

**COMMUNITY ENGAGEMENT OF LOCAL SPACE IN  
CRIME MAPPING AND POLICING OF INFORMAL SETTLEMENTS:  
A STUDY OF CATO CREST INFORMAL SETTLEMENT**

**By**

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## **DECLARATION**

I declare that, “**COMMUNITY ENGAGEMENT OF LOCAL SPACE IN CRIME MAPPING AND POLICING OF INFORMAL SETTLEMENTS**” is my own work.

This study represents my original research and has not been submitted in any form to another University. Where I have used work of other authors and researchers, it has been specifically indicated and acknowledged by means of completed references in the text described in this dissertation. This research was empirical and accomplished under the Supervision of Professor Monique Marks (Department of Development Studies) and Doctor Hema Hargovan (Department of Development Studies).

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## **DEDICATION**

This dissertation is dedicated to my loving and supportive wife Patricia, my children, Taitum and Liam, and my parents, Shah and Meena Singh.

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In completing this research, I would like to record my heartfelt appreciation to the following persons who are acknowledged and contributed to the success of this research:

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## **ABSTRACT**

In any country where there are informal settlements, crime prevention and combat is, to a great extent, determined by the availability of reliable information about crime and about the physical environment in which it occurs. Of equal importance in reducing crime is accurate reporting on the behalf of the public and accurate mapping of crime incidences on the part of the police. Informality makes such information gathering, reporting and mapping extremely challenging.

Street level geocoding match rates are lower in informal settlements areas compared to formal urban areas, due to the fact that these areas are unplanned without any road networks or proper address points. To determine the success or otherwise of measures taken to control crime in informal settlements, it is necessary for a system to be in operation whereby crime can be geocoded to a specific location.

The integration of community local knowledge with Geographic Information Systems can help populate urban-based geospatial databases for informal settlement crime mapping, and a mental mapping exercise can contribute by the identification of landmarks which can be geocoded.

The aim of this research was to establish how community understandings and constructions of their local geography can contribute to ‘official’ police crime mapping and, consequently, to the improvement of policing in informal settlements. In order to achieve this research objective, community ‘mind maps’ were explored through focus groups and these were correlated with police geocoding and mapping systems. The aim here was to explore whether and how these systems can work together in dealing more effectively with crime and in enhancing police-community relations in informal settlement areas.

A key finding of this research was that, coming together or integration between community generated mapping information and conventional GIS methodologies, has the potential to completely transform the way in which informal settlements crimes are mapped.

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## **LIST OF ABBREVIATIONS**

ABM	:	Area Based Management
ANC	:	African National Congress
CAS	:	Crime Administration System
CBD	:	Central Business District
CPF	:	Community Police Forum
DFR	:	Durban Functional Region
GIS	:	Geographic Information System
INK	:	Inanda ,Ntuzuma & Kwa-Mashu
iTRUMP	:	Inner eThekwinI Rejuvenation Urban Management Programme
PES	:	Police Emergency Service
POP	:	Public Order Policing
RDP	:	Reconstruction &Development Programme
SAPS	:	South African Police Servic

# CHAPTER ONE

## GENERAL INTRODUCTION

*“Each name suggests a story which has never been forgotten”. (John Steinbeck)*

I want to begin this dissertation with a story about a name. This story is about a place with a name – Mwananyamala. This named place is a small African village and its name tells a story which hasn't been forgotten to this day.

The story goes like this: Back in the old days, when there were less people and their houses more scattered, a big population of lions lived in the area around a village. The lions would sneak into the village under the cover of darkness to look for food, mostly pigs, which people raised. The people knew they were coming. They heard the footsteps and recognized the heavy breathing of lions in the dark. People would sit in their houses, too scared to move, too scared to breathe. Quietly, with a whisper, the mothers sang to their children to comfort them “Mwananyamala!”, “Baby be quiet!” Later on in time, the village came to be called by its people by the name Mwananyamala. The people of the village gave this name as it had meaning in their minds and in their daily experiences. They played a role in defining space, in creating geography.

This research is concerned with the community's contribution to crime mapping in a place where there is very little formal mapping – Cato Crest, an informal settlement in urban Durban. I aimed to establish how community perceptions and self-organisation of geography can be combined with police mapping systems to make the policing of informal settlements ‘smarter’.

Given this broad objective, there were four key questions that underpin this research:

- How do communities in informal settlements create mental maps to make sense of their lived geography?
- How do and could police make use of community generated mapping in their own crime mapping systems?

- In what ways can police and community members collaborate to establish maps and a spatial data base to assist in the combating and prevention of crime?
- Does community mapping have any tangible impact on the policing of informal settlements?

Informal settlements are a result of poorly planned and managed urbanization processes. This rapid and unplanned growth of the urban population is a big concern for all governments, but most particularly in developing countries where resources are limited and government capacity is weak. People living in informal settlements generally have poor life chances and a compromised quality of life. They usually live in dire circumstances (Carazzai, 2002).

Many of the problems faced by those living in informal settlements pertain to security. Housing structures are insecure and there is no formalization of road names, nor proper planning of infrastructure such as roads, sanitation and transport hubs. Given the lack of street names and proper maps in these areas, as well as a very liquid population, policing informal areas is very challenging (Pelser, 2000:5).

The biggest hurdle to policing such areas, from a police perspective, is the almost complete lack of formal mapping. Most informal settlements in South Africa are not to be found on conventional town maps – as though they do not exist. Residents of informal settlements have had to find creative ways of making sense of their lived geography, particularly by allocating their own names to significant places and spaces such as “Bottle Brush”, “Siyanda”, ”Fast Track”, and ”Congo”. Reporting crime is a challenge for those living in informal settlements, and documenting crime and other policing incidences is very taxing for the police whose jurisdictions include informal settlements.

Limited spatial coverage of maps and therefore the inability to maintain appropriate crime patterns are but two of the problems that regularly confront police in the field of crime prevention and police service delivery within informal settlements. Without a common understanding of crime patterns, police and the public cannot engage the real safety challenges in these localized areas (Sliuzas, 2001:2).

As stated above, the difficulties of policing informal settlements are essentially rooted in

the lack of urban planning that usually accompanies housing developments. Poor or non-existent urban planning leads to failures in service delivery, and quality of life deficits may in turn feed crime and disorder. For the police, having good data sets for these areas may be even more important than having those for the more formalized suburbs (Barry & Ruther, 2005). Establishing such data sets requires a combination of local knowledge together with the use of tried and tested technologies such as Geographic Information Systems (GIS). This dissertation, in part, aims to explore what local knowledge existed and could be tapped into, to create maps and spatial information sets. It also explored how this localized knowledge could be aligned to more formalized knowledge generating technology and procedures.

In order to police effectively, an understanding of geography of an area is important. The environment supports or does not support criminogenic activities. However, the ability of the police to make use of mapping is dependent on proper and meaningful geographical information of the area, landmarks, locations, and street names. None of this really exists in informal settlements. Without this, crime cannot be mapped according to its proper location. As a result, very little exists in the way of providing correct or physical address points to plan combat operations, aid investigative services and generate intelligence for policing operations.

The use of GIS by law enforcement agencies in the analysis of crime is rapidly coming into its own as an invaluable decision making support system in efforts to tackle crime through the identification of crime patterns, trends, clusters as well as the application of more sophisticated types of analyses. The power of GIS lies in the ability of the researcher and the police to discover the underlying patterns and characteristics of crime clusters and for practitioners to target high crime areas with effective crime prevention measures at specific locations.

Crime mapping offers a powerful way for police and the public to define the patterns of crime and to track how police actions affect crime. Crime mapping is not only used for analyzing patterns of fear, perceptions and concerns, but is also an integral tool for intelligence gathering, police services delivery and response, management reporting, problem analysis and real time-time patrols updates to neighbourhood patrols. The map generation process allows street officers, their senior commanders and public

representatives to develop a common picture of an area, incorporate emerging information that helps to explain crime patterns, and suggest solutions, and monitor changes over time. (Markovic & Stone, 2002:1).

Proper crime mapping therefore enhances the possibility of effective policing. Not surprisingly, then, police agencies across the world have relied on wall maps to detect patterns in the locations of certain crimes, but the recent use of computers to map crime has greatly increased the value of mapping. Standard commercial computer mapping programs allow users to examine patterns of particular crimes, at certain times of the day and in relation to other geographic, economic and social data. With contemporary technology, maps can be widely shared and quickly updated with the latest information.

Crime mapping provides cartography of the crime problem, an analytical chart to uncover the answers and influences the development of theories that can provide a route map to the solution. Being able to overlay additional layers of socio-economic and demographic data allows for the formulation of more cost effective and contextual crime reduction strategies through the appropriate deployment of resources based on mapped and analysed incidents of crime (Rich, 1999:37; Goldstein, 1990:72; Boba, 2001:13).

This research was aimed at understanding how policing in informal settlements occurs, how local communities and police make sense of these areas, and how community mental maps of the space are created to improve police service delivery. The research study was based in Cato Crest in Durban. Cato Crest is an informal settlement, situated west of the city of Durban with a total land size covering approximately 4 square kilometers. The current area of Cato Crest informal settlement has a combination of housing types that include formal brick houses recently created through RDP (Reconstruction and Development Programme) housing projects, mud houses and shacks built with corrugated iron which characterize its partial formal and predominately informal township setting.

By capturing geographic intelligence data that more accurately and precisely articulates how the community is viewing their situated environments, the overall aim of this research was to generate policing interventions that are more effective and efficient. While this dissertation focuses on one case, Cato Crest, the spatial relationships methodology developed in this community can be implemented in other informal settlement areas in

South Africa as well and perhaps in other parts of the world. GIS systems thus become a tool that can help explore these relationships.

This research employs a participatory GIS approach within the broader GIS and Society conceptual framework to examine how the integration of community local knowledge can help populate urban-based geospatial databases for informal settlement in crime mapping and policing.

In order to achieve my objective of creating more complete and representative urban geography maps, I used focus groups drawn from police and community groupings and employed a GIS and Society approach and integrated local community perceptions of informal settlement geography into a GIS for a more place-based understanding of the Cato Crest informal settlement. The information gathered from the community focus groups was integrated to create maps that make sense to both the police and the local community.

This study provides conceptual guidance for integrating local community knowledge with geo-spatial technologies, where crime can be mapped to its proper locations using community names and demarcations as reference points.

Through the use of new crime mapping techniques better information can be harnessed about the relationship of incidents and patterns of criminal activity in the area. This is a fundamental requirement for decent intelligence-led policing (Ratcliffe, 2003:2), particularly in less formal geographical spaces.

## **WORKING DEFINITIONS**

In this dissertation I make use of a range of terms that may not be familiar to the reader. I have therefore chosen to provide definitions of some of the key terms used in this dissertation.

## **Crime Analysis**

Crime Analysis is an investigative tool, defined as “the set of systematic, analytical processes that provide timely, pertinent information about crime patterns and crime-trend correlations. This assists the operational and administrative personnel in planning the deployment of resources for the prevention and suppression of criminal activities, aiding the investigative process and increasing apprehensions and the clearance of cases” (Boba, 2005:5).

## **Crime Mapping**

Crime Mapping is used by analysts in law enforcement agencies to map, visualize, and analyse crime incident patterns. Maps offer crime analysts graphic representations of crime-related issues. It is a key component of crime analysis and CompStat policing strategy. Mapping crime, using Geographic Information System, allows crime analysts to identify crime hot spots, along with other trends and patterns. Crime analysts use crime mapping and analysis to help law enforcement management to make better decision, target resources, and formulate strategies, as well as for tactical analysis (Maltz, Andrew & Friedman, 2000:2).

## **Participatory Mapping**

Participatory mapping is an interactive approach that draws on local people’s knowledge, enabling participants to create visual and non-visual data to explore social problems, opportunities and questions. Participants work together to create visual representation of a place using tools and materials at their disposal. At the same time, while creating their map, the group may deliberate over how to best represent the place in question, share their observations as they go along, and tell personal stories and anecdotes. This can lead to rich and sometimes surprising data for social research (Chambers, 2006:1).

## **Human Geography**

Human geography is the science that describes and analyses spatial patterns of static and moving phenomena of human nature that are present on the earth (Van der Avoort,

2005:25). Criminal appearances are also part of those phenomena, which means that they are an indirect subject of human geographic studies. Human Geography falls within the social science category and can be defined as “the part of the discipline of geography concerned with spatial differentiation and organization of human activity and its interrelationships with the physical environment” (Van Niekerk, 2009:7).

### **Definition of GIS**

GIS stands for Geographic Information System and can be described as “a system of hardware, software and procedures to facilitate the management, manipulation, analysis, modelling, representation and display of geo-referenced data to solve complex problems regarding planning and management of resources” (Nordin, 2004:2). Cowen (1988:1554) defines a GIS as a “decision support system involving the integration of spatially referenced data in a problem-solving environment”.

### **Hot Spot Analysis**

GIS identifies areas that contain dense clusters of crime events or incidence which are known as “hotspots”. These high concentration areas usually demand special police attention. For example, GIS can allow an analyst to identify all the areas in the Westville Police station jurisdiction where at least five hijackings occur within a 1 kilometer radius or at a specific location. These are then outlined on a map. Using GIS to identify hotspots provides a consistent method to measure the concentration of criminal events over time (Johnson, 2000:1).

## **STRUCTURE OF THE DISSERTATION**

### **Chapter One: General Introduction**

The introductory chapter describes the general orientation of the research, which includes and discusses the background of the problem being studied. Concepts central to this research are defined and the structure of the chapters that constitute this dissertation is outlined.



## **Chapter Two: Methodology**

Chapter Two is the research methodology followed to meet the objectives of this study. This includes the research aim and objectives, value of the study, problem statement, the research approach design, together with the methods used to collect data, data analysis and ethical considerations.

## **Chapter Three: Literature Review**

The fourth chapter is theoretically focused. It examines the relationship of crime mapping and mental mapping to environmental criminology. It further examines the relationship of mental mapping and its contributions to crime mapping, including discussions of cognitive reference points and spatial cognition theory and community and participatory mapping in relation to mental mapping. Crime mapping will also be introduced in this chapter since its home is, in many ways, environmental criminology. The crime mapping theme will also be discussed in the more empirical chapters.

## **Chapter Four: Background of Cato Crest**

Chapter Three provides a historical and social background to the informal of Cato Crest. It provides a profile of the area under study. The chapter also describes the geographical and social characteristics of Cato Crest, and its infrastructure.

## **Chapter Five: Policing of Cato Crest**

This chapter reviews the current position of policing in Cato Crest by discussing the policing challenges. In this chapter the voices of community members and the police will be central and will provide the reader with an understanding about the police and community perceptions and the service delivery challenges. The chapter concludes with a review on the issues relating to infrastructure and its impacts on crime mapping and policing in Cato Crest.

## **Chapter Six: Crime Mapping**

Chapter Six examines community perceptions of geography, particularly in relation to the lived reality of Cato Crest. Crime mapping in South Africa and informal settlements is also discussed, as well as the current crime mapping in Cato Crest.

Chapter Six integrates the literature on crime mapping with the empirical findings of the focus groups held in Cato Crest. This chapter examines how the community of Cato Crest maps the geography in informal ways and have significance that can be of use to formal institutions such as the police. The creation of a spatial database, the use of GIS technology, in its current form, and how GIS systems could be adapted to fit with community mental mapping is addressed.

## **Chapter Seven: Conclusion and Recommendations**

The chapter reviews the whole research dissertation and makes recommendations based on the findings. The relevance of this research to criminology, and the theoretical contributions derived from this research, also is presented.

## **CHAPTER TWO**

### **METHODOLOGY**

*“If we knew what it was we were doing, it would not be called research, would it?”*

**Albert Einstein**

#### **INTRODUCTION**

Research, particularly qualitative research, is always fluid. We enter into situations not really knowing what to expect, but rather being open to what the data says to us. Of course we have our own preconceptions, but we need to be open to being surprised by what we find. Having said this, all good research requires a focused question, and a sense of purpose. Our objectives and our framework allow us to create research designs and to identify appropriate methods for doing research.

The focus of this particular chapter is on my choice of methods and it provides details as to my role as a participant observer, and as a facilitator of focus groups. Research ethics are also discussed.

#### **BACKGROUND AND OUTLINE OF RESEARCH PROBLEM**

As noted in the introductory chapter, within informal settlements there are few, if any, street names and formalized landmarks such as schools, churches and parks. “‘Conventional’ urban maps have failed to incorporate the geographic details required to plan adequately and effectively within informal settlements. This problem with planning impacts as much on crime prevention and combat as it does on any other public good planning that is required for general well-being and effective service delivery.” (Barry & Ruther, 2005:43).

One way of getting around the disjuncture between formal and informal mapping in regard to crime is to develop and test an alternative approach to existing spatial mapping and geographic identification. Such an alternative approach entails the involvement of local

community members in the identification of local landmarks and demarcations as well as places of significance. It was envisaged that the involvement of the community in mapping processes has the added benefit of giving a voice to localized perceptions of what Innes refers to as 'signal crimes' i.e. crimes that are significant to community members rather than reliance on the 'bureaucratic inertia' of the public police (Innes, Abbott, Lowe, & Roberts, 2009:101).

What I wanted to determine was the role and value of the Cato Crest community's local knowledge of geography and crime in their area, and how this could contribute to crime mapping and policing of Cato Crest informal settlement. In order to gain access to this local knowledge, I made use of an environmental criminology approach which advocates the importance of crime mapping through mind mapping. It is now widely accepted in the criminology literature that people carry a great deal of information in their heads relating to the likelihood of a crime occurring at any given location and time. This study draws on criminological theories of mind mapping and intelligence led policing. Kevin Lynch first examined mental maps in the late 1950's and early 1960's. Lynch (1960:18) found predictability in the way people interact with the built environment and suggested that a good impression of an individual's image of the environment can be elicited through freehand sketch maps. Such maps show the building blocks into which individuals disaggregate the city in their minds (paths, nodes, edges, landmarks, districts etc.).

The larger objective was to discover whether it is possible to align local informal crime mapping with more formal police crime mapping processes.

## **VALUE OF THIS STUDY**

This research study was focused on Cato Crest informal settlement and dovetailed with initiatives which were already underway to resolve the problem of crime mapping in this area.

There are three rationales for this intended (action orientated) outcome. Firstly, by applying new techniques to crime mapping, the research provides new information about what crimes are taking place in the area, according to the systems developed by community members themselves, in collaboration with the police in the area. This is

important not simply for testing new crime mapping processes but also for improving police planning, deployment strategies and the monitoring of crime displacements. In turn this allows for more effective (targeted) use of (finite) police resources (Innes, Abbott, Lowe, & Roberts, 2009:110). This is an exploratory study that could assist with future model building.

Secondly, through the use of new crime mapping techniques, better information can be harnessed about the relationship of incidents and patterns of criminal activity in the area. This is a fundamental requirement for decent intelligence-led policing (Ratcliffe 2003).

Thirdly, through experimenting with new mapping technologies in Cato Crest, it will be possible to distinguish between actual crime and reported crime. At present, many residents of informal settlements do not report many crimes to the police because they are aware that the police are unable to locate crime sites and record incidents accurately.

The use of integrated crime mapping will help inform and overcome inaccurate perceptions of exactly where problems are located in the Cato Crest informal settlement, and will present information in a visually accessible format to Cato Manor police who are responsible for policing Cato Crest. This will enhance operational decision making, proper resource allocation and managerial accountability.

## **RESEARCH APPROACH AND DESIGN**

The research methodology employed is qualitative in nature, both descriptive and explorative. Qualitative research refers to research that produces descriptive data such as persons own written or spoken words and forms of observations that are recorded in language, behaviours etc. These include field observations, focus groups, and in-depth interviews (Terre Blanche, Durrheim & Painter, 2006:305).

In using these methods I was able to gather information that was very detailed and rich. “It is this very exhaustive recording of events and an interview that makes that data so rich and significant so that the subject matter at issue can be better understood.” (Neuman, 1997:327-328).

I approached my participants with a triangular research method consisting of participant interviews, semi-structured interviews follow up interviews and focus group discussions.

## **Sampling**

Sampling can be defined as the “selection of research participants from an entire population, and involves decisions about which people, setting, events, behaviours and or social processes to observe.” (Babbie, 1986:163).

An ideal population sample would have included all the residents of Cato Crest informal settlement, but such approach was not practical. For the purposes of this research, I selected the sample groups to focus on rich information from the community and the police, rather than trying to include the whole population.

Purposive sampling was used to determine who will form part of the focus groups and who will be interviewed. In purposive sampling, samples are selected with a purpose in mind, and one or more specific predefined groups are targeted (Du Plooy, 1995:62). This type of sampling permits the selection of interviewees whose qualities or experiences indicate an understanding of the phenomena in question, and are therefore valuable. This is the strength of purposive sampling. According to Du Plooy (1995:63) the advantage of a purposive sample is that the units selected are qualified to assist in the research. One can ensure that groups found in the population are represented in the sample. In this study, the sample included representatives of the community and the police.

For the purpose of this research, five separate focus groups were conducted with members of the Cato Crest community and members of the Cato Manor Police Station. Three focus groups were held with the community representatives and two focus groups were held with the police. The focus groups were arranged via Safer Cities, a department of the eThekweni Municipality responsible for facilitating improvement of community initiatives in terms of safety and security within the eThekweni Municipality. This was then followed by a consultation with members of the Cato Manor Community Police Forum and sector team.

‘Focus group’ is a general term given to research interviews with a group who share a similar type of experience (Terre Blanche, Durrheim & Painter, 2006:305; Stewart &

Shamdasani, 1990:12). Focus groups are used to determine 'group thinking' about a particular issue and to facilitate deliberations that might lead to new ways of thinking about specific problems and dilemmas. Focus group discussions are conducted with small structured groups and are led by a facilitator. These discussions can help test attitudes and opinions on controversial or sensitive issues, like the discussion Blauner and Weelman in 1982, which tried to probe feelings about critical racial issues and their causes (Ferreira & Puth, 1988:165-169).

Three focus groups were held with community members. One focus group consisted of ten people who are community leaders who represent the community in liaising with Municipality regarding service delivery at Cato Crest. A second group was made up of twelve residents from Cato Crest who have been victims of crime and/or are active members of community policing forums. A third community focus group was held with twelve young people in Cato Crest who are either creating their own mental maps or are adopting the mind maps that are already established by older generations. The following key questions guided each of these group discussions:

- How would you describe the relationship between the police and the community in your area?
- When you report a crime or an incidence to the police, do they respond effectively?
- In you view, what prevents the police from responding effectively to crime in your area?
- Do the police know where to come to when an incident or a crime is reported to them?

In addition, focus group discussions were also used to determine the geographic locations, community landmark names and demarcations of Cato Crest as perceived by the community, in order to establish a spatial data base.

Two focus groups were held with the police. One of the police focus groups comprised ten operational members working in the area, while the other comprised of eight police officers who are involved in crime information analysis. The following key questions guided each of these group discussions:

- How would you describe the relationship between the police and the community in your area?
- In your view, what prevents the police from responding effectively to crime in Cato Crest?
- Do the police know where to go to when an incident or a crime is reported?

## **DATA COLLECTION**

Various sources of data were used including participant observations, interviews with community members while visiting the area, focus groups and literature.

### **Participant Observation**

It was through participant observation that I became privy to much richer data than I would have obtained otherwise. It is these more informal interactions which are a vital part of the research process and it was here, in the field as a participant observer, that I came to learn so much about the Cato Crest community which I would not have learned from the interview process alone.

Iacono, Brown and Holtham (2009:39) state that in participation observation, the researcher purposively joins in the group's activities while observing them. According to Haralambos and Holborn (1991:744) it includes the "researcher becoming involved in some way or another in the everyday events of the world of the people whom he or she is studying".

The primary rationale for choosing participant observation as a method of obtaining data is that it provides a way to gain a complex and first hand understanding of the social dynamics of the area and the meanings that community members give to their own space and their localized experiences of insecurity.

