CRIME PREVENTION STRATEGIES FOR TURKISH CITIES THROUGH SPATIAL CRIME ANALYSIS: A CASE STUDY OF KEÇİÖREN

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ABSTRACT

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A CASE STUDY OF KEÇİÖREN

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The place-based crime prevention notion comes from the idea that the human behavior is influenced by the environment, so it is possible to prevent crime before it happens by controlling and managing the environment with a proper design. To create a more secure environment and better quality of life, it is necessary to analyze the physical and non-physical factors that affect crime victimization in order to develop crime prevention strategies. In the thesis, a spatial model is developed to analyze the physical and non-physical parameters of crime victimization in Turkish cities to develop place-based strategies for crime prevention. Five neighborhoods of Keçiören Municipality in Ankara is selected as the study area, concerning its typical urban structure of Turkish cities and the crime victimization problem.

The analysis is performed for non-physical parameters at the macroscale, which defines 98 small statistical areas within 5 neighborhoods. Non-physical parameters are defined as socio-economic variables, precautions taken against crime, and the perception of security. The micro analysis evaluates the relationship of physical parameters in a smaller representation unit as buildings, road segments and three different zones for buildings on the main roads, buildings behind the main roads, and buildings in the hinterland. The physical parameters are defined as the building density on road segments, target accessibility, the degree of road network, and building properties like the number of floors, the use of building, the availability of gardens, parcel walls, a defined entrance, the side of entrance, facing the public realm, and the availability of elevation differences in the building. The data used for the macro analysis are derived from a victim survey with 1744 samples applied to the households about their socio-economic status, the precaution methods they use, their attitude towards crime and the perception of security, and victimization for different crime types. The survey was prepared by Düzgün (2006) and funded by the State Planning Organization in 2007, under the name of the project “Developing Crime Prevention Strategies Based on

Spatial Analysis in Urban Area". In the macro analysis, the Socio-Economic Status index (SES), precaution, security, and victimization indexes are created by a multivariate statistical model, the Principle Component Analysis. The correlation between crime victimization and three different indexes are analyzed and the relationship between population density and land use and different crime victimization types is evaluated. In the micro analysis burglary victimization and physical parameters are evaluated for smaller representation units. Finally, the physical and non-physical variables are statistically tested with the regression analysis and with the results, place-based strategies are suggested to prevent crime in the study area and in Turkish cities**.**

Keywords: Crime Prevention, Indexing, Geographical Information Systems (GIS), Macroscale, Microscale, Crime Analysis

ÖZ

TÜRK ŞEHİRLERİ İÇİN MEKÂNSAL SUÇ ANALİZİ İLE SUÇ ÖNLEME STRATEJİLERİ GELİŞTİRME: KEÇİÖREN ÖRNEĞİ

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İnsan davranışlarının çevreden etkilenmesi, suçun çevre kontrolü ve uygun tasarımla oluşmadan önlenebileceği fikrini geliştirmiş, ve mekansal suç önleme nosyonu buradan çıkmıştır. Daha güvenli ve kaliteli bir çevre için Türkiye'de suc mağduriyetini etkileyen fiziksel ve fiziksel olmayan faktörlerin incelenmesi ve suc önleme stratejilerinin geliştirilmesi gerekmektedir. Bu tezde, suç mağduriyetine etki eden fiziksel ve fiziksel olmayan parametreleri analiz eden bir model geliştirilmiş ve Türk şehirleri için mekansal suç önleme stratejileri önerilmiştir. Ankara'da Keçiören Belediyesi'ne bağlı 5 mahalle, tipik Türk şehirlerinin kent yapısına sahip olmaları ve suç mağduriyetinin bölgede bir problem olması nedeniyle çalışma alanı olarak seçilmişlerdir.

Analizler fiziksel olmayan parametreler için bölgesel ölçekte beş mahallede bulunan 98 istatistiksel alan için yapılmıştır. Fiziksel olmayan değişkenler sosyoekonomik statü, suça karşı alınan önlemler, ve güvenlik algısı olarak tanımlanmıştır. Yerel ölçekte ise fiziksel parametreler bina, hane, yol parçası gibi daha küçük birimler için yapılmıştır. Binalar anacadde üzerindekiler, anacadde arkasındaki binalar ve iç kısımlarda kalan binalar olarak bölgelendirilmiştir. Yerel analizlerde fiziksel parametreler yol parçası üzerindeki bina yoğunluğu, hedefe ulaşılabilirlik, yol derecesi, bina özellikleri (kat sayısı, bina kullanımı, bahçe, parsel duvarı, tanımlı giriş mevcudiyeti, bina giriş yönü, kamusal alana cephesi, kot farkı) olarak incelenmiştir. Bölgesel analizlerde veri olarak 2007'de "Kentsel Alanlarda Mekansal Suç Analiziyle Suç Önleme Stratejileri Geliştirme" projesi kapsamında Şebnem Düzgün tarafından hazırlanan, Devlet Planlama Teşkilatı tarafından finansmanı sağlanan 1744 anketlik bir çalışma kullanılmıştır. Bölgesel ölçekteki analizlerde, çok değişkenli veri analizi olan Temel Bileşenler Analizi kullanılarak Sosyo-Ekonomik, Güvenlik, Önlem ve Mağduriyet İndisleri hazırlanarak mağduriyet ve diğer üç indisin korelasyonları incelenmiş, farklı suç türlerine ait mağduriyet oranları arazi kullanımı ve nufus yoğunluklarıyla karşılaştırılmıştır. Yerel ölçekte, evden hırsızlık mağduriyeti ile fiziksel parametreler incelenmiş, modelin ve parametrelerin geçerliliği regrasyon testiyle kontrol edilmiştir.

Çalışmanın sonucunda elde edilen sonuçlar değerlendirilerek Türk şehirlerinde suçu önlemek için mekânsal stratejiler önerilmiştir.

Anahtar kelimeler: Suç Önleme, İndis, Coğrafi Bilgi Sistemleri (CBS), Bölgesel Ölçek, Yerel Ölçek, Suç Analizi

To My Mother and My Father
My Dear Sister

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LIST OF ABBREVIATIONS

ABPRS: Address Based Population Register System
AMMOWI: Ankara Metropolitan Municipality Office of Water and Infrastructure.
BARD: Better Automated ReDistricting
CAD: Computer Aided Design
CPTED: Crime Prevention Through Environmental Design
GIS: Geographical Information Systems
MAUP: Modifiable areal unit problem
MMA: Metropolitan Municipality of Ankara
SES: Socio Economic Status
SSA: Small Statistical Areas
SOM: Self Organizing Maps
PCA: Principal Component Analysis
TURKSTAT: Turkish Statistical Institute

CHAPTER 1

INTRODUCTION

The cities in Turkey has been struggling against the rising crime rates in recent years. The crime rates increased by 64% between 2005 and 2006 throughout Turkey (Ankara Chamber of Commerce, 2007). The Chamber of Commerce of Ankara announced together with the General Directorate of Security that between January and September 2006, a crime incident took place in Turkey in every 39 seconds. Besides, in every 6 minutes a burglary and in every 18 minutes a robbery occurred. Sociological facts, rapid migration, uneven economic distribution, economic crisis, lack of education and family support are the main factors of this rapid increase in crime rates (Ankara Chamber of Commerce, 2007).

The rise of crime incidents leads institutions to develop crime prevention strategies. A crime prevention center was established by Police Academy in 2007 in order to analyze crime and create policies for politicians (Police Academy, 2013). Furthermore, many provinces established crime prevention units under the security departments. The Sivas Directorate of Security manages a crime prevention project using the environmental design in the city center. The project consists of renovating 58 locations that have high rates of crime incidents (Sivashaber, 2012). Another project was developed by the Greater Municipality of Keçiören, Ankara, under the name of "safe life against burglary&robbery" to decrease the rates of crime against property (Keçiören Municipality, 2013). Recently, a competition named "Crime Prevention Projects" was held by the Karaman Directorate of Security in June 2013, aiming to increase the participation of different groups of public in crime prevention against public security (Suçönlemeprojeleri, 2013).

To create a more secure environment and better quality of life in Turkey, it is necessary to analyze the relation of crime with Turkish urban parameters and propose crime prevention strategies. An efficient crime prevention needs strategies and solutions developed by means of the participation of different disciplines which consider social and psychological facts together with spatial facts (Düzgün, 2007). Crime prevention applications have been used in many countries for a long time. Singapore has a national Crime Prevention Council, which has a strategy guide book for the applications specific to central business areas, industrial areas, educational institutions, and different crime types (National Crime Prevention Council, Singapore, 2012). In Denmark, an approach towards crime prevention through environmental design was applied to a social housing area and the investigations proved that the crime rates decreased after the application of the design. Other crime prevention design applications were also used in Canada and The Netherlands, with referenced developed crime theories but concerning the properties of each country (population density, transportation use, and structure of houses) (Colquhoun, 2004).

In this thesis, concerning the rapid growth of crime in Turkey and the need for efficient crime prevention strategies, it is aimed to analyze the physical and non-physical factors that may influence crime victimization and to develop prevention strategies for Turkish cities. In social theories, the scope of a study is called macroscale if a society, community, or a group of people is studied. On the other hand, it is called microscale when it studies smaller groups and individuals (Hammond and Cheney, 2010). For this purpose, a spatial crime analysis was performed in two different scales, the macroscale to analyze relation between non-physical factors and all types of victimization such as burglary, robbery, extort, car theft, and pickpocketing, and the microscale to analyze relation between physical factors and burglary victimization. Concerning the studies developed by governmental institutions in Keçiören district of Ankara and the availability of data which can be used in the analysis, five neighborhoods in Ankara Keçiören District, namely Ayvalı, Aşağı Eğlence, Etlik, İncirli, and 19 Mayıs, were selected as case study areas. In macroscale, the analysis consisted of 98 small statistical areas within five neighborhoods and in microscale, the analysis were done in smaller units like households.

In order to understand the physical and non-physical parameters specific to Turkish cities, the urban development and structure of Turkish cities should be evaluated. Starting from the 1950s, the general housing development in Turkish cities were by contractors (yap-sat) and illegal squatters (gecekondu), which was a result of huge migration and fast urbanization. The rapid growth of urbanization especially in big cities like Ankara and İstanbul experienced land speculation and it became the aim of housing development to provide as much shelters as possible rather than creating an environment with proper natural and social conditions. This form of development caused poor urbanization and inadequate infrastructure in Turkish cities. The “yap-sat” form of housing uses the maximum construction area allowed by the rules in parcel system. In fact, because of political reasons the number of floors allowed by the government increased from time to time, whereas the conditions of infrastructure stayed the same. The increase in population and shelters brought about a need for commercial areas and social amenities. The commercial facilities seeped into the residential areas, generally on the first floor of the residential buildings. This uncontrolled development of urbanization led to the typical Turkish city structure, with a narrow road network with side-parking, insufficient pedestrian routes, no discrimination in housing and commercial use of spaces and buildings with uniform types and heights (Evyapan, 1980, Şenyapılı, 2004). The study area of the thesis is a typical example of this urban form constructed by yap-sat, with housing units that have 3-5 floors, a homogenous building density, the same building structure, narrow roads, side parking on roads, and commercial activities located in the buildings.

In this thesis, socio-economic status, social relations, public awareness, perception of crime, and precautions are analyzed in macroscale in order to evaluate the effect of non-physical parameters on crime victimization. The relationship between crime victimization, land use and non-physical parameters are evaluated in macroscale. In microscale, on the other hand, building density on the roads, connectivity of roads, number of floors on the buildings, road type, use of buildings, design of buildings such as gardens, parcel walls, availability of

defined entrance, entrance side, facing public realm are considered as physical parameters that can be related to crime victimization. The relationship between burglary victimization and physical parameters are evaluated.

In order to understand the notion of crime prevention, first of all, the definition of crime, crime victimization and the theories developed in ecology of crime are discussed. Crime is explained using four factors: "a law" which defines the act as illegal, "an offender" who breaks the law, "a victim" who has loss from the act, and "a place" where the criminal event occurs (Brantingham and Brantingham, 1991). Crime victimization is the loss situation of a person from a criminal event (Beşe and Geleri 2013:83). The theories of criminality mostly focus on the factors of motivations of offenders, and the theories of victimization focus on why a person becomes a target for a crime (Miethe and Meier, 1994).

The crime prevention designs are developed assuming that human behavior can be controlled by proper design. Controlling human behavior through environmental design is not only used for criminal studies, but it is also used in private sector to increase profit margins. In big shopping malls, the stairs and the design of the mall force customers to walk around the mall. In a big supermarket, daily products like bread and milk are located on the edge of the market to lead customers to walk all through the market and to pass other products and increase consumption (Jones and Bartlett Pub., 2013). Similarly, managing the physical properties of the environment has an effect on human behavior. A person walking in the middle of the night in a dark street where nobody exists will probably feel insecure. On the other hand, such a solitary and dark area will give criminals a secure feeling. Therefore, as a contrast, secure places for victims in public areas will be insecure for criminals. With a proper design and an effective use of built environment, it is possible to reduce the incidence and fear of crime. This will increase the security and quality of life in cities (National Crime Prevention Council, Singapore, 2012).

Starting from the 1920s, many models and theories were developed to explain and predict crime events within the space. The ecological crime theories were developed after the 1920s, which explain spatial and social aspects of crime. The Chicago school's "Social Disorganization Theory" studied the social facts of crime, explaining the relationship of crime with the level of social disorganization in the society (Kubrin, 2010). Oscar Newman's "Defensible Space Theory" (1972) became a reference for many further theories. He supported the idea that safer residential areas are possible through natural surveillance, access control and territorial control. In the same years, another theory was developed by Jefferey (1971), Crime Prevention through Environmental Design (CPTED), to explain the relationship between crimes and design (Crowe, 2000). In the following years, environmental criminology and situational crime prevention were developed to explain the influence of physical environment on human behavior and how to reduce crime. Generally, crime prevention strategies try to decrease the probability of offenders to commit crime through "surveillance", "target hardening", and "access control". Surveillance is the observation of environment by users, such as neighbors watching the surroundings in case an abnormal activity occurs. Hence, generally the physical design tries to increase the ability of

natural surveillance to increase the risk of being caught or being seen for the offenders. Target hardening increases the effort of the offender to commit crime by use of alarms, locked doors, etc. Barriers, locked doors, and special entrances are also tools for access control. An effective access control can be said to exist only if who enters and who exits is fully controlled (Jones and Bartlett Pub., 2013).

The examples of crime prevention through environmental design show that the strategies applied in cities are based on the same principles but they change according to the properties of cities (Colquhoun, 2004). Cities are not only structures with spatial objects like buildings, roads, and recreation areas, they are also living structures that are characterized with their citizens. They have socio-economic parameters which have significant effects on city identity. Income, ethnicity, education, age, occupation, and gender have direct effect on cities; therefore, they should be considered in planning strategies. Each planning decision has consequences and each city will react in a different way. Therefore, identities, spatial factors and socio-economic dynamics of cities should be considered for prevention strategies.

In addition to spatial and social parameters, their relationships are also important to understand crime occurrence in cities. The physical and social factors will have effect on each other concerning their location and physical relations. Distance, physical barriers, accessibility and such other geographic parameters may create correlations or isolations among the parameters. Hence, spatial crime analysis and geographic information systems are important tools to layer the data, visualize the incidents and the patterns, observe and analyze the relationships among multiple parameters, and model them for further analysis.

The thesis is composed of seven chapters. In Chapter 1, an introduction of the study is presented. In Chapter 2, the overview of crime, criminal and victimization studies, the ecological crime theories, the objectives of crime prevention through environmental design, crime analysis and the use of GIS in crime analysis are given. Examples of crime and crime prevention studies are summarized. Chapter 3 describes the study area and the methodology of the study. Chapter 4 is the analysis of non-physical parameters related to crime in macroscale. In this chapter, eight non-physical parameters, sociodemographic properties, economic status, migration, solidarity in neighborhoods, precautions taken against crime victimization, the perception of security, crime victimization for all crime types, and the attitudes of people towards crime are evaluated in macro level. A victimization survey applied in the area in 2007 is taken as data for the analysis. The survey was funded by the State Planning Organization (2006) for the project entitled “Developing Crime Prediction Models and Prevention Strategies based on Spatial Analysis in Urban Areas”. The answers of the survey is organized and a database was created. During the analysis, instead of using administrative regions, 98 statistically homogenous small statistical areas (SSA) developed by Yavuzoğlu (2009) are used as geographical units. The quality of survey data is checked by creating and comparing two socio-economic indexes created from survey data and Address Based Population Register System (ABPRS) data derived from Turkish Statistical Institute (2008). Indexing was performed by using a multi-variate statistical method, namely,

the principle component analysis. A comparison map is created which shows the SSAs that do not fit the ABPRS data indexing. Later, eight indexes are created for eight non-physical parameters and they are reduced to four indexes, socio-economic and demographic, security, precaution and victimization. Socio-economic and demographic variables give information on education level and income level. The security parameter measures the sense and attitude of residents towards crime. The precaution parameter evaluates the precautions that households use to protect themselves from crime such as using alarm, steel door, lightning, security, dogs, guns, etc. Finally, the victimization parameter shows whether the household has been victimized or not in recent years. The four indexes, socio-economic and demographic, security, precaution and victimization indexes are mapped together with the victimization rate maps, which are prepared for different crime types such as burglary, robbery, pick pocketing, extort, auto theft and property theft from auto. The results are compared and evaluated with a land use map to see the relationship between non-physical and physical parameters in macro level. In Chapter 5, the physical parameters that have an influence on crime victimization is analyzed in microscale. Since the locations of the incidents are not reported in the survey, only burglary victimization is taken into consideration for the analysis. Aşağı Eğlence neighborhood including Etlik Street, which is the busiest street of the region with high commercial activities and a heavy traffic, is taken as microscale study area. The physical parameters such as building density of roads, connectivity of roads, building properties like number of floors, use of building, availability of garden, walls, defined entrance, side of entrance, facing public realm, facing road degree, and elevation difference in building are evaluated. The correlations and statistical significance of the variables are tested and the results are evaluated. At the end of Chapter 5, important parameters derived from the analysis are examined and in Chapter 6 prevention strategies are proposed in urban design scales, which can be applied to the study area. Finally in Chapter 7, the conclusion of the study is given, crime prevention strategies are suggested for Turkish cities, and proposals for further studies are presented.

CHAPTER 2

LITERATURE REVIEW ON THEORIES OF CRIME PREVENTION

2.1. Introduction to Crime and Crime Victimization

According to environmental criminologists, a crime consists of four elements:

1. A law which defines the act illegal
2. An offender who acts in a way that violates the law
3. A target, which can be a property or a person harmed
4. A place where criminal activity occurs. (Brantingham and Brantingham, 1991)

Explaining crime and criminality is conceptually different; crime is related to criminal events, while criminality explains the patterns of crime. "Criminal theories are theories of the potential crime; that is, they are theories of sufficient conditions that create potential offenders" (Miethe and Meier, 1994:9). Criminal theories cannot explain crime but they try to explain the factors that cause a person to commit crime. Some of these theories focus on offenders and ignore what makes a person a victim or a target suitable for crime; on the other hand, some theories focus on what makes a place magnet for crime. However, most of these theories ignore the situational context of crime. The situational context of crime includes not only the offender but also the victim, opportunities that encourage the crime, place and time (Paulsen and Robinson, 2004). "A social explanation of crime necessarily requires attention to offenders and victims, but it can never be complete without a sense of the context in which criminal acts take place" (Miethe and Meier, 1994: xiii).

The theories of criminality mostly focus on the factors that motivate offenders and under what circumstances they choose to commit crime, while they ignore the routine activities and lifestyles of victims that create opportunities for crime. The theories of victimization focus on why a person becomes a target for crime, and ignore social, psychological and other factors that motivate offender to commit crime (Miethe and Meier, 1994). Victimization studies started in the 1970s as a part of criminology and later became a new scientific area known as 'victimology'. It supports that facts about the victims should also be considered while dealing with the facts of crime in criminal theories. The word victim refers to a person who suffers a mental, physical or emotional loss or harm from any source. Victimization, on the other hand, is a situation in which the victim faces social, economic, legal or psychological loss (Beşe and Geleri, 2013:83). Victimization has four conditions:

- An abnormal activity occurs (accident, crime).
- It causes a physical or psychological loss.
- People should be involved in this loss.
- This loss should have an effect on people for a certain period (Dinler, 2006).

Crime and victimization are not only related to physical harm or economic loss but also to fear of crime. People who have fear of crime spend extra effort on security and defense against crime. Sometimes people may have growing fear of crime victimization, disregarding the actual crime rates. For example, the fear of sexual abuse among women is higher than the actual crime rates (Beşe and Geleri, 2013). In the past, criminal justice data were used to analyze crime, but nowadays both dimensions of crime from the victims' and criminals' perspective are taken into consideration.

One of the earliest theories of criminal victimization was developed by Hindelang et al. (1978) in order to see the differences in violent victimization risks among different social groups. According to the theory, demographic differences and differences in life styles are important factors in victimization since life styles are related to their routine activities, dangerous places or times, or situations in which there are risks of victimization. The victimization risks are randomly distributed in space and since different lifestyles have different risks of being in particular places, lifestyles can be assumed as factor that affect victimization. Therefore, the theory has been known as the 'lifestyle theory'. The theory argues that vulnerable groups such as the young, the single, black males, and people with low income have higher risks of victimization, whereas old people, married people, white people, and people with high income have lower risks of victimization. The risks taken from gender and racial equality should decrease in time. Another important theory, the routine activities theory, supports the idea that routine activities of victims create an opportunity pattern for crime. The lifestyle theory considers different crime risks in different social groups, whereas the routine activities theory considers change of crime over time (Miethe and Meier, 1994).

Victimization theories underlying criminal opportunities put forth the concepts of 'proximity to crime', 'exposure to crime', 'target attractiveness' and 'guardianship' as factors of crime victimization. Proximity to crime is the physical distance to high crime areas in which potential targets and a relatively high population of offenders exists. The theories assert that geographical areas with high crime rates have high ethnic heterogeneity and low socio-economic status. Proximity to high crime areas increases the risk of victimization. Exposure to crime refers to the visibility and accessibility to crime. For example, the risk of being victimized is related to time spent in public areas or contact to hot spots like drinking places or public transport. Some other dangerous places also increase the risk of victimization. Target attractiveness is represented with the economic or symbolic value of the target. The attractiveness of a person as a target can be represented by income. The studies vary in the results of target attractiveness; while some studies show that groups with higher income have higher victimization rates, other studies produce opposite results (Cohen and Cantor, 1980; Hough 1987; Miethe and Meier 1990; Miethe, Stafford and Sloane 1990 in Miethe and Meier 1994). The concept of capable guardianship has two dimensions as social and physical guardianship. Social guardianship is the number of neighbors and/or friends who can watch the property against crime, whereas physical guardianship stands for target hardening activities like alarms, dogs, and locks (Miethe and Meier, 1994).

Victim surveys have been conducted since the 1960s. Today, a great many countries, including the United States, England, The Netherlands and Canada, organize regular victim surveys. In 1989, European researchers standardized a survey on crime, called "International Crime Victims Survey". The surveys were applied in 1500-2000 households in each country and 30% of them had faced crime victimization at least once (Davis et al., 2007). In the United States, a national crime survey was carried out to measure the extent of crime under the sponsorship from the U.S. Bureau of the Census and the Bureau of Justice Statistics. They interviewed 72,000 households who were older than 12 until the year of 1984. The design of the survey included short-term (6 months) and long-term crime victimization experiences of households and their basic demographic variables such as age, sex, and income, the general perception of crime, the fear of crime, and vulnerability to crime. The national crime survey also studied the ecology of victimization, when and where victimization occurs, the relationship between victims and offenders and the relationship between demographic variables and crime victimization. Another victimization survey was done in Seattle, Washington, which aimed to study the theories of victimization and find the answers for these questions: "Do major components of victimization theories (proximity, target attractiveness, guardianship) influence the risks of violent victimization and property victimization?", "Do socio-economic changes explain the changes in crime rates over time?", and "How do the target hardening efforts of the households and their neighbors affect the individual crime victimization?" The survey collected data from 5,302 residents who were in 600 city blocks. First, a burglary map was created on the building block map, then the information was recorded on the physical characteristics of the environment as road (length, traffic flow, number of cross streets) and dwelling units (visibility of front yard, location on the block) and demographic variables (age, gender, ethnicity, income, marital status, education, household size, home tenure, housing unit). Finally, the risks of victimization within these variables were compared (Miethe and Meier, 1994).

Both crime theories and the theories of victimization have 'macro' level and 'micro' level concerns. Macro level (macroscale) theories of criminality concentrate on structural features explaining groups, communities or the entire society rather than the individuals in it. They concentrate on variables like population density, homeownership, race, age, etc. According to macro level theories, criminality is the result of social marginality – people whose bonds with the conventional society are weak and more likely to commit crime than the ones who have stronger bonds. Micro-level (microscale) theories study the social process that people go through in becoming criminals. They focus on individuals rather than groups. According to micro level theories, individuals who have contact with offenders display stronger tendency to become criminals. Other factors which motivate crime are economic problems, frustration, behavioral models, psychological disorder, etc (Clarke and Cornish, 1986).

2.2. Social Aspects of Crime

The crime incidents do not occur equally and they are not randomly located in the space; they form clusters in some part of the areas. The theory of social disorganization explains to what extent these variations in crime incidents occur. The social disorganization theory was developed in the 1920s by the researchers of the Chicago School as a consequence of growing urbanization and industrialization in Chicago neighborhood in order to understand how large-scale changes in the city affected the social organization and crime rates. The growth in Chicago caused an expansion of the central business district (CBD) and deterioration in the residential areas in the CBD. The deterioration caused residents with high economic status to move away from the CBD and this change in turn caused a social disorganization in the City of Chicago (Kubrin, 2010). According to Veysey and Messner (1999), social disorganization brings about changes in culture, values and norms, weakens primary relationships and reduces internal and external control, which causes individuals to develop deviant behavior. Inadequate supervision of young people, lower participation in community activities, and sharing less with friends has certain influences in crime (Sampson and Groves, 1989). Two important results were obtained from the Chicago School. First, the delinquency and crime are related to social problems such as poverty, unemployment, or to socioeconomic status(1). Second, some areas have higher crime rates regardless of the characteristics of residents living in these areas. According to the theory, those areas with higher rates of residential turnover are opposed to higher crime rates (Kubrin, 2010).

The reasons for why some groups of people or some neighborhoods suffer from crime incidents more than others are also explained by other researches. Disproportioned amount of crime incidents on specific areas is not by chance. According to Sherman (1998), community compositions like employed-unemployed and married-divorced, the social structure of the community, criminogenic commodities such as the rate of violence, and social and physical disorders are the factors that increase crime in some regions. Goldstein (1994) also explains the differences in crime rates with factors like income inequality, stress, population density, population heterogeneity, and unemployment. According to the theory of social disorganization, in communities which have solidarity, social interaction among residents, and cohesion (bonds between neighbors), there are lower crime rates when compared to the disorganized communities. Heterogeneity, socioeconomic status, family disruptions, residential mobility, participation in community activities, and family supervision to the youth can be considered to predict socially disorganized areas (Kubrin, 2010).

According to Robinson (2004), testing and measuring social disorganization is possible in a community through *nominal definitions*, which explain the concepts, and *operational definitions*, which measure the concepts through the study.

(1) Socioeconomic status is represented as the percentage of families on relief, occupation, and home ownership levels in the studies of the Chicago school.

Social Disorganization: (Nominal) It is the inability to control the behaviors of residents because of social conditions. (Operational) Residential mobility, immigration, population density, and heterogeneity derived from surveys or census can be measured.

Socio Economic Status (SES): (Nominal) The presence of lower class people in a community. (Operational) The proportion of economic classes can be measured by the census data.

Residential mobility, instability: (Nominal) The degree of population turnover. (Operational) The degree of turnover taken from the census data can be measured.

Migration: (Nominal) The number of people that move into a neighborhood. (Operational) The number of people that migrate to the neighborhood can be measured.

Racial or ethnic heterogeneity: (Nominal) The diversity of neighborhood among different ethnic groups. (Operational) The degree of diversity can be measured.

Population density: (Nominal) The concentration of people in the area. (Operational) The number of people living in the area can be measured by the census data.

Physical disorder: (Nominal) Physically untended properties. (Operational) The number of broken windows or poor-lighted areas can be measured.

Family disruption: (Nominal) The presence of single-parent families. (Operational) The statistics of single-parent and divorced families can be measured.

Collective efficacy: (Nominal) The degree of cohesion in the neighborhood. (Operational) Friendship and community organizations can be measured.

Crime Rates: (Nominal) The measure of crime in an area. (Operational) Crimes per capita can be measured (Robinson (2004) in Paulsen and Robinson, 2004).

Sampson and Groves (1989) studied 238 British neighborhoods in terms of social disorganization. The results showed that urbanization, family disruption, ethnic heterogeneity, and socio-economic status (SES) are related to unsupervised groups and urbanization. Moreover, family disruption has direct effects on crime victimization. Veysey and Messner (1999) studied the effects of socio-economic status, urbanization, family disruption, ethnic heterogeneity, unsupervised teenage groups, friendship networks and organizational participation on victimization of street crimes. They found that the unsupervised teenage groups are the main factors of victimization and it is followed by urbanization and family disruption. They also found that socio-economic status and urbanization is related to organizational participation. Another study conducted in the United States shows regional differences in crime rates. According to Ousey (2000), the gap

between the wealthy and the poor, poverty levels in the region, income inequalities, and cultural values are the main reasons for these differences (Paulsen and Robinson, 2004). It is derived from these studies that social characteristics of offenders and victims should be considered in order to understand criminal activities and there is a relationship among social variables like (SES), ethnic heterogeneity, education in the norms of society, participation in social organizations, sharing with friends, family, and crime victimization.

2.3. Spatial Aspects of Crime

Crime is directly related to geography; when an incident occurs, it has a place with a geographical location and a time. "Place" bears vital importance in order to understand crime and how crime occurs. The geography of crime has two fields of study as objective crime patterns and perceptual crime patterns (Brantingham, Brantingham and Butcher, 1986 in Figlio et al., 1986). Objective crime patterns are the analysis of actual crime incidents, police records and the mapping of crime locations, whereas perceptual crime patterns study the locations where there is a perception of crime and fear of crime.

Crime statistics show that certain areas in cities are subject to higher crime rates than other parts (Paulsen and Robinson, 2004). The high variance and unequal distribution of crime incidents in space and time brought about a new field of science called "ecological crime". This field studies the distribution of crime events in space and time (Crew, 2001). The theories examine space and time on three different levels as 'macro' (international, national spaces, interspaces, decades, centuries), 'mezo' (neighborhoods, months, one year), and 'micro' (blocks, buildings, minutes, hours) (Branthingham, 1998).

The ecological crime theories are highly useful to understand why crime occurs, why criminal behavior takes place, what causes crime and when and where crime tends to take place (Paulsen and Robinson, 2004). In the next part, the principles of the ecological crime theories and strategies that arise from them and references for crime prevention are explained.

2.4. Ecological Crime Theories and Crime Prevention

Crime prevention aims to determine the factors that cause crime, reduce the crime opportunities, decrease the fear of crime among citizens, improve the knowledge of security and catch the offenders after incidents of crime (Beşe and Geleri, 2013). There are three crime prevention approaches, which are ideologically different from the others. These are traditional, liberal and radical approaches. The traditional approach asserts that the criminals analyze the risk of crime before they make their decisions. Therefore, penalties can affect offenders' decisions to commit crime. For liberal approach, crime is a social problem and the conditions of criminals are the main factors of crime. This approach, therefore, focuses on the groups that may have tendency to commit crime. Finally, radical approach claims that

inequalities among people are the main reasons for crime and crime prevention is possible by reducing the economic inequalities and improving everyone's quality of life and rights within the society (White, 1996).

From a chronological order, the first traditional ecological crime theory was developed by moral statisticians, the Chicago School, and social disorganization theorists. They focused on the reasons that cause a person to become a criminal/offender by analyzing the offender's social conditions. New ecological theorists developed place-based, opportunity, crime place, and environmental criminology theories. At first, social disorganization theorists developed the "defensible space", crime prevention through environmental design (CPTED) and space syntax theories, and afterwards the new theorists of ecological crime developed the theories of Routine Activities, Situational Crime Prevention, Rational Choice and Crime Pattern. These new theories focus on environmental conditions which provide opportunities for the offender and explanations on why crime occurs in that specific setting (Erdoğan, 2007). Many of the theories were developed to explain and predict crime events within the space. They are influenced by each other and therefore many concepts overlap among them. In this chapter, the leading theories are summarized (Table 2.1)

Table 2.1 Summary of Ecological Crime Theories

	YEAR	APPROACH	NAME OF THEORY	PRINCIPLE
Traditional Ecological crime	1830	Offenders Approach	Moral Statisticians	Why do people commit crime?
	1920		Chicago School	
Early New Ecological crime	1971	Opportunist Approach	CPTED	What place-based conditions and opportunities cause crime?
	1972		Defensible Space	
	1977		Space Syntax	
Late New Ecological crime	Late 70s	Place based theories	Environmental Criminology	Patterns are built by spatial and temporal events. Place-based: Space and time
			Rational Choice Theory	
			Routine Activities Theory	
			Situational Crime Prevention	
	90s		Crime Pattern Theory	

2.4.1. Traditional Ecological Crime Theories

The traditional ecological crime studies the conditions of offenders. The "offender" theories aim to verify the main argument "why do people commit crime?" (Eck and Weisburd, 1995). They use analytical methods such as statistical tests after applying cartographic techniques like analyzing the spatial distribution of crime or offender maps with spatially defined areas. They assume that these areas have different social and environmental conditions (Whitt, 2001). The analysis of traditional ecology utilizes dependent variables such as crime events or crime rates and independent variable such as age, sex, the socio-economic condition of offender, education level, infant mortality, mental disorder, unemployment, ethnic minority, etc., and environmental variables like housing quality, building quality, physical deterioration, etc. (Shaw and McKay, 1942).

In the 1830s, moral statisticians Quetelet and Guerry found out on macro level that the crime rates were unevenly distributed among urban and rural areas of France (Whitt, 2001:231, Herbert, 1982 in Wu, 2001:2). Another English geographer found that the levels of crime rates varied in different locations and in different aggregate levels (Glyde 1856, in Erdogan, 2007). On mezo level, some studies were carried out in the 1920s by the Chicago School, which suggested that the delinquent rates decreased as distance from the central business district increased. The central business district is defined as the least desirable place to live in with physical deterioration, ethnic heterogeneity, residential mobility, etc. (Shaw and McKay, 1942).

2.4.2. Early New Ecological Crime Theories

Early new ecological crime theories shifted the focus from offender's conditions to events and place-based conditions. These theories appeared in the 1970s as a result of the industrialization in Europe and the USA. The theories of early new ecological crime are:

1. Defensible Space
2. Crime Prevention Through Environmental Design (CPTED)
3. Space Syntax

2.4.2.1. Defensible Space

The architect Newman (1972) developed the notion of defensible space in 1972 based on the idea that people tend to protect the areas which they own, and the larger areas are shared, the less care is given by people. Therefore, the areas can be designed and built to increase the residents' feeling of ownership. "At his heart, then, defensible space is about creating, shaping, preserving and maintaining proprietary control over one's territory" (Schneider, 2007:19).

In 1956, a 2870-unit high-rise housing complex was built in St. Louis, "Pruitt-Igoe", to the design of award-winning architect with styles of 'International Congress of Modern Architects'. The design provided large ground space for trees, common recreational rooms, shared laundry facilities, elevators which stopped on special floors, and different collective activities to increase public share. Though the underlying idea was bright, the project resulted in a real disappointment. It became a place for crime and disorder. The trees were full of garbage, and shared places became lairs of gangs and vandals. On the other side of the road across Pruitt-Igoe, another housing unit was built in 1942, named Car Square Village. The residents' profile was similar low-income, minority households. The difference between these two housing units was in their designs. The Car Square Village had a horizontal development, while in Pruitt-Igoe, there were high buildings in which corridors were shared by 20 dwellings and elevators were shared by 150 households, which caused a lack of knowledge among the residents getting to know each other. People had difficulty to know whether their neighbors were outsiders or residents. In Car Square Village, there were smaller buildings with multiple entries and smaller shared areas, in which residents could recognize the outsiders. "Newman suggested a direct relationship between building height and occurrences of crime, especially robberies within the 'public' interior spaces, although burglaries were also higher in high-rise buildings than in their lower-rise counterparts" (Schneider, 2007:20).

In defensible space theory, territoriality, access control and boundary marking, and natural surveillance are significant elements which aim to increase the risk of the offender to commit crime. Natural surveillance is defined as the ability of daily users to see the surrounding by a proper design, and boundary marking is boundary definition by symbolic or actual barriers (Schneider, 2007).

2.4.2.2. Crime Prevention through Environmental Design (CPTED)

The theory was developed by Dr. C. Ray Jeffery in 1971, in the same time period as Newman's "Defensible Space" theory. He described the relationship between crime and design. His concepts are practiced in many countries such as Canada, England, Australia, and the Netherlands. "CPTED is a process for improving planning decisions. The proper design and effective use of the built environment can lead to a reduction in the fear of crime and the incident of crime, and to an improvement in the quality of life." (Crowe, 2000:1).

According to Crowe (2000), the management of environment has a direct effect on the users. The users in a shopping center try to keep themselves close to other people or entrances to become visible so that they feel secure. That is why the users' feeling of safety is important for crime prevention; normal users (residents) and abnormal users (non-residents) act differently in a space. In a visible space by the neighborhood, non-residents feel unsafe, while residents feel safe.

CPTED strategies are used to create a difference between public and private space, natural surveillance, access control, the users' control type and facilities. There are 3 important strategies in CPTED:

1. Natural access control
2. Natural surveillance
3. Territorial reinforcement

Natural access control: Access control is a design concept directed primarily at decreasing the opportunity of crime. Access control strategies are typically classified as organized (guards), mechanical (locks), and natural (spatial definition). The primary purpose of an access control strategy is to deny access to a crime target and to create a sense of risk in offenders (Crowe, 2000).

Some examples of CPTED strategies of natural access control:

- Reduce the access of non-residents through vehicle traffic, closures, and one-way streets.
- Improve pedestrian safety by reducing speed, using traffic lights, increasing chokers.
- Specify the transition from public to private space clearly, use monuments to install entry monuments in order to define the identity of the community.
- Divide parking areas into smaller parts with fewer cars in each one, one way in and out traffic design can give a sense of entrapment to abnormal users (Crowe, 2000).

Natural surveillance: Surveillance is a design concept directed primarily at keeping intruders under observation. Surveillance strategies are typically classified as organized (police patrol), mechanical (lighting), and natural (windows). Natural surveillance uses the following strategies in housing locations:

- Increase the outdoor use of space through parks and yards to increase the watchers in the space.
- Reduce light pollution on bedroom windows to let the residents leave curtains open for better vision of space.
- Install windows in dead walls of the buildings to reduce blind parts.
- Use automatically controlled porch lights to increase the identification of faces without light pollution and unnecessary use of electricity.
- Place car parking in visible parts of units.
- Remove walls and barriers that limit natural surveillance (Crowe, 2000).

Territorial reinforcement: The concept of territoriality suggests that physical design can contribute to a sense of territoriality. In other words, physical design can create or extend a sphere of influence so that users develop a sense of proprietorship – a sense of territorial

influence – and potential offenders perceive that territorial influence. In order to create territorial influence, the following strategies are used:

- Decrease the number of people sharing common areas such as entrances, balconies, and green areas.
- Increase the use of yard space.
- Use parallel sidewalks with close proximity to individual units in order to keep abnormal users far and to create defensible space for the residents (Crowe, 2000).

CPTED Planning Strategies

In order to create a safe and controlled community and reduce the fear of crime, zoning, business regulations, sizing, shaping, landscaping, the exterior designs of local buildings together with the management of parking lots, parks, schools, and all other facilities are particularly important factors. Crowe (2000) gives the possible tools for crime prevention design which may not be widely known. His strategies are affected by the concepts of CPTED, developed by Jeffery (1990), based on territorial control, natural surveillance, marking clear border definition for public to semi-public, semi-private and private space, along with the allocation of activities and reducing isolation and distance effects.

Crime prevention against specific types of crime has five stages:

1. Collect the necessary data to define the problem (data about crime type, victim, incident time, location).
2. Analyze crime (crime pattern).
3. Evaluate security plans (civil organizations for security, parking lot design, lighting design).
4. Select the most appropriate plan and apply it (use of alarms, increasing police forces).
5. Follow the results and evaluate them (decrease in crime rates, change of crime locations) (Beşe and Geleri, 2013).

As an example of CPTED design objectives for residential areas, streets, parking lots and recreational areas, the design strategies of Crowe (2000) are explained and discussed with their impacts on human behavior.

Objectives for Residential Areas

- Access control: To prevent unauthorized access to residential buildings, barriers can be used.
- Surveillance through physical design: The design should increase the risk for offenders to be detected.
- Mechanical surveillance: Mechanical devices that warn illegal entries can be used.
- Design and construction: Quality of building has an effect on security.

- Land use: The facilities which have a negative effect on security can be removed from residential areas.
- Resident action: Safeguards for security can be enhanced.
- Social interaction: Social interaction increases the awareness of neighbors and natural surveillance.
- Private security: Professional security guards can be employed for residential security.
- Police services: Improved police service and public participation in reporting to the police decrease crime.
- Territorial identity: Clear borders determining private areas and public areas discourage offenders.
- Neighborhood image: Improving the image of neighborhood area to encourage users and to increase the economic vitality decreases crime (Crowe, 2000).

In Figure 2.1, a residential street, which is a narrow one with little traffic, can be seen. In the first design, the parking can be on the street in front of the buildings, and the residents can recognize the neighbor's cars and non-residents who pass the road. The gutters are clean and the front yards are well-maintained. In the second design, a school is located in the neighborhood, which is socially desirable. This development increases the pedestrian and vehicle activity. Non-residents park in front of the houses, the property value grows and retention falls. The residents turn their backs to the street, which diminishes their control on the neighborhood.

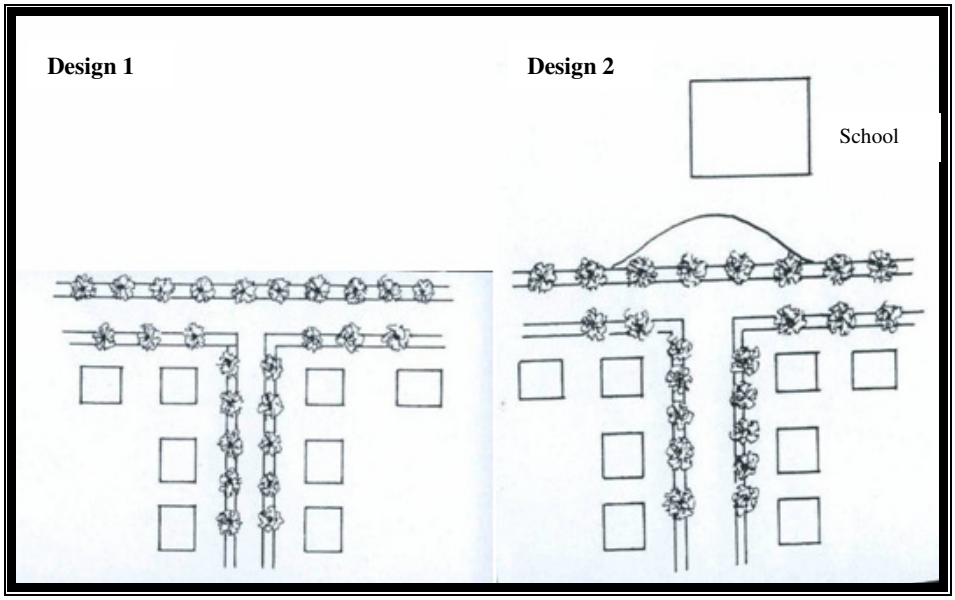


Figure 2.1 Residential Streets, (Source: Crowe, 2000)

In Figure 2.2, an expanded school is located on the street, which changes the neighborhood's identity of being only a residential area. The traffic and parking activities increase, and controlling residents and non-residents gets more difficult. As it can be seen, a new traffic status can be implemented by expanding the roads and pedestrian roads. The improvements

in street capacity result in an increase of on-street parking and the removal of trees. Sidewalks and front yards are pushed closer to the dwelling units (Crowe, 2000).

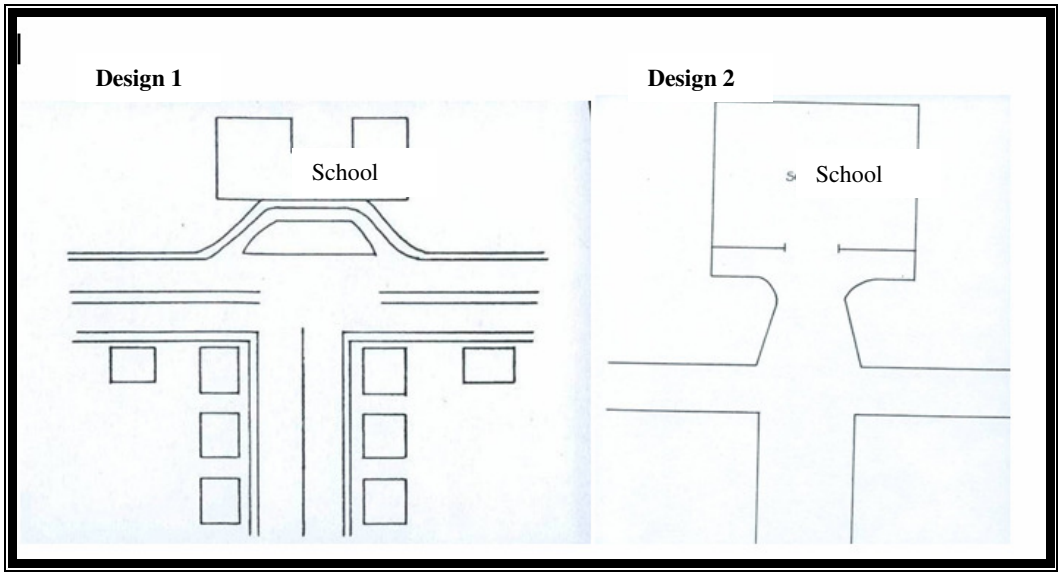


Figure 2.2 Residential Streets, (Source: Crowe, 2000)

Crowe (2000) mentions in his study that any major change in the land use will contribute higher demands for public services, increased housing turnover, and a growing crime rate. Access to the new school can be isolated from residential streets. The vehicular access of the school property can be moved to an alternative location which has an existing high-capacity commercially- or industrially-oriented street. Pedestrian flow will still increase, but vehicular traffic will be diverted. Alternatively, a setback to allow transition can be located for services and parents waiting for kids. The traffic can be controlled by directing the flow far from the residential areas. (Figure 2.2)

Objectives for Streets

In Figure 2.3 a curvilinear street is seen. This kind of housing unit is very popular in market because it provides green areas and amenities. The unassigned green areas are aesthetically attractive but also hard to be controlled by the residents since they do not give a sense of ownership. CPTED planners advise that these areas be assigned to contiguous clusters of houses to increase the territorial control (Crowe, 2000).

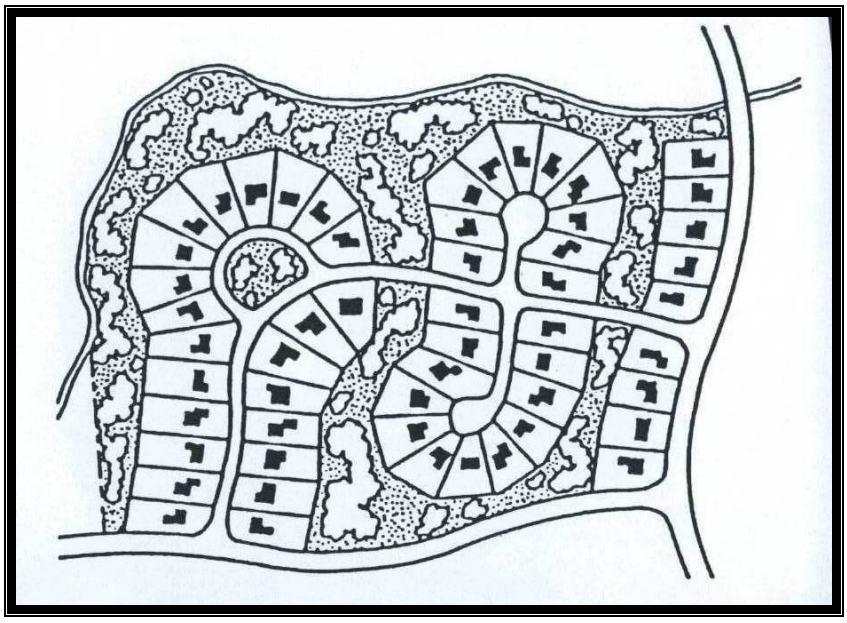


Figure 2.3 Curvilinear Streets, (Source: Crowe, 2000)

Alternatively, the ends of roads can be closed with other facilities in order to increase the control and reduce outsiders' use of the streets. In Figure 2.4, the road access to the residential area is from one side of the road which controls the crossover from the street. Cul-de-sacs also limit the access and provide boundary control.

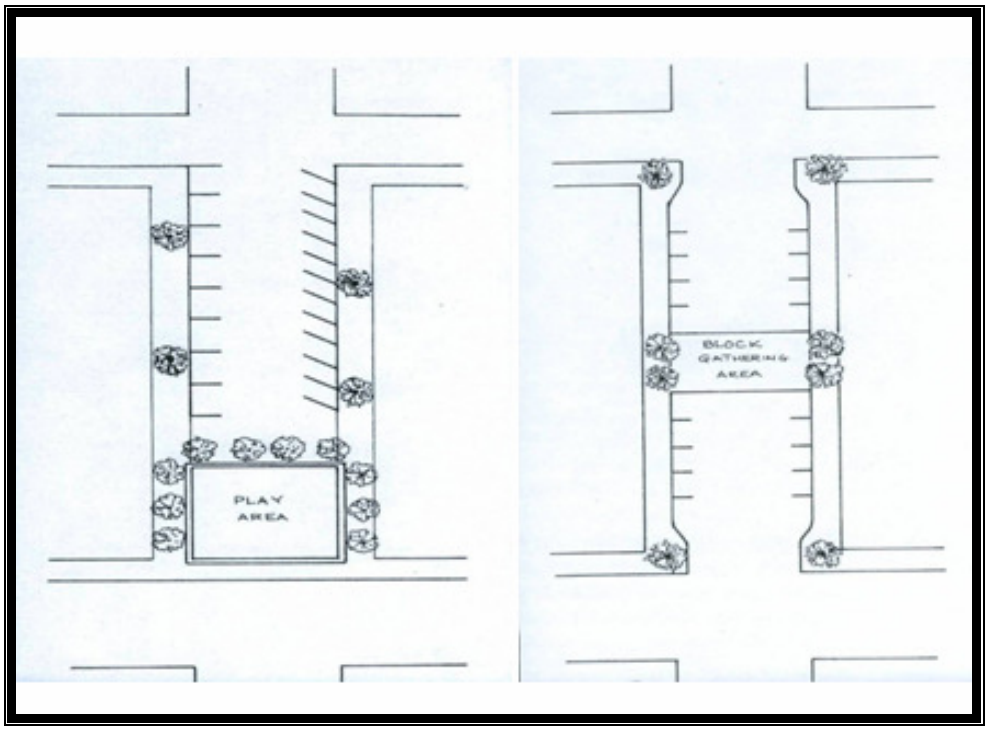


Figure 2.4 Facilities on Streets, (Source: Crowe, 2000)

A typical downtown street generally has parking on streets and narrow sidewalks (Figure 2.5). Narrow pedestrian roads increase the fear of vagrants and other abnormal users of space. Normal users avoid these streets, which causes a decline in business and normal downtown activities. Downtown streets become “no man’s land” at nights and at the weekends. Decreasing the vehicle capacity and lowering the speed limit can increase the safety of pedestrian streets. Increasing the pedestrian capacity lowers traffic; moreover, wider sidewalks and redesigning the on-street parking can be also helpful. In addition to these, scheduling the street for other uses like shopping days and festival times increases the normal users on the street and gives a safer feeling (Crowe, 2000).

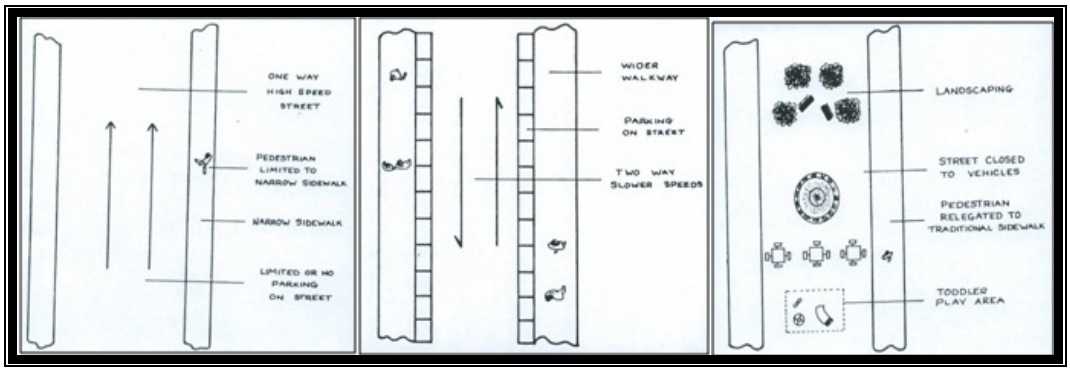


Figure 2.5 Streets, (Source: Crowe, 2000)

Parking Lots

In Figure 2.6, an off-street garage is seen. Here, late arrivals get the less desirable spots, which are generally located in unobserved places. The arrivals choose to put their vehicles in safer places, close to the entrances or in more visible locations. A good design of a parking lot provides visual observation for all places. Direct traffic can be used to provide the use of all locations. If the parking lot has multiple floors, some of the floors can be closed in order to increase the use of other floors. Guards and security measures can be also used in a rule of enforcement (Crowe, 2000).

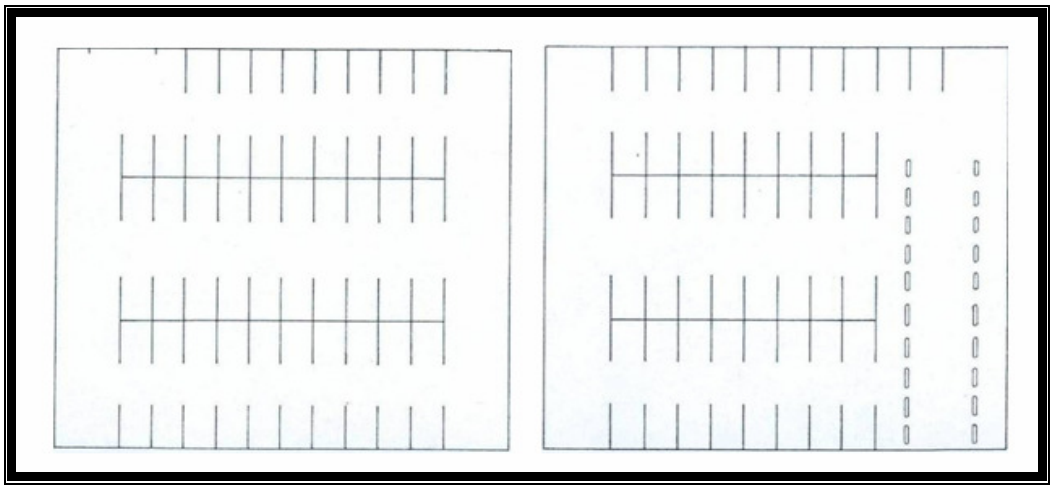


Figure 2.6 Parking Lots, (Source: Crowe, 2000)

Recreational Areas

In Figure 2.7, a recreation area contiguous to a basketball area can be seen. Basketball involves aggressive behavior and noise, which is annoying and disturbing for senior citizens and small children. The sport activities also bring abnormal users to the space. A natural barrier of distance elevation or a parking lot can be used to avoid this. Any natural barrier that they should pass will bring about a sense of risk for the abnormal users (Figure 2.7) (Crowe, 2000).

