in the theoretical and methodological section about the approach and level of analysis of this study. Testing of the hypothesis and discussion of crime incidences is the climax of the study's level of analysis which tries to blend the people-land use and transformation of the same with crime incidences.

Null Hypothesis 1: There is no relationship between land use changes and violent crime incidence.

In testing of the study's hypothesis, binary logistic regression was used. It is normally used when the dependent (violent crime incidences) is a dichotomy and the independent (land use transformation) are of any type.

Logistic regression uses binomial probability theory, does not assume linearity of relationship between the independent variables and the dependent, does not require normally distributed variables, and in general has no stringent requirements.

As shown in Table 35 in appendix 2, binary logistic regression was done to determine the factors that significantly lead to changes in violent crime in Dandora. The result in

the table indicates that changes in land use significantly leads to changes in violent crime levels in the area. The coefficient (1.796) is positive and statistically significant at the $p < 0.01$ level. Increase in land use transformation increases probability of crime by 1.796. Thus changes in land use increases the odds of changes in crime levels by 6.023. The coefficient on the Changes in Land Use variable is positive and statistically significant at the $p < .000$ level which is less than conventional significance level of $p < 0.05$ - LUT addition is statistically significant.

This is also supported by the correlation of indicators of land use transformation and perception on crime victimization as shown in Table 34 on number of floors and crime victimization. According to the Pearson's and Spearman's correlation measure of the two variables, there is a positive relationship between the two variables i.e. .352 and .308 respectively. This shows that as a place undergoes densification, there is a high chance of residents being victims of crime. It further indicates that around 9.5-12.4 per cent of crime incidences may be explained by densification factor as a surrogate of land use transformation. These two set of measures lead to rejection of the study's null hypothesis.

Table 34: Symmetric Measures of Number of Floors and Crime Victimization

| | Value | Asymp. Std. Error(a) | Approx. T(b) | Approx. Sig. |
|---|-------|----------------------|--------------|--------------|
| Interval by Pearson's R | .352 | .114 | 2.575 | .013(c) |
| Ordinal by Spearman Ordinal Correlation | .308 | .132 | 2.223 | .031(c) |
| N of Valid Cases | 49 | | | |

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

c Based on normal approximation.

7.6 Socio-Spatial Analysis and Implications

In summing this chapter, triangulation of the information gathered confirm issues discussed in previous chapters dedicated in understanding the connection between

land use transformation and crime incidences. This chapter confirms and identifies the multi-criteria factors and indicators which have been used as surrogates of multi-contextual theory.

Multi criteria factors and variables emerging strongly as possible explanation of linking crime incidences to land use transformation in Dandora are; anonymity, trust, tipping point, surveillance, social cohesion, target hardening and absentee guardian. These factors in relation to land use-crime theories are key in understanding response mechanisms and the following theories;

- ◆ Routine Activity theory
- ◆ Social Disorganization theory
- ◆ Rational Choice theory
- ◆ Defensible Space theory and
- ◆ Broken Windows theory

Study findings show that mixed land use, public-oriented land uses such as churches and commercial have been associated with anonymity factor. This is because they have potential of drawing people from within and surrounding communities which may offer a sufficient level of target concentration or density. As noted by Eck (2007) such density may have a magnetic effect. Offenders residing in a peripheral neighbourhood such as Kariobangi South with lower levels of anonymity and fewer potential targets may be enticed to travel out of their home jurisdiction toward this core community created by the magnetic land use. Alternatively, offender residing close to such land use as shown earlier in the discussion of travel behaviour of offenders would travel shorter distances to reach these target rich areas hence contributing to crime incidences propensity.

With regard to surveillance, deserted locations such as dumpsite, railway line and undeveloped land offer opportunity for robbery, kidnapping and other forms of violence that take advantage of none surveillance. As noted by Shaw and Carli (2011), these are common to mass housing estates which form majority of planned new communities. In such areas, the physical layout of roads and open spaces between buildings as noticed in phase three and four of Dandora which also ignore building lines result in unsafe paths and unwatched spaces. This argument can be used

to explain routine activity theory, rationale choice theory and defensible space theory. The surveillance argument in the sense of improving the undesirable spaces can also be linked to broken windows theory.

Dandora is a multi-ethnic neighbourhood with a complex sense of community. As noted in the community policing focus group discussion, the year 2007 and 2008, brought this complexity to the fore. Prior to 2007, Kenya's general election and immediately after the elections, landlords and tenants resented any new tenants based on their ethnicity which was seen as supporting certain presidential candidate. Ethnic stereotypes create suspicion even among community policing members. This is reflected as an element of tension preventing community cohesion as noted by Bretherton and Pleace, (2008:46-47). This also qualifies (Thompson *et al*, 2007; Hopkins, 2007) the notion that perceptions and stereotypes of different ethnic and socio-economic groups could contribute to other barriers to community cohesion in Dandora including fear of crime and collective response, which may prevent residents from interacting with neighbours of different ethnic background associated with crime.

In response to these challenges, it was found that residents prefer living in areas dominated by their own ethnic groups as landlords or tenants, for acceptability. Meredyth *et al* (2002) in measuring social-capital in network housing estate, noted that while factors like language difference are a major fault line between residents of diverse ethnicity, isolation from the wider population actually strengthens relationship with, and dependence on other residents of the same language and ethnic group. Which Easthope *et al* (2011) revealed as developing of a number of different communities to which residents belong, which although may take away from a common feeling of belonging or community spirit across a neighbourhood. This is a factor contributing to the social disorganization manifested by the production of the social-spatial disparity informing the neighbourhood development. Olima (2001) noted that the social-spatial segregation in Nairobi should be seen as a response to the social and economic needs of the community at a particular point in time.

CHAPTER EIGHT: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This section of the study highlights key study findings and conclusive implications of the findings in line with the study objectives and hypothesis guiding the study and gives recommendations according to what has emerged in the study.