I was mindful in the first instance of the ways in which community members describe their lived geography and the mind-maps that they use to make sense of where things occur and secondly, of how community members make use of their own mind-maps in dealing with the police. As a participant observer, I spent long hours conducting informal interviews



with the participants (local community members) and becoming more familiar with the environment. This gave me an opportunity to observe the value of the community's local knowledge and perception of geography in Cato Crest.

I became a regular customer at a local "Shisanyama", a place which sells and barbecue's (braai's) meat and was able to establish a certain level of trust and rapport with the community by socialising with customers and patrons at this spot. I gained an understanding of the community's sensibility of geography and the spatial definition that they gave to Cato Crest by listening to the accounts of their daily interactions in relation to their "own spatial environment". They would refer to particular locations where incidents occurred through the use of their own community names. For example, I remember patrons referring to the place where a young lady who had given birth in Cato Crest, as "Rama". I also attended a community meeting, scheduled on a Sunday morning, that took place at a common location known as "Esihlahleni", a significant place known for community meetings. It was amazing to see how the community assembled at this particular spot, having common knowledge of this particular spot to discuss community issues.

As a participant observer, I also regularly visited a place called "Big tree" where unemployed people met during the day to play a game of cards, spending time as a group talking about local community issues. It was here that I felt more of a participant than an observer. I was invited by residents to share a meal of bread, Simba chips and Coco Cola. I tended to move in the area surrounding 'Big Tree' on foot and this allowed me to witness the liquidity of the area. People moved in and out at a high rate, probably because of the popularity of this 'spot'. Given the density and the movement of people in this space I was able to interact with a wide range of people who were part of the Cato Crest community. I watched how people navigated their space with very poor road networks, no vehicle access, inadequate lighting and usually no formal sanitation facilities. The area itself is irregular in its infrastructure and so difficult to police. I often moved around the area on foot and witnessed vast amounts of people in and around the informal settlement moving around. My interaction exposed me to the general infrastructural characteristics of Cato Crest which includes a poor road network with no vehicular access in most areas, insufficient street lighting and general lack of sanitation.

Another way in which I became a participant observer was by taking rides on minibus taxis

in Cato Crest. These rides provided me with the opportunity to interact with passengers who lived in Cato Crest and to chat to them about crime and insecurity, and to gain ideas about their mind maps. I was able to understand how people mapped out their space by observing taxi routes and hearing the names that were attached to particular places. Everyone in the minibus taxi understood what terms referred to which places. A localised knowledge of space clearly exists in Cato Crest, shared by taxi drivers. This knowledge has become institutionalised within the community yet is not part of the formal mapping process of the municipality or even of the police.

Another scene of participant observation was the community policing forums which took place in Cato Crest as well as other community events such as sporting events at the high school. In these places I was able to listen to the stories that people told about their lived geography, their sense of security (or insecurity), and the ways in which they make sense of the informal governance of almost every aspect of their lives. It was not difficult to do participant observation work in Cato Crest. I have worked in Cato Crest as a police officer for many years, and the residents in this community are familiar with me. They did not see me as a 'stranger' and I did not feel in any way threatened in terms of my safety. It is interesting to note that despite the fact that community members were aware of my being a cop, they were critical of the police in the focus groups. Members of the community often referred to me as "Singh" as they found it difficult to pronounce my name, Shalendra.

At the beginning of the fieldwork I used semi-structured interviews. I began by introducing myself and explained my research goals. In addition, I used this opportunity to gather some basic background information on the participants, keeping the interview less structured so that I could establish a general direction for conversation and thereafter pursue specific topics raised by the participants. Bray (2008:309) states that interviews complement participant observation because they enable the researcher to compare the interview with the actual observed behaviour in the field.

In addition, I attended the Crime Combating Task Group meeting and Crime Information Analysis meetings. The aim of this participant observation process was to establish which Information Systems are used and to gain insight as to how police evaluate the effectiveness of these systems. I spent time in the charge office, observing how complainants from Cato Crest cases were dealt with and the challenges of trying to register

such cases with unknown physical address points on the CAS (Crime Administration System).

I also accompanied members on patrol duty to see what mapping the police use in their policing of Cato Crest and to establish whether or not they take account of community mental maps in operational planning and interventions. Whilst on patrol I often observed and evaluated member's efficiency and challenges, in regards to complaints in Cato Crest and their difficulties in locating the exact location of complainants. There was a considerable amount of time spent trying to locate the complainant especially on the night shifts. The operational policing duties also included responding to crimes in progress in other areas of Cato Manor and high speed chases of stolen motor vehicles. This allowed me to evaluate the efficiency of the police locating complaints in areas which have formal demarcations with proper addresses and street names, such as Bonella, which is next door to Cato Crest. The response time obviously differed from that in Cato Crest.

Aside from interviewing the community in semi-structured interviews, I also interviewed other key informants such as the CPF (Community Police Forum) head, local community representatives and the ABM (Area Based Management) Manager, who could give me input about the service delivery between the police and the community. English was not a communication barrier, as they were involved in other community initiatives with the police which were conducted in English.

### **Focus Group Interviews**

The advantage of using focus groups in this research is that it enabled me to understand the general feelings of community members regarding the research problem and establish reliability of the information given by comparing the participants' responses. Most importantly, focus groups allowed for debate, exchange of ideas and change of thought.

The focus group method enabled me to invite participants to sit down at a neutral venue where we could have undisturbed group discussions. The focus group discussions were held at the local Cato Manor library as this was the most convenient place for the participants. At times these focus groups were very frustrating, as participants sometimes did not arrive as promised and therefore meetings had to be postponed. This is to be

expected in communities that are fluid and where members of the community may not be used to research processes. Being a research participant was probably not viewed as a priority for them.

In these community focus groups, I asked questions that pertained to community mind maps and the effectiveness of existing police GIS systems. As the focus groups progressed we became very comfortable with one another to the extent that the participants often allowed me insight into their feelings and thoughts involving some of the political activities that had an impact of policing in Cato Crest. I noticed from body language that in the initial phases of the research, participants did not feel comfortable with the focus group discussions, and with the questions that were being asked. Participants in these early focus groups refused to make eye contact, and looked away. They also spoke very softly initially.

The focus groups that were held with the police established how the police understand the effectiveness of their existing GIS systems. These focus group discussions were directed at eliciting police views on the incorporation of community mind mapping into formalized police mapping. The police officers were much more confident and articulate due to their educational levels. Body language also highlighted the participants “emotions”, especially when they felt strongly about a topic. A good example of this was when a participant expressed his frustration with the fact that other members of the police could not locate him when he was shot in Cato Crest because of the lack of street names and geographic identifiers. He gesticulated a lot and stood up to emphasize the point he was making, demonstrating his frustration.

The questions for both groups (community and police) were structured, so that I was able to directly manage the conversation to ensure that the discussion was consistent with the research objectives. The questions I asked remained open-ended and allowed the participants to respond in their own time. According to Bray (2008:310) open-ended questioning allows the participants to express themselves.

I played a facilitator role in these focus groups and realised the importance of remaining impartial to remarks made by the participants when their views were different to mine. This allowed the participants to express their own opinions without criticism from me, made the focus group discussions participant centered, rather than researcher centered.

Babbie and Mouton (2003:297) also talk about the importance of temporarily adopting your participant's point of view, to gain "insider understanding".

Each session was concluded with some refreshments which gave me an opportunity to speak informally to individuals who made interesting comments during the discussions. I depended on my memory and later noted any interesting points that were made. This served as a stimulus to recreate as many details of the day as possible. I always made copies of these notes which allowed me to make further notes and use a colour highlighter pen while preserving the original copies.

A digital tape recorder was used to record the contributions of participants which were then transcribed. Recording the interviews allowed me to fully capture the content and emotional responses of the participants. To increase the quality of information gathered during these interview sessions, I took field notes as well. At times I decided not to take notes during the focus groups interviews as this would interrupt the free flow of conversation. After each interview I spent some time summarising the interviews on the digital recorder.

### **Spatial Data Collection**

This research also had a practical component. Part of the process of this research was geared toward developing (through focus groups with community members) a shared and workable model for crime mapping in informal settlements. This involved developing a spatial database containing geographic points in Cato Crest generated from research with the Cato Crest community.

In the community focus group, a visual map was used to stimulate discussion and deliberations. This map was used to encourage focus group participants where the concept and role of using *cognitive maps* to identify landmarks, locations, common community names and demarcations that community members and police will have in regard to Cato Crest.

The research process provided a space in which community members discovered that they have a shared knowledge of their local area, superior to that of outsiders, including the

police. Discussions were inclusive and open and provided residents with an opportunity to highlight their problems whilst at the same time learning about and being mindful of the needs of others. The focus groups buzzed with the energy as the participants developed their maps and shared their ideas. This shows how community participation events can lead to better understanding between police and community, and can improve the police understanding of the environment.

Location types identified by the participants ranged from an informal crèche to spaza shops, foot bridges, informal businesses and taverns amongst others. An interesting aspect of the collected data included the fact that the community within Sector One had also informally demarcated this sector into ten separate areas.

## **Data Analysis**

Data Analysis is the culmination of a lengthy process of hypothesis formulation, construction of instruments and data collection (Bailey, 1994:378).

As several factors can influence the quality of focus groups interviews, considerable effort was made to minimise the risk of poor quality responses within the groups. However, even though much care was taken to maximize quality in these groups, it must be realized that the community cannot be assumed to have “a unitary set of values and interests” (Edwards, 1989), nor that those participating in the focus groups represent the diversity of interests likely to be found within the area. The results of these sessions are therefore only indicative of possible issues and priorities.

From the data collected from the focus groups discussions and interviews, I read through the transcripts and made a list of significant ideas that came to mind. This data was coded and then clustered by theme. Exploring these categories and themes is called elaboration, which I used to revise the coding system. The data collected was interpreted, checked and summarised. The qualitative analysis, in this research involved critical analysis and synthesis of narrative information to derive verbal rather than numerical conclusions.

## **Ethical Issues**

Research ethics is seen as the branch of philosophy that reflects on morally 'good' and morally 'bad' behaviour in scientific research (Dooley, 1984:330). My identity as a researcher was made known to all participants; I was an overt researcher. All information gathered in the focus groups remained confidential and the participants' anonymity was guaranteed and respected in the research process. All focus group members signed an informed consent form and participated voluntarily. The participants were allowed to terminate their participation at any point in the research process.

Sensitive police issues such as police corruption and racial discrimination are not discussed or exposed in the final research dissertation. I requested permission from the participants to use a digital recorder during these sessions. When the participants were concerned that information was sensitive or too personal, they requested that I stop recording. Recordings of sessions during the research were being kept in a locked cupboard. They were also informed that the only other person to access the recordings would be the transcriber.

Field notes from my participant observation were typed on my computer and a password was required to access the field notes. One of the ground rules of the focus groups was that all discussions that took place within the focus group remained within the focus group. I adhered to the prescribed University of KwaZulu-Natal code of ethics at all times.

## **CHAPTER THREE**

### **LITERATURE REVIEW**

*"You go where you know, and you know where you go." (Dr Kim Rossmo).*

#### **INTRODUCTION**

This chapter seeks to provide an overview of environmental criminology in relation to mental mapping and crime mapping. Environmental criminology speaks about the criminology of place, and seeks to find ways of preventing crime through environmental design.

Environmental criminology seeks to move beyond, and away from, bureaucratic state police solutions and explanations. Environmental criminologists emphasise that local communities understand and negotiate space and place in the face of crime or fear of crime. Communities make use of what environmental criminologists call ‘mind maps’ to make sense of place, particularly where spaces are not formally delineated or mapped out.

The mental map is a graphical way of expressing a subjective reality of space, that is to say, the way in which an individual imagines a part of lived space. This tool thus facilitates the collection of spatial representations that individuals make of their environment. The environmental information stored in memory is termed a cognitive, or mental, map.

While over the decades the idea of mental mapping has become familiar to urban and human geographers, mental maps are now the object of renewed interest as social construction of space, particularly in the field of environmental criminology. Applied to environmental criminology, and used as a supplement to crime mapping and intelligence led-policing, these maps are not only of great assistance in collecting spatial representations, but are also helpful in analyzing crime.

This literature chapter provides an account of environmental criminology, intelligence led policing and mind mapping as a background to the more empirical chapters which focus on



the way mind maps have been constructed in Cato Crest and how police and communities can jointly develop understandings of space in trying to deal more effectively with crime problems.

## **HUMAN GEOGRAPHY AND SPATIAL CRIME DATA**

Crime is inherently a geographic phenomenon, given that the scene of the crime is a particular point in space (Shelley & Clarke, 1994:390). When crime occurs, it happens in a very particular geographical location. It is not surprising then that there has been a significant interest among geographers in the issue of crime. Much of this human geography focuses on patterns, processes and responses in the local environment. The concern is with the localized interface between societal systems and spatial outcomes (Herbert, 1983).

Researchers have also focused on ecological relationships and the identification of crime 'hot spots' where, for example, police activity could be concentrated (Barr & Pease, 1992:200). This scholarly work falls under the broad umbrella of human geography which explores the interface between societal dynamics with those of space and place (Johnston, 1986:4).

The study of crime has been an important focus in human geography. There have been many theoretical and methodological advances that have allowed crime to be studied from a number of different geographical perspectives. These range from the empirical mapping and analysis of crime data to more critical appraisals of crime and society. Consequently, the geography of crime has developed into a rich and diverse sub-discipline of human geography and of criminology. Despite this richness, however, geographical studies of crime have been firmly entrenched in the urban environment and crime in the countryside has largely been ignored. This is at a time when there is growing public concern about rural crime and it's policing (Yarwood, 2001:1).

In recent decades, a strong synergy has been forged between human geography and criminology and a strong parallelism. This has become increasing so as a series of paradigmatic shifts have located criminology more within the ambit of social sciences.

The first model of geography of crime dates back to the early twentieth century when researchers who developed the concentric zone model of urban structure noticed that crime rates also tended to fit concentric patterns (Shelley & Clarke, 1994:390). Since the 1950s human geography has been concerned with quantitative methods and model building, in relation to spatial analysis, to identify regional and intra-urban crime patterns (van der Avoort, 2005:25).

Similar developments can be recognized in criminology, especially since the last decades with the introduction of environmental criminology. Interests in cognitive mapping, environmental perception and the values and meanings attached to 'place' have developed the framework for interaction between criminology and human geography and the development of a 'geography of crime' or 'criminal geography' in the 1970s. Geography of crime has a mainly descriptive role with attempts to explain crime patterns. These trends have been particular strong in Germany and the United States (van der Avoort, 2005:35).

## **SPATIAL PERSPECTIVES ON CRIME**

Lawman (1982:73) identifies four major stages which the spatial and ecological perspectives on crime underwent during the past 150 years. First, there was the cartographic school of criminology, which started in France and spread to other European countries, most notably England, from 1830 to 1880. The second stage was the Chicago ecological school of the 1920s and 1930s, followed by the third stage, the factor analytic school of the 1950s. The final and current stage is the geography of crime and environmental criminology. The cartographic school was called that because of the frequent use of maps to depict regional and seasonal variations in pattern of crime. One of the French exponents of the cartographic school was Andre-Michel Guerry, who mostly concentrated on the urban-rural differences in crime occurrence. Guerry also identified different seasonal patterns, concluding that crimes against property were more frequent during winter in the north of France, whilst the south had more incidences of crimes against person during summer (Herbert, 1982).

The spatial ecology of crime was developed at the Chicago School of Criminology with the work of Shaw and McKay. Shaw and McKay used data collected on crime in Chicago to map the homes of juvenile offenders through the use of dot maps to show actual

distributions and crime rate maps as well as to identify aerial variations in delinquency residences. These maps indicated a regular change from the centre to the periphery of the city, in terms of the number of offender residences. This research led to the conclusion that delinquents are concentrated near the city centre. These 'delinquency areas' were correlated with variables related to its physical and social environments such as "substandard housing, poverty, foreign-born population and mobility" (Herbert, 1982:21). This ecological analysis of areas with a large number of delinquents, in terms of the above variables, showed that the communities within these areas tended to function least efficiently as an agent of social control.

The factor analytic stage emphasizes empirical relationships between the geographic distribution of criminals and crimes and the characteristics of the different areas in which the criminals live or the crimes are committed (Lawman, 1982).

Most important are the studies of Morris (1957) and Lander (1954). Lander shows that an analysis of large areas, like Shaw and McKay did, does not show the underlying variations in crime, which has brought severe criticism of ecological theory. He also shows that the relation between the percentage of delinquents and the characteristics of different areas varies with time and place. Morris shows that areas where delinquents commit their crimes do not always correspond with the area where they live. In many older ecological studies the starting point is that delinquents live in the area where they commit their crimes. Morris shows that areas where crimes are committed and areas where criminals live are different (van der Avoort, 2005:19).

The final and current stage of spatial perspective on crime, according to Lawman (1982:173), is that of the complementary fields of the geography of crime and environmental criminology. This geography of crime represented the first attempts by geographers to enter the crime research in arena. This mainly involved engaging in a "modern form of research in aerial and ecological traditions" which forms the initial links with the geography of crime (Herbert, 1982:21). The majority of this work emerged in the USA, although British research is also well documented (Herbert, 1982:21).

## ENVIRONMENTAL CRIMINOLOGY

Deriving from the ecological tradition, Brantingham and Brantingham in the late 1970s coined the phrase environmental criminology. Environmental criminology introduces the concepts of the 'spatial dimension of crime' and the 'criminal event'.

According to Bottoms and Wiles (1997:305) environmental criminology is the "study of crime, criminality and victimization as they relate, firstly to particular places and secondly, to the way individuals and organizations shape their activities spatially and in doing so are in turn influenced by place based or spatial facilitators".

Environmental criminology suggest that we analyse a variety of characteristics about the physical landscape such as land use, access, and visibility, to determine areas that are conducive to crime (Paynich & Hill, 2010:4).

Environmental criminology had its intellectual beginning as early as the 1800s. Guerry (1833) and Quetelet (1842) researched early French crime statistics and mapped convictions for violent and property crimes at the department level. Crime statistics were compiled for the first time by Adolphe Quetelet, a Belgian statistician, to show that crime is a social phenomenon and that it can be analysed and explained with the aid of figures (statistics). Crime statistics entail all data and information on crime that are scientifically arranged and tabulated in order to offer a total picture of the crime problem.

Crime statistics, as used by the fathers of the ecological school of criminology such as Quetelet and Guerry, and the spatial plotting of criminal events, indicate the distribution of crime and crime clusters. The ecological criminologists were at pains to demonstrate that spatial patterns of crime persist over time and that this 'reality' can be used as a useful predictive device for policy makers and those concerned with developing anti-crime programmes (van der Avoort, 2005:17). Spatial analysis can assist with the analysis of the criminal event and the environment in which it occurred.

During the nineteenth and early twentieth century crime was seen as a form of social defiance-behaviour, which is different from 'common' behaviour and frequently observed patterns. Studies focused on the origin of criminal motivation which pointed out that this

traditional approach ignored several important dimensions. There has been a shift from a sociological to a geographical perspective thereby including the dimension of geographical space crime in crime research (van der Avoort, 2005:19).

Increasingly, criminologists and geographers have come together in a quest to show the importance of the interaction between space, biography and organization in crime patterns. The key question that they have tried to answer is “where does crime occur and why does it take place in those locations?”.

The growth of environmental criminology in the 1980s, spearheaded by Paul and Patricia Brantingham, allowed geography to make inroads into criminological theory. Environmental criminology fused criminological and geographical theories together with GIS and provided opportunities to empirically test the theories it was proposing through using geographic and mapping technology.

Significant contributions by Marcus Felson, George Rengert, Jim LeBeau and Keith Harries to environmental criminology using GIS and spatial statistics software continued, thereafter, to strengthen the role of geography in the study of crime (Chainey & Ratcliffe, 2005). As a result, criminology now has several geographic theories of crime such as defensible space, situational crime prevention, routine activity theory and crime pattern theory. Environmental criminology, then, is a family of theories that share a common interest in criminal events and the immediate circumstances (or place) in which they occur (Wilson, 2007:138).

Environmental criminology today draws its strength from a focus on the spatial distribution of criminal activity dependent of other variables in the crime equation. This orientation is certainly useful for describing patterns of crime. The use of official crime data such as incident location and arrest records has emerged as the dominant methodology in the criminology of place (environmental criminology) (Rosenbaum & Lavrakas, 1988:290).

According to Brantingham and Brantingham (1991:2), “environmental criminology argues that criminal events must be understood as the confluence of offenders, victims or criminal targets and laws in specific settings at particular times and places”.

Environmental criminologists look for crime patterns and seek to explain them in terms of environmental influences.

Environmental criminologists such as Brantingham and Brantingham (1991) and Carter and Hill (1980) have focused on analyzing the location and the environment where crimes occur. Their objective is to find out if there is a pattern in where, when and how crimes occur. This approach to understanding crime has proven very useful for policy makers and practitioners involved in crime combat or crime prevention enterprises since it provides technologies for identifying and analyzing crime patterns and change. These theories and approaches provided the fundamentals for what is today known as crime mapping (van der Avoort, 2005:20).

The theories developed by the environmental criminologists explained that crime could be understood in more depth by exploring its geographical components. This relationship can be investigated in the form of crime mapping with GIS because this tool can provide the medium within which crime data can be layered with geographic base maps and environmental data that represent the place and milieu of the area where a particular crime is associated (Tabangin, Flores & Emperador, 2008:17).

## **CRIME PATTERN THEORY**

Crime pattern theory attempts to describe how criminal opportunities come to the attention of an offender. Offenders may come into contact with criminal opportunities through their daily activities and awareness of space, which may centre on work, shopping or entertainment. These theories suggest that there may be environmental features in a neighbourhood that may draw criminals who do not live in the immediate area but may otherwise be familiar with or frequent the area (Eck & Weisburd, 1995:6).

Crime pattern theory is particularly important in developing an understanding of crime and place because it combines rational choice and routine activity theory to help explain the distribution of crime across places. The distribution of offenders, targets, handlers, guardians, and managers over time and place allows for prediction of crime patterns (Eck & Weisburd, 1995:6).

Crime pattern theory focuses on how and why crime happens in specific locations and at specific times. This focuses on the victim and target set in place and time with emphasis on the place of the criminal event. The criminal event can be understood in the context of people's normal movements through those places in the course of the day, week and year.

The distribution of crime in time and space is non-random. Because criminal behaviour is dependent upon situational factors, crime is patterned according to the location of criminogenic environments. Crime rates vary from suburb to suburb and from street to street and may peak at different times of the day, days of the week, and different weeks of the year. The purpose of crime analysis is therefore to identify and describe these crime patterns, and to link them to place (Wortley & Mazerolle, 2008:2). Crime then takes on a specific pattern and this pattern is largely structured by geography and other 'fixed' conditions such as age and gender.

Crime pattern theorists argue that it is possible to identify crime patterns and trends, and these are generally linked to space and environmental conditions. Kim Rossmo provides a guide for using crime pattern theory and research in practical crime investigation. He focuses upon the problem of serial violent criminals to illustrate the ways in which offender search can be used in combination with computer mapping capabilities to identify the probable home locations of violent offenders. Of particular interest is that Rossmo begins with the spatial pattern of the crime sites of a single offender and uses this information to locate a small area in which the offender is likely to live or work. His use of offender search theory and computerized mapping demonstrates the utility of environmental criminology for very practical purposes. His work provides a solid example of the potential ways in which crime place theory and method, drawn from the best of academic criminology, can be brought to the grassroots level of crime prevention activities (Eck & Weisburd, 1995:8).

## **INTELLIGENCE-LED POLICING**

Intelligence-led policing entered the police lexicon in the early 1990s. As noted, the origins of intelligence-led policing are a little indistinct, but the earliest references to it originate in the United Kingdom where a seemingly inexorable rise in crime during the late 1980s

and early 1990s “coincided with increasing calls for police to be more effective and to be more cost-efficient” (Ratcliffe, 2003:1).

Intelligence-led policing is the application of criminal intelligence analysis as an objective decision-making tool in order to facilitate crime reduction and prevention through effective policing strategies and external partnership projects drawn from an evidential base (Ratcliffe 2003:3-5).