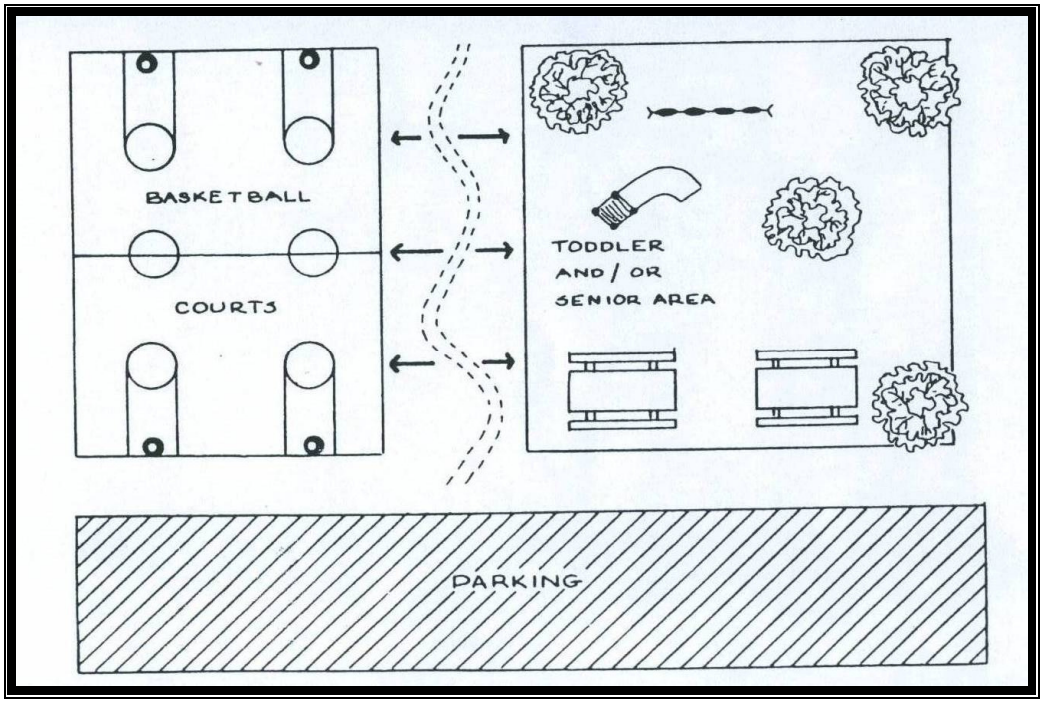


Figure 2.7 Recreational Areas, (Source: Crowe, 2000)

The main criticisms of CPTED (Schneider and Kitchen, 2002) are stated below:

- It is unsupported by empirical evidence.
- It is too focused on design solution without considering the social explanations.
- It is difficult to apply in many urban areas.
- It does not consider the fear of crime.
- It is too dependent on consultants' solutions rather than focusing on the solutions of the community.

2.4.2.3. Space Syntax

Space syntax, developed by Hillier in 1977, supports the idea that it is possible to reduce crime in space through its physical characteristics. Different from Newman (1972), who suggests that physical design directly influences crime rates, Hillier (1977) supports the idea that "spatial configuration in the first place is related to patterns of social interaction and by that means it may affect crime rates" (Fanek 1997, in Erdoğan, 2007:29). Hillier and Hanson (1983 and 1984) introduced a method of analysis as "a new definition of spatial order", considering morphological relations and global patterns. This theory defines "axial" and "convex" spaces on their distribution/non-distribution and symmetry-asymmetry. They used the variables of "connectivity", "regular/deformed grids", "control", "global integration", and "local integration" (Fanek, 1997, in Erdoğan, 2007:30). Hillier criticizes Newman's defensible space theory for territoriality and surveillance. He believes that excluding strangers from the area and protecting the environment merely through the residents' surveillance can never work; instead it causes segregation and enclosure. They criticize territoriality, because of it inadequacy in explaining differences in physical configuration (Hillier and Hanson, 1984).

Space syntax methods are used to divide space into elements and make analytical calculations in order to prove certain hypotheses. Space syntax is a group of techniques which are designed for identifying, representing and measuring spatial relationships in space. It can be used to analyze the effects of spatial parameters that affect crime (Peponis, 1997).

Target hardening, the absence of guardians, runaway time, target value, and social surveillance are important parameters for crime prevention. Building height, the orientation of buildings and roads, street lighting, shared public areas, the number of families per entrance, barriers and various spatial parameters should be evaluated. Hilliers's technique of space syntax is being used in numerous crime analyses since it allows to find a relative degree of accessibility of network compared with the surrounding. In a study carried out in the Metropolitan Detroit Area in Michigan with a population of 22,362, it was observed that 1,273 crime incidents were reported to the FBI in 2003, particularly for burglary, robbery and theft. Two space syntax measures known as "connectivity" and "integration" are used, which are calculated by a specific software developed by Peponis (1997). A map of axial lines is created and connectivity is evaluated by calculating the number of lines intersecting with a specific line. Integration is represented by how easily one can reach a specific line and

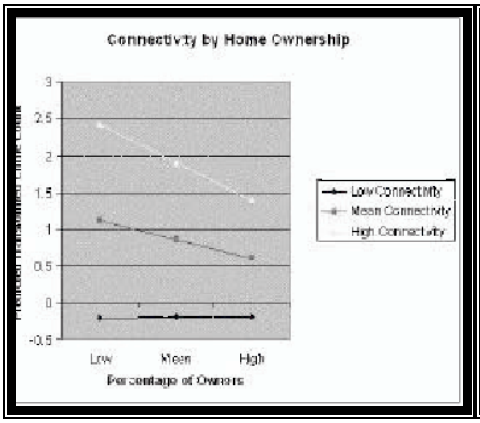
the average number of spaces one needs to pass to reach a specific line. Also, a sociodemographic map is created for the building blocks along the axial lines. Syntactic values are given for each street segment. Since the data was collected for a year, the final data is used for the development of poisson regression model. The parameters in the model are tested using maximum likelihood tests and the correlations between parameters and crime are tested, which results in that higher home ownership has a higher correlation with crime, which proves the effect of surveillance (Nubani and Wineman, 2005).

Another study done by Baran et al. (2007) also uses global integration values for the axial map. The level of syntactical measures are linked to the parcel data and regression analysis is used for four types of crime, robbery, burglary, car theft and larceny. Land use variables and global, integration and connectivity values together with socio-demographic variables are taken as independent variables. Moreover, distance to certain land uses is also integrated into the analysis. The results show that socio-demographic characteristics are not strongly related to any crime type. Contrary to Hillier (1988), global integration values are positively associated with the occurrence of each crime type, which means that offender selects the target among parcels which are easy to reach, because it is also associated with escape routes.

In his study of "Space Syntax", Peponis (1997) focuses on certain questions such as the connection between street and block design and neighborhoods, the relation between workplace design and productivity, and the relation between office layout and employee satisfaction, which are in fact quite influential in our understanding of space as a specific notion of relationships. More specifically, he mentions about three projects in which space syntax is used to explore these questions. According to Peponis (1997), space syntax is the study of the principles used in the designs of space; in other words, it can be described as "an attempt to make the spatial relationships explicit which underlie our everyday experience of the designed environment and the way it functions culturally and socially" (Peponis 1997:1). In this sense, space syntax is about the spatial relationships, which is actually one of the main aims of built environments we live in. Therefore, space syntax aims to have certain principles of spatial design and wants to evaluate the precedents and prospects. In order to deal with design questions, space syntax functions through some "specialized hypotheses about the functions and effects of designs" and finally it forms certain techniques. Peponis (1997) explains that space syntax is a two-faced tool which can be used both to read and interpret geometry in a graphical and analytical way. He also notes that space syntax analysis becomes useful only through "testable hypotheses" and draws attention to the link between "natural movement" and the effects of designs. He has a research application named "The Atlanta Beltline Project". The aim of this project was to redesign streets and reconnect with Atlanta's neighborhoods by developing old industrial sites. He designed the connectivity of streets, created new streets and managed the destinations and directions to shape the flexible growth in future and to bring public value to the area. He suggests that space syntax is especially useful in evidence-based learning and design through the framework that it brings together in order to compare environments and their performance.

In their analysis of space syntax, Nubani and Wineman (2005) try to explore the relation between crime and space through socio-demographic factors. They use space syntax measures of accessibility in order to analyze the geographical patterns of offensive behavior such as burglary, larceny, vehicle theft and robbery. Referring to the theories like the rational offender theory and the routine activities theory, Nubani and Wineman (2005) put forth that there are four general concerns shared by offenders: "How quickly does it take to get to the target?", "How quickly does it take to run away?", "How much value does the target possibly have?", and, "How likely is the offender to be caught while committing the crime or leaving the scene?" (Taylor, 2002; Rengert, 1969 qtd. in Nubani and Wineman, 2005).

Pointing out to the effect of configurational properties on crime, they refer to the link between measures of Space Syntax and crime in residential neighborhoods. According to them, Integration- "an indicator of how easily one can reach a specific line" and Connectivity- "the number of lines that are directly connected to a specific line" (Nubani and Wineman, 2005:416) are two space syntax measures which are used to determine the level of accessibility of street segments from all other street segments. Since types of crime mostly change according to land use and social characteristics (Dunn, 1980, qtd. in Nubani and Wineman, 2005:417), they narrowed their study to four stranger-to-stranger types of crimes: larceny, motor vehicle theft, breaking and entering, and robbery. They analyzed Ypsilanti, a city within the Metropolitan Detroit area in Michigan. The FBI Crime Reports show that the crime level here is worse than the national average, especially in cases of burglaries, robberies, and thefts. In this study, they used the software created by Peponis and Wineman known as "the spatialist" which runs via MicroStation. They made an axial map of "the longest lines of sight that can be used to characterize every street segment in the Ypsilanti area". The Integration and Connectivity were calculated (Figure 2.8). As their results show, local integration and connectivity were closely related to the general crime rate followed by density. In their study, local integration had a positive correlation with crime rates. Furthermore, the levels of youth concentration and the percentage of owners at the block group level moderated the effect of connectivity on crime count: "the higher the percentage of youth concentration at a block group level, the more negative the relationship between connectivity and crime"(Nubani and Wineman, 2005:420).



Effect	Estimate	Standard Error	DF	t Value	Pr > |t
Intercept	-0.2705	0.1928	16	-1.40	0.1796
CONNECTI	0.2390	0.05055	17	4.73	0.0002
INTEGR3	0.1189	0.02941	592	4.04	<.0001
YOUTH	1.3562	1.3200	592	1.03	0.3046
EDUC2PER	-0.2857	0.3446	592	-0.83	0.4074
PEROWNER	0.09685	0.1428	592	0.68	0.4980
DENSITY	0.000060	0.000025	592	2.44	0.0149
CONNECTI*YOUTH	-1.3444	0.4184	592	-3.21	0.0014
CONNECTI*PEROWNER	-0.1593	0.04919	592	-3.24	0.0013

Figure 2.8 Poisson Regression Model and Connectivity Graph, (Source: Nubani and Wineman, 2005)

In “The space syntax and crime: evidence from a suburban community”, Baran (2007) tries to explore the link between syntactical properties of space and the actual crime locations in the town of Cary, North Carolina. Here, larceny, robbery, burglary and auto theft are connected to syntactical measures, land use, and conventional sociological variables. As their study shows, global integration has a direct positive independent effect on each crime type; certain crime types may be predicted through different land uses (e.g. burglary is associated with apartments, while robbery is associated with shopping malls), “socio-demographic characteristics of the surrounding areas next to a land parcel” do not seem to be associated with these four crime types; moreover, “the frequency of crime ‘decays’ as a parcel gets further from commercial land uses.” In their analysis, global integration has a positive correlation with each crime type’s occurrence and connectivity decreases the effect of magnate one land uses (such as bars and movie theaters) on these four types of crimes. On the other hand, connectivity increases the effects of magnate two land uses (such as shops). As suggested by these results, offenders choose their targets from among land parcels which are “easy to get to in terms of accessibility/proximity or part of their “routine activities” (Baran, 2007).

A study by Brantingham (2005) on modeling crime patterns investigates spatial and temporal aspects of crime in urban areas. They create a formal framework to be used in semantic modeling and the integration of the established theories of crime analysis and prediction. Basically, they refer to the need for mathematical and computational models to make more use of the empirical deduction obtained from research data. Therefore, this study proposes a multi-agent system which serves an abstract mathematical framework to model spatial and temporal characteristics of crime particularly in urban environments. Although the system they suggest seems unconventional for the time being, it achieves to combine earlier multi-agent modeling of social systems. The simulations they create are also quite influential in crime analysis and prevention. As there are many different types of entities forming the urban environment, this study categorizes these entities into three groups: passive objects, active objects and autonomous agents. A passive object merely possesses several attributes; an active object has not only attributes but also an associated behavior-action; and lastly, an autonomous agent has attributes and behaviors as well as motivations and a memory (Brantingham, 2005).

Their model is mainly based on the acting agent, namely the person agent, whose purpose is to model the behavior of offender in an urban environment. Behaviors of a person agent are categorized into certain modules such as The Space Evolution Module (SEM), The Target Selection Module (TSM), and The Agent Decision Module (ADM). Though this system is new and unconventional, it can be helpful in future studies.

Space syntax methods helped scientists to develop similar methods. Street design index is a GIS-based modeling tool developed by Evans (2007) at London Metropolitan University. The idea is based on daily trips starting from home or ending at home, called “the Whole Journey Environment”. The study aims to create a living street, which is designed with both

high quality for users and also against crime. Evans evaluated the routes of the residents who experienced barriers to pedestrian access and fear of crime. He used GIS techniques to make digital data analysis and visualization of the journey environment. According to Evans (2007), "Community safety, accessibility and social inclusion have emerged as particular changes to the design of the urban environment, raising a wide range of issues affecting mobility and participation in everyday life" (Evans, 2007).

According to Evans (2007), 11% of the people in the UK would travel more if they felt secure on the transport system, particularly women and old people. Crossings and car speed are limitations for the pedestrian access for daily users, and old people feel anxiety and insecurity. Communities living in disadvantaged areas had 1.5 times higher risk of being victimized than other communities. A good design for Evans will provide three important aspects:

- Enhance the quality of public realm
- Minimize the psychological barriers to accessibility (reducing fear of crime)
- Reduce physical barriers to accessibility (good design of streets with lighting, amenities, cycle routes, pedestrian routes)

"Street design index widens the scope to perceptual factors such as fear of crime, natural surveillance, key amenities such as WCs, furniture, signage and legibility, and uses a more comprehensive mapping of neighborhoods, communities and routes" (Evans, 2007).

In order to analyze the quality of environment and develop an index for accessibility, the physical and non-physical criteria are measured. During the development of street design index, CPTED strategies for urban design and streets are evaluated, GIS-based data are created and both physical and non-physical elements are evaluated. The spatial data consist of crime incident maps for burglary, robbery, bike theft, etc., socio-economic and demographic information such as age, gender, ethnic minority, education, economic status, car ownership, etc., and finally, land use and other facilities such as schools, community facilities, bus stops, etc. The second stage of the study is to create urban design layout, which consists of building structure, pedestrian and vehicle road routes, and land survey of the environment. The quality problems are recorded at macro level, whereas urban design problems are recorded at micro level. "This information was also recorded and annotated into a GIS database allowing mapping and correlation with the land use and community profiles above and visualized in 2D&3D" (Evans, 2007).

The last stage of street design is to acquire the residents' ideas and their consultancies by making them fill in questionnaires about their safety problems, their routine activities, routes behavior and aspirations. The users' recommendations are taken for "moving and combining bus stops, extending bus routes, reducing road traffic, providing more local amenities such as local food shops and community facilities, and reducing further development/densities."

For a good design, Evans (2007) considered the features which are more influential, such as the arrangement of boundary walls, plants (trees, grassed areas, flowers and borders), banners and signs, lighting, shop fronts (banners, signs), advertisements, and safety and security (emergency equipment).

In Figure 2.9, a crime map for robbery is seen. In this study, street crime gathers at the edge of the area, which is used as pedestrian access to bus and other transportations. By using GIS techniques it is possible to layer the visual data and determine the hot spots and dangerous routes. It is also useful to use GIS combined with photos and spatial data for monitoring spatial features of the environment.

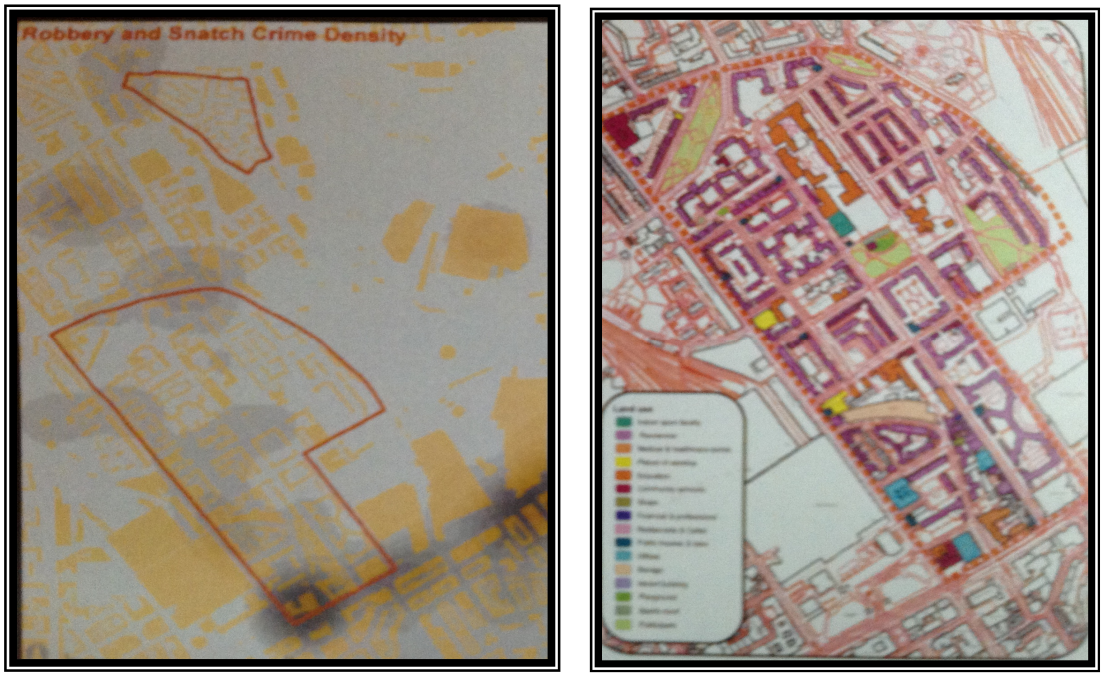


Figure 2.9 Crime and Land Use Map, (Source: Evans, 2007)

The aim of the Street Design Index application is "to develop a tool that can easily be deployed in any urban area providing an instant overview of where psychological barriers linked to the urban environment are limiting mobility and access" (Evans, 2007).

2.4.3. Late New Ecological Crime Theories

Late new ecological crime theorists developed the new theories of crime analysis and prevention in late 1970s from a place-based view, that's why they are called 'crime placed theories" or 'place-based crime theories'. They criticized the early theories for focusing on individuals and social environment and disregarding the physical environment (Erdoğan, 2009). The most important aspect of these theories is 'place', which refers to 'space' and 'time'. In this section, four important place-based theories are explained.

2.4.3.1. Environmental Criminology

Environmental criminology studies crime with its place-based or spatial factors. It supports the idea that crime should be considered with its location, assuming that individuals shape their activities spatially (Bottoms, 2007).

A crime incident has four elements as law, offender, victim and place. Environmental criminology studies how these elements are related to the place, and how people are related to this place with their behaviors and activities. "Day-to-day events and activities create the activity and awareness spaces of offenders and victims, and define the offenders' search areas for targets" (Brantingham, 2005). He means that while victims live their daily routine, they actually create a movement pattern. This pattern helps the offenders predict where their victims will be and when, the crime location the offenders choose can be their own space or also other places (Brantingham, 2005).

Schneider (2007) argues in his study that the daily activities of offenders has a fact to select the victim; they may choose their victim in their own routine area where the awareness is maximum and the people which coincide with these daily activities may have the risk of being victimized. "Victimization is therefore related to the mental images (the 'templates') of offenders based on their routine movements in space and time across the urban landscape" (Schneider, 2007:32). A hunter searching for his chase would probably first go to the area where he may easily find the chase, search for the possible caves or places they feed themselves. In crime incidents, offenders look after their target in a similar way. All people have daily routine activities. An ordinary worker leaves home between 7 a.m. and 8 a.m., takes a ride to work and comes back home after 6 p.m. Thus, this worker has an empty house for whole day during his/her routine activities. This information can be obtained easily by following the victim for a couple of days. This information reduces the offenders' risk to break into the house. 'Routine Activities theory' is based on the routine activities of victims during the day; their activities belong to a specific place in a specific time. Targets become a part of criminals' routine activity in their daily life (Schneider, 2007).

Traditionally, environmental criminology explains the spatial distribution of offences and the spatial distribution of offenders (Bottoms, 2007). Environmental criminology focuses on crime characters and works on the pattern of victimization, 'when' and 'where', and 'crime pattern'. The pattern analysis is mapping the sets of crime incidents, nowadays generally supported by geographic information systems. During the analysis, environmental criminology searches for the relations between crime and economic, social, and physical factors behind the incidents. They are interested in land use, traffic patterns and street design, and the daily activities and movements of victims and offenders (Verma and Lodha, 2002).

2.4.3.2. Rational Choice Theory

Rational choice theory is based on the assumption that a rational offender gives the decision of a crime after measuring all the possible perceived risks and gains (Lersch, 2004). The theory suggests that all people tend to maximize their profits and minimize their losses. That's why law is an important tool to reduce criminal tendencies by increasing the possible losses. Without the force of law, the society would descend into anarchy (Shaftoe, 2004). The classical response to this is twofold: to make the crime more difficult to commit (opportunity reduction) and to increase the certainty of apprehension and punishment (deterrence) (Clarke and Cornish, 1986).

There are many theorists, but the most complex model was developed by Derek Cornish and Donald Clarke (Clarke and Cornish, 1986). They found that even though the centers serviced the same type of delinquents, some of the treatment centers had more problems than the others. Clarke and Cornish (1986) developed the idea that something about specific environmental characteristics in some of the treatment centers provided greater opportunities for misconduct than in centers with fewer problematic incidents. In effect, some situations provided greater opportunities for deviant behavior than others (Clarke and Cornish, 1986).

According to them, "Criminal involvement refers to the processes through which individuals choose to become initially involved in particular forms of crime, to continue, and to desist". (Clarke and Cornish, 1986). They argue that offenders are attracted by many factors, such as their gender, background, need of money, risks and gains of the crime and many other factors. They support that the social background of the offender, that is, family structure, social class, and educational level, affects the person to be an offender or not. The economic level and the need for money may also encourage the offender to take risks and commit crime. The balance between the profit and the risk of crime also affects the offender's decisions. Moreover, the conditions of crime also have an effect on the offender's behaviors. The decision about a crime taking place in the daily routine of life will be easier than a crime situation that happens unexpectedly.

Rational choice theorists argue that in order to reduce crime, the focus should be on criminal event itself and its situational factors and motivations (Lersch, 2004).

2.4.3.3. Situational Crime Prevention

Schneider (2007) explains the essential element of situational crime prevention as "opportunity" (Schneider, 2007:27). The theory was developed from the principle of rational choice theory; that's why it basically supports the idea that in order to keep the offenders from committing a crime, risks should be increased and the benefit gained from the crime should be decreased. In order to increase the risks of the offenders, situational crime prevention strategies were developed. The first strategy is target hardening, implemented by using alarms or locks in order to prevent the offender from reaching a target. The second

strategy is surveillance, which can be carried out by the residents in the form of natural surveillance or formal surveillance by the police or private security. Another strategy is environmental management, which is a sociological management to keep the population limited assuming that age and education level of the population affect the crime rates. An alternative perspective was developed in the 1980s, which was known as "opportunist criminal". This perspective supported the idea that offenders do not commit crime because of low risks; it is rather a sociological and psychological fact that they search for it. Shaftoe (2004) explained that perspective in his study with an example. If a person sees an unlocked car or a shop with an open door or window and if this person is a criminal, then he/she will use that opportunity to commit crime, whereas a great many other people would hesitate to do so. These people are not only afraid of being caught but this is also a sociological and cultural understanding, and moral believes.

Situational crime prevention not only focuses on environmental factors, but also on how offenders take risk to commit crime. Opportunity is related to risk, effort and reward; if the risk of target increases, the effort will increase, too, and the crime rates will be reduced. However, many situations also show that when the risk of crime increases in a situational area, the offenders either change the place of the crime or change their way of reaching their target. For example, the use of internet banking for money transfers has probably reduced the robbery on the streets but increased the digital credit card robberies.

In his book, Mayhew (1980) identifies eight situational measure that is effective in situational crime prevention.

1. Target hardening, alarms, locks
2. Target removal, use of credit cards instead of cash
3. Removal of means, gun control
4. Reducing payoff, property marking
5. Formal surveillance, police
6. Natural surveillance, neighborhood watch
7. Employee surveillance, private security guards
8. Environmental management, reduce vandalism

2.4.3.4. Crime Pattern Theories

Crime pattern theory is a combination of rational choice and routine activities theory. It is developed in the 1990s for the purpose of determining the relationship between crime locations and where offenders live by the criminologists Paul and Patricia Brantingham. They introduced a new vocabulary term, 'action of space'. The areas offenders travel during the day are referred as 'nodes', the movement between these nodes are called 'awareness space'. The movements along these nodes create 'edges' and based on these movements 'a cognitive map' is formed. As long as people move in the areas defined as cognitive map they feel safe. The crime pattern theory suggests that offenders search their targets outward from

the nodes and paths which is called as 'distance decay function'."It is along the pathways, edges, and within the nodes of their awareness space that offenders select appropriate targets or victims through a multistage decision making process" (Lersch, 2004:94). Canter and Larking (1993) developed a model based on the hypothesis that offenders choose their location of crime at a distance from where they live. This model suggests that drawing a circle around location of two offences, the radius of two offences' the farthest part has a possibility to encompass the resident of the offender (Canter and Larkin, 1993).

2.5. Use of CPTED in Various Countries

Royal Danish Institute of Fine Arts, the School of Architecture made a research on CPTED, and raised an important issue especially for Scandinavian countries, "Open Society". "This issue is the extent to which society is prepared to accept crime in the environment in relationship to the barriers that it can create for quality of life "(Colquhoun, 2004:58). The study also mentions that different groups have different risks of crime in different places and time.

Sibeliusparkken was the first application of CPTED in Denmark. It was a social housing located 8 km from Copenhagen. They developed public, semi-private and private zones, pedestrian and cycle routes. The design of the housing is seen in Figure 2.10, with a small entrance yard or bench supported by bench or other facilities. Low walls defined private spaces, and balconies provided natural surveillance to watch outside. No stairs were used in the entrances; instead, ground floor gardens were preferred. "The analysis showed that most burglaries took place in places with fewer opportunities for overlooking and fewer passers-by". The investigations on crime rates confirmed their design as an effective use of CPTED in the decrease of car theft and burglary rates (Colquhoun, 2004:60).

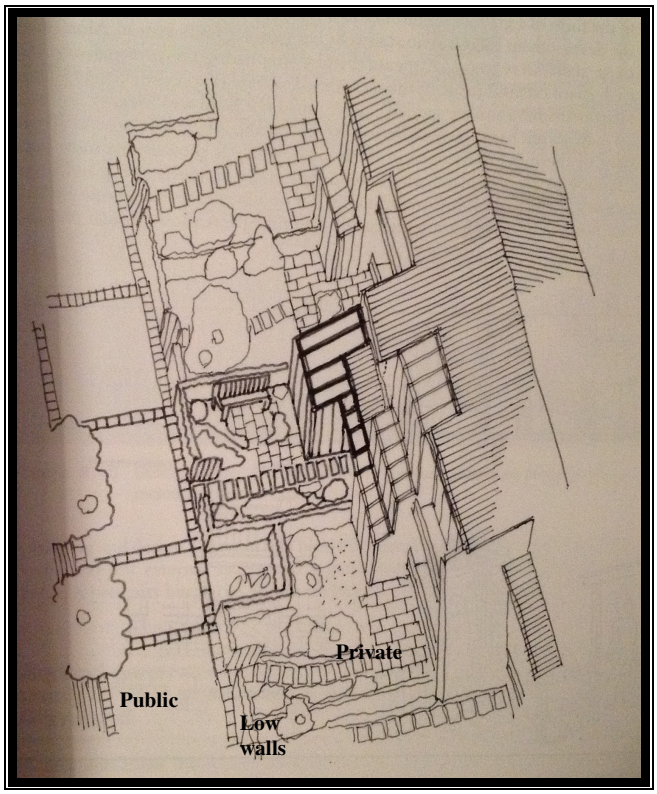


Figure 2.10 Design of Sibeliusparkken, (Source: Colquhoun, 2004)

Another CPTED application was used in Cleveland. This is a second generation CPTED; that's to say, "Second Generation CPTED views the design of the built environment as only the first step to create healthy, sustainable communities" (Colquhoun, 2004:61). The designers used five issues:

- Size of districts, density, differentiation of dwellings
- Safe meeting places
- Facilities for youth
- Residents' participation and responsibility

They created a new approach as "ecological sustainable development used by CPTED principles". This approach supported small local communities where people live near their workplaces with schools and social activities. They asserted that this would increase friendship without sacrificing personal space and privacy. The local opportunities must be sustainable, which means self-sufficient communities in terms of jobs, social activities, education and cultural opportunities. "It means respecting personal choice and privacy, while still creating common places and events of social interaction that allow people to celebrate their diversity." (Colquhoun, 2004:63).

Design patterns were described in 1977 by the Dutch architect Christopher Alexander. He described the language for design principles. The key principles were as follows:

- The Size of community: Communities should have a population of 5000-10,000.
- Neighborhoods should contain 500-1000 people.
- The density should be 15 houses per acre (50 houses per hectar).
- Life cycle should provide the needs of everyday life.
- The maximum storey height is four.
- Small gardens in privacy are needed.
- Local facilities are needed.
- Open public spaces that open to streets are needed.
- Looped local roads, but not cul-de-sacs, and bike paths are recommended.
- After school facilities for teenagers are needed.

Alexanders's (1977) principles were more or less used in Helsinki by Pikku-Huopalathi. The site was in woodland with a lake with a population of 8,500 near Helsinki. They planned a center with shops and facilities with a school nearby which was supported by a tramway system. They built a pyramid housing with 12 storeys, which could be seen from all parts of the site and so created a sustainable community (Colquhoun, 2004).

The United States also has several CPTED applications. The US has relatively less densely populated residential areas compared with Europe. The residential areas are places where crimes, especially burglary, robbery, sexual assault and drug violations, are clustered. In a residential area called Harbordale, Florida, with approximately 2300 residents, who are mostly retired people and below the federal poverty level, the crime rates were higher than the federal crime rates. A crime prevention design was applied to the city. First, high rated burglaries and robberies were mapped and afterwards the neighborhood plans were developed for seven issue areas, which were crime and public safety, housing, mangroves, infrastructure, recreation, landscaping, neighborhood identity and transportation. The infrastructure improvements were implemented, speed ramps were used for roads, sidewalks were designed, signs and street beautification were applied, and a linear walking park was created. The crime rates decreased especially on robberies and drug related crimes (Schneider, 2002).

Other CPTED applications for business parks and bus stops also had effective results in the United States. California Industrial Parks, Peiser and Chang, located near low-income residential areas, had high crime rates. Crime prevention strategies focused on access control and reducing escape routes by using fences between the buildings. Target hardening was improved by using window bars, surveillance was improved by lighting and security guards. After the changes, the breaks-in the area were reduced. Another CPTED application was used for bus stops in Los Angeles. The environmental attributes of ten bus stops were analyzed and compared with low crime rated bus stops which were nearby. Three categories were used as bad neighbors (bars, liquor stores), desolation and lack of surveillance (crowd, broken windows), and easy escapes. The results showed that there is a relationship between density, the levels of street activity, and crime occurrence. The strategies were applied to remove dead spaces in order to increase surveillance by removing stands, signs, improving lighting, and removing crime magnets such as bars and single room hotels (Schneider, 2002).

The European Committee for Standardization developed fifteen prevention strategies that should be applied in European countries. They are summarized from CEN (European Committee for Standardization, 2003 in Schneider, 2007:75).

Planning Strategies:

- respect existing social and physical structures
- create liveliness
- mixed different groups of society, avoid isolations
- urban population density

Urban Design Strategies

- Create visibility
- Control accessibility
- Assess territoriality
- Provide attractiveness, street furniture, lights
- Provide robustness, doors, windows

Management Strategies

- Target hardening
- Maintenance
- Surveillance
- Rules for public places
- Infrastructure for the youth and the homeless
- Communication

Another guidance was developed by the UK Government, the Commission for Architecture and the Built Environment (CABE) in 2003, which presented a good design with eight design principles:

- Access and movement (well-defined routes, spaces)
- Activity (appropriate level of human activity)
- Adaptability (adaptation to changing requirements)
- Management and maintenance
- Ownership (territorial responsibility)
- Physical protection (well-designed security features)
- Structure (Interaction between users)
- Surveillance (Colquhoun, 2004).

2.6. Crime Analysis

Crime analysis is a qualitative and quantitative study of crime with socio-demographic and spatial factors to reduce and prevent crime and to evaluate prevention and organizational procedures (Boba, 2001). Crime analysis is an analytical processes which provides time and pertinent information about crime patterns and their correlations to operational and administrative units. It is used for the purpose of investigating processes, clearing cases, preventing criminal activities, and supporting the budgeting, planning and administrative units (Gottlieb, Arenberg and Sing, 1994). According to Boba (2005), crime analysis is a systematic study of crime, which considers socio-demographic, spatial and temporal factors, aiming to assist crime disorder reduction and crime prevention. There are four goals of crime analysis, which are 'Criminal Apprehension', 'Crime Prevention', 'Crime and Disorder Reduction' and 'Evaluation' (Boba, 2005:8). In crime analysis, both quantitative and qualitative data are used. Quantitative data are numerical or categorical data like location, date, and time of crime incidents. Qualitative data, on the other hand, are non-numerical data which are the interpretations of observations like large numbers of narratives which are not possible to analyze statistically and therefore represented in patterns (Boba, 2001).

The crime analysis involve socio-demographic, spatial and temporal data. Socio-demographic data consists of social data like race, gender, age, education, and income. At the individual level (micro level), the data give the characteristics of individuals, whereas at a broader level (macro level) the data give the characteristics of groups. The spatial information of crime analysis identifies the locations of crime incidents, their patterns and the relationships between the incidents and geographical features. Temporal information considers the levels of temporal analysis like criminal disorder by days, by weeks and by seasons (Boba, 2008). The analyses are performed in five steps, which are data collection, collation, analysis, dissemination and feedback (Figure 2.11)

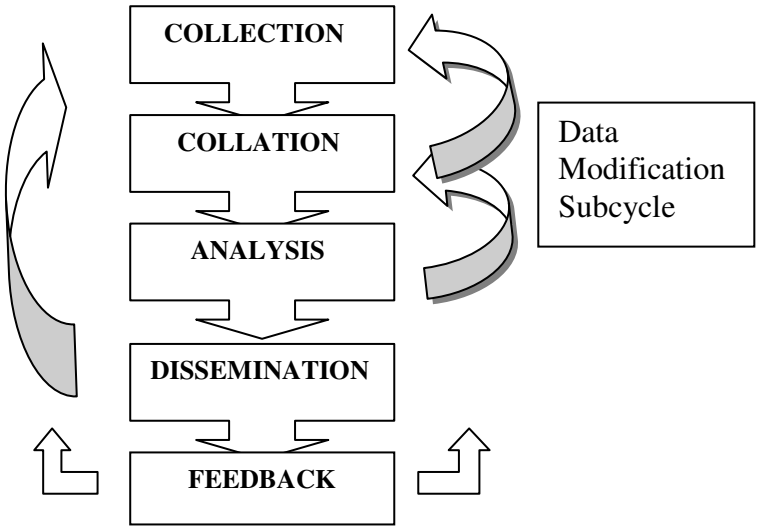


Figure 2.11 The Crime Analysis Process (Source: Boba, 2005:9)

Data collection in crime analysis should be accurate and consistent. It has to be in electronic format and collected regularly (e.g. weekly or daily) in significant amounts. Since the data are collected by sources of police reports or from calls to police call centers, it may need cleaning and geocoding. Sometimes it may also be necessary to create new variables from the subsets of variables, and all these editing steps form the collation step of crime analysis (Figure 2.11). The analysis includes many visualization and statistical techniques. Since the analyst is not aware of the problems with the data, during the analysis, the analyst must go back to the data collection step to change or improve the data. This is called the data modification subcycle (Figure 2.11).

There are five types of crime analysis:

Intelligence Analysis: It identifies the network of offenders and their criminal activities such as drug networks or prostitution rings. The analysis considers not only the crime data but also other types of data like travels, telephone conversations and business relationships.

Criminal Investigation Analysis: It analyzes criminal profiles. The personality, social habits, and work habits of offenders are analyzed.

Tactical Crime Analysis: It analyzes recent crime activities, their location and time, the methods of offenders, the type of victims, the type of locations, and the type of crime. It aims to determine the links between crime and pattern, potential suspects of crime and crime patterns, and to solve some crime cases.

Strategic Crime Analysis: It aims to identify long-term crime problems and evaluate police responses to the cases. The analyses consider crime rates, victimization, repeated victimization, Hot spots and environmental conditions.

Administrative Crime Analysis: It aims to make a research on legal and political concerns to inform governmental institutions and citizens (Boba, 2005:9-17).

2.6.1. GIS in Crime Analysis

For the interpretation of crime patterns, physical objects need to be represented in digital platform to be visualized, interpreted and statistically analyzed. In this respect, Geographic Information System (GIS) is a useful tool to visualize and analyze spatial and temporal data. “GIS is a set of computer-based tools that allow the user to modify, visualize, query and analyze geographical and tabular data” (Boba, 2005:37). According to the definition of McDonnell and Kemp (1995:42), GIS is a “computer system for capturing, manipulating, analyzing and displaying data which are spatially referenced to the Earth”.

GIS has four components:

1. Hardware: Computer itself
2. Software: Standard requirements of an operating system (ArcView, ArcGIS, MapInfo, GeoMedia)
3. Data : Crime and other related data

4. User: A GIS user trained in GIS, coordinate systems and projection systems to edit data and to query, display and do the analysis.

GIS uses three types of files, namely tabular, spatial and raster files. An attribute file is the contents of the data. For example, a crime attribute datum has the attributes of crime types, the date of crime, the address of crime, and the time of incidents (Chainey and Ratcliffe, 2005).

With spatial files, GIS translates physical objects in the nature to geographical features. GIS uses point features, line features, and polygon features. Point features are generally used to represent locations, like those of crime incidents, buildings or lamps. Line features represent line-shaped features in the nature such as roads, rivers, and bus routes. Polygon features, on the other hand, represent areas in the nature, like neighborhoods and the boundaries of land uses like parks, campuses and police districts. Image features, in other words raster files, are images taken from satellites or a plane, which are digitized and geographically coordinated. The images can show land use or the environmental features (Boba, 2005 and Chainey and Ratcliffe, 2005). Figure 2.12 shows a map of a city representing streets as line features, hydrants as point features and finally parcels as polygon features.

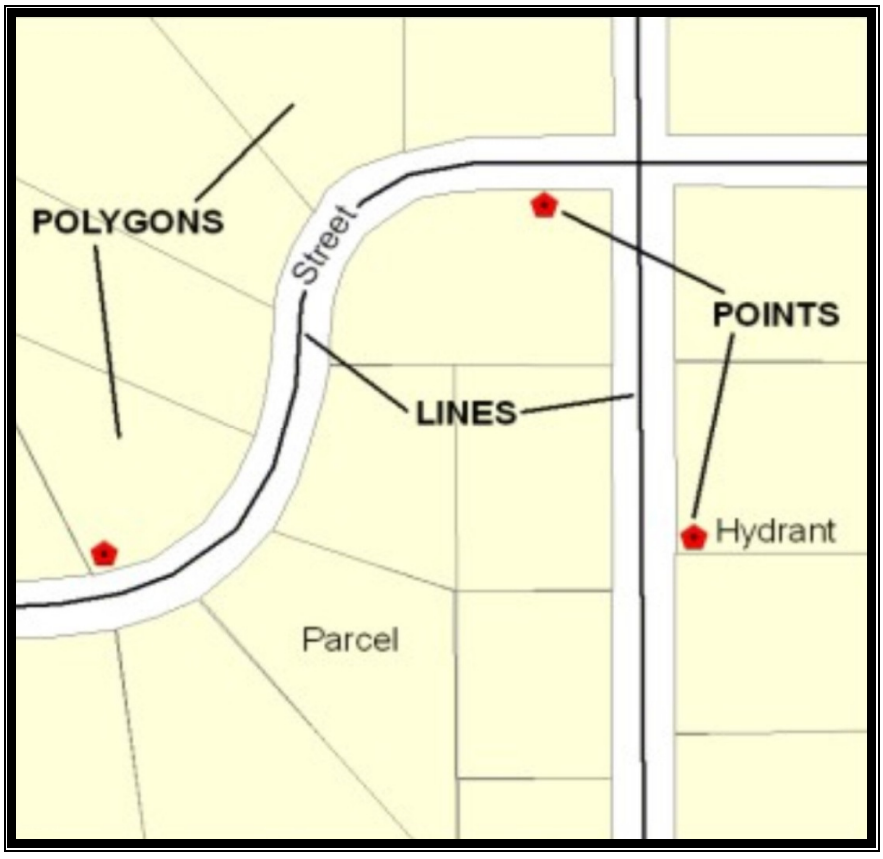


Figure 2.12 Example of point, line, and polygon features in GIS (Source: Lemon Pro GIS)

With the tools of GIS, geographic information such as land uses, street network, buildings, population census data and the locations of cash machines etc. can be represented in individual layers, and can be manipulated, analyzed and displayed separately or can be combined to create a new perspective of the area. For example, the locations of all crime incidents can be viewed as a separate layer and burglary incidents, a subset of crime incidents, can be mapped in another layer. The locations of burglary incidents can be analyzed to determine the burglary crime Hot spots. The data of burglary incidents can be combined with other data like the residential properties of the area and the burglary dwelling rate of the number of burglaries per 1000 households can be calculated and mapped (Chainey and Ratcliffe, 2005). Figure 2.13 shows the combination of different layers in GIS. The layers of land use, demography, crime initiatives, transport networks, regeneration areas and crime incidents are superimposed over each other as geo-referenced layers.

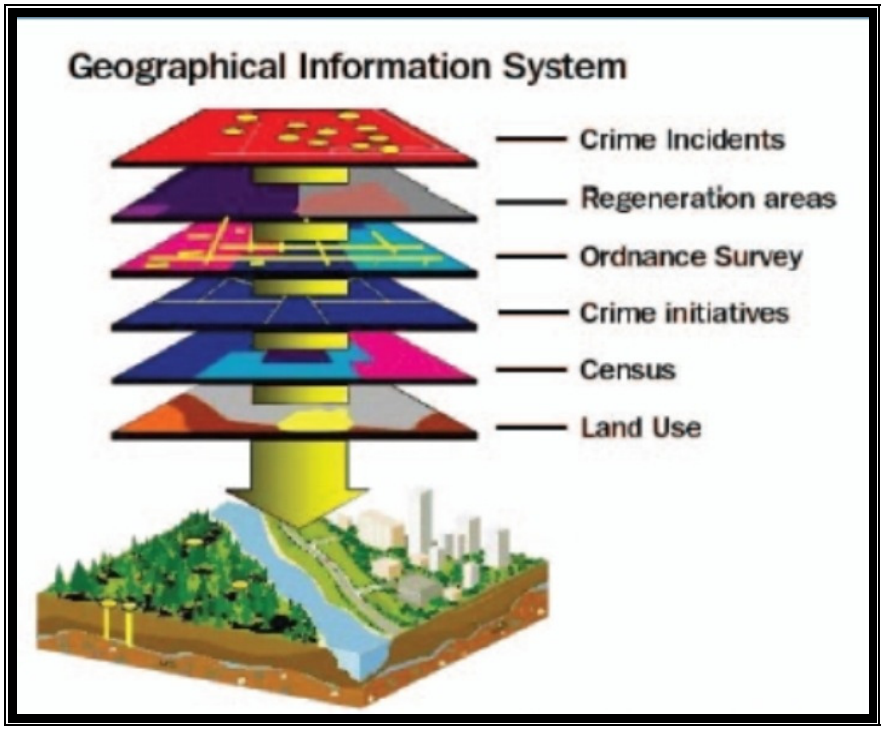


Figure 2.13 Integration of Different Layers in GIS (Source: ESRI UK adopted by Crime&C)

GIS is an essential part of crime analysis that incorporates law enforcement data with demographic, spatial and temporal data. GIS helps to understand the dynamics of events and people in the neighborhood. It also helps to identify the risks of locations, determine regional or seasonal Hot spot locations and capture call-service locations. Mapping incidents over a period of time helps crime analysts to understand crime movements and patterns (ESRI, 2008). It is possible to perform spatial quarries with GIS, analyze the crime patterns and clusters, and see the relationships of incidents with geographical features. GIS has a capability of linking with other tools too; therefore, it is possible to call on other tools to assist, use more advance databases or do certain analyses (Chainey and Ratcliffe, 2005).

The method of mapping incidents rose in the 19th century in London due to cholera, which was then a fearful disease. An English physician called Dr. Snow mapped the locations of cholera incidents and discovered that the areas which were provided with free beer did not consume water and were not affected by cholera. This effort of Dr. Snow became an example of the use of mapping for informing public policy. The first use of crime mapping was created by Adriano Balbi and Andre-Michel Guerry in 1829 in France. They created maps of crime incidents against property and crime against person to compare with education levels; they discovered that the northern part of France, in which the education level was high, had higher levels of crime against property but lower levels of crime against person (Oberschall, 1989 in Weisburd and McEwen, 1997). Another early crime mapping study was developed in the 1920s by the University of Chicago in order to explain the crime problem in the Chicago City. They discovered the relationship of crime with social disorganization and poverty in urban areas (Weisburd and McEwen, 1997). Crime mapping has changed since 1997, when the first GIS crime map was produced. Today, through the developments in geocoding processes, the simplification of interface and the developments in mapping applications, it is possible to be used by a wider group of people (Chainey and Ratcliffe, 2005).

GIS is used in crime mapping because it enables law enforcement agencies and crime analysts to create, update and plot the locations of incidents, victims or service providers. 'Pin maps' are the easiest way of creating a map of locations. In Figure 2.14, a map of homicides committed in Washington between 1994 and 1995 years is given, in which the red points represent the locations of homicides (US Department of Justice, 2003).

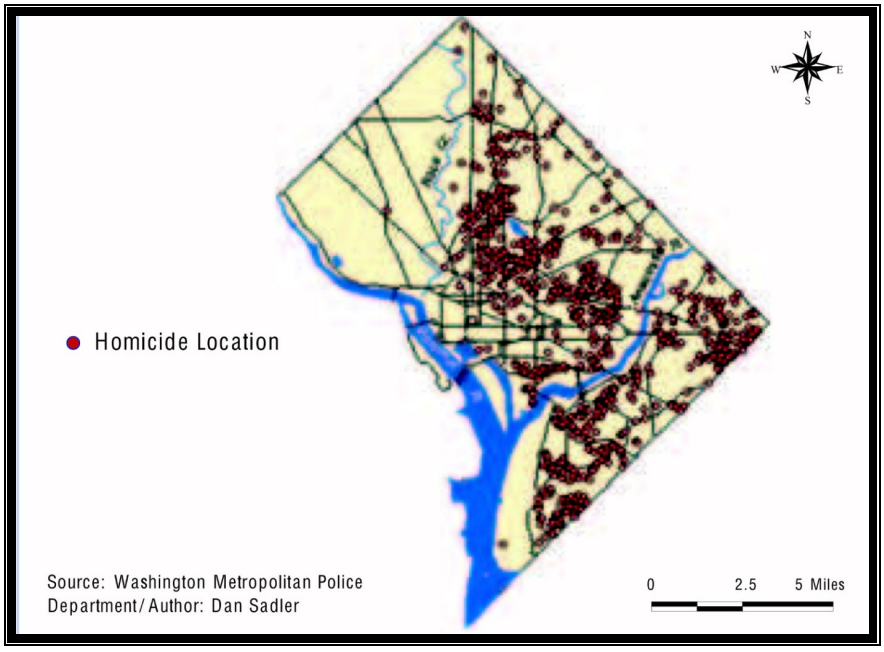


Figure 2.14 Example of a Pin Map Showing Homicides in Washington (Source: US Department of Justice, 2003)

Another map technique, ‘thematic mapping’, is used for visualizing attributes aggregated to administrative zones like countries, states, neighborhoods. A thematic map can identify the density values of an attribute like population, number of assaults or victim compensation claims. In Figure 2.15, a thematic map of California showing the density of subgrantees is seen. The map ranges from dark colors to light colors, which represent the highest density value and the lowest density value, respectively (US Department of Justice, 2003).

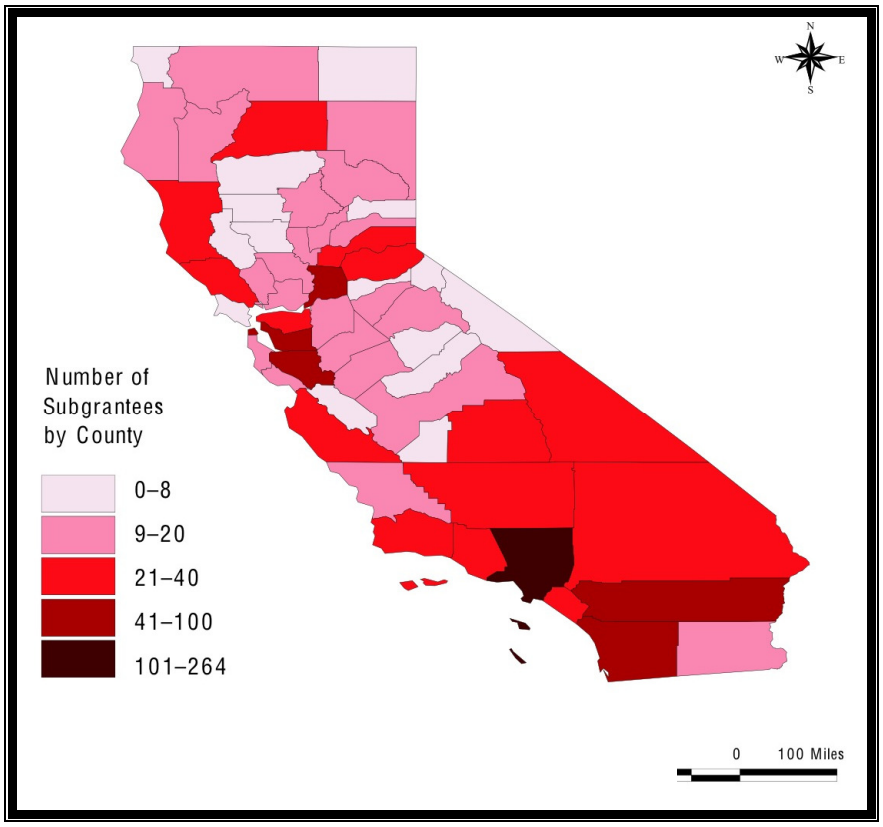


Figure 2.15 An Example of Thematic Map Showing Density of California Subgrantees (Source: US Department of Justice, 2003)

The combination of pin maps and thematic maps are called ‘integrated maps’. In Figure 2.16, an example of integrated map is presented. The points represent the public housing units and 1997 aggravated assaults, and the population information is represented as shades of color (US Department of Justice, 2003).

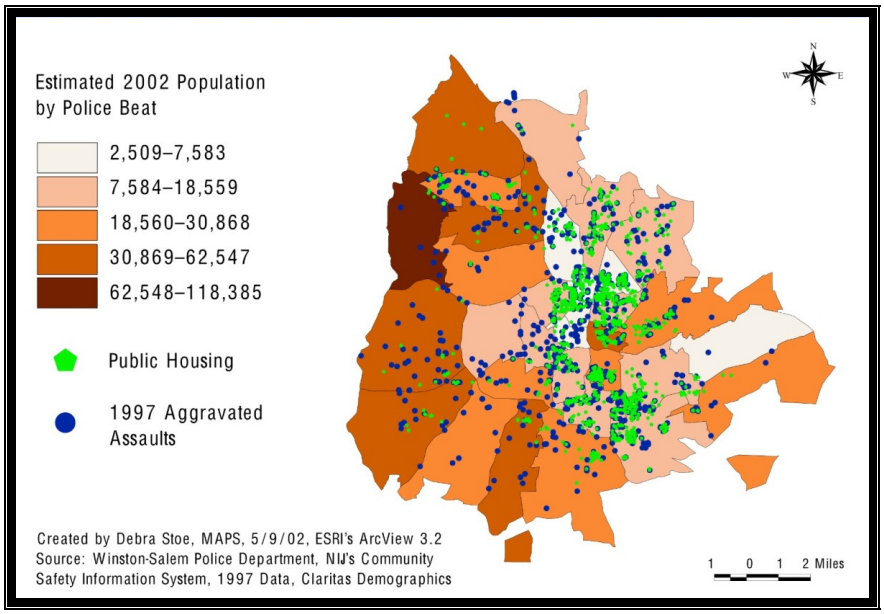


Figure 2.16 An Example of Integrated Map Showing Winston-Salem (Source: US Department of Justice, 2003)

2.6.2. GIS Analysis Methods in Crime Analysis

There are mainly five GIS analyses used in analysis of crime:

Proximity analysis: Aims to determine the proximity of crime incidents to other geographical features. It does not involve statistical analysis but includes the interpretation of crime patterns and locations. The buffer zones and theme selection are the main methods of proximity analysis. Buffer zones are boundaries that are created in a specific distance from an object. For example, drug-free zones are formed in a distance of 500 feet from schools. Theme selection allows the user to select features within a specific distance. An example is selecting homicides within a distance of 25 miles from schools.

Spatial distribution analysis: Reveals the pattern of crime incidents, the distribution of center, how far it spreads, and the direction of the distribution. The mean center analysis is widely used to explain the spatial distribution showing the approximate center of the distribution. This method helps to describe the spatial pattern of different crime types or the same crime type in different time periods. Another first order statistics method is standard deviation analysis, which measures three different measures of standard deviations for X, Y, and standard distance variation. It is used to explain the orientation, dispersion and shape of different crime types. Spatial autocorrelation analysis provides information on at what level the crime incidents are related to each other. Moran's I and Geary's C are used to determine the degree of spatial autocorrelation.

Distance analysis: Shows the clustering of crime. They are used to visualize the clustering of different crime types in space. The nearest neighborhood method compares the average distances of crime incidents to their closest neighborhood.

Advanced spatial analysis: Which is mainly hot spot analysis, a common method, to analyze the concentrations of crime types by showing hot spots of crime incidents. Hot spot analyses have five basic categories which are visual interpretation, choropleth mapping, grid cells analysis, point pattern analysis and spatial autocorrelation (Jefferis,1999 in Paulsen and Robinson 2004:315). Among point mapping techniques, fuzzy mode is a method which counts the number of incidents in different locations in a user-defined area.