8.1 Summary of Findings

8.1.1 Land Use Transformation Drivers and Impacts

The drivers of land use transformation can be summarized as economic, social and institutional. In addressing transformations, the study found that the genesis of transformation of Dandora land use changes was premised on the infiltration in the late 1980s when those who had been allocated plots were unable to service their loans. It was also noted that the original allottees were given a grace period of 10 years to pay-up their loans and when this expired in late 1980s a number of them lost their plots. A major cause of transformation in Dandora is attributed to financial ability of the developers. Others are institutional capacity to manage and control development in the area, housing demand, insecurity which is in relation to fencing and putting up of gates and perimeter walls.

Indicators used to measure transformation in Dandora are; rate of new developments, redevelopments, conversion of old developments, neighbourhood density (both vertical and horizontal) and open space conversion and availability. Dandora Phase Four was found to averagely lead in (80per cent) of the indicators and Phase One was found to be the most conservative, in terms of transformation. The space between buildings is also narrowing for the new developments especially in Phase 3 and 4. Most new developments were high rise developments and were geared towards profiteering and investment returns. Vertical transformation was a common character of every Phase streetscape.

The transformation was also found to be shaping the socio-cultural and economic space of the neighbourhood. This has led to occupancy of certain parts of the neighbourhood by people of certain ethnic groups, including location and distribution of businesses, since people from the same ethnic groups patronize businesses run and managed by people from their ethnic group creating some sort of ethnic enclaves.

This state of affair has also led to stereotyping and labelling of certain spaces in relation to some ethnic group. From a system perspective, this indicates that Dandora as a neighbourhood has a weak sense of unified community and social solidarity.

8.1.2 Land Use Transformation, Crime Incidences and Response

Findings indicate that crime was not randomly distributed. They are influenced by certain land uses. All land uses attract crime and that different land uses attract different levels and forms of crime; including public purpose such as churches and mosques. However, the degrees of certain crime happening in some land uses greatly differ. Crime such as rape and muggings were found to be rampant in deferred land or undeveloped land and incomplete buildings as opposed to a church, whereas drug abuse and peddling on the other hand were rampant in educational and recreational facilities. Violent robbery was common in commercial and mixed use development, while carjacking and mugging was rampant in terminuses and deserted transportation routes.

Areas around major streets were also found to be prone to crime, despite being close to high rise developments and commercial land uses accommodating many people and generating traffic as opposed to single family units. This finding negates the principle of eyes on the street and natural surveillance associated with defensible space theory and qualifies routine activity theory in relation to anonymity and supply of offenders which overwhelms space guardians.

Other areas prone to violent crime in the area are public vehicle terminal facilities, dumpsite and undeveloped plots. These areas qualifies for what Felson (2003) noted as areas of crime behavioural setting. Certain crimes were found to happen in certain locations repeatedly and one could even predict the type of crime in certain spaces. It is also prudent to note that the pattern of crime is changing. Previously common crime types such as rape and robbery seemed to be reducing. This picture was also confirmed by the police records.

8.1.3 Land Use Transformation and Response to Crime

Most residents in Dandora have adopted several coping mechanisms which seemed to be individual routine based, that is, most of them go back home early before dark. They often walk in pairs when going back home late, but communally have employed security guards, some are members of neighbourhood security watch groups, live in houses with burglar proof and make effort to know their neighbours well.

Another observed common and well documented survival mechanism in Dandora, was related to composition and distribution of individuals choice of residence and business location. It was found that certain ethnic groups dominate certain quarters of the neighbourhood. These people tend to be very close with people coming from or neighbouring their rural areas and whenever there is a call of distress coming from their ‘home person’ the reaction was immediate. This is a crime response mechanism, which was not initially anticipated. However, as the neighbourhood gets more densified, this is weakened and complicated connections emerge, as more strangers come in with their strange connections and values in the neighbourhood.

Dandora community policing is a multi-ethnic group facing some challenges related to perceptions and stereotypes. There is fear among some community policing members that their group had been infiltrated by the illegal “*Mungiki*” sect. This compromises the performance of the group, despite research findings by Thompson et al (2007) pointing out that the kind of trust and cooperation generated by community interaction and social bonds are particularly important in low-income and ethnically diverse neighbourhoods. This mistrust in Dandora made it very hard to discuss freely the crime incidences in relation to ethnicity with the Community Policing Group. Most of *Mungiki* discussions were mentioned by Police, households and business persons and was noted as an outstanding issue in Dandora.

There is still more ground to cover in formulating a true community policing structure as stipulated in the Police Act. What currently exists is more of a group of residents who are concerned with the insecurity in the area but who have not even been vetted hence still loaded with ethnic stereotypes and mistrust amongst members. They are not even sure of their mandates and responsibilities and their only major contribution

is giving information to the police. They are inadequately prepared to engage in formal community policing.

From the crime response findings and hypothesis testing, it can be noted that Dandora's land use developments and transformations has led to security exclusion of the minority where ethnic contacts supersedes the general public good and interest related to security.

8.2 Conclusion

The study concludes that, Dandora just like many other neighbourhoods in Nairobi is undergoing transformation, but the transformation experienced is blamed on inadequate capacity of the Housing Development Department (HDD) to control and regulate rapid development which is coming with different challenges such as social ills related with violent crime.

Some land uses such as dumpsite and riparian areas are more associated with violent crime compared to other land uses such as transport corridor or residential. This is because they tend to attract more crime predators than the victims which mean that the supply of the offenders is comparatively higher than the victims, hence high chance of being a victim. Land use has an impact on crime incidences. Violent crime incidences are not randomly distributed; they are influenced and hosted by certain land uses. Land uses affect behaviour and attitude towards crime and general security

Community or individual response to crime are either precautionary or preventive for example those living near land uses such as dumpsites and bus stages are fond of and are more likely to close their gates all the time to reduce chances of strangers getting into their premises than those who live far from such land uses. This implies that crime response-land use tension is building in relation to "*publicness*" of land uses. This questions "More eyes on the street" and "natural surveillance" propagated by new urbanists such as Jacobs.