With technological advancements such as crime mapping, environmental criminology has become proactive, which is the main concept in defining something in the category of Intelligence-Led Policing. To go further, we must analyse the location and predict the environment where crime will occur, to thus prevent it. It also defines the process associated with intelligence that is incorporated into crime-prevention strategies.

Intelligence played little role in the ‘standard’ model of policing which favoured a reactive and investigative approach to crime, rather than a preventative one. Prior to the 1990s, criminal intelligence was rarely used in any coordinated, proactive sense but was used on a case-by-case basis to gather evidence to support prosecutions (Ratcliffe, 2008:265). The driving forces for the move to a new, smarter, strategy of policing were both external and internal to the craft of the police (Ratcliffe, 2003:1).

The aim of intelligence-led policing can be interpreted from the tactical tasking priorities of the UK National Intelligence Model. This model postulates that crime is not randomly distributed, with the corollary that identification of hotspots of criminal activity is a worthwhile pursuit. It recognises the importance of working with partners to achieve crime prevention. There should be a spotlight on targeting the criminal and not a focus on the crime (Ratcliffe, 2003:2).

Intelligence-led policing is a conceptual model that uses crime analysis and criminal intelligence in strategic manner to determine offenders targeting behaviour. This model has been adopted by police officers throughout the world in recent decades. Police now talk about policing intelligently or smartly through using all available information that allows for an understanding of where crime occurs and why this is the case. In so doing, they draw heavily on information about the crime environment and on technological systems



such as GIS. The combined use of this type of information, together with the creation of policing networks, enables the police to target resources to the most vulnerable areas, known as ‘hot spots’ (Ratcliffe, 2008:266).

For example, the Metropolitan Police in 1998 using crime intelligence-driven programmes such as ‘Operation Bumble Bee’ and ‘Operation Eagle Eye’ succeeded in reducing burglaries to their lowest in 18 years; street crime such as robbery by 6%, theft and receiving of stolen goods to their lowest level since 1983, and motor vehicle theft to their lowest levels since 1980 (Zim & van Tonder, 2004:174).

The objective of this intelligence-driven policing strategy was to maximize the proactive response to hot spots and enhance the capture, analysis and dissemination of intelligence. All of this information provides the police with an overview of specific crimes. On the basis of such intelligence, crime combating strategies can be launched.

### **Hot Spots and Geocoding**

‘Hot spots’ are geographically bounded spaces of varying size that are associated with heightened victimisation risk and a proportionately greater number of criminal incidents than other similarity sized areas of the city. Hot spots are usually smaller in geography than neighbourhoods, and comprise of block or street segments that experience enormously high crime incidents (Anselin, Griffiths & Tita, 2008:99).

Crime hot spots have distinctly spatial nature and accurate identification of hot spots is an important crime prevention aid. (Ratcliffe & McCullagh, 2001:330). The spatial component related to crime incidents, offender data and contextual features in a GIS database on maps requires a record to be assigned to geographical grid coordinates. Mapping of this point data can be produced by a process known as “geocoding”.

Geocoding is the process of finding associated geographic coordinates (often expressed as latitude and longitude) from other geographic data. These coordinates are based on the address or location of the crime/incident. The geocoding process translates standard street address information into latitude and longitude coordinates so that the locations of criminal incidents and contextual features such as parks and schools, boundaries of police and

neighbourhood watch districts and census tracts can be displayed on maps (Markovic & Stone, 2002:3).

The geocoding purpose is to assign tabular data to an earth surface location to visualize their spatial character (Office of Community Orientated Policing Services, 2000:4). It then identifies areas that contain dense clusters of crime events or incidence which are known as 'hot spots'. Hot spot analyses generated from crime incident locations (geocoding) has become a popular tool for directing tactical police applications (Anselin, Griffiths & Tita, 2008:101). The process of geocoding, i.e. turning an address into a point on a map, is therefore of vital importance in crime mapping.

Computer systems are now seen as an essential part of this identification process, and police agencies throughout the world have extended the drive in information technology to include GIS (van der Avoort, 2005).

### **Spatial Data Collection Technique and its Importance for Policing**

An important function of a GIS in combination with a database is the possibility of representing the reality of spatial information on a computer. There are many information systems available for capturing and storing information, but most systems do not take spatial components into consideration, i.e. visualization of information in maps. A GIS offers the possibility to combine different layers of information and to perform a spatial analysis. In the law enforcement environment the spatial analysis function is used to recognize crime trends and patterns (van der Avoort, 2005:34).

GISs are very powerful tools that provide a means of bringing together information about people and the physical environment in a spatial context so that relationships and patterns with respect to crime can be identified. Even so, further tools for extracting information and knowledge need to be developed to enable crime researchers to identify and explore patterns and relationships more fully (Veenendaal & Houweling, 2000:4).

Data goes through several stages before it is actually presented on a map. These stages are: perception of the reality of the user, the conceptual or logical data model, a database structure and finally the physical data model (van der Avoort, 2005:46).

The data consists of two main parts: geographic entities and attributes. Entities are features from the perception structure such as streets or locations where crimes happen. Attributes are descriptive data about the entities. For example, a point (entity) on a map might indicate a robbery location at Cato Crest, whilst the attribute data will include the type of crime, the date and time of offence, the item value of property taken during the robbery. Attribute data is vital if the spatial information is to have more than superficial value. Within a GIS, attribute information can be stored in table form with an index linking to the appropriate spatial data (Ratcliffe, 2010:9).

Every policing agency has its own perspective of reality. For policing in Cato Crest, police conceptions such as crime, victim and risk area belong to the reality. All those conceptions have a spatial component and can be objects of a GIS. The perception structure of geographic reality is one of geographic entities such as roads, buildings, landmarks rather than one of layer of data, and it is desirable for the data model to directly reflect this perception. This is firstly organised into a conceptual or logical data model. Some objects might be very important for the data, whereas other information can be neglected because it has no direct representation of geographic features.

Using the logical data model, a GIS structure is defined. GIS stores spatial information in three main ways as points, lines or polygons (Ratcliffe, 2010:8). According to Chainey and Ratcliffe (2005:43), a polygon is a particular form of spatial information – a closed area or a region represented around its perimeter with a polyline. A polygon describes a multisided land parcel, and can be used to describe a policing area. For instance, “*Stop one to stop ten*” in Cato Crest are polygons. Therefore a police member’s knowledge of these stops is limited. “*Stops*” are not sufficient to police the area.

Crime event locations are stored as points, and this requires a process to convert the address locations of a crime into a point map. Crime data are mapped to and is derived through a process previously discussed as geocoding. Geocoding is the process of taking specific street addresses of crime incidents and matching them to a reference file containing a range of addresses for a given area (Ratcliffe, 2010:9). The relevant objects are geocoded and converted to a raster or vector geometry (van der Avoort, 2005:46).

The last step is the implementation of the database structure into the GIS, which creates the

physical data model. Now different layers of information can be presented on a map and the information is available for future analysis.

The developed GIS database can be used for both geocoding and spatial analysis of incident points and their attributes (Erdogan, 2007:95). In this way GIS can provide the forum within which crime data can be layered with base maps and other geographic data that represent the landscape of the area with which the crime data is associated. The power of GIS comes from the ability to relate different information in a spatial context and to reach a conclusion about this relationship (Foster, 2004:93).

Spatial analysis techniques using GIS have opened new opportunities, such as the use of automated crime mapping. The main advantage that these techniques offer over non-spatial techniques is that they allow visual depiction of observations by place and time. This has tremendous significance because being able to 'see' facts is crucial to understanding them. It is also advantageous because social characteristics and behavior can be mapped along with individual criminal events or crime rates in order to assess relationships between these facts and crime (Paulsen & Robinson, 2004:6).

Spatial information is also helpful in making informed decisions about community growth projections and infrastructure planning. GIS can integrate the different information types for efficient planning, administration and analysis (Barry & Ruther, 2005:49). In this way, it can provide the means to measure some of the discrepancies observed between predicted policing service delivery and crime prevention. Often crime mapping is used to identify the extent of a crime problem, and to enable the targeting of resources to deal with the problem (Ratcliffe & McCullagh, 2001:331).

## **Crime Mapping**

According to Wilson (2007:138), crime mapping with computers made an entrance in the world of the police in the mid-1960s, allowing the production of maps of crimes by city block shaded by volume of crime. Crime mapping has developed alongside intelligence led policing with the aim of directing (more precisely) police operational activity. It incorporates the collections and review of information into manageable summaries for example, crime maps or network charts, to facilitate its interpretation (Ratcliffe, 2003:3-5).

Crime mapping plays a significant role in a broad range of intelligence functions, from the more immediate (by supporting operational requirements) to the strategic level (by identifying areas that need a more considered response). This is particularly the case when information needs to be presented in an accessible and visual form to a wide array of audiences. As a result, crime mapping provides a tool for facilitating discussions about crime problems. At the most general level, crime mapping is an important tool for visually linking spatial information with temporal information to support effective resource deployment (Bleas, 2008:4-5).

Through crime mapping, data is stored as information in virtual layers (one layer for each variable) to be displayed on the computer in form of a multilayer, virtual map. A single layer may be displayed or several layers can be combined to show relationships among the layers (types of information) resulting in an overall picture of crime and its spatial context (Paynich & Hill, 2010:13).

Crime maps enable various causal factors to be represented visually rather than simply as a set of numbers on paper. Crime statistics alone do not present the whole picture since they are often laid out as large unintelligible (and uncontextualised) tables that are more of a historic record over broad areas, rather than as up-to-date -records that take into account locations of crime (Veenendaal & Houweling, 2000:2).

Crime mapping forms an integral subset of analysis. It plays a useful role helping to visualise the geographic patterns of crime through the use of hotspot maps, as well as being used as an integral tool for analyzing patterns and relationships previously not observable (Veenendaal & Houweling, 2000:2). The use of crime mapping has helped the police to better inform and overcome inaccurate perceptions of where problems are located.

Computerized crime maps capture a wide array of crime data and allow users to display changes in the level of different crimes over time and between neighbourhoods. These maps are an effective way of displaying progress (or the lack of progress) in reducing crime. A map of a police district can show which sectors are experiencing an increase and which a decrease, in any particular crime in the system. A map of a city or state can show the equivalent patterns across several police districts (Markovic & Stone, 2002:8).

A growing trend is for local area police commanders to be shown maps of crime distribution in their area of command, and for individual officers to be made responsible for the management of identified patterns. This trend originated and was developed by the New York City Police Department in the mid 1990s and the best known use of computerized crime mapping to measure performance was the CompStat system (Ratcliffe & McCullagh, 2001:332).

The term “CompStat” is used to refer to both the management practices implemented and the associated computer system that integrates maps, charts, and statistical tables to show changing patterns of crime in each police precinct or district.

According to Schwabe and Schurink (2000:3), an important conceptual requirement for the development of spatial information system is an information technologically orientated SAPS police culture. The organizational culture of the SAPS should additionally be supportive in its desire to utilize the information system, such as CompStat where station commanders are held responsible for reduction of crime by making use of spatial information.

## **MENTAL MAPPING AND ENVIRONMENTAL PERCEPTION**

The perception of individuals and communities of their environment might not coincide with ‘official’ data sets. Understandings of the physical world are deeply impacted by experience, culture and history. The meaning that individuals and collectives give to their physical space has now become an important field of human geography and environmental criminology, particularly in relation to issues of crime and insecurity.

Environmental perception became an important subject in human geography in the 1950s and 1960s and it continues to be a central element of the larger field of behavioural geography and the study of human choices with respect to the environment (Short, 1984:219).

Perceptions and depictions of space and place are dependent on mental images and representations, often created over time or as a result of significant events. This image of the environment is termed our "mental map", whilst the process of acquiring spatial

knowledge is termed the "cognitive mapping process" (Rengert & Pelfrey, 1997:3).

One of the earliest and most prominent statements on the subject was J. K. Wright's 1947 description of human perceptions of the landscape as a *terra incognita* – an “unknown territory” for geographical study (Wright, 1947:3). Subsequent inquiry in this area led to the concept of the mental map, introduced in the 1960s by Peter Gould. Mental maps, for Gould, were the images and impressions that people have of the places that surround them or in which they are embedded (Wright, 1947:3).

A mental map is an individual's selective representation of their known physical world. The definition of mental mapping originates from the science of cognitive psychology. In many fields of practice the mental representation of the environment by the human being is of essential importance. In daily life the mental map of our physical surroundings is essential in finding our way in reality. It structures our remembrance of several aspects of reality; either the city, our supermarkets or a private book collection at home (Sulsters, 2011:1).

A mental map, then, is an individual's own internal map of their own world which is why human geographers have chosen to use mental maps to understand the way in which people give structure and meaning to their environment and lived space (Rosenberg, 2008:2). “Mental maps” can guide behaviour and in particular, travel behaviour. These maps and perceptions are the product of social interaction, which develops within the storytelling communicative infrastructure (Matei, Ball-Rokeach & Qiu, 2001:431).

Mental maps, like ‘real’ maps, are a means of structuring and storing knowledge about the physical environment in ways that make sense locally and internally. Every person stores a different city experience in a personal, unique mental map. The mental map not only consists of direct experiences by personal use, but also aspects of personal appreciation and personal values. These maps therefore relate to our own individual lives and lifestyles. Mental maps are not as objective and unanimously accepted as a conventional map. The brain creates its own version of reality by a selective process of simplification, categorization, deletion, distortion or generalization (Sulsters, 2011:1).

The fact that the term is metaphorical should be noted because very little is known about

how environmental information is stored in the brain. Nevertheless, it is widely accepted that the simplified image, or mental map, that individuals have of their world is very “real” in the sense that behaviour is often conducted in response to a person’s mental world rather than any objective map of what actually exists on the ground (Walmsley & Jenkins, 1991:37).

Cognitive maps are the main tools that are used to identify spatial images and the difference between physical and subjective environments. Cognitive mapping is a process by which individuals acquire, store and recall information about the places in the environments with which they come into contact (Gold, 2009:287).

Downs and Stea (1977:6) define cognitive maps as an abstraction covering those cognitive or mental abilities that enable us to collect, organise, store, recall and manipulate information about the spatial environment.

Kevin Lynch, Professor of Architecture and Urban Planning at M.I.T., first examined mental maps in the late 1950’s and early 1960’s. He published “The Image of the City” which was the result of a five-year long research project examining the most important elements in a city as perceived by the residents of the area. His goal was to identify what features of the built environment were significant to the people of the city of Boston. His innovation was the concept of ‘place legibility’, which is the people’s ease of understanding the layout of the place (Nixon, 2011:1).

Lynch (1960:18) discovered that it is possible to uncover people’s impression of the built environment through getting them to create freehand sketch maps. Such maps show the building blocks into which individuals disaggregate the city in their minds. He noted that mental representations often contained within them paths, nodes, edges, and significant landmarks (Nixon, 2011).

Lynch’s (1960) early work suggested that there are five components to images of urban environments: paths which compromise the channels along which people move; edges which serve as barriers to movement; districts which are relatively large areas of a city with an identifiable character; nodes which are foci for travel and places that individuals



actually enter; and landmarks which are reference points used in navigation (Walmsley & Jenkins, 1991:40).

The components Lynch are helpful in uncovering the functional aspect of the mental map of city users. His work provides us with a number of important questions that need to be answered in trying to fathom peoples understanding of space and place, and significant events that occur therein. These questions include:

- How do people orient themselves and find their way in the environment?
- Which urban elements and artifacts are playing an important role?
- What can be seen as landmarks?
- Which activities are taking place in the (public) area and how is the physical environment supporting these?
- Which artifacts or parts of the public domain are most used and by what groups?
- What urban program is most used, how does this relate to human activities?

Mental maps can be analysed in two ways: quantitatively (a count of the features included on the maps) and qualitatively (an examination of the way or style in which information is portrayed) (Sulsters, 2011:1).

While our mental maps are built up from direct and indirect information on our environment, these maps are at the same time filters that qualify new information coming from the environment. The order of existing knowledge conditions the way we store new information in this system. This process can be seen as the ‘shaping’ of our mental maps by transferring new experiences through several levels based on the confidence that our map of reality is the truth (Sulsters, 2011:1).

Mental mapping methodological approaches build on traditional public participation methods to create in-depth knowledge of place, while overcoming certain limitations inherent in conventional GIS practice like in the case of informal settlements.

### **Community and Participatory Mapping**

The drawing of maps by local people in developing a sense of place and identity and to

enhance cultural knowledge can be traced back centuries. However social and spatial mapping as a participatory exercise, often facilitated by ‘outsiders’ as a means for research and knowledge creation, has only really developed over the last 20 years (Chambers, 2006:2-3).

In the development literature, community mapping is identified as having many different sources from social anthropology to participatory action research and popular education (Chambers, 2008: 299).

Community mapping involves the process of geographic inquiry using maps and geographic tools such as GIS to ask and answer questions of the place that community members call home. It is a way of formalizing collective ‘mind mapping’. The objective is to retain the value of the community’s understanding of the geography, infrastructure, and typology through mental mapping, while having an opportunity to present their life and practices without any limitations during this interactive approach. This has to be gained with the community’s perception of the environment, and their understanding of how they relate to their space (Environmental Science for Social Change, 2008:5).

Community mapping activity provides crucial information on the community’s perception of the area. The information provided by the community can be very detailed and is often different from the maps and intelligence that the state police has about the communities they police. The great value of such information is that it comes from people who know the area best and are best able to locate events and incidences (Craig & Weiner 2002; Environmental Science for Social Change, 2008:16).

Participants work together to create a visual representation of a place using the tools and materials at their disposal. At the same time, while creating their map, the group may deliberate over how to best represent the place in question, share their observations as they go along and tell personal stories and anecdotes. This can lead to rich and sometimes surprising data for social researchers (Carazzai, 2002:12).

More importantly the community mapping process allows communities to meaningfully participate through mental mapping exercise. This enables communities to generate, impart and use their knowledge of their own area in identifying locations and landmarks

commonly known to residents of the informal settlements (Environmental Science for Social Change, 2008:7).

When a group participates freely and openly in such an activity such as mental mapping, the individuals unconsciously organise their thoughts and their actions as a community. The map gives them something to hold, to show to others and say: “*this is where and how I live*” (Environmental Science for Social Change, 2008:4).

Another benefit that can be brought by stimulating a participatory approach through mental mapping is community empowerment which can be felt in a variety of ways, but mainly through a process of recognition of their knowledge and experience. The community realizes its own capability to perceive their own lived space and geography whilst working with the police.

A good example of participatory GIS in how people view, exploit, and manage their physical resource base is the case of KaNgwane village, situated in Mpumalanga Province in South Africa. Research was conducted by Daniel Weiner and Trevor Harris with the aim of contributing to the implementation of a community-integrated GIS in South Africa (Weiner & Harris 1999:62). The research helped to explain the multi-media community-integrated GIS methodology combining conventional ‘scientific’ data with local understandings of land. Similar findings were also presented by Pickles (1995), where a mental map was produced which depicts how a specific local knowledge can be represented in GIS – in this case, the location of “better soils” (Pickles, 1995:643).

## **MENTAL MAPPING AND CRIME MAPPING**

Policing is as much about addressing actual crime events as it is about addressing community perception of crime and mental maps can be one more tool to assist in this job (Lopez & Lukinbeal, 2010:53).

Existing police records such as the CAS (Crime Administration System) simply do not contain the types of data that are needed to draw a complete picture of the criminogenic forces at work in specific locations. A comparison of statistics on crime with the spatial perspective on crime may reveal some important discrepancies and inconsistencies. The

extent to which crime statistics reflect the true geographic distribution of crime and spatial analyses are based on police records, which can suffer from a number of shortcomings (Rosenbaum & Lavrakas, 1988: 290). These shortcomings include: a significant problem with unreported crime; inaccurate location identification; a lack of formal maps and landmarks (particularly in more informal spaces); human error in recording and inputting data; as well as low-quality database management (Rosenbaum & Lavrakas, 1988: 291).

A possible solution to the problem between formal and informal mapping of crime, is to develop and test an alternative approach to existing spatial mapping and geographic identification. Such an alternative would entail the involvement of local community members in the identification of local landmarks and demarcations as well as places of significance within an informal settlement through mental mapping.

It is now widely accepted in the environmental criminology literature that people carry a great deal of information in their heads relating to the likelihood of a crime occurring at any given location and time. The idea of using "mental maps" to illustrate the spatial distribution of residents' perceptions and feelings about crime-related matters is not a new concept (Gould & White, 1974:187).

The process of mental mapping consists of a set of operations designed to code environmental information in such a manner that it can later be decoded to allow for spatial information about crime which can then provide insight into crime patterns and their relationship with the space in which they happen (Rengert & Pelfrey, 1997:3).

Such crime pattern matching may help to explain why people use the target environment in predictable ways. Therefore, spatial orientation and spatial perception are primarily focused on the way that physical characteristics of the environment influence capabilities of crime mapping.

Mental maps can shed light on the relation between a place's vulnerability to crime and the perceived levels of insecurity by different groups of residents, as illustrated by the residents of Jordbro (Stockholm, Sweden) who were invited to engage in a mental mapping exercise. South Jordbro is apparently perceived as more unsafe than north Jordbro. One interesting finding is that people from north Jordbro felt that south Jordbro is more

dangerous than those who actually live there. Those who feel unsafe were invited to indicate on a map in the questionnaire the areas they avoid. These sketch maps were later transferred to the basic digital map using GIS. The map shows that those areas that are close to Jordbro commercial centre, tram station and bus stop are perceived as unsafe places with disturbances, which matches quite well with the pattern from the map based on official statistics (Ceccato & Snickars, 2000:5).

Although mental map landmarks may not allow accurate metric judgments, they do allow spatial perspective-takings and inferences about spatial locations. They are constructed from spatial cognition and basic spatial relations, relations between elements with respect to a perspective or between an element and a frame of reference which can be geocoded with a GIS, to a specific geographic location (landmarks, demarcations and community names) as reference points.

The process of geocoding community landmarks arising from mental mapping exercises and turning address points into a point map is important in crime mapping. Crime patterns can be explored within a mapping system by geocoding crime locations, which can be structured and spatially referenced through a mental mapping or cognitive mapping process. Linkages within the GIS environment are then used to integrate all other data with this information, thus creating a spatial data base which includes an intelligence profile. This is a fundamental requirement for decent intelligence-led policing (Ratcliffe, 2003).

Although GIS was initially developed for physical geographic application, it can be used for the management and intelligence analysis of crime. As the use of GIS has grown within the practitioner community it has also grown in the academic environment beyond the original field of geography, enabling criminal justice professionals and criminologists to explore questions of spatial criminology in greater detail than ever before (Ratcliffe, 2004:6).

Geographic information systems, combined with mental mapping methodology, can extend the means of human spatial cognition. The visualization capacity of information management tools (such as GIS) can assist researchers to capture the broader spatial and social contexts of communities. GIS is one of a number of technologies that police are using to achieve more effective intelligence-based operations.

The use of crime mapping technology, such as geocoding to chart crime hotspots within an informal settlement environment contributes to spatial data bases. This is dynamic, where the whole room can see the effectiveness or limitations of crime reduction strategies, leaving a powerful impression on all. In this situation “*a picture truly is worth a thousand words*” (Ratcliffe, 2004:3).

Spencer Chainey, a head consultant at a software firm that has many offices in India regards crime mapping as an extremely useful tool "to identify crime problems and target resources to tackle these problems" (Ragavan, 2002:3). He adds that this tool helps the police to "focus efforts to crime hotspots, and by drawing on other local information such as population, deprivation and the location of different properties, helps (them) to understand the problems in these areas" (Ragavan, 2002:3).

Through the use of new crime mapping techniques using mental mapping, information from a spatial data base can be harnessed with information from mental mapping so that incidents and patterns of criminal activity in the area can be mapped to its proper location, using community names (community landmarks) and demarcations. This can be a significant contribution to intelligence led policing.

Crime trends can be uncovered by using mental mapping process to predict the locations of emerging hot spots of crime. Graphic presentations of this spatial data base provide a powerful medium to communicate conditions, crime patterns, and crime trends, often creating an avenue for intelligence analysts to disseminate information, which is the cornerstone of intelligence-led policing practice.