Density mapping: Is a spatial statistical technique, which is also called Kernel Interpolation method and is used to analyze point patterns. Kernel is a search constant radius and crime incidents are weighted based on their distance to the kernel (Levine 2002, in Paulsen and Robinson, 2004:325). This interpolation brings the advantage of deriving information for the whole area (Paulsen and Robinson, 2004:287-333).

2.7. Crime Analysis and Crime Prevention in Turkey

In recent years, crime prevention studies have been growing in scientific and governmental institutions in Turkey. The importance of crime prevention has been well understood by crime prevention departments established under provincial directorates of security. A crime prevention center was established in Police Academy in 2007 in order to analyze crime and create policies for the politicians. The center aims to make national and international researches, conduct analyses to develop projects and share the results with the decision makers. “Turkish national crime fear”, “crime fear in Malatya”, and “developing a research-based policy approach for the juveniles criminal justice system” are some of the researches they carried out (Police Academy, 2013). Sivas Directorate of Security manages a crime prevention project through environmental design in the city center. The project consists of renovating and removing fifty-nine locations and buildings that have high crime incident rates (Sivashaber, 2012). Bursa Directorate of Security together with Bursa Greater Municipality developed a “Safe Houses, Smiling Faces” project, which aims to improve the security of 1000 houses in Nilüfer, Osmangazi, and Yıldırım districts. The project consists of fitting locks on the doors, improving security on windows and fitting sensor lights on windows (Suç Önleme Org., 2013). They also provide house and work security consultancy services at the moment for Yıldırım district as a pilot area. Karaman Directorate of Security held a competition of “Crime Prevention Projects” in June 2013. The competition aimed to increase the participation of different groups of public in crime prevention against public security crimes (sucönlemeprojeleri, 2013). In Ankara, Keçiören District, the Greater Municipality of Keçiören applies a project of “Safe Life against Burglary & Robbery in Keçiören”. Within the projects, seminars are given to the residents explaining the types and methods of crime and the prevention methods to reduce the risk of the crime victimization (Keçiören Municipality, 2013). Aydın (2006) developed a web-based data acquisition

method for accurate geocoding, which provides a fast and reliable data acquisition system for crime incidents. He constructed a multiplatform system for online data entry from each police station, which is useful for the needs of daily, weekly or monthly reports in crime analysis.

Another crime analysis and prevention study was performed by Erdoğan (2007) for police station zone in Etlik, Ankara. She analyzed the distribution of crime incidents against property in the spatial and temporal distribution among planned areas, areas in transition and areas with squatters, also concerning the time effect. She found that a higher density of incidents and clusters was observed in the most planned areas. These planned areas are mostly vulnerable in routine activities of space and time and these incidents spatially interact with each other. The incident clusters are generally within a radius of 1.5 km of the police station, mainly located in planned regions with similar and also dissimilar environmental features. In her study, she recommended creating a high level of neighborhood relations and community policing with a hierarchical order as apartment manager, street representative, and "muhtar". Moreover, she recommended the integration of different socio-economic groups by designing integrated mixed and diverse environments (Erdoğan, 2007).

In another study performed in Ankara Bahçelievler, Polat (2007) created a spatio-temporal crime prediction model based on the analysis of crime clusters. In her study, a clustering algorithm was created and the spatio-temporal distribution of crime was observed and a model was developed to predict crime in time dimension. The proposed model was implemented for Çankaya and Bahçelievler central police precincts. She concluded that incidents against property displayed the highest level of spatial clustering in global scale and spatial interaction in local scale. Furthermore, she suggested that the planned areas provide greater opportunities for crime incidents. The incidents against property are more likely to take place in planned areas (Polat, 2007).

Düzgün and Kalaycıoğlu (2007) analyzed the spatial distribution of crime in Çankaya Police Station precinct, considering the temporal and spatial distributions of crime. For the question 'where', crime maps, and for the questions 'when' and 'how many', time series model were used. They created the model to predict the amount of crime incidents through time and place (Düzgün and Kalaycıoğlu, 2007).

Another crime analysis study was done by Akpınar (2005), which analyzed the relationship between the pattern of crime incidents and land use using spatial data analysis and GIS. She analyzed the crime incidents for burglary, auto theft, pickpocketing, usurpation and murder recorded in 2003 in two police precincts of Ankara, the first one in the Çankaya district, the Centre of Çankaya Police Station Zone and the second one in Bahçelievler Police Station Zone. She identified the land use categories as commercial, military, museum, park, public association, residential, and road, and then evaluated the relationship between land use distributions and incident rates. She found that auto theft occurs mainly on streets, when compared to roads or parking lots. Pickpocketing incidents occur mostly on streets and business areas, murder incidents occur mostly on roads, and burglary incidents generally

take place in houses. In her study she also considered temporal effects on crime incidents, finding that burglary incidents happen mostly during the 00:00-08:59 time period. When different types of crime incidents are compared, it is seen that auto thefts and burglary incidents increase near schools, hospitals, and landmarks, while burglary, pickpocketing and usurpation incidents occur near the police stations. Besides, subway stations have high correlations with crime incidents, whereas parks have low correlations.

2.8. Summary of Chapter 2

The following summaries are the major facts discussed in Chapter 2

- Crime is defined with four elements. A crime must involve a law to define the activity as illegal, an offender who breaks the law and commits crime, a person who has a loss, and a place where crime occurs.
- The concept of 'crime' explains the criminal incidents, while the concept of 'criminal' explains the pattern of crime. Criminal theories do not explain the crime itself, but explain the factors of crime and the potentials of crime.
- The theories of criminality focus on offenders' opportunities, the factors that make them criminals and the reasons of their choices. Victimization theories focus on victims, the fear of crime and the factors that make them targets for a crime.
- Victimization theories supports the concepts of 'proximity to crime', 'exposure to crime', 'target attractiveness' and 'guardianship' as the factors of crime victimization.
- Target attractiveness is the economic value of the property or the income level of a person. Some studies show that as socio-economic status of people increases, victimization increases too; on the other hand, some studies suggest the opposite.
- Both criminal theories and the theories of victimization have macro- and micro-level concerns. Macro-level theories of criminality concentrate on structural features for groups or communities, such as population density, homeownership, race, or age. Micro-level theories concentrate on individuals rather than groups, studying economic problems, psychological problems, and family factors of individuals.
- Crime has social and spatial aspects. Social theories explain the variations in crime incidents through social factors like heterogeneity, socio-economic status, family disruptions, residential mobility, participation in community activities, and family supervision to youth. Spatial theories explain the variations of crime incidents with spatial and temporal factors.
- According to the Social Disorganization Theory, community compositions like employed-unemployed, married-divorced, community social structure, criminogenic commodities such as rates of violence, social and physical disorders are the factors that influence crime occurance in space.
- Social factors of offenders and victims should be considered to understand criminal activities and there is a relationship among social variables like SES, ethnic heterogeneity, education as norms of society, participation in social organizations, sharings with friends, family and crime victimization.

- Due to unequal distribution of crime incidents and clustering of specific crime types in specific locations, a new field of study called 'ecological crime' has been developed. The ecological crime theories are useful to understand the causes of a crime, the reasons of criminal behavior and the tendencies of crime in a specific location and time.
- Traditional ecological crime theorists developed the social disorganization theory, which proved the relationship between crime and social parameters like SES, ethnic heterogeneity, migration, physical disorders, population density, family disruption, solidarity, and community organizations.
- The studies of early new and late new ecological crime theorists focus on the opportunities of crime and they developed place-based prevention strategies.
- Oscar Newman's (1972) 'Defensible Space' theory aimed to reduce crime incidents and fear of crime by increasing territoriality and natural surveillance. The theory was tested in a social housing area in Florida, and the results of the study showed that high storey buildings which had more than 10 floors had higher risk of crime victimization than 4- or 5-storey buildings.
- Jeffery's (1971) Crime Prevention through Environmental Design (CPTED) aimed to decrease crime, crime risks and the perception of crime via a proper design of environment. CPTED strategies try to decrease the opportunities of an offender by increasing natural access control, natural surveillance, and territorial reinforcement, allocation of facilities and creation of public, semi-public and private spaces.
- Space Syntax developed by Hillier (1977) supports that the patterns of social integration and physical properties of an area affect crime rates. He criticizes earlier theories, asserting that territoriality does not explain physical configuration of space and it creates segregation. Target hardening, absence of guardians, runaway time, target value, and social surveillance are important parameters for crime prevention; therefore, building height, buildings-roads orientation, street lighting, shared public areas, number of families per entrance, barriers, connectivity and integration of roads and various spatial parameters should be concerned.
- Environmental Criminology defines four elements of crime as law, offender, victim and place. It studies how these elements are related to the place, and how people are related to this place with their behaviors and activities. Therefore, environmental criminology studies crime patterns and crime victimization patterns, explaining spatial distribution of offences and spatial distribution of offenders.
- Routine Activity Theory is based on the routine activities of victims during the day, their activities belong to a specific place in a specific time. Daily routine activities of people increase the vulnerability of crime victimization.
- Rational Choice Theory supports the idea that all offenders have a tendency to maximize their profits and minimize their losses; therefore crime prevention is possible by reducing offenders' opportunities. The social background of the offender, economic level, family structure, social class, and educational level are the main causes to encourage people to commit crime and make them criminal.
- Situational Crime Prevention argues that the main element of crime prevention is opportunity and crime prevention can be achieved by decreasing the profits and increasing the risks of offenders. Target hardening, target removal, removal of means, property

marking, surveillance and environmental management are strategies of situational crime prevention.

- Crime pattern theory suggests that some places are more prone to crime than other areas, and offenders choose their targets in a distance from where they live. The choice of the offenders is related to how well they know the area.
- Crime prevention studies are applied around the world and recently Turkey has also started to develop crime prevention strategies by governmental institutions and universities.
- Crime analysis is an analytical process in which crime patterns and their relationships with physical and social factors are studied, which aims to investigate crime factors and processes and to prevent criminal activities.
- The crime analysis consists of socio-demographic, spatial and temporal data. Socio-demographic information consists of social data like race, gender, age, education, and income. The spatial information of crime analysis identifies the locations of crime incidents, their patterns and the relationships between incidents and geographical features. Temporal information considers the time of incidents (daily, weekly).
- The crime analyses are done in five steps, which are data collection, collation, analysis, dissemination and feedback.
- There are different types of crime analysis. Criminal investigation analysis analyzes criminal profiles, the personality, social habits, and the work habits of offenders. Tactical crime analysis analyzes recent crime activities, their locations, time, and methods of offenders, type of victims, type of locations, and type of crime. Strategic crime analysis identifies long-term crime problems and evaluates police responses to the cases. Administrative crime analysis makes researches on legal and political concerns.
- Geographic Information Systems (GIS) is useful for crime analysis with the property of incorporating law enforcement data with demographic, spatial and temporal data. GIS helps to understand the dynamics of events and people in the neighborhood, to identify the risks of locations, to determine regional or seasonal hot spot locations and to capture call-service locations.
- Pin maps, thematic maps and integrated map techniques and advanced spatial analysis, proximity analysis, density mapping with kernel interpolation and distance analysis techniques of GIS are widely used for crime analyses.
- Numerous crime analysis methods are used in Turkey, showing the distributions of crime incidents related to land use, other spatial factors, and time.

CHAPTER 3

METHODOLOGY

3.1. General Description of the Research Methodology

The aim of the study is to develop place-based/spatial crime prevention strategies by means of a spatial crime analysis in Turkish cities, with a case study area, Ankara Keçiören District.

In order to reach the aim following research questions are tried to be answered:

- What physical and non-physical parameters affect crime victimization in urban areas?
- How does the socio-economic and demographic status of people affect crime victimization?
- What is the relationship between the perception of security through crime, precaution and crime victimization?
- How do other social factors such as migration, solidarity, and attitude towards crime affect crime victimization?
- How does the spatial pattern of cities affect crime distribution?
- What crime prevention strategies can be developed in Turkish cities?

The research questions are evaluated in two scales: macroscale and Microscale. In Chapter 2, a summary of victimization studies were given, explaining both macro and micro level concerns of victimization theories. In macro level, the theories concern structural features explaining groups, communities or the entire society rather than individuals within the society. The macro-level theories explain the criminal activities with social marginality and disorders. Therefore, they focus on social parameters like race, age, ethnicity and population density. The micro level theories focus on individuals and households rather than the groups in the society. The focus is on individual factors of the victims that make them a target for a criminal activity (Cornish and Clarke, 1986). In this study, the analyses were completed in both macro and microscales.

Macroscale analyses were done in five neighborhoods of Ankara Keçiören District with the purpose of explaining the relationship between crime victimization of all crime types and social/non-physical parameters. As a geographical unit, 98 small statistical areas (SSA) created by Yavuzoğlu (2009) were used. The non-physical parameters are socio-demographic, economic status of groups, migration, solidarity, perception of security, attitude towards crime, and precautions used against crime victimization. Small Statistical Areas (SSA) created by Yavuzoğlu (2009) are obtained by using statistical clustering methods with the criteria of homogeneity, compactness, contiguity, and equal population.

Microscale analyses represent each household, aiming to analyze the relationship between physical parameters (buildings and road segments) and burglary victimization. For the building parameters, the analyses are run in 3 zones; the main road (zone 1), secondary roads behind main roads (zone 2) and secondary roads in hinterlands (zone 3). In this case, Aşağı Eğlence neighborhood, including Etlik Street is selected as the micro-scale study area.

The main difficulty for such a study was to reach data about socio-demographic parameters and actual crime incidents. It was not possible to reach the reports of actual crime incidents from the police department. Therefore, in this thesis a study on victims is used to evaluate the socio-economic and demographic indicators, the victimization data and the perception of crime victimization. The victims' survey was prepared by a team of researchers at Middle East Technical University within the project entitled "Developing Crime Prediction Models and Prevention Strategies based on Spatial Analysis in Urban Areas"and funded by the State Planning Organisation (2006). The project has 4 parts. The first part determines the different levels of socio-economic status in the area using the population census of the years 1990 and 2000 by the Turkish Statistical Institute. In the second part, the crime types are classified and analyzed with spatial and temporal factors. The third part analyses the spatial relationship between the socio-economic status of groups with different crime types and in the last part of the project, detailed crime maps are created showing crime patterns for selected police station zones. The data collection method for the project was the application of questionnaires. 3000 questionnaires consisting of 80 questions were applied in 9 neighborhoods of Keçiören between April and September 2007. All questionnaires were applied face to face, and the names of the households were not reported. Most of the questions were categorized in the answers to provide a faster and more efficient use in the statistical analysis, but some questions offer possibilities for different answers as well. The questionnaire applied within the study is given in Appendix A. Nine neighborhoods of the study area are as follows:

1. Yükseltepe
2. Sancaktepe
3. Aşağı Eğlence
4. Ayvalı
5. Esertepe
6. Etlik
7. İncirli
8. 19 Mayıs
9. Şehit Kubilay

The results of the study show different socio-economic status and urban development among these neighborhoods. From 3000 questionnaires, 1744 of them corresponding Ayvalı, Etlik, Aşağı Eğlence, İncirli and 19 Mayıs neighborhoods were used in the thesis. From now on, the data taken from the project will be called as the "survey data" and the questionnaire applied within the project will be called as the "household survey".

It was mentioned in the previous chapter that victimization surveys are used in order to explain the factors of crime incidents. Especially in cases where it is not possible to reach data about offenders, victims' studies are helpful to analyze the social factors of crime and the fear of crime in the society. In this study, crime victimization is explained in macroscale with the question "Have you faced any crime in the last 2-3 years?", which corresponds to the question number 63 in the household survey in Appendix A. In order to evaluate the different types of crime victimization, Question 55 in the household survey is used. Question 55 shows the perception of households to the increase in different crime types in their neighborhood by asking the question "In your neighborhood, which crime types happen and in which frequencies?". The answers "very often" and "often" are taken as positive replies for these crime types, whereas the rest of the answers are assumed to be "no victimization". In microscale, burglary victimization is taken into consideration for the reason that only burglary victimization can show a relative location, while the other crime types like pickpocketing may occur in the other side of city.

The crime victimization has both social and spatial aspects. The first part of the analysis evaluates the effect of non-physical parameters on crime victimization of all crime types (burglary, robbery, auto& property theft from auto, pickpocketing, injuries, etc) in macroscale. The second part of the analysis evaluates the effect of physical parameters on burglary victimization in microscale, measuring the parameters on street and in household units. The microscale study area is determined from the results of macroscale analysis. Both macro and microscale analyses are performed and evaluated with reference to crime prevention theories and finally crime prevention stategies are proposed accordingly (Figure 3.1).

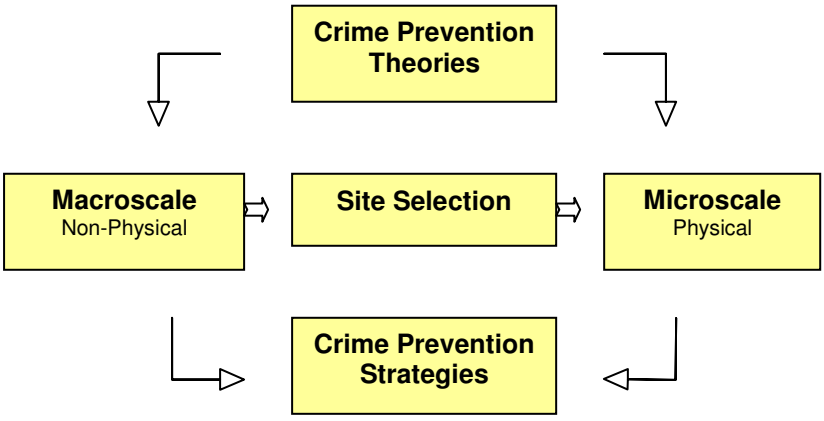


Figure 3.1 Summary of the Methodology

The non-physical parameters used in macro analyses are**;**

1. Socio-demografic status:
2. Economic status
3. Migration
4. Perception of Security
5. Precaution
6. Solidarity
7. Victimization
8. Attitude towards Crime

The physical parameters used in micro analyses are;

1. Building density of roads: Number of buildings/length of road segment
2. Connectivity of roads: Number of road connections on road segment
3. Building properties: Number of floors, road degree where building stands (main or secondary road), facing public realm, the use of building (only for residence or residence with trade), the availability of gardens, the availability of parcel walls, the availability of a defined entrance, the side of entrance (side or front), the availability of additional floors from elevation differences.

In Figure 3.2, the detailed methodology of the study is given in 17 steps. To summarize the order of the study, the study start with collecting the necessary data and making a literature survey. The detailed physical data, such as the number of floors, the use of buildings, the number of households, the entrance side, the availability of physical barriers such as walls, gardens, a defined entrance, and facing public realm such as parks or mosques, are collected by means of a field survey in the area, whereas the other spatial data (road, landuse, building maps) are obtained from Ankara Metropolitan Municipality Office of Water and Infrastructure. All the necessary data are organised and prepared for further analysis (Figure 3.2, Step 1-4). In macroscale, the socio-demographic data (questionnaire survey & Address Based Population Register System (ABPRS) data) and the spatial data (administrative neighborhoods, road network, small statistical areas, and building data) for the analysis are managed. The survey data is organized in the SPSS, spatial data is updated with the new street names, and the address matching is completed for the questionnaires on building map (Figure 3.2 Step 5). In order to test the reliability of the method, quality assesment is done by comparing the socio-economic index created by the survey data with socio-economic index created by the ABPRS data. A comparison map is prepared and small statistical areas that do not fit in the model are determined and excluded from the microscale analyses (Step 6). Indexes are created for eight headlines and they are statistically tested (Figure 3.2 Step 7). Eight headlines are later reduced to four for a simpler representation. The index values are classified into five groups and mapped using the Geographic Information System (Figure 3.2 Step 8). The percentages of crime victimization for burglary, auto and profit theft from auto, robbery, and pickpocketing are mapped (Figure 3.2 Step 9). The results are evaluated by

comparing the maps with a land use map (Figure 3.2 Step 10). The study area for microscale analysis is determined (Figure 3.2 Step 12).

In microscale, a land survey is done in the field and building properties data are organized (Figure 3.2 Step 11). The variables in this survey are decided with reference to theories and physical properties of city structure. The microscale study area is detemined with reference to the results of Step 8 and Step 9 (Figure 3.2 Step 12). The analyses are carried out for microscale on roads for accessibility and density and on buildings for other physical variables in three different zones (Figure 3.2 Step 13, 14, 15). The results are mapped and the significance of the model is tested for physical variables (Figure 3.2 Step 16). At the end of the analysis, the results of macro and microscales are evaluated and as a conclusion, crime prevention strategies are developed for Turkish cities (Figure 3.2 Step 17).

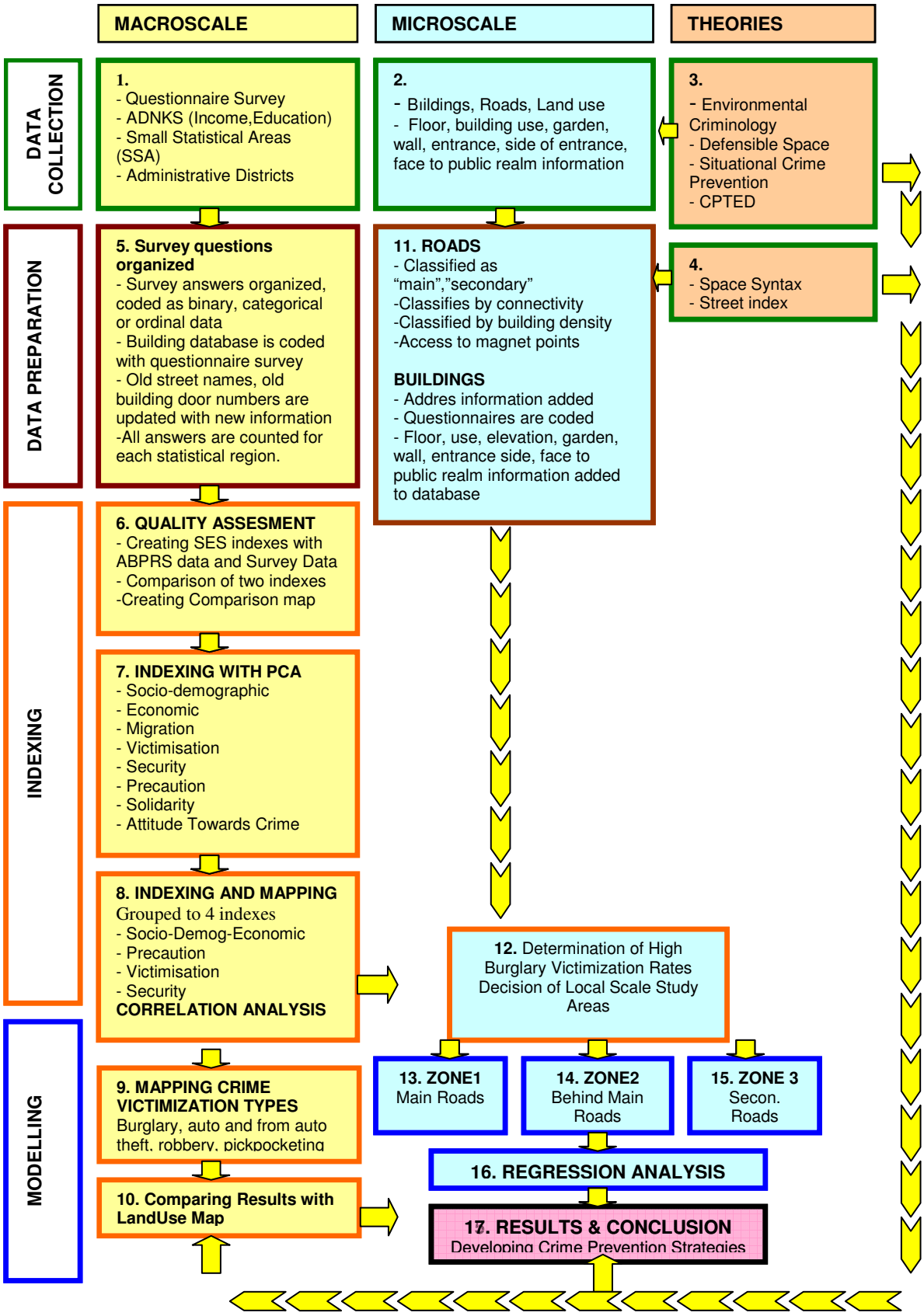


Figure 3.2 Methodology Flow Chart

3.2 Macroscale Analyses - Creating Socio-Economic Status (SES) Index

According to the social disorganisation theory and other new ecological crime theories, Socio Economic Status of communities, economic inequalities, and the education level of the society have influences on crime incidents. The study by Sampson and Groves (1989) carried out in 238 British neighborhoods demonstrates a direct effect of SES, family disruption, urbanisation and heterogeneity on crime victimization. Parsons (1964) defines social status as a mechanism which sorts individuals in social hierarchy according to social division of labor. Measuring the socio-economic status of the communities is important for the sociologists to understand the reasons of inequalities in societies. In Turkey, studies on social classes and social status were carried out by Boratav (1991 and 1995) which explain the changes in social classes after the 1980s from economic, sociologic, ideologic and political perspectives. Sönmez (2001) mentions about the income inequalities in Turkey among different social classes. Lately, a study was conducted by Kalaycıoğlu et al. (2010) that constructed a method for creating the SES Index in order to determine the properties of different social status groups in Ankara. The survey data was collected through face to face interviews by applying a questionnaire in 1769 households in eight districts of Ankara. The questionnaire asked about the education level, occupation, income, the ownership of property and the consumption information of the households. Household is used as the unit of the study and five criteria are used to measure the SES of the households, which are education, income, occupation, the ownership of house, and the ownership of other properties.

With reference to Kalaycıoğlu (2010), socio-economic and demographich variables from the survey data are used to create a SES index. The variables are selected as the same variables of Address Based Population Register System data taken from TURKSTAT, Turkish Statistical Institute, in order to assess quality of the indexing by using survey data.

Variables Used for the SES Index:

1. The number of illiterate people
2. The number of people that have graduated from primary school – primary education or secondary education (5 – 8 years)
3. The number of people that have graduated from high school (11-12 years)
4. The number of people that have an undergraduate or graduate degree
5. The number of people whose income is below 500 TL
6. The number of people whose income is between 501 and 1000 TL
7. The number of people whose income is 1001 TL and more

In macroscale analysis, the answers given to the questionnaire are grouped under eight headlines to create a single index for all indicators to check their relationship with victimization by using a multivariate statistical analysis, namely Principle Component Analysis (Figure 3.2, Step 5).

1. Socio-demografic
2. Economic
3. Migration
4. Security
5. Precaution
6. Solidarity
7. Victimization
8. Attitude

There are various multivariate statistical techniques which are modeled to reduce the number of variables and weigh them. PCA, Principle Component Analysis is used to create a single index value by reducing and weighing various variables. Arc GIS 9.2 was used during the study.

Before creating eight indexes, a quality assesment for the survey data was completed by comparing the survey SES index with another SES index created with the Address Based Population Register System (ABPRS) data conducted by TURKSTAT. The ABPRS data are taken from a digital database system which gives information for all citizens recorded with a uniqe identfication number, named "TC citizen number". The database provides information about address, education, income source, and income amount. Two socio-economic and demographic status indexes (SES) are created by using PCA from both the ABPRS and the survey data. The results of two indexes are compared and the small statistical areas which do not coincide are determined, which denotes that the survey data in these areas are not representative (Figure 3.2, Step 6).

In macroscale analysis, eight indexes are created and mapped, and the multicollinearity among the indexes are tested (Figure 3.2, Step 7). Because of the high correlations among these variables, the eight indexes are grouped and reduced to four groups: (Figure 3.2, Step 8).

1. Socio-demographic and -economic index
2. Security, solidarity, attitude index
3. Victimization index
4. Precaution index

In this part of the study victimization of burglary, robbery, extort, pickpocketing, auto theft and property theft from auto victimizations are mapped and the results are compared with land use maps. The land use maps are prepared considering population density in SSAs, number of squatters in SSAs, use of area (residential, residential & commercial) and land marks (hospital, education, shopping center, mosque).

In the second part of the analysis, physical indicators that affect the crime victimization for burglary are evaluated and the following maps are obtained:

4. Burglary Victimization Rate Mapping
5. Building Density of Roads
6. Connectivity of Roads
7. Building Properties

3.3 Microscale Analyses

Microscale analysis aims to see the relationship of burglary victimization with the physical factors of the study area. For analyzing physical parameters on road network, building density and connectivity, the risk factor for each physical segment was measured. For example, the connectivity of each road segment is calculated and assumed to be a risk factor for that part of the road. For building analyses, the use of building, facing the public realm, connectivity with other roads, the number of floors, garden, wall, entrance availability, and the entrance side are used as other physical parameters (Figure 3.2, Step 11). During the determination of these variables, early new ecological crime theories are used as reference. The space syntax theory supports the connectivity and accessibility relations with crime risks on the road segments. The theory of defensible space shows a relationship of number of floors and burglary incidents. The new and late ecological crime theories mention the importance of target hardening and access control, which can be provided with buffer zones like gardens or access controls with parcel walls. CPTED mentions the importance of territoriality and the sense of ownership, and the definition of private, semi-public and public spaces. The parcel walls and defined entrances provide a territoriality for the building. The situational crime prevention or environmental criminology theories focus on increasing the offenders' risks and decreasing their profits. Therefore, facing public realm, being on the main or secondary road and the use of building affect the natural surveillance and the privacy of buildings.

In microscale the burglary victimization is evaluated in three zones. Zone 1 represents the main roads, and in this case Etlik Street. Zone 2 consists of the buildings behind the main street buildings and finally Zone 3 involves secondary roads. Statistical relations between burglary and road connectivity, building density on roads, and other building properties are analyzed (Figure 3.2. Step 12, 13, 14, 15).The factors that may increase crime victimization are explained with respect to the results and the related prevention policies are developed to reduce the victimization (Figure .3.2 Step 16, 17).

3.4 Description of Study Area

Ankara is the capital of Turkey with a population of 4,890,893 (TURKSTAT, 2012). Ankara has 24 districts. As can be seen in Table 3.1, Keçiören is the most populated district with a population of 843,535 (ABPRS, 2008). Five neigborhoods within the Keçiören Municipality region, that are Ayvalı, 19 Mayıs, Etlik, Aşağı Eğlence, and İncirli, were selected as the

study area because they represent a typical example of Turkish urban form and it is possible to acquire the necessary data for the study. Keçiören represents the low and middle income population of Ankara. In the 1940s, as a result of migration from rural areas to urban areas, squatters housing increased in the region, and during the 1960s and 1970s reconstruction and improvement plans started to be applied (Şenyapılı, 2004).

Table 3.1 Population Census for Neigborhoods of Ankara (Source: ABPRS, 2008)

Ankara Population Census of Neigborhoods			
Altındağ	**370,735**	**Çamlıdere**	**9,329**
Çankaya	**792,189**	**Çubuk**	**83,826**
Etimesgut	**289,601**	**Elmadağ**	**48,013**
Gölbaşı	**73,670**	**Evren**	**4,027**
Keçiören	**843,535**	**Güdül**	**10,676**
Mamak	**503,663**	**Haymana**	**39,310**
Sincan	**413,030**	**Kalecik**	**17,007**
Yenimahalle	**614,778**	**Kazan**	**36,147**
Akyurt	**23,354**	**Kızılcahamam**	**25,288**
Ayaş	**13,159**	**Nallıhan**	**31,768**
Bala	**23,505**	**Polatlı**	**118,454**
Beypazarı	**46,884**	**Şereflikoçhisar**	**34,808**
TOTAL			**4,466,756**

Keçiören is located in the northern part of Ankara, surrounded by its neighbours Kazan and Cubuk to the north and Altındag, Cankaya and Etimesgut to the south (Figure 3.3). It has a surface area of 58.66 km^2 and has 51 neigborhoods within the municipal borders. It became a district in the year of 1984. Keçiören was a resting place for the wealthy residents of Ankara before 1955 (Keçiören Municipality, 2013).

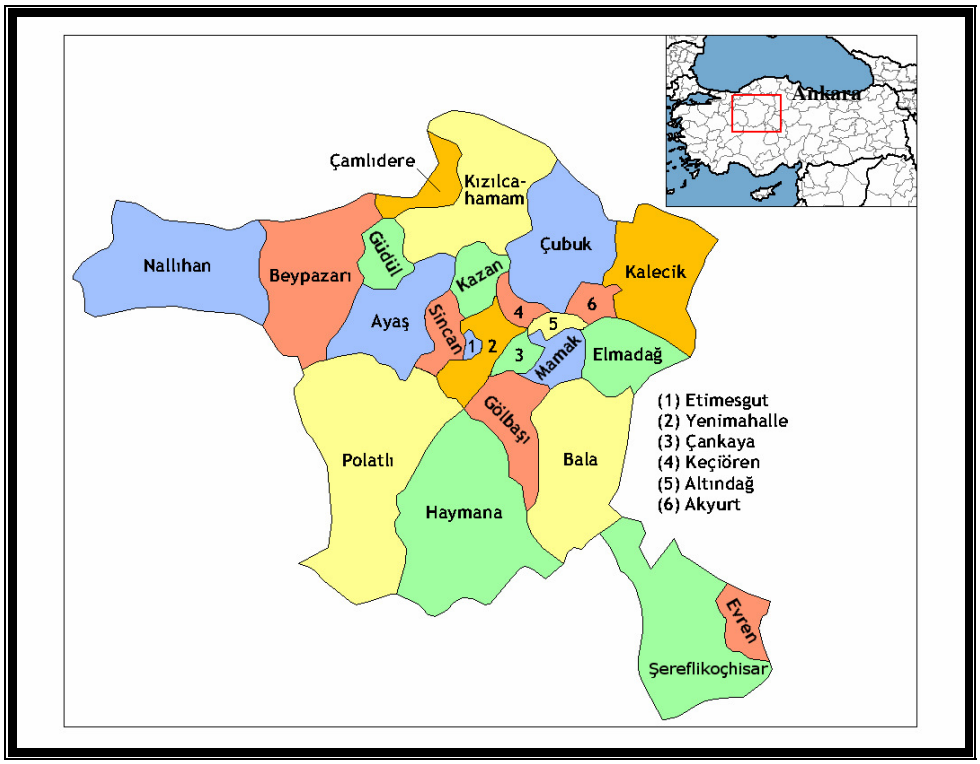


Figure 3.3 Map of Ankara Districts

According to the study by Şenyapılı (2004), Keçiören was designed as vineyards and orchards in Jansen's plan in 1932, who was the first city planner of Ankara selected by Atatürk through an international plan competition. Jansen's master plan for Ankara was the division of the city into functionally specialized zones, which was an unfamiliar concept when compared to the traditional Turkish urban form (Türkoğlu, 2007). "Jansen was also called for the compulsory integration of green belts and areas within the city to promote a healthy urban environment, even extending the vision to the housing stock, which was designed to incorporate both front and rear gardens." (Ökeşli, 2009). In those years, there was a growing demand for housing constructions in the region but it was rejected due to the limitations of Jansen's plan.

When Ankara was first planned in 1928, the local planning authority predicted Ankara's population of 1980 to be 300,000, thus the Jansen's plan was developed for a population of 300,000. However, the city underwent a rapid growth and reached that population in 1955. In 1980, city population was already 1,800,587. This unexpected increase in population brought about housing problems. The government authorities tried to solve the problem by allowing the addition of 2-3 floors to the buildings which were originally planned by Jansen (Yazman, 2009). The housing demand created a new construction method, which was cheaper and beneficial for the constructers (yap-sat), and also squatters (gecekondu). The squatters started to rise in the 1940s in North of Etlik built by poor people or villagers who wanted to use job opportunities in the city. In the 1960s, the northern part of Keçiören,

especially Emrah and Aşağı Eğlence neighbourhoods around Etlik were full of squatters (Şenyapılı, 2004).

In the 1970s, the Ankara Structural Plan was prepared, in which Etlik was a settlement region for the middle-low income group. In 1984, Keçiören was declared as one of the eight municipalities of the Ankara Metropolitan Municipality. The municipalities started to prepare 1/1000 scale construction improvement plans for squatter areas and Ayvalı, Etlik, and İncirli, and some parts of 19 Mayıs was started to be improved (Şenyapılı, 2004). The IKONOS satellite image shows the satellite view of the region as of 2008 (Figure 3.4).

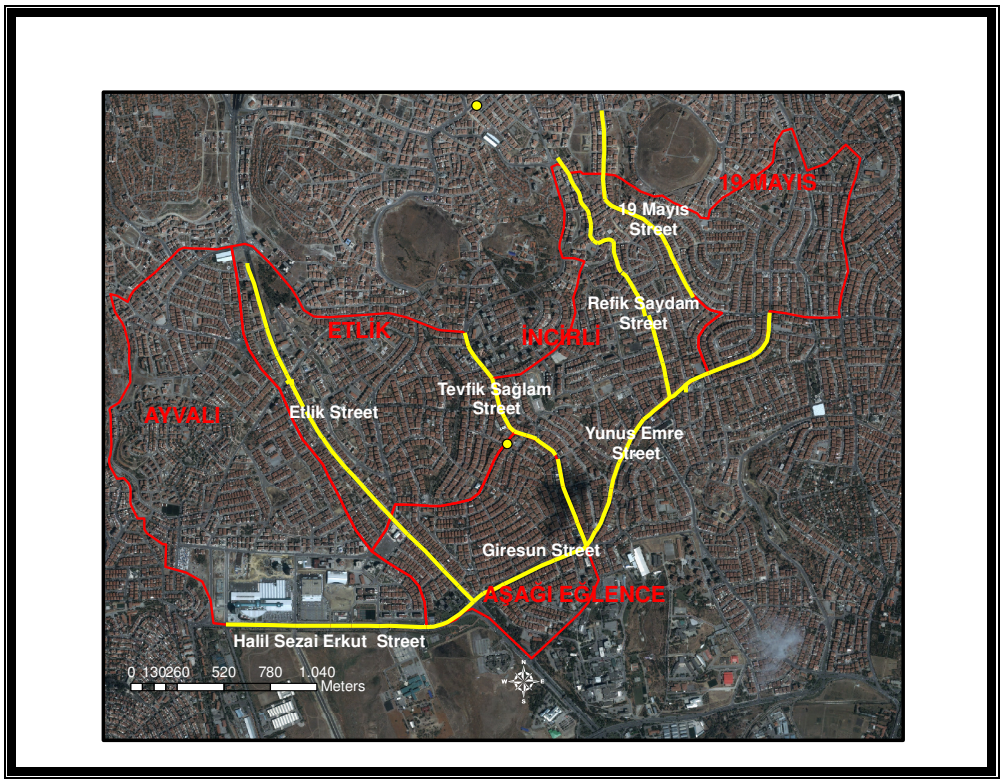


Figure 3.4 IKONOS 2008 Satellite Image and Administrative Boundaries of the Study Area, (Source: Keçiören Municipality, 2008)

Yap-sat form of housing uses maximum construction area allowed by the laws in parcel system. It creates a homogenous structure in the area with the same style of buildings with individual management within the buildings. In the study area, the housing blocks use the maximum allowed construction area which is 3 meters from the sides of the parcel. Generally, the buildings have 4-5 floors on the main streets and 3-4 floors on the secondary streets. Some of them have front gardens, but on the main streets the front yards of the buildings can not be used either for parking or as garden because of commercial uses. The improvement plans have been applied throughout the region, yet certain parts of squatters still exist especially to the northern part, that is Etlik Street, and the Incirli neigborhood.

The commercial shops took their places under the buildings which were designed to be housing units. It is seen that markets, banks, restaurants, grocery stores and other small trades are located along the main streets. There is a heavy traffic load in Etlik and Tevfik Sağlam, Halil Sezai Erkut and Giresun streets since trade facilities and public transportation routes create a mass along the streets (Figure 3.4 and Figure 3.5). There are big markets (metro), business centers and shopping centers located along the Etlik and Halil Sezai Erkut streets, and there are also recreational parks and gathering places which have been developed in the recent years. In Figure 3.5, a park and a secondary road can be seen. On secondary streets on-street parking is visible, whereas on the main streets this causes a problem both for the residents and for the traffic flow.

Figure 3.5 View from Secondary Streets and Recreational Areas

In Ankara, according to the General Directorate of Security, the property crime rates raised to 35% from 2005 to 2006. Sociological facts, rapid migration, uneven economic distributions, economic crisis, lack of education and family support are the main sociological factors of this rapid increase (Ankara Chamber of Commerce, 2007). In order to decrease the number of property crimes, Ankara Greater Municipality of Keçiören launched a project named "Safe Life against Burglary & Robbery in Keçiören". Within this project, the residents of Keçiören are informed about the methods of crime and the prevention methods which can be applied individually. The studies of the Keçiören Municipality and State Planning Organisation show that there is a problem of burglary and robbery, and prevention is required in the region. For this reason, the area is suitable for a case study not only because it meets the needs of such a study but also it possesses a typical urban form of Turkish cities. The results of this study can set an example for other cities with a similar urban structure.

CHAPTER 4

MACROSCALE ANALYSIS
ANALYZING CRIME VICTIMIZATION THROUGH NON-PHYSICAL PARAMETERS

Criminology, which focuses on the reasons of crime and criminals, supports the idea that education level, social group, family relationships, socio-economic status, characteristics, age, gender and many other factors are of great significance to understand crime (Beşe and Geleri, 2013). This chapter aims to investigate the relationships between non-physical parameters such as socio-economic status, education, migration, security, precaution, etc. and crime victimization. In this chapter, the relationship between socio-economic status and victimization, the security perception of the households and the precaution relationship with socio-economic status and victimization was evaluated. For macroscale analysis, victimization due to burglary, robbery, auto theft and property theft from auto, extort, pickpocketing are taken into consideration as the data were available for these types. Figure 4.1 gives a summary chart of the steps applied. The study starts with collecting the spatial and non-spatial data, organizing them and matching the tabular data with the spatial data (Figure 4.1, Step 1-5). All the answers of the questionnaire are grouped and counted for each small statistical area (SSA) with the help of GIS tools (Figure 4.1, Step 6). For the indexing, the answers of the questionnaire are grouped under eight headlines. In order to test the reliability of the survey data and the model, two SES indexes are created by using a multivariate statistical analysis, Principal component analysis (PCA), with both the data from Address Based Population Register System (ABPRS) and the survey data. The results are compared and small statistical areas which do not fit the model are derived (Figure 4.1, Step 7). The rest of the small statistical areas are assumed to be the representative of the population.

After the quality assesment of the survey data, a single index value is found for each SSA for every eight headline (Figure 4.1, Step 8, 9). The results are evaluated and the correlation between these indexes is analyzed (Figure 4.1, Step 10). The indexes are correlated with each other. For example, precaution is related with the economic status of the households, with an explanation that people with a low level income do not use alarms, special locks or other precautions to prevent crime. Therefore, it is possible to group them and reduce them to four headlines. Consequently, some of the variables which do not have a strong weight in the phenomena are removed from the Principal Component Analysis and the original eight indexes are grouped under four headlines, which are socio-economic and demographic, security, precaution and victimization (Figure 4.1, Step 11). The results are mapped and the correlations are checked among indexes. (Figure 4.1, Step 12, 13). A land use map is created to check the relationship between victimization and physical parameters in macro level

(Figure 4.1, Step 14, 15). At the end of the macro analysis, the results are evaluated and the area for micro analysis is determined (Figure 4.1, Step 16).

In the following parts of this chapter, the detailed information of the analyis is explained.

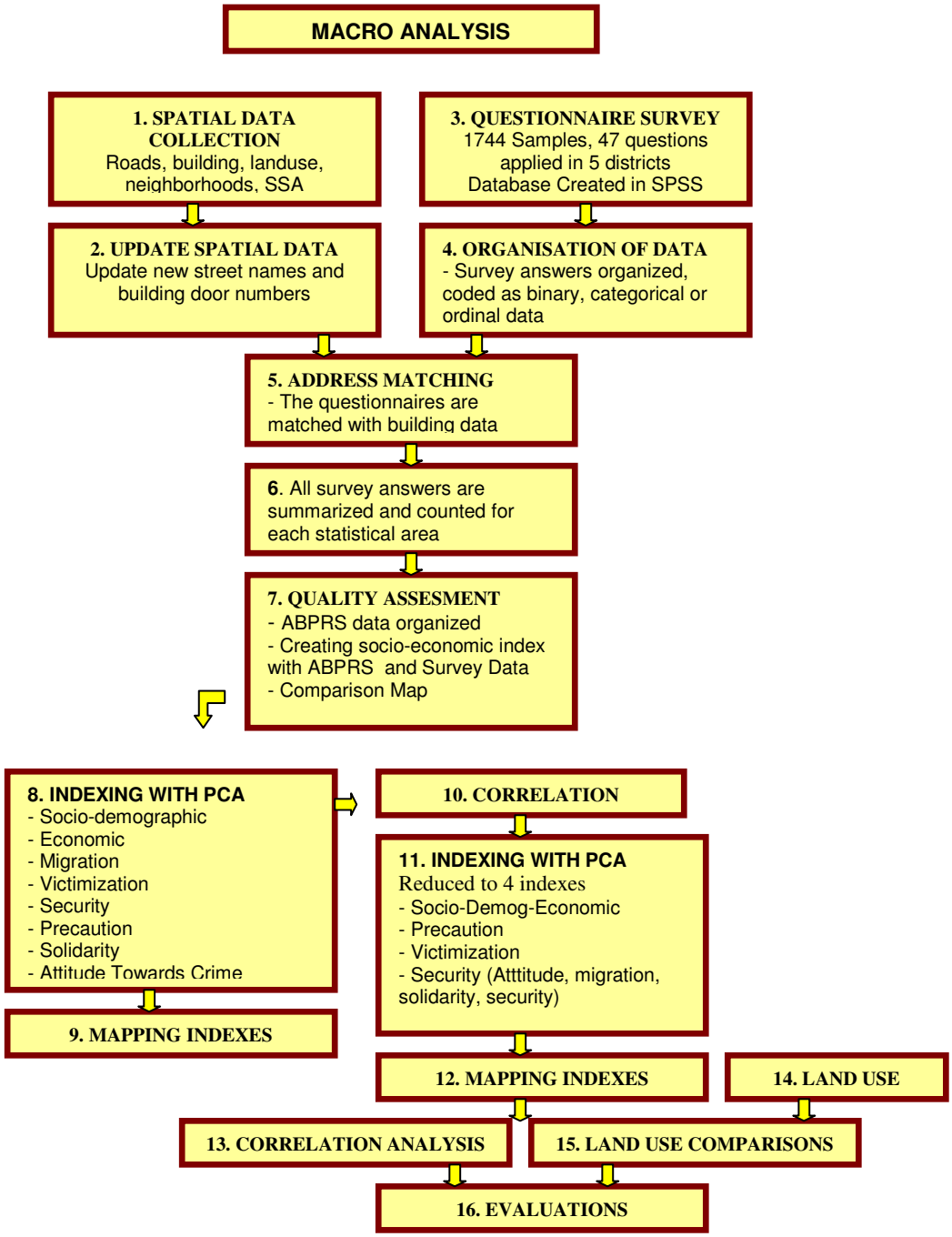


Figure 4.1 Summary for Methodology of Macroscale Analysis

4.1. Data Collection

In order to analyze the physical and non-physical parameters of the study area, which are socio-economic and demographic characteristics, two types of data are collected as spatial data and non-spatial data. As spatial data, neighborhood borders, satellite images, roads, buildings, and land use maps are collected and prepared. Most of the spatial data are obtained from Ankara Metropolitan Municipality Office of Water and Infrastructure (AMMOWI) and Metropolitan Municipality of Ankara (MMA). Table 4.1 gives the list of spatial data used in the study.

Table 4.1 Spatial Data

DATA	DATE	TYPE	CONTENT	SOURCE
Building	2000	Polygon	Addresses, door numbers	MMA AMMOWI
Roads	2000	Polyline	Roads and names, degrees	MMA AMMOWI
Landmarks	2000	Point	Mosques, schools, hospitals, police, parks, shopping areas, military areas	MMA AMMOWI
Provinces	2000	Polygon	Names and Boundaries	MMA AMMOWI
Districts	2000	Polygon	District boundaries	MMA AMMOWI
Small Statistical Areas	2000	Polygon	Boundaries and Population	Şeyma Yavuzoğlu
Building Properties	2012	Polygon	# Floors, use of building, garden, parcel wall, entrance side, ect.	Land Survey is done
IKONOS Satellite Image	2008	ECW (Enhanced Wavelet Compression)	ECW (Enhanced Wavelet Compression)	Keçiören Municipality

Non-graphical data are collected in three steps and the ABPRS data are taken from TURKSTAT for population, income, and education parameters. The second part consists of collecting physical parameters of the region by conducting a field survey. This information is explained in detail in the next chapter. The third part is organizing the answers of the

household questionnaire, which is the main data for the non-physical analysis in this chapter. In addition to these, in order to update the spatial data old-new road names, door numbers, and population info are also taken from the TURKSTAT. Table 4.2 gives a summary of the non-graphical data used in the study.

Table 4.2 Non Spatial Data

DATA	DATE	TYPE	CONTENT	SOURCE
ABPRS data	2008	sheet	Socio-economic data of households, population, address information	TURKSTAT
Road Names	2008	sheet	New and old names of roads after reconstruction of region	TURKSTAT
Population	2008	sheet	Population information of districts and neighborhoods	TURKSTAT
Questionnaire	2007	Sheet/ SPSS (..sav)	80 questions About socio economic-demographic, migraration, security, precaution, victimization, attitude towards crime	State Planning Organisation Project of " Developing Crime Prevention Models and Prevention Strategies based on Spatial Analysis in Urban Areas"

4.2. Organizing Household Questionnaire

The questionnaire was prepared by the project entitled "Developing Crime Prediction Models and Prevention Strategies based on Spatial Analysis in Urban Areas", funded by State Planning Organisation and conducted by the researchers in sociology department and geodetic and geographical information technologies department at Middle East Technical University. The questionnaire was applied face to face with 80 questions in nine neighborhoods of Keçiören to 3000 households in 2007. The questions were about socio-demographic conditions of the households, solidarity, migration, victimization of all crime types, crime incidents faced in the neighborhood, the perception of security, precautions taken against crime and the attitude of households towards crime. The valid sample size was 2999. The questionnaire was applied to Şehit Kubilay, Yükseltepe, Sancaktepe, Aşağı Eğlence, Ayvalı, Esertepe, Etlik, İncirli, and 19 Mayıs neighborhoods, but the ABPRS data were derived for only 5 neighborhoods; therefore only 1744 out of the sample size were used in the analysis with 43 questions which were applied to Ayvalı, Etlik, İncirli, 19 Mayıs, and Aşağı Eğlence neighborhoods.

The questions were prepared in order to understand the victimization of the households to crime incidents since there is no chance to receive the police records for the crime incidents within the region. All the answers to the questions were grouped under eight headlines and the results were prepared for the future analysis. Table 4.3 shows the number of samples applied in nine neighborhoods.

Table 4.3 Number of Questionnaires Applied in Neighborhoods

Aşağı Eğlence	381
İncirli	415
Ayvalı	441
Esertepe	268
Etlik	445
Şehit Kubilay	261
19 Mayıs	344
Sancak	227
Yükseltepe	212
Total	2999

- Sampling Size: 3000
- Valid sample size: 2999
- Sample size used in study: 1744
- Sample Date: 2007
- 80 questions in total
- 1-30 socio-demographic
- 31-43 economic
- 44-52 solidarity
- 53-74 crime incidents around neighborhood
- 75-84 security/defense
- 85 understanding of crime
- Total number of questions used in the study: 43

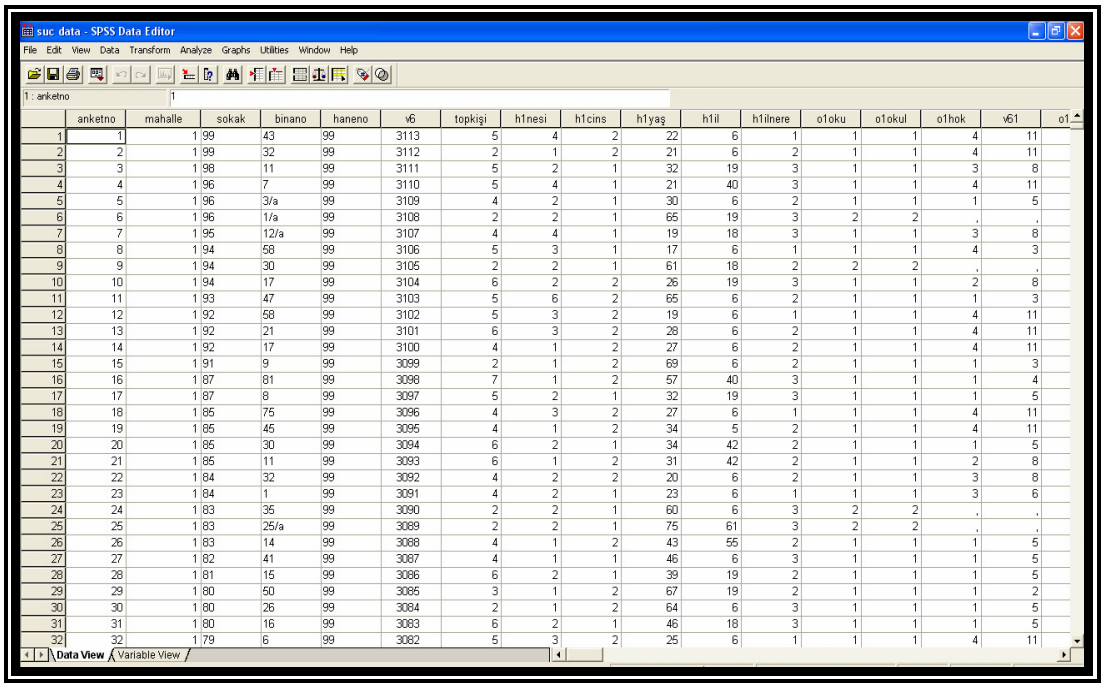
In Appendix A, a copy of the questionnaire applied to the households is given. The questions are answered either by the leader of households or the wife/husband of the leader of household. The questions were designed by sociologist, who take part in the project and grouped in eight headlines. In Appendix B, a summary of the questionnarie is given within eight headlines with their possible answers in English translation, their codes in the SPSS data and the codes in the questionnaire. The questionnaire consists of the following parts:

- Surveyors Part
- Demographic Part
- Migration Part
- Economic Indicators Part
- Solidarity Part
- Crime Incidents Part
- Precaution-Security Part
- Attitude Part

The questionnaire answers were prepared in the SPSS and reorganized according to the needs of the study. When comparing the questionnaires with each other, it was noticed that on some questions there were some missing answers. In some of the questionnaires, in

multiple choice questions, the answer was missing or sometimes was not in the list. For example, in question number '03', the answer "işveren" was not used; instead numerous people replied as "retired". Therefore, a new answer choice was created for the answer. After managing the answers, all the SPSS data were converted to the Excel format, since the data were too big to be stored in the SPSS.