Due to transformation and high rate of geographic mobility among residents who are tenants and in Dandora specifically, where less than 30 per cent of the residents are landlords, it becomes very difficult to create and develop a stable and committed

community, which can respond to crime as unified community sustainably, since most residents conduct their work, social contacts and leisure activities outside the place they happen to live which erodes people's attachment to their local community. Furthermore, they are aware that they are only there temporarily and hope to move out to their own houses once their situation improve or retire back to their rural homes. This makes crime response overwhelmingly an individual responsibility, especially if the developments in the area remain unregulated.

The study concludes that the findings explain the multi-context of the multi-contextual theoretical framework adopted in this study. The findings give credence to the arguments of routine activity theory that land use changes lead to changes in human behaviour including movements in search of goods and services. This may explain interaction between offenders and victims. Findings also concur with social disorganization theory that rapid changes in a neighbourhood can weaken social cohesion and trust in a community, leading to rising cases of crime and fear of crime. Evidence also supports arguments of rationale choice theory of criminals making decision based on the favourability factors supporting their decisions.

However, the findings do not support defensible space theory and broken windows theory, although the line of thought in relation to the study's theoretical framework confirms that land use transformation leads to change in neighbourhood form. In turn, this changes neighbourhood social interaction network which creates the platform on which crime incidences and prevention can be understood. The built environment plays a pivotal role in shaping the spatial pattern of criminal activity. While certain combinations of land use and design elements can foster criminal activity by blocking lines of sight and providing easy access to potential targets, other combinations can virtually eliminate the opportunity for criminal events (Wuscke *et al*, 2010). The way space is structured often dictates how communities function and relate within the built environments, which has not been well articulated locally.

In contextualizing crime response-land use arguments in relation to this study, land use and subsequent changes play a role in the level of crime, but the relationship between the two is not as clear as with other measures of socio-economic factors especially in terms of crime response. But what seems convincing from the literature

reviewed and the study findings, is the argument linking routine activities and surrogates of land use which denotes that, places with larger populations and higher densities can be expected to have a larger variety of land uses. In this way, more opportunities for crime may exist in an area than if it were simply residential, retail, or industrial, which qualifies the study's hypothesis which indicates that crime incidences can be explained by land use types and land use transformations.

8.3 Recommendations

For sustainable land use transformation to take place in Dandora, review of zoning regulations, design and more importantly development control must take place. There is need to have a guiding and accurate population projections which should also be in line with the reviewed carrying capacity of the area and other urban neighbourhoods experiencing such kind of transformation. Care need to be taken to match revised zoning regulations with existing infrastructure facilities and other services such as police, fire stations, health centres etc, so as to support the migrating population sustainably. The development and implementation of Integrated Development Plans as stipulated in the Urban Areas and Cities Act and the County Government Act could help greatly in guiding future transformation of urban neighbourhoods and general urban development.

Need to streamline development of land in Dandora. This calls for setting precise zoning guidelines, including observation of building lines, dealing with applications promptly, rendering technical assistance and extension services to developers and cooperating with professionals in order to achieve systematic and orderly development of the neighbourhood.

Police and security providers should target enforcement to the specific times, places, and events which activate and attract crime. The planners should also use this knowledge in developing different functions in areas prone to crime and allocate specific functions and responsibilities in management of such places especially in the public spaces which are noted to be crime-ridden.

Violent crime and crime generally tend to happen in some known locations, harbouring certain land uses, and characteristics. This indicates that with knowledge

of these land uses and related characteristics, it is possible to advocate for the land use and their respective design according to what are deemed to enhance security. In responding to land use-crime defined area, there is need to execute directed patrols of locations where crime tend to happen.

A Land use that reduces interaction and objective natural surveillance should be discouraged. This may require modified skills in understanding the right places where mixed use development are encouraged and respective densities of these developments. This will help in reducing situations where criminals tend to “colonialize” a particular place and certain land uses. It is important that land uses and their transformation be informed by how they enhance or diminish guardianship of space.

There is need for mainstreaming issues of urban safety in planning design and implementation of urban development and to institutionalize crime prevention as proposed by UN-Habitat safer cities programme. In developing crime prevention in Dandora there is need to reform planning process by making it more participatory, by allowing other stakeholders to scrutinize the development applications, this requires the following to be part of the team;

- Community (neighbourhood) representatives, taking into consideration gender and youth. The representative should be well versed with the area where the proposed development is going to take place.
- Police representative - should also be working in the area and knowledgeable of the neighbourhood.

Such collaborative approach to development plan approval will enable the team to identify, discuss and ventilate on issues which may lead to crime in the neighbourhood and more so violent crime which seem to be more threatening as compared to other forms of crime.

In response to ethnic diversity and stereotypes, the City County of Nairobi in conjunction with the provincial administration in collaboration with private sector and Non-Profit Organizations should work with communities to create a culture of peace and encourage tolerance of diverse ethnicity through public awareness campaigns. This will be helpful in developing community trust needed for success of truly

community driven initiatives such as community policing. As a beginning point, there is need to map and identify all existing institutions and groups that promote security in the area

In stepping up safety and crime prevention measures in planning and development application processing, there is also need to have a Crime Impact Assessment and Auditing (CIA/A), the same way the Environmental Impact Assessment and Auditing (EIA/A) is conducted. This should be made a mandatory requirement for anybody applying for development in order to assess the likely impact of a proposed development or redevelopment on crime, including how they are going to mitigate envisaged crime as a result of related development.

8.4 Area for Further Research

The study's arguments are limited to two factors namely; a) explanation of the relationship between land use transformation and violent crime incidences and, b) how communities respond to changing land use situations.