The inclusion of geospatial database created from mental mapping enables law enforcement intelligence agencies, such as the police, not only to better interpret their environments and uncover crime patterns, but also to strengthen their capacity to deliver visually descriptive and relevant intelligence products needed to influence police commanders and line operational personnel.

The use of mental mapping in relation to crime mapping is not so much as an alternative to official police data for measuring the extent of criminality, but a complementary approach that can generate a new set of environmental data to supplement and triangulate

official statistics. The strength of the mental mapping approach is that it can provide up-to-date information about human perceptions of, and reactions to, the social and physical environment of interest. This strength is critical for understanding the relationship between the social and physical environment and for validating theories of criminality that are concerned with the proper location of crime, for effective intelligence led-policing.

The spatial analysis of crime mapping of a specific area enables the police to classify high and low-risk areas based on their crime hot spots. The process, in addition to providing a closer understanding of local spatial dynamics through the explanation of crime patterns within a specific informal geographical area, can itself become a basis for improved intelligence from the community to address crime with a more technological approach such as crime mapping and central to the success of intelligence led policing.

The city of Mamelodi near Pretoria, South Africa, and two towns in the Northern Cape have served as the base for an interesting experiment using an innovative approach to integrate crime mapping, crime prevention through environmental design and problem-oriented policing. In each of the cities, communities have been organised, bringing together citizens and specially trained police facilitators to have a frank discussion about the spatial nature of crime. Community participants at the events are asked by facilitators to develop individual and collective maps of where crime occurs in the neighbourhood. Individuals begin by making their own maps of community hot spots, which are then organised into a community wide map that reflects the combined experience of participants with crime in their neighbourhoods (Liebermann & Coulson, 2004:132).

The efforts typically reveal a wide range of high-risk areas that the police were not aware of and that residents themselves may have thought about only individually and may not have realized were causing collective concern. The process opens up opportunities for constructive discussions about where crime is occurring in a neighbourhood and why. In one Northern Cape area, residents realized that a tight alleyway that connected a school to another part of the community was a site of frequent muggings. This enabled residents and police to realize that the problem could be solved by simply stationing a school official in that place at certain times of day to prevent crimes from occurring. The sessions concluded with discussions among police facilitators and residents on ways to develop collective solutions to local problems that integrate stakeholders, design techniques and police

response (Liebermann & Coulson, 2004:132).

## **CONCLUSION**

The term ‘informal settlement’ in this study is applied to the unplanned occupation of land by people who desperately need housing in the urban and peri-urban areas. Within informal settlements there are few, if any, street names and formalized landmarks such as schools, churches and parks.

The methodology employed in this study links modern geospatial information technologies with geographic knowledge creation through integrating community perceptions and understanding of social construction of space of their environment by means of mental maps. This generates a valuable information layer in spatial databases used for decision-making in intelligence led policing. Forms of mapping that are community centered and based on local community knowledge can help populate urban-based geospatial databases of informal settlements.

Mental maps capture geographic intelligence data more accurately and precisely, articulating how the community is viewing their situated environments, leading to crime mapping and intelligence led policing interventions that are more effective.



## **CHAPTER FOUR**

### **BACKGROUND TO CATO CREST**

*“within the shantytowns of Cato Crest, the sense of unity and community spirit was based upon the circulation of money, commodities and services in a way which bound the shack-dwellers together” (Iain Edwards, 1996)*

#### **INTRODUCTION**

The accelerating pace of informal settlements, especially in the countries of the Third World, has been a matter of growing concern to planners, decision-makers and development analysts. Cato Manor has become a political metaphor for urban dispossession and resistance. It has the most complex and violently contested history of land ownership and occupation in Durban. Cato Manor has a history that is perhaps typical of many settlements in South Africa during the apartheid era.

The informal community of Cato Crest within the Greater Cato Manor area in Durban was chosen as the study area. This community mirrors many informal settlements in South Africa so is an appropriate site for the identification and assessment of geographic factors underlying challenges to policing. In this chapter, I provide a profile of Cato Crest and an in-depth discussion on the impact of the informal settlements on urban spatial structure. Since the infrastructure of Cato Crest is intimately related to policing and a process for crime mapping, it forms the most important part of this chapter.

#### **WHAT ARE INFORMAL SETTLEMENTS?**

Informal settlements often referred to as squatter settlements or shanty towns, are dense settlements comprising of communities housed in self-constructed shelters under conditions of informal or traditional land tenure (Ali & Sulaiman, 2006:3).

The UN Habitat programme (1995) defines them as unplanned settlements and areas where housing is not in compliance with current planning and building regulations (Begu, 2003: 11). The only place where this can take place is in an unplanned area where neither

drawing nor building permits are required. The dwellings do not comply with legal building requirements and are constructed with salvaged materials like wood, tins and corrugated iron. They lack proper indoor infrastructures, such as water supply, sanitation, drainage, waste disposal and proper road access, making it an environment where the spread of contagious diseases is rife (Tshikotshi, 2009:1).

Informal settlements are also described as illegal and spontaneous shantytowns lacking decent services and infrastructure. Terms for informal settlements vary, ranging from slums, *favelas* (Brazil), *aashwa'i* (Egypt) and *ciudades perdidas* (Spanish, “lost cities”) and *mjondolo* (South Africa) (Kramer, 2006:7). Godehart and Vaughan (2008) contend that these settlements are characterized by illegality and informality, environmental hazards, poverty and vulnerability, social stress and other such factors (Tshikotshi, 2009:4).

Informal settlements are common features in developing countries. Household incomes are generally very low and these neighbourhoods typically have poor access to services. Informal settlements are characterised by poor service delivery, lack of secure tenure, access to formal housing and land, insecurity and environmental hazards. They are also characterised by high levels of poverty, unemployment and social instability.

Poor environmental qualities of these settlements are exacerbated by the lack of basic services. These areas usually have serious public health problems such as the lack of sanitation and clean drinking water and poor waste removal. The most common consequences are limited access to public services such as access to water system in some way and connection to the sewer system, inadequate street cleaning and refuse collection services.

They are also symbolised by high levels of crime and can be fairly violent places to live in (Van Neierk, 2009:5). Informal settlements have been identified as incubators for crime for a number of reasons. Poor infrastructure such as the unavailability of roads and clear reference points for the identification of crime hot spots for the police and other service providers make these areas safe havens for outlaws and criminals in general. Young people have been especially affected by the overall conditions of segregation, with the lack of opportunities (Fernandes & Kabbani, 2007:28; Ali & Sulaiman, 2006:10).

## **REASONS FOR THE GROWTH OF INFORMAL SETTLEMENTS IN SOUTH AFRICA**

Two of the major contributing factors for the development of informal settlements are firstly, rapid urbanization, and secondly, the inability to cope with the housing needs of people in urban areas. Informal settlements provide housing for the urban poor in South African cities and towns.

They are often the result of the illegal occupation of land by people who lose patience with the government's housing programme. The relaxation and eventual scraping of influx control laws of the apartheid government is a contributory factor to the growth of informal settlements in South Africa. Other factors include the natural growth of communities in their original locations which often necessitates more land which then places more pressure on the settlement planning process.

The current housing provided by the government through once-off capital subsidies is unaffordable and inaccessible for a large percentage of the urban poor and does not help solve the housing problems of the poor. South Africa has a high rate of population growth that is impacting on the cities in the form of burgeoning squatter camps and informal settlements (Saff, 1996:235).

Large segments of low- and moderate-income groups have no choice but to rely on informal land and housing markets for access to land and shelter, thus fostering the expansion of irregular settlements in and around cities. People start constructing houses by using mud and thatch and these are gradually replaced over time by cement bricks and corrugated iron sheets. Informal land and housing delivery systems remain the only realistic alternative for meeting the needs of low-income households. Few individuals would volunteer to live in these settlements if they can afford to live in a formal brick and mortar structure (Tshikotshi, 2009:4).

Most informal settlement inhabitants migrate from the countryside to flee from rural poverty, seeking relative progress amidst the seeming optimism of cosmopolitan opportunities (Kramer, 2006:71). Moreover, migrants are attracted to cities by socio-economic conditions such as the considerable rural-urban gap of living standards. For

many, it is also close to where they work. The pull factor of better access to socio-economic opportunities contributes to the establishment, and the permanence, of informal settlements in South Africa such as Bhambayi and Inanda informal settlements . Thus, a vicious circle is created whereby poverty leads to informal settlements and informal settlements breed poverty (Ali & Sulaiman, 2006:9).

Poverty in informal settlements is much more than a simple lack of income or unemployment. It is primarily extended by the waning of health and nutritional rates, overcrowded housing, increased school dropout levels and increased stress upon physical and social environments of low-income urban residents. It is in this context that a distinct macro-economic model of poverty is inadequate while there is a genuine need to consider social safety nets aligned to the needs for the urban poor (Tshikotshi, 2009:4).

However, often rural migrants to urban areas lack the ability to succeed in the cities due to lack of skills, education and decent houses. They frequently live in informal settlements that are economically, socially, and politically marginalised urban communities. This lack of skills also affects their ability to sustain their livelihoods (Tshikotshi, 2009:7).

## **THE HISTORY AND PROFILE OF CATO CREST**

The area known as Cato Crest is one of six ‘informal’ settlements that comprise the community of Cato Manor, a community with a rich history. Cato Crest is located along the ridge or crest of Cato Manor. Approximately seven kilometres to the west of the Durban central business district, Cato Manor is regularly serviced by taxis and a taxi ride to the city takes less than 10 minutes. Its close proximity to the CBD is an important factor in the shaping of its past and present (Leclerlec-Madlala, 2004:3).

The story of Cato Manor began in the 1850s when the land was acquired by George Cato, for farming purposes. This large tract of land was then sold in smaller parcels to white smallholders in the second half of the nineteenth century. From the late 1800s the land was bought mainly by Indians who had completed their indentured service and did not wish to return to India (Makhatini, 1994:3).

By the early 1930s most of it was Indian owned land and used for market gardening

(Butler Adam & Venter, 1984:70). Most built simple houses of wood and iron, and became market gardeners, growing fruits and vegetables on small family plots (Scott, 1992:87).

The build up to the Second World War, with its increase in industrial demand for labour, saw a major wave of African influx into the city. This resulted in an acute densification of Cato Manor as Indian landowners filled up their smallholdings with African tenants. This densification, which resulted in fears amongst whites and competition for scarce resources, was exacerbated by the tenants further letting to other African subtenants (Makhatini, 1994:4).

Shacks quickly mushroomed on the banks of the Umkhumbane River, with conditions typical of an urban slum of that size at that time, with much overcrowding and all lacking proper facilities like water, electricity and little in the way of proper sanitation. Cato manor residents attributed descriptive names to most areas such as “two sticks”, “ndlovu”, “raincoat”, “jeepcoat” are amongst some of the names that were used (Berning, 1994: 3). With the influx of African residents into Durban, Cato Manor grew dramatically and by the 1950’s it had a population of approximately 150 000. Cato Manor was now a very ‘mixed’ area.

This contributed to the pressures that led to the eruption of conflict between the African and Indian populations of Cato Manor in 1949. Known as the Cato Manor Riots, and allegedly sparked by the assault of an African boy by an Indian man, the violent two-day long riot resulted in many Indians fleeing the area. These riots had begun as Afro-Indian but later widened into a challenge against white local authority. Whilst there are many explanations as to the cause of this conflict, there is strong suspicion that this was an engineered strategy to jeopardise the racial harmony which existed between Indians and Africans. It is further believed that the racial unity in Cato Manor had been seen as threatening to the white citizens of Durban (Makhatini, 1994:3).

The conflict later gave further ammunition to the whites who had been advocating for the remaining illegal inhabitants of Cato Manor to be removed. Pressure from white residents and the riots led to support for the application and the implementation of the Native's Urban Areas Act 21 of 1923 and the creation of the Group Areas Act 41 of 1950 (Peterson, 1994).

Shortly after the promulgation of the Group Areas Act in 1950, the entire population of the area was forcibly removed, with Africans being moved to KwaMashu and Umlazi and the Indians to Chatsworth and Merebank. Forced removals were militantly opposed, resulting in loss of lives. In 1959 demonstrations in the settlements stopped the evictions three times. There were moments when the resistance was clearly organised and articulated as a women's project and by the women of Cato Manor (Pithouse, 2006:12). The Indian landowners took relief from the courts of the country while the tenants and their subtenants rioted and physically resisted.

From the 1960's onwards most of the area was vacant. All that remained in Cato Manor were a few Hindu temples amongst the numerous mango, litchi and avocado trees that were once the pride and joy of the Indian market gardeners. All traces of African informal dwelling were erased from the landscape (Leclerlec-Madlala, 2004:4).

The late 1980's and early 1990's saw the beginning of squatting by the African population. People began to move back into the area, reclaiming their land and establishing informal dwellings in what today is called Cato Crest.

The current settlement in Cato Crest is influenced by the history of Cato Manor, leaving in its wake a legacy of competing claims to land and settlement rights. Through various pieces of legislation such as the Group Areas Act, the apartheid government enforced residential segregation by intensifying influx control, mass removals and enforcing stricter residential control on blacks (Motladi, 1995:57).

Makhatini (1994:7) asserts that the development of Cato Manor as a whole has been influenced by apartheid laws, township overcrowding, changes in political climate, skewed resource distribution and other socio-economic conditions.

Apart from a handful of families who had been in Cato Crest since the time of removals, and a small transitory population, the process of recent informal settlement took place in 1989 when new arrivals moved into the area. People wanting to escape from the violence torn areas in and around the Durban Functional Region (DFR) and obtain jobs in and around the city, began erecting shacks under the cover of lush vegetation in the area. By 1992 the population had increased to a point where the growing shack settlement began to

generate anxieties among white residents in neighbouring Manor Gardens (Motladi, 1995:57).

The most recent wave of settlement began in mid-June 1993, spurred by frustration on the part of the Cato Crest residents and their leaders over the continued uncertainty about their status in Cato Crest. According to Hindson and Makhathni (1993) a further factor which opened the way for new and ongoing settlement, was the power struggle within the Cato Crest leadership and constituencies (Motladi, 1995:57).

The early settlers quickly established a leadership that organised residents and negotiated on their behalf with the municipality (for access to water and the right to remain). Their unity was driven by a common purpose and shared experience of deprivation. They also helped determine where newcomers went; a potential newcomer's acceptance into the settlement was determined by the strength of their social relationship to someone within the settlement.

New shacks were, and still are, erected only next to the shack of a relative or friend, with an unspoken consensus that the plot of land around the first shack is 'owned' by its occupant and can therefore be legitimately transferred. Successive waves of newcomers challenged the hegemony of the early leadership. Their different visions for the future of Cato Crest weakened the leadership's power-base. These old community structures competed against, and were eventually undermined by party political structures at ward level keen to canvass the votes of poor black Africans. Cato Crest consistently and in large numbers votes for the African National Congress (ANC).

Political competition within the settlement was fiercest amongst individuals for leadership positions. Such positions control the allocation of resources within the community and create opportunities for political patronage and self-enrichment (Patel, 2009:137).

The explosive development of Cato Crest was also linked to the political transition in South Africa. With the relaxation of laws and policies related to human settlement such as the Group Areas Act, a political climate conducive to increased land invasions was created (Motladi, 1995:58).

Currently Cato Crest is home to an estimated 20740 people (eThekweni Municipality, 18 May 2011). The area comprises a total land size of approximately 4 square kilometers and comprises 5798 houses (eThekweni Municipality Housing Department data, 18 May 2011). There is a combination of housing types that include, formal brick houses recently created through Reconstruction and Development Programme housing projects, mud houses and shacks built with corrugated iron characterizing its partial formal and predominately informal profile. A steady influx of people from other areas, including immigrants (both legal and illegal) from all over the continent, has seen a considerable increase in the population size to current proportions (Leclerlec-Madlala, 2004:4).

Very few people currently squatting in Cato Crest have come directly from the rural areas. Most families have been on epic journeys in and out of the peripheral areas of the city. The direction of these movements have largely been influenced by apartheid, overcrowding, changes in the political climate, skewed distribution of resources, violence and other socio-economic conditions at given times (Makhatini, 1994 :7).

### **Geographical Profile of Cato Crest**

Cato Crest has its own “area sub-divisions” (sub-polygons) within Cato Crest informal settlement. This was established between 1996 and 2000, developed by the community and Area Based Management of the eThekweni Municipality. The ward councilor was consulted during this process. Cato Crest has been sub-divided into 10 smaller geographical areas.

The areas were demarcated between certain pathways and streams within Cato Crest. These were formed by the community in order to identify common community locations, give directions, and explain to people their “residential identity”. This was promoted at community meetings, sporting events, church gatherings, and named after some prominent persons in the community who have died. Today, it has become somewhat of local ‘cultural’ practice for the Cato Manor community to designate leaders in small areas and refer to these areas to describe their location of residence.

The area representatives are, in general, a very strong institution inside the Cato Crest community and were created as a channel of representation for solutions to the problems



involving the community. In this way one of the most important activities of the community is to negotiate with councilors and municipal departments to improve life in these settlements.

The community is very co-operative with the local Ward Councilor, who is able to interface with political leaders and structures, hence facilitating the election of community area representatives within Cato Crest. The area representatives are elected by residents annually at the community hall.

The political relationships in the area seem to be the factors which retain the population of this area. The area is very politically sensitive and the community frequently engages in protest action, often somewhat spontaneously.

The transition from just an informal settlement to spatial planning for informal settlements is marked by the public recognition given to squatters through the allocation of “CC numbers” by Metro Housing to identify the number of shacks in Cato Crest. The allocation of numbers has different meanings for the authorities and for squatters, but for the squatters it signifies legitimacy and a degree of permanence. For the authorities it has meaning in terms of control and identification of each shack.

The purposes of these numbers are to keep a proper record of the number of houses and the number of people that reside at these houses, and to establish a beneficiary list regarding who is entitled to receive houses. The CC numbers also prevent “ring fencing” (mushrooming of houses) at Cato Crest.

Town planning has been completed however; there is a challenge in the allocation of these houses”. (Interview with Mhlengi Gumede of ABM 8 March 2011).

The community has a unique sense of human geography, grounded in the local culture and practices of the area. The local community does not use ‘proper’ names allocated by the municipality. The community names are generally generated at community meetings. The purposes of these names are to establish common identity or a shared sense of geography within an informal settlement, which has no formal infrastructure or addresses points. Examples in Cato Crest include “Gearbox” where gearboxes used to be repaired,

“Emafrijini” where fridges are repaired, “Empompini” where the first water stand pipe in the area that was installed by the municipality, and “Dorothy Nyembe”, a prominent antiapartheid activist.

### **Social Characteristics of the Community of Cato Crest**

A large number of youth reside in Cato Crest. At least 77% of the population is younger than 35 years. Education levels however are low, with 34% educated between Grades 5 and 7, and 45% educated between 8 and grade 12. 0.07% of the population had a post-matric qualification. Only 24% of the economically active population in the area is formally employed. Sixteen per cent more men than women are employed, with unemployment amongst women at 55%. (2001 census data).

Unemployment in Cato Crest is very high, with some estimates as high as 45% (South African Census 2002). This result in the visible presence of many men, young and old, hanging about playing cards, drinking alcohol or smoking dagga, frequently visiting each other whilst moving from one area to another, giving them an opportunity to familiarize themselves with different community names. High levels of unemployment and poverty are obviously the most serious factors contributing to high crime levels.

Numerous ‘shebeens’ (informal drinking establishments) are found throughout the community, some deriving their names from their locations. For example the unemployed people would sit underneath a tree, a well-known spot, daily to meet and consume liquor. A name such as: “Big tree” then arose, although today the tree no longer exists.

During my research in Cato Manor, a number of community leaders and police officers highlighted the enormous number of shebeens and taverns in the area, which were open from early morning to late at night. Some spaza shops and stores also sell liquor and home-brews without adhering to regulations. Subjective evidence suggests that certain shebeens serve alcohol to children and others act as a conduit for the sale of drugs. Also, a growing problem of drug abuse and theft as a means for supporting expensive drug habits was identified as a new and growing trend, especially amongst the younger men.

Poverty is an issue. Clothing and food are daily concerns for many residents. Most school

going youth have to walk considerable distances to school. This makes them vulnerable as many of these passage ways to their schools are dangerous. School teachers noted that unscrupulous liquor outlet operators, unemployed community members and informal traders within the school vicinity target their scholars for criminal activities. It must also be noted that during the field research in the informal settlements, many school learners were observed loitering and wandering about aimlessly in school uniform during school hours. This was a clear indication of the somewhat relaxed or lack of control over many of the scholars in and around this area.

According to records kept by the Ekuphileni Clinic, patients who visited the clinic in 2002 presented with a variety of illnesses. Chief among those was HIV/AIDS related illnesses (55%), tuberculosis (30%), and diarrhea (15%). Clinic records also reveal high rates of malnutrition in children but no exact statistics were available for that year. When asked to identify the health conditions that the people themselves felt to be especially prevalent in their community, key informants identified common colds, influenza, skin sores and diarrhoea (Leclerlec-Madlala, 2004:4).

### **Infrastructure and Basic Services**

Like most South African informal settlements, Cato Crest is characterized by a poor road network with no vehicular access in most areas, insufficient street lighting, general lack of sanitation and enjoys very limited access to municipal services that are necessary for human settlement.

The area has a rather irregular spatial structure with only some parts of Cato Crest having access to electricity. Many households that do not have access to services such as electricity have resorted to illegal connections from the electricity boxes. This poses a serious and dangerous environment for the police, especially during chasing of suspects.

Participant research demonstrated that access to electricity, in general, is low. This limits users to energy for lighting and small appliances such as kettles and television sets. Many residents rely on paraffin, wood and coal or gas for cooking.

The lack of services like electricity, water and sanitation has a direct influence on crime in

the informal settlements. Electricity is needed to install lighting, which is needed for security at night. The people in the informal settlements must walk far distances from the safety of their dwellings to collect water or use available toilets. This makes them vulnerable to criminals in their quest to access these services.

In the surrounding areas are trees and bushes that are used for dumping household refuse that is not readily accommodated in the green plastic bags provided to households by the municipality. Green refuse bags full of garbage also form part of the general heaps of refuse strewn about the settlement. Although the municipality picks up refuse twice a week in Cato Crest, the problem of numerous unsightly and unhealthy garbage heaps remains. These refuse sites are constantly visited by local dogs and cats that scavenge, and no doubt provide ideal breeding and nesting places for rodents. Leclerc-Madlala (2004:4) provides the following description of Cato Crest:

The physical environment is a health hazard, due largely to the numerous unattended refuse heaps and garbage disposal bags. With pit-latrines in so close proximity to houses, and pools of dirty stagnant water everywhere, the smell is sometimes unbearable. Oddly, the soil seems to be constantly damp and moist, even when there's been no rain for a long period.

While access to waterborne sanitation is severely limited, access to latrines is high, including a significant number of pit latrines. A short distance from most houses, are small toilets in the form of pit latrines that are encased by large pieces of wood and corrugated iron.

The postal services are processed through schools within Cato Crest. There are no physical address points and this hampers postal services to the community. The Principal will read out the letters that are addressed to a particular person of the Cato Crest community. The children then fetch these letters on behalf of their parents or neighbours. Some members of the community use "Bassa's Hardware" or other local businesses or their place of employment as postal points. In most instances, the community members have to obtain letters from the Ward Councilors' office, and also obtain letters from the councilors to confirm proof of residence at Cato Crest.

Recreational and shopping amenities are very scarce. As a result there is a wide array of small trading establishments such as basic grocery shops, spaza shops, makeshift barber shops, cellphone outlets, illegal liquor outlets and shebeens that are situated both sides of the tarred main road within the settlement.

Two primary schools, one high school and several privately owned day care centres serve the community. There is a new 'Multi-Purpose Centre' housing a community hall, public library, sports field, a pre-school and a primary school. A modern clinic, the Ekuphileni Clinic, was completed in 1997 and offers a range of primary health services. King Edward the VII Hospital, the province's largest hospital, is located a few kilometres away, and serves as the referral hospital for the clinic. The Albert Luthuli Hospital is only two kilometres south of Cato Crest on Bellair Road, but is a tertiary facility which means that it only deals with referral cases from other hospitals. Mini-bus taxis are the most common mode of transport used by residents in the area.