A snapshot view from the questionnaire data in the SPSS is seen in Figure 4.2. The questionnaires are coded as questionnaire number (anketno), which is unique to the database, and each questionnaire has also address information such as street number (sokak) and door number of building (binano). These two are the most important pieces of information to convert the questionnaires into graphical data. The answers are given in relation to the codes in the questionnaire sheets. On the first row of the first questionnaires, the raw data means that, the first questionnaire was conducted in the street number 99, and the building number 43 in first neighborhood, which corresponds to 'Yükseltepe'. Within the household 5 people live (topkişi), the person who answered the questionnaire is the daughter- or son-in-law of the household leader (h1nesi). The gender is female (h1cins) and her age is 22 (h1yas). They are from Ankara (h1il) (the number 6 represents the code of Ankara), and from Keçiören district (h1ilnere), which is represented by the number '1'.



	anketno	mahalle	sokak	binano	haneno	v6	topkişi	h1nesi	h1cins	h1yaş	h1il	h1ilnere	o1oku	o1okul	o1hok	v61	o1
1	1	1	99	43	99	3113	5	4	2	22	6	1	1	1	4	11	
2	2	1	99	32	99	3112	2	1	2	21	6	2	1	1	4	11	
3	3	1	98	11	99	3111	5	2	1	32	19	3	1	1	3	8	
4	4	1	96	7	99	3110	5	4	1	21	40	3	1	1	4	11	
5	5	1	96	3/a	99	3109	4	2	1	30	6	2	1	1	1	5	
6	6	1	96	1/a	99	3108	2	2	1	65	19	3	2	2	,	,	
7	7	1	95	12/a	99	3107	4	4	1	19	18	3	1	1	3	8	
8	8	1	94	58	99	3106	5	3	1	17	6	1	1	1	4	3	
9	9	1	94	30	99	3105	2	2	1	61	18	2	2	2	,	,	
10	10	1	94	17	99	3104	6	2	2	26	19	3	1	1	2	8	
11	11	1	93	47	99	3103	5	6	2	65	6	2	1	1	1	3	
12	12	1	92	58	99	3102	5	3	2	19	6	1	1	1	4	11	
13	13	1	92	21	99	3101	6	3	2	28	6	2	1	1	4	11	
14	14	1	92	17	99	3100	4	1	2	27	6	2	1	1	4	11	
15	15	1	91	9	99	3099	2	1	2	69	6	2	1	1	1	3	
16	16	1	87	81	99	3098	7	1	2	57	40	3	1	1	1	4	
17	17	1	87	8	99	3097	5	2	1	32	19	3	1	1	1	5	
18	18	1	85	75	99	3096	4	3	2	27	6	1	1	1	4	11	
19	19	1	85	45	99	3095	4	1	2	34	5	2	1	1	4	11	
20	20	1	85	30	99	3094	6	2	1	34	42	2	1	1	1	5	
21	21	1	85	11	99	3093	6	1	2	31	42	2	1	1	2	8	
22	22	1	84	32	99	3092	4	2	2	20	6	2	1	1	3	8	
23	23	1	84	1	99	3091	4	2	1	23	6	1	1	1	3	6	
24	24	1	83	35	99	3090	2	2	1	60	6	3	2	2	,	,	
25	25	1	83	25/a	99	3089	2	2	1	75	61	3	2	2	,	,	
26	26	1	83	14	99	3088	4	1	2	43	55	2	1	1	1	5	
27	27	1	82	41	99	3087	4	1	1	46	6	3	1	1	1	5	
28	28	1	81	15	99	3086	6	2	1	39	19	2	1	1	1	5	
29	29	1	80	50	99	3085	3	1	2	67	19	2	1	1	1	2	
30	30	1	80	26	99	3084	2	1	2	64	6	3	1	1	1	5	
31	31	1	80	16	99	3083	6	2	1	46	18	3	1	1	1	5	
32	32	1	79	6	99	3082	5	3	2	25	6	1	1	1	4	11	

Figure 4.2 SPSS Data for the Questionnaires, (Source: Developing Crime Prediction Models and Prevention Strategies based on Spatial Analysis in Urban Areas, 2006)

In the SPSS, all the 3000 questionnaires in 9 neighborhoods were organized and later it was decreased to 5 neighborhoods, when it was converted into graphical data by address matching. All the answers of the questionnaires can be seen in the SPSS data view, and all the codes used in the answers can be seen from variable view. In Figure 4.3, it is seen that the second raw 2 "mahalle" is a numeric data and values are coded as "1" = Yukseltepe, "2"

= Sancaktepe, “3” = 19 Mayıs, “4” = Sehit Kubilay, “5” = Etlik, etc. It can be also seen that some of the questions are coded as evet (yes) =”1” and hayır (no) =”0”.

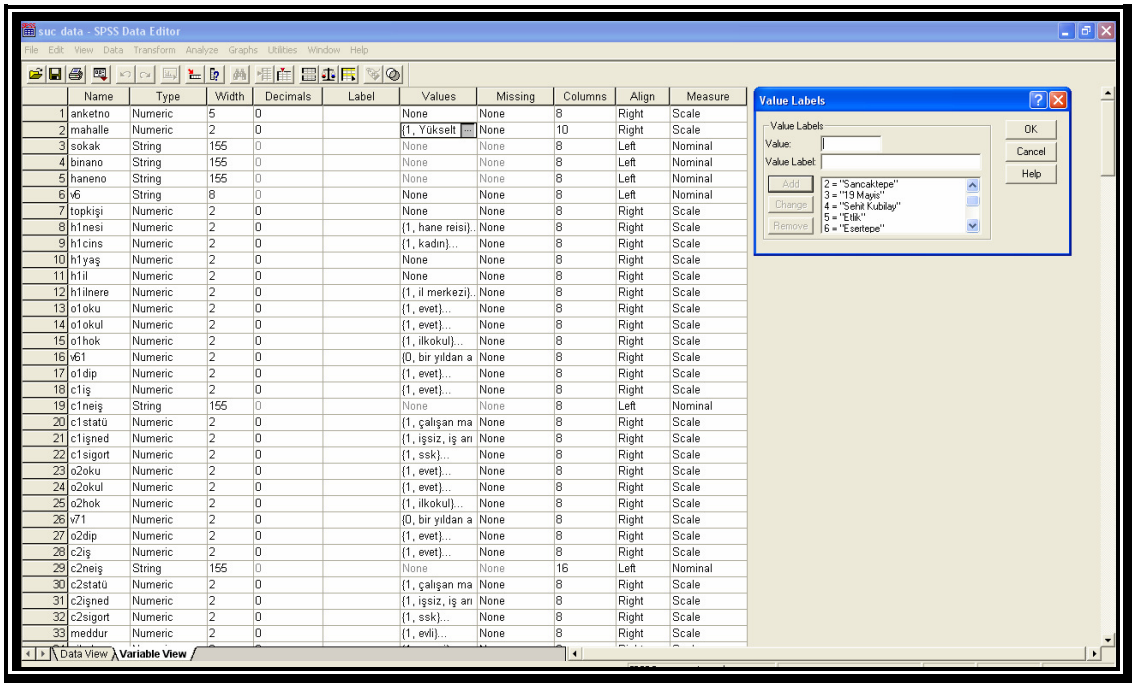


Figure 4.3 SPSS Data Variable View

The most difficult part of the data processing was the address matching of the questionnaires with graphical building data. In building data, there was no information on street names and consequently street information had to be found by using street data in the ESRI ArcGIS 9.2. Since the area is undergoing a reconstruction process, the door numbers of most of the buildings and the street names have been changed. First of all, all the street names are found and updated with the new street/road names in the road data. After 1744 questionnaires are searched one by one in the ESRI ArcGIS 9.2, the address matching is completed between each questionnaire and the related building. In order to match the graphical data with the non-graphical data, a column is added to the attribute data of the buildings and a questionnaire code is given (see Figure 4.4). In Figure 4.5, a map showing all the buildings in five neighborhoods is seen. Here, the dark blue spots represent the buildings to which the questionnaire is applied. As can be seen, the distribution of the questionnares is generally homogenous, except one part. In İncirli neighborhood, near the SSA’s border of İncirli, Etlik, and Aşağı Eğlence districs the number of questionnaires are not adequately distributed.

anketlibinalar

ANKETNO	MAH_KODU_1	MAHALLE	SOKAK	BINANO_1	BINANO_EX	V6	H1NESI	H1IL	H1IL	H2NESI	H2CINS
913	1687	7	37	A1110	8	466	1	50	2	2	1
2103	1687	7	38	A1114	1	468	3	6	1	1	2
920	1687	7	3. cadde	A969	9	449	2	6	1	1	2
924	1687	7	3. cadde	A971	7	442	2	6	2	1	2
905	1687	7	41	A1087	5	485	3	6	1	1	2
2073	1687	7	9	A1189	0	532	1	6	1	8	2
2074	1687	7	8	A1178	0	531	1	6	1	2	1
2095	1687	7	4	A1161	6	478	1	90	0	2	1
2096	1687	7	4	A719	44	477	1	6	1	2	1
2005	1687	7	kardesler 1	A1128	12	647	1	6	2	2	1
2466	1687	7	suleymaniye cad	A1121	38	761	1	58	2	2	1
2567	1687	7	2. cadde	A865	27	411	1	38	1	2	1
2569	1687	7	2. cadde	A861	17	409	2	6	1	1	2
2580	1687	7	15	A1082	2	398	2	6	2	1	2
2560	1687	7	22	A1147	4	418	1	6	2	2	1
2566	1687	7	2. cadde	A855	5	412	1	1	3	2	1
2544	1687	7	26	A881	6	434	2	66	3	1	2
2541	1687	7	27	A866	5	437	2	71	2	1	2
2562	1687	7	21	A878	9	416	1	79	1	2	1
2546	1687	7	25	A871	9	432	1	58	2	2	1
2548	1687	7	25	A876	3	430	1	58	3	2	1
2564	1687	7	21	A1059	10	414	3	6	1	1	2
2543	1687	7	26	A873	9	435	2	6	1	1	2
2547	1687	7	25	A875	5	431	3	6	1	1	2
2552	1687	7	24	A787	21	426	1	6	2	2	1
2554	1687	7	24	A786	19	424	2	33	3	1	2
2573	1687	7	18	A1075	7	405	1	18	3	3	1
2549	1687	7	25	A783	14	429	1	6	2	3	2
2559	1687	7	22	A1074	15	419	2	51	2	1	2
2579	1687	7	15	A1076	5	399	1	32	2	2	1

17 Show: All Selected Records (0 out of 1744 Selected) Options

Figure 4.4 Address Matching – Building Attribute Table

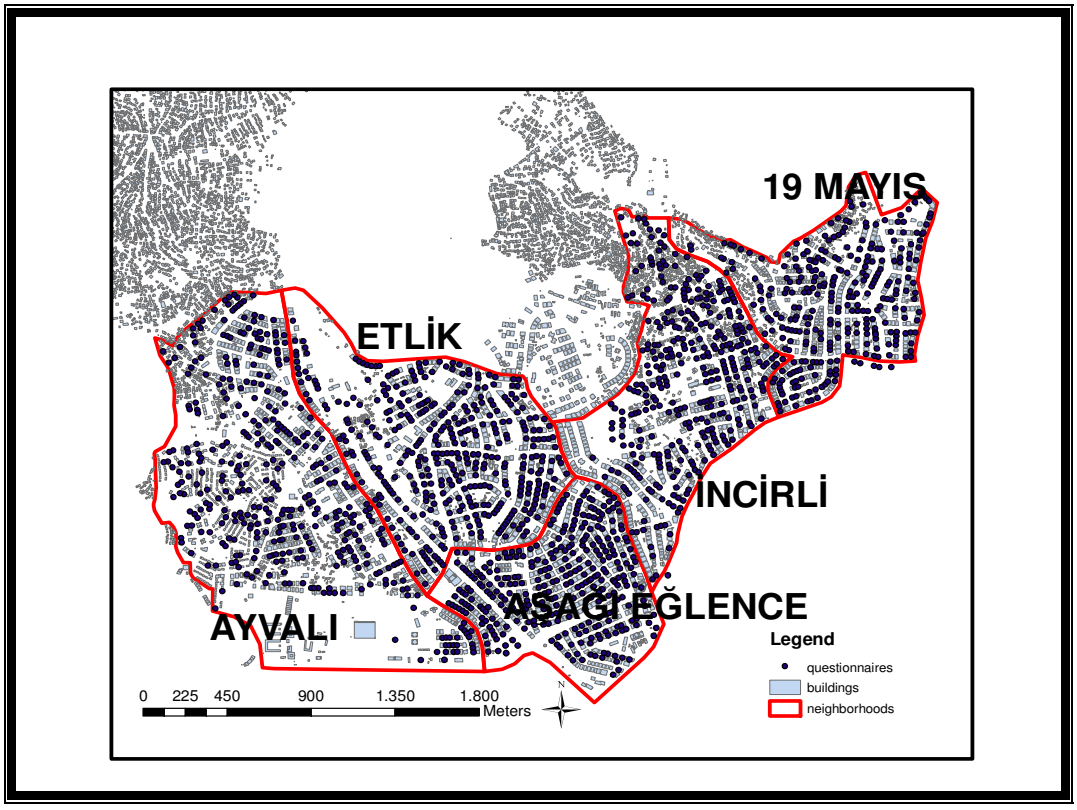


Figure 4.5 Map of the Buildings in Which the Questionnaires were Conducted

4.3. Determination of Geographical Units

The data collected for this study, which provide a great advantage as it was gathered over the households, were to be brought into integrity in itself to conclude an average result. For such a conclusion, the administrative regions (neighborhoods) would be too immense and general. As the neighborhoods' borders for administrative causes are already determined, both social and physical differentiations within them are ignored. Within this context, what was needed is to detect a geographical unit considered in physical segregations caused by the urban structure without losing the precision of the data collected.

In detection of the geographical representation unit, a study conducted in the area by Yavuzoğlu (2009) is used as a reference. She created statistical regions by creating a Socio-Economic Status (SES) index for each building parcel using the ABPRS data taken from TURKSTAT (Appendix C). The criteria considered are homogeneity (showing similar characteristics), similar population size, compactness (distance from center) and appropriate boundaries (rivers, visible roads). She created a SES index for each parcel since all the social and economic indicators are actually correlated with each other and SES gives a summary index for all indicators. To create a SES index, a multivariate analysis method, the PCA, Principal Component Analysis was used by Yavuzoğlu (2009). At the end of her study, Yavuzoğlu grouped the parcels by using Self Organizing Maps (SOM) Clustering, taking SES values into consideration and as a result, small statistical regions (SSA) were created.

Yavuzoğlu (2009) used three different methods for creating the SES index, which are Bards clustering, K-means clustering, and SOM clustering. She made her analysis for parcel and block scales; since the questionnaire unit is households, parcel scaled results are used. At the end of her study, Yavuzoğlu tested all three methods for quality assesment. In Table 4.4, the quality assesment given for parcels in her study is presented.

Table 4.4 Quality Assesment of SSA Creating Methods (Source: Yavuzoğlu, 2009)

	The First Method: Simulated Annealing on K-means clustering	**The Second Method:** K-means Clustering	**The Third Method:** Simulated Annealing on K-means clustering for SOM u-distances
	SSA PLANS FROM PARCELS WITH RAW DATA		
Compactness	0.2256	**0.1432**	**0.2159**
Contiguity	0.924	0.924	**0.912**
Equal Population	**0.0207**	0.0412	**0.0239**
Homogeneity	**2.257**	2.262	**2.253**
Overall Score	**275.62**	278.75	**273.32**
	SSA PLANS FROM PARCELS WITH SES INDICES		
Compactness	**0.2242**	**0.1258**	0.2321
Contiguity	**0.926**	0.927	**0.925**
Equal Population	**0.0223**	0.0392	**0.0223**
Homogeneity	**2.26**	2.28	**2.25**
Overall Score	**274.76**	275.76	**272.77**

As can be seen in Table 4.4, SSA Plans from parcels with SES indexes, the best results are given by the third method. It has the best results for Contiguity, Equal Population, Homogeneity, and Overall score. This method is the worst merely in compactness, which is also not of vital importance for the purpose of this study. As a consequence of the quality assessment of Yavuzoğlu's study, SSA areas based on parcels created by the third method, which was K-means clustering for SOM u-distances, are selected.

As can be seen in Figure 4.6, SSA regions created by Yavuzoğlu (2009) have different cluster sizes. The northern İncirli and western Ayvalı have smaller SSA areas. The main reason of this situation is that the smaller areas have higher densities, which means that they have more dwelling units. To keep equal population principal, these cluster sizes are smaller (Yavuzoğlu, 2009).

The representing geographical units created by Yavuzoğlu (2009) using the third method is seen in Figure 4.6. The number of the areas represents the unique identification number 'BARDPlanD'. As can be seen, there are 103 statistical regions, but since only 98 have questionnaire information, 98 statistical regions are used in this thesis. The neighborhood of Ayvalı has 22 SSAs, while Incirli has 18, Etlik has 23, Aşağı Eğlence has 17, and 19 Mayıs has 18 SSAs. SSAs number 56, 57, 58 and 59 are excluded from the analysis since they do not belong to any of these neighborhoods and SSA100 is excluded because no questionnaire was applied in the region.

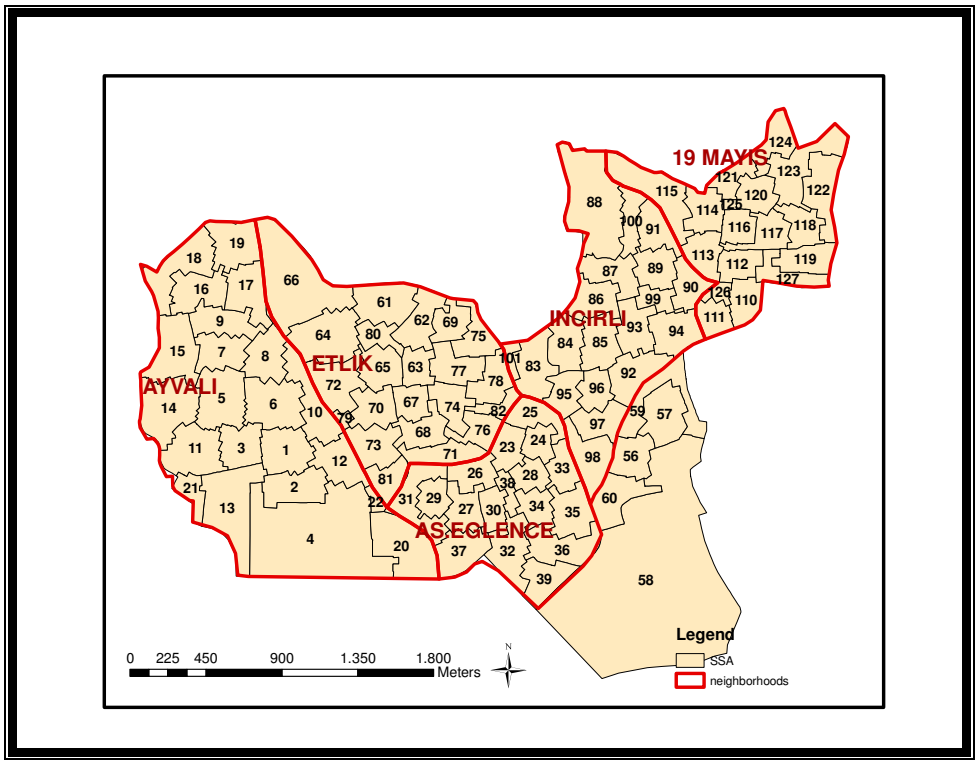


Figure 4.6 Part of Small Statistical Areas, SSA (Source: Yavuzoğlu, 2009)

In Figure 4.7, a view of Attribute Table of Small Statistical Areas is given. BardPlan ID is the unique code for small statistical areas. It is also seen that the population of each region is available.

Attributes of parcel_third_merge_ses_Spati1

FID	Shape	BARDPlanID	SUM_POP	MEAN_UDIST	MAX_BARDPI	MEAN_C_ind	STD_C_ind
0	Polygon	1	2124	0,049922	1	-0,376592	1,656378
1	Polygon	2	1992	0,047041	2	0,179793	1,846968
2	Polygon	3	1988	0,042154	3	-1,078262	1,441528
3	Polygon	4	1968	0,048083	4	-0,474994	2,409017
4	Polygon	5	1968	0,050733	5	-2,112907	1,452048
5	Polygon	6	1984	0,050537	6	-1,136666	1,928093
6	Polygon	7	1968	0,058265	7	0,80254	2,223265
7	Polygon	8	2184	0,060334	8	-0,562558	2,133641
8	Polygon	9	2056	0,051521	9	-0,166175	2,09668
9	Polygon	10	2000	0,055899	10	-0,879407	2,06068
10	Polygon	11	2232	0,038181	11	-1,19895	1,87173
11	Polygon	12	2136	0,052499	12	-0,596237	1,620813
12	Polygon	13	1980	0,039069	13	-1,071418	2,147367
13	Polygon	14	1972	0,049469	14	-1,835536	1,650822
14	Polygon	15	2032	0,053106	15	-1,267344	1,810087
15	Polygon	16	2028	0,049816	16	0,137985	2,406236
16	Polygon	17	2220	0,053642	17	0,089338	2,248741
17	Polygon	18	2048	0,052088	18	-1,304141	2,500062
18	Polygon	19	2320	0,053738	19	0,288098	1,613979
19	Polygon	20	3060	0,058059	20	0,550547	4,188703
20	Polygon	21	928	0,036397	21	-1,79355	1,221363
21	Polygon	22	184	0,051929	22	-0,527291	1,591478
22	Polygon	23	2064	0,050345	23	2,318405	2,588568
23	Polygon	24	2008	0,048524	24	2,141271	2,463322
24	Polygon	25	2020	0,046589	25	1,855316	2,082663
25	Polygon	26	2076	0,052248	26	1,059531	2,222206
26	Polygon	27	1996	0,052825	27	0,574295	2,157787
27	Polygon	28	2036	0,047042	28	2,38394	2,316574
28	Polygon	29	2016	0,053534	29	1,584833	1,763448
29	Polygon	30	2020	0,050044	30	2,379344	1,848878
30	Polygon	31	2224	0,053312	31	1,143806	2,205159

Record: 1 Show: All Selected Records (0 out of 103 Selected)

Figure 4.7 Attribute Table of Small Statistical Areas

4.4. Indexing Non-physical Parameters with Principal Component Analysis

Quetelet found out almost 200 years ago that in wealthy communities there were more properties to experience crime, because there were more properties to steal (Vold, Bernard and Snipes, 2002). Socio-economic status between classes does not reflect crime, yet it has an effect on the risk of residents who are subject to criminal behavior (Hall, 2007). Numerous studies demonstrate the relationship between crime and economic conditions. Arthur (1991)in Hall,2007 finds a positive correlation between crime rates and socio-economic factors. DeFronzo (1997) also shows a correlation between welfare and crime (Arthur (1991) and DeFronzo (1997) in Hall 2007:9). "The socio-economic indices summarize social and economic conditions over a wide variety of indicators into a single composite index" (Kashaninia, 2013:2). In Turkey a socio-economic status index model was developed by Kalaycıoğlu et al. (2010) aiming to determine different groups in society, the criteria which determine the social groups and evaluate the groups' socio-economic properties. Socio-economic status is defined as households/individuals' positions in social hierarcy by Kalaycıoğlu et al. (2010:192). The study was applied for the center of Ankara, Altındağ, Çankaya, Etimesgut, Keçiören, Mamak, Sincan, Yenimahalle and Gölbaşı districts. A questionnaire was applied to 2400 randomly selected households, and 1769 samples were used. The questionnaire was applied face to face to a resident in the household who was between 18 and 69 years old. The measurement unit of the method is "household", which is defined as the group of people living in the same part of a housing unit, who share the costs and income regardless of their blood relation. Different family members sharing the same house, like student houses are disregarded in this study, due to the fact that different families belong to different socio-economic status groups. In order to measure the socio-economic status of the households, the following variables are used:

1. Education: Avererage number of education years for all the household members. Education years for people aged over 15. Education years who left school before the age of 15. As the average year of education increases, the SES rises.
2. Income: Salaries, social help, retirement payments, veteran help, dower. As the income increases, the SES rises.
3. Occupation: A status point is calculated for different occupations, concerning their income and education year. As the work status point increases, the SES rises.
4. Ownership: The ownership of the house in which they live. The ownerhip of another house. The ownership of automobile. As ownership increases, the SES rises.
5. Ownership of other properties: The ownership of a radiator, washing maschine, more than two televisions, a DVD player, Internet. As ownership increases, the SES rises.

For education, income, mean, min-max values and standard deviations are calculated. For ownership and ownership of properties, one point is given for each property owned and all the ownerships are summed. For occupation, the work status is grouped under 15 headlines and a status point is calculated for each category. To calculate the status point, first of all, the years of education and income is calculated for each household. The correlation between income and education year is tested and a new variable is created for each household that has

a job using the linear regression technique. In order to calculate SES index values, multiple regression analysis is used and the SES values are calculated with equation 4.1, and then grouped into five different SES categories (Kalaycıoğlu et al., 2010).

SES= (b1)+(Av. Education year x b2) + (Income x b3) + (Ownership of house x b4) + (ownership of second house x b5) + (automobile x b6) + (radiator x b7) + (dishwasher x b8) + (2nd TV x b9) + (dvd player x b10) + (internet x b11) + (occupation status point x b12)

b = standarized coefficient = weights associated with each variable
Equation 4.1

The results of study by Kalaycıoğlu (2010) showed that as the occupation status, education years and ownership increases, the SES rises.

In this part of the study, it is aimed to define socio-demographic and economic parameters which have an influence on crime victimization (burglary, robbery, car theft, pickpocketing, etc.). This kind of analysis requires high dimensional data sets which are difficult to interpret. In this concern, univariate statistical techniques can be restrictive. A great number of variables should be considered, yet not all of them may be needed. The dimension of the data set should be reduced, and different weights should be given to different variables, since they do not effect the phenomena in the same way; moreover, these variables are most probably correlated. The variables with high correlation should be reduced into other subsets; this reduction will keep the most meaningful original data with most effective data variables and remove highly correlated ones. For this kind of datasets it is common to use multivariate statistical methods. In this study, a multivariate statistical technique, namely the Principal Component Analysis, PCA, is used.

The Principal Component Analysis is a multivariate statistical technique which creates components or uncorrelated indices, where each component is a linear weighted combination of the variables. For variables from X1 to Xn, the linear equation is:

PC1 = a11X1 + a12X2 +…….+ a1nXn
PCm = am1X1 + am2X2 +……+ amnXn
Here amn represents the weight of Principal component “m” for variable “n”.

The PCA reduces the number of variables into smaller sets of variables. The number of variables shows the dimension of the analyis. The weight for each principal component is given by the eigen vectors of the correlation matrix, or if the original data are standardized, the co-variance matrix (Vyas and Kumanayake, 2006). Figure 4.8 shows two eigen vectors of the co-variance matrix, scaled by the square root of the corresponding eigen value, and shifted so that their tails are at the mean.

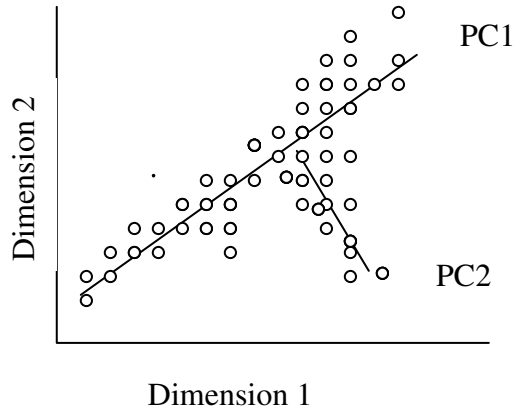


Figure 4.8 Eigen Vectors of PCA

The variance of each component is given by the eigen value of the eigen vector. The sum of the square weights of eigen vectors are equal to "1". The Principal Component explains the largest possible amount of variation in the data and the Principal Component 2 explains additional but less variation than the first component. Each component is uncorrelated with the previous component; therefore each component captures an additional dimension of data but with smaller variations. If the the correlation among the variables is high, fewer components are required to capture information (Vyas and Kumanayake, 2006).

The common use of PCA is in spatial studies which consist of spatial objects like irregularly spaced points used in environment sampling measures or samples in boundaries like neighborhoods which measure the properties of the sample at the location (Demsar et al., 2012). In this study, to prepare the variables for the analysis, for eight different headlines, related questions are selected and grouped. Different index headlines have different numbers of variables. The PCA gives different weights for each variable, and the result of the first component is used to create a single index value. It is common to select components with eigen values higher than 1.

The final variables thus were found after the first PCA analysis was run. For instance, economic index variables were 34 and the results of the PCA showed that six of these variables had less than 10% weight on the phenomena; therefore they can be reduced to 28 variables. Another method was to check the standart deviations among the variables and the correlations among the variables, because variables with lower standart deviation would carry lower weights in the analysis.

In order to use the analysis and interpretation capabilities of GIS, geographical information system software ARC_GIS 9.2.is used. The PCA is suitable for raster data in Arc GIS, since the data is in vector format. A VBScript Macro called "STAT TOOLS" script file from ESRI's ArcScripts website via VBScript macro language is provided. The script is loaded as

a .dll (dynamic link library) file under Windows Operating System, and with the help of the script additional to raster data, it is possible to use the analysis for vector data.

In the analysis, the representation unit was selected as SSA, statistical regions which were given in Figure 4.6. The questionnaire unit is household, but the building info is too detailed for such a study, so the results may be lost among details, whereas neighborhoods will be very small scale and will not show the differences throughout the region. In order to apply the PCA for SSA, the variables are needed to be counted. Therefore, in order to sum all the variables for all statistical areas, the variables are recorded as YES-1, NO-0. The total number of answers is found for each area. In Appendix D, a snapshot from the attribute table of buildings is given, answers for the column "who owns the house" (ev kimin) are from 1 to 5, whereas variables like radiator (kalorifer), Internet, and Digiturk are either 1 or 0. If the household has Internet connection, the answer is coded as 1, whereas it is coded as 0 if Internet does not exist.

In Appendix E, as it is seen in the snapshot of table of small statistical areas, the answers in all statistical areas are counted and written in the attribute table of SSA. In order to make calculations, the area and buildings were combined by the "spatial join" tool of ArcGIS and afterwards all the answers were written as 1 or 0 and they were dissolved again. The dissolve tool brought about the answers grouped in SSAs according to BARDPlan ID.

It is seen in Appendix E that for the statistical region 1, unique code is represented by 1 in column BARDPLan_1, 17 households declared that they are the owner of their houses, whereas three of them declared that they are tenants. Sum_evtur (sum of building type) shows that all 20 houses in the region are flats, while SUM_kalori (sum of radiators) shows that all 20 houses are heated by radiator.

In Appendix E, the columns of the table show population, number of questionnaire applied in SSA region, the total number of people represented in the sample (it is derived from the question, "how many people live in the household?"), the average number of people in households (the mean of population of households in the survey is taken), and the number of households in the region (since the population and the average number of people in households are known, the total number of households is calculated by simply dividing the population by the average population in households). It is seen in yellow printed areas that the number of questionnaires is not equally distributed in the regions. For example, SSA2, represented by BARDPlanD=2, has a population of 1992 (derived from the ABPRS data), with 608 households (the estimated calculation); the region is represented by 11 samples (questionnaires), whereas BARDPlanD=13 has a lower population, which is 1980, and there are an estimated 551 households in the region, but it is represented by 17 questionnaires. In this case, if both SSAs have 10 burglary victimization cases, the rate will be 90% for SSA2, but 58% for SSA13. For that reason, a scale correction had to be used for the SSAs, which is Equation 4.2.

Scale Correction: (A x B) / C
A: # of Answers
B: number of questionnaires
C: number of households in region

Equation 4.2

In Appendix F, the last column "Survey/HHolds" is the scale correction number for each SSAs. All the sums of the answers to the questions in the survey for each SSA are calculated, then multiplied with this constant and the scale correction is performed. Appendix G shows an example of the calculation from SSA1. 17 households said that they own their houses. SUM_evkim is used as variable for that answer after the scale correction R_owner = 0,646. The values of the rated variables are used in the next part, as variables for the Principal Component Analysis.

4.5. Quality Assesment-Comparing SES Index with ABPRS data and Survey Data

In order to test the reliability of the data used, two SES indexes are computed with the same methodology but using the ABPRS data (Address Based Population Registration System), obtained from the Turkish Statistical Institute and the survey data. The two variables common in both indexes are derived as "being illeterate", "education" and "income". The education and income variables are reorganized to create a common database. In both indexes, the education variable is given as "graduated from primary school (which is 1-5 and 1-8 years of education), "graduated from high school" (8-12 years of education), and "graduated from university or higher degree" (including graduate, master and doctorate studies). Income variables are grouped as "below 500 TL", "500-1000 TL" and "above 1000 TL". Two different SES indexes are created by using the Principal Component Analysis technique, the results of two indexes are mapped and compared in order to derive the SSAs which do not coincide. During the comparisons, SSA60 is excluded from the analysis since there is no ABPRS data for the area.

4.5.1 Socio-Economic-Demographic Index with ABPRS Data

The ABPRS is a system in digital platform which is used to store and update the Turkish population and address data. The difference of this system from population census studies is that it is updated regularly. With the help of this technology, old-style population census studies in which outdoor existence was restricted are no longer the case. Since all the entries are coded with the unique "Turkish Identification Number", it is not possible to avoid being registered in the system. In Appendix C, the household information form is given. The questions consist of general information about household, income level, income source and education level. Figure 4.9 and Figure 4.10 show the part of the form which gives the address information and general information. In both parts, address information, name, surname, nationality, and citizen number are asked, respectively.

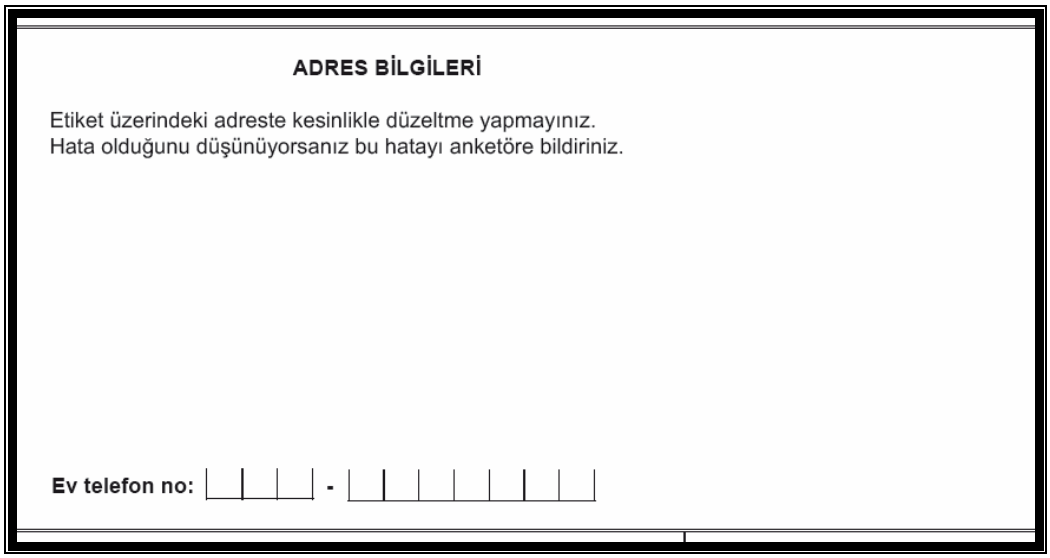


Figure 4.9 ABPRS Address Information Part

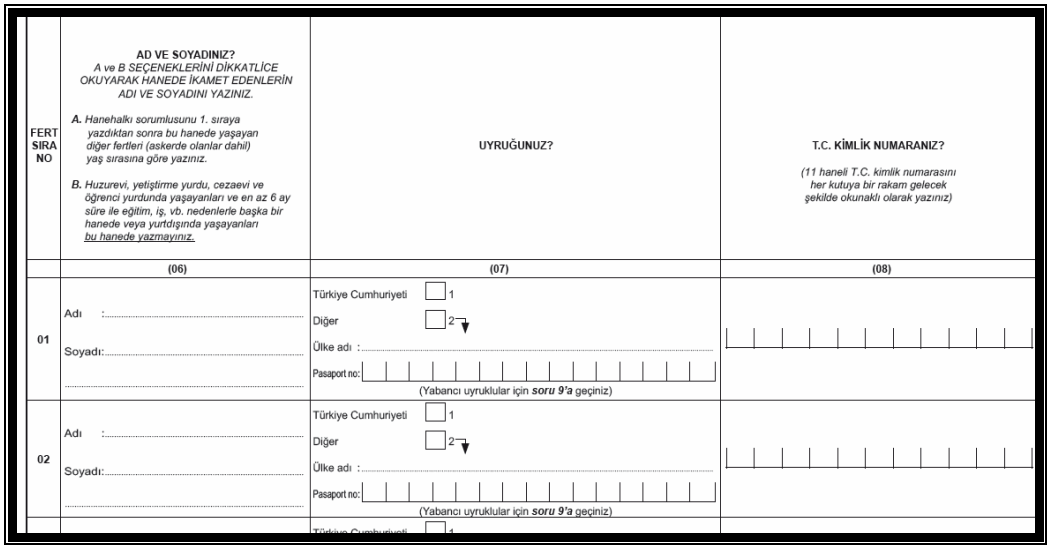
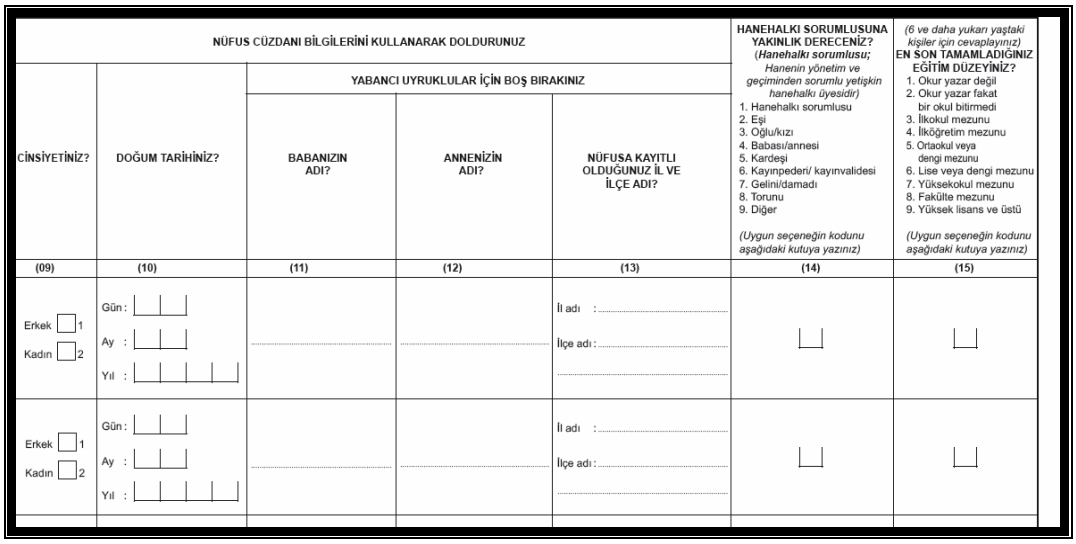


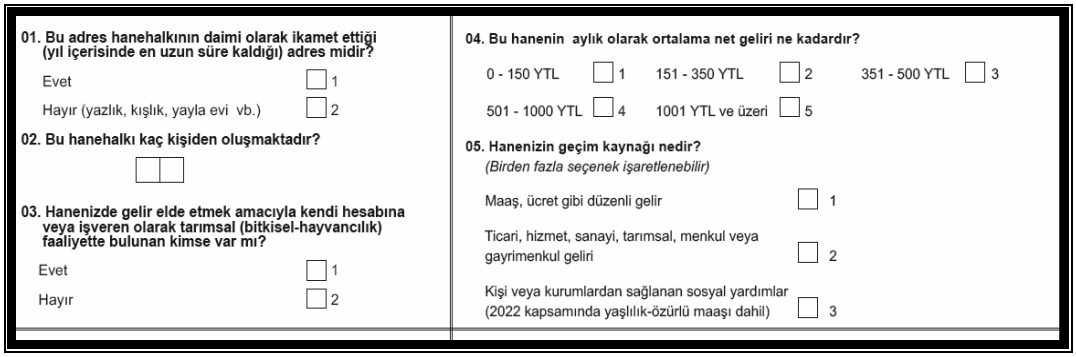
Figure 4.10 ABPRS General Information Part

Figure 4.11 shows the questions about Gender (09), Date of Birth (10), Father's Name (11), Mother's Name (12), Registered City and Province Name (13), Relation with Household Head (14), and Education Level (15). Figure 4.12 consists of questions about Income Level (04) ve Income Source (05).



NÜFUS CÜZDANI BİLGİLERİNİ KULLANARAK DOLDURUNUZ					HANEHALKI SORUMLUSUNA YAKINLIK DERECENİZ? (*Hanehalkı sorumlusu; Hanenin yönetim ve geçiminden sorumlu yetişkin hanehalkı üyesidir*)	*(6 ve daha yukarı yaştaki kişiler için cevaplayınız)* EN SON TAMAMLADIĞINIZ EĞİTİM DÜZEYİNİZ?
		YABANCI UYRUKLULAR İÇİN BOŞ BIRAKINIZ				
CİNSİYETİNİZ?	DOĞUM TARİHİNİZ?	BABANIZIN ADI?	ANNENİZİN ADI?	NÜFUSA KAYITLI OLDUĞUNUZ İL VE İLÇE ADI?	1. Hanehalkı sorumlusu 2. Eşi 3. Oğlu/kızı 4. Babası/annesi 5. Kardeşi 6. Kayınpederi/ kayınvalidesi 7. Gelini/damadı 8. Torunu 9. Diğer *(Uygun seçeneğin kodunu aşağıdaki kutuya yazınız)*	1. Okur yazar değil 2. Okur yazar fakat bir okul bitirmedi 3. İlkokul mezunu 4. İlköğretim mezunu 5. Ortaokul veya dengi mezunu 6. Lise veya dengi mezunu 7. Yüksekokul mezunu 8. Fakülte mezunu 9. Yüksek lisans ve üstü *(Uygun seçeneğin kodunu aşağıdaki kutuya yazınız)*
(09)	(10)	(11)	(12)	(13)	(14)	(15)
Erkek ☐ 1 Kadın ☐ 2	Gün : ☐☐ Ay : ☐☐ Yıl : ☐☐☐☐	.....	.....	İl adı : ..... İlçe adı :	☐	☐
Erkek ☐ 1 Kadın ☐ 2	Gün : ☐☐ Ay : ☐☐ Yıl : ☐☐☐☐	.....	.....	İl adı : ..... İlçe adı :	☐	☐

Figure 4.11 ABPRS Population Part



01. Bu adres hanehalkının daimi olarak ikamet ettiği (yıl içerisinde en uzun süre kaldığı) adres midir?

Evet ☐ 1

Hayır (yazlık, kışlık, yayla evi vb.) ☐ 2

02. Bu hanehalkı kaç kişiden oluşmaktadır?

☐☐

03. Hanenizde gelir elde etmek amacıyla kendi hesabına veya işveren olarak tarımsal (bitkisel-hayvancılık) faaliyette bulunan kimse var mı?

Evet ☐ 1

Hayır ☐ 2

04. Bu hanenin aylık olarak ortalama net geliri ne kadardır?

0 - 150 YTL ☐ 1 151 - 350 YTL ☐ 2 351 - 500 YTL ☐ 3

501 - 1000 YTL ☐ 4 1001 YTL ve üzeri ☐ 5

05. Hanenizin geçim kaynağı nedir?

(Birden fazla seçenek işaretlenebilir)

Maaş, ücret gibi düzenli gelir ☐ 1

Ticari, hizmet, sanayi, tarımsal, menkul veya gayrimenkul geliri ☐ 2

Kişi veya kurumlardan sağlanan sosyal yardımlar (2022 kapsamında yaşlılık-özürlü maaşı dahil) ☐ 3

Figure 4.12 ABPRS Income Part

From the answers given to the ABPRS information form, the variables listed below are prepared and reorganized to create variables common with the survey data. The ABPRS data can be taken with special permission. Therefore, the data and variable codes are derived from Yavuzoğlu (2009). In Table 4.5, variable lists derived from Yavuzoğlu (2009) and in Table 4.6 reorganized variables used in SES indexing are given.

Table 4.5 Variable List in ABPRS Data

VARIABLE CODE	DESCRIPTION
E1	Number of illiterate people
E2	Number of literate people that did not attend any school
E3	Number of person that is graduated from primary school (5 years)
E4	Number of person that is graduated from primary education (8 years)
E5	Number of person that is graduated from secondary school (5+3 years)
E6	Number of person that is graduated from high school (11-12 years)
E7	Number of person that is graduated from university
E8	Number of person that have a masters degree
E9	Number of person that have a doctorate degree
E10	Number of person whose education level is not known
A1	Number of person whose income is between 0 and 150 TL
A2	Number of person whose income is between 151 and 350 TL
A3	Number of person whose income is between 351 and 500 TL
A4	Number of person whose income is between 501 and 1000 TL
A5	Number of person whose income is 1001 and more
A9	Number of person whose amount of income is unknown

Table 4.6 ABPRS Variables used in SES Indexing

VARIABLE CODE	DESCRIPTION
E1	Number of illiterate people
E2	Number of person that is graduated from primary school – primary education or secondary education (5-8 years)
E3	Number of person that is graduated from high school (11-12 years)
E4	Number of person that is graduated from university or higher degree
A1	Number of person whose income is below 500 TL
A2	Number of person whose income is between 501 and 1000 TL
A3	Number of person whose income is 1001 and more

Table 4.7 shows the total number of answers counted for each SSA. In the next step, the Principal Component Analysis is run to create a single SES index and the first component is taken as the index value. In Figure 4.13 the SES index map created by the ABPRS data is given. The index values are mapped in five groups with *natural break method* [(1)]. (-) values of PCA1 and lightly shaded areas represent higher socio-economic status, while (+) PCA1 values and darkly shaded areas represent lower socio-economic status. It is seen that Aşağı

Eğlence, Etlik and Northern parts of İncirli neighborhoods have higher socio-economic status, whereas Ayvalı neighborhood, the western parts of İncirli and 19 Mayıs neighborhood have lower socio-economic status.

Table 4.7 ABPRS Database Showing Total Number of Answers in each SSA

BARDPlanID	E1	E2	E3	E4	A1	A2	A3
1	9	103	44	31	53	87	46
2	2	65	42	33	23	67	52
3	4	69	53	36	32	77	56
4	9	98	55	54	53	94	74
5	0	32	23	35	11	28	52
6	7	90	39	28	28	80	54
7	7	98	53	30	39	102	53
8	7	118	52	28	56	93	59
9	3	66	34	18	28	56	41
10	3	104	50	27	43	91	55

(1) Natural Break Classification: Data classification method, which seeks to reduce the variance within the classes and maximize between classes (Jenks, 1967).

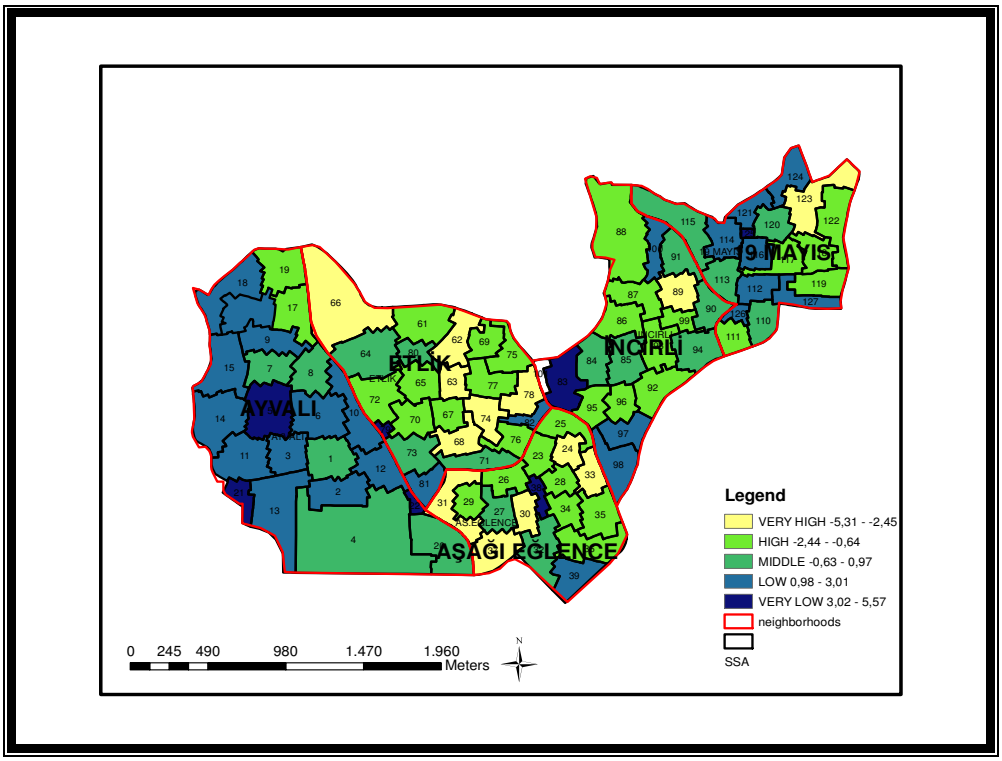


Figure 4.13 Spatial Distribution of Socio Economic Status (SES) Index with ABPRS Data

4.5.2. Socio-Economic-Demographic Index with Survey Data

In this part, socio-demographic and economic variables derived from survey data are considered together to create a socio-economic-demographic index. In the survey data there are 51 variables which are related to the socio-economic and demographic status, but in order to compare with the ABPRS data, seven variables are used in creating the SES index. In Table 4.8, the variables of the survey data are seen. In the survey data, the answers of income level are coded as “below 500 TL”, ”501-1000 TL”, “1001-2000 TL”, “2001-4000 TL”, and “above 4000 TL”; the last three income groups are grouped together and a variable of “income above 1000TL” is created to achieve the same income range as the ABPRS data. The rest of the variables are also evaluated with descriptive statistics.

Table 4.8 Survey Variables used in SES Indexing

VARIABLE CODE	DESCRIPTION
okumabil	Number of illiterate people
Sos_ilk	Number of person that is graduated from primary school – primary education or secondary education (5 – 8 years)
Sos_high	Number of person that is graduated from high school (11-12 years)
Sos_univ	Number of person that is graduated from university or higher degree
orgelir	Number of person whose income is below 500 TL
orgelir1	Number of person whose income is between 501 and 1000 TL
in1000us	Number of person whose income is 1001 and more

The Principal Component Analysis is run and using the first Principal component, a SES Index is created and mapped in five groups. In Figure 4.14, the map of survey SES Indexes is given. The dark blue areas represent low level of socio-economic status, whereas light colored areas demonstrate the highest socio-economic status. In the border of Etlik and Ayvalı neighborhoods, which is along the northern parts of Etlik Street, the socio-economic index shows medium and high results. The western border of İncirli neighborhood and the northern parts of 19 Mayıs neighborhood have the lowest socio-demographic-economic status. In the northern section of İncirli neighborhood, the light green and yellow colored areas are the ones which were reconstructed through the redevelopment plan of the region has high SES.

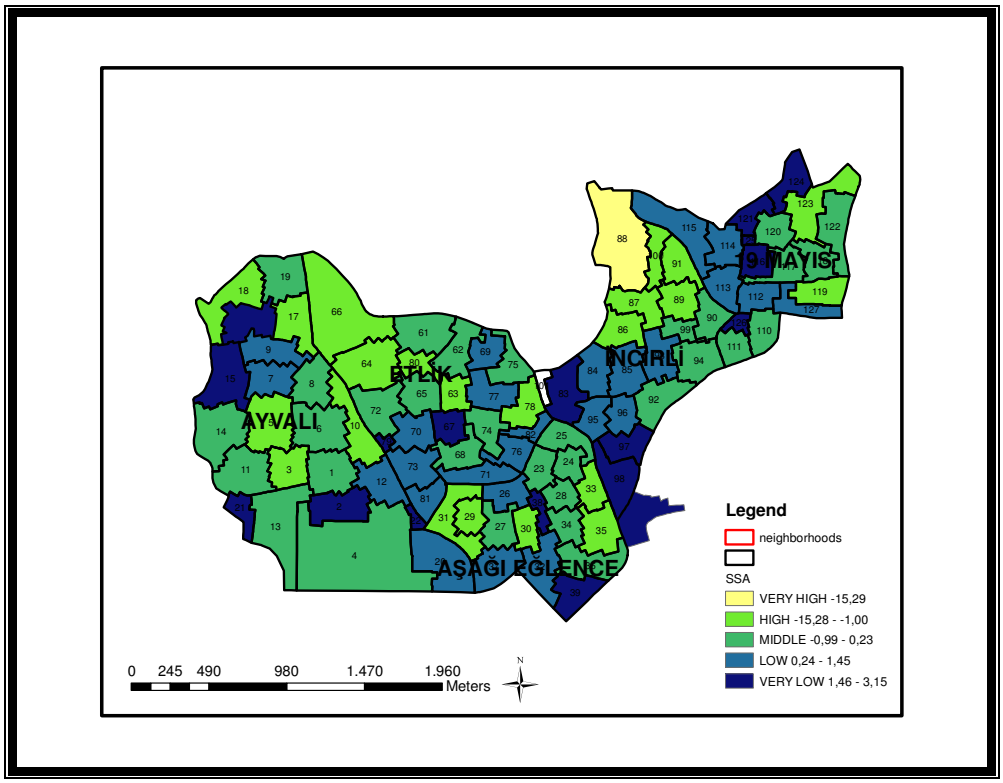


Figure 4.14 Spatial Distribution of Socio-Economic - Demographic (SES) Index

When two maps created from SES Indexes are compared, the SSAs which belong to the same SES group or the two closest SES groups are considered as valid areas, whereas those SSAs which belong to other groups are considered as "invalid SSAs". For example, the SES Indexes are grouped as "Very High", "High", "Middle", "Low", and "Very Low" according to their first Principal component using the "Natural Breaks" categorization technique in Arc Map. SSA1 belongs to the middle SES group in both maps, SSA2 belongs to the SES group "very low" in the survey SES Index map and belongs to "low" SES group in the ABPRS SES Index map. These two SSAs are considered as valid SSAs, but SSA5 belongs to the "high" SES group in the survey SES Index map and belongs to the "very low" SES group in the ABPRS SES Index map. Therefore, it is considered as an "Invalid SSA". Figure 4.15 shows the comparison map showing three invalid SSAs. The comparisons show that SSA5, SSA37, and SSA67 are invalid areas and these areas are therefore excluded from the micro analysis, which will be explained in the next chapter.

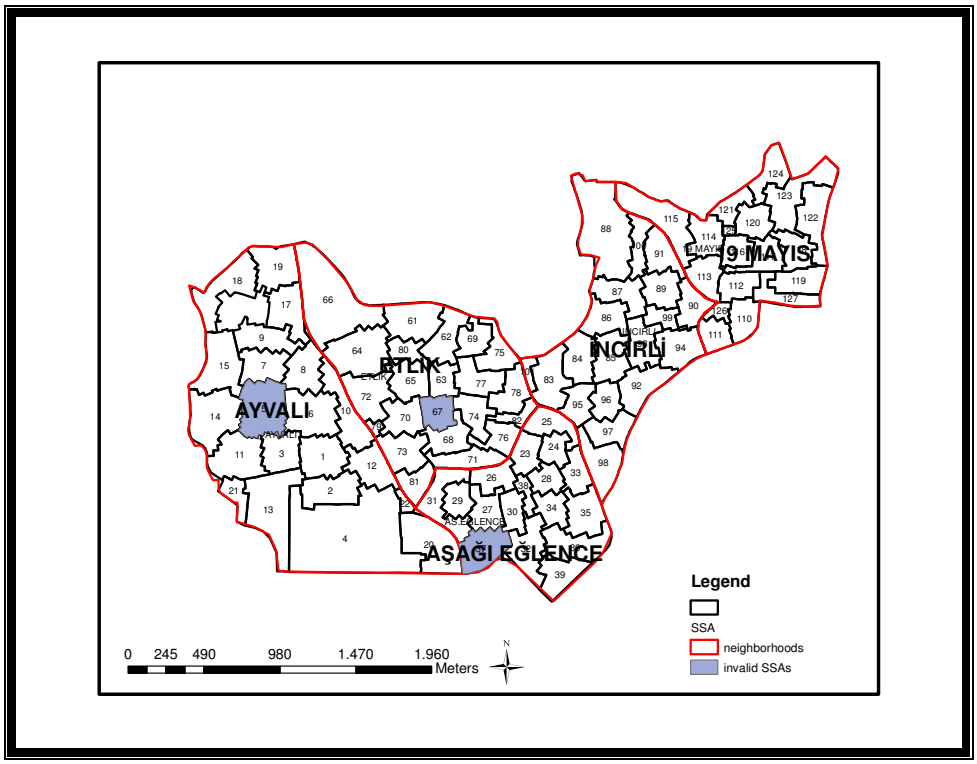


Figure 4.15 Comparison Map of SES Indexes, Survey versus ABPRS

When the reasons of these differences are evaluated, it is seen that the problems are generally caused by sampling due to the mixed type of buildings, such as squatters existing together with apartments. When the rates of the income and education levels are evaluated, it is seen that SSA37 and SSA67 have differences in the rates of "income above 1000 TL" (Table 4.9).