The aspect of land use transformation is based on residents and business persons perceptions and interview with the experts and observations. This was due to lack of official statistics showing the exact number of development applications received over time, by type and exact location and also due to the fact that most development in the area are either not approved or have applied for developments permission. This makes it impossible to do a model relating land use transformation by type and how it impacts on crime incidences and response. This calls for more studies focusing on neighbourhood crime and land use changes.

It would however, be necessary for further research to develop such a model focus on the extent of land use transformation impact on various crime incidences and response, so as to gauge at what point a neighbourhood is considered stable and how this builds specific and different categories of crime response and how this can eventually be used to inform zoning regulations and designs of neighbourhoods.

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APPENDIX 1: DATA COLLECTION INSTRUMENTS

Kenya Police Interview Guide

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

KENYA POLICE DEPARTMENT -INTERVIEW SCHEDULE

Research title: CRIME PATTERNS AND LAND TRANSFORMATION IN NAIROBI

Date of interview.....

Declaration: This information will be treated confidential and used purely for academic purposes only.

1.0 BACKGROUND/PERSONAL INFORMATION

Personal/background information

1. Name :(optional).....2.Position.....

3. Duration at the present Position (Years)

2.0 NATURE OF CRIME INCIDENCES IN NAIROBI

4a. According to the police records how has crime incidences changed in Nairobi since 1980s?

b. What has contributed to these changes?

- i. _____
- ii. _____
- iii. _____

c. On average, which Police Division(s) seems to be experiencing crime reduction over the period between 1985 and 2007?

Why?

- i. _____
- ii. _____
- iii. _____

d. On average, which Police Division(s) seems to be experiencing crime increase over the period between 1985 and 2007?

Why?

5a. On average when could you say to be the crime turning points in Nairobi, i.e. seasons when crimes are highest and lowest in the area?

| Periods of High Crime (Year) | Periods of Low Crime (Year) | Months of High Crime | Months of Low Crime | Time of High Crime | Time of Low Crime |
|------------------------------|-----------------------------|----------------------|---------------------|--------------------|-------------------|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |

- b. According to police records which are the **five** most insecure residential areas?
- c. What make these areas to be crime-ridden?
- 6a. How would you compare the crime incidences in Dandora with other estates in Nairobi?
- b. How would you compare the crime incidences in Dandora with other estates in Nairobi Eastlands e.g. Kayole or Jericho?
- 7a. Are there any unique crime (s) which is/are found in Dandora and not any other area in Nairobi or in the country?
- b. If yes, specify the type of the crime (s)
- c. Why is it happening or common in Dandora? _____
- d. What is your department doing to contain the crime(s)?

3.0 CRIME INCIDENCES AND LAND USES IN NAIROBI

- 8a. Are there crime(s) that only happen in specific land uses/sites/places e.g. bars, bus stops, residences, shops or shopping centres etc within Nairobi?
- b. If yes, please indicate the type of crime and associated land use in the table below

| Land Use | Crime Type | |
|-------------------------------------|------------|----------|
| | Daytime | At Night |
| Residential- Low density | | |
| Residential- High density | | |
| Industrial | | |
| Educational | | |
| Recreational | | |
| Public Purpose | | |
| Commercial | | |
| Public Utilities | | |
| Transportation e.g. bus stop, roads | | |
| Undeveloped/Deferred | | |
| Mixed Use | | |

- c. Do you see any relationship between crime type and land use?
- d. If yes, what is the relationship?
- e. Why are certain crimes prevalent at night and not daytime?
 - i. _____
 - ii. _____
 - iii. _____

9a. What are the crime hot spots in Nairobi?

| Spot | Type of Crime |
|------|---------------|
| 1. | |
| 2. | |
| 3. | |

- b. What are the distinctive characteristics of the above-mentioned hotspots?

| Spot | Characteristics |
|------|-----------------|
| 1. | |
| 2. | |
| 3. | |

c. What kind of land uses and densities would you propose for these areas, to improve security?

| Spot | Change Required |
|------|-----------------|
| 1. | |
| 2. | |
| 3. | |

d. Why? _____

10a. What is your view on the community policing in Nairobi?

b. What is community's response to crime distresses? _____

c. Why? _____

4.0 CRIME REDUCTION STRATEGIES

11a. How can security be enhanced in the area?

b. Who are you partnering with, in provision of security services in the area? _____

12a. What are the challenges you are facing when discharging your duties in the area?

i. _____

ii. _____

iii. _____

12b. What are some of the proposed solution to the above mentioned challenges?

i. _____

ii. _____

iii. _____

13a. Are there security-related problems likely to be faced in Nairobi as a result of land use changes and development in the area? _____

13b. If Yes, what security related problems are likely to be faced in the area as a result of continuous land use changes and development in Nairobi?

13c. What are the solutions to the above listed problems?

i. _____

ii. _____

iii. _____

THANK YOU FOR SACRIFICING YOUR TIME TO RESPOND TO THE QUESTIONS!

Housing Development Department Interview Guide

UNIVERSITY OF NAIROBI
DEPARTMENT OF URBAN AND REGIONAL PLANNING
HOUSING DEVELOPMENT DEPARTMENT QUESTIONNAIRE

| |
|--|
| Research title: CRIME PATTERNS AND LAND TRANSFORMATION IN NAIROBI: An Analysis of Land Transformation on Dandora Crime Patterns |
| Date of interview..... |
| Declaration: This information is purely confidential and strictly confined for academic purposes only. |

1.0 INSTITUTIONAL BACKGROUND AND PERSONAL INFORMATION

Personal/background information

1. Name :(optional).....2.Position... ..
3. Duration at the present Position (Years)

Institutional background information

- 1a. Give a brief historical background of HDD
- b. HDD mission and Vision
- c. Interest of HDD in Dandora?