The problems confronting residents of Cato Crest do not differ much from those of younger and less consolidated areas: public insecurity, a low efficient public service and infrastructure problems related to the lack of maintenance of the existing drainage and drinking water systems are the most common problems. The accessibility of this area is not modified, and it can be expected that the spatial infrastructure and socio-economic character of this place remains challenging for the police.

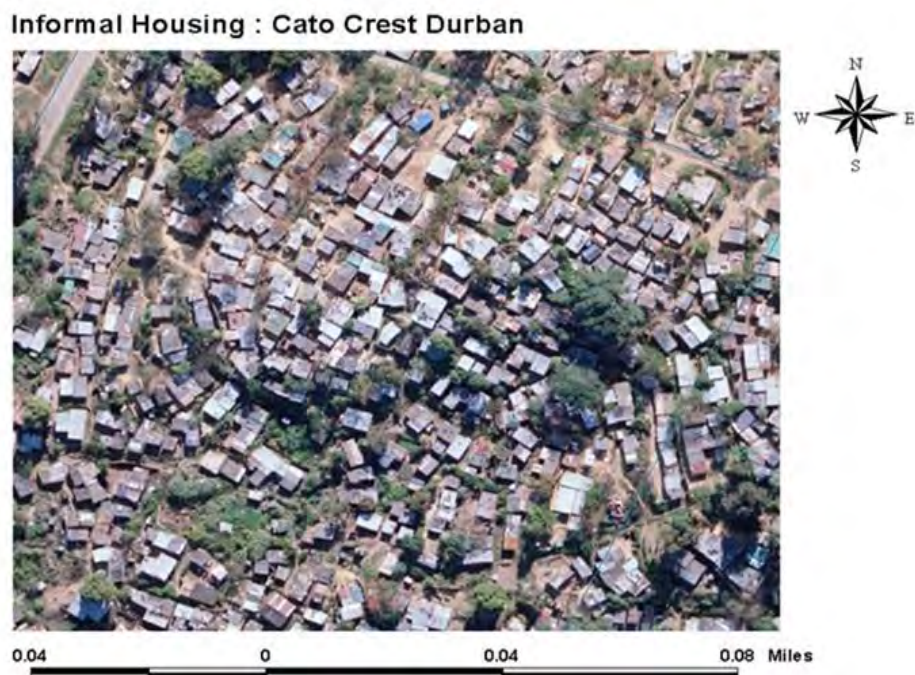
Due to a relatively low density, the speed of urban consolidation (drinking water and energy supply, drainage construction) is very slow and the area is not developed commercially, perhaps as a consequence of the same spatial isolation. This spatial irregularity is perhaps one of the main factors hindering functional policing.

All these aspects contribute to disorder in the informal settlements, which in turn contribute to making the police work harder in these communities. The lack of infrastructure is not the responsibility of police as they are mandated to enforce the law, but this is the biggest hurdle police have in policing informal settlements. This may be one of the reasons police members are very negative about working at Cato Crest (see Chapter 5).

Infrastructure and service-related issues relating to policing in informal settlements as identified by this research are described in the following sections.

### **Roads and Access Issues**

Most of the roads in the Cato Crest settlement, where they exist, are un-tarred and filled with potholes and trenches. This status quo is a result of soil erosion emanating from heavy seasonal rains and the general lack of maintenance. Accessibility as well as movement in and around the informal settlement is thus negatively affected by members of Cato Manor SAPS (South African Police Services) (see Figures 1 and 2). However, some parts of the informal settlement do have roads which were easily accessible with a normal vehicle, especially those which are situated along the main road.



**Figure 1: Informal housing in Cato Crest.**

Most parts of Cato Crest do not have a road infrastructure at all. Members of the communities in these settlements have created “passage ways” in between their dwellings in response to access needs of humans and vehicles. Pathways between houses are

commonly strewn with refuse and consist of sand, mud and stagnant pools of water, sometimes interspersed with pieces of cardboard to provide a dry cover for walking. This illustrates the unavailability of storm-water control in the informal settlements which is a direct result of the lack of proper planning prior to their establishment.

The Cato Manor police servicing the areas have been resourced with 4-wheel drive vehicles in order to alleviate the access challenges posed by the lack of adequate roads infrastructure in the informal settlements. However, in many cases even these vehicles cannot manoeuvre around some of the roads and “passage ways”.

The informal placement of shacks also prohibits the municipality from developing appropriate storm water drains in and among the informal settlements. This leads to further problems when heavy rains occur.

The existing tarmac and gravel, as well as the informal roads, get washed away. This makes accessibility into the settlements even harder for policing.



**Figure 2: Poor road access to Cato Crest informal settlement.**

## CONCLUSION

The Cato Crest community within the Greater Cato Manor area was considered an appropriate community for the identification and assessment of factors that challenges policing, in that it displays some of the generic socio-economic and biophysical characteristics of informal settlements in South Africa.

Currently little spatial data is available for analysis of the complex and multi-dimensional dynamics in Cato Crest informal settlement. The availability of spatial data is an important step toward resolving crime related problems and, improving access to basic infrastructure and social services. The lack of relevant spatial data is a prohibitive factor in understanding the nature of crime occurring within the informal settlements such as Cato Crest.

As a result of the inadequacies of the formal planning for the infrastructure of Cato Crest, the local police face many daily challenges to address crime from a spatial perspective or geographic context such as crime mapping. This will be dealt with in more detail in the chapter on policing at Cato Crest (Chapter Five).

The message from the limited spatial data that is available, however, encourages the trend of adding community based approaches to data collection, because this has the potential to address many of the shortcomings of poor spatial data. Crime mapping is an important step in the process of resolving crime in informal settlements, and facilitating access to basic infrastructure and social services, which will be discussed in Chapter Six.



## **CHAPTER FIVE**

### **POLICING IN CATO CREST**

*“The reality is that, poor people living in informal settlements are the foremost victims of crime and violence, as opposed to the middle-classes living in wealthier neighbourhoods with higher levels of protection”. (Share the world resources, 2010)*

#### **INTRODUCTION**

Informal settlements in South Africa are a priority focus for development and social upliftment (Rural Safety Report, KZN Department of Community Safety and Liaison, 2010:8). There is a two-way relationship between safety and informal development: on the one hand, where there is insecurity and crime, development is hampered. On the hand where there is under-development, insecurity and crime flourishes (KZN Department of Community Safety and Liaison, 2010:8).

Poor economic conditions caused by low economic growth and unfair distribution of national capital often leads to lack of or inadequate social services and infrastructure which in turn creates crowded, criminogenic slum areas (Sub-Saharan Executive Policing Conference, 2000:20). In most informal settlements crime is an ever-present threat and police response has been inadequate. Community members of these informal settlements become frustrated by the inability of the police to effectively render police service delivery within the community.

Section 206 of the South African Constitution, Act 108 of 1996, highlights the role of the police in ensuring effective levels of service delivery. That responsibility includes the development of systems and initiatives to bring about an improvement in police service delivery across all communities in the country and this province.

Legislation pertaining to policing in South Africa has undergone substantial reform since the 1994 democratic elections, most notable of which was renaming the South African

Police Force as the South African Police Service (SAPS), indicating a conceptual shift away from authoritarian models of policing to community based models of policing.

The core function of the SAPS is reflected in Section 205(3) of the Constitution which enjoins the police service “to prevent, combat and investigate crime, to maintain public order, to protect and secure the inhabitants of the republic and their property, and to uphold and enforce the law”.

In addition to high rates of crime and violence and the lack of access to many basic resources, informal settlements also have different policing needs in comparison with other communities such as suburbs and cities.

In the discussion that follows, I will examine the policing of Cato Crest which reflects the relations between the community and police and includes the policing challenges faced due to the poor geographical infrastructure of Cato Crest.

## **POLICING OF INFORMAL SETTLEMENTS**

In low and middle-income countries, some of the most complicated areas to police are extremely poor and often comprise of self-constructed neighbourhoods. Informal housing fulfills the housing needs of more than half the residents of an urban area. These areas, which are rarely well mapped and usually lack a solid infrastructure, pose significant political, planning and crime challenges to residents and city officials (United Nations Office on Drugs and Crime, 2011:60).

Factors which characterize urbanization in urban informal settlements such as overcrowding, unemployment and increased consumer demands and expectations are associated with high crime rates. Overcrowding leads to competition for limited resources, greater stress and increased conflict. The population growth rate is a time bomb because it is likely to give rise to ever-growing unemployment, tensions, diseases and crime (Ngceshu & Newane, 2002:12). According to Ndingaye (2005:2-4, 51), high unemployment amongst the youth and lack of entertainment and job opportunities in informal settlements lead young people to engage in crime as a result of boredom and peer pressure.

Informal settlements are often created and inhabited by populations that are not effectively integrated into the economic or political systems and who may suffer substantial discrimination simply because of where they live or as a result of a variety of other social, religious, ethnic or racial factors (Commonwealth Human Rights Initiative, 2003:31-35).

To make matters worse, slums and shanty towns may have long-term disputes with the government or private landowners over land occupation or unpaid rent. In these situations, the main connection between these communities and the government may be through political patronage that in some cases may be mediated by criminal groups (Arias, 2006).

Unsurprisingly, informal settlements are often viewed as sites of criminality and danger in the wider city. That perception, as well as demands from affected landowners and neighbours, often leads to slum removal efforts. Contacts between residents and the police are often limited to engagement in such removal efforts or in other raids against criminal groups that may operate in the area. After such operations, police will often withdraw and leave residents to their own devices and to being subject to local dominance. These conditions augment local resentment and harden police attitudes towards these areas (United Nations Office on Drugs and Crime, 2011:60).

In a situation where informal residence is combined with unemployment or low status occupations and poverty, safety measures and initiatives are compromised by the social status of these areas (The Witness, 29 October 2009). The perceived dangerousness is amplified by an assumption that 'ghetto' socialization inculcates values of violence, irrationality and instant need gratification which may stand in contrast to the more dominant parent culture of a society. This 'otherness' of the ghetto attracts intense surveillance and harsh treatment by the police. The criminalising treatment of these persons then leads to a record of contact with the police. Perceived unjust treatment in turn leads to resentment and hostility to the police (and the society), and solace may then be found in gangs or crews (Harriottt, 2000).

According to the recommendations on policing from the United Nations, for police to succeed in controlling crime in these areas, the Government needs to develop comprehensive policies to establish ties with the population and address the safety concerns of residents, including working to improve relations between police and community members, basic mapping, and improvement of services to discourage crime

(United Nations Office on Drugs and Crime, 2011:60).

The inherent problems which face urban informal settlements are also common to rural informal settlements. In one rural settlement near Port Shepstone known as “Mkholombe” which is populated by migrant workers from the Eastern Cape and foreigners who came to work in the Marburg industrial area, it appeared that the congestion of the settlement has resulted in stabbings, rapes, assaults and murders (KZN Department of Community Safety and Liaison, 2010:20).

A recent report in *The Witness* newspaper focused on a special police operation conducted in the early hours of a Monday morning. This operation led to the arrest of 15 residents of Mkholombe informal settlement. The informal area was raided by more than 100 police, including the Public Order Police unit. House to house searches were conducted and a helicopter circled above Mkholombe to make sure nobody was able to escape the search. (Burnard, 2011). What we see here is an enormous amount of police resources focused on an informal settlement. However, the type of policing metered out is ‘hard’ policing, not likely to build good relations between residents of the informal settlement and the police.

## **POLICING AT CATO CREST INFORMAL SETTLEMENT**

The Cato Crest informal settlement is policed by the Cato Manor police station, which is also responsible for policing the adjoining Cato Manor area. The area of jurisdiction of the police station covering approximately 17 km<sup>2</sup> includes the area of Bonella, a well planned residential area developed by the eThekweni Municipality with schools shops and recreational facilities and Chesterville which consists of a number of planned low cost housing areas, such as Chesterville Extensions 1, 2 & 3, Insimbini, Incremental Phase 2, Mashxha, Fast Track, Infill and Ridgeview.

The police station has a staff component of 125 members and 31 vehicles and is responsible for policing a population of approximately 150 000. There are four policing sectors within Cato Manor of which, Cato Crest is Sector One. A sector commander has been appointed for Cato Crest. According to the White Paper on Safety and Security (1998), sector policing refers to “the division of policing areas into smaller managerial sectors and the assignment of police officers regularly to these areas on a full time basis to

enhance a good relationship between the police and the community with aim of solving crime issues”. The logical framework of sector policing is that it is an innovative, proactive approach to restructuring how policing enforcement agencies conduct their overall crime fighting strategies, personnel deployment, and allocation of resources to improve their effectiveness and efficiency.

The South African Police Services Act 68 of 1995, Chapter 7 section 19(1), outlines the need for Community Policing Forums (CPF's). In South Africa, the need for a new policing approach was further necessitated by changing political environment and mistrust, antagonism and even open hostility of some sections of the community towards the South African Police. The establishment of the CPF's was provided in section 221(2) of the South African Constitution.

The purpose of a CPF is to ensure police accountability, improvement of transparency and promote co-operation and service delivery between the police and the community. According the Cato Manor police, the CPF in Cato Manor is well established since 1995.

In this research, it has been established through focus group discussions, that the community policing forum is well established and active in Cato Manor.

### **Crime and Crime Prevention in Cato Crest**

It is accepted that there is an inherent problem with the collection of police and crime statistics, as experienced throughout the world. Crime statistics are dependent on reporting rates and some crimes are not even reported to the police. The police at Cato Manor stated that it is very difficult to determine the exact extent of crime that occurs at Cato Crest due to the community not being committed to reporting crime in the area as the result of poor police-community relations and the informality of the area more generally.

The priority crimes in Cato Manor that have been identified by the SAPS include: housebreaking, murder, rape, robbery, and assault to do grievous bodily harm. There are no specific dates of the month or days of the week or specific times in which these crimes are committed, which has led the police to conclude that crimes are committed opportunistically (Cato Manor Crime Intelligence Analysis Centre, 2011).

There are also reported and known incidents of domestic violence, however, cases are often withdrawn by spouses and in other instances, spouses are too scared of their partners to report violence and open a case. As pointed out by the Department of Community Safety and Liaison (KZN Department of Community Safety and Liaison, 2010:17), marital status, economic dependence on husbands or live-in partners, illiteracy, acceptance of violence as a form of discipline, limited job opportunities, absence of safe houses and non-availability of transport to a police station all place women in a vulnerable position.

Thieves and pickpockets, if caught, are often severely beaten by crowds in public. Such spontaneous and community-based crime resolution goes a step beyond the actual problem and gives rise to a new law and order problem, where the perpetrator becomes victim (Ahmed, 2010:12). This community response suggested, was the result of poor police response time and a lack of trust between the Cato Crest community and police. The police are perceived as unfair and cannot be trusted and these unfair acts by the police are seen and tendered as “counter-productive” to crime and policing in Cato Crest.

Political demonstrations and rallies often result in a specific form of urban violence in Cato Crest, especially when members of the community are arrested. These clashes result between rival political groups and with police.

Cato Crest CPF members raised a particular concern with regard to the licensing of shebeens (local taverns) and the apparent high incidence of crime that occurs in the locality of such premises. In many cases shebeens are located opposite schools or crèches, endangering children and making them vulnerable to crime. Similarly, shebeens opposite taxi stops also make passengers more vulnerable to crime.

In addition, the location of businesses and houses in the vicinity of shebeens and taverns makes these properties vulnerable to damage of property, burglary and physical attacks. Shebeens that operate during the day encourage potential criminals to abuse alcohol and commit crime in nearby areas when they depart from these places. Whilst alcohol abuse has been found to go hand in hand with Cato Crest culture of violence, people who consume alcohol are also more likely to become victims of crime. In Paddock, Ezinqoleni Municipality, the District of Ugu, youth frequenting taverns are known to become violent

both at the taverns as well as when they return home (KZN Department of Community Safety and Liaison, 2010:17).

The CPF members raised their concerns about shebeens to the police. However according to some members of the community, the act of trading illegal in liquor is generally viewed as an acceptable means of economic survival and social activity in informal settlements settings.

Some community members have attributed the high crime levels in Cato Crest to the area's proximity to the Durban City Centre as a major key transport route. This makes Cato Crest easy to access from the city centre where criminals may have been active. This view is shared by the officer from the Crime Prevention Unit at the SAPS Cato Manor:

Cato Manor is close to the City of Durban so everyone that escapes from other areas comes to Cato Manor to hide. This ends up giving Cato Manor a high crime level because we not only have criminals from Cato Manor but have people doing crime in the city and taking cover in our area. (Interview with Crime Prevention Unit of the SAPS Cato Manor, 14 March 2011).

One of the key issues related to policing in Cato Crest that came out during the police focus group held with members of the Crime Information Analysis Centre was the difficulty of detecting exactly where crime occurs. The current Crime Administration System (CAS) does not have the capability to map crimes in Cato Crest to any address points because the area is informal and does not have proper address points. When I asked the police a question about where the crime hotspots in Cato Crest are, their response was:

hey we don't know, we cannot identify the hotspot, but we go by the stats. Mmm-hmm, it's very difficult. You see from my experience, right, most of the time we have to get our own information because the people won't give us information, very seldom they give us information about firearms or drugs. Like in most cases, we have our own operations, like stop search, and that's how we finds drugs and firearms. Crime mapping does not work like the city with proper addresses (Interview with Crime Prevention focus group members, 8 March 2011).

## **Police Service Delivery at Cato Crest**

The city centre of Durban is approximately 6 km<sup>2</sup>. The streets follow a consistent north-south, east-west pattern. The beachfront has a less consistent grid, although the streets are well-ordered, long-established and mapped. While the SAPS and Durban Metro Police face many challenges in dealing with the variety of criminal activities that occur in parts of the city, they know where addresses are and have little trouble in getting to those places quickly.

These conditions are dramatically different from those faced by the Cato Manor police trying to work in Cato Crest informal settlement. Police working there do not know where a specific location is and, for a variety of structural and organizational reasons, are not be able to gain access to those places in a timely fashion. Roads are poorly lit, homes do not have formal addresses and maps do not exist.

One of the reasons police do not have an exact location where crime hotspots are in Cato Crest is that proper geographic analysis is not available due to the fact that a crime mapping approach is not possible because of the lack of proper address points. This means that operational members cannot be deployed correctly to crime hotspots and a proactive approach to policing at Cato Crest is not possible. The policing strategy therefore is mostly reactive. As one of the officers interviewed for this study said,

It's more like a reactive answer to the problem. I'll tell you why. You see, basically with the clustering the houses, prevents visibility. Crime prevention is a visible thing; you cannot make yourself visible in a clustered area. When you are walking you are covered by shacks and they are clustered (Crime Prevention focus group members, 8 March 2011).

Informal research showed Cato Crest with limited formal roads, no electricity, no running water in their homes, no sanitation or sewerage facilities, no official street names, shack numbers that appeared to be randomly distributed, no storm water drains to assist in rainy seasons, no street lights to assist the communities at night and no services to remove rubbish.



All these aspects contribute to the disorder present in the informal settlements, which in turn contributes to making police work harder in these communities. This bears a resemblance to the broken windows theory which proposes that urban decay, and poor building maintenance such as “broken windows”, vandalism and minor crimes can lead to substantial increase of crime in the area, Crime is not necessarily caused by broken down neighbourhoods but that they become magnets for crime and delinquent behavior because of their disorganization. Residents may become more lax in their civility and criminals and other delinquents may then be drawn to these areas of lawlessness.

The lack of infrastructure is not the responsibility of police as they are mandated to enforce the law, but this is the biggest hurdle police have in policing informal settlements as it was revealed during the study that police members are very negative about working in Cato Crest. They feel that the environment is very unhealthy, and even mentioned that one member fell into a sewer pit whilst chasing suspects. Police members are booking off sick regularly which has an impact on personnel shortage.

### **Visible Policing**

At the time I immersed myself in Cato Crest, I saw that access to crime locations or attending to complaints is a problem for the police, especially at night. There are no structured foot paths and no lighting. Operational risks are higher at night, which requires more logistics such as torches, vehicles, bullet proof vest etc.

The problem of locating and accessing crime scenes is also evident in other informal settlements in other areas as well. Residents of Khayelitsha (Western Cape) prepared a memorandum about the lack of effective policing there. Police operating in this area have complained that policing is extremely difficult due to the lack of accessible roads and thoroughfares, and the absence of public lighting at night (Memorandum from Khayelitsha Residents, 2010:5).

Interviews with the police and community members revealed that reporting crime are low, because people in the area do not have access to phones to call the police when a crime occurs. In some instances when they do not have phones, the usual procedure is that they have to personally go to the charge office to lodge a complaint, even though they have

been traumatised by the criminal incident. This places complainants at further risk because there have been cases where they have become victims of crime again while making their way to the charge office to report the first offence.

Like for example, take a woman, they got a problem of a domestic issue now, for them to leave the place where they stay to come to a place such as the police station, it's like a risk factor on the way. Sometimes they can be also further subjected to crime, like it happened previously; there was case where a victim of domestic violence was raped whilst on her way to the police station. You know, because the van can't just come, because we don't have the address, they can't actually tell the van, come to a specific shack, we will not find it (Crime Prevention focus group member, 16 March 2011).

The Community Service Centre members are aware of the challenges that investigating officers encounter to locate complainants in Cato Crest. From the focus group discussions it appears that the charge office operates with a standard procedure when it involves residents of Cato Crest. They encourage complainants to come to the police station the next morning after opening cases so that they can accompany the detectives to the scene of the crime or the suspect's address because police do not know the area or specific locations. Under these circumstances of not having a physical address point to furnish the police with, the community feels that there isn't an alternative solution, but to co-operate with the police in the investigation process.

Another problem related to the lack of formal address points is that complainants tend to report crimes using 'CC' numbers. These are house numbers assigned by the municipality. However, the numbers are not in sequence, neither are they situated with odd numbers on the left hand side of the road and even numbers on the right. Often the numbers are not visible, especially at night. The police have more challenges to deploy members for an operation to target a specific location or disseminate an operational plan with no proper address point. It is widely acknowledged that proper infrastructure assists in enhancing the physical appearance of the area which contributes to community safety.

If the police are mobile and cannot find a particular location, then they have to contact the complainant by cellphone (if possible) to get directions or arrange a location to meet. However, cellphone access at Cato Manor police station is restricted to two members per

shift. Phones were originally given to all members but due to abuse they were withdrawn.

pin codes supposed to be for all members, but the reason why all members don't have it is because of the payment. Then they decided to slowly take away the pin numbers from them, because each one gets a bill at the end of the month to account for the calls they made, they are unable to account for the calls, so it happens over a period of time in which they now suspend their accounts. That means suspending their pin code. So they no more have pin codes. Now, eventually the burden is left on to us now, because it will be two or three people in the shift who have pin codes now. So they were taken away from them because they were not paying and they give them to the commanders in the shift (Interview with Relief Commander, 5 April 2011).

PIN codes are issued to two members to dial numbers for work related issues only. However, it is often the case that operational police members have to ask the members working at the community service centre for directions via the two way radio to locate the complainant. In turn, the members of the charge office have to contact the complainant via cellphone and then relay information back to the operational officers. Delays often occur because the members with the cellphones are busy with other duties such as statements, cell visits or are deployed to other places. This causes stress on members trying to locate complainants in the field and high petrol consumption whilst driving around trying to locate complainants. Other complaints/reports in Cato Manor area are delayed due to the time spent on trying to find Cato Crest complainants, resulting in poor service delivery to the whole area. This contributes to loss of confidence in the police and further breakdown in police-community relations.

and then they comment on poor service delivery or they criticise poor service delivery because you're not in a position to get there immediately because you don't know the area, the next thing they say no the police is incapable in this area and incompetent (Crime Prevention focus group member, 16 March 2011).