Table 4.9 Comparisons of variables for Invalid SSAs

	Rate of income Below 500 TL		Rate of income 500-1000 TL		Rate of income Above 1000 TL	
	Survey	**ABPRS**	**Survey**	**ABPRS**	**Survey**	**ABPRS**
SSA5	13%	12%	30%	30%	56%	57%
SSA37	5%	12%	27%	33%	66%	51%
SSA67	0%	28%	57%	40%	43%	32%

In Figure 4.16, a satellite image of IKONOS for 2008 can be seen. Here, SSA5 is a part of urban development area. Since the area is a reconstruction region, not all the squatters are represented in the survey, and the number of samples from squatters is not enough. This causes deviations in the results. In SSA37, there is a high-storey residential site with four buildings each having 13 floors and 52 households. The site is represented with 2 samples. On the other part of the region, which belongs to the beginning of Etlik Street, there are two samples, and behind it four samples exist. The number of samples compared with the

number of households in the buildings creates a mismatch in this region. The housing site belongs to a higher income group, yet the number of samples used in these high-storey residential units are not enough to represent the area.

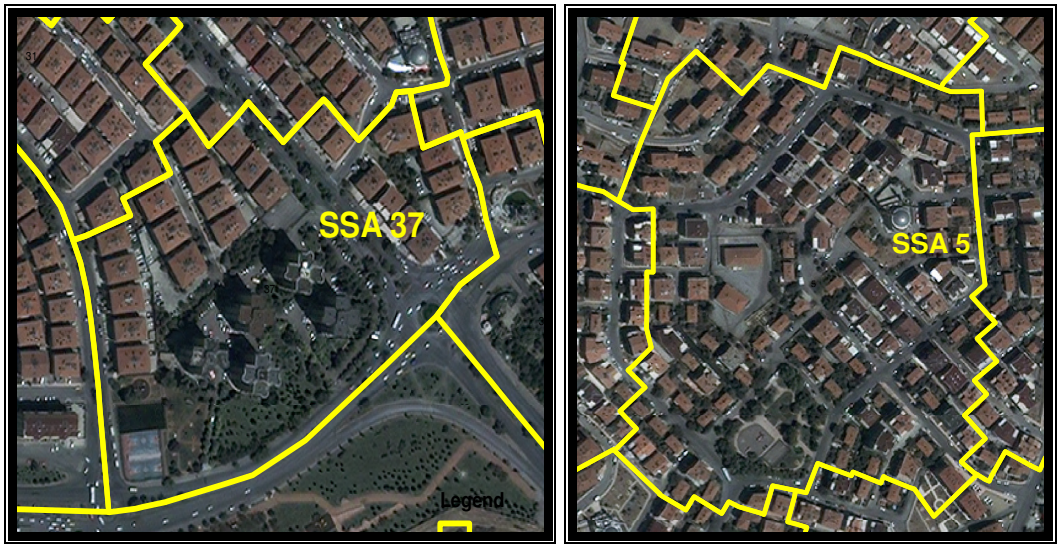


Figure 4.16 Satellite image for SSA5, and SSA37

4.6 Principal Component Analysis for Eight Headlines

In this part of the study, for eight headlines, the PCA calculations, which explain 90% of the cumulative percentage of the total variance, are given. All the list of variables and their weights on PCA1 and PCA2 are given. The variables which have a higher weight effect on the analysis are colored with grey, whereas the variables with a lower weight are colored with yellow. Later, the results are used in order to reduce the number of variables in further analysis.

4.6.1. PCA for Socio-Demographic Variables

PCA results show that PCA1 explains 60.69% of the total variance and 91.3% of the cumulated total variance is explained by the 7th PCA (Table 4.10). The variable list shows that the dimension of multivariate space is 17, and variables such as or_okumab (literate), or_ilkoku (graduated from primary school), or_lise (graduated from high school), or_evli (married), or_hicoku (employed), and or_magdur (number of people in household) have approximately 30% negative weight. or_okulag (attended school) and or_stat03 (to be the owner of business) do not have a considerable effect on the analysis (Table 4.11).

Table 4.10 PCA Calculations for Socio-Demographic Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7	
Eigen values:	10.32	1.34	1	0.9	0.71	0.63	0.56	…..
% of total variance explained	60.69	7.88	5.88	5.3	4.18	3.72	3.32	……
Cumulated % of total variance explained	60.69	68.58	74.46	79.76	83.93	87.66	90.97	…..

Table 4.11 Eigen Values and Weight of Variables for Socio-Demographic Indexing

Dimension of the multivariate space : 17					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
or_okumab	Literate	0.61	0.42	-0.31	-0.03
or_okubil	illiterate	0.02	0.03	-0.17	-0.34
or_ilkoku	graduated prim.sch	0.28	0.21	-0.28	0.06
or_lise	graduated high.sch	0.2	0.16	-0.27	-0.13
or_univ_u	gratuated university	0.13	0.11	-0.23	-0.02
or_okulag	attended school	0	1	0	0
or_diplom	diploma	0.54	0.39	-0.31	-0.02
or_evli	married	0.55	0.38	-0.31	-0.01
or_bekar	Single	0.08	0.07	-0.24	-0.26
or_hicoku	workıng	0.61	0.41	-0.31	-0.02
or_magdur	# people iıve in house	2.34	1.62	-0.31	0.01
or_stat01	Salary	0.11	0.22	-0.21	0.45
or_stat02	Paid	0.12	0.1	-0.23	-0.03
or_stat03	business owner	0	0.01	-0.05	0.75
or_stat05	Workalone	0.05	0.05	-0.2	0.15
or_statdig	other jobs	0.02	0.03	-0.21	-0.06
or_staemek	Retired	0.02	0.05	-0.24	0.09
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.06	0.01

4.6.2. PCA for Economic Variables

In “Economic Index”, parameters which are assumed to show the wealth of the household were used. These parameters were “the ownership of the house (rent, owner)”, ”type of house (flat, villa, squatter)”, ”having a radiator system”, “separate baths”, “Internet”, “Digiturk”, “more than 1 TV”, “dish-washer”, “computer”, “DVD player”,”the ownership of real estate property (flat, one house, more than one house, garden, field, building lot, cooperative)”, “the ownership of an automobile”, “income”, “the need for financial support”, “the perspective of the household to the economic situation in recent years”, and “unemployment”.

The PCA results for economic variables show that PCA1 explains 60.99% of the total variance and 89.6% of the cumulated total variance is explained by the 10th PCA (Table 4.12). The variable list shows that the dimension of multivariate space is 34, and the variables colored with grey have a higher weight than the variables colored with yellow. It is seen that variables such as “building type = house”, “number of fields”, “land”, “gardens”, “land” and “cooperative housing” have a weight between -0.04 and -0.07, which is very low and the variables which have weight smaller than absolute value of 0.20 do not have strong effect on the phenomena. (Table 4.13).

Table 4.12 PCA Calculations for Economic Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7	PCA8	PCA9	PCA10
Eigen values:	20.74	1.87	1.41	1.22	1.15	1.06	1	0.77	0.67	0.57
% of total variance explained	60.99	5.51	4.14	3.6	3.37	3.12	2.94	2.28	1.97	1.69
Cumulated % of total variance explained	60.99	66.5	70.63	74.23	77.6	80.72	83.66	85.94	87.91	89.6

Table 4.13 Eigen Values and Weight of Variables for Economic Indexing

PCA WITH ECONOMIC VARIABLES					
Dimension of the multivariate space : 34					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
orevkim	owner of house	0,44	0,33	-0,21	-0,01
orevkim1	rent	0,19	0,14	-0,18	0,06
orevtur	apartment	9,29	13,84	-0,21	0,15
orevtur1	squatter	0,02	0,05	-0,16	0,27
orevtu_1	house	0	0,01	0	-0,1
orkalori	radiator	0,55	0,37	-0,21	-0,02
orinternet	internet	0,22	0,15	-0,2	-0,16
ordigit	private tv digiturk	0,07	0,08	-0,18	0,02
oruydu	satellite	0,31	0,23	-0,21	-0,06
orfazlat	2nd television	0,4	0,33	-0,21	0
or188	dishwasher	0,63	0,43	-0,22	0,01
or189	computer	0,43	0,3	-0,21	-0,06
ordvd	dvd player	0,42	0,31	-0,21	-0,04
orevadet	number of realestate	0,62	0,43	-0,22	0,02
ortarla	field owned	0,02	0,04	-0,15	-0,02
orbahcead	garden owned	0,01	0,02	-0,07	-0,22
orkoopadet	cooperative owned	0,01	0,03	-0,04	-0,41
orarsa	land owned	0,04	0,04	-0,07	-0,4
orarac	automobile	0,27	0,2	-0,2	-0,09
or241	cash help taken	0,08	0,09	-0,17	0,27
or252	opinion "better" for economic situation	0,21	0,19	-0,2	0,02
orecosys	opinion "worse" for economic situation	0,1	0,09	-0,1	-0,22
orecocbs	idea about economy in 5 years "better"	0,13	0,13	-0,19	0,02

Table 4.13 (Cont'd)

VARIABLES	EXPLANATION	MEAN	STDEV	WEIGHT PC1	WEIGHT PC2
orecobsy	idea about economy in 5 years "worse"	0.19	0.18	-0.2	0.09
orecob_1	idea about economy in 5 years "same"	0.21	0.14	-0.18	0.06
orissiz	unemployed <6months	0	1	0	0
orissiz1	unemployed>6months	0.04	0.05	-0.12	0.08
orbanyo	second bathroom	0.6	0.4	-0.22	-0.01
orevad1	# house owned	0.02	0.03	-0.09	-0.17
orgelir	income < 500	0.05	0.08	-0.17	0.24
orgelir1	501<income< 1000	0.27	0.21	-0.2	0.13
orgeli_1	1001<income< 2000	0.25	0.15	-0.19	-0.19
orgeli_2	2001<income< 4000	0.05	0.06	-0.16	-0.08
orgeli_3	4001<income	0.01	0.02	-0.04	-0.42
Check : Sum of square of Eigen vectors = 1					
TOTAL				-0.04	-0.42

4.6.3. PCA for Migration Variables

Migration index variables show the length of living in the city and the birth city of households. "living more than 10 years", "living less than 10 years" and "from Ankara" PCA results for migration variables show that PCA1 explains 87.91% of the total variance and 100% of the cumulated total variance is explained by the 3rd PCA (Table 4.14 and Table 4.15). The variable list shows that the dimension of multivariate space is three and the variables have more than -0.56 negative weight on the analysis.

Table 4.14 PCA Calculations for Migration Indexing

	PCA1	PCA2	PCA3
Eigen values:	2.64	0.3	0.06
% of total variance explained	87.91	10.04	2.05
Cumulated % of total variance explained	87.91	97.95	100

Table 4.15 Eigen Values and Weight of Variables for Migration Indexing

PCA FOR MIGRATION VARIABLES					
Dimension of the multivariate space : 3					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
or_mahsur	live in region less than 10 years	0.29	0.22	-0.56	0.7
or_mahsu1	live in region more than 10 years	0.34	0.25	-0.56	-0.71
or_ilankd	from Ankara	0.33	0.25	-0.6	0.01
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.36	0

4.6.4. PCA for Solidarity Variables

The solidarity index variables are composed of questions that show the relations of the households with their neighbors or relatives. "With whom do you meet more often (neighbors, relatives, people from native land, no one, kids, friends, families, colleagues), "How often do you meet with them? (everyday, once a week, rarely)", "Do you have someone who will help you when you needed? (absolutely yes, yes and no, definetely no)", "Do you have neighbors to share your problems? (absolutely yes, yes, yes and no, no, definitely no)", "Which of the activities have you attended before? (voting, trade union, school organiations, non-profit organizations, native meetings)".

The PCA results with solidarity variables show that PCA1 explains 50.19% of the total variance and 90.32% of the cumulated total variance is explained by the 10th PCA (Table 4.16). The variable list shows that the dimension of multivariate space is 21, the variables colored with grey are the variables with a higher weight effect. Meeting with parents, family, relatives and colleagues every day has a higher weight than meeting with natives or meeting no one. In the variable list, meeting no one is not an eligible preference and that's why it has a weight of -0.04 in the analysis. Moreover, meeting someone everyday has a higher effect on the solidarity PCA (Table 4.17).

Table 4.16 PCA Calculations for Solidarity Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7	PCA8	PCA9	PCA 10
Eigen values:	11.54	1.93	1.68	1.4	1.11	0.88	0.66	0.59	0.53	0.46
% of total variance explained	50.19	8.4	7.29	6.08	4.82	3.82	2.87	2.56	2.29	2
Cumulated % of total variance explained	50.19	58.59	65.89	71.97	76.79	80.61	83.48	86.03	88.32	90.32

Table 4.17 Eigen Values and Weight of Variables for Solidarity Indexing

PCA WITH SOLIDARITY VARIABLES					
Dimension of the multivariate space : 21					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
ordayan	meet neighbors	0.26	0.24	-0.25	0.16
ordayan1	meet relatives	0.02	0.03	-0.15	-0.08
ordayan2	meet natives	0.06	0.06	-0.17	-0.28
ordayan3	no one	0.01	0.01	-0.04	0.44
ordayan4	family	0.12	0.11	-0.23	0.18
ordayan5	colleages	0.08	0.09	-0.22	-0.01
orhergun	everyday	0.33	0.32	-0.26	-0.07
orhafta1	once a week	0	0.01	-0.18	-0.18
orseyrek	rarely	0.02	0.04	-0.08	0.42
orcumle11	support absolutely yes	0.06	0.07	-0.19	0.15
orcumle12	support yes	0.03	0.03	-0.12	0.09
orcumle13	support yes&no	0.04	0.06	-0.2	-0.14
orcumle15	support definitely no	0.3	0.23	-0.25	0.17
orcumle21	share prob with neighbors abs yes	0.22	0.17	-0.25	0.09
orcumle33	share prob with neighbors yes	0.1	0.09	-0.16	-0.32
orcumle34	share prob with neighbors yes&no	0.14	0.13	-0.23	-0.26
orcumle35	share prob with neighbors no	0.17	0.17	-0.29	0.25

Table 4.17 (Cont'd)

VARIABLES	EXPLANATION	MEAN	STDEV	WEIGHT PC1	WEIGHT PC2
oroykula	voting	0.56	0.4	-0.29	-0.02
orsendika	trade union	0.05	0.05	-0.19	0.05
orokulaile	school org	0.27	0.19	-0.26	-0.15
orhemseri	native meetings	0.07	0.07	-0.23	0.13
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.05	0.02

4.6.5. PCA for Security Variables

PCA results with security variables show that PCA1 explains 50.56% of the total variance and 90.45% of the cumulated total variance is explained by the 8th PCA (Table 4.18). Security variables are about households' feelings about safety and it is seen from the Table 4.19 that answers which say "crime increased" or "crime decreased", "I feel safe in the evening", "I don't feel safe in the evening", "I feel safe at home", "I don't feel safe at home", "Streets are safe", "Streets are safe when crowded", "Streets are always safe" have a positive weight on the analysis. The other variables have a lower weight and therefore can be removed from the analysis. The variable list shows that the dimension of multivariate space is 17 (Table 4.19).

Table 4.18 PCA Calculations for Security Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7	PCA8
Eigen values:	8.59	1.37	1.23	1.19	0.95	0.75	0.71	0.57
% of total variance explained	50.56	8.08	7.25	7.03	5.62	4.44	4.16	3.33
Cumulated % of total variance explained	50.56	58.63	65.88	72.91	78.53	82.97	87.12	90.45

Table 4.19 Eigen Values and Weight of Variables for Security Indexing

PCA FOR SECURITY VARIABLES					
Dimension of the multivariate space : 17					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
or_sucor	opinion crime increased	0.14	0.14	0.3	0.01
or_sucor1	opinion crime decreased	0.38	0.28	0.32	-0.06
or_suco1	opinion crime didn't change	0.03	0.03	0.19	-0.23
or_suco2	no idea	0.07	0.06	0.11	0.33
or_gece1	evening feel safe yes	0.21	0.21	0.3	-0.05
or_gece2	evening feel safe sometimes	0.24	0.16	0.27	-0.07
or_gece3	evening feel safe no	0.17	0.13	0.27	0.09
or_gece4	evening feel safe don't know	0.02	0.03	0.22	0.25
or_evdeguv	home safe	0.38	0.31	0.32	0.07
or_evde1	home sometimes safe	0.14	0.11	0.21	-0.46
or_evde2	home not safe	0.11	0.08	0.26	0.33
or_guvsok	street always safe	0.24	0.21	0.3	0.29
or_guvs1	crowded street safe	0.2	0.15	0.27	-0.31
or_guvs2	street not safe	0.05	0.07	0.18	-0.39
or_guvs3	street safe	0.12	0.11	0.27	0.11
or_guvs4	no wallet carrying	0.01	0.02	0.01	-0.27
or_guvs5	not safe but not worried	0.01	0.02	0.02	0.1
Check : Sum of square of Eigen vectors = 1					
TOTAL				0	0.01

4.6.6. PCA for Precaution Variables

Precaution variables are aimed to understand the level of precautions taken by the households to decrease victimization. The PCA results with variables show that PCA1 explains 60.99% of the total variance and 89.6% of the cumulated total variance is explained by the 10th PCA (Table 4.20). As precaution variables "having empty house for more than 2 hours a day", "insurance", "steel door", "alarm", "locks", "louver (panjur)", "balcony", "lamp", "surveillance by neighbors", "security guard", "dog", "doing nothing", "gun", "car insurance", and "car locks" a total of 42 variables were used. The total list can be seen in Table 4.21. The variable list shows the dimension of multivariate space which is 42. It is

seen in Table 4.21 that all the variables have a weight effect between absolute value of 0,13 and 0,18. In this analysis all the answers which show precaution are used as variables.

Table 4.20 PCA Calculations for Precaution Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7	PCA8	PCA9	PCA 10
Eigen values:	20.74	1.87	1.41	1.22	1.15	1.06	1	0.77	0.67	0.57
% of total variance explained	60.99	5.51	4.14	3.6	3.37	3.12	2.94	2.28	1.97	1.69
Cumulated % of total variance explained	60.99	66.5	70.63	74.23	77.6	80.72	83.66	85.94	87.91	89.6

Table 4.21 Eigen Values and Weight of Variables for Precaution Indexing

Dimension of the multivariate space : 42					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
or_kimyok	empty house less 2h	0.45	0.27	-0.15	-0.23
or_kimy1	empty house 2-4 h	0.1	0.14	-0.15	-0.2
or_kimy2	empty house more 2h	0.08	0.1	-0.11	0.01
or_sig1	insurance	0.04	0.05	-0.18	-0.03
or_sig2	no insurance	0.57	0.4	-0.18	0.03
or_celik	steel door	0.49	0.31	-0.16	-0.14
or_celik1	no steel door	0.14	0.15	-0.16	-0.14
or_alarm	alarm	0.06	0.06	-0.14	0.08
or_alarm1	no alarm	0.56	0.39	-0.18	-0.05
or_demir	iron branch	0.21	0.19	-0.16	-0.05
or_demir1	no iron branch	0.41	0.28	-0.17	-0.01
or_allah	god protection	0.51	0.29	-0.17	0.09
or_allah1	no god protection	0.11	0.19	-0.15	-0.22
or_kilit	lock	0.35	0.26	-0.17	-0.02
or_kilit1	no lock	0.27	0.21	-0.17	-0.04
or_panjur	louver	0.21	0.19	-0.17	-0.05
or_panj1	no louver	0.41	0.27	-0.17	-0.01

Table 4.21 (Cont'd)

VARIABLES	EXPLANATION	MEAN	STDEV	WEIGHT PC1	WEIGHT PC2
or_balkon	balcony	0.43	0.3	-0.18	0.01
or_balkon1	no balcony	0.19	0.16	-0.15	-0.09
or_lamba	lighting	0.17	0.14	-0.15	0.08
or_lamba1	no lighting	0.45	0.33	-0.18	-0.08
or_komsu	neighbor	0.36	0.23	-0.16	0.09
or_komsu1	no neighbor look-out	0.26	0.24	-0.17	-0.14
or_ozelgu	private security	0.6	0.41	-0.18	-0.03
or_ozelg1	no priv. security	0	0.01	-0.01	0
or_kopek	Dog	0	0.01	-0.01	0.08
or_kopek1	no dog	0.63	0.43	-0.18	-0.03
or_hicbis	nothing	0.63	0.43	-0.18	-0.03
or_hicbis1	nothing	0.63	0.43	-0.18	-0.03
or_gelenek	traditional	0	0.01	-0.1	-0.21
or_gelen1	no traditional	0.63	0.43	-0.18	-0.02
or_silah	gun	0	0.01	-0.12	-0.28
or_silah1	no gun	0.63	0.43	-0.18	-0.02
or_mahall	safe district	0.45	0.32	-0.17	0.02
or_seckom		0.08	0.09	-0.1	0.43
or_site1	site housing	0.1	0.09	-0.12	0.36
or_secgoc		0.08	0.09	-0.1	0.43
or_tekon		0.3	0.22	-0.15	0.2
or_aracal	car alarm	0.13	0.11	-0.15	0.03
or_direks	car lock	0.07	0.07	-0.13	0.04
or_aracsig	car insurance	0.17	0.13	-0.15	0.08
or_evgir	house entrance	0.21	0.17	-0.13	0.25
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.02	0.06

4.6.7. PCA for Attitude Towards Crime Variables

The PCA results with attitude towards crime variables show that PCA1 explains 44.49% of the total variance and 82.78% of the cumulated total variance is explained by the 10th PCA (Table 4.22). The variable list shows that the dimension of multivariate space is 31, the variables are more about the behaviour of the households when they face crime, and the

answers such as “call the police”, “interfere”, and “run away” has higher negative weights in the analysis. The variables colored with grey are the ones with higher negative weights.

The crime attitude variables examine the attitude of the households towards crime faced by themselves or by others. The following questions are examined: “If you see a woman disturbed by a man on street, what will you do?”, “If you see a robbery on the street, what will you do?”, “If you see your neighbors’ house being robbed, what do you do?”, “Preventing crime is a responsibility for citizens”, “I believe everything is destiny”. The list of all the variables is given in Table 4.23 with the explanation and their weight on the analysis.

Table 4.22 PCA Calculations for Attitude towards Crime Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7	PCA8	PCA9	PCA 10
Eigen values:	13.79	2.96	1.52	1.28	1.09	1.04	1	1	1	0.98
% of total variance explained	44.49	9.54	4.91	4.12	3.51	3.36	3.23	3.23	3.23	3.17
Cumulated % of total variance explained	44.49	54.03	58.94	63.06	66.57	69.93	73.15	76.3	79.6	82.78

Table 4.23 Eigen Values and Weight of Variables for Attitude towards Crime Indexing

PCA WITH ATTITUDE TOWARDS CRIME VARIABLES					
Dimension of the multivariate space : 31					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
ors1	woman disturbed on street - interfere	0.27	0.2	-0.24	-0.06
ors11	ask help	0.08	0.08	-0.1	-0.07
ors12	pretend not to see	0.13	0.13	-0.23	-0.02
ors13	check her dress	0.04	0.05	-0.19	-0.06
ors14	call police	0.09	0.07	-0.21	0.09
ors15	depends on situ	0.01	0.03	-0.12	0.08
ors16	get mad	0	1	0	0
ors17	get sad	0.01	0.03	-0.09	0.51
ors18	blame man	0	0.01	-0.02	0.19
ors2	see robbery on street - call police	0.34	0.24	-0.25	-0.05
ors21	runaway	0.07	0.08	-0.21	-0.11
ors22	interfere	0.2	0.15	-0.23	-0.05
ors23	depends on situ	0.01	0.02	-0.03	0.01
ors24	get shock	0	0.01	-0.03	-0.1
ors25	get mad	0	1	0	0
ors26	do nothing	0.01	0.03	-0.09	0.51
orkomsu	see burglary in neighbors' house - call police	0.49	0.28	-0.25	-0.03
orkoms1	runaway	0.02	0.05	-0.2	-0.11
orkoms2	interfere	0.1	0.14	-0.23	-0.04
orkoms3	depends on situ	0	0.01	0.02	-0.05
orkoms4	get shock	0	1	0	0
orkoms5	get mad	0.01	0.02	-0.03	0.49
orsuconl	crime prevention is your responsibility - yes	0.4	0.27	-0.25	-0.09
orsucon1	No	0.18	0.17	-0.24	0.08
orsucon2	don't know	0.05	0.05	-0.17	-0.07
orvergi	accept to pay extra tax to prev.crime.	0.31	0.21	-0.24	-0.05
orvergi1	don't accept to pay tax	0.26	0.21	-0.25	-0.06
orvergi2	don't know	0.06	0.06	-0.21	0.11
orkader	crime is destiny	0.24	0.2	-0.25	0
orkader1	crime is not destiny	0.32	0.23	-0.24	-0.15
orkader2	don't know	0.07	0.06	-0.14	0.27
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.02	0.07

4.6.8. PCA forVictimization Variables

The variable list shows that the dimension of multivariate space is 2, and the variable asks if the household has faced crime or not. In the answers, it is possible to have "yes-no" and empty or "don't know" answers; therefore, both yes and no answers are taken as variables. The PCA results with victimization variables show that PCA1 explains 84.64% of the total variance and 100% of the cumulated total variance is explained by the 2nd PCA (Table 4.24). It is seen that the first variable "faced crime" has a weight of 0.14, whereas "not faced crime" has a weight of 0.49 in the analysis (Table 4.25).

Table 4.24 PCA Calculations for Victimization Indexing

	PCA1	PCA2
Eigen values:	1.69	0.31
% of total variance explained	84.64	15.36
Cumulated % of total variance explained	84.64	100

Table 4.25 Eigen Values and Weight of Variables for Victimization Indexing

PCA FOR VICTIMIZATION VARIABLES					
Dimension of the multivariate space : 2					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
orsizesuc	victim from crime	0.29	0.22	0.14	0.14
orsizesuc1	not victim from crime	0.34	0.25	0.49	0.33
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.5	0.5

4.7. Correlations Analysis for Eight Indexes

In Table 4.26, the correlation matrix for eight indexes is given. A correlation value with an absolute value close to 1 implies high correlation between x and y. Table 4.26 shows correlations among eight variables, the absolute values of which are all above 0.9 and thus, high. That's why all the indexes should not be used together as dependent variables in a regression model, otherwise they will introduce multicollinearity. Because of the high correlations among eight indexes, it is possible to group them, so the number of indexes is

decreased to four, Socio-Economic, Precaution, Security and Victimization. In order to evaluate the precaution and socio-economic indexes separately, they are included in the analysis but modeled separately.

Table 4.26 Correlation Matrix among Indexes

Correlations

		ECONPCA	SOSYOPCA	migrationPCA	securtiyPCA	precautionPCA	solidartypca	ATTIPCA	VictimisationPCA
Pearson Correlation	ECONPCA	1,000	,985	,990	-,991	,993	,989	,991	,982
	SOSYOPCA	,985	1,000	,986	-,987	,984	,977	,987	,973
	migrationPCA	,990	,986	1,000	-,990	,990	,986	,990	,980
	securtiyPCA	-,991	-,987	-,990	1,000	-,993	-,986	-,991	-,981
	precautionPCA	,993	,984	,990	-,993	1,000	,987	,992	,983
	solidartypca	,989	,977	,986	-,986	,987	1,000	,985	,976
	ATTIPCA	,991	,987	,990	-,991	,992	,985	1,000	,984
	VictimisationPCA	,982	,973	,980	-,981	,983	,976	,984	1,000
Sig. (1-tailed)	ECONPCA	.	,000	,000	,000	,000	,000	,000	,000
	SOSYOPCA	,000	.	,000	,000	,000	,000	,000	,000
	migrationPCA	,000	,000	.	,000	,000	,000	,000	,000
	securtiyPCA	,000	,000	,000	.	,000	,000	,000	,000
	precautionPCA	,000	,000	,000	,000	.	,000	,000	,000
	solidartypca	,000	,000	,000	,000	,000	.	,000	,000
	ATTIPCA	,000	,000	,000	,000	,000	,000	.	,000
	VictimisationPCA	,000	,000	,000	,000	,000	,000	,000	.
N	ECONPCA	98	98	98	98	98	98	98	98
	SOSYOPCA	98	98	98	98	98	98	98	98
	migrationPCA	98	98	98	98	98	98	98	98
	securtiyPCA	98	98	98	98	98	98	98	98
	precautionPCA	98	98	98	98	98	98	98	98
	solidartypca	98	98	98	98	98	98	98	98
	ATTIPCA	98	98	98	98	98	98	98	98
	VictimisationPCA	98	98	98	98	98	98	98	98

In Figure 4.17, the maps of eight indexes are given. In this part, the maps are not evaluated in detail because they will be evaluated under four headlines in the following solutions. However, in order to see the multicollinearity, they are compared with each other.

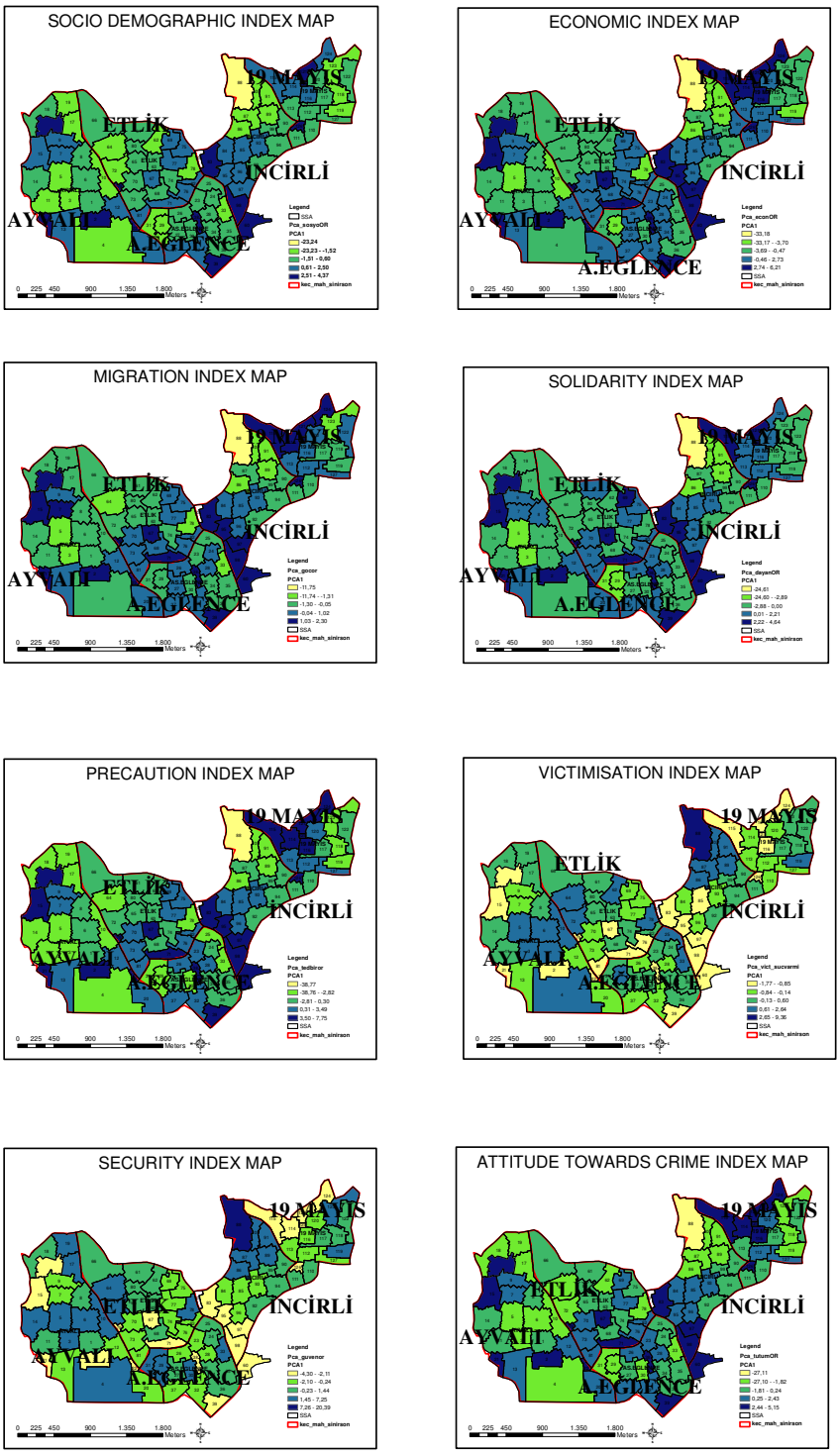


Figure 4.17 Spatial Distribution of Eight Indexes

When socio-demographic and economic index maps are compared, it is seen that the categorization of the indexes are related. Western İncirli, Northern Ayvalı and Northern 19 Mayıs neighborhoods show lower socio-demographic and economic index values. Etlik and Ayvalı neighborhoods around Etlik Street, close to trade facilities, SSA 1, 6, 8, 64, and 72 belong to middle and higher socio-demographic and economic groups. When precaution and victimization maps are compared, in precaution map lightly shaded areas represent higher precaution, so it is seen that economically lower groups do not use precautions. On the other hand, in victimization map, lighter areas represent less victimized areas and it is seen that the higher precaution areas also have higher victimization. The relationship of these two variables has a different pattern than expected. The expectation is that precautions will reduce victimization, yet the pattern is similar which indicates that taken precautions are not effective. Besides, all three indexes such as security, attitude towards crime and precaution have correlations which are visually noticable (Figure 4.17).

4.8. Indexing for Reduced Set of Factors

As it was mentioned in the previous part, at the beginning of the study, eight different indexes were created. Since the results showed a high correlation, it is possible to make a generalization by grouping them into four indexes: Socio-economic – demographic, Security, Precaution and Victimization. Socio-economic – demographic index is created and explained in 4.5.2 as a SES Index. In this part, the other three indexes are explained and evaluated.

4.8.1. Victimization Index

The victimization index measures the victimization of the hoseholds with the question “Have you faced crime in 2-3 years?” PCA1 explains 84% of the total variance and 100% of cumulated total variance explained is reached by PCA2. Light green areas are less victimized areas. Looking at the statistics of lightly colored areas, we can say that a small percent has faced crime in these regions (Table 4.27 and Table 4.28).

Table 4.27 PCA Calculations for Victimization Indexing

	PCA1	PCA2
Eigen values:	1.69	0.31
% of total variance explained	84.64	15.36
Cumulated % of total variance explained	84.64	100

Table 4.28 Eigen Values and Weight of Variables for Victimization Indexing

PCA WITH VICTIMIZATION VARIABLES					
Dimension of the multivariate space : 2					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
orsizesuc	victim from crime	0.29	0.22	0.14	0.14
orsizesuc1	not victim from crime	0.34	0.25	0.49	0.33
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.5	0.5

When the victimization map is analyzed (Figure 4.18), crime victimization is observed to be high in dark areas. In the western part of the İncirli neighborhood, it is seen that victimization is at the lowest level. Also, when compared to SES index map, it is noted that in the neighborhood in general, as the economic status increases the victimization increases as well. Interiors of Aşağı Eğlence neighborhood, north parts of İncirli which has high SES also has high victimisation In the interiors of Ayvalı neighborhood, most of the SSAs belong to middle SES group, and in ABPRS SES index they belong to low SES group, in these areas victimization is also high.

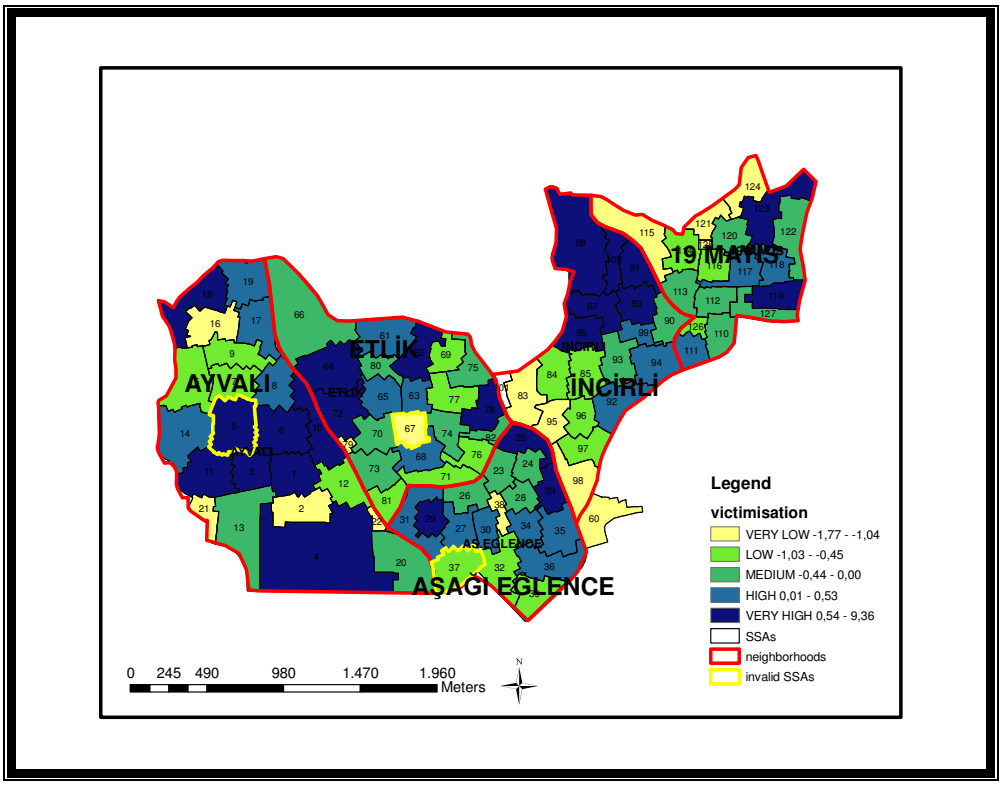


Figure 4.18 Spatial Distribution of Victimization Index Due to All Crime Types

The victimization analysis consisted of any type of crime. Since the question is "Have you faced crime in 2-3 years?", the answer includes robbery, auto theft, burglary, or any crime that may happen. Unfortunately, the answers do not give any location for the incidents, and therefore it is not possible to claim that auto theft, robbery or pickpocketing happens in the study region. On the other hand, the survey is done in the households and that is why the burglary incidents can be taken into account. Unfortunately, the answers are not sufficient to the question number 64, "Which one of these crime types have you faced?. Burglary rates are shown as 0.008 for 19.Mayıs, 0.009 for Incirli, 1% for Aşağı Eğlence and 2% for Etlik and Ayvalı. That's why from the answers of question number 55 "In your neighborhood, which crime types happen and in which frequencies?". "very much" and "much" are taken into account to understand burglary victimization and rated for all SS areas. In Figure 4.19, a map of burglary rates classified by the natural break method is given; the rates represent the number of households with victimization of that crime type over the total number of questionnaires in SSA. The invalid SSAs are represented by black borders; dark orange and red colors show the regions with burglary victimization rate over 66%, the yellow colored regions represent burglary victimization below 36%. It is seen that the burglary victimization map has similarities with the overall victimization map. In Etlik, Ayvalı and Aşağı Eğlence, the regions around Giresun street, Halil Sezai Erkut street on which Metro shopping market stands, have higher burglary victimization rates whereas around Etlik Street the burglary rates are low. It is also achieved that the interior parts of Aşağı Eğlence and Ayvalı, which are residential areas have also high burglary victimization rates.

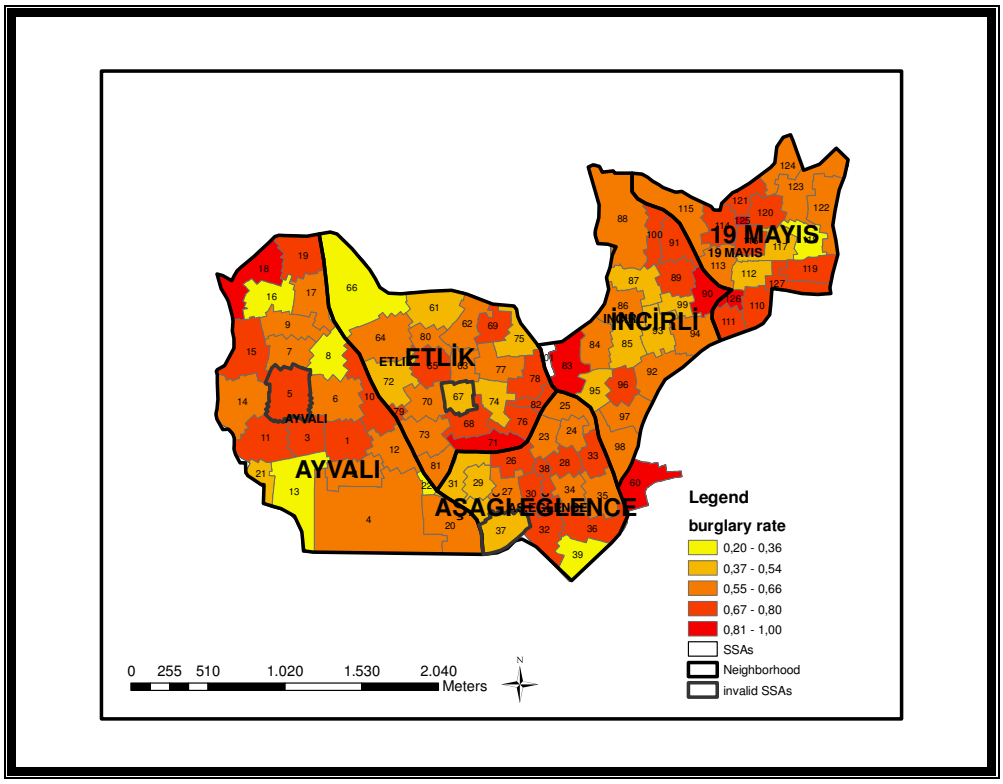


Figure 4.19 Spatial Distribution of Burglary Victimization rate

In order to see the victimization types and the relationship with the land use of the region, land use maps are created for population density, areas with squatters, use of areas (housing, housing and commercial, and commercial), and land marks (health, sport, education, mosque, shopping or business center). Population density is calculated by the number of people divided by the area of SSA in square meter. It is seen in the density map (Figure 4.20) that Etlik, Aşağı Eğlence and 19 Mayıs neighborhoods have higher population density, which is demonstrated by darker green areas. When density is regressed to burglary rate, it is seen that density does not have a significant effect on burglary rate, sig: 0.9 (Table 4.29). When compared with the squatter housing map in Figure 4.21, it is seen that the SSAs with squatter housing have less density. In Figure 4.21, light green areas show that there is no squatters in the area, darker green areas show there are a few (between 1-5) squatters and the darkest green areas show there are more than five squatters. It is seen that the northern part of İncirli and 19 Mayıs neighborhoods have not completed the urban redevelopment and some parts of Ayvalı still has squatters among the apartments.

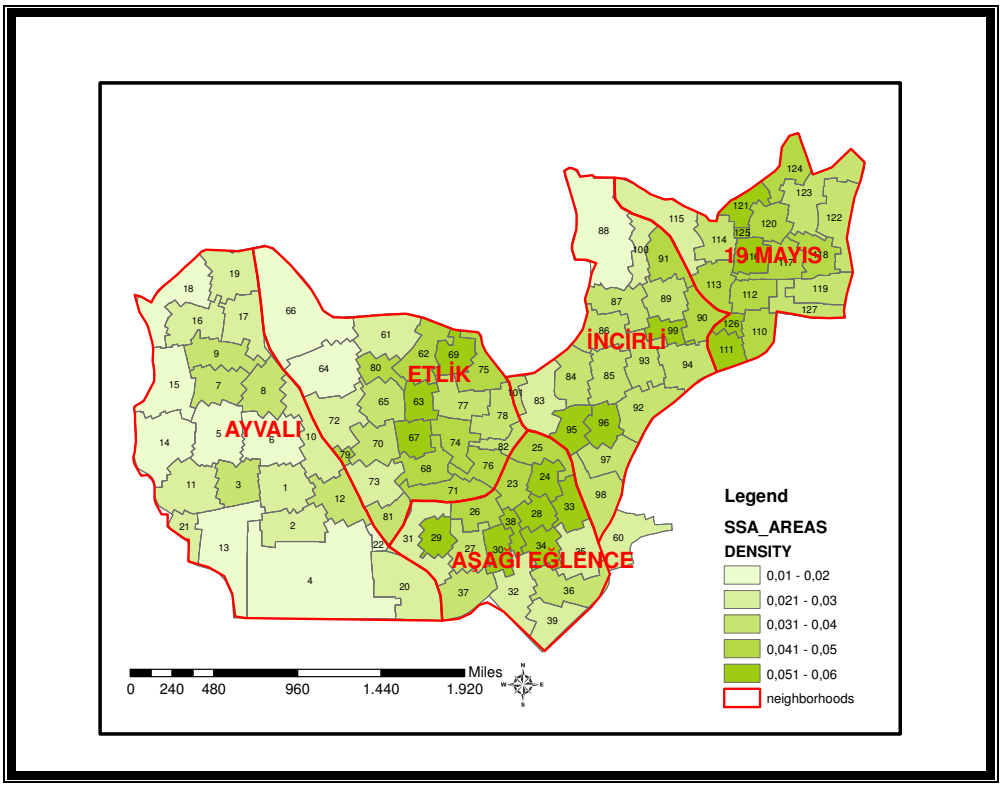


Figure 4.20 Population Density

Table 4.29 Regression Analysis

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.598	.072		8.336	.000		
	density	-.212	1.888	-.011	-.112	.911	1.000	1.000
a. Dependent Variable: burgrate								

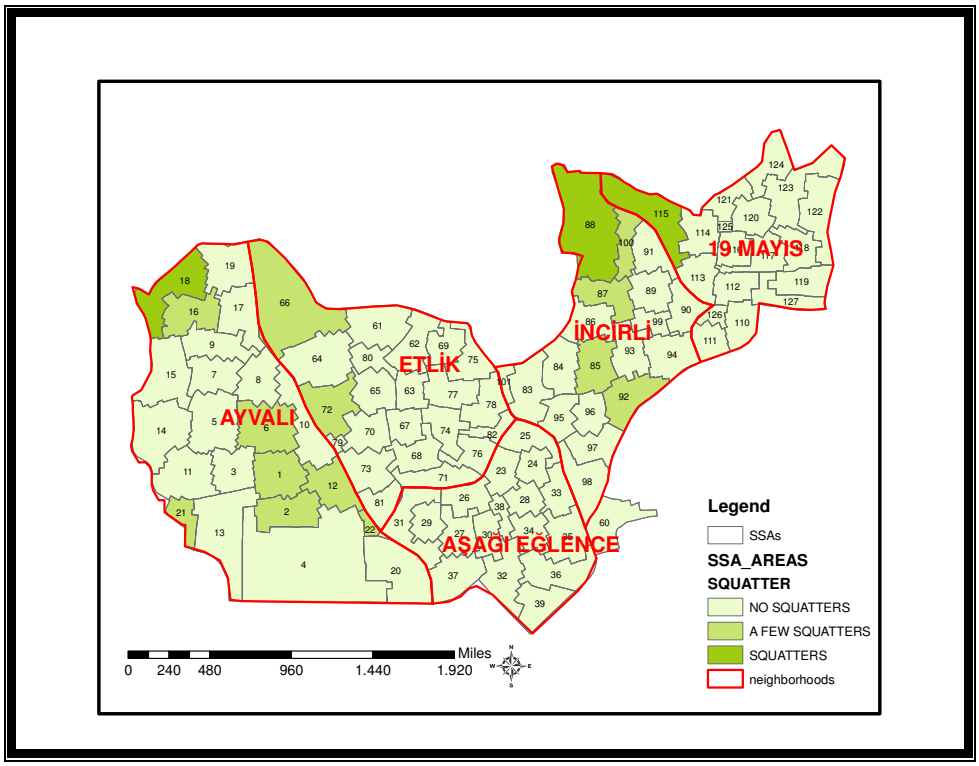


Figure 4.21 SSAs with Squatters

Figure 4.22 shows the areas which have only residential buildings and the areas with commercial use and residential buildings. It is seen that around the main streets like Etlik Street (parallel to Ayvalı – Etlik, the neighborhood border of Ayvalı and Aşağı Eğlence), Yunus Emre Street (along Etlik - İncirli, and İncirli - Aşağı Eğlence neighborhood border), Tevfik Saydam Street (along the southern border of İncirli neighborhood) and Giresun and Halil Sezai Street (parallel to the southern border of Ayvalı and Aşağı Eğlence neighborhoods), the areas have both commercial and residential use. Figure 4.23 shows the landmarks of the region. It is seen that the southern part of the region has more education facilities, sport centers and hospitals, and Metro Gross Market is in this section of the region.

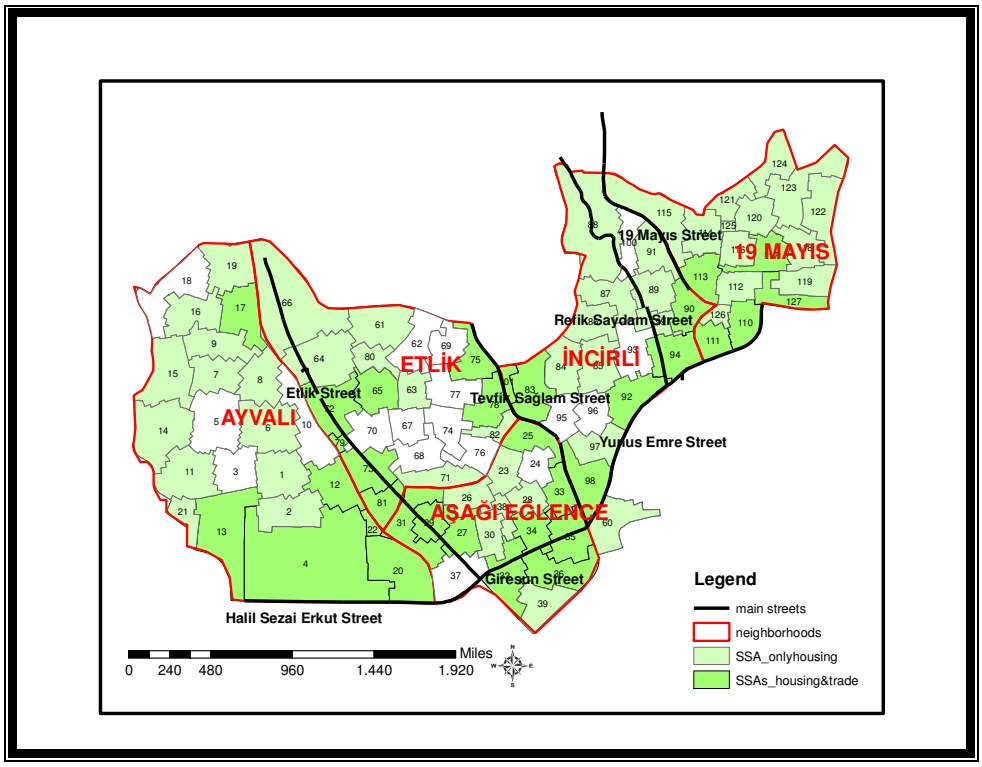


Figure 4.22 Use of Areas

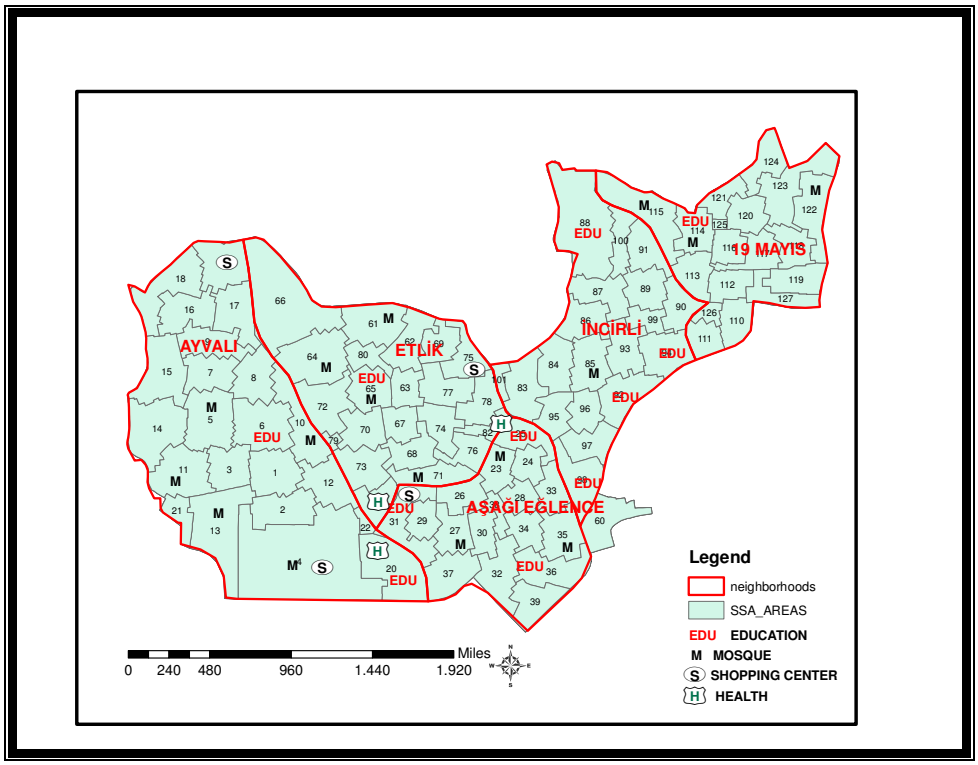


Figure 4.23 Land Marks

When the rates of victimization for other types of crime are mapped via the natural breaks method and compared with land use maps, it is seen that in all crime victimization types Aşağı Eğlence has the highest rate. Especially for extort victimization, most of the SSAs in Aşağı Eğlence have extort victimization rates between 21 and 33%, which is the highest rate compared to the rest of the region. For auto theft and property theft from auto victimization, regions around Metro Gross Market, hospitals, schools or sport facilities, like SSA1, SSA2, SSA4, SSA12, and SSA20 in the southern part of Ayvalı neighborhood and, along the border of İncirli and Aşağı Eğlence neighborhoods, SSA25, SSA82, SSA78, and SSA83, which is around health and education facilities, have higher rates. On the contrary, around the Etlik Street, which also has health, trade and education facilities, auto theft and property theft from auto victimization is low. Along Yunus Emre and 19 Mayıs Streets, which stand parallel to the İncirli neighborhood border, auto theft and property theft from auto is relatively lower than the other parts of İncirli neighborhood (Figure 4.24). For extort victimization, Incirli has the highest victimization rates around the Tevfik Saydam Street, which also shapes the administrative border of Etlik neighborhood (Figure 4.25).