2.0 NATURE OF LAND USE REGULATION AND TRANSFORMATION

- 4a. According to the initial plan of Dandora what was the range and respective proportion of land use types in the area? E.g. 30per cent to be residential (provide a map or layout)

| Land Use Type | Per centage/Proportion |
|---------------|------------------------|
| | |
| | |

- b. How has the initial plan changed over time?

| Land Use | per cent In 1980-1989 | per cent In 1990-1999 | per cent In 2000- to date |
|----------|-----------------------|-----------------------|---------------------------|
| | | | |
| | | | |

- 5a. What were the initial policy guidelines in terms of:

- i. Zoning Requirements
- ii. Plot Ratio _____
- iii. Ground Coverage _____
- iv. Building Code _____
- v. Any by-law guidelines that govern growth and development of Dandora

- 5b. What was the rationale of having the above mentioned guidelines for Dandora?

- 5c. Has there been a review of the above mentioned policy guidelines over time?

- I. Yes II. No

5c. If No, are there any plans to review the guidelines?

5d. If Yes What is the current policy guidelines in terms of:

- i. Zoning Requirements
- ii. Plot Ratio _____
- iii. Ground Coverage _____
- iv. Building Code _____
- v. Any by-law guidelines that govern growth and development of Dandora

5e. What is the rationale of reviewing the policy guidelines for this area?

6a. What is the criterion for change of plot/property ownership in the area?

b. What is the criterion for change of use of properties from initial use to present use?

8a. Have all the physical development in Dandora been approved by your department? I.

Yes 2. No

b. If No, what proportion of development in the area has been approved by your department?

c. Which area/phase is the most compliant and which one is least compliant?

Most Compliant _____ Least Compliant _____

d. Why? _____

d. What is the department doing to make sure that unlicensed developments are regularized or otherwise condemned?

e. How would you compare Dandora and other site and service schemes e.g. Kayole and Umoja in terms of rate of transformation?

8a. Is there any relationship between land use changes and crime incidences in the area? I. Yes

II. No

b. If Yes, what is the relationship? _____

c. Which types of crime(s) are related to specific land use(s)?

| Land Use | Planning No. Code | Crime Type |
|---------------------------|-------------------|------------|
| Residential- Low density | 0 | |
| Residential- High density | 0 | |
| Industrial | 1 | |
| Educational | 2 | |
| Recreational | 3 | |
| Public Purpose | 4 | |
| Commercial | 5 | |
| Public Utilities | 6 | |
| Transportation | 7 | |
| Undeveloped/Deferred | 8 | |
| Agriculture | 9 | |

9. What is the council doing as far as development control is concerned?

10a. What are the planning challenges you face as a department in carrying out your duties in this area?

10b. What are some of the proposed solution to the above mentioned challenges?

11a. What problems are likely to be faced in the area as a result of continuous land use changes and development in the area?

11b. What are the solutions to the above listed problems?

City Inspectorate Department Interview Guide

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

CITY INSPECTORATE DEPARTMENT INTERVIEW GUIDE

| |
|--|
| Research title: CRIME PATTERNS AND LAND TRANSFORMATION IN NAIROBI: An Analysis of Land Transformation on Dandora Crime Patterns |
| Date of interview..... |
| Declaration: This information is purely confidential and strictly confined for academic purposes only. |

1.0 INSTITUTIONAL BACKGROUND AND PERSONAL INFORMATION

Personal/background information

- 1. Name :(optional).....2.Position... ..
- 3. Duration at the present Position (Years)

Institutional background information

- 1a. Give a brief background of department of inspectorate

- b. Mission and Vision

- 2a. Which tools/regulations do you use to enforce development control in the city?

- b. What action do you take, when developers flout development rules?

- c. How effective is the mechanism?

- d. Have you ever been required to intervene in Dandora? I. Yes II. No
- e. If Yes, which rule(s) was flouted? _____
- f. Which is the most common flouted rule? _____
- g. Which area/phase in Dandora is most problematic in flouting development rules?
- h. Which area/phase in Dandora is most compliant in as far as sticking to rule(s) is concerned?
 - i. Reasons for flouting development rules? _____
 - ii. Reasons for compliance? _____
- 3a. What challenges do you face in the department in carrying out your duties?
 - c. How have you been coping with these challenges?

Community Policing FGD Guide

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

COMMUNITY POLICING TEAM FGD GUIDE

Research title: CRIME PATTERNS AND LAND TRANSFORMATION IN NAIROBI: An Analysis of Land Transformation on Dandora Crime Patterns

Date of interview.....

Declaration: This information is purely confidential and strictly confined for academic purposes only.

SECTION A: COMMUNITY POLICING BACKGROUND:

1. When was the community policing initiated in Dandora?
2. What was the objective (s) of forming it?
3. Was it formed in all phases of Dandora simultaneously?
4. What are the qualifications for one to be a member?
5. What is the size of the community policing in terms of membership

| Phase | Female Members | Male Members | Youth | Total |
|--------------|-----------------------|---------------------|--------------|--------------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |

- 6a. What are the professional background of the members?
- b. Age distribution of members?
- c. How was crime prevented in the area before community policing?

SECTION B: COMMUNITY POLICING MODE OF OPERATIONS:

7. How do you respond to crime in Dandora?
8. How do you relate with the community/residence in crime prevention?
- 9a. How do you prevent crime in the area?
- b. What aspects of crime prevention works? Is it effective in all areas?
- c. Is crime related to activities going on in a place? (Explain)?
- d. Could crime be reduced by changing land use? (Explain)
- e. Are their certain land uses that bring community together? (Explain)
- f. Which parts of Dandora are prone to crime (Hotspots)?

- g. What types of crime are frequent in the hotspots?
- h. What attracts crime to those areas?