If a complainant calls the Cato Crest police station via telephone, then it is procedure that the Cato Crest charge office will relay this complaint to PES (Police Emergency Services), previously known as "Flying Squad", who will record and dispatch a local police van (Cato Crest) from the PES control room. If the patrol vehicle which was dispatched to attend the complaint cannot locate the complainant, then the patrol vehicle will ask the

PES channel operator (dispatcher) to contact the complainant and ask for a more clearly identifiable location. The (PES) radio operator is usually not familiar with Cato Crest him/herself. In addition, the channel operator may not have the initial contact details of the complainant, as these details were taken down by the Charge Office staff at Cato Manor police station. The delay in this process contributes to the community's frustration and anger against the local police station.

Research for this study has revealed a further complication regarding reporting of complaints. The complainant/victim will sometimes call the emergency police number '10111' to report a crime, expecting to get a better response from the Police Emergency Unit rather than the local police station. In such cases it is the protocol that PES, a centralized control centre, dispatches a local police van from Cato Crest to attend to the compliant. However, the complainant expected a vehicle from the PES to respond. This can lead to an escalation of frustration on the part of the community toward the police.

the radio control takes the number, they are in computer system, they take information. Now for example sometimes people phone 10111 then you got radio control, radio control dispatches the van. We don't do that, we're supposed to, but we don't do (Interview with Relief Commander, 5 April 2011).

A further problem related to the lack of formal address points is that it is often impossible for "back up" to locate a police officer that requires assistance. In one case, a police member was shot in Cato Crest and carried out of the shack whilst shots were fired, but the members responding could not locate the reservist. As one member said,

Warrant officer S Govender was shot in the middle of the shacks and they were carrying him out from the police van, carrying him all the way down, the guy was still firing shots in the air, they carried the policeman out to the road, that's how bad it is. The vans couldn't even locate him because they didn't know where to find him (Crime Prevention focus group member, 16 March 2011).

In addition, in this instance, the crime scene was destroyed because evidence was contaminated by the fact that the spent cartridges of the bullets could not be located and the poor lighting conditions affected the authenticity of the photographic evidence. The

suspect could not be linked to the crime.

When answering the questions on how they locate complainants, the police responded by saying that they will sometimes ask the community to use fixed landmarks such as the community hall or health clinics to direct them. This is the case too when requesting the service of an ambulance. The ambulance then meets community members, who then escort it to the homes of the sick or injured. From this, one can see that general service delivery from emergency services is seriously affected by poor infrastructure and the lack of proper address points, although the local police have tried to be as innovative as possible in providing delivery in these challenging circumstances.

While the police might believe they are trying to develop appropriate solutions to the informality problem, focus groups with community members indicated that residents believe that the police are not familiar enough with locations they are given, such as community landmarks. This reveals that there is not enough communication between police and the community regarding common address reference points, and currently a common language does not exist to describe them such as cardinal points of the compass.

### **Investigation Responses and Challenges**

There are several problems encountered by detectives during the course of their investigation work.

According to participants in the focus group held with the detectives, complainants are generally requested to meet with detective at the station to obtain further statements because of the difficulties associated with locating them. This causes several delays in the investigation due to scheduling (complainants need to get time off from work to meet with the investigating officers during the detective working hours which are 07h30 to 16h00) and transport issues. Sometimes this leads to cases being withdrawn because the case docket has not been prepared timeously with all the statements that are required. In turn, this leads to a sense of despondency and lack of faith on the part of community residents toward the police. Detectives are also frustrated by not being able to carry out their primary function i.e. crime combat and prevention and investigation.

As mentioned previously, detectives need complainants to assist them in pointing out a suspect's place of residence as detectives cannot locate this by themselves. This is because they are unlikely to get assistance from other community members in finding locations:

the other problem you have in the informal settlement is that you very rarely get co-operation from the community, because whenever they see the police coming they always think on the negative, "Hey the police is here to arrest someone." "No assistance is given from community if you are looking for directions to assist the police to arrest a suspect (Cato Manor Detective Branch focus group member, 19 April 2011).

According to the focus group members, because of the risks in certain instances of the complainant being identified by the community, the police vehicle used needs to have tinted windows. However, a tinted window vehicle is not always available or may be in the police garage for repairs, so the pointing out needs to take place at night if it is in a vehicle without tinted windows. This is a much more dangerous operation.

The detectives interviewed stated that the same problems of getting to the location effect crime scene experts such as photographers, ballistics and fingerprint experts. Therefore, they require an escort from other fixed landmarks in the area. Needing to provide an escort puts a strain on personnel and vehicle resources.

Due to the large crowds which gather at crime scenes who are very curious, and because sometimes they are angry at the slow arrival of police or an ambulance if there are injuries, evidence is sometimes destroyed or tampered with:

Like we had experience where a gentleman was shot and during that incident another gentleman came, took the firearm. So, the incident is more or less destroyed, you know like you can't pick up the pistol to link the suspect with fingerprints or ballistics (Cato Manor Crime Prevention Unit focus group member, 8 March 2011).

The detectives explained that a crime scene sketch is sometimes of no use because it does not have commonly recognised points of geographical reference, or do not adequately match up to the findings of an inspection *in loco*, or contains terminology used to describe community landmarks which are unfamiliar to the courts.

Although the issues listed above can inhibit and delay the effectiveness of an investigation generally, the problems are far more complicated in Cato Crest, where there are challenges in terms of poor infrastructure, the absence of road network and design and lack of police resources etc. This can result in suspects having time to flee and evidence such as firearms being disposed of. In addition, delays in investigation can result in cases being withdrawn and suspects being released if prosecutors' requests are not complied with in a specific time.

In spaces like Cato Crest, detectives are exposed to risk and sometimes require other detective branch members to assist by accompanying them to crime scenes. This causes stress on the personal lives of those detectives who have to alter their times of work.

There is one other (legal) challenge which does not come to mind immediately. In terms of the Criminal Procedure Act 55 of 1977, section 60(4), the court can refuse bail if there is a possibility that the accused does not have a fixed abode and so can possibly evade trial. This can result in an innocent person being held in custody until the case is withdrawn. This obviously has a negative impact on the individual as they could develop habits whilst in custody which could turn them into a criminal, and also leads to unnecessary overcrowding of police cells at Cato Manor or Westville prisons (the two prisons used by the Cato Crest police). In some instances, bail is refused simply because the person lives in an informal settlement and therefore does not have a formal address (Interview with Detectives, 12 April 2012).

### **Community and Police Perceptions of Poor Service Delivery**

Paula Meth (2004) conducted a study in which she solicited diaries of crime in Cato Crest. One of the respondents wrote in her diary:

...the most intriguing problem is the fact that the police services do not respond in time to the criminal events. According to law, one has to report his or her problem to the police services. Each time that one reports their case to the police, it becomes clear that the police do not care. This is depicted by the fact that their investigation into the crime does not bear any fruits (Environmental and Urbanization, 2004:158).

Meth's findings are corroborated by community members who participated in this study's focus groups. According to respondents in the focus groups, Cato Crest residents receive little or no assistance from SAPS. When the police do respond to reports of crime, the response time is slow, and often there is no follow up on investigations. Cato Crest CPF members also argued that their ability to fight crime was hindered by a lack of knowledge and information on the part of the police about the area, and also by their limited access as an entity to the police themselves and to their information. The respondents in the community focus group agreed that there were no regular visible patrols in Cato Crest and that the police refused to enter certain parts of Cato Crest. They described the police as lazy and unprofessional. Less than a third of those who reported incidents of crime to the police were satisfied with the response that they received.

Some participants of the community focus group believe that police visibility is a solution to their problems. They allege that the police are not serious about decrease of crime in the area. They say that the community is trying but the police do not "buy in" (active support). In response, the police argue that crime prevention is restricted due the clustering of the shacks without fixed address points. The community also mentioned that they requested to have a satellite police station and increase the visibility of policing by having "Nyalas" (police armored vehicles) involved in patrols. They were unsuccessful in their request.

The mere presence of visible police prompts voluntary obedience of the law and increases the possibility of success of crime prevention. Hale (1981:109) points out that that a strong, visible presence in society is an extremely important element in the creation of police omnipresence. The public feel reassured through a sense of security from the knowledge that the police are active in the area. Caldwell (1972:43) asserts that police visibility of a police official is of greatest importance, since the success of proactive policing depends on the degree of visibility of the police.

A very good example of reassurance policing and the effectiveness of a well designed satellite police station strategy is the Japanese *Koban* system. Kobans are small police posts located on streets which enable police to maintain long-term interaction with area residents and cultivate knowledge about the area thus promoting reassurance policing. The geography of urban Japan is extremely complex and can best be understood through a long term presence in a specific neighbourhood. The existence of kobans with specific areas and



a stable cohort of officers enable the police to develop an intimate geographic knowledge that cannot be developed through other means. Kobans serve as local administrative centers, dispensing information to visitors and residents of areas looking for addresses or needing help from the Government. They also serve as sounding boards where area residents can complain about local problems and resolve disputes. Police in the koban carry out annual surveys of businesses and residents by visiting the locations of homes and businesses. Police themselves become part of the community and develop knowledge that helps to control crime (Bayley, 1991).

### **Accusations at Bias and Selective Policing**

The Cato Crest community accuses the police of being biased. As one focus group member commented:

...they always have excuses that they are not familiar with the place, however in the next hour they raid the shebeens (Cato Crest community focus group member, 22 February 2011).

They argued that the police make excuses that the area is too dark and dangerous, or that there is a vehicle shortage and yet vehicles with members will still raid shebeens. This unfortunately creates poor perceptions about police and thus effects relations between the police and the community.

The police did not concur with this perception. In their view, presented in interviews and in focus groups, the police do not 'over police' when it comes to shebeens. They argue that they respond to complaints from the community which they receive via police radio. This happens when, according to the police interviewed, a patrol vehicle receives the complaint via police radio and acknowledges this complaint, whilst a crime prevention team is also on duty. The crime prevention team does not know if the complainant has been attended to by the patrol vehicle who initially 'copied' (acknowledged) the complaint. Coincidentally the crime prevention will plan an operation to charge a shebeen in the vicinity of the complaint, without knowing if the complaint has been attended to by the patrol vehicle. This may appear like very selective policing, but the police do not believe that this is intentional. Whatever the case, the police feel misunderstood by the community, and the

community feels that the police respond selectively in their choice of preventive and combative operations.

Regarding community allegations about police vehicles, the police state that it may occur that complainants come to the station and find that there are other vehicles parked at the station even though they have been told that there are no vehicles available. However, these vehicles belong to other units who are off duty. There are also occasions when police vehicles are defective. A lack of vehicles is often identified by SAPS as one of the main logistical reasons why they cannot attend to complaints (Bentley & Connor, 2010:34). The ubiquitous “sorry we don’t have a vehicle” is still without doubt the most frequently cited excuse to explain away poor police response times generally encountered by the residents of Cato Crest. According to the police, cluster operations are sometimes held in Cato Crest, with a large number of personnel and vehicles from other police stations.

In-depth interviews with the members of the police indicated that the lack of personnel and resources are two major reasons hampering better police service delivery in this area. The majority of the police officials felt that their crime prevention strategies would be much more effective if they had more resources and personnel to do so. This includes more vehicles as well as staff, especially over weekends when the need for policing in these areas is higher. This suggests that police members also concur about the community’s complaints about the police service delivery issues.

According to one of the police focus groups, the police feel isolation in terms of their duties as when they enter the Cato Crest informal settlement to conduct an operation, members of the public start whistling so as to notify criminals of the police presence. The result of this is that community members are themselves responsible for the lack of arrests of offenders because they want to protect friends and family members against police action. This dynamically results in fear within the community that wants to report crime and promotes distrusts to the police, which contributes to general lack of cooperation with the police. This puts a vulnerable group at greater risk, and the dynamic leads to much frustration on the part of the police.

The police say that the community does not freely assist them with information regarding criminal activities. As a result most of the police information is generated through cordon

and search operations which are often experienced by communities as invasive and selective policing. This type of police operation involves isolating the target area by cordoning off and searching suspected premises and persons to arrest and seize illegal items. Whilst the police are mandated to combat crime, the community at Cato Crest being subject at any hour to search and seizure can be viewed as unjustified intrusion on their privacy. The difficult task of the police is to ensure that a proper balance is achieved to maintain constitutional rights and, the prevention and combating of crime.

I am of the view that it could be that the community has had a bad experience with the police and therefore is reluctant to assist with directions and information. Some of the community members alluded to the fact that if they assist the police, they could be seen as “*mpimpis*” (spies). According to the police, information is usually only given if there is personal vendetta against the suspect. They maintain that the community only becomes concerned if there is a personal vendetta against a suspect.

One of the reasons given by the community focus groups for not giving information to the police is that there is a fear of reporting crime because when the suspect is released back into the community there is a risk of victimisation. They added that they have no faith or confidence in the police whilst they are intimidated by the release of suspects. There is no police protection programme in Cato Crest, they argue.

The community mentioned that the community leaders and CPF are trying their best but the police have let them down by not maintaining confidentiality, and this makes them very vulnerable in a community that is not regulated or protected by state institutions. In their view, the release of suspects on bail appears to the community to indicate collusion with criminals. When this view was shared with the police, they disagreed vehemently. They made the point that the community is not aware of bail procedures. Bail is granted by courts and not by the police. The police argue that this is beyond their control and issues of bail rest largely with the discretion of the courts, not the police. The police made the important point that they have to protect themselves against civil claims for unlawful detention and therefore have to respect bail awards.

There are two distinct approaches to bail. The police who maintain law and order want to see severe restrictions that prevent suspects from regaining their freedom and the courts

that have to observe the accused rights by granting of bail which advances personal liberty in keeping with the accused constitutional right. Whilst the court may have an obligation to the accused rights, the police have a responsibility to ensure that bail is not granted due to insufficient evidence (Neveling & Bezuidenhout, 1997:279).

Another reason for poor response time as stated by the participants of the community focus groups is, they believe, related to who takes the call. Many of the police in the area are not familiar with the names allocated to spaces and places by community members. They are also unable to speak isiZulu, the language of most residents of Cato Manor. However, from my interaction with the Cato Manor police, I am aware that every shift including the crime prevention unit has Zulu speaking members. I also observed whilst on patrol with the police that generally a Zulu speaking person is present when the police are on patrol in Cato Manor. It could be that on that particular instance when the community member called the police that there were no Zulu speaking members on that shift. It could also occur that a Zulu speaking member was on leave or off sick on that particular day.

The Cato Crest community is sometimes involved in crime prevention activities as a result of their frustration with police ineffectiveness. I accompanied the sector forum and community members who cut down bush in an area where robberies and rape was prevalent. This area was identified by the community as a crime hotspot at the safety committee meeting. However their involvement was dependent on the fact that the councilor was also involved in the process of clearing up the bush. It appears the community is motivated by the councilor presence and his active involvement. This initiative was a community initiative and did not involve the police.

## **CONCLUSION**

For a variety of reasons such as poor service delivery, distrust that exists between the community and the police, lack of community cooperation and sound partnership, discourages cordial and healthy relations between the police and the residents of informal settlements. From this research study it is evident that the current relationship between the police and community in Cato Crest is poor.

The general picture that I obtained as a result of all the opinions of the participants in this

study is that there is a huge challenge to deal with the problem of policing at Cato Crest. In turn, the police are frustrated because all their efforts to address this problem are fruitless.

While it can be concluded that measures need to be implemented to improve policing in Cato Crest, it is also acknowledged by the police and community members that the SAPS faces limitations including limitations of resources. The public police are therefore unable to single handedly provide effective policing services in Cato Crest.

The police at Cato Crest are dependent on landmarks, taxi stops and shebeens to find their way complaints, to compile operational plans and to direct members etc. This is not easy, considering that the area is geographically dispersed in terms of its infrastructure and spatial planning, and undermines effective policing service delivery.

From the empirical research done in Cato Crest, both with police and with community focus groups, it is evident that there is an urgent need for the proper address points and improved infrastructure to supplement the crime mapping process and enable effective policing. The future of subsequent crime mapping in Cato Crest informal settlement revolves primarily around the ability of the GIS to overcome the basic problems regarding lack of infrastructure which can be achieved through participatory or community mapping. The facilitation of partnerships with the local community to understand their space and integration of GIS puts crime into its spatial perspective, which contributes to crime mapping of an informal settlement. Crime mapping is the focus of the next chapter.

## **CHAPTER SIX**

### **CRIME MAPPING**

*“Policing is as much about addressing actual crime events, as it is about addressing community perception of crime, and mental maps can be one more tool to assist in their job”*

*(Lopez & Lukinbeal, 2010:53).*

#### **INTRODUCTION**

With the advent of computer technology, crime mapping has become a popular method for examining the relationship between criminal behavior and other social indicators. More specifically, crime mapping and spatial analysis of crime are recognized as powerful tools for the study and control of crime, because crime maps help police identify problems at a policing precinct, which is within specific geographical boundaries. Crime mapping can provide information about the location of hotspots or high levels of reported crime (Ahmadi, 2003:1).

Areas that experience rapid housing development pose serious challenges regarding the identification of locations of reported crime and of crime hotspots. New streets and new housing developments spring up rapidly leaving a lag time before these streets are available on a street database for geocoding purposes. The major difficulty occurs where development takes place in a haphazard and uncontrolled manner as in the case of informal settlements, where there is a lack of detailed crime data.

Many townships have been poorly planned from the outset, with little or no attention given to issues of community safety. In the case of informal settlements, urban design is often absent (Shaw & Louw, 1998:1). In some of these settlements such as iKhayalami, Cape Town, planning by residents themselves has led to safer environments in the absence of planning by officials or consultant planners. Both formal and informal settlements present a diversity of urban management and planning challenges, of which security is only one

(Shaw & Louw, 1998:1). Without proper planning, including the formalization of space through mapping, safety is heavily compromised, as discussed in previous chapters.

Unlike other developing countries such as Uganda, Nigeria, and Ghana, South Africa has a fairly good level of geocoding accuracy in urban areas such as city centers, low to middle class suburbs and residential areas where there is existing data for road networks, land parcels and address points. However, this is not the case for informal settlements which are the fastest expanding areas in South Africa at present (Breetzke, 2007:41).

In many South African cities, informal settlements are interwoven with formally developed areas. However, there is little in the way of spatial data bases on the geocoding of crime location and name of places as determined by the communities living in these settlements.

The use of geospatial technologies to understand crime in informal settlements is now becoming a commodity. This particular research explores the need for a spatial data base that can help crime mapping of informal settlements in South Africa. This is accomplished by exploring the community's perception and understanding of geography through participation in mental mapping. The information gathered can then be used to augment the conventional GIS, thereby integrating community knowledge as an important information layer to form a spatial data base through group mental mapping and focus group discussions.

The methodology employed in this study thus links community participatory methods to modern geospatial information technologies. Specifically, perceptions and experiences of local communities are integrated into traditional GIS databases as layers of information to create a spatial database where crime can be mapped to its proper location (geocoded), using community names, landmarks and demarcations.

In this chapter I explore the ways in which mental maps have been constructed in Cato Crest and suggest how police and communities can develop understandings of space in trying to deal more effectively with the crime problem. A detailed description of mental mapping used through spatial data collection from the community follows.

## **THE CHALLENGES OF CRIME MAPPING IN INFORMAL SETTLEMENTS**

A sensible starting point in the study of crime mapping in informal settlements would be to examine patterns of crime in informal settlements. The empirical analysis of these patterns would provide a useful way of quantifying, identifying and evaluating the actual crime in informal settlements.

The problems of examining patterns of crimes in informal settlements and the analysis of these crime patterns associated with this exercise, are compounded by the emergence of irregular settlements that have informal street patterns. These settlements are unmapped and are often unfamiliar to outsiders and public officials (Global Report on Human Settlements, 2007:9-10).

The inadequacies of police crime information are a reality in most societies. In South Africa, particular problems relating to technical issues of data integrity and accessibility exacerbate the situation. Understanding the nature of particular crime types, especially those that are poorly recorded in official crime statistics such as victim surveys provide useful details (which are difficult to glean from the South African Police Service (SAPS) databases) on where and when crimes are the most likely to occur, and circumstances which characterise certain crimes (Louw, 1999:2).

The peripheral growth of informal settlement areas is a serious concern given the high density of the population in most of these areas. There is a correlation between the high number of crime incidents in the informal land use class areas between urbanization such as overcrowding and unemployment. As there are no formal addresses in these areas, geocoding from the national address directory database is impossible (Eloff, 2006:11).

Leggett (2004) notes that many residents in South Africa live on properties in informal settlements, as well as around mine dumps and in undeveloped areas, in which there is an absence of any physical address, as well as no formal or well-defined road network. These properties or “street segments” are extremely difficult, if not impossible, to geocode (Breetzke, 2007:41).

Crime data pose particular challenges for geocoding, with two key challenges facing the



spatially mapping of crime incidents in South Africa. A major difficulty arises when attempts are made to geocode an address for a street that does not exist or is not yet added to the GIS database at the SAPS. This difficulty is particularly pertinent in South Africa, which has experienced phenomenal growth in urban and rural housing development in the past decade (Breetzke, 2006: 79). Moreover, some crime sites are not geocodable because the address information presented to the crime analyst contains insufficient information to determine the incident location. For instance, if a base street file has not been updated recently there may be a whole housing development comprising of a number of streets that are not geocodable. Any crime events in these streets will not appear on a map, and their location will not be randomly distributed around the image but will cluster in one location i.e. the new housing development (Ratcliffe, 2004:70).

Any error in the initial geocoding process will translate into compounding errors as the analytical and dissemination stages of police intelligence work are undertaken. The reality of modern crime analysis is that, while crime mapping is an enlightening and practical intelligence tool at many levels, the analyst rarely has time to track down the location of ungeocoded incidents and completely successful geocoding is not the norm (Ratcliffe, 2004:62).

Additional logistical challenges lie in distinguishing between the ambiguous addresses of the physical crime address noted by the SAPS and the GIS databases that contain corresponding address data (Chainey & Ratcliffe, 2005). The problem can be as a result of sloppy police work through an inaccurate recording of address level data at the crime location, human errors such as misspelling or incomplete data or data omissions within the police docket.

What is definitely needed is standard street address information with latitude and longitude coordinates. Without this, the geocoding engine built into the mapping software cannot automatically review the data fed into it by the operator. This calls for editing, and the process is time-consuming and defeats the very purpose of computerised crime mapping (Ragavan, 2002:3).

An important factor to remember is that crime mapping is heavily dependent on maps prepared by government departments, especially civic bodies such as city councils. The

level of details varies from country to country and city to city. In a place where there is no organised mapping of streets and where there are a number of clusters of informal settlements which defy identification (such as slums in a majority of Indian cities), crime mapping becomes a futile exercise (Ragavan, 2002:3).

## **THE CHALLENGES OF CRIME MAPPING IN CATO CREST**

The first successful project of the ABM (Area Based Management) was the crime mapping project. The Cato Manor ABM provided financial and logistical support to the Metro Police for this project and helped market it.

Emerging crime patterns were discussed with the local CPF. They commissioned police officers and obtained the authority to address public meetings with situational analysis on crime. Today the CPF is one of the major drivers of community safety initiative meetings and activities.