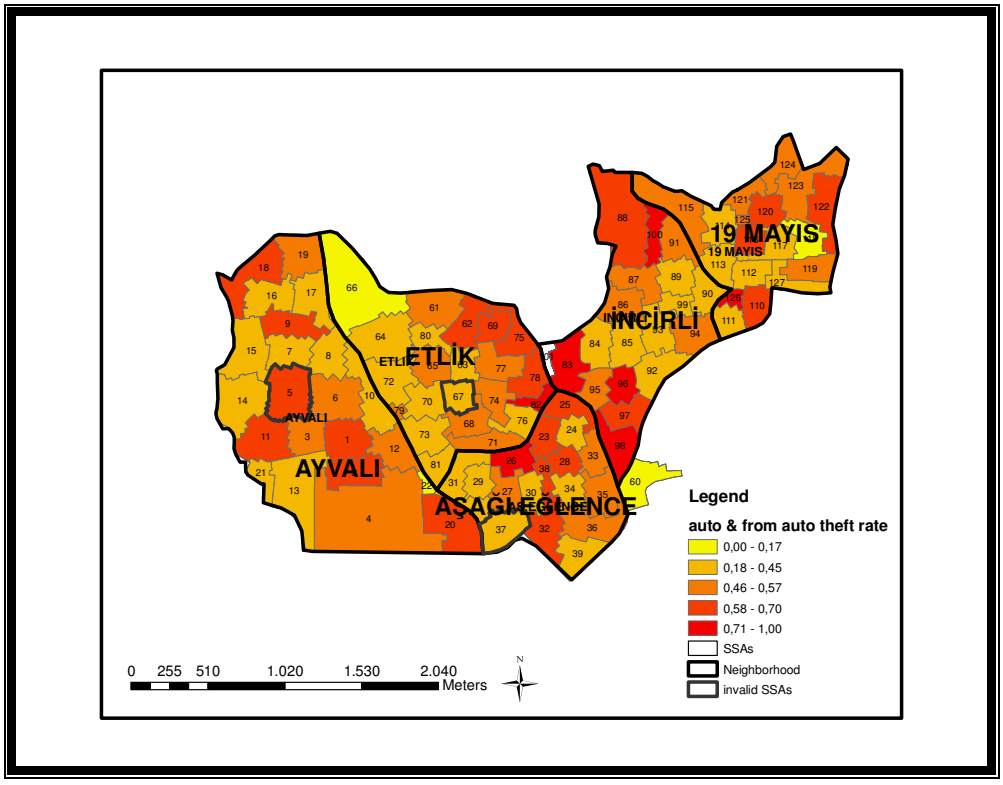


Figure 4.24 Spatial Distribution of Auto and From Auto Theft Victimization rate

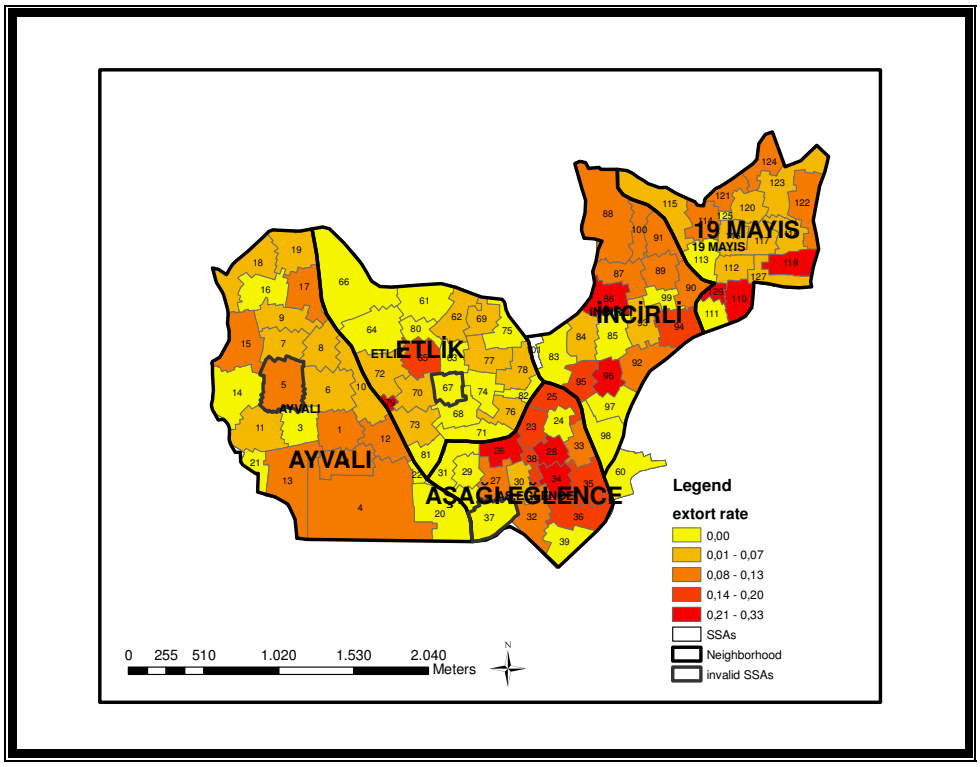


Figure 4.25 Spatial Distribution of Estort Victimization rate

For pickpocketing and robbery, along the Yunus Emre Street, parallel to İncirli neighborhood border, the southern part of Ayvalı neighborhood around Metro Gross Market, sport, university facilities, and the Tevfik Saydam Street have higher victimization rates. Except the southern part of the Etlik Street, Etlik has lower victimization rates for pickpocketing (Figure 4.26 and Figure 4.27).

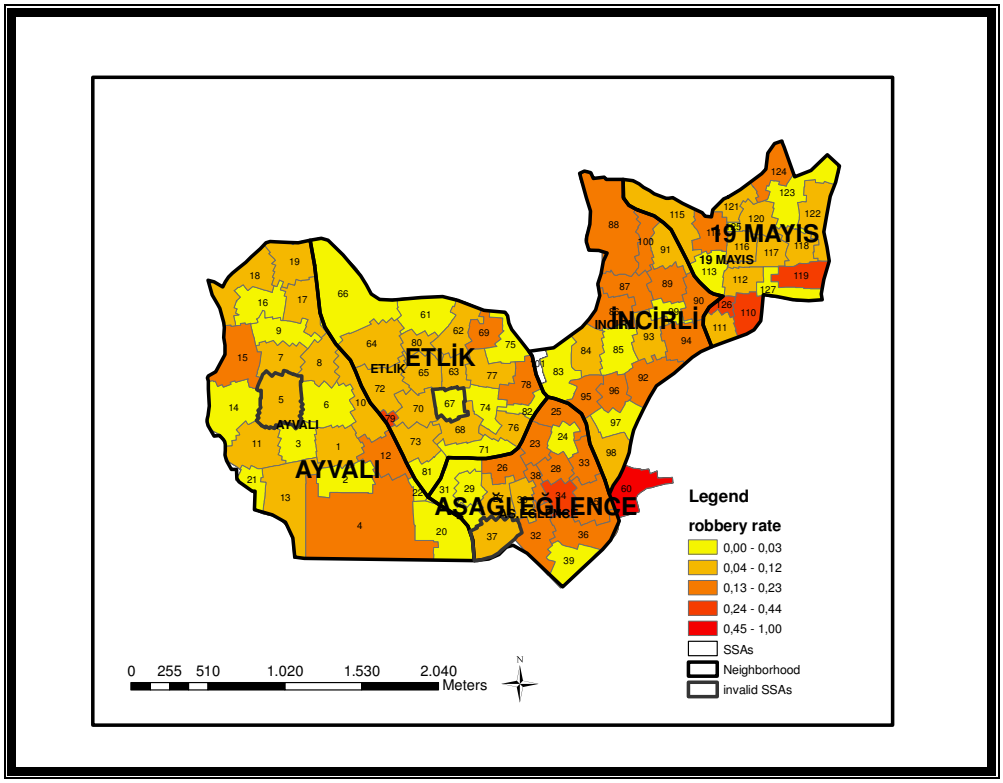


Figure 4.26 Spatial Distribution of Robbery Victimization rate

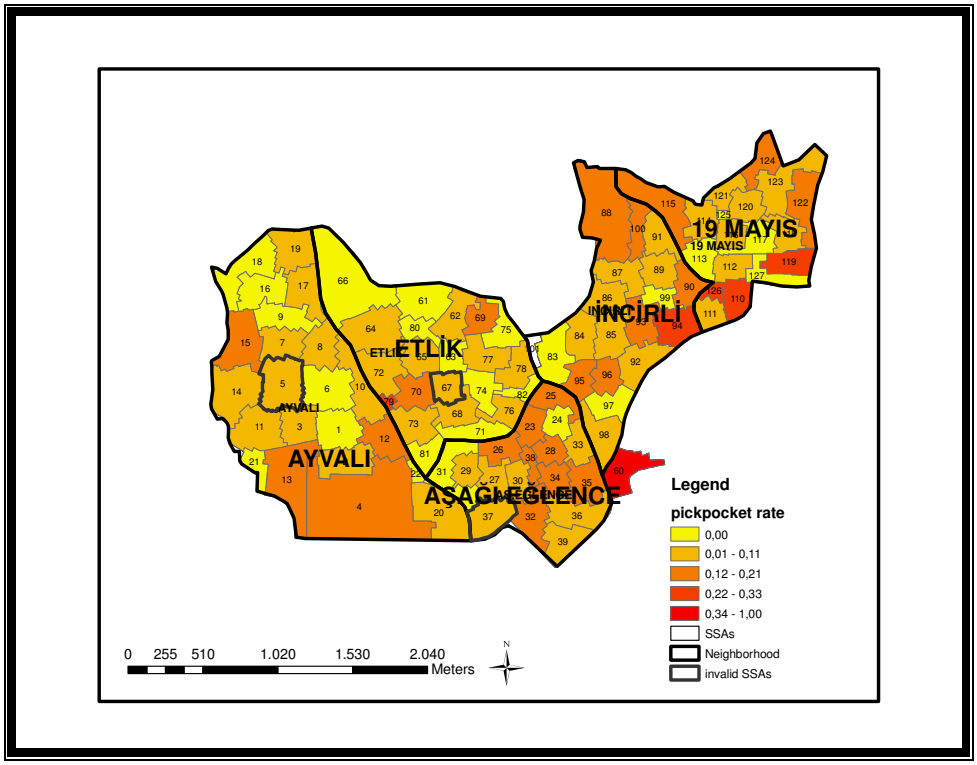


Figure 4.27 Spatial Distribution of Pickpocketing Victimization rate

4.8.2. Security Index (Solidarity – Security – Attitude Variables)

All variables of solidarity, security and attitude towards crime were used together in Principal Component Analysis to create a single index showing the attitude towards security and precaution against crime victimization. The security index is created to see the differences of the SSA regions according to their understanding and attitude towards crime and security. In this part, the total number of variables for Solidarity, Security and Attitude is decreased to 35 variables altogether.

The percentages of the solidarity variables show that 41% of the households meet with their neighbors more often, and 51% say that they meet every day. On the other hand, 51% of the households believe that they do not have anyone they can trust when they need (Table 4.30).

Table 4.30 Percentages of Security Variables

SUM_ors1	SUM_suconl	SUM_ors12	SUM_ors4	SUM_ors2
0.43	0.63	0.20	0.14	0.53
SUM_ors21	SUM_ors22	SUM_komsu	SUM_dayan1	SUM_ orcumle14
0.10	0.32	0.78	0.41	0.31
SUM_komsu2	SUM_vergi	SUM_vergi1	SUM_vergi2	SUM_kader
0.16	0.50	0.41	0.10	0.38
SUM_orsucon1	SUM_ordayan4	SUM_dayan5	SUM_dayan hergun	SUM_dayan cum15
0.28	0.19	0.13	0.51	0.48
SUM_ dayanhemser	SUM_guvsucor	SUM_ guvsucor1	SUM_guvgece1	SUM_guvgece2
0.11	0.23	0.60	0.32	0.39
SUM_guvsok	SUM_guvsok1	SUM_guvsok3	SUM_orsivilt	SUM_guvgece3
0.39	0.31	0.19	0.08	0.27
SUM_ dayancum21	SUM_ dayancum34	SUM_ dayanoy	SUM_guvevde	SUM_guvev2
0.36	0.22	0.88	0.59	0.18

The security variables also measure the feeling of safety among the regions through questions such as “When comparing the last 2-3 years, do you think that crime rates increased? (nochange-increased-decreased-no idea)”, “Do you feel safe when you walk around home in the evening? (yes, sometimes, no, I dont know)”, “Do you feel safe when your are alone at home in the evening? (always, when crowded, late at night)”, and “Are you worried about being robbed on street? (always, crowded places, late at night, no I feel safe, I dont carry wallet, not safe but I am not worried)”. The statistics show that 23% of total households believe that the crime rates have increased in the last 2-3 years. 27% of them have always feared being robbed on the street in the evenings while 32% feel safe. 20% are afraid of being robbed in crowded places and 5% are afraid late in the evenings. 39% do believe that streets are safe places, but 31% believe that streets are safe when they are

crowded and 19% believe that streets are not safe at all. 59% of the households always feel safe at home, yet 18% of them feel safe depending on time (Table 4.30).

The crime attitude variables examine the attitude of the households to crime faced by themselves or by others. The statistics of the attitude variables' results show that when a woman is disturbed by a man on the street, 43% of households interfere with the incident, whereas 20% pretend not to see it. 14% said that they would call the police. When the households see a robbery on the street, 53% said they would interfere with the situation. Only 32% would call the police, and 10% would pretend not to see it. If the incident is related with some relative, the households respond more sensitively. If they see their neighbor's house being robbed, 78% of them responded that they would call the police, and 16% said they would interfere. 50% of households agree to pay an extra tax to reduce crime but 41% disagree to pay an extra tax for it (Table 4.30). The PCA results with security variables show that PCA1 explains 71.01% of the total variance and 90.46% of the cumulated total variance is explained by the 9th PCA (Table 4.31). In Table 4.32, the list of variables and their weights used in the analysis is given.

Table 4.31 PCA Calculations for Security Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7	PCA8	PCA9
Eigen values:	25.28	1.76	1.28	1	0.81	0.72	0.66	0.55	0.49
% of total variance explained	71.01	3.86	3.4	2.86	2.4	2.19	1.84	1.56	1.34
Cumulated % of total variance explained	71.01	74.88	78.27	81.13	83.53	85.72	87.56	89.12	90.46

Table 4.32 Eigen Values and Weight of Variables for Security Indexing

PCA WITH SECURITY VARIABLES					
Dimension of the multivariate space : 35					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
ors1	Woman disturbed - interfere	0.27	0.2	-0.18	-0.01
ors12	pretend not to see	0.13	0.13	-0.17	-0.02
ors14	call police	0.09	0.07	-0.14	-0.3
ors2	see robbery on street-call police	0.34	0.24	-0.18	-0.05
ors21	Runaway	0.07	0.08	-0.16	0.12
ors22	Interfere	0.2	0.15	-0.17	0.1
suconl	Crime prev. is citizen responsib.	0.4	0.27	-0.19	0.01
Sucon1	Disagree	0.18	0.17	-0.18	0.01
orkomsu	burglary neighbors - call police	0.49	0.28	-0.18	-0.08
orkoms2	Interfere	0.1	0.14	-0.17	0.1
orvergi	pay extra tax Yes	0.31	0.21	-0.18	-0.06
orvergi1	No	0.26	0.21	-0.19	0.13
orvergi2	Don't know	0.06	0.06	-0.15	-0.2
orkader	Is crime destiny? Yes	0.24	0.2	-0.18	0.06
ordayan1	meet relatives	0.02	0.03	-0.1	0.54
ordayan4	Family	0.12	0.11	-0.15	-0.05
Dayan5	colleagues	0.08	0.09	-0.15	-0.08
dayanhergu	Every day	0.33	0.32	-0.17	0.08
dayancum15	support definitely no	0.3	0.23	-0.17	-0.06
dayancum21	share prob with neighbors yes	0.22	0.17	-0.17	-0.2
dayancum34	share prob with neigh. yes&no	0.14	0.13	-0.15	0.18
dayanoy	Voting	0.56	0.4	-0.2	-0.01
dayokaile	school org	0.27	0.19	-0.17	-0.12
dayhemser	native meetings	0.07	0.07	-0.15	-0.04
daysiviltop	Non-profit org	0.06	0.07	-0.13	-0.12
guvsucor	opinion crime increased	0.14	0.14	-0.18	0.2
guvsucor1	opinion crime decreased	0.38	0.28	-0.18	0.2
guvgece1	evening feel safe yes	0.21	0.21	-0.17	0.1
guvgece2	evening feel safe sometimes	0.24	0.16	-0.15	0.06
guvgece3	evening feel safe no	0.17	0.13	-0.16	-0.22
guvevde	home safe	0.38	0.31	-0.19	0
Guvev2	home not safe	0.11	0.08	-0.15	-0.32
guvsok	street always safe	0.24	0.21	-0.17	-0.18
guvsok1	crowded street safe	0.2	0.15	-0.15	0.3
guvsok3	street safe	0.12	0.11	-0.16	-0.09
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.02	0

In Figure 4.28, the security index is mapped; the dark areas show the areas with a low awareness of anxiety against the victimization, whereas light green and yellow colored areas represent the households that are aware of victimization. When the map is compared to the socio-demographic-economic index, the awareness of the crime is seen to correspond to the education and economic status. In this sense, it is observed that in the border regions of Incirli to Etlik and Aşağı Eğlence neighborhoods, in the northern sides of 19 Mayıs, in the border where Etlik is connected to Aşağı Eğlence and the interior part of Ayvalı Street in Ayvalı neighborhood, the awareness of crime and the attitude towards prevention are not sufficient when compared to the other neighborhoods.

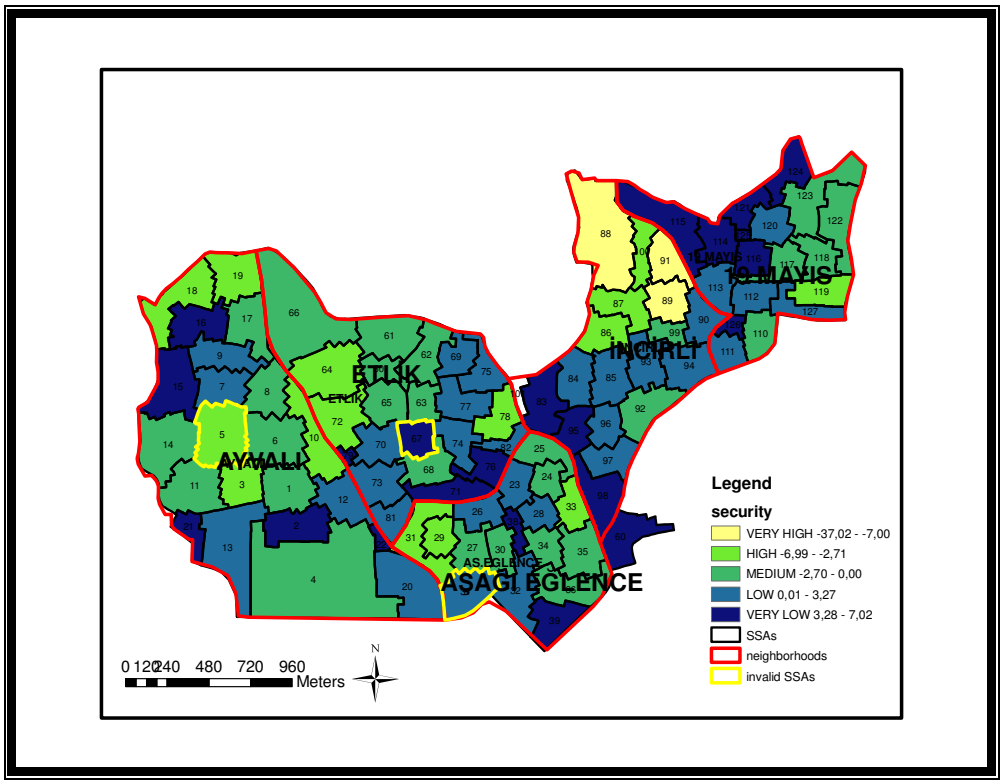


Figure 4.28 Spatial Distribution of Security Index

4.8.3. Precaution Index

Precaution Index shows the precaution of the households towards crime victimization throughout SSA areas. Different from the previous part, one dimension of variable is used, which means that only the variables showing precaution against crime victimization is used during the analysis.

Precaution index questions were asked to investigate the precaution methods used by the households. “How many hours a day is your house empty? (0-2 hours, 2-4 hours, more than 4 hours)”, “How do you protect your house against robbery?”, “Which items do you consider while you choose the house to live?”, “How do you protect your car?” were the questions

asked. The statistics show that 71% of the houses are empty for 0-2 hours. 9% of the households use alarms to protect their cars and only 28% have car insurance. 21% try to protect their car by parking it in front of their home and 7% use wheel locks. 78% of the households protect their houses by steel doors, 33% with iron branches fixed on the windows, 55% use locks and 57% use lighting. None of them use private security companies or guns (Table 4.33). The PCA results with precaution variables show that PCA1 explains 63.41% of the total variance and 90.7% of the cumulated total variance is explained by the 7th PCA (Table 4.34). Table 4.35 shows 23 variables used in creating the precaution index with their weights on the phenomena.

Table 4.33 Percentages of Precaution Variables

SUM_kimyok	SUM_sig_1	SUM_celik_	SUM_alarm_	SUM_demir_	SUM_allah1	SUM_kilit_	SUM_panjur
0.71	0.07	0.78	0.09	0.33	0.17	0.55	0.32
SUM_evgiri	**SUM_balkon**	**SUM_lamba_**	**SUM_komsu_**	**SUM_komsu1**	**SUM_ozelgu**	**SUM_kopek**	**SUM_hicbis**
0.34	0.27	0.57	0.41	0.95	0.00	1.00	1.00
SUM_hicb_1	**SUM_gelene**	**SUM_silah_**	**SUM_mahall**	**SUM_seckom**	**SUM_site_1**	**SUM_secgoc**	**SUM_aracsi**
1.00	0.00	0.00	0.72	0.46	0.16	0.13	0.28

Table 4.34 PCA Calculations for Precaution Indexing

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7
Eigen values:	14.58	1.98	1.37	1.1	0.7	0.58	0.55
% of total variance explained	63.41	8.62	5.96	4.77	3.05	2.52	2.37
Cumulated %of total variance explained	63.41	72.02	77.99	82.75	85.81	88.33	90.7

Table 4.35 Eigen Values and Weight of Variables for Precaution Indexing

PCA WITH PRECAUTION VARIABLES					
Dimension of the multivariate space : 23					
VARIABLES	**EXPLANATION**	**MEAN**	**STDEV**	**WEIGHT PC1**	**WEIGHT PC2**
or_kimyok	empty house less 2h	0.45	0.27	-0.23	-0.05
or_sig1	insurance	0.04	0.05	-0.17	0.12
or_celik	steel door	0.49	0.31	-0.25	0.04
or_alarm	alarm	0.06	0.06	-0.2	-0.03
or_demir	iron branch	0.21	0.19	-0.22	0.12
or_kilit	lock	0.35	0.26	-0.25	0.1
or_panjur	louver	0.21	0.19	-0.24	0.12
or_balkon	balcony	0.43	0.3	-0.25	0.07
or_lamba	lighting	0.17	0.14	-0.22	0.03
or_komsu	neighbor	0.36	0.23	-0.24	0.01
or_ozelgu	private security	0.6	0.41	-0.26	0.08
or_kopek	dog	0	0.01	0	-0.2
or_gelenek	traditional	0	0.01	-0.14	0.2
or_silah	gun	0	0.01	-0.16	0.22
or_mahall	safe neighbor.	0.45	0.32	-0.25	0.06
or_seckom		0.08	0.09	-0.16	-0.51
or_site1	site housing	0.1	0.09	-0.18	-0.39
or_secgoc		0.08	0.09	-0.16	-0.51
or_aracsig	car insurance	0.08	0.09	-0.23	0.05
or_aracal	car alarm	0.07	0.07	-0.19	0.09
or_direk	car wheel lock	0.17	0.13	-0.23	0.01
or_evgir	house entrance	0.21	0.17	-0.19	-0.27
or_allah1	no god protection	0.11	0.19	-0.21	0.2
Check : Sum of square of Eigen vectors = 1					
TOTAL				0.04	0.04

In Figure 4.29, the darker areas show the neighborhoods where the precaution against victimization is low, whereas light green and yellow colored areas represent the neighborhoods in which the households take precaution against crime. When the map is compared to the SES index, it is realized that the tendency to take precaution against crime corresponds to education and economic level; improvements in these levels increase the individual precaution against crime.

When compared to the victimization map, it is also observed that this situation in the neighborhoods with low victimization rate does not result from the precautions taken but instead it overlaps with the economic status. On the contrary, in the neighborhoods where the victimization is low, neither the awareness of crime nor the necessity to take precautions is observed, whereas in the neighborhoods where precautions are taken, these precautions did not have any effect on victimization.

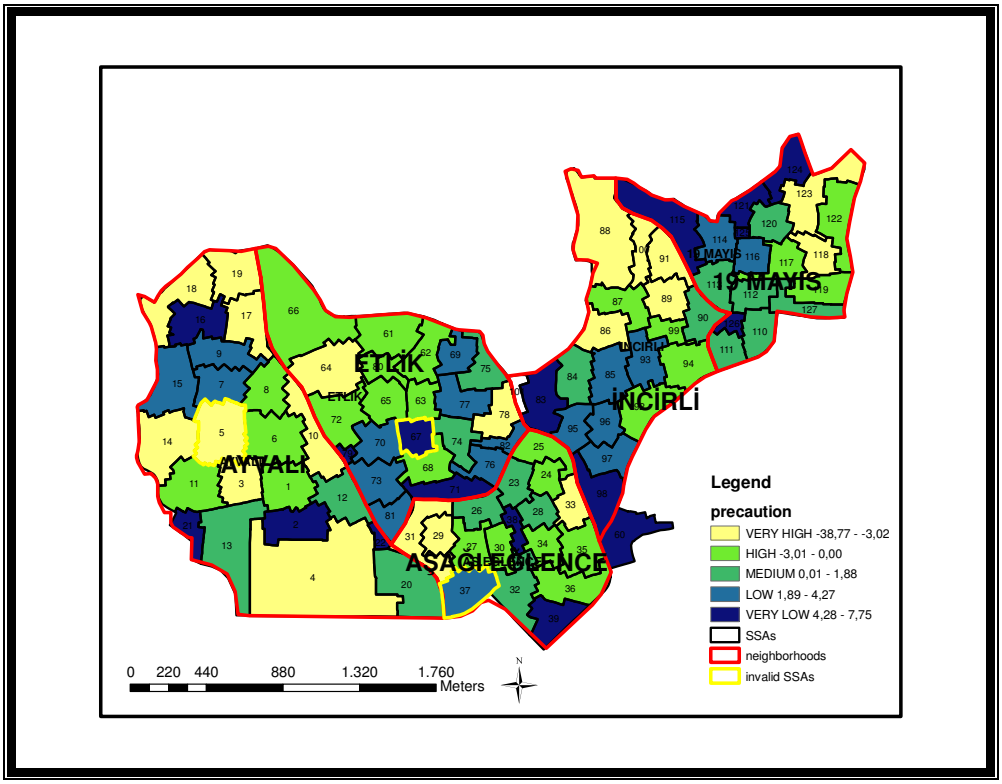


Figure 4.29 Spatial Distribution of Precaution Index

4.9. Correlations among Four Indexes

In this part of the study, the correlations among four indexes are checked, and it is seen that there is a relationship between victimization and non-physical parameters. The Pearson correlation value is over 0.9, which shows high correlations. The model is significant at 0.01 level. This high correlation can be explained with respect to the fact that these four variables are derived from the same household and since the answers are correlated with each other, the indexes are also highly correlated. This result is particularly significant because people who have awareness towards crime use precaution methods, but since these precaution methods are mainly steel doors and alarms, which are individual precaution methods, they are not efficient enough. That's why regions with high economic status have higher victimization even though they apply precaution methods more than low socio-economic groups (Table 4.36).

Table 4.36 Correlation Matrix for Four Indexes

Correlations

		SES	victimization	security	precaution
sosyoecon	Pearson Correlation	1	-.973**	.990**	.990**
	Sig. (2-tailed)		.000	.000	.000
	N	98	98	98	98
victimization	Pearson Correlation	-.973**	1	-.985**	-.982**
	Sig. (2-tailed)	.000		.000	.000
	N	98	98	98	98
goc_day_sec	Pearson Correlation	.990**	-.985**	1	.998**
	Sig. (2-tailed)	.000	.000		.000
	N	98	98	98	98
precaution	Pearson Correlation	.990**	-.982**	.998**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	98	98	98	98

**. Correlation is significant at the 0.01 level (2-tailed).

4.10. Results of Macroscale Analysis

Analysis of 1744 samples shows that 44% of the region graduated from 8 years primary school, 31% from high school and only 21% are university graduates. 70% are working with salary and 8% belong to the lowest income group with an income lower than 500TL (<385$), 42% belong to the second income group, which was (500-1000) TL in 2007 (385-770). 90% own at least one flat. All these results show that the households are from low-mid income group. There are socio-economic differences within the neighborhood since there is an area including the urban renewal. From the socio-economic variables in the multivariate analysis, "being the 2nd income group", "being the owner of house", having "satellite", "2nd TV", " 2nd bathroom", "diploma", "second house", and "Internet" are the most effective variables. When we compared the SES indexes of the regions, it was seen that in the border of Etlik and Ayvalı neighborhoods, which is along the Etlik Street, the socio-economic index is between medium and high results, whereas the western border of İncirli neighborhood has the lowest socio-demographic and economic status. The northern part of İncirli neighborhood, where the reconstruction development has been recently completed, has a high SES, whereas all the SSA regions to the north of Ayvalı have the lowest group of SES (Figure 4.14).

In order to test the reliability of the questionnaire, a socio-economic status index was prepared with the same method but with the ABPRS data provided from the Turkish Statistical Institute, TURKSTAT (2008), and two indices were compared to each other. As 3 of 98 SSA did not overlap, they were not included in microscale analyses (Figure 4.15). In the ABPRS SES Index mapping, almost all parts of Ayvalı neighborhood belong to two lowest income groups. The highest SES values are seen in Etlik and Aşağı Eğlence, which are the busiest regions in terms of commerce in the area. The Etlik Street, which cuts Aşağı Eğlence and Etlik neighborhoods, has business centers, commercial activities, and small

shopping centers all along the street. The ABPRS SES Index shows that the western border of Incirli and the northern part of Ayvalı belongs to the low income group, whereas the northern part of Incirli belongs to the second highest SES (Figure 4.13). When the causes of differences are explored, insufficiency of questionnaires appear to be influential. For instance, in SSA numbered 37, there is a site consisting of four 13-storey buildings with a total of 52 flats and the neighborhood was represented by 8 questionnaires, 4 of which were conducted on the Etlik Street, 2 in secondary roads and 2 in the residential site. In this case, two questionnaires were not enough for the representation of the population of a multistory housing site which belongs to the higher economic status. As a result of this sampling, the neighborhood was mapped as a low SES group.

When the SES index is evaluated, it is noted that socio-economic-demographic status is related to crime victimization. Areas with higher SES values are subject to victimization more than the lower SES areas (Figure 4.14 and Figure 4.18). Groups with similar socio-economic status demonstrate similar behaviors in terms of the awareness of the risk of crime victimization and the precautions they take to prevent the crime. For example, SSA70, 71, 73, 74, 76, and 81 have low socio-economic and demographic status and the precaution map shows that they do not use precaution methods as well (Figure 4.30).

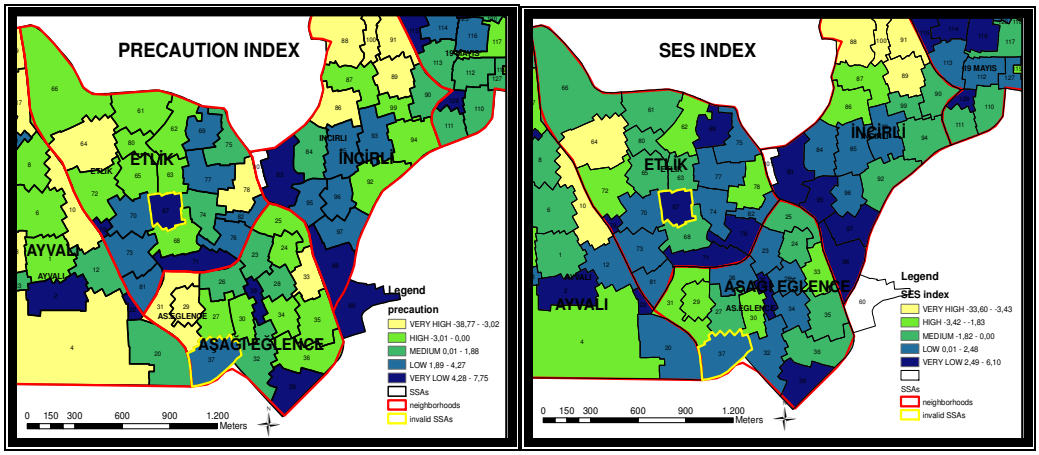


Figure 4.30 Similarities in SES and Precaution Indices

When the results for security and solidarity variables are evaluated, it is seen that this region has neighboring relationships, which can be observed in the recreational gathering areas. Furthermore, the results show that almost half of the households mentioned that they meet with their neighbors every day. Even the statistics show that in the years of 2005 and 2006, crime rates increased by almost 64% (Ankara Chamber of Commerce, 2007). Only 23% of the households think that crime rates increased. Almost 20% do not feel safe on the streets, while 39% of them believe that the streets are safe.

The analysis of the attitude towards crime variables shows that the reaction of the households facing crime changes according to the crime incident and the victims' profile. If the households see a woman abused by a man, only 14% states that they would call the police. This figure is 32% if they see a robbery incident. If they see a burglary in the

neighbor's flat, 78% of them would call the police, according to their statements. This means that the sensitivity of the public increases provided they know the victim; moreover, a crime about sexual abuse is not regarded as a crime to be reported to the police. The answers show that in case of sexual abuse the public starts to analyze the victim's situation and sometimes judge the situation. Another important result is the public attitude towards crime prevention. 50% of the households agree to pay an extra tax to be spent for crime prevention, which means the rest of the households do not agree on the importance of crime prevention.

The attitude towards crime and precautions taken in the neighborhoods overlap with their socio-economic status (Figure 4.17). As the socio-economic status increases, the awareness of the crime and the precautions taken along with it also increase. However, when the victimization map in precautions is analyzed (Figure 4.17), it can be seen that the precautions specified are not actually influential in preventing crime. Especially through the Etlik Street, where trade is centered and which has several office blocks, the overall victimization rank is the highest whereas in the western part of İncirli district where precautions are at the lowest level, overall victimization rank is the lowest (Figure 4.18 and Figure 4.29). Common precautions such as steel doors (78%), locks (55%) and lighting (57%) are not effective. Moreover, door alarms and private precaution systems that are expected to be effective are not used at all. As the rates given are for the whole study area, when SSAs numbered 1, 6, and 12 from Etlik and Ayvalı neighborhoods are considered, it is recognized that vehicle precautions have priority over home precautions (Figure 4.29). The vehicle alarms of six SSAs that are analyzed, in comparison to home alarms, are 22%-9% for SSA1, 8%-4% for SSA6, and 47%-0% for SSA12. When the precautions taken at home are compared to the highest burglary victimization rates in Table 4.37, in SSA1 where the burglary victimization rate is higher, the use of locks is the lowest. On the other hand, in the other SSAs, the use of precautions like steel doors and locks are high since the households think the victimization is high in the neighborhood. We can say that the fear of victimization results in an increase in the precautions. Nevertheless, these precautions taken at homes have not been influential in decreasing the crime victimization; in fact, in today's world, precautions such as locks and steel doors can easily be deactivated.

Table 4.37 Precaution rates

SSA	Burglary victimization rate %	Steel door rate %	Lock rate %	Lamp rate %	Door Alarm %	House empty for more than 2 hours
1	**77**	**68**	59	18	9	36
6	**60**	**69**	47	21	4	21
12	**64**	**100**	100	11	0	34

When the burglary victimization is mapped, it is seen that the burglary victimization rates are higher in Aşağı Eğlence, in the section where Metro Gross Market exists, and the middle part of Etlik and Ayvalı districts. Similar to victimization, burglary victimization rates also increase as the SES increases. Density do not have a significant effect on burglary victimization (Table 4.29). When the burglary victimization is compared to the overall

victimization, it is seen that in many areas they have certain similarities; when the overall victimization is high, burglary victimization also gets higher. However, when analyzing Etlik and Aşağı Eğlence neighborhoods, through the Etlik Street, it is seen that SSA1, SSA6, and SSA11 have both high overall victimization and burglary victimization, while SSA72 has high overall victimization but middle burglary victimization. This shows that in this area the victimization for other crime types (robbery, pickpocket, auto theft) are higher. Along the northern parts of the Etlik Street, SSA17 and SSA19, both overall victimization and burglary victimization are high. This shows that as the commercial activities decreases along the Etlik Street, the burglary victimization increases. In Aşağı Eğlence neighborhood, SSA23 and SSA26 have middle overall victimization but high burglary victimization levels. In SSA30, which is located in the middle of Aşağı Eğlence neighborhood, the overall victimization is high but the burglary victimization is even higher (Figure 4.31).

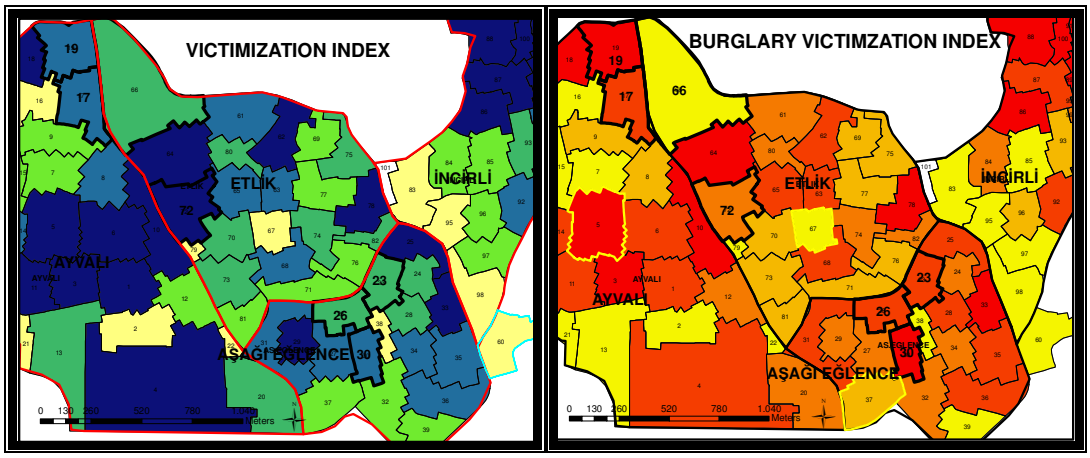


Figure 4.31 Differences in Overall Victimization and Burglary Victimization

When the victimization of other crime types are evaluated, it is seen that auto theft and property theft from auto is higher in areas with health and education facilities. In Aşağı Eğlence, the SSAs around the Tevfik Sağlam Street have the highest auto and from auto victimization. As to the extort victimization, the Aşağı Eğlence neighborhood and SSAs along the 19 Mayıs and Yunus Emre Street have the highest victimization rates. Robbery and pickpocketing victimization rates show similar results in SSAs with high economic status like Aşağı Eğlence, the northern İncirli, and around Yunus Emre and Giresun Streets which stands parallel to the southern border of the İncirli neighborhood, have high robbery and pickpocketing victimization rates (Figure 4.26 and Figure 4.27).

One of the most important factors influencing crime victimization is the socio-economic status. Areas with higher SES values are subject to victimization more than lower SES areas. The perception of security and precautions are also related to the SES. As the socio-economic status increases, the awareness of crime victimization, the fear of victimization, and the precautions taken increase, too. The precaution methods, which are mainly steel doors, lamps, insurance, and alarms, do not have significant effect on the victimization. The areas which are subject to victimization are also the areas that use precaution methods more

than the other areas. In the study area, the Aşağı Eğlence neighborhood, the northern part of Incirli and the middle part of Ayvalı have higher victimization, yet in these areas SSA5 from Ayvalı, and SSA37 and SSA67 from Aşağı Eğlence do not represent the model when they are compared to the ABPRS SES indexes, so they are excluded from the micro analysis.

When the overall victimization and the burglary victimization are compared, it is seen that there is a correlation between them; areas with high overall victimization also have high burglary victimization, but in certain sections along the Etlik street and Aşağı Eğlence, some areas belong to the lower burglary victimization groups. This can be caused by the effect of commercial activities in these regions, which increase the victimization of other crime types and decrease the burglary victimization. Other crime types like robbery and pickpocketing victimization is higher in the SSAs with a higher SES; on the other hand, the victimization of auto theft and property theft from auto is higher in the SSAs with, health and education facilities. For the extort victimization, Aşağı Eğlence has the highest victimization rates especially around the Tevfik Saydam and Giresun Streets; in contrast, the rates are low around the Etlik Street. The SSAs in land use maps with a mixed use of commercial and residential buildings show higher victimization rates for robbery and pickpocketing. No effect of commercial activities was observed on an increase of burglary and auto theft rates and no effect was observed for squatter housing parts. Since all the crime types have the highest rates in Aşağı Eğlence, Aşağı Eğlence neighborhood is selected for the local analysis including the Etlik Street, which has the highest commercial activity and the heaviest traffic in the area, to make a detailed analysis and evaluate the facts on the burglary victimization.

CHAPTER 5

MICROSCALE ANALYSIS
ANALYZING PHYSICAL EFFECTS ON BURGLARY VICTIMIZATION

Criminologists, planners, and architects have different perspectives on the offenders' choices of crime location. Criminologists associate crime with socio-demographic factors such as income, education, or racial composition. On the other hand, architects associate crime with environmental factors such as physical design and orientation of environment, lighting, target hardening, etc. (Nubani and Wineman, 2005).

In the previous chapter the effects of non-physical factors such as the socio-economic status, precautions and the perception of security on crime victimization were analyzed. In this chapter, the physical factors that may affect crime victimization is evaluated as a planning concept. The burglary incidents specific to locations are not available; that's why, it is not possible to analyze the actual burglary rates. Instead, the perception of burglary victimization given by the households in the survey is taken as the type of victimization for the analysis. The other crime types such as robbery or car theft can occur in any part of the city, but since the area is a residential one, it is possible to derive burglary victimization and its relationship with physical factors. The local analysis is carried out in two parts. In the first part, a database is created for the road network, which shapes the city structure and thus the activities of the city. The two parameters, "building density" and "connectivity", are evaluated on road network and related with the burglary victimization. In the second part, the physical properties of the city structure on buildings are transferred into a database by making a land use and field survey. The number of floors in the building, the road degree faced by the building, the physical properties of buildings such as the existence of a garden, walls, entrance, the entrance side on the building (front-side), and elevation differences are evaluated with regards to their relationship with burglary victimization (Figure 5.1).

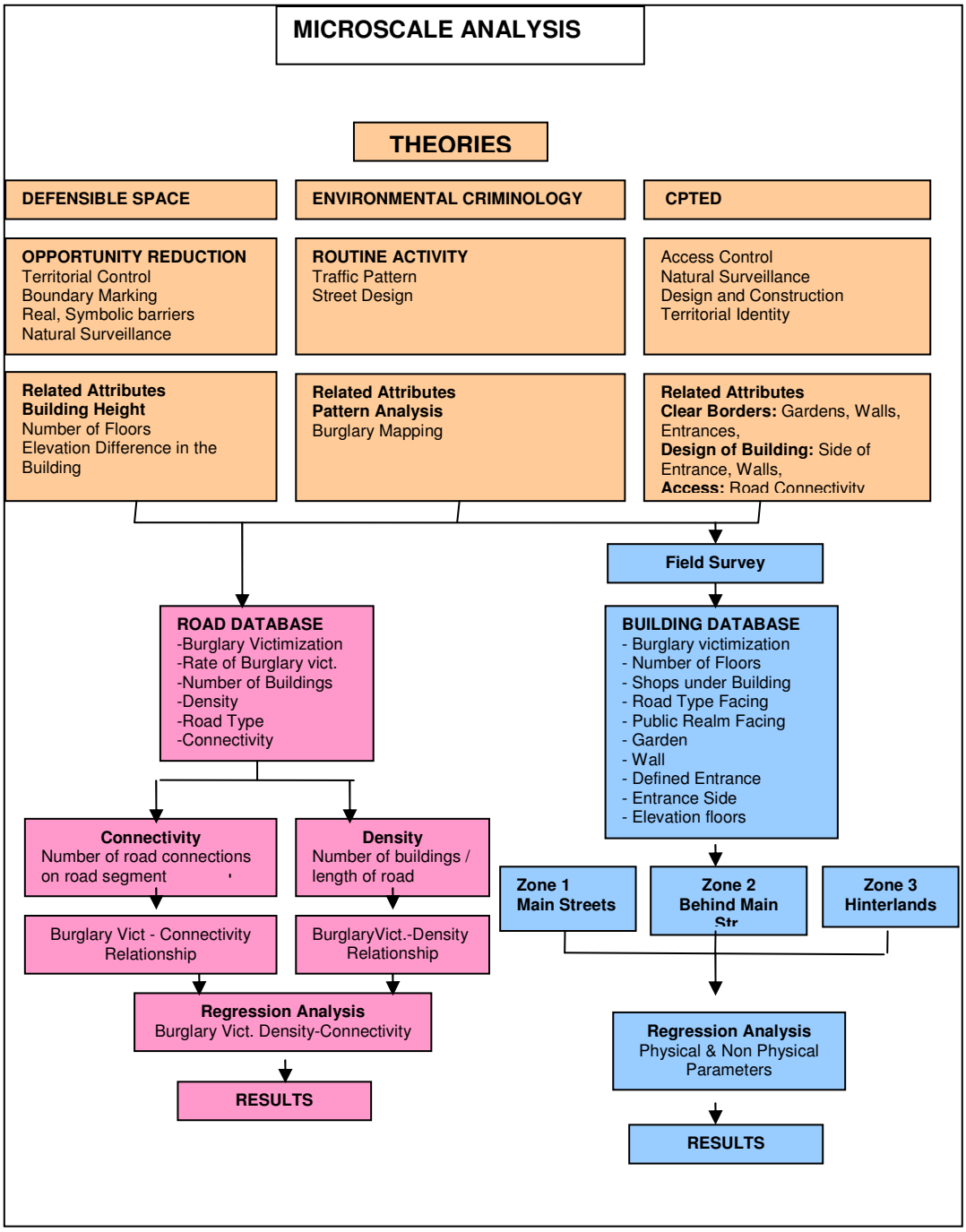


Figure 5.1 Methodology for Microscale Analyses

Theories of crime prevention which lead to today's crime prevention strategies were summarized in Chapter 2. Newman (1972) suggested "Territorial Control, Boundary Marking, Real and Symbolic Barriers, and Natural Surveillance" as important elements in opportunity reduction. He found a direct relationship between the building height and the occurrence of crime, which shows that burglaries also occur with higher rates in high-rise buildings than in their lower-rise counterparts (Schneider, 2007:20.). Jefferey's (1971)

CPTED, Crime Prevention through Environmental Design, explained design strategies to prevent crime. Jefferey mentioned four important aspects in his method, namely Access Control, Design and Construction, Territorial Identity, and Natural Surveillance. "Good Access Control exists when we have the ability to regulate who enters and exits an area or building. Surveillance is the ability for the legitimate users of a space to observe their surroundings" (Jones&Barlett Pub., 2013:103). Three important theories were taken as reference throughout the study, Defensible Space, Environmental Criminology, and CPTED. The referenced physical parameters and their referenced theories are given in Table 5.1.

Table 5.1 Physical Attributes Referenced to Theories

NAME OF THEORY	SUPPORTED CRIME PREVENTION PARAMETERS		ATTRIBUTES IN PHYSICAL PARAMETERS ANALYSIS
DEFENSIBLE SPACE	TERRITORIAL CONTROL	LEGITIMATE - NON LEGITIMATE USERS' USE	Shops Under Building
	BOUNDARY MARKING		Parcel Walls, Defined Entrance
	REAL&SYMBOLIC BARRIERS		Gardens, Walls,
	NATURAL SURVEILLANCE	BUILDING HEIGHT AND NUMBER OF DWELLINGS IN BUILDING	Building Density, Building Face Road, Entrance Side, Building Face to Public Realm,
ENVIRONMENTAL CRIMINOLOGY	TRAFFIC PATTERN	PATTERN ANALYSIS CRIME MAPPING	Road Connectivity
	STREET DESIGN		
CPTED – CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN	ACCESS CONTROL	ACCESSIBILITY TO TARGET AND BARRIERS	Walls, RoadType which Building Face, Connectivity
	DESIGN AND CONSTRUCTION	QUALITY AND DESIGN OF THE BUILDING	Entrance Side, Walls, Gardens
	TERRITORIAL IDENTITY	CLEAR BORDERS IDENTIFYING PRIVATE AREAS	Building Face to Public Realm, Commercial Use in Building (Shops)
	NATURAL SURVEILLANCE		Entrance Side, Facing Public Realm

One of the countries which uses a well-defined planning policy on crime prevention is the United Kingdom. It has a national planning policy statement which focuses on the lists of attributes that are relevant to crime prevention.

1. Access and Movement: Places with well-defined routes, spaces and entrances that provide convenient movement without compromising security.
2. Structure: Places that are structured so that different uses do not use conflict.
3. Surveillance: Places where all publicly accessible spaces are overlooked.
4. Ownership: Places that promote a sense of ownership, respect, territorial responsibility and community.
5. Physical Protection: Places that include necessary, well-designed security features.
6. Activity: Places where the level of human activity is appropriate to the location and creates a reduced risk of crime and a sense of safety at all times.
7. Management and Maintenance: Places that are designed with management and maintenance in mind to discourage crime in present and future (Chiarada et al., 2009).

Most of the surveys which focus on spatial effects on crime prevention evaluate different crime types with different spatial factors. The crime types such as auto theft or robbery have a possibility to occur in another part of the city. Therefore, since the survey is applied to the households and the area is a housing region, the relationship of burglary victimization with physical parameters are analyzed. Unfortunately, the data about burglary incidents is not available and the related questions in the survey do not give sufficient answers. That's why, in this part the burglary victimization of the households in their neighborhood will be evaluated rather than the actual burglary incidents.

Considering the literature reviews and the theories, most importantly the physical properties of the study area and the possibilities to reach necessary data, the physical attributes that may affect burglary victimization is defined (Table 5.1).

In this part of the study, the relationship between the burglary victimization and physical parameters such as building density, road connectivity, facing main or secondary roads, facing public realm, the availability of garden, wall and defined entrance, the entrance side, the use of building, the availability of elevation, and the number of floors are evaluated. The Aşağı Eğlence neighborhood is taken for the microscale analysis for the reasons that in Chapter 4, this neighborhood has the highest crime victimization rates for all types of crime and within this area it is possible to analyze both the main street with high commercial and traffic activities and residential areas without trade facilities, less traffic load or other public facilities.

In Figure 5.2 and Figure 5.3, the microscale study area is given. The microscale analysis is carried out in this region in order to evaluate the effect of physical parameters on burglary victimization.

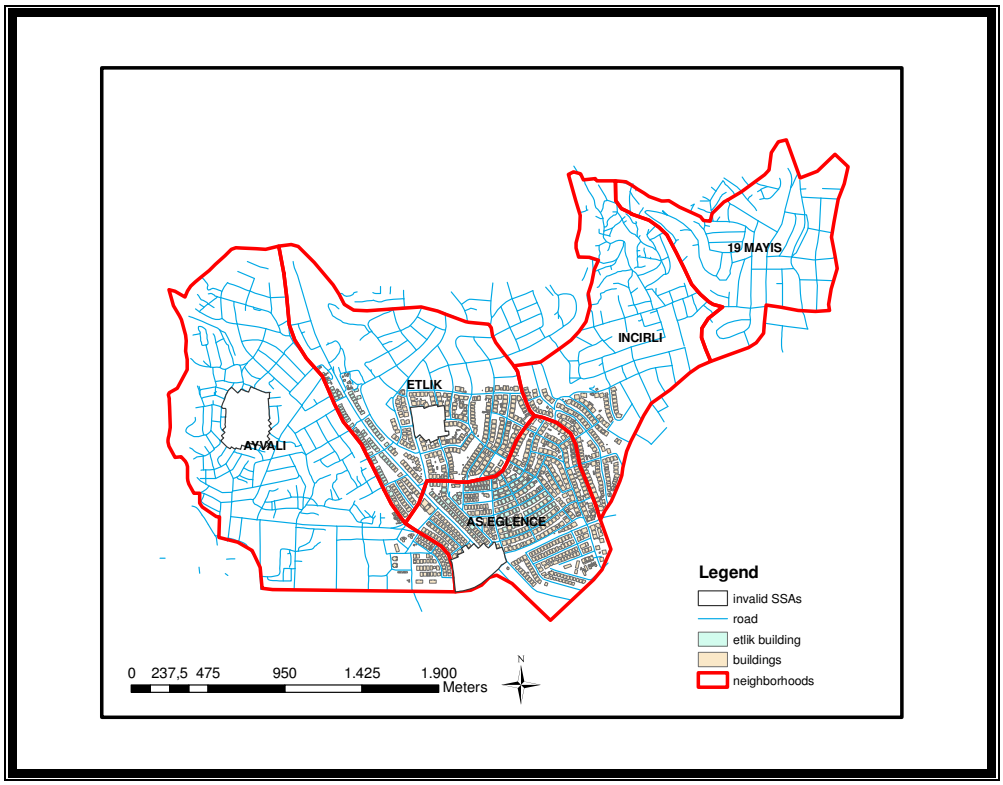


Figure 5.2 Local Study Area on Regional Study Area

In Figure 5.3 the red lines represent the border of Aşağı Eğlence Neighborhood, the white polygon areas are small statistical regions which do not coincide with the SES Index made with the ABPRS values in Chapter 4. The pink colored buildings represent Zone 1, yellow colored buildings represent Zone 2, and the color peach represents the areas of Zone 3. In Figure 5.4, the green dots represent the buildings in which the survey is applied. It is seen that the survey is well-distributed in the region, and the red dots in Figure 5.5 show the buildings with burglary cases.