SECTION C: COMMUNITY POLICING PARTNERS:

10a. Who do you partner with in crime prevention?

| Partner | Nature of Collaboration | Effectiveness |
|---------|-------------------------|---------------|
| 1. | | |
| 2. | | |
| 3. | | |

- b. Is the partnership restricted to community policing/security provision?
- c. What other activities do you carry out together with these partners?
- d. Who coordinates this partnership?

SECTION D: COMMUNITY POLICING IMPACTS:

11a. what changes in crime can you attribute to community policing?

- b. Is there a role in which planning of the area can boost community policing? Explain?
- c. Have reduction in crime in certain parts of Dandora led to increase in crime in other parts of Dandora?

SECTION E: COMMUNITY POLICING CHALLENGES:

12a. What challenges are you facing?

- b. How do you intend to carry out your duties in future?
- c. How does the project ensure about the safety of its members?
- d. Is the community policing resulting in the changes it was anticipated to respond to?

Dandora Chief Interview Guide

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING

COMMUNITY SECURITY COORDINATOR/AREA CHIEF

Research title: CRIME PATTERNS AND LAND TRANSFORMATION IN NAIROBI: An Analysis of Land Transformation on Dandora Crime Patterns

Date of interview.....

Declaration: This information is purely confidential and strictly confined for academic purposes only.

1. What are the causes of violent crime in the area?
2. Which types of violent crime are common in Dandora?
3. Which parts of Dandora are prone to these violent crimes?
4. How do you respond to crime in the area?
5. Who do you work with in ensuring that crime is deterred in the area?
6. What is community's response to crime distress? (Coping Mechanism)
7. What is your view on the community policing in Dandora?
8. How can security be enhanced in this area?
9. What aspects of your actions works?
10. Is there any relationship between crime incidences and land uses e.g. certain crime happening in business premises and not residential?
11. Is there hope in reducing crime through change of land uses?
12. How is crime changing in Dandora in terms of type and frequency?

Household Questionnaire

**UNIVERSITY OF NAIROBI
DEPARTMENT OF URBAN AND REGIONAL PLANNING
HOUSEHOLD QUESTIONNAIRE**

**Research title: CRIME PATTERNS AND LAND TRANSFORMATION IN
NAIROBI: An Analysis of Land Transformation on Dandora Crime Patterns**

Name of the interviewer.....

**Physical Location _____ Phase _____ No. Of
Floors _____**

**Questionnaire No.....Date of
interview.....**

**Declaration: This information is purely confidential and strictly confined for academic
purposes only.**

1.0 BACKGROUND/PERSONAL INFORMATION

Personal/background information

1. Name :(optional).....2.Age
3. Gender (F)... (M) Education Level
4. Occupation..... Household Size.....
5. How long have you lived in Dandora (Years)
6. Name of Home District

2.0 NATURE OF LAND USE TRANSFORMATION

7. In your opinion, has there been any land use changes in Dandora?

- (a) Yes
- (b) No

8. If yes briefly describe the nature of
change(s)_____

9a. When did this change(s) took place_____

b. Where is the changes most pronounced in Dandora
generally?_____

c. Where is the changes most pronounced in this particular phase/area?

10a. What are the **positive** impacts of these changes?

b. What are the **negative** impacts of these changes?

11. What problems do you and your household encounter as the result of the changes?
- 12a. Is the space you are living in, meant for activity (ies) carried out currently?
- a. Yes
 - b. No
- b. If no, what was the initial planned purpose for the space? _____
- c. Explain the reason for the change of use for the space _____
13. Why do you live here and not any other place/phase within Dandora?
14. What major problems in order **of the most prevalent to the least prevalent** do you encounter as a resident in this area?
15. What do you think need to be done to improve the security/reduce crime in this area?
16. In your opinion what do you think are the cause(s) of these crime(s)?
- 17a. Would you recommend/advocate for further land use transformation in the area? a. Yes
- b. No
- b. If Yes, What kind of transformation would you like to see in the area?
- c. If No, Why?

3.0 CRIME PATTERNS AND TRENDS IN THE AREA

18. In your opinion, have there been any changes in crime incidences the area?
- (a) Yes
 - (b) No
19. If yes briefly describe the nature of change(s) _____
- 20a. In your opinion where would you consider to be the most risky place (s) in Dandora? (Give 3)
- b. Why? _____
- c. . In your opinion where would you consider to be the most risky place (s) in this area? (Give 3)
- d. Why? _____
- e. In your opinion where would you consider to be the safest place (s) in Dandora? (Give 3)
- f. Why? _____
- g. . In your opinion where would you consider to be the most Safest place (s) in this area? (Give 3)
- h. Why? _____

21. Indicate in the table below, the type of crime existing in the area and the frequency of their occurrence in the area?

| CRIME TYPE | FREQUENCY 1. High 2. Medium 3. Low 4. Indifference | AREA | PHYSICAL CHARACTERISTICS OF THE REA | EXISTING SOLUTION/COPING MECHANISM | SUGGESTED SOLUTIONS |
|-------------------------|---|-------------|--|---|----------------------------|
| ASSAULT | | | | | |
| BURGLARY | | | | | |
| ROBBERY | | | | | |
| CAR JACKING | | | | | |
| RAPE | | | | | |
| OTHERS (Specify) | | | | | |

22a. Have you /household member ever been a victim of crime since you moved in to Dandora? a. Yes b. No

b. If Yes which one(s) _____

c. When did the last one happened? _____

d. Were you or member of your household injured? _____

e. Did you report the crime to police? A. Yes B. No

f. What action(s) were taken? _____

g. What strategies have you developed to protect your household against crime?

- h. How is this strategy transforming your neighbourhood?
- i. Is the strategy working and sustainable? A. Yes B. No
- j.

Explain _____

4.0 CRIMES AND LAND USE TRANSFORMATION

23a. Is there any crime(s) you can attribute to land use transformation in the area? A. Yes B.

No

b. If yes, which type of crime(s) can you attribute to land use transformation in the area?