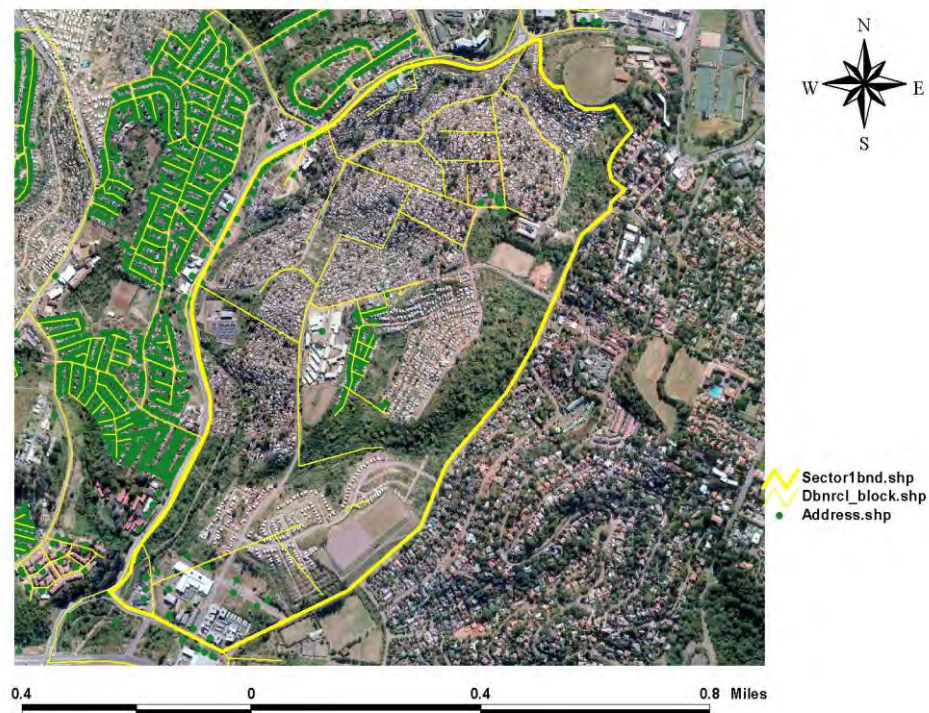
Initially the SAPS and Metro Police worked separately with strict jurisdiction boundaries. It was a rather long bureaucratic procedure, to gain access to official crime statistics held by the SAPS. Through Cato Manor ABM facilitation, this process has developed into a more integrated and collaborative working environment. The Cato Manor SAPS has a close working relationship with Cato Manor ABM.

Law enforcement agencies in South Africa are inevitably faced with a sliding scale of crime mapping accuracy, in that some crime incidents are mapped to specific address points whilst others are mapped to the spatial mean of a road segment within a land parcel, CAS block (policing precinct) or centroid (geometric centre) of either of these polygons (see Figure 3).

During the course of the crime mapping initiative, it soon became apparent that a vast proportion of reported crimes could not be mapped using the address point database for the reasons mentioned above. Furthermore, the current address point data base did not extend to such spaces as vacant land parcels, informal areas or along main arterial roads that were flanked by bush on either side. In these instances the reported incidents of crime were mapped to the mean of the road segment or centroid of the CAS block (see Figure 4).

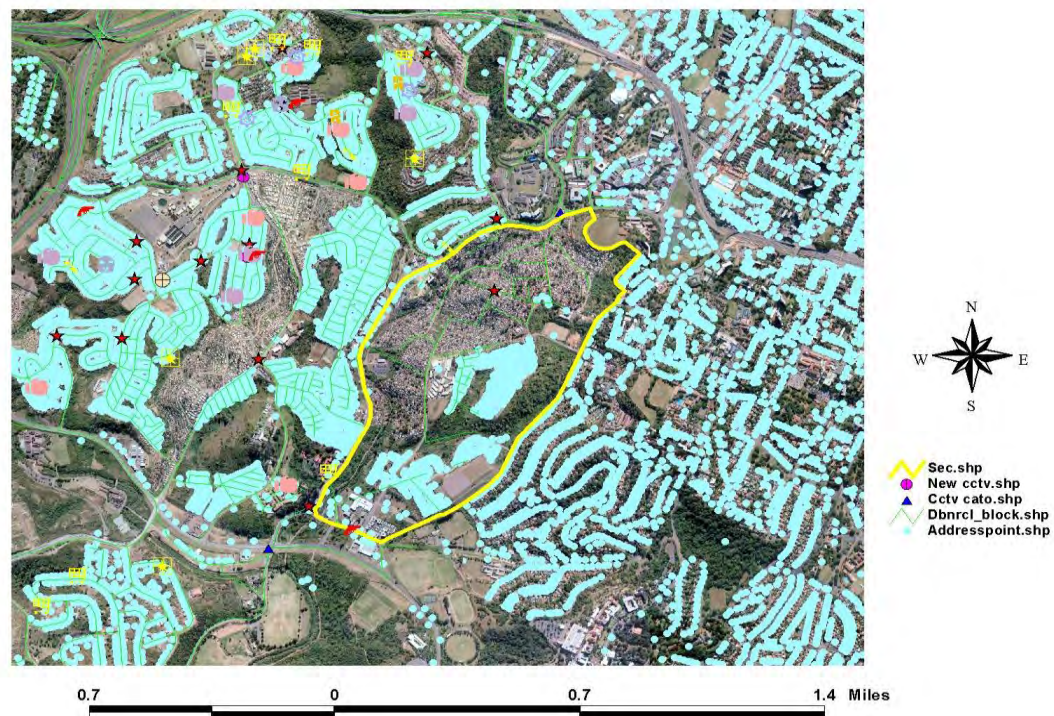
You know, we are not actually pinpointing exactly the hotspot area, it's like you're just saying Cato Crest but you are not showing exactly which part of Cato Crest is being affected, how much of crime is committed from that particular area. You're just saying Cato Crest, but it's a big area too, square kilometre metres, ten I think, somewhere there, I think. So actually you're just looking at the whole junk of the area, it's hard (Crime Prevention focus group member, 8 March 2011).

### Sector 1 Cato Crest



**Figure 3: Sector One, Cato Crest Informal settlement.**

## Reported Crime Locations : Cato Manor



**Figure 4: Reported crime locations mapped to the mean of the road segment or centroid of CAS BLOCK 347104.**

It became evident from interviews with police officials that there is a void in crime mapping technology and training in crime mapping at Cato Manor Police Station.

you must also remember that crime mapping is a very new concept in the police. I mean they are not like, you know, trained, and went through a course to tell them like, this is important, so, they're not given that kind of background knowledge. Even if you give them some crime statistics and you tell them these are the crimes, they are not told like this is how it's demarcated, where the demarcations of this area is. (CIAC focus group member, 25 April 2011.)

another point of view is that the CAS operators are civilians who are not knowledgeable with area from an operational perspective. The cases would be captured as CAS block number "347104" (Polygon) used by default, to capture and map all crime that occurs within Cato Crest informal settlement (Cato Manor Community Service Center focus group member, 5 April 2011).

The police also indicated that the public has an expectation for police to attend to complaints located with CC numbers. However, police do not have CC numbers correlated to their GIS system and hence cannot map these crimes or complaints according to these numbers. As a result police are criticized for poor service delivery.

The people do not understand our problem and challenges with crime mapping. The computer cannot pick up a specific shack like CC 221, the computer cannot pick that. But if you got like a fix address like 21 Blinkbony Road, the computer picks it up. It picks Blinkbony up and it tells you exactly where that is, it's exactly like a GPS system, but the GPS cannot find all the shacks (CIAC focus group members, 25 April 2011.)

However, in focus groups held with community members, it appeared that community members did not believe that problems with mapping were the primary cause of police ineffectiveness in the Cato Crest area. For them, police discriminate against people who are poor, particularly those who live in informal settlements. There was substantive discussion about discriminatory behavior of the police toward the Cato Crest community.

In the South African context, both Breetzke (2006:78) and Stylianides (2000) identify data collection protocols, data integrity and variance between spatial data sets in use by the SAPS as constant challenges for law enforcement officers who are trying to do geocoding. With so much data available electronically, analysts rarely have the time to check geocoding results and instead rely on high, but less-than-perfect, geocoding hit rates to get a general picture of crime in a geographical area (Ratcliffe, 2004:70).

While this level of mapping accuracy may be acceptable if the aim is to be able to visualise the distribution of crime as a whole across the police station area of operation, this generalised approach to the location of crime incidents also precludes law enforcement agencies from developing an understanding of the interaction between the physical environment, local residents and causal factors of crime which is central to the concept of crime analysis (Veenendal & Houweling, 2000:3).

In most instances, police crime data are neither designed to facilitate the recognition of such crime patterns, nor presented in a manner designed to be readily accessible,

comprehensible or useful to officers or others for identifying patterns. These problems of design and presentation are compounded by the incomplete nature of the data since they are primarily derived from victims' reports. Also missing from the police informational data base is the day-to-day social context of crime, which may be understood more completely by community residents rather than by the police because of residents' knowledge and experience of neighbourhood problems and activity patterns. This is certainly true of Cato Crest. As a government official who has been working in the area stated:

In Cato Crest, the community emphasized that they prefer to report crime to the CPF and sector manager. They have more confidence as CPF will understand local geography and exact location of a crime that occurred. The CPF would be able to identify with local geography if they, the community had to refer to community landmark names. This also assists the CPF in identifying crime patterns, similar crimes, strengthening relations between CPF and community (Interview with Mlengi Gumede of ABM, 8 March 2011).

As expected in South Africa, some crime density and hotspot analyses are located at the mean of road segments and centroids of CAS blocks, which holds little value for the tactical facet of crime analysis in those areas (Canter, 2000). The effect of this, as stated earlier in the text is that we have not advanced our knowledge regarding the location of crimes or the factors associated with the generation of such percentage crimes.

Due to the volume of such percentage of crimes, case dockets are evenly distributed to detectives. Whilst this distribution is done in order to even the work load, fragmentation in terms of investigation takes place. Information on location of actual crime scenes and suspects' location are fragmented.

We share information about suspects and locations face to face, informally. Detectives will occasionally pass information to each other in order to assist in arrest. The main problem that we have, is to see where exactly the crime has occurred in Cato Crest so that we can recruit and cultivate informers (Cato Manor Detective Branch focus group member, 19 April 2011).

Detectives interviewed commented that they are evaluated on a regular basis on the number of arrests they make; some may withhold information from other detectives if that



information will lead to an arrest. The volume of crimes is high enough to stretch the limits of memory. Thus, the detectives need some mechanism for storing and retrieving the information contained in the case dockets so that they can access that information. Mapping all of the information about the location of crime (entities) and further details (attributes) on the computer, however, would mean that the unclassified information would be shared by any detective who used the computer (Maltz, Gordon & Friedman, 2000:99).

In practical terms law enforcement agencies are then limited in their ability to identify and respond to those specific locations which are crime generators as well as causal environmental and socio-economic factors associated with that crime generator/s (Clarke & Eck, 2003).

An alternative approach to this situation is to develop a spatial data base by participatory mapping particularly through mental mapping of local land marks, locations or demarcations that are significant enough to give a general representation of how the community perceive their immediate environment. For example, many cities contain informal settlements without planned streets or services and addresses in these areas may not have standard names or numbers. The level of detail is important not only for display and analysis, but also for locating crime incidents (geocoding) and contextual features on the maps (Markovic & Stone, 2002:3).

## **COMMUNITY MAPPING AND SPATIAL RELATIONSHIPS TO LANDMARKS**

### **What are landmarks?**

Landmarks are key components of the way we organise our knowledge of global, regional, and local environments. Our knowledge of the world is usually described as our “cognitive map”. Landmarks are significant in one’s formation of a cognitive map of both physical environments and electronic information spaces (Golledge, 2002:1).

“Landmarks are defined in physical space as having key characteristics that make them recognizable and memorable in the environment. Landmarks are prominent, identifying features in an environment, which provide an observer or user of a space with a means for locating oneself and establishing goals.” (Sorrows & Hirtle, 1999:1).

Landmarks are also a point-reference (similar to nodes) and are often physical structures such as a building, sign, or geographic features (e.g. mountain). The range of landmarks is extensive, but the commonality is that they are used by the individual to better understand and navigate the built environment. Landmarks clearly are significant in both physical and electronic spaces. They are key to our ability to orient ourselves and to navigate in any given environment (Sorrows & Hirtle, 1999:5).

An element in the environment may be a landmark based on its content, meaning, use, or cultural significance. A building or site may be a landmark because of its historical significance. For example in Cato Crest, a library was constructed at a well known place where a famous anti-apartheid activist, Dorothy Nyembe, once resided. The area in which the library is situated is still known to many people and in the community who today, often refer to as “Dorothy Nyembe”.

A landmark may be any element in an environment that is external to the observer and that serves to define the location of other objects or locations. A landmark may have particular visual characteristics, may have a unique purpose or meaning, or may be in a central or prominent location that makes it effective as a landmark. In Cato Crest there is a well known liquor outlet called “Mazithangaza tavern” (drink to till you feel the fun). This name was given to the tavern by those community members who frequent the place. It is a landmark because of its very loud music.

A cognitive landmark is one in which the meaning stands out. A feature or object may be a cognitive landmark because it has typical meaning, or because it is atypical, in the environment. Cognitive landmarks are most likely to have characteristics of unusual or important content or prototypicality (Sorrows & Hirtle, 1999:10).

It might be culturally or historically important. For example, in Cato Crest, the first water standpipe was erected by the municipality in Area 7 of Cato Crest. This then gave birth to the name as “*Mpompini*” (communal water tap). As a result people living within close proximity of the area started to call the area “*Mpomponi*”. This became a common demarcation or land mark that is known as “*Mpompini*” (Figures 5 and 6). Although there are eight standpipes erected within Cato Crest, the historical or cultural name still exist in that particular area, based on its unique status.





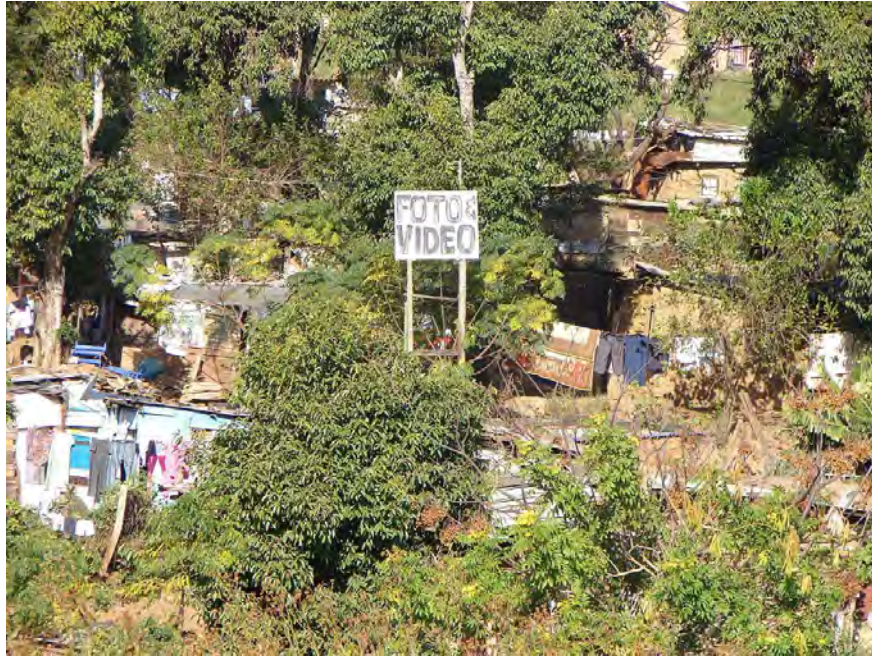
**Figure 5: Communal water stand pipe known as “Mpompini”.**



**Figure 6: Area known to the Cato Crest community as “Mpompini”.**

Cognitive landmarks tend to be more personal and can be missed by those not familiar with the environment, unless they have some distinguishing markings or signage. If the content of the landmark is in contrast to the surrounding locations, then there is a greater likelihood of a cognitive landmark developing. In Cato Crest, recently a video recording business was established and the owner erected a board for advertising purposes which contrasted to the environment. This has now generated a community landmark known as “Video” (see Figure 7).





**Figure 7: Cato Crest community landmark known as “Video”.**

In Cato Crest, landmarks are given names if new activities arise in the community. For example, the local municipality has been involved in a project aimed at constructing a new tarred road in Cato Crest. This is a significant development for the residents of Cato Crest. The space is now known as “New Road”, and has become a landmark for the community. This is the same concept that has applied to the Soldiers Way Bus Rank that is situated in the CBD (Central Business District) of Durban. During the construction, this bus rank was referred to as “New Rank” by public transport commuters. Today, 35 years later this is still called “New Rank”, yet there are more taxi ranks that have been built or constructed after that one, and the existing one is far from new.

A structural landmark is one whose importance comes from its role or location in the structure of the space. This class of landmarks may be highly accessible, and may have a prominent location in the environment. In physical space designers often create certain spaces, intersections or aspects in the environment that can be considered structural landmarks, for example DuPont Circle in Washington, D.C., Trafalgar Square in London, or a typical downtown plaza.

## **Landmarks as a Navigational Tool**

Inherent in navigation is the use of landmarks. Landmarks serve multiple purposes in wayfinding. As Golledge (1999:17) has argued, they serve as either an organizing concept for space or as a navigational aid. They help to organise space because they are reference points in the environment defined by a combination of features such as greater familiarity, visual domination of nearby locations, visibility from a distance, or significant cultural importance. While there is overlap among these uses, it is important to consider each use separately and how it might alter the definition of landmarks. Local landmarks are used in idiosyncratic ways by long-term residents to assist in navigation and organise space. Our ability to function depends on forming an understanding or representation of the environment and to plan routes to areas that are not in view.

Due to the lack of infrastructure and accessibility, the majority of residents and police officials who were interviewed in Cato Crest found the use of contact points between communities and the police to be useful. Community members use contact points, like traffic lights, billboards, tuck-shops, community halls, churches, schools, etc to meet with police in case of emergencies or to lodge complaints. While the use of contact points are not always ideal – since they may not be exactly where a crime is located – this approach is nevertheless a ‘quick win’ in connecting police and the community in the task of crime control. Indeed, there is little choice but to use this approach in places like Cato Crest where there are no proper roads, street names, house numbers or proper lightning.

There are many examples of the use of such landmarks in Cato Crest. Being a business entrepreneur is important in Cato Crest. As a result, places of business and workmanship are important. One important landmark in Cato Crest is “Gearbox”, a place where motor car gearboxes used to be repaired. “Emafrijini” is a business place where people of Cato Crest community repair fridges.

While the construction of formal RDP houses has occurred in parts of Cato Crest, previous landmarks still have value for residents. Long outdated community names are still used as address points. For example, the community still refers to places that existed prior to the development such as “Emafrijini” and “eCar Wash”, even though these enterprises no longer exist in these places

Community names are easily spread and embedded in communities such as Cato Crest. One reason for this is that most residents use public transport, and when they want to describe the point of disembarkation, they make use of landmarks in the absence of proper road names. Public transport users quickly come to share the same language. As a community member stated during a focus group:

taxi drivers become familiar due to the fact that the community will teach him as he drives in the community. Even if passengers are coming from the farm to visit at Cato Crest, they will ask the taxi driver to leave them at a particular place as they have been told by their host. For example, if a resident's brother has come from Stanger, he will mention to the driver in the city when he embarks the taxi that he needs to get off at "etankini". Although the visitor is not familiar with the place as they are from another area, the driver will know exactly where to leave them. People giving family members direction coming from the farm will use community names. People who walk regularly in the community and children's interaction with others at school promotes these names (Cato Crest community focus group member, 15 February 2011).

The process of "cognitive mapping" is defined by Downs and Stea (1973:7) as "a series of psychological transformations by which an individual acquires, stores, recalls and decodes information about the relative locations and attributes of the phenomena in his everyday spatial environment". This is to describe our internal spatial/geographic knowledge, or as a hypothetical construct to provide a functional concept related to the mental storage of spatial/geographic information. Canter (1994) succinctly states that "where we go depends on what we know and what we know depends on where we go".

Although we may not know exactly how information is encoded and stored in the brain, we do know that the mind can create images (such as maps) in working memory to help recognize objects/features/places, as a way to help recognize such things or as a way to assist problem-solving (e.g. finding the nearest supermarket). This brings us back to landmarks (Sorrrows & Hirtle, 1999:1).

We do not necessarily have to visit a location or place to acknowledge its landmark status. We may have seen representations of it on TV, movies, in newspapers or magazines, in photos, or heard about it on a radio, or read about it in books, or simply heard many people

mention it in conversation. Whatever the source, we acknowledge and assign special status to phenomena. Some of these are personal, where knowledge is necessary for everyday life but shared by few others (e.g. your personal home or favourite fishing spot). These we refer to as “idiosyncratic”. Others are known in common among large numbers of people. These are: common’ or “communal” landmarks and facilitate communication and exchange of interpretable information (Golledge, 2002:1), such as, “let’s meet in the container park area next to the eKhreshi (crèche)”. This information was shared by residents in the focus groups. Another example that was given was that unemployed community members in Cato Crest would agree to meet at “Rama”; a common community name given to a place which has a signage of Rama margarine (see Figure 8). “The Big Sheen”, an outdoor drinking place, is another well known landmark or point for Cato Crest residents, particularly the youth (see Figure 9).



**Figure 8: Community landmark known as “Rama”.**



**Figure 9: Common place where unemployed people meet known as “The Big Sheen”.**

### **CREATING A JOINT SPATIAL DATA BASE**

To overcome existing police technological inadequacies, this research added fieldwork based community local knowledge and the creation of mental maps through focus groups discussion, was integrated into GIS. This local knowledge information layer has helped to create a suitable spatial data base.

In an expansive, unplanned city like Karachi (Pakistan) the street addressing system was confusing or nonexistent. The urban expansion was prevalent around the city with formal development dwarfed by the expanding "KatchiAbadis," or informal settlements, that typify Karachi. These areas were almost completely unmapped and were hot spots of violent crime (Pryjomko, 1999:3).

This presented a major problem for law enforcement agencies when they responded to incidents. Often the only means of navigation was by local knowledge or landmarks known to the authorities and general populace (Pryjomko, 1999:3).

A standard operating procedure for the identification and classification by the community

of various types of landmarks within each Police Station Jurisdiction was implemented. After two weeks, more than 5,000 unique landmarks were integrated into the street spatial database. This figure will certainly grow as landmarks from within the area assist in the geolocation of crime incidents (Pryjomko, 1999:3).

With this in view, I decided to try to create a map which included community landmarks by engaging with the community members in Cato Crest, with the aim of improving crime prevention and crime combating activities. The focus groups were used as a space to create a spatial database. In creating this database, it was important to explain to focus group members the complexity in creating shared understandings of space, and moving away from sensibilities of blame (usually the police) for not doing their job. A solution, a map, required the coordinated input of community focus groups, and the CPF to assist with the identification of community landmarks.

The data collection process commenced with an AO size 1:2000 scale ortho-photograph of Cato Crest (Sector One), which I presented to the community focus group members with a request to identify as many landmarks, locations, paths etc. and then mark the AO size ortho-photograph accordingly. A total of forty locations, landmarks and demarcations were identified by the community representatives within the area demarcated as Sector One, none of which appear on any of the SAPS or eThekweni Metropolitan Council spatial data bases.

During the data collection process, the police noted that since the community contributed to the identification of landmark`s, exact locations in terms of coordinates did not appear to be an issue and therefore supported the fact that the community had a greater understanding of the geography of Cato Crest by identifying landmarks which then contributed to the creation of a map.

In community focus group, the map (and accompanying discussions) revealed that residents have a strong sense of their collective identity as residents of the area and a shared idea of where its boundaries begin and end. In this study, the focus group interview proved a useful tool for understanding the place-related perceptions of Cato Crest community members.



It allowed for personal local knowledge to be shared, and for deliberations to occur between community focus group members of different ages and genders.