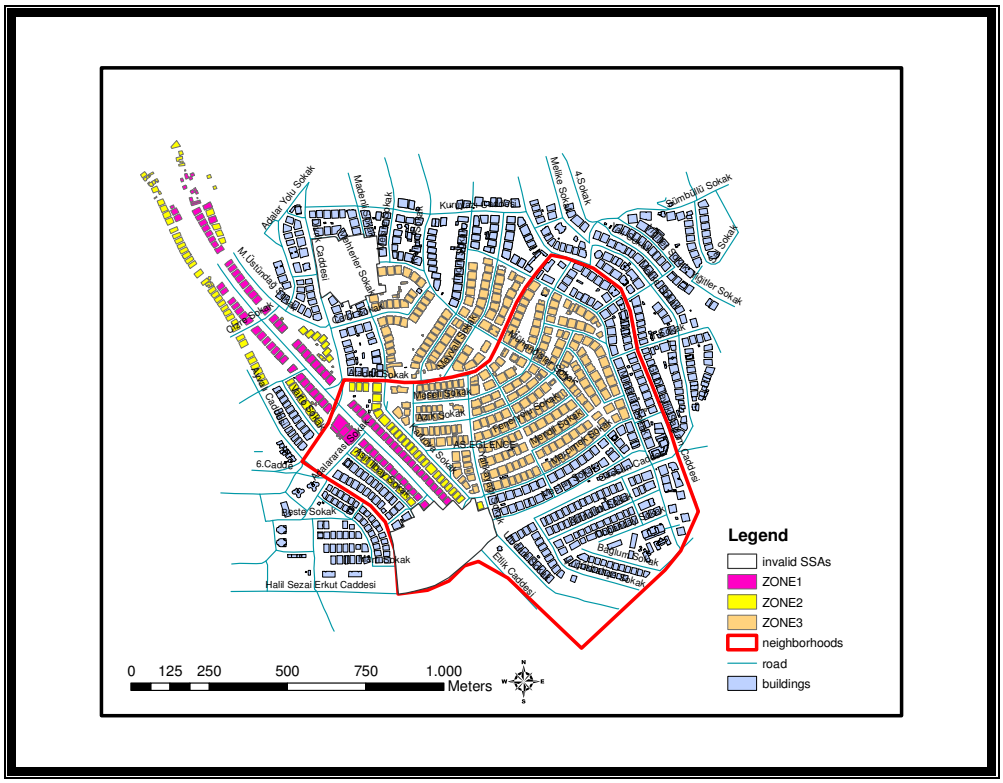


Figure 5.3 Zones in Local Study Area

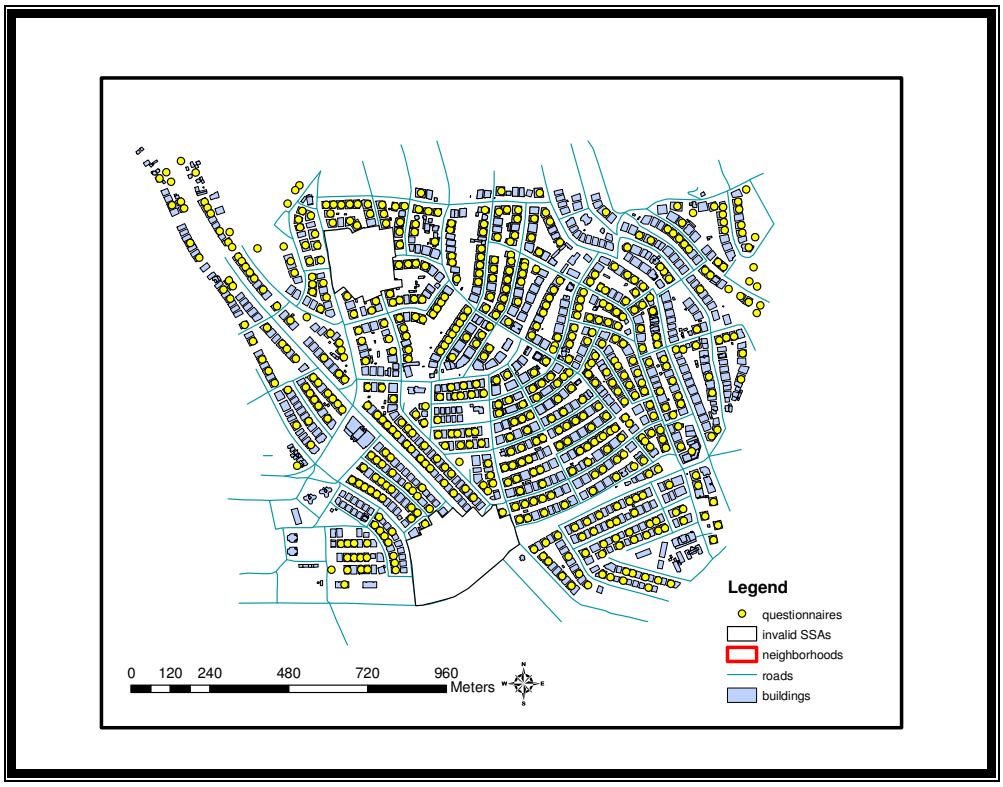


Figure 5.4 Map of Buildings Where the Questionnaire is Performed

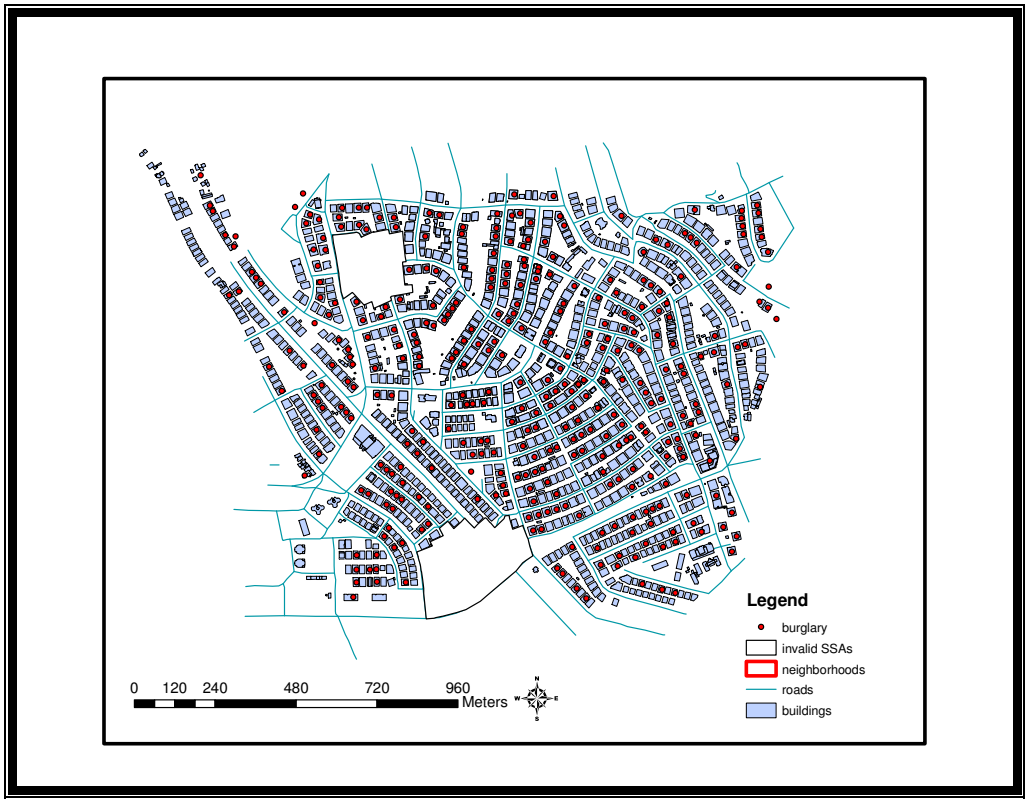


Figure 5.5 Map of Buildings with Burglary Victimization

In this part of the study, two types of databases are created in order to make the analysis. First, the road database is created (Appendix H). The database is used for analyzing burglary victimization rates, connectivity and density analysis; therefore the database has attributes such as the name of road (TR_Adı), the length of road segment (LENGTH), the use of road, roads for residential use, roads for public activities (mix)(USE), the number of burglary victimization incidents in road segment (OTO), burglary victimization rate in road segment (DIGERORAN), the number of surveys in road segment (ANKETSAYI), survey rate (the number of questionnaires / the number of buildings) (ORAN), and the number of intersections with other roads on road segment (INTERSEC).

With the database, first the burglary victimization is rated for each road segment. Figure 5.6 shows the roads which have victimization rates over 80%. As can be seen from the map, the main roads such as Etlik and Ayvalı Streets do not have high burglary victimization. Only the road segment which is connected to the shopping malls and business centers has high burglary victimization rates. On the other hand, Figure 6.6 shows the burglary victimization below 25%. In this map it is seen that the victimization is low around trade or public buildings and the main roads.

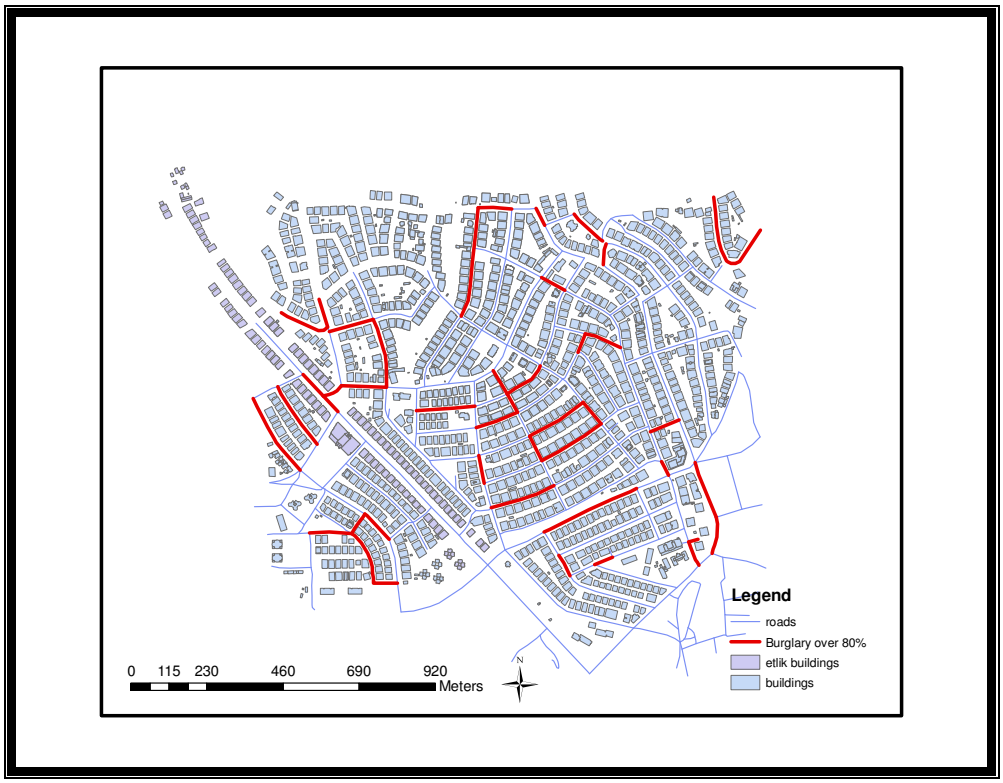


Figure 5.6 Map of Roads with Burglary Rates over 80%

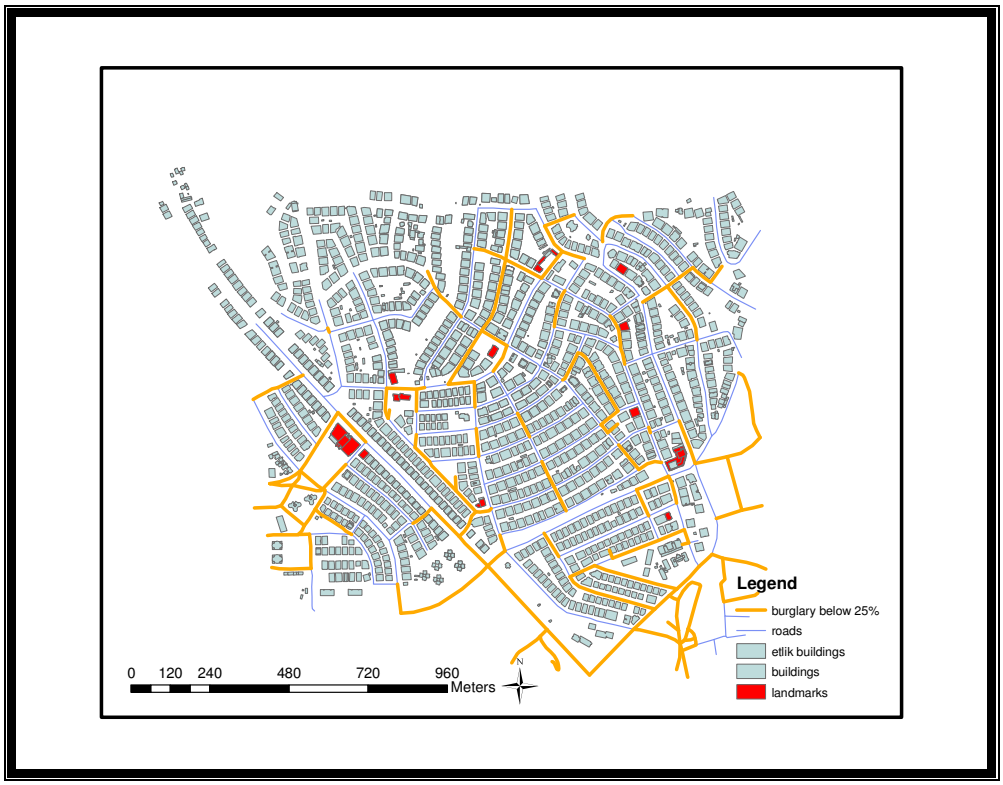


Figure 5.7 Map of Roads with Burglary Rate Below 25%

5.1. Accessibility Measured by Road Connectivity

In their nature, cities are dynamic, movement-based systems, and movement is shaped in the first instance by the configurations of its street network (Hillier, 2005). According to crime prevention theories, the target hardening, target value, runaway time and social surveillance are important factors on crime victimization. The accessibility to the target and how to escape from it affects the attractiveness of the target for the offenders. The offenders commit crime when there is a profit from the risk and effort-profit equation, and the theory of "rational offender" is based on the opportunity of the offender to commit crime.

How can the accessibility of the road be measured? Many factors such as the degree of road, the number of connections on road segment, and the traffic flow of the road can affect the accessibility. Numani and Wineman's explain accessibility of roads with Integration- "an indicator of how easily one can reach a specific line" and Connectivity- "the number of lines that are directly connected to a specific line" (Nubani and Wineman, 2005:416). Hillier's (1999) and Peoponis (1997) also measure the effect of connectivity on crime in their studies. With reference to these studies, connectivity, which is measured by the number of connections on road segment, is used to measure the road accessibility. By using GIS, a road network is created. Each line segment represents the road segment, whereas each connection point represents the crossroads. In Figure 5.8 it is seen that a connection can be done in six different levels. 1 means the road is connected to only one more road segment, 2 means the road segment is connected to two other road segments. The level of the connectivity shows the number of connections and the connectivity number 6 represents the grid system, which is widely used in Turkish cities.

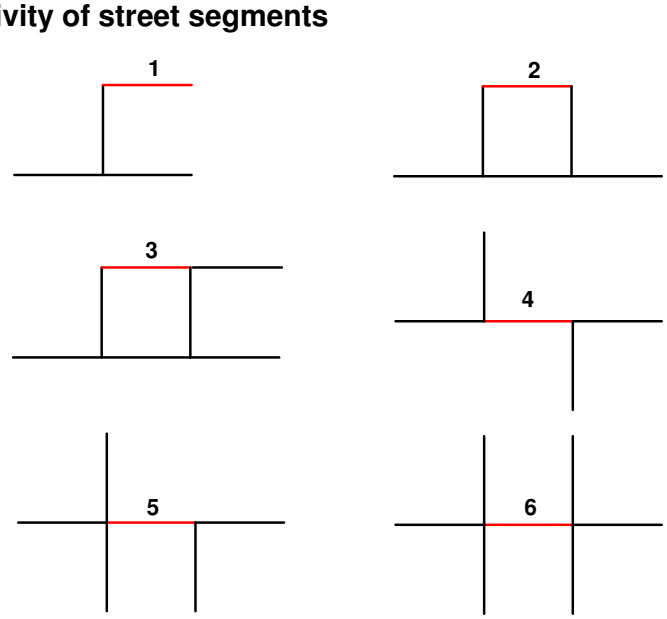


Figure 5.8 Connection of Road Segments

For the study area, an attribute is created for the road database showing the level of connectivity. Figure 5.9 shows a map of the study area showing the degrees of connectivity. The green and yellow lines represent the road segments with low connectivity, whereas orange and red colored lines represent higher connectivity with more than four connections. As the degree of connectivity increases, the level of accessibility increases as well, since reaching the target and the opportunities to escape from it will be easier. It is seen that the accessibility of the main roads are lower than the secondary roads which are located towards the inner part of the study area. It is seen that the inner parts with residential areas have the grid structure and high connectivity.

Figure 5.9 Map of Road Connectivity Levels

5.2. Density of Roads

A general perception states that there is a positive relationship between the population density of cities and crime rates. Crime rates are high in urban environments where the population density is higher than rural areas, which creates a general opinion that population density affects crime. This opinion was proved in Nolan (2004) by showing the relationship between population size and crime rates. The relationship between population density and crime rates were also proved by Harries (2006), who said higher population densities were associated with higher levels of violent and property crimes. When a city has a rapid growth, it does not only affect the population or the density of the city but it also changes the socio-

economic structure and the land use in cities. It is not possible to associate crime victimization with merely one variable. However, in this part the effect of density on burglary rates is evaluated and later a correlation is established to see the relationship between burglary victimization and density. “Nominally, density refers to the number of persons per unit area. However various modifications can be made in the hope of producing more refined measures” (Harries, 2006:1). In this part building density per road length is used as unit of density. In order to make an analytic calculation for the roads, it is seen in Appendix H that a database is created on the attribute table of roads, showing the number of buildings, the number of road junctions, the use of roads, the number of questionnaires, burglary victimization, and the rates of burglary victimization. In order to calculate density, the number of buildings is divided by the length of each road segment. In the previous Chapter, in macroscale analyses, population density for small statistical areas were evaluated, in microscale the risk of the roads which buildings face is aimed to be analysed, hence using the density in road length unit was preferred. In order to calculate the density of each road segment, number of buildings are divided by the length of the road segment in meters.

Density= number of buildings / length of the road segment in meters

In Appendix H, in a view from road database, it is seen that all the density values are added to the road database as a new attribute. In order to evaluate the changes in the burglary rates according to density, an x-y graph is created for the first case area. In Table 5.2, burglary is actually Burglary rates, which is;

Rate of burglary vict = number of burglary vict / number of questionnaires (on the road segment)

In Figure 5.10 it is seen that density has a negative effect on burglary rates. As the number of buildings on road segment increases, the burglary rates increase as well. As the number of the buildings increases in the road segments, so does the number of targets, and since it is difficult to create a natural surveillance, it is easier to reach and escape from the target for the burglars. This may be the explanation, yet it cannot give a conclusion because the structure of the area does not give such big density changes. Within the whole study area, the densities vary in different SSAs, but in the parts with low density, the building structure is with squatters and the comparison of squatter areas with apartment housing areas may not give reliable results.

Table 5.2 Burglary Rate – Density Changes

Density	Burglary
0.0 - 0.01	0.142857
0.02-0.03	0.240981
0.04-0.06	0.337549
0.07-0.08	0.527489
0.09-1.00	0.501944

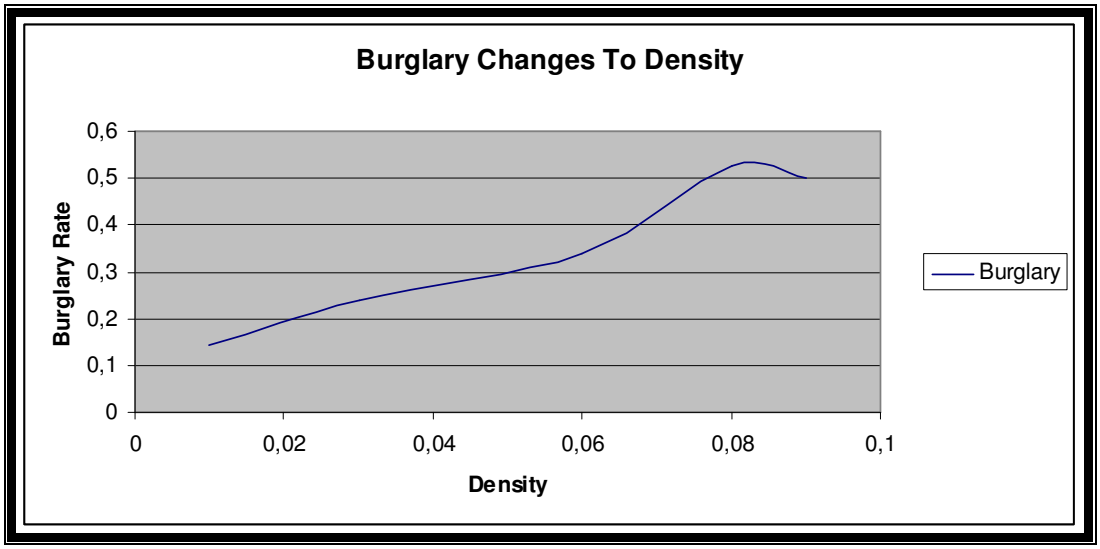


Figure 5.10 Burglary Rate Changes According to Density

Until now the burglary rates to building density and the connectivity levels of the roads have been evaluated. In the following part, the correlations between burglary rates and road connectivity levels and building density of the roads is going to be checked.

Density and connectivity, which is called as the variable = "INTERSECTION", are regressed on burglary rates. The model is significant Sig= 0.00, R^2 is 0.153, which means that 15% of the variation in burglary rate is explained by density and connectivity. Both covariates are significant at the p=0.01 level. Since VIF values are smaller than 10, there is no multicollinearity in the model. To explain the model, density has a higher effect with Standardized Beta of 0.298 than connectivity with Standardized Beta of 0.174.

Table 5.3 Regression Results of Burglary Rates Density & Connectivity

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.391[a]	.153	.146	.3650621

a. Predictors: (Constant), INTERSEC, density

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.882	2	2,941	22.068	.000[a]
	Residual	32.651	245	.133		
	Total	38.533	247			

a. Predictors: (Constant), INTERSEC, density

b. Dependent Variable: BURGLARY RATE

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-.016	.069		-.236	.814		
	density	3.666	.766	.298	4.785	.000	.893	1.120
	INTERSEC	.043	.016	.174	2.793	.006	.893	1.120

a. Dependent Variable: BURGLARY RATE

5.3. Building Properties

In the previous chapter, a model was created to 'differentiate' and 'group' the victimization in SSAs according to socio-economic- demographic, precaution and other social parameters. All the data were at macroscale represented by SSAs. In this section, we are going to explore which physical parameters influence victimization at microscale which is represented by households and buildings.

The parameters obtained from the literature such as accessibility, proximity to targets, possibilities to escape for offenders, physical barriers, and natural surveillance were referenced to decide the physical building parameters. In such a study, it is difficult to access the data; therefore, a field survey is done and the necessary physical parameters are collected.

Table 5.4 shows the attributes in the building database. The number of targets is represented by the number of floors and elevation; as the number of floors increases, the number of targets increases and the attractivity of the building for the offenders increases. The floor number is given by integers; according to this, the number "3" means that the building has three floors counted from the front facade. If the elevation attribute is "1", this means there are additional floors because of the elevation difference on the back side of the building. Existence of Shops in the Building, Facing Public Realm, and Entrance Side are important for natural surveillance. As the number of people who keep an eye on the environment increases, the offenders' risk increase as well. On the other hand, shops in the buildings may also have a negative effect on crime victimization since the residents of the buildings may not control non-residents in the building. The effect of this factor is evaluated during the analysis. The accessibility to the target is measured by the road degree, building stands and connectivity, as the number of the road segments increase, it is easier to reach the target and escape from it. Therefore, if the building is on one secondary road, it is represented by "1"; if it is on the cross of 2 secondary roads, it is represented by "2". If it is in the cross of one main and one secondary road, "3" is given and if it is on the main street "4" is given in the data set. The physical barriers were only gardens, walls and defined entrances in the study area, so the existence of these variables are coded as "0" and "1".

Table 5.4 Attributes in Building Database

Parameters Influencing Crime Victimization Derived From Crime Theories	Attributes In Building Database	Description of Data	Data Type
Number of Targets	Floors	The data shows the number of floors from entrance	Integer
	Elevation	Shows the availability of additional floors from elevation difference	0- No elevation floors 1- Elevation floors
Natural Surveillance	Shop	Availability of shops under the building	0 - No shops 1 - Shops
	Face Public	Building face to public realm, parks, schools, mosque etc.	0 - No Public Face 1- Public Face
	Entrance Side	Entrance side of the building	f – in front facing road s- side of the building
Accessibility To Target	Road	Number and Degree of Roads Building Face	1 - face 1 secondary road 2- face 2 secondary roads 3- face 1 secondary 1 main road 4- face main roads
Physical Barriers	Garden	Garden in front of building	0 - No garden 1 - Garden
	Wall	Parcel Wall as a barrier	0 - No wall 1 - Wall
	Entrance	Defined Entrance	0 - No Defined Entrance 1 - Defined Entrance

The study area selected for microscale analysis has differences within the area, concerning commercial facilities, traffic load, the use of buildings and most importantly, high victimization. Aşağı Eğlence is a district where trade is intense and has hinterlands standing solely for dwelling purposes. As can be seen in Figure 5.6 and Figure 5.7, the burglary victimization is lower on the main streets. Yet, the majority of the road segments with high burglary victimization are connected to the main streets or on secondary streets. This road structure of the area influences the crime victimization. For this reason, the analysis is run in three groups which are related to this structure.

1. Zone 1: Buildings on the main streets (The Etlik Street as a case).
2. Zone 2: Buildings behind the main streets that do not face the main street (Buildings behind the Etlik Street).
3. Zone 3: Alleys and hinterlands (Buildings on the secondary roads which do not coincide with the main streets.)

Before starting the detailed analysis, the burglary victimization rates for these three zones are calculated (Table 5.5). The highest rates of the burglary belongs to the 3rd zone, which is buildings on the secondary roads on hinterlands. It is followed by the 2nd zone, which are the buildings behind the main street, Etlik Street, whereas the Etlik Street stands as the zone with the lowest burglary rate.

Table 5.5 Burglary Rates in 3 Zones

	ZONE 1 ETLIK STREET		ZONE 2 BEHIND ETLIK STREET		ZONE 3 HINTERLAND	
Code	# Burglary vict .	Percentage	# Burglary vict.	Percentage	# Burglary vict.	Percentage
0	29	57 %	22	52.4%	64	35%
1	22	**43 %**	20	**47.6%**	121	**65%**

5.3.1. Zone 1: Main Roads – Etlik Street

The Etlik Street is one of the busiest parts of the region with intense commercial activities, shopping and business centers, public transportation and heavy traffic. Along the Etlik Street, there are residential apartment buildings with 4-5 floors and trade locations under the buildings. In addition to shops under the buildings, there are also buildings for commercial uses such as banks, restaurants and confectionaries. The underside of the street is within the administrative borders of Aşağı Eğlence neighborhood and from the part where it connects with the Divrik Street, it belongs to the administrative borders of the Etlik neighborhood. In the section of the street that is within the borders of Aşağı Eğlence, the use of trade is intense and in the western part close to the Ayvalı neighborhood there is a big shopping and business center. In one part of the Etlik Street, within the borders of Etlik neighborhood, lesser use of commerce and areas mostly used for housing and parking are observed throughout the street. In this part of the street, the area between M. Üstündağ and Etlik Streets, there are still squatters while the renewal has been completed in the part across the street and it was turned into a recreational park area. This park area between the Ayvalı and Etlik Streets were represented with two questionnaires which were applied to the squatters in the survey studies. Yet they are included in the study although they were destroyed and turned into a recreational area.

Because of the differentiation between the lower and higher parts of the Etlik Street, the analysis in Etlik Street is applied in two groups as the Etlik Street in the Aşağı Eğlence neighborhood and the Etlik Street in the Etlik neighborhood. In Figure 5.11, the two parts of the Etlik Street is given.

Figure 5.11 Map of Etlik Street – Zone 1

In Table 5.6 the frequencies of the physical variables of Etlik Street are given. As can be seen, the burglary victimization rate over the street is 43%, which is low concerning the rest of the area. 83% of the buildings have commercial activities, shops, banks, and restaurants under the buildings. Because of the commercial use of the entrance floor, only 16% of the buildings have gardens and 14% have walls. 90% of the buildings have 4-5 floors, and 34% of them have elevation difference floors (kot), generally one or two floors. 36% face the public realm, but since the street is one of the most crowded parts of the region, the whole street can be assumed to face the public. The buildings in the zone have uniform structure.

Table 5.6 Frequency Table of Zone 1

Frequencies for Zone 1 Etlik Street						
Code	# Burglary victimization	Percentage	Shop	Percentage	Public Realm	Percentage
0	29	57%	9	17%	33	64%
1	22	43%	42	83%	17	36%
Code	Garden	Percentage	Wall	Percentage	Defined Entrance	Percentage
0	43	84%	44	86%	38	75%
1	8	16%	7	14%	13	25%
Code	Elevation	Percentage	Code	Entrance side	Percentage	
0	34	66%	front	9	17%	
1	17	34%	side	42	83%	
	Floor	Percentage	Code	Road	Percentage	
1	2	4%	1main	41	80%	
4-5	46	90%	1main 1 sec	7	14%	
6	1	2%	2-3 main	3	6%	
13	2	4%				

5.3.1.1. Etlik Street in Aşağı Eğlence Neighborhood

In both the eastern and western sides of the Etlik Street in Aşağı Eğlence, the burglary victimization rate is 20% along the street. Compared to that of the microscale area in general, this rate is low. This part of the street is the busiest part of Etlik street, and since the buildings have similar structure, the low rates can be explained by the natural surveillance principle of ecological crime theories. The satellite image is seen in Figure 5.12. In Figure 5.13, the buildings colored with peach represent the buildings in which the survey was applied and the red buildings are those where burglary victimization incidents took place.

Figure 5.12 Satellite Image for Etlik Street – Aşağı Eğlence Neighborhood

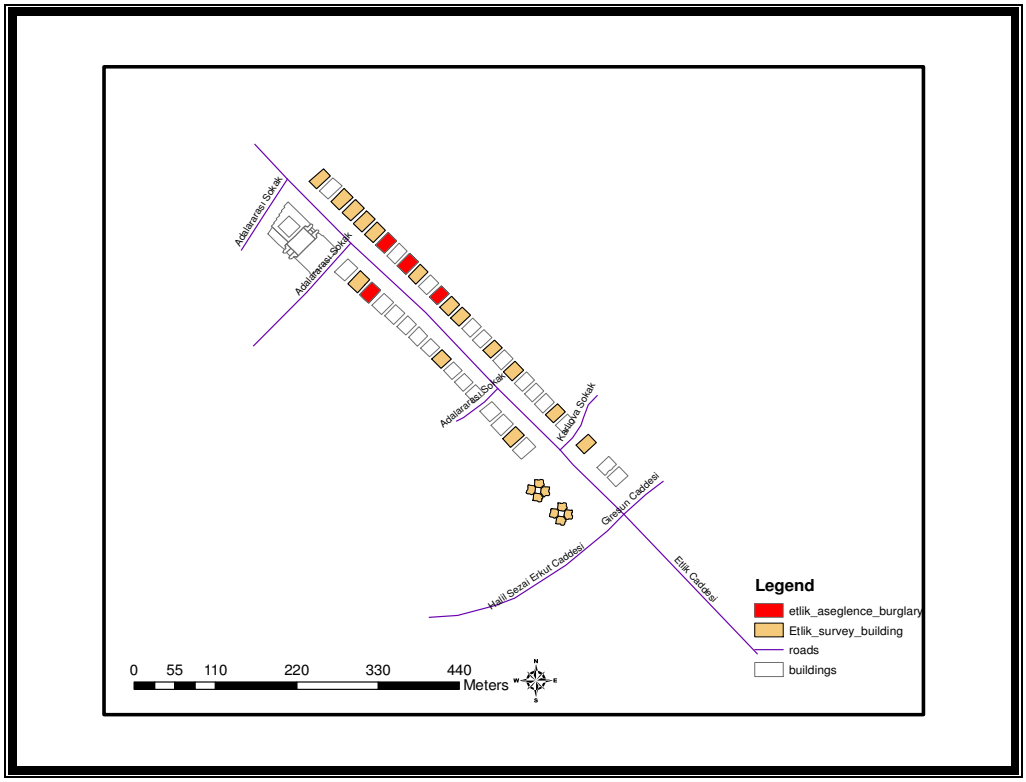


Figure 5.13 Buildings of Etlik Street - Aşağı Eğlence Neighborhood

100% of the burglary victimization incidents are observed in the buildings which have no gardens or walls and which have commercial use on the entrance floor. Since 90% of the buildings along the street have four floors and 86% have shops on the first floor, these parameters do not give any differences to explain the phenomenon (Table 5.7). In fact, in the analysis for the Etlik Street 29% is noted as facing public realm, but it can be considered as 100% because the street is actually very busy with public transportation and trade facilities.

Table 5.7 Frequency Table of Variables Zone 1 – Aşağı Eğlence Neighborhood

Frequencies for Zone 1 - Etlik Street Aşağı Eğlence Neighborhood						
Code	# Burglary victimization	Percentage	Shop	Percentage	Public Realm	Percentage
0	17	80%	3	14%	15	71%
1	4	20%	18	86%	6	29%
Code	Garden	Percentage	Wall	Percentage	Defined Entrance	Percentage
0	17	81%	18	85%	17	81%
1	4	19%	3	15%	4	19%
Code	Elevation	Percentage	Code	Entrance side	Percentage	
0	18	85%	front	5	23%	
1	3	15%	side	16	77%	
Code	Floor	Percentage	Code	Road	Percentage	
4	19	90%	1main	19	90%	
13	2	10%	2-3 main	2	10%	

5.3.1.2. Etlik Street in Etlik Neighborhood

In Figure 5.14 the satellite image of the Etlik Street in the Etlik neighborhood and in Figure 5.15 the buildings in which the survey was applied and the buildings with burglary victimization are given. In the western part of the Etlik neighborhood on the Etlik Street, the burglary victimization rate is 50%, while in the eastern part it is 69%. In the subregions of the Etlik Street, where the traffic and trade is heavy, the burglary victimization is 20%, whereas in the northern parts it is higher. It is possible to say that as the commercial activities decrease on Etlik street burglary victimization decrease. In the eastern of the street which fronts the public realm, there are mosques and parks and 70% of the buildings were observed to be exposed to the burglary victimization. In most of the buildings where victimization is evaluated, there are neither gardens nor walls. 86% of the buildings in general have side entrances. In this part of the street, there are buildings benefiting from the elevation (kot). In the eastern side of these buildings, there are eight buildings and 75% of them were observed to have victimization. Moving towards the end of the street, there are squatters on both sides of the street (Table 5.8).

Figure 5.14 Etlik Street Satellite Image – Etlik Neighborhood

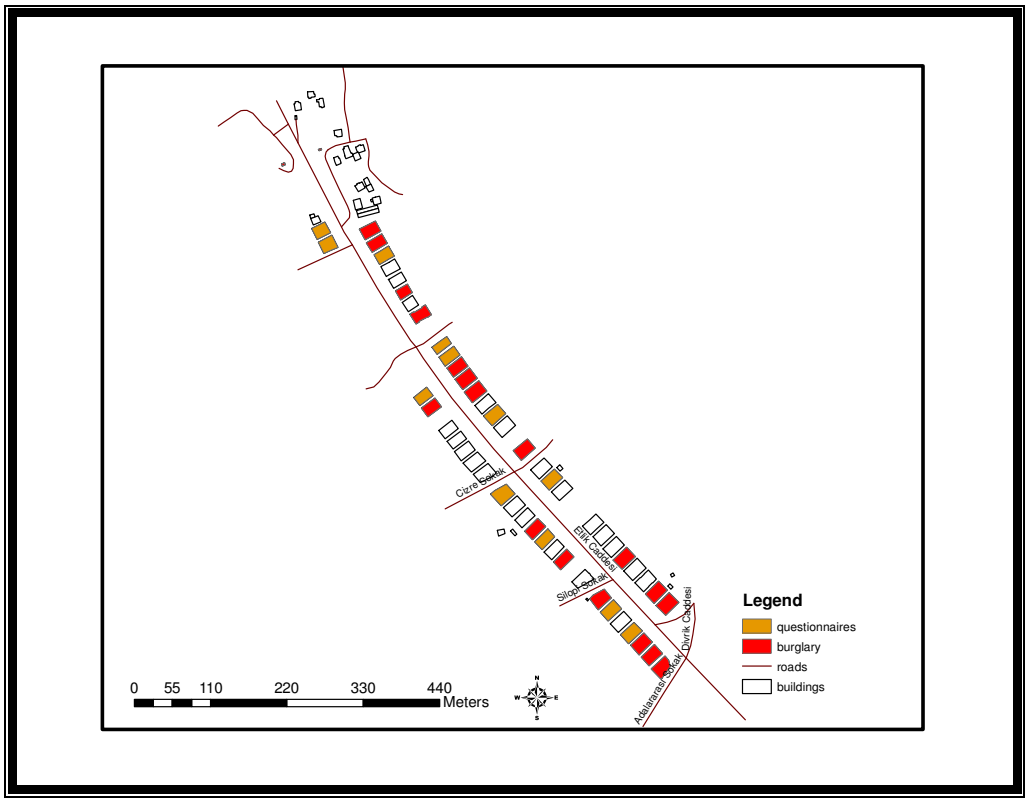


Figure 5.15 Building of Etlik Street–Etlik Neighborhood

Table 5.8 Frequency Table of Variables Zone 1-Etlik Neighborhood

Frequencies for Zone 1 - Etlik Street Etlik Neighborhood						
Code	#Burglary victimization	Percentage	Shop	Percentage	Public Realm	Percentage
0	12	40%	6	20%	18	60%
1	18	60%	24	80%	12	40%
Code	Garden	Percentage	Wall	Percentage	Defined Entrance	Percentage
0	26	86%	26	86%	21	70%
1	4	14%	4	14%	9	30%
Code	Elevation	Percentage	Code	Entrance side	Percentage	
0	16	53%	front	4	14%	
1	14	47%	side	26	86%	
Code	Floor	Percentage	Code	Road	Percentage	
1	2	27%	1main	22	73%	
4-5	27	90%	1main 1 sec.	7	24%	
6	1	3%	2main	1	3%	

When the western part of the Etlik Street within the Etlik neighborhood border is evaluated, the burglary victimization rate is detected as 50%. 85% of it is seen in the buildings with trade facilities on the entrance floor (Table 5.9). All the buildings where burglary victimization is observed have side entrances (Table 5.10). For this area because 80% of buildings has shops on the first floor it is not possible to derive results from for existence of shop, garden, parcel walls in Zone 1.

Table 5.9. Etlik Street Eastern Part – Etlik Neighborhood

		Shops Under Building		Total
		No shop	shop	
Burglary	0	2	5	7
	1	1	6	7
Total		3	11	14

Table 5.10 Etlik Street Eastern Part – Etlik Neighborhood

		Entrance side		Total
		f	s	
Burglary	0	3	4	7
	1	0	7	7
Total		3	11	14

5.3.2. Zone 2: Secondary Roads behind the Main Streets

In Zone 2, the buildings located behind the buildings fronting the Etlik Street are analyzed. The burglary victimization rate in Zone 2 is 46%, which is higher than the burglary victimization rate in Zone 1. The buildings which are located on the south-western corner of the Aşağı Eğlence district are removed from the analysis since they are within invalid SSAs (Figure 5.16).

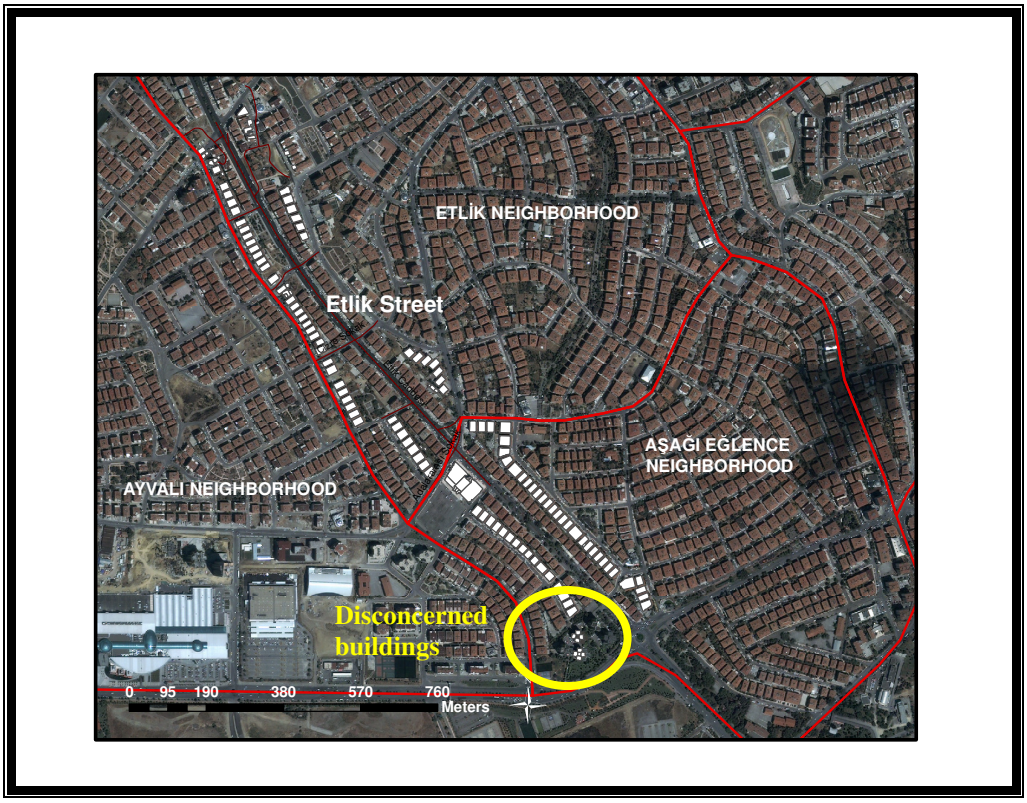


Figure 5.16 Satellite Image for Secondary Roads behind Etlik Street

As can be understood from Table 5.11, 38% of the buildings have commercial use on the entrance floor and 60% of the buildings have 4-5 floors. When compared with Zone 1, the height of the buildings is lower. 60% of the buildings are on the secondary roads whereas 40% of the buildings are on the crossroads. 66% of the victimized buildings have garden walls or side entrances. Of five buildings facing the public realm, 40% have burglary victimization, which suggests that facing the public realm has no effect on victimization. Half of the buildings located on the crossroads have burglary victimization, so being on the crossroads do not exert an effect on victimization. For Zone 2, being on the main streets or secondary streets also does not produce an effect on burglary victimization. Both the buildings located on the secondary roads and the buildings located on the main street (Ayvalı Street) have 50% of burglary victimization. In the buildings which have shops on the entrance floor, 47% has burglary victimization.

Table 5.11 Frequencies of Variables for Zone 2

Frequencies for Zone 2 Behind Etlik Street						
Code	# Burglary victimization	Percentage	Shop	Percentage	Public Realm	Percentage
0	22	52.4%	26	62%	35	83.3%
1	20	47.6%	16	38%	7	16.7%
Code	Garden	Percentage	Wall	Percentage	Defined Entrance	Percentage
0	22	52.4%	21	50%	33	78.6%
1	20	47.6%	21	50%	9	21.4%
Code	Elevation	Percentage	Code	Entrance side	Percentage	
0	19	45.2%	front	13	31%	
1	23	54.8%	side	29	69%	
Code	Floor	Percentage	Code	Road	Percentage	
1	2	5%	secondary	25	60%	
3	14	33%	2 secondary	4	10%	
4	21	50%	1 main 1 sec	5	11%	
5	4	10%	2 main	8	19%	
13	1	2%				

5.3.3. Zone 3: Secondary Roads

In order to analyze how burglary victimization changes in the areas where the web of traffic and trade is less, the hinterland of the Aşağı Eğlence neighborhood, which stands between the Etlik Street, Divrik Street, Giresun Street, Teyfik Sağlam Street and Kuruyazı Street is studied. In choosing this area for analyses, there were certain influential factors such as the fact that under housing trade was not dense, that the traffic was not heavy because it was not on the flow of public transportation and that the use of housing was high. Moreover, in Chapter 4, according to Figure 4.18 and Figure 4.19, the comparisons of burglary victimization with the overall victimization, this whole area has high victimization and SSA30 has higher burglary victimization than the overall crime victimization.

Figure 5.17 and Figure 5.18 show Zone 3, where the dark blue lines show the main roads, whereas the thinner line segments represent the secondary roads. In Figure 5.17, pink polygons represent the whole buildings, whereas in Figure 5.18 the buildings where the survey was applied is given. The red printed buildings represent the buildings with burglary victimization. As can be seen, the buildings behind the main roads are excluded from Zone 3 in these figures. A field survey is also done for Zone 3 and a building database is created.

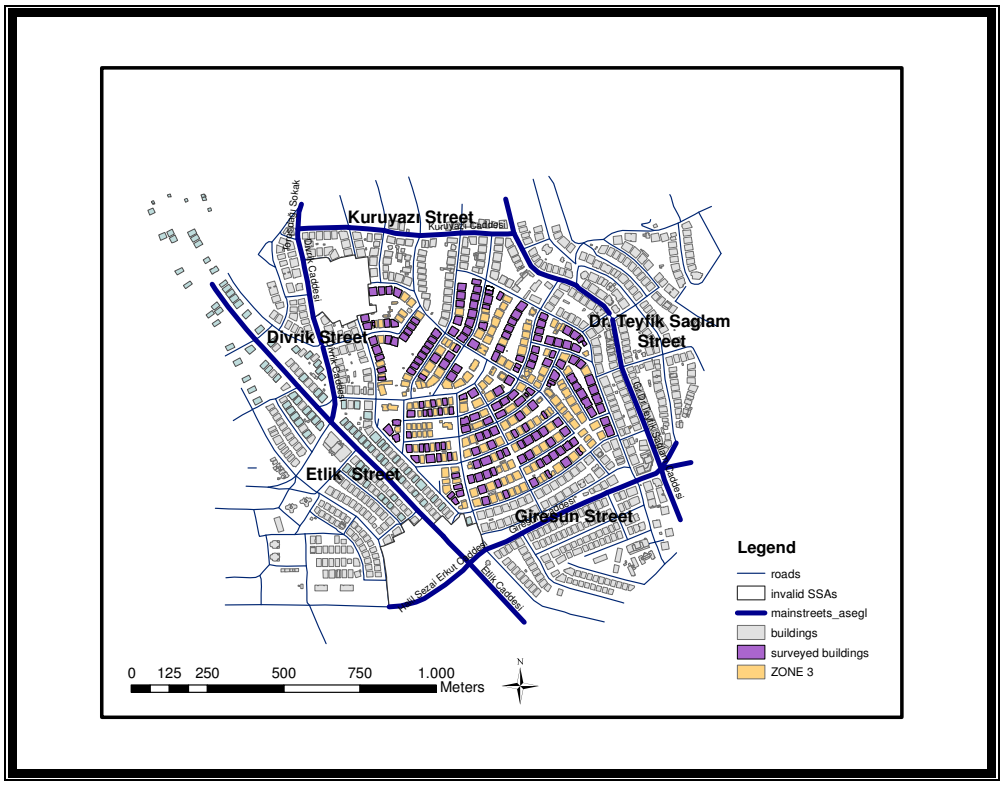


Figure 5.17 General Layout of Zone 3

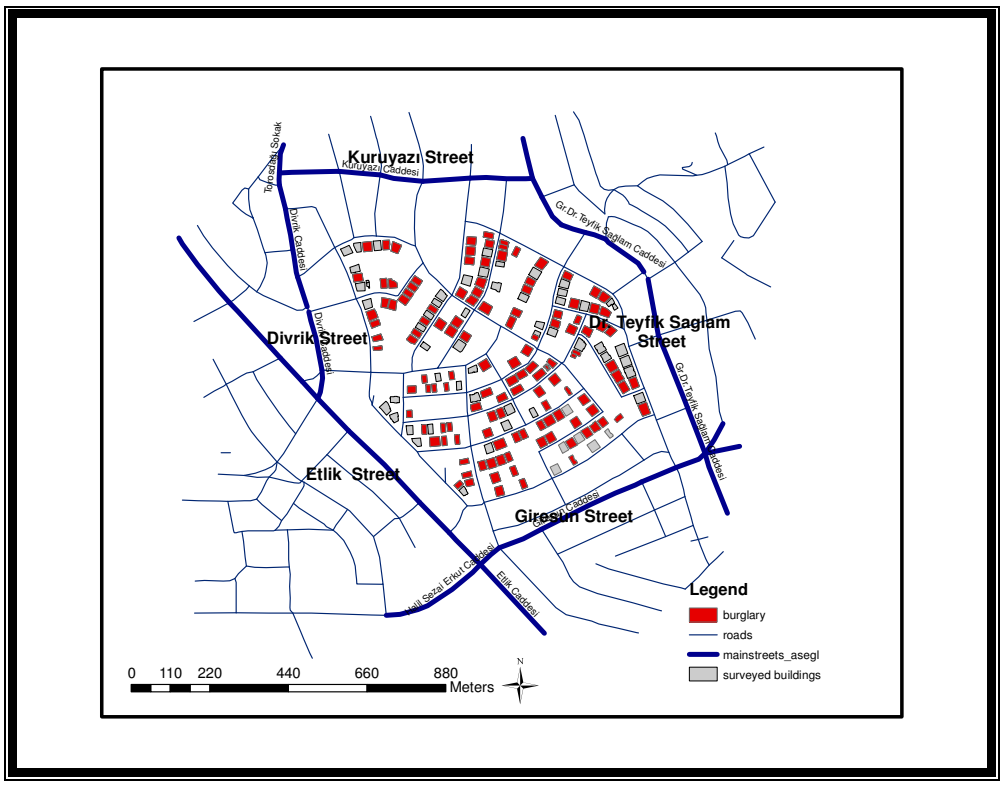


Figure 5.18 Zone 3 – Surveyed Buildings

A total of 185 buildings were included in this analysis; as burglary victimization rate was mentioned to be related with burglary in the questionnaire conducted in 121 buildings, the rate is 65%. 26% of the buildings have commercial use on the first floor. The area is homogenous in terms of the number of floors; 85% of the buildings have 4-5 floors. Since the rates of commercial use on first floor are lower than Zone 1 and Zone 2, the rates of the availability of gardens and parcel walls are higher, which are 62% and 57%, respectively (Table 5.12). While the relationship between the burglary victimization and the availability of gardens and parcel walls was evaluated, it was detected that in 104 buildings which do not have gardens and in 105 buildings which do not have parcel walls, the burglary victimization rate is 70% and 66%, respectively. Besides, 71 buildings have garden walls and their rate of burglary victimization is also 67%. The percentages show that garden walls do not have significant effect on the accessibility to the target. From 112 buildings which have front entrances, 60% have burglary victimization incidents. On the other hand, 72 buildings with side entrances have burglary victimization rate as 72%. The results show that the direction of the entrance in the building has an effect on the burglary victimization in interior areas. The buildings with side entrances are more prone to the burglary victimization than buildings with front entrances (Table 5.13).

Of all the buildings, 18 face the public realm and in these buildings 66% have burglary victimization. If we compare the rate with the rest of the buildings, 167 buildings do not face the public realm and they have 65% of burglary victimization. It is seen that in Zone 3, facing the public realm has no effect in the increase of burglary victimization. The elevation difference can be seen in 28% of the buildings and 56% of them have burglary victimization, whereas the rate of victimization is 68% in buildings without an elevation difference. This means that in Zone 3, additional floors due to the elevation difference do not increase crime victimization. Table 5.12 and Table 5.13 show the frequencies and cross comparisons of the parameters with burglary victimization.

Table 5.12 Frequencies for Variables in Zone 3

Frequencies for Zone 3 Hinterland						
Code	**# Burglary victimization**	**Percentage**	**Shop**	**Percentage**	**Public Realm**	**Percentage**
0	64	35%	138	74%	167	90%
1	121	65%	47	26%	18	10%
Code	**Garden**	**Percentage**	**Wall**	**Percentage**	**Defined Entrance**	**Percentage**
0	114	62%	105	57%	162	88%
1	71	38%	80	43%	23	12%
Code	**Elevation**	**Percentage**	**Code**	**Entrance side**	**Percentage**	
0	132	72%	front	112	60%	
1	53	28%	side	73	40%	
Code	**Floor**	**Percentage**	**Code**	**Road**	**Percentage**	
3	1	5%	**1**	133	72%	
4-5	162	85%	**2**	51	27%	
6	1	5%	**3**	1	1%	
10	1	5%	**4**	0	0%	

Table 5.13 Cross Comparisons of Physical Parameters with Burglary in Zone3

		Garden			Wall			Entrance		
		0	1	Total	0	1	Total	0	1	Total
Burglary	0	41	23	64	35	29	64	58	6	48
	1	73	48	121	70	51	121	104	17	121
Total		114	71	185	105	80	185	162	23	185
		Entrance side			Public Face			Elevation		
		front	side	Total	0	1	Total	0	1	Total
Burglary	0	44	20	64	58	6	64	41	23	64
	1	68	52	120	109	12	121	91	30	121
Total		112	72	184	167	18	185	132	53	185

When the transportation network around these buildings is analyzed, it is found that the burglary victimization rate on the secondary roads are 69% whereas on the crossroads the victimization rate is 55%. This means that being on crossroads do not increase crime victimization in the hinterland (Table 5.14).

Table 5.14 Cross comparison of Burglary with Road Network

		Roads		Total
		1 secondary road	crossroads	
Burglary	0	40	24	64
	1	92	29	121
Total		132	53	185

5.4. Regression Analysis for Physical Parameters in Local Study Area

In this part of the study, all physical parameters analyzed in the chapter are used in the regression analysis to check the significance of the model. Since burglary is coded as 1 (burglary) and 0 (no burglary), the logistic regression is used. Table 5.15 shows the results of the regression analysis. Omnibus tests of Model Coefficients show that the model is significant, and when the variables in the equation are checked, only the "ROAD" parameter which shows the degree of the road where building faces is significant. The physical form of the city is shaped by the road network, other variables such as shops under buildings are generally along all the main streets; because the commercial use, gardens, walls, and defined entrances also exist in the buildings most of the time. Those buildings without shops are generally on the secondary roads. The variable "Floor" is not significant because the main structure of Turkish cities is created by yap-sat form of construction, and therefore has a uniform style of buildings with 4-5 floors. As a consequence, it did not make any difference in the analysis. This result is also expected when the defensible space theory is considered. Newman (1972) mentioned in his theory that high-rise buildings such as over 10 floors show higher burglary rates when compared to 4-5 floor housing.

Table 5.15 Logistic Regression for Physical Variables

Dependent Variable: Burglary Victimisation
Independent Variables: Number of floors, Shop, Road Degree, Facing Public, Garden, Parcell Wall, Entrance, Entrance side, Elevation

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	19,604	9	,021
	Block	19,604	9	,021
	Model	19,604	9	,021

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	FLOOR	-,068	,129	,277	1	,599	,935
	SHOP	-,211	,322	,428	1	,513	,810
	ROAD	**-,421**	**,145**	**8,433**	**1**	**,004**	**,657**
	FACEPUBLIC	,098	,388	,063	1	,801	1,103
	GARDEN	,431	,479	,809	1	,368	1,539
	WALL	-,276	,480	,330	1	,566	,759
	ENTRANCE	,568	,396	2,058	1	,151	1,765
	ENTRANCESIDE	,285	,271	1,105	1	,293	1,330
	ELEVATION	-,220	,279	,620	1	,431	,803
	Constant	1,000	,748	1,789	1	,181	2,718

a. Variable(s) entered on step 1: FLOOR, SHOP, ROAD, FACEPUBLIC, GARDEN, WALL, ENTRANCEHA, entrancesid, kot.

Other variables such as elevation differences in buildings (kot), entranceside, and facing public realm (FACEPUBLIC) are modeled separately. Only the variable “road” turns out to be significant when they are modeled separately. Table 5.16 shows the results of the regression analysis for road types.

Table 5.16 Logistic Regression Analysis Results of Road

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	13,575	3	,004
	Block	13,575	3	,004
	Model	13,575	3	,004

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	347,522[a]	,050	,067

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than ,001.

Classification Table[a]

	Observed		Predicted		
			BURGLARY		
			0	1	Percentage Correct
Step 1	BURGLARY	0	33	76	30,3
		1	22	136	86,1
	Overall Percentage				63,3

a. The cut value is ,500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	ROAD			13,119	3	,004	
	ROAD(1)	1,217	,361	11,395	1	,001	3,377
	ROAD(2)	,668	,417	2,559	1	,110	1,950
	ROAD(3)	,331	,641	,267	1	,605	1,393
	Constant	-,486	,318	2,335	1	,127	,615

a. Variable(s) entered on step 1: ROAD.