24a. Which type of land use is prone to crime incidences in the area?

| Land Use | Planning No. Code | Crime Type(s) | Reason (Why) |
|--|------------------------------|----------------------|---------------------|
| Residential- Low density | 0 | | |
| Residential- High density | 0 | | |
| Industrial | 1 | | |
| Educational | 2 | | |
| Recreational | 3 | | |
| Public Purpose e.g. halls, churches etc | 4 | | |
| Commercial | 5 | | |
| Public Utilities e.g. dump sites, road reserves | 6 | | |
| Transportation e.g. bus stop/terminus | 7 | | |
| Undeveloped/Deferred | 8 | | |
| Agriculture | 9 | | |
| Mixed Land Use | | | |

25a. Is there type(s) of land use transformation that can lead to reduction of crime? A. Yes

No

b. If yes, which one(s)? _____

26a. Which type of crime(s) is likely to be impacted by the land use change? Why?

5.0 LAND USE TRANSFORMATION AND CRIME MITIGATION

27a. Have you ever been involved in any form of physical development in this area? A. Yes

B. No

b. If yes, did you seek permission from any authority? A. Yes B. No

c. If Yes, from whom?

d. Describe the kind of development you are/were involved in and its impact on crime in the table below

| No | Development/Land use changes (description) | Impact on Crime |
|----|---|-----------------|
| 1. | | |
| 2. | | |

Enterprises Questionnaire

**UNIVERSITY OF NAIROBI
DEPARTMENT OF URBAN AND REGIONAL PLANNING
ENTERPRISES QUESTIONNAIRE**

**Research title: CRIME PATTERNS AND LAND TRANSFORMATION IN
NAIROBI: An Analysis of Land Transformation on Dandora Crime Patterns**

Name of the interviewer.....

Physical Location_____ Phase_____

Is it within a shopping centre or Residential Area _____

Questionnaire No.....Date of interview.....

Declaration: This information is purely confidential and strictly confined for academic purposes only.

1.0 BACKGROUND/PERSONAL INFORMATION

Personal/background information

1. Name of the enterprise/Institution:.....

2. Enterprise/Institution Age

3. Sub-sector activity;

I. Manufacturing

II. Service

III. Trade

4. Premise Ownership

I. Fully Owned

II. Partially Owned

III. Rental

IV. Government

V. Other (Specify) _____

5. Respondent's Education Level _____

2.0 NATURE OF LAND USE TRANSFORMATION

5. Have you been doing the same business/activity in the same place since you moved here?

(a) Yes

(b) No

6a. If no briefly describe the nature of the work you were engaging in before? _____

b. Why did you change from the previous business?

- 7a. Were you doing/giving the same business/service in the previous base of operation?
- (a) Yes
- (b) No
- b. If Yes, where were you located? _____
- c. If no please explain the reason for changing _____
- d. When did this change(s) take place? _____
- e. Why that particular time?
- 8a. Which area in Dandora are the land use changes most pronounced generally? _____
- b. Where are the changes most pronounced in this particular phase/area?
- 9a. What are the **positive** impacts of these changes?
- b. What are the **negative** impacts of these changes?
10. What problems do you and your fellow enterprises encounter as the result of the changes?
- 11a. Is the land/space you are working in, meant for activity (ies) carried out currently?
- c. Yes
- d. No
- b. If no, what was the initial planned purpose for the space? _____
- c. Explain the reason for the change of use for the land/space _____
12. Why do you situate your enterprise here and not any other place/phase within Dandora?
13. What major problems in order of **the most prevalent to the least prevalent** do you encounter as an entrepreneur in this area?
14. What do you think need to be done to solve the problems listed above in Q13?
11. If crime/insecurity is mentioned ask for the cause(s) of these crime(s)?
- 12a. Would you recommend/advocate for further land use transformation in the area? a. Yes
- b. No
- b. If Yes, What kind of transformation would you like to see in the area?
- c. If No, Why?

3.0 CRIME PATTERNS AND TRENDS IN THE AREA

12. In your opinion, have there been any changes in crime incidences the area?
- (a) Yes
- (b) No
13. If yes briefly describe the nature of change(s) _____
- 14a. Have you /your employee ever been a victim of crime since you moved in to Dandora? a.
- Yes b. No
- b. If Yes which crime(s) _____
- c. When did the last one happened? _____

- d. Were you or your employee injured? _____
- e. Did you report the crime to police? A. Yes B. No
- f. What action(s) were taken? _____
- g. What strategies have you developed to protect your enterprise against crime?
- h. How is this strategy transforming your neighbourhood?
- i. Is the strategy working and sustainable? A. Yes B. No
- j. Explain _____

Indicate in the table below, the type of crime existing in the area and the frequency of their occurrence in the area?

| CRIME TYPE | FREQUENCY 1. High 2. Medium 3. Low 4. Indifference | AREA | PHYSICAL CHARACTERISTICS OF THE REA | EXISTING SOLUTION/COPING MECHANISM | SUGGESTED SOLUTIONS |
|-------------------------|---|-------------|--|---|----------------------------|
| ASSAULT | | | | | |
| BURGLARY | | | | | |
| ROBBERY | | | | | |
| CAR JACKING | | | | | |
| RAPE | | | | | |
| OTHERS (Specify) | | | | | |

4.0 CRIMES AND LAND USE TRANSFORMATION

15a. Is there any crime(s) you can attribute to land use transformation in the area? A. Yes B. No

b. If yes, which type of crime(s) can you attribute to land use transformation in the area?