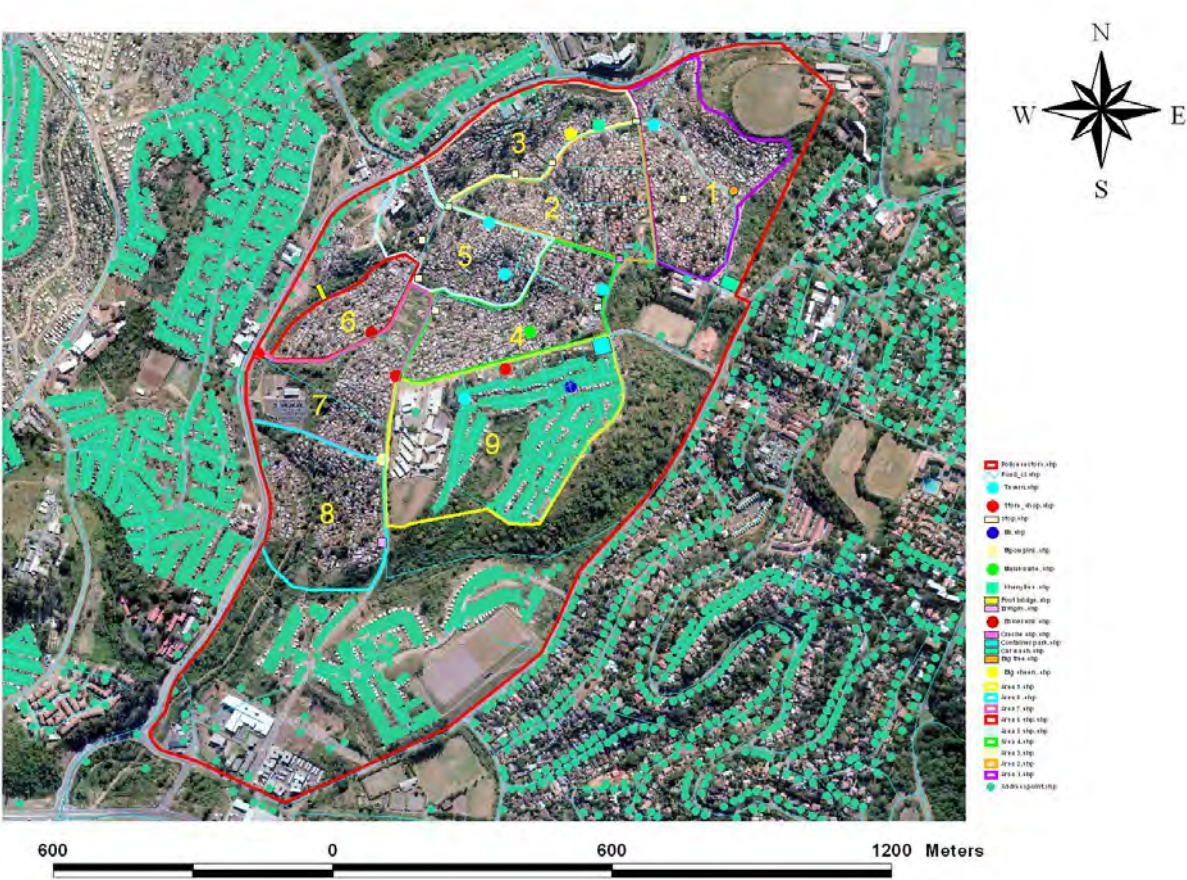
Location types identified by the participants of the community focus group ranged from an informal crèches to spaza shops, foot bridges, informal businesses and taverns amongst others. An interesting aspect of the collected data included the fact that the community that resides within “Sector One” have themselves informally demarcated this sector into ten separate geographical “Areas” (see Figure 6.8). A data set containing all the identified locations and demarcated geographical areas in Sector One was compiled (see Figure 10) with the assistance of the iTrump department (inner eThekweni Rejuvenation and Urban Management Program) within the eThekweni Municipality.

Identification of landmarks, places and paths that are of common significance to the community albeit from the subjective contributions of residents allow the police to begin gathering the type information needed to construct an alternative spatial database. With the internalised geographic information system or cognitive map established through this research, police using an ortho-photograph would be able to orientate themselves spatially by using environmental cues or landmarks and in doing so be able to identify other locations and/or paths relative to those significant internalised locations or landmarks (see Figure 11) (Canter & Harries, 2003).

The access to and application of GIS technology has allowed me to gather data in a more cost effective and less intrusive manner than tasking law enforcement personnel to take GPS (Global Positioning System) readings of locations and demarcations in loco. This cost saving is reflected in the time it took for the focus group representatives to plot all forty locations and demarcations. This exercise took approximately four hours, and the creation of the data layers another six hours. The time span taken to complete this exercise from gathering spatial data from a mental mapping exercise to its inclusion into the crime mapping project spatial data base was less than two working days, less than the time taken to collect data for GPS readings.

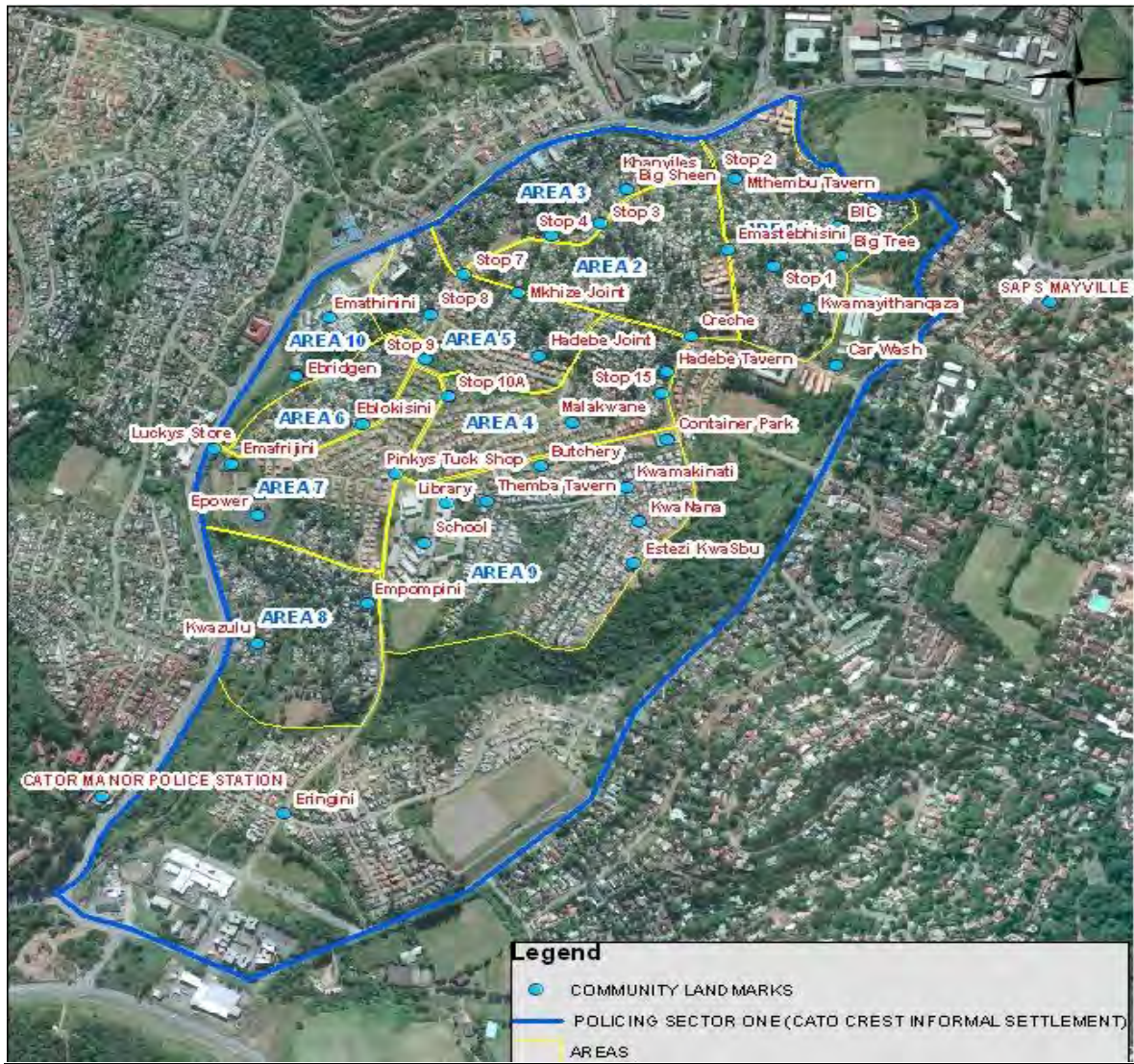
The practical mapping exercise resulted in the creation of a spatial database which should ideally allow law enforcement to map and respond to crime incidents reported in informal settlements and peri-urban areas which were previously consigned to the centroid of a CAS

block, land parcel or mean of a road segment and so were not useful (Stylianides, 2000).



**Figure 10: Spatial database containing “Areas” demarcated by the Cato Crest Community.**





**Figure 11: Spatial database containing “Community Landmarks” in Cato Crest.**

A visual comparison of Figure 3 to Figure 10 and Figure 11 indicate the extent to which this alternative approach to collecting spatial data has not only provided us with a richer understanding of the socio-economic mechanics of the Sector One area, but also the means to map crimes to locations – a task which could not have been done before. If the geocoding process is successful, then the results are usually a location at a specific landmark, where GIS uses these coordinates of these landmarks to locate the crime in relation to other spatial data sets being mapped. This means that a crime event can now be viewed on a map relative to its proximity to informal crèches, to spaza shops, foot bridges, informal businesses and taverns amongst others in Cato Crest, as the creation of this spatial data base can cause these locations to be geocoded.

The “geocoding hit rate” (the percentage of address locations which have been geocoded) is used to indicate the success rate of the geocoding process (Ratcliffe, 2004:61).

While firsthand knowledge is never the sole source of information for decision making in a situation where there is infrequent mapping and monitoring, its importance in operational planning is likely to be more significant. The collection and processing of spatial data from the community in this research study were seen first and foremost as methods and techniques that should improve the available information base whilst at the same time enhancing the ability of police to deal with crime at Cato Crest informal settlement. The main focus at community level was the creation of mental maps of their lived geography and the physical development processes of crime mapping in informal settlements.

The informal settlement’s residents’ ownership of data on key development related variables can also be seen as a form of empowerment in that it may be used to provide leverage in their collaboration with the police.

By releasing control of their data communities not only relinquish a degree of power that is inherent in their intimate knowledge of their locality, they also gain power by their “superior position” to decide who they want to interact with and creates an impression of police that can be very dependent and obligated to the community for their partnership and interaction.

For the police, the research had two benefits. Firstly, hard intelligence was obtained from the people themselves as well as an understanding, first hand, of the crime environment. Second, the whole exercise led to an improved relationship with community members through building shared meaning and understanding. Participation in and of itself led to enhanced trust and confidence in the police by the community.

The presentation of qualitative spatial data has also served as community relations tools which have demonstrated a way to visualize the community’s knowledge and understanding of local space during community police forum meetings, police conversations with the community and the possible enhanced community interaction with the police.

Another “value add” of this research is that it requires policing agencies to work closely with CPF’s and other community structures and in doing so creates a sense of empowerment which is seen in the physical production of maps containing the data contributed by the community members themselves. This research also indicates that this practical exercise of community mapping has been viewed by the community as a positive step in community-police relations.

The police can spatially address the concerns of the Cato Crest community, rather than relying on receiving complaints from the public. The objective of this research has been achieved and may help to produce new policing tools that combine qualitative information with statistical data to better support residents and police in Cato Crest.

In other words, the geographical perceptions and understanding of the community’s local space can allow the police to conduct comparative analysis to better visualize the spatial arrangement that emerged mental mapping exercise. Based on this study, a number of areas have been of interest to police, due to large disparities between their perceptions of the geography of Cato Crest and compared to that of residents.

The Cato Manor police are now in a privileged position to look at various potential relationships such as that between location type and crime type leading to a more accurate analysis and effective crime reduction actions on the part of law enforcement in this policing sector.

## **CONCLUSION**

The Crime Mapping and Analysis application moves beyond the creation of computerised pin maps to assist decision makers with visualizing, analysing and uncovering patterns in the large spatial data-base that the law enforcement organizations work with on a daily basis.

The ability to represent informal settlements spatially by means of a participatory approach such as in Cato Crest shows that the involvement of community members in the process brings a greater understanding of their living environment, thereby contributing to the

implementation of improvements and so meeting the community's actual policing and safety needs.

The importance of participation and inclusion of inhabitants themselves in the processes of identification, spatial planning and regularization should not be underestimated. GIS and community framework through participatory mental mapping widens geographic knowledge creation, through integrating community perceptions of their environment as an information layer in spatial databases used for decision-making in policing.

The GIS, is a visual representation of spatial data and attribute data provides the underpinning for geospatial information management technology for informal settlement policing. Viewed in this light, geospatial information management has the potential to completely transform the way in which informal crimes are mapped.

## **CHAPTER SEVEN**

### **CONCLUSION AND RECOMMENDATIONS**

*“A map is the greatest of all epic poems. Its lines and colors show the realization of great dreams.”(Gilbert H. Grosvenor)*

In this dissertation I aimed to establish how a community understands and constructs their local geography through mental mapping, and show how such mental mapping can contribute to ‘official’ police crime mapping. I demonstrate that the coming together of community mind mapping and official geo-mapping police programmes can contribute in very positive ways to the policing of informal settlement areas, such as Cato Crest.

What this research illustrated is that policing in informal areas that are poorly planned and lack proper maps is incredibly difficult. This leads to frustration on the part of both police and community members, as well as misunderstandings about the reasons behind police ineffectiveness. While the police are viewed as incompetent and discriminatory (in regard to class), they face many daily challenges from a spatial or geographic perspective. Geocoding in a place like Cato Crest is almost impossible. Finding crime scenes thus becomes incredibly difficult. However, if the police have a better sense of how communities make sense of their own space, this would assist in their mapping processes and in their ability to locate scenes of crime, social conflict or disorder. With new forms of mapping that are community-centered and are based on local community knowledge, urban-based geospatial databases for informal settlement in crime mapping and policing through a process of mental mapping may be established.

This research shows that the future of crime mapping in Cato Crest informal settlement revolves, primarily, around the ability of the GIS to overcome the basic problems regarding the information gap that comes with a lack of formal special organization and mapping. The best way of closing this gap is through participatory or community mapping. This allows for the real partnerships to develop between the local community and the police. The outcome of this would be a shared understanding of space and place, and the integration of GIS with community maps. Efficient crime mapping will, it is hoped,

emerge from such exercises.

These ideas were tested out in focus groups of community members and the police in Cato Crest informal settlement. The Cato Crest community within the Greater Cato Manor area was considered an appropriate community for the identification and assessment of factors that challenge policing, in that it displays some of the generic socio-economic and biophysical characteristics of informal settlements in South Africa.

Through an analysis of these focus group discussions, what emerged was the complexity of informal settlements. They comprise of plural spaces and diverse population groupings. Residents of the informal settlement are impacted very differently by their geography. Much depends on how physically mobile they are and how easy it is for them to access means of communication, such as mobile phones. Yet almost universally, members of the Cato Crest community felt that the police did not understand the place that they inhabit, nor do they make any attempt to understand space from a local perspective. From the police perspective, the lack of relevant spatial data was a prohibitive factor in understanding the nature of crime occurring within the informal settlements such as Cato Crest.

The research also demonstrates that there are certain forms of qualitative information, drawn from community and local knowledge which presents itself for spatial analysis, which traditional GIS does not. A key finding of this research is that there should be a coming together, or integration, between community generated mapping information and conventional GIS methodologies. Although conventional GIS technology is a suitable platform analyzing and representing spatial phenomena, it is insufficient in informal settlements (Koti & Weiner, 2008:12).

Most conventional GIS systems are based on “expert knowledge” i.e. the knowledge of the police or professionals. Such knowledge is skewed towards visualizations and qualifications as it employs the principles of traditional science to analyse and represent spatial phenomena (Koti & Weiner, 2008:12). This police focused, limited view, contributed to what community members considered to be poor service delivery from the police. Whatever the root of the policing gaps, what has resulted is distrust that exists between the community and the police and therefore lack of community co-operation and



sound partnership.

While mapping is not the only problem contributing to poor police-community relations, finding more common ground in this regard is likely to dramatically improve police effectiveness and therefore police-community relations. Improved police-community relations will in turn contribute to improved policing outcomes as community members will be more prepared to work in partnership with the police (Van Heerden, 1992:132). What is required, the research shows, is an urban-based geospatial database for Cato Crest informal settlement which supports crime mapping and policing through a process of mental mapping. Community members, during the focus groups, were able to come up with such a database through identification of local landmarks and demarcations as well as places of significance, and plotting these on a geospatial database (map).

Community members, through mobilizing their local knowledge and resources, are able to create mental maps and then capture these as geographic intelligence. This 'intelligence' is arguably more accurate and precise than that of the police because it is based on local knowledge and thus gives expression to lived experiences of space and place. Such mapping is entirely dependent on bottom-up processes that allow for participation and are inclusive. Community members themselves are responsible, in these processes, for identification, spatial planning and regularization should not be underestimated. GIS and community framework, through participatory mental mapping, has expanded geographic knowledge, through integrating community perceptions of their environment, thus becoming an information layer in spatial databases that can be used for decision-making in policing.

The Cato Crest case study demonstrates that participation from both the community and operational police members allows for a greater understanding of the living environment, and this in turn will, no doubt, contribute to the implementation of improvements in meeting the community's actual policing and safety needs. The police responsible for the Cato Crest area were also convinced of this. Community based approaches to data collection and mapping has the potential to address many of the shortcomings of poor formal spatial data.

In this case study I was not able to integrate the GIS system with the local mapping

database. In part this is because there are limitations inherent in the existing GIS analysis system. These could be overcome by integrating community and local knowledge within the GIS as an information layer. Using a community-integrated geographic information systems methodological approach, the research findings show that there is a strong link between the spatial relationships that have been developed from the community mapping, which is important in the study of crime mapping in informal settlements (Koti & Weiner, 2008:11). Community mapping has encouraged Cato Crest residents to provide information about the geography of their area. As revealed by oral narratives and focus groups discussions, knowledge of landmarks and use is impacted by effective crime mapping of informal settlements. These can quite literally be added onto formal maps as a layer that lies above the GIS generated map.

It can be deduced that the GIS data provides the underpinning for geospatial information management technology for informal settlement policing. Viewed in this light, geospatial information management has the potential to transform completely the way in which informal settlement crimes are mapped. The participatory GIS approaches, more often than not, are a complementary rather a contradiction of traditional GIS (Abbott, 2003:590).

The development of crime mapping in police departments and the enthusiasm for environmental criminology as a mechanism to effect change, resulting from a better understanding of the spatial-temporal characteristics of crime, advances traditional understandings of crime patterning and methods for analyzing the incidence of crime. The coming together of these two systems of knowledge has the potential to shift police and even community thinking away from the bureaucratic inertia that comes with a dependency on crime statistics, rather than with qualitative experience.

Criminology, as a discipline, has been greatly affected by the field of crime mapping. This field has gained prominence and acceptance by effectively using software to combine criminological theory and geographic analysis principles. This has mostly been because of advancements in geographic information systems (GIS) and other spatial crime analysis. This occurred due to the operationalizing of geographic analysis techniques and the progress of computers and software (Eloff, 2006:230).

In criminology studies, there is an historical link to early ecological ideas of crime and

crime pattern communities. In the present study the methodology employed has linked modern geospatial information technologies, with geographic knowledge creation through integrating community perceptions and understanding of social construction of space of their environment from mental maps which can then function as an information layer in spatial databases used for decision-making in intelligence led policing. The use of various geographic and mapping concepts described in this research can be integrated logically through specific methodologies to contribute to the science of criminology.

The future of GIS and subsequent crime mapping in policing in South Africa revolves primarily around the ability of the GIS private sector, local, provincial government and the broader GIS community in South Africa to overcome the basic problems in regard to bureaucratic inertia and of technological constraints. It provides new and important avenues for a more effective governance of security that involves a range of actors, most particularly the police and local community residents, both of whom come to the ‘information network’ with their own sets of knowledge, capacities and skills.

## **RECOMMENDATIONS**

Based on the findings of the research conducted, I would like to present a number of recommendations for improving the policing of poorly demarcated and mapped out areas, such as informal settlements in South Africa.

### **Encourage Community Participation**

For decades now the community policing movement has pushed for closer collaboration and the building of partnerships between communities and the police. However, for the most part, community policing has come to be viewed as an incredibly vague and some would argue, ineffective policing philosophy/strategy. Nonetheless, the ethos of community policing prevails and in large part this is because it is somewhat commonsensical to say that the police need the community to work effectively. But good community policing must be mutually beneficial and empowering, and this is seldom the case.

Community mapping in places like Cato Crest provide a good example of knowledge

sharing for a common good i.e. more effective crime combat. If police in general were to mobilise the knowledge of the community in ways similar to those discussed in this chapter, this would provide for a real partnership that values both ‘professional’ and local knowledge in finding solutions to problems such as creating ‘maps’ (Liebermann & Coulson, 2004:134).

The active presence of the police in the community can lead to improved relations between the police and the community, as police takes actions that can improve contacts with residents. In Rio de Janeiro, for example, police act as a contact point to help solve local problems.

Dealing with security issues in such areas should include some sort of community policing strategy. Seeking a stronger strategy for service delivery is essential to improving policing in informal settlements.

The geospatial technology for understanding crime of informal settlements is now becoming a reality. To support the conventional GIS, community understanding of geography should be integrated in the form of a layer. That layer then forms the spatial data base which geocodes locations of crime scenes, common landmarks which assist in crime mapping and analysis. The community should be consulted for their knowledge and experience of the area. Through GIS, it will be possible to identify local causes and develop crime prevention strategies.

The Japanese Koban system is an interesting example of community policing that operates through the presence of policing posts covering small areas where police are tasked with mapping streets and maintaining close contacts with the community.

### **Create a Spatial Database**

Modern GIS technologies use digital information, for which various digitized data creation methods are used. The most common method of data creation is digitization, where a hard copy map or survey plan is transferred into a digital medium (spatial database) and has geo-referencing capabilities.

The inadequacies of crime data in informal settlements are a reality in South Africa. A spatial data base of an informal settlement that is created by crime mapping through community participation holds great possibilities for effectively representing geographic entities and attributes which can in turn help to:

- determine the extent of crime in informal settlements;
- identify risks , vulnerable areas and victims of informal settlements;
- identify hotspots and crime patterns within informal settlements;
- assist in the measurement and evaluation of crime that is mapped more accurately; and,
- evaluate policing interventions and strategies.

One significant difference here is the explicit integration of a community's knowledge and involvement into a spatial data base that complements the conventional spatial information generated for GIS.

### **Utilize the model of GIS to involve Community Perceptions of Geography**

GIS accuracy depends upon source data and represents real objects. GIS provides decision makers and planners with a new tool in which community preference can be visually represented. Often people have difficulty quantifying spatial patterns and opinions. GIS can alleviate this problem by providing a community with a tool which represents their daily interactions with crime. The spatial representation of issues allows unique communication of viewpoints on a range of issues by different sectors of society. The spatial representation of information gives GIS unique analytical abilities and gives the results it generates added power and perceived authority. The democratisation of spatial analysis in GIS will at least make more explicit some of the choices that have been made in achieving an operational police decision.

### **Give Formal Recognition to the Integration of Community and Formal Mapping process**

Developing technical knowledge on policing is critical to reforms. The role of crime mapping should be done in conjunction with the analysis process carried out by the CIAC.

This does not form part of strategic and tactical analysis. Currently, spatial distribution of crime cannot be viewed across multiple policing precincts. For example, the crime mapped in the Suburbs and those mapped in informal settlements drastically differ and cannot be viewed as a whole. This has to be viewed in separate policing areas. In terms of informal settlements where the infrastructure has no address points, no spatial analysis such as crime density analysis can be carried out. This spatial distribution can only be viewed properly where addresses are available.

The ability to map these crimes requires proper data base of geographical locations. This can only be achieved through proper knowledge of the area, thus endorsing the concept of mapping crime in informal settlements according to its location. The police should recognize the integration of community mapping as integral to any policing plans or strategies. GIS systems should be adapted for this integration to occur.

It was suggested by the members of Cato manor police station that new technology such as crime mapping are required because informal settlements have different policing challenges to those of formal settlements. They also further suggested that advancements in computer technology and Geographic Information Systems (GIS) coincide with practical innovations in crime analysis, investigation, and crime prevention in Cato Crest informal settlement. The technology and techniques recommended require that the CIAC department incorporate geographic and spatial components, and emphasize the importance of integrating crime mapping techniques into departmental management, analysis, and enforcement practices.

Recently improvements in mapping software have made GIS applications to crime prevention relatively inexpensive and effective. It is recommended that proper geographical information be furnished to map crime in informal settlements. People with technical expertise viz. with recognized GIS training should be employed and recognized GIS software such as Arc View be considered.

The police can also consider specialised training for existing members and purchasing of software. Training and development in this area can be geared towards the improvement of policing. Good mapping should precede good crime prevention thus assisting in effective decision making.

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