Table 5.16 above shows that the model is significant at 95% confidence level. The Nagelkerke R squared value is 0.067. This measure is intended to mimic the ordinary least squares R squared value, which would show the proportion of the variance explained by the independent variable. Table 5.16 shows that 63% of the predicted model values coincide with the actual values. The odds ratio value for type1 is 3.377, and the contrast category is main road (ROAD). This means that the odds of burglary are three times higher for secondary streets (type 1) when compared to main road type 4. In other words, the burglary risk on secondary roads (type 1) is three times higher than main roads (Type 4). Although the odds ratios of the crossroads of two secondary roads (type 2) and the crossroads of main and secondary roads (type 3) are still higher than the main roads, these odds ratios are not significantly different from odds ratio of 1. Type 3 is crossroads of one main and one secondary road and therefore it is maybe the reason not to be significantly different from main roads.

In order to test the correlation between other physical variables such as gardens, walls, entrances, and shops, the regressions in Zone 3 is tested. Testing these variables in the whole area did not produce any explanations because of the strong effect of the road. Therefore, it is tested for Zone 3, which is only on the secondary roads. The gardens, walls, entrances, or entrance side gave no significant differences. This means that the garden walls and gardens are not enough to keep the offenders away from the buildings and they do not make any difference as a physical barrier. Only the shop variable shows a significant difference in Zone 3. In inner regions, buildings with shops in the entrance floor have half as much risk of having burglary victimization as the buildings without shops have. Exp (B): 0.497 in Table 5.17.

Table 5.17 Logistic Regression Results for "Shop" Variable in Zone 3

Dependent Variable : Burglary
Independent Variable: Shop

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	4,046	1	,044
	Block	4,046	1	,044
	Model	4,046	1	,044

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	234,567[a]	,022	,030

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than ,001.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	shopcode	-,699	,346	4,081	1	,043	,497
	Constant	,827	,185	19,967	1	,000	2,286

a. Variable(s) entered on step 1: shopcode.

When the logistic regression is performed to investigate the relationship of burglary victimization with both the physical and non-physical parameters, the model is significant (Table 5.18), yet the parameters of income and education are not significant to explain the burglary victimization. Concerning the results of the macroscale analysis, which shows a relationship between the burglary victimization and socio-economic status, we can say that the socio-economic status of the region has an effect on offenders' decisions of choosing the

location at macroscale, but it does not have any effect on their choices at microscale decisions.

Table 5.18 Logistic Regression Results for Physical & Non-physical Parameters

Dependent : Burglary

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8,588	17	,505	2,613	,001[a]
	Residual	39,241	203	,193		
	Total	47,828	220			

a. Predictors: (Constant), UNIV, kot, INC3, GARDEN, FACEPUBLIC, entrancesid, ENTRANCEHA, FLOOR, INC1, SHOP, INC5, INC4, HIGHSC, ROAD, WALL, PRIM, INC2

b. Dependent Variable: BURGLARY

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,316	,398		,795	,428		
	FLOOR	-,005	,035	-,010	-,150	,881	,873	1,146
	SHOP	-,059	,075	-,060	-,787	,432	,701	1,426
	ROAD	,000	,036	,000	,006	,995	,704	1,420
	FACEPUBLIC	,182	,090	,134	2,017	,045	,916	1,092
	GARDEN	,004	,105	,004	,036	,971	,338	2,960
	WALL	,078	,106	,083	,737	,462	,319	3,137
	ENTRANCEHA	-,040	,090	-,030	-,446	,656	,866	1,155
	entrancesid	,183	,062	,197	2,963	,003	,917	1,090
	kot	-,212	,065	-,220	-3,262	,001	,892	1,122
	INC1	-,190	,343	-,100	-,556	,579	,125	7,976
	INC2	-,406	,318	-,430	-1,275	,204	,035	28,186
	INC3	-,360	,325	-,384	-1,108	,269	,034	29,708
	INC4	-,370	,335	-,252	-1,105	,270	,078	12,851
	INC5	,093	,416	,023	,223	,824	,377	2,652
	PRIM	,201	,161	,209	1,246	,214	,143	6,975
	HIGHSC	,219	,169	,216	1,299	,195	,147	6,815
	UNIV	,053	,175	,051	,303	,762	,141	7,117

5.5. Results of Local Scale Analysis

When the burglary rates are analyzed at micro scale, it is seen that main streets like the Etlik Street have the lowest burglary rates, while the secondary streets behind main streets have higher rates, and hinterlands have the highest burglary rates. As the streets go further from crowded areas, in relation to the natural surveillance principle, the burglary rates increase. In the questionnaire survey, the question of being victimized from burglary had few answers (Question 64), which was not enough to determine any results and therefore it was not used

in the analysis. In all five neighborhoods, only 34 burglary victimization incidents were mentioned. From 34 victimized households, it is seen that 83% live in the secondary roads.

Target's accessibility is an important criterion for the offenders; reaching a target and escaping from it easily is important for the offenders' decision-making. In this aspect target accessibility should be considered. There are numerous criteria for such a measure, but the most applicable one, which is the connectivity, is taken as a measure. If the connectivity of the road segment increases, the target accessibility increases as well. Similar to the common belief that a higher population brings higher crime rates, the building density on the road unit is measured and regressed to burglary victimization. The results show that till the point where the density is 0.08, as density increases burglary increases, too; but after 0.08, it does not increase. In this case, the density is measured by the number of buildings divided by the length of road segment, because the height of the buildings does not make any difference since all the buildings have more or less the same number of floors. As a result, both the connectivity and density are regressed on burglary. The model is significant and the results show that density effects burglary more than connectivity does.

Building properties are analyzed in 3 zones. Zoning was used because in the burglary map a crime pattern was observed. Therefore, zones are created as main streets, secondary roads behind main streets, and hinterlands, which are generally only residential parts. It is seen that the burglary rates increase from main roads to secondary roads and it becomes the highest in hinterlands. This can be explained by natural surveillance with the traffic flow of the main street. Commercial activities increase the risk of the offender to be seen or caught.This is explained by the natural surveillance principle. Zoning brought about both advantages and disadvantages. For each zone, the building properties were more or less the same, for example, in the Etlik Street all the buildings have the same number of floors, shops on the entrance floor, and they do not have any gardens. For the building properties, the number of floors, the use of building, facing the public realm, the availability of gardens, walls, a defined entrance, the entrance side, and elevation difference were used. Because of the homogeneity of the physical properties, many of these variables do not have significant effects on the victimization.

When all the zones are modeled together in the logistic regression, the burglary victimization was dependent and all the physical properties were independent variables. The road that the building stands was the only significant variable that effects the crime victimization. This is expectable because the whole structure of the area is formed by the streets. So, the other variables are also related to the street network. The commercial use is more frequent on the main streets, whereas it is possible to see gardens and garden walls in the hinterland. As a result, the variable of the number of floors was included in the model because of Newman's theory, which argues that in residential areas increases in the number of floors increases victimization, but in his case he mentioned high-rise buildings such as over 10 floors. In our case, the floor numbers were between 3 and 5; therefore, it did not give any explanation. The variables gardens, garden walls and a defined entrance were the variables for access control. The theories suggest that defined boundaries make offenders less comfortable, and access

control is important for target hardening, and fences, walls or locks can be used for that purpose. In the study area, the garden walls and entrances do not provide adequate access control and therefore do not provide protection.

To sum up, in the microscale analysis the burglary victimization is not tested by incidents. Instead, the victimization in the environment is evaluated in relation to the physical properties of the environment. Because of the form of the physical structures, which is homogeneous in density, the form of buildings, the height of buildings etc., some variables did not give significant results, yet it is expected that if the model is applied to a bigger sample with different densities, number of floors, and land form, more satisfactory results can be acquired.

CHAPTER 6

RESULTS AND SUGGESTIONS FOR CRIME PREVENTION STRATEGIES

6.1. Results

Crime prevention is necessary to provide better environment in cities. Without safety and security it is not possible to speak about the quality of life. In this thesis, it is aimed to develop crime prevention strategies to create a better and safer environment in Turkish cities. The following results are derived concerning the macroscale and microscale analyses.

In Turkey there is a need for an organization to organise, structure and maintain the prevention against crime. Applications to be carried out should involve the participation of all groups of people in the society from decision makers to stakeholders, from scientific institutions to households. The awareness of crime does not exist in all parts of the society; the high socio-economic groups are aware of the crime risk they are faced to, but low socio-economic groups do not aware of the risks of crime. On the other hand, high socio-economic groups use individual precaution techniques against property crime such as alarms, locks, and steel doors. The precaution techniques they use for crime against properties are not efficient enough to decrease the risks of crime victimization.

The results of the macroscale analysis show that there is a relationship between the crime victimization and the socio-economic status of the areas. As the socio-economic status of the areas increases, the victimization of the area increases as well. On the other hand, statistical results show that at microscale, the socio-economic status of the households does not affect the crime victimization. It is understood that for offenders' perspective, the important parameter for choosing the location of crime is their economic gain, which is related to the opportunity theory. The socio-economic status of the regions affects offenders' choices at macroscale but not at microscale.

The victimization and burglary rates have similarities in the small statistical areas, but in main streets there are certain parts in which the burglary victimization is lower than the overall crime victimization. These areas have high commercial activities and this may show that other crime types such as robbery, pick-pocketing, and auto theft are more frequent than the burglary victimization in these areas.

The area studied in this thesis has a definite urban structural shape which was formed during the years of fast urbanization in Turkey in a yap-sat form. Because the center functions were not created within a center and sub-center planning, center activities seeped into residential areas. In such areas, urban reconstruction seems impossible to be realized in the near future.

This form of the urban structure is very homogenous both in density and in building forms. More than 90% of the buildings have 4-5 floors and the same building design. The parcel system is applied with the maximum use of construction area allowed by the laws, which is 5 meters from the front and 3 meters from the sides. This form of parcel does not provide parking space for the residents, which causes on-side parking on the streets. On-side parking creates a disadvantage since it forms a sort of barrier between roads and gardens, and inhibits the visibility of the roads. The front gardens are not large enough to use for any facility, and garden walls either do not exist or they are too low to be a barrier for the access control. The commercial facilities are located under the residential buildings generally on the main streets. This form destroys the privacy of the parcel system in that the boundaries of the parcels are not defined and they are part of the public area. In main roads there is no discrimination between 'private' and 'public' spaces.

For the use of facilities, there is no discrimination in the space. In the main streets, the offices are located in the buildings and therefore there is no privacy inside the buildings in the main streets. There is a very high density compared to other cities. The density of one block is measured as approximately 8 buildings/hectare, which means 90-100 units per hectare. This is a high density for a residential area (Campoli, 2006). This high density and high commercial use in the main streets causes both vehicle and pedestrian traffic load in the main streets. There are no efficient pedestrian routes on the main streets because of parking or commercial facilities. On secondary roads, on the other hand, there is not much traffic.

This formation based on the parcel system also makes the management structure of building individual. This individuality creates a disadvantage for cooperation against crime prevention as well. The households apply individual precaution methods. The present legal system should give the rights of an organization in a group of parcels and blocks. Thus, the management and maintenance studies carried out at the building level can be done at block or neighborhood scales.

In this study, crime prevention strategies are suggested in two parts, which are the improvement of the present situation, suggestions for the new developing areas. The general concepts of CPTED, which are "natural surveillance, "access control", "territorial reinforcement" and "proper placement of land uses" (Schneider, 2006) and a set of variables required for sustainable cities, which are access, surveillance, ownership, physical protection, level of human activity, management and maintenance, are used as references of the suggestions given (Davies, 2004).

6.2. Suggestions for Crime Prevention Strategies

Suggestions for Built Urban Areas:

- Problem: In the main roads, the use of the commercial activities provides natural surveillance but also brings about difficulty to recognize the strangers in the buildings. The boundaries of the buildings are not marked and the private and public space in the area are not defined. In Figure 6.1 and Figure 6.2, a view of buildings in the Etlik Street is seen, with commercial activities on the first, and a mixed use of commercial and residential activities on the other floors. The buildings have offices like dentists, accountants, and hairdressers on the second floor. There is no control for outsiders and residents in the buildings.

- Strategy: A proper design for land use is needed to relocate the activities, to increase the privacy in buildings, to define the borders of private and public areas, and to provide access control in the buildings. (CPTED strategies; access control, allocation of facilities, definition of public private spaces)

- Suggestion: The commercial activities can be limited only to the entrance floor with a separate entrance. Commercial activities like offices, real estate agencies, services like doctors' and lawyers' offices should be removed from the residential buildings. In this case, the privacy can be achieved in side of the buildings. The entrances to the building for residents can be clearly defined and to provide access control, cameras and locks on the doors can be used.

Figure 6.1 A View of Building from Main Street Showing Office and Commercial Activities

Figure 6.2 A View of Building from Main Street Showing Office and Commercial Activities

- Problem: Territorial reinforcement is also another important tool for crime prevention. In Turkey, main streets like the Etlik Street are mixed with residences, shops, vehicle traffic, and public transportation. That's why the streets lose the boundaries of public and private areas. In Figure 6.3, a view from the main street is given. It is seen that the parcel of the building became a public area and it has no defined boundaries, on the other hand it is still used for private purposes of the shops.

- Strategy: Territory control, defining the boundaries of private and public areas, making a transition from public to private areas. (CPTED strategies; territorial identity, definition of private and public spaces, access control)

- Suggestion: The parcels of the buildings which are designed to be gardens turn into pedestrian routes. Even though the shops have an open front area, the borders of the pedestrian routes and building parcels can be defined by pavement differences, or street furniture. This will discourage the outsiders with a feeling of private area and give the residents a feeling of ownership (CPTED, Crowe, 2000). In Figure 6.4, a view of a building in the main street is given, using some street barriers to define the private space.

Figure 6.3 A View of Building from Main Street Showing Boundary Problems between Public & Private Space

Figure 6.4 A View of Building from Main Street Showing Its Boundary between Public & Private Space

- Problem: In secondary roads there is not much traffic, the crime victimization rates are high.

- Strategy: Natural surveillance should be increased. (CPTED and Situational Crime Prevention strategy)

-Suggestion: Natural surveillance can be improved either by outsiders or by neighbors. In this area the households are sensitive to their neighborhoods and therefore locating neighborhood facilities can provide natural surveillance without pulling the outsiders. Some gathering and recreational facilities can be located on the secondary roads where neighbors can spend their time and observe the environment. In Figure 6.5 and Figure 6.6, views from a gathering area located near the main and secondary roads are given. The areas create a social place for the neighborhood and provide natural surveillance in the neighborhood.

Figure 6.5 A View of Gathering Area on Main Road

Figure 6.6 A View of Gathering Area on Secondary Road

- Problem: Barriers between the streets and recreational areas can create blind points which may be a magnet for offenders.

- Strategy: Increase natural surveillance (CPTED and Situational Crime Prevention strategy).

- Suggestion: For gathering or recreational areas, the physical barriers between the amenities and residential areas should be removed to increase natural surveillance. In Figure.6.7 it is seen that no physical boundaries are used between the green areas and the pedestrian route.

- Problem: The pedestrian routes should also be developed. Especially the street parking and parking on pedestrian routes prevent the visibility of the routes and inhibit the pedestrian flow. In Figure 6.7, a view of a pedestrian route which is blocked by cars is seen.

- Strategy: Make a proper design for pedestrian routes, increase the quality of the routes. (CPTED strategies; surveillance through design, better neighborhood image)

- Suggestion: The pedestrian routes can be redesigned, parking should be removed and the green used along pedestrian routes should be small trees or flowers to allow the users to see a possible attacker. In Figure 6.8, a view of bushes is seen; since they are not high, they provide both visibility and an aesthetic look to the environment.

Figure 6.7 A View from Pedestrian Route

Figure 6.8 A View of Bushes

- Problem: There is no access control in the parcels; existing walls and physical boundaries like gardens do not provide access control.

- Strategy: Target hardening by increasing the access control. (Situational Crime Prevention strategy; target hardening)

- Suggestion: Especially in the hinterlands the gardens and entrances should be redesigned, the garden walls should be improved to provide full access control by increasing the height and using a lock on the doors. In the main streets, the entrances of the buildings can be isolated from commercial activities by defining the boundaries. In Figure 6.9 a garden design with a lock on the door which provides visibility is given. In Figure 6.10, another entrance for a housing site area is given, which provides access control.

Figure 6.9 A View of Garden with Access Control

Figure 6.10 A view of Entrance Providing Access Control

Other Suggestions:

- The isolated routes on the roads should be removed or designed (tunnels, bridges, dead end streets). Segregated areas are proved to be high risk areas for crime (Hillier, 1999). Some additional facilities can be located, like shops on tunnels or bridges. Lighting or cameras can also be used for visibility. Other isolated areas like school yards in the evenings and parking lots can also be risky for the users. The areas should either be closed after a certain hour or the visibility of the area should be increased. The blind points on the environment should be removed or some mirrors or cameras should be used to discourage the offenders (Natural Surveillance).

- The lighting should be provided throughout the streets in order to make the residents feel safe in the evenings, especially on roads where nobody passes (Natural Surveillance).

- The existing structure has private and public areas. Semi-public areas can be located. For example, a recreational park with access control for the residents can be used, thus a semi-public park can be provided for the neighborhood. In our local study area, a neighborhood can be created by organizing the blocks together for creating semi-private areas in their blocks. In Figure 6.11, two blocks with 48 buildings can provide a neighborhood to share the common areas and for the maintenance of the neighborhood (Territorial identity).

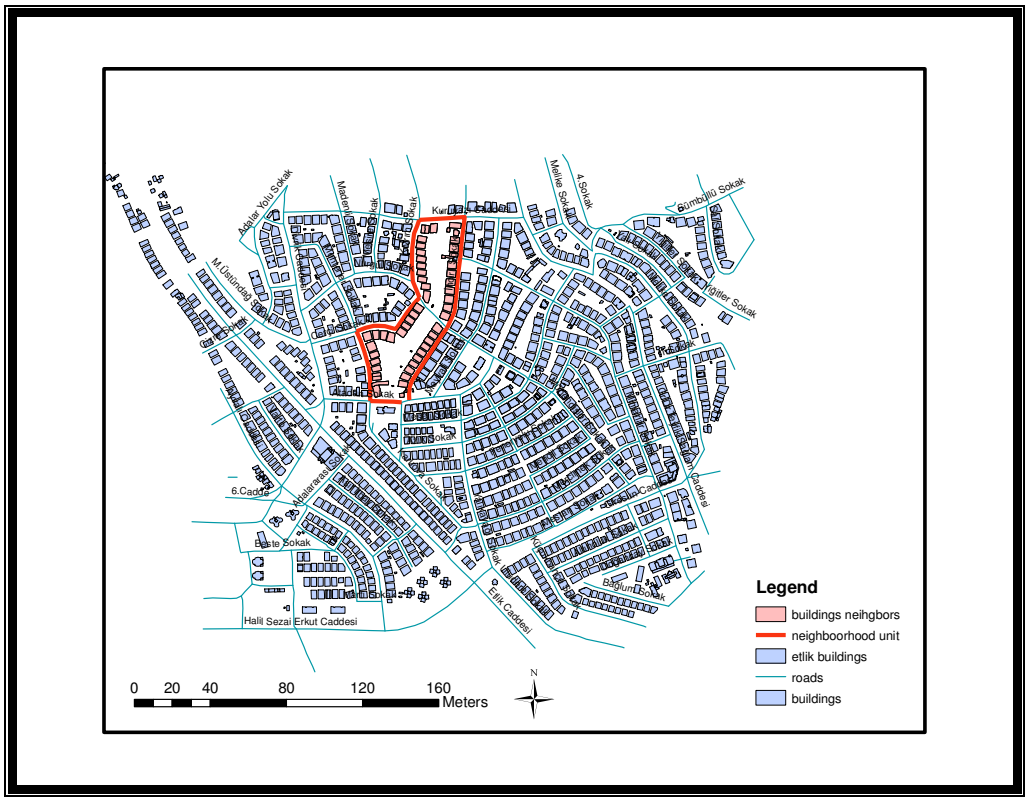


Figure 6.11 Neighborhood Suggestion

- The existing management and maintenance system of the buildings are individual. Block or neighborhood hierarchy can be developed with each representative of a building to create neighborhood management organisations.

- From a general perspective, the overall design of the environment should be improved. In case of an area like Keçiören, the density is approximately 8 buildings/hectare, which means 90-100 units per hectare. This is a high density for a residential area (Campoli, 2006). In such a form, the design has certain limitations for developing both crime prevention design and quality improvement design strategies.

Suggestions for New Urban Areas:

Residential areas:

- At macroscale the locations of different facilities and land use should be designed.
- In both macroscale and microscale, the private, semi-private and public spaces should be clearly defined.
- For high-populated plans, the communities and neighborhoods can be developed. The size of the communities and densities can change; therefore it is not possible to give a specific size or density. According to a Dutch planner, the density should be 50 units per hectare (Colquhoun, 2004).
- In recent years, in macroscale under the Mass Housing Authority of Turkey, many high-rise building sites have been constructed. These buildings are designed as high-rise

buildings to create space for other recreational or parking facilities. If there is no access control, these buildings will have higher risks for crime than 4-5 storey buildings, according to Newman (1962). That's why if it is not possible to exert full access control, the number of floors can be limited to 4-5 floors in microscale.

Road Networks:

- The road network is an important factor of crime victimization. Looped roads are advised since all parts of road are used by the residents. This kind of road form increases the natural surveillance in residential areas (CPTED strategy) (Crowe, 2000).
- Pedestrian routes can be designed in a distance that they will not be too close to the residential houses and not so far to be invisible (Natural surveillance).
- The bushes or hedges located between private and public areas should be kept low to provide visibility. A buffer zone can be used between private and public areas. (CPTED strategy)
- In order to increase natural surveillance, facilities can be located in the streets, like branches and parks (CPTED strategy) (Crowe, 2000).
- Semi-private parking lots can be created (CPTED; territorial identitiy).

Centers:

- City centers should be designed concerning activities. Some activities are specific to a time period which can create busy places. The offenders' routine activity theory in environmental criminology supports that this can increase the crime risk at that location.
- The public transportation routes should be visible at all times during the day. Isolated routes should be used with facilities or should be removed. Natural Surveillance should be applied (CPTED).
- Traffic can be opened to pedestrian routes at specific times of day (Davies, 2004).
- Appropriate lighting can be used to create visibility without creating light pollution or loss of electricity. (CPTED strategy; natural surveillance)

CHAPTER 7

CONCLUSION

In recent years, socio-economic factors like economic problems and inequalities in income distribution, social factors, inadequacies in education system as well as the rapid and unplanned urbanization have influenced the rising crime rates in Turkey. The theories and applications developed around the world must be assessed with the socio-economic, cultural and urban conditions of Turkey. The studies in the literature relates the crime victimization to the socio-economic status (SES). The Chicago School proved that as the residential turnover increased, so did crime victimization, while social disorganization theories relates crime with social disorganization level in the society, which is measured with such factors as SES, heterogeneity, family disruptions, and the rate of participation in social activities (Kubrin, 2010). Within the scope of this study, when the socio-economic status of the victims was examined, different results were obtained at the microscale and macroscale. When victimization in all types of crimes were evaluated at the macroscale, it was observed that income groups with a higher SES level were victimized more frequently. The fact that the offenders choose areas with a high SES level as the crime location can be explained with that great numbers of targets and the high profits the offender gets from the target. This result overlaps with the opportunity theory of the new and late ecological crime theories. Rational choice theory (Shaftoe, 2004) and situational crime prevention theory (Schneider, 2007) argues that offenders demonstrate a tendency to maximize the profit and minimize the risk while choosing the crime location. When the crime victimization of buildings is examined at the microscale, on the other hand, it is observed that SES does not affect the burglary victimization. This can be explained with the homogeneity of the building structures in the study area and unpredictability of the economic conditions of households.

When other parameters that might affect social disorganization such as solidarity, social organizations and population density are studied, the results can be assessed at the microscale and macroscale as follows: Crime rates are high in urban environments where the population density is higher than rural areas, which creates a general opinion that population density affects crime. This opinion was proved in Nolan (2004) by showing the relationship between population size and crime rates. The relationship between population density and crime rates were also proved by Harries (2006), who said higher population densities were associated with higher levels of violent and property crimes. In the analyses conducted in the study area, it was found that the population density measured by square meters were not influential in the crime victimization at the macroscale. Since the same number of floors and structure usage area are already used in yap-sat areas constructed by contractors, the population density per square meter only drops in squatter regions. Although this situation decreases the population density, since it also decreases the SES level, no increase in crime victimization rates is observed in low density areas. At the microscale, however, the ratio of

the number of buildings to the road length is measured in order to find the density of buildings along the road on the road segment. It is seen that as this ratio gets higher, crime rates increase for a period of time and then it stays the same. This means that increasing the spaces between the buildings along the roads will decrease the number of buildings, and thus the burglary victimization rates.

The neighbor relations and mutual solidarity culture of the Turkish people are also an advantage in crime prevention. Natural surveillance, which was put forth in CPTED by Jefferey (1971) as one of the important strategies for crime prevention, will become more effective through neighbor relations and solidarity. Most of the households in which the study was performed stated that they met their neighbors every day. Moreover, as to their attitude towards crime, it was detected that they were more sensitive about crimes committed against their neighbors. Creating semi-public common usage areas to be used by neighbors in which the natural surveillance strategy will be implemented and planning these areas in a location that will allow the observation of the neighborhood will offer opportunities to involve neighbor relations in crime prevention programs. In the study it was seen that the precautions taken against crime were related to the socio-economic status and the perception of crime. As the awareness of the phenomenon of crime and the fear of victimization increase, the precautions taken also increase. 50% of the households where the survey was conducted do not regard crime as a problem and thus do not accept to pay for crime prevention. Since crime prevention is not possible with the involvement of groups of people with a high education level, seminars and organizations must be held that educate and inform all the groups of the public about crime, the reasons of crime and the required precautions. The project of "safe life against burglary & robbery" organized by the Keçiören Municipality aims to inform the public. Extending such projects will be useful (www.keçioren.bel.tr, 2013).

Crime and crime prevention is also related to the location in addition to the sociological factors. Therefore, the urban form that established Turkish cities should be examined. With the rapid population growth in city centers in the 1950s in Turkey, the control on housing was lost and a planned urban structuring did not take place. During this period, new forms of structures developed in Turkey. One of them is squatter areas (gecekondu), which met the accommodation needs of low income groups and those groups that moved to the urban areas dreaming of better job opportunities and life standards. Squatter housing is illegal housing activities taking place on public or private lands, characterized by low-quality structures that violate public construction rules. The state deals with this problem through "urban transformation" projects by transforming squatter areas into new high-density residential areas with building sites, green areas and parking lots inside. These new housing types create dwelling sites in which both squatters and higher-income groups live, which demonstrate a mixed structure in socio-cultural terms. In recent years this site type dwelling areas have been preferred in Turkey for housing. This new housing form created a higher quality and more organized urban environment. Moreover, it establishes a new urban form in which the housing areas are totally separated from commercial areas. Within the scope of this study, it was seen that using housing areas together with commercial uses, the form called the "mix

use", is effective in preventing burglary victimization. From this perspective, totally independent housing areas will contribute to the increase in crime rates. These usually high-rise housing types create a new dimension for neighbor relations both inside the building and the site. Buildings with 15-20 floors consist of 60-80 apartments, which means there are 200-250 people assuming in each apartment there is one nucleus family. It is not possible for the individuals to recognize the residents in the building of within the site. This prevents the implementation of "natural surveillance" strategy, one of the leading crime prevention theories. The negative effect of building height on burglary, which was proved by Oscar Newman (1972) in his theory of "Defensible Space", will increase crime for such areas. Newman stated in his study that the most appropriate building height is five floors. This building height can provide housing types that can only address to high income groups with the present land and construction costs. On the other hand, this site type housing are suitable for the implementation of "Access control", one of the leading crime prevention strategies. In these sites where full access control is exerted, crime rates can be controlled to a great extent. Access control might be realized in these housing sites via private security companies or by means of cheaper smart card or lock systems.

Another housing type caused by the rapid urbanization in Turkey is "yap-sat". Housing areas in yap-sat form are structured in parcel form by the contractors in order to provide dwelling units for middle and high income groups. They are generally established with such a design to acquire the biggest profit. Therefore, the maximum building coverage ratio and building lot are used. This parcel form required individual solutions within parcels for maintenance and organization. In yap-sat housing areas, commercial activities are usually located under the apartment buildings on the entrance floors in the main streets because of the rising population. Such a usage type brought about a situation in which commerce and housing intermingled too much and private and public spaces could no longer be separated. Similar to site type housing areas, in these areas it is not possible to understand who is a resident and who is a stranger. In the streets where commercial use is widespread, offices are common within the buildings in addition to the entrance floor usage. This changes the definition of 'private' within the building as well. In these buildings private areas are limited to the apartments and the residents have no semi-public areas. A building to which strangers enter at any time during the day does not give any sense of security. Macro- and micro-level studies in these areas show that mix use construction which decreases crime victimization at the macroscale increases the risk of crime victimization of the residents and the building itself at the microscale.

If yap-sat housing areas are divided into two groups as those areas with commercial use and those only for residential use, it is seen that burglary rates are higher in areas only used for housing where the traffic flow is low. Although the uncertainty about the locations in which crimes other than burglary take place influence the reliability of the victim survey, the values obtained show that certain crimes intensify in certain regions. For burglary, the farther one goes from commercial activities, the burglary victimization increases. This situation is different for auto theft and property theft from auto, another crime against property. In the sections with the heaviest traffic load the rate of auto theft and property theft from auto is

low, while it gets intensified in some streets with trade, education and health activities and in their surroundings. Auto theft and property theft from auto often take place the near surroundings of commercial roads while it does not occur in the busy Etlik Street, where natural surveillance is active at all times of the day. In the study area, extort victimization was found to be high especially in inner areas close to the commercial streets with a high socio-economic level. In this case, the mix use form in which the housing areas exist together with other facilities will be helpful to prevent crime. When robbery and pick-pocketing are examined, it is seen that the densest areas are the main crossroads where there are universities, big markets and trade activities and their surroundings. Then it can be said that victimization differs according to the crime types. Crimes such as burglary, robbery, pick-pocketing, and auto theft are rare in the Etlik Street, where there is a busy retail trade, whereas these crime types are more common in other main streets like Giresun and Halil Sezai Erkut streets. The Etlik Street has retail sale while the Halil Sezai Erkut Street different uses like Metro Gross Market, a university campus and sports arena. This situation suggests that crime prevention depending on natural surveillance is also related to the characteristics of the trade.

In this case, for new construction areas, new structure models should be developed which raise urban living standards suitable to the present requirements and which meet more than one purpose like trade, green areas, and housing. There are similar examples around the world. The project of "sustainable city" carried out in Cleveland (Colquhoun, 2004) creates small self-sustained communities. Instead of independent housing sites, such neighborhoods can also be developed in Turkey, where common work areas, commercial use areas and recreational areas exist in a hierarchical form. Within the scope of this study, it is seen that retail trade close to housing areas brings about advantages for crime prevention, while it is preferred that business centers, big markets, hospitals and education centers do not exist together with housing areas. Therefore, the mix use form should be redesigned. The commercial areas should be located as a separate structure next to the housing blocks, not inside the building constructed as a housing area and within that parcel. Besides, uses such as hospital, university, and sports complex should be separate from housing areas. The neighborhood units to be established also bring about advantages in administrative terms. The neighborhoods may also organize crime prevention settings such as security, lighting, environmental planning and maintenance in a hierarchical form.

On the other hand, currently the yap-sat organization establishes most Turkish cities and it is not possible that it will be restructured in the near future. An organization is needed to rehabilitate this situation and to implement crime prevention strategies. Since the applications in parcel form have limitations, block and complex type housing that bring parcels together should be preferred. There are currently private and public areas yet no semi-public areas. Common parking lots and recreational areas might be established through a new administrative organization for complexes or blocks. These common areas may be called semi-public areas with access control.

The cities in Turkey still undergo changes. The transformation work of squatter areas and housing areas into mass housing areas causes the emptied areas in the city center to change as well. In such areas commercial uses fill the empty housing areas or these areas become desolate (çöküntü) areas. Çağlayandereli (2012) describes desolate areas as follows: "In the once inhabited historical central districts of the city, housing units are transformed into workplaces. These districts are deserted because commercial activities change with time and they no longer turn into residential areas. Therefore, low-level work places and accommodation opportunities for single people get common in the area." The movement of middle and high income groups living in the city center to outside of the city and the transformation of the city center into areas where low income groups dwell was also discussed by the Chicago School, one of the early ecology of crime theorists. The emptied parts of Chicago were filled by immigrant families, illegal activities and persons with social dysfunctions and this caused social disorganization (Park and Burgess, 1925). The areas in Turkey where housing is diminishing demonstrate differences at certain times of the day. During the day, these areas get busier as a business area at certain times while in the evening the residents become more crowded. A strategy is also needed for these areas which will not cause social disorganization.

Crime prevention in Turkey will be inadequate if it is dealt with only in terms of planning. There is a growing need for an institution in Turkey that conducts scientific research and develops strategies towards crime prevention and that organizes the implementation of these strategies. Research about crime incidents, crime patterns, offenders and victims, and reasons of crime must be given weight. There is no crime prevention guide book applied in our country. In European Union countries a 15-item "strategies for crime prevention for management and planning strategies" book is applied (Schneider, 2007). A guide book that involves crime prevention strategies and suggestions must be developed in Turkey.

Understanding crime and preventing it in Turkey requires an organization that brings different disciplines and applications together. Düzgün (2007) mentions the importance of the simultaneous use of sociology, psychology, city planning and environmental criminology disciplines in understanding the crime phenomenon. Crime prevention must be evaluated in terms of planning and legal dissuasive regulations and implementations in addition to sociological and psychological evaluation. For successful crime prevention, first sociological, psychological and economic reasons that encourage people to commit crime must be examined and removed. Then legal dissuasive regulations must be completed and their feasibility must be ensured. These factors are actually main reasons of crime; what is more, place will be effective in choosing the crime location. Therefore, risk factors of place must be decreased through organization and regulations, the reasons that increase the risk factors for victims must be determined and the victims must be informed on the issue. Successful crime prevention can only be possible through the participation of each and every sector of the society, from the politicians to the local administrations, and from the police to the households.

Recommendations for Future Work

In the study, socio-economic and physical factors that caused crime victimization in Turkey were studied and these factors were tried to be related to crime victimization and different crime types. Insufficient data and inability to access to the police records, thus to the information on the location and time of crime incidents was the biggest factor that limited the scope of the study. Therefore, crime victimization and burglary victimization were studied. To improve this study, how crime types are formed in land use at the macroscale and in areas belonging to socio-economic groups can be examined if crime incident information is obtained. Although it is found out that groups with higher socio-economic level are victimized by crimes against property more frequently, it is possible that different results will be achieved for different crime types such as injury or homicide. Therefore, how crimes change with respect to the social disorganization level may be studied at the macroscale. At the microscale, on the other hand, the distribution of crime types into the space, the relationship of crime pattern with environmental factors and time, and the existence of a relationship between the dwellers' daily activities and the crime possibilities of offenders can be studied. In the survey used in the study, the participators were asked whether they were victimized by crime types like extort, pick-pocketing and auto theft, yet the time and locations of the crime were not stated. At the microscale, the activities in which the people are exposed to these crimes (using public transportation, shopping or while doing sports) must be examined and crime prevention strategies must be developed at the microscale considering individuals' habits.

Crime studies study victims and offenders. In this study the victim survey is used for macro analyses. Another survey to be conducted on offenders that examines their socio-economic levels, family structures, factors that push them towards crime, factors of choice, and crime methods will bring about a new perspective. On the other hand, it is important that the studies have continuity; the survey that was prepared in 2007 and used in the study must be repeated at certain intervals. The study area completed its urban transformation process to a great extent in 2013 and the influence of this change in crime victimization must be studied.

As a further stage of this study, projects might be developed in terms of planning. New suggestions for construction projects that take crime victimization into consideration and in which self-sustained communities can be established may be put forward. A study may be carried out on new public areas, private areas, semi-public areas and the location choices of different commercial uses. On the other hand, the current yap-sat form of housing is regarded as a problem with its low urban quality. Rehabilitation projects might be developed towards creating a safe and inhabitable environment in these areas. At the microscale, a study on crime prevention strategies and their effects for individuals and buildings may be carried out.

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APPENDIX A

HOUSEHOLD SURVEY

KENTSEL SUÇLAR İÇİN MEKANSAL ANALİZ YÖNTEMLERİNE DAYALI SUÇ TAHMİNİ MODELLERİNİN VE SUÇ ÖNLEME POLİTİKALARININ GELİŞTİRİLMESİ ARAŞTIRMASI
-HANEHALKI SORUKAĞIDI-

TANITIM BİLGİLERİ	
İl : ..... □□	KOD ADI :
İlçe : ..... □□	
Mahalle : ..... □□	
Sokak : ..... □□	
Bina No : ..... □□	
Daire/Hane No: ..... □□	***[Binayla aynı ise "99" yazınız]***

ZİYARET / GÖRÜŞME BİLGİLERİ
Tarih (Gün – Ay) : ..... Anketörün Adı-Soyadı: .....

SONUÇ KODLARI	**KİŞİ SAYILARI**
01 Soru kağıdı doldurulduu **02** Ziyaret sırasında evde hanehalkı yok veya görüşülebilecek nitelikte kimse yok **03** Hanehalkının tümü araştırma tarihlerinde evde yok **04** Sonraya bırakıldı **05** Reddetti **06** Konutta, adreste yaşayan yok / Adres, konut değil **07** Konut yıkılmış **08** Konut bulunamadı **09** Görüşme yarıda kaldı **10** Öğrenci evi **96** Diğer	Hanehalkı listesinde toplam kişi sayısı: □□

ANKETÖR	**KOORDİNATÖR**	**VERİ GİRİŞÇİ**
İsim : İmza :	İsim : İmza :	İsim : İmza :

HANE SATIR NO	HANE HALKI LİSTESİ	HANE REİSİNE YAKINLIK DERECESİ	CİNSİYET	YAŞ	DOĞUM YERİ	
	Lütfen bana konuşulan kişi (kendinizden) başlayarak bu evde yaşayanların **hane reisine** göre yakınlık derecelerini söyler misiniz?	..... hane reisinin nesi olur? *AŞAĞIDAKİ* ***KOD LİSTESİNİ KULLANIN***	..... erkek mi, kadın mı? **1** Kadın **2** Erkek	..... kaç yaşında? (kaç yaşını bitirdi?) ***BİTİRİLEN YAŞ OLARAK YAZIN. 95 YAŞINDAN BÜYÜK İSE "95" YAZIN.***	Hangi ilde doğdunuz? ***DOĞDUĞU YERİN İL TRAFİK KODUNU YAZIN. YURTDIŞI İÇİN "90" YAZIN.***	İlin neresinde doğdunuz? **1** İl merkezi **2** İlçe merkezi **3** Bucak/köy **4** Yurtdışı **5**. Bilmiyor
(01)	**(02)**	**(03)**	**(04)**	**(05)**	**(06A)**	**(06B)**
01		□□	1 2	□□	□□	1 2 3 4
02		□□	1 2	□□	□□	1 2 3 4
03		□□	1 2	□□	□□	1 2 3 4
04		□□	1 2	□□	□□	1 2 3 4
05		□□	1 2	□□	□□	1 2 3 4
06		□□	1 2	□□	□□	1 2 3 4

(03) HANEHALKI REİSİNE YAKINLIK DERECESİ KODLARI

01 Hane Reisi
02 Karısı/Kocası
03 Oğlu/Kızı
04 Gelini/Damadı
05 Torunu
06 Annesi/Babası
07 Kayınpederi/Kayınvalidesi
08 Kardeşi
09 Kardeşinin Eşi
10 Kardeşinin Çocuğu (Yeğeni)
11 Halası/Amcası
12 Teyzesi/Dayısı
13 Üvey Çocuğu
14 Kuzeni
15 Büyükannesi/Büyükbabası
16 Eşinin Büyükannesi/Büyükbabası
17 Eşinin Kardeşi
18 Eşinin Kardeşinin Eşi
19 Eşinin Kardeşinin Çocuğu
20 Eşinin Halası/Amcası
21 Eşinin Teyzesi/Dayısı
22 İkinci Eşi
23 Kuması
88 Kendisi ama hane reisi değil
96 Diğer kişi akrabası değil
98 Bilmiyor

EVDE AKRABA OLMAYAN KİŞİLER BERABER OTURUYORSA KENDİSİ İÇİN 88 VE DİĞER TÜM KİŞİLER İÇİN 96 KODLARINI KULLANIN.

HANE SATIR NO	OKURYAZARLIK VE ÖĞRENİM DURUMU [6 ve YUKARI YAŞTAKİLER İÇİN]				BİR İŞTE ÇALIŞMA DURUMU				SOSYAL SİG.
	..... okuma-yazma biliyor mu? 01 Evet 02 Hayır 08 Bilmiyor	..... hiç okula gitti mi? 01 Evet 02 Hayır 08 Bilmiyor	.....'in en son gittiği okul hangisidir? Bu okulda en son kaçıncı sınıfı tamamladı? *KOD LİSTESİNİ KULLANIN* OKUL SINIF	..... bu okuldan mezun oldu mu? (diploma aldı mı?) 01 Evet 02 Hayır 08 Bilmiyor	Bir işte çalışıyor mu? *["Hayır" ise 14'e geçin]* 01 Evet 02Hayır	Çalışıyorsa, ne iş yaptığını açıkça yazınız.	Çalışılan işin statüsü *KOD LİSTESİ KULLANIN*	Sadece Çalışmayan kişiye sorun: Çalışamama Nedeni *KOD LİSTESİ KULLANIN*	*KOD LİSTESİ KULLANIN*
(01)	(7)	(8)	(9A) (9B)	(10)	(11)	(12)	(13)	(14)	(15)
01	1 2 8	1 2 8	□ □□	1 2 8	1 2				
02	1 2 8	1 2 8	□ □□	1 2 8	1 2				
03	1 2 8	1 2 8	□ □□	1 2 8	1 2				
04	1 2 8	1 2 8	□ □□	1 2 8	1 2				
05	1 2 8	1 2 8	□ □□	1 2 8	1 2				

(9A) OKUL KODLARI	(9B) SINIF KODLARI
1 İlkokul (5 sınıf) **2** Ortaokul (3 sınıf) **3** İlköğretim (8 sınıf) **4** Lise (3 sınıf) **5** Üniversite (4 sınıf) **6** Lisansüstü **8** Bilmiyor	**Mezun/ Okunan / Terk edilen okulun hangi sınıfı?** **00** Bir yıldan az/Üni. Hazırlık **66** Lisansüstü **98** Bilmiyor

(13) ÇALIŞILAN İŞİN STATÜSÜ

01 Çalışan-maaşlı
02 Çalışan-ücretli
03 İşveren
04 Ücretsiz aile işçisi
05 Kendine hesabına esnaf/zanaatkar
06 Kendine hesabına profesyonel
07 Çiftçi
08 Marjinal işler
09 Günlük/Mevsimlik işçi
10 Diğer (belirtiniz): .....

(15) SOSYAL SİGORTA DURUMU

01 SSK
02 Bağ-Kur
03 Emekli Sandığı
04 Özel sigorta
05 Sigortasız
06 Yeşil kart
07 Diğer (belirtiniz):

(14) ÇALIŞAMAMA NEDENİ

01 İşsiz, iş arıyor
02 Ev kadını/kızı
03 Öğrenci
04 Emekli
05 Günlük/Mevsimlik çalışan
06 Çalışamaz halde
07 Gayirmenkuldan kira geliri
08 Diğer (belirtiniz): .....

I. SOSYO-DEMOGRAFİK ÖZELLİKLER

16. Hane reisinin medeni durumu nedir?

01 Evli
02 Boşanmış
03 Dul
04 Ayrı yaşıyor
05 Diğer (Belirtiniz)……..
99. Soru bu kişi için geçersizdir (evde akraba olmayan iki yetişkin kişi oturuyorsa)

17. Hane reisinin nikah türü nedir?

01 Resmi nikah
02 İmam nikahı
03 İkisi
99. Soru bu kişi için geçersizdir

18. Hane reisi ve eşi nasıl evlenmişler? ***[Evde, evli çift yoksa "99"u işaretleyiniz]***

01 Görücü usulu ile tanışarak evlendik
02 Görücü usulu ile tanışıp, bir süre arkadaşlık ettikten sonra evlendik
03 Kendimiz tanışarak evlendik
04 Kız kaçırma
05 Diğer (belirtiniz): .....
99. Soru bu kişi için geçersizdir

19. Hane reisinin kaç çocuğu var? 99. Soru bu kişi için geçersizdir

…… *tane çocuğu var.*

20. Bunlardan üvey olan var mı?

01 Evet 02 Hayır 99. Soru bu kişi için geçersizdir

21. Çocukların hepsi aynı evde mi oturuyor?

01 Evet 02 Hayır 99. Soru bu kişi için geçersizdir

22. Göç Tablosu:

	Doğduğu yer (köy-ilçe-şehir)	**Ankara'da yaşam süresi**
Hane Reisi / oturan kişinin		
Hane reisinin Eşi / diğer kişinin		
Hane reisinin babası		
Hane Reisinin Eşinin babası		

23. Kaç yıldır bu mahallede oturuyorsunuz?

Oturulan toplam yıl yazılacak : ……*yıldır bu mahallede oturuyorum.*

24. Oturduğunuz ev kime ait?

01 Kendime / Eşime ait
02 Kira
03 Akrabaların evi (kira ödemiyor)
04 Lojman
05 Diğer (belirtiniz): ..…….....……

25. Oturduğunuz evin türü nedir?

01 Apartman dairesi
02 Gecekondu
03 Kapıcı dairesi
04 Müstakil betonarme
05 Kerpiç ev
06 Diğer (belirtiniz): .....…….....……

26. Evinizi nasıl ısıtıyorsunuz?

01 Kalorifer (merkezi sistem) ile
02 Odun ile
03 Kömür ile
04 Tezek ile
05 Kombi ile
06 Diğer (belirtiniz) : ..…….....……

27. Oturduğunuz evde aşağıda belirtilenlerden mevcut olanları belirtiniz:

	01 Var	**02 Yok**
01 Elektrik		
02 Şebeke Suyu		
03 Kanalizasyon		
04 Kalorifer		
05 Tuvalet (ev içinde)		
06 Ayrı Banyo		
07 Internet bağlantısı		
08 Digitürk		
09 Uydu		

28. Aşağıda belirtilen eşyalara sahip olma durumunuzu belirtir misiniz?

E ş y a	**01 Var**	**02 Yok**
01 Birden fazla TV		
02 Çamaşır makinası		
03 Bulaşık makinası		
04 Bilgisayar		
05 DVD – VCD		
06 Yatak odası takımı		
07 Oturma odası takımı		

29. Hane Reisinin veya evde oturan kişinin sahip olduğunu gayrimenkullerini var mı?

	Ev (oturulan dışında)	**Tarla**	**Bahçe**	**Çiftlik**	**Arsa**	**Kooperatif**
Adet						
Büyüklük (oda sayısı ve m2 veya dönüm)						
Kime ait?						

30. Hane Reisinin veya evde oturan kişinin sahip olduğunu bir otomobil, minibüs, kamyonet, kamyonunuz var mı?

01 Evet ise:
Türü : ……
Modeli : ……
Yılı : ……
02 Hayır

II. GELİR/GEÇİM/İŞ DURUMU

31. Hanenizin toplam kullanılabilir net geliri (maaş, ücret, kira, vb. Giderler) ne kadardır?

01 500 YTL altı
02 501-1000 YTL
03 1001-2000 YTL arası
04 2001-4000 YTL arası
05 4001 YTL ve üstü

32. Bu gelirle hanenizin temel ihtiyaçlarını hangi düzeyde karşılayabiliyorsunuz?

01 Çok kolay
02 Kolay
03 Orta
04 Zor
05 Çok zor

33. Geçim Zor veya Çok zor ise, ne kadar olmalı?

01 500 YTL altı
02 501-1000 YTL
03 1001-2000 YTL arası
04 2001-4000 YTL arası
05 4001 YTL ve üstü

34. Evinizde <u>geçime ilişkin bir sıkıntı</u> olduğu vakit ilk önce hangi harcamalarınızı kısıyorsunuz? (birden fazla cevap olabilir)

01 Eğitim
02 Sağlık
03 Beslenme/mutfak
04 Giyim
05 Eğlence
06 Evin kalitesini artıracak harcamalar, (boya, badana, restorasyon)
07 Dayanıklı tüketim malları ve çeşitli ev eşyaları alımı
08 Hiçbir kısıntı yapmam
09 Diğer (belirtiniz): .....

35. Aylık ortalama gelirinizden düzenli olarak tasarruf yapabiliyor musunuz?

01 Evetse, tasarruf türü belirtiniz (altın, döviz, fon, vb.)
Tasarruf Türü:.....
02 Hayır

36. Son 2-3 yılda siz veya aile bireylerinizden biri ayni (mal) ya da nakdi (para) herhangi bir yardım aldınız mı?

01 Evet 02 Hayır

37. Son 2-3 yılda hangi kurum ya da kişiden yardım aldınız?

01 Belediye
02 Müftülük
03 Sosyal Yardımlaşma ve Dayanışmayı Teşvik Fonu (Valilik, Kaymakamlık)
04 Akraba, komşu, vb.
05 Gönüllü kişi ve kuruluşlar
06 Diğer (belirtiniz): .....…….....……

38. Ne tür bir yardım aldınız?

01 Yiyecek
02 Giyecek
03 Ev eşyası
04 Yakacak
05 İlaç/tıbbi araç gereç
06 Nakit para

07 Ücretsiz eğitim/burs
08 Kira yardımı (başkasının evinde ücretsiz oturma)
09 Diğer (belirtiniz): .....…….....…….…….

39. 5 yıl öncesi ile bugünü karşılaştırdığınızda <u>ekonomik</u> durumunuzu nasıl değerlendirirsiniz?
01 Daha iyi
02 Daha kötü
03 Fark yok aynı
04. Fikrim yok

40. 5 yıl sonrasını düşündüğünüz vakit <u>ekonomik</u> durumunuzun nasıl olacağını düşünüyorsunuz?
01 Şimdiki gibi olacak
02 Daha iyi olacak
03 Daha kötü olacak
04. Fikrim yok

Aşağıdaki 3 soruyu <u>konuşulan kişiye</u> sorunuz:

41. Tam olarak ne iş yaptığınızı belirtir misiniz? (Bir iş gününü nasıl geçirirsiniz?)
…….

42. Eğer işsizseniz iş aradınız mı?
01 Evet 02 Hayır

43. Eğer işsiz iseniz, ne kadar süredir işsizsiniz? (toplam ay olarak yazılacak)
…….

III. SOSYAL DAYANIŞMA AĞLARI

Şimdi size aile üyeleri, yakın akrabalar ve komşular ve devlet kuruluşları ile olan ilişkileriniz hakkında bazı sorular sormak istiyorum

44. Gündelik hayatınızda en sık kimlerle görüşürsünüz? Birden fazla cevap olabilir.
01 Yakın komşularımla
02 Yakın akrabalarımla
03 Kendi memleketimden olan tanıdıklarla
04 Pek kimse ile görüşmeyiz
05 Çocuklarımın arkadaşlarının aileleri ile
06 İş yerinden (eşimin/benim) edindiğimiz arkadaşlarla
07 Kendi edindiğim arkadaşlarımla
08 Diğer (belirtiniz): .....

45. Görüşme sebepleriniz nedir? Neler konuşulur? *[en çok görüştüğü 3 kişiyi söyleyecek]*

	Kimle	Görüşme sıklığı	Görüşme Nedeni
1. Kişi			
2. Kişi			
3. Kişi			

46. Aşağıdaki cümleler, sizin için ne kadar doğru veya değil?

1 2 3 4 5
Kesinlikle hayır Kesinlikle evet

01 İhtiyacım olduğunda yanımda olan özel bir insan var. 1 2 3 4 5

02 Sevinç ve kederlerimi paylaşabileceğim özel bir insan var. 1 2 3 4 5

03 Sorunlarımı paylaşabileceğim komşularım var. 1 2 3 4 5

04 İhtiyacım olan duygusal yardımı ve desteği ailemden alırım. 1 2 3 4 5

05 Arkadaşlarım bana gerçekten yardımcı olmaya çalışır. 1 2 3 4 5

06 İşler kötü gittiğinde arkadaşlarıma güvenebilirim. 1 2 3 4 5

07 Sorunlarımı ailemle konuşabilirim. 1 2 3 4 5

08 Sevinç ve kederlerimi paylaşabileceğim arkadaşlarım var. 1 2 3 4 5

09 Kararlarımı vermede ailem bana yardımcı olmaya isteklidir. 1 2 3 4 5

10 Sorunlarımı arkadaşlarımla konuşabilirim. 1 2 3 4 5

47. Aşağıda belirtilen aktivitelere hiç katıldığınız oldu mu? (Birden fazla cevap olabilir)

Kategoriler	**Evet**	**Hayır**	**Geçerli değil**
Oy kullanma			
Sendikaların düzenlediği toplantılara katılma			
Okul aile birliğinin toplantılarına katılma			
Çeşitli sivil toplum örgütlerinin düzenlediği toplantılara katılma			
Hemşeri derneklerinin düzenlediği toplantılara katılma			

48. Sizce devletin en önemli görevleri nelerdir? (en önemli görülen 3'ü seçilecek)
ANKETÖR DİKKAT: OKUMAYIN KART GÖSTERİN

01 Gelir dağılımını düzenlemek,
02 Yeni iş sahaları açmak
03 Eğitim, sağlık gibi hizmetleri tüm vatandaşlarına eşit şekilde ulaştırmak
04 Hukuk ve düzen içinde bir toplum sağlamak
05 Yolsuzlukları önlemek
06 Vergi toplamak
07 Vatanın bölünmez bütünlüğünü sağlamak, iç huzuru ve güveni sağlamak
08 Eşitlik ve adalet sağlamak
09 Can güvenliği sağlamak
10 Diğer .....

49. Gecenin geç vakti, yan komşunuzdan kavga sesleri geldiğini yaptığını düşünün. Ne yaparsınız?

01 Hiç karışmam , durumu normal karşılarım
02 Polisi ararım
03 Kavgayı bitirmeleri için duvara vururum
04 Kapısına gider uyarırım
05 Ertesi gün gider rahatsızlığımı bildiririm
06 Apartman yöneticisine/muhtara en kısa zamanda durumu bildiririm
07 Diğer (belirtiniz): .....

IV. YAKIN ÇEVRE VE SUÇ OLAYLARI

50. Yakın akrabalarınızdan ve/veya ailenizden cezaevine giren oldu mu?

01 Evet 02 Hayır

51. Evet ise,

Size yakınlığı	Cinsiyeti 01 Kadın/02 Erkek	Yaşı (bitirdiği yaş)	Cezaevinde ne kadar süre kaldı?	Hangi Sebepten? (açıkça sebebi yazın)

52. Akrabalarınız arasında mesleği polislik olan var mı?

01 Evet 02 Hayır

53. Hiç karakola çağrıldığınız veya gittiğiniz oldu mu?

01 Evet 02 Hayır

54. Evet ise: Hangi neden veya nedenlerle karakola çağrıldınız veya gittiniz? Açıkça belirtiniz.

…….
…….
…….

55. Oturduğunuz mahallede aşağıdaki ne sıklıkta olduğunu düşünüyorsunuz?

	Çok fazla	Oldukça fazla	Oldukça az	Hiç denecek kadar az	Fikrim Yok
01 Evden hırsızlık					
02 İşyeri hırsızlığı					
03 Otodan hırsızlık					