16a. Which type of land use is prone to crime incidences in the area?

| Land Use | Planning No. Code | Crime Type | Reason(s) |
|--|-------------------|------------|-----------|
| Residential- Low density | 0 | | |
| Residential- High density | 0 | | |
| Industrial | 1 | | |
| Educational | 2 | | |
| Recreational e.g. sports ground, pool table joints | 3 | | |
| Public Purpose e.g. Churches, Halls | 4 | | |
| Commercial | 5 | | |
| Public Utilities e.g. Dump Sites, Road Reserves | 6 | | |
| Transportation e.g. Bus Terminus | 7 | | |
| Undeveloped/Deferred | 8 | | |
| Agriculture | 9 | | |
| Mixed Land Use | | | |

17a. Is there type(s) of land use transformation that can lead to reduction of crime?

A. Yes B. No

b. If yes, which one(s)? _____

18a. Which type of crime(s) is likely to be impacted by the land use change?

b. Why?

5.0 LAND USE TRANSFORMATION AND CRIME MITIGATION

19a. Have you ever been involved in any form of physical development in this area?

A. Yes B. No

b. If yes, did you seek permission from any authority? A. Yes B. No

c. If Yes, from whom?

d. Describe the kind of development you are/were involved in and its impact on crime in the table below

| No | Development/Land use changes (description) | Impact on Crime |
|----|--|-----------------|
| 1. | | |
| 2. | | |

20. How has the land use changes transformed crime in this area? **(If there has been any kind of transformation in your opinion)**

21. How has the adjacent land use developments/changes affected crime incidences in this area? (If any)

22a. Are you aware of any land use planning policy documents for Dandora?

(a) Yes (b) No

b. If Yes, which one(s)?

a) 23. Do you experience any crime-related challenges/problems associated with these land use changes in Dandora? a) Yes b) No

24. If yes, briefly describe the nature of the challenges? _____

25. In your opinion what should be done to contain or reduce crime in the area?

26a. In your own opinion how is the rating of the following services and facilities in Dandora? (Tick appropriately) 1. Very Unsatisfied 2. Unsatisfied 3. Indifference 4. Satisfied 5. Very Unsatisfied

Facilities/Services Provided

Satisfaction Level

| | 1 | 2 | 3 | 4 | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 5 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Security | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Lighting | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Neighbourhood Layout | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recreational facilities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Shopping Facilities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Communication Facilities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency response | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Are there any crime(s) you can attribute to land use transformation in the area?

A. Yes B. No

27. What do you perceive as the possible implications of the land use changes on crime if the situation is left the way it is?

28. In your opinion what planning input and policies can you propose in Dandora to curb the crime challenges in the area?

29. What have you done personally to ensure that you are secure from crime?

APPENDIX 2: HYPOTHESIS TESTING TABLES

Table 35: Hypothesis Testing

| | | B | S.E. | Wald | Df | Sig. | Exp(B) |
|-----------|----------------------------|--------|------|--------|----|------|--------|
| Step 1(a) | Change s in land use | 1.796 | .447 | 16.138 | 1 | .000 | 6.023 |
| | Constant | -3.368 | .727 | 21.438 | 1 | .000 | .034 |

a Variable(s) entered on step 1: q21a.

Table 36: Modal Summary

| Step | -2 Log likelihood | Cox & Snell Square | R Nagelkerke R Square |
|------|----------------------|--------------------------|-----------------------------|
| 1 | 120.559(a) | .150 | .209 |

a Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

APPENDIX 3: COMMUNITY MAPPING PHOTOGRAPHS

Dandora Community Policing Members Mapping



APPENDIX 4: CRIME STATISTICS

NAIROBI DIVISIONAL CRIME DATA FOR THE YEAR 2010

| OFFENCE | DIVISIONS | | | | | | | | | | TOTAL |
|--------------------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|---------------|-------------|
| | CENTRAL | KASARANI | GIGIRI | B/BURU | KAYOLE | KILIMANI | EMBAKASI | LANGATA | NGONG | KAJIADO NORTH | |
| HOMICIDE | 19 | 20 | 16 | 21 | 16 | 7 | 12 | 17 | 6 | 1 | 135 |
| OFFENCES AGAINST MORALITY | 14 | 41 | 11 | 24 | 23 | 32 | 23 | 29 | 21 | 9 | 227 |
| OTHER OFFENCES AGAINST PERSONS | 155 | 204 | 33 | 209 | 53 | 143 | 84 | 158 | 57 | 29 | 1125 |
| ROBBERY | 50 | 45 | 40 | 44 | 21 | 47 | 33 | 59 | 21 | 6 | 366 |
| BREAKINGS | 116 | 45 | 21 | 49 | 22 | 86 | 41 | 68 | 32 | 21 | 501 |
| THEFT OF STOCK | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 7 | 14 |
| STEALING | 533 | 141 | 28 | 144 | 27 | 203 | 79 | 150 | 57 | 21 | 1383 |
| THEFT BY SERVANT | 135 | 68 | 9 | 29 | 9 | 66 | 62 | 35 | 13 | 9 | 435 |
| VEHICLE AND OTHER THEFTS | 86 | 40 | 21 | 52 | 25 | 72 | 22 | 57 | 8 | 0 | 383 |
| DANGEROUS DRUGS | 73 | 36 | 7 | 48 | 24 | 22 | 22 | 38 | 16 | 14 | 300 |
| TRAFFIC OFFENCES | 8 | 4 | 0 | 4 | 1 | 1 | 3 | 0 | 0 | 0 | 21 |
| CRIMINAL DAMAGE | 29 | 19 | 2 | 21 | 12 | 23 | 14 | 17 | 12 | 9 | 158 |
| ECONOMIC CRIMES | 386 | 58 | 40 | 32 | 17 | 116 | 37 | 30 | 6 | 1 | 723 |
| CORRUPTION | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 |
| OTHER PENAL CODE OFFENCES | 70 | 48 | 27 | 47 | 12 | 45 | 20 | 34 | 23 | 2 | 328 |
| GRAND TOTAL | 1675 | 771 | 255 | 724 | 264 | 866 | 452 | 694 | 272 | 129 | 6102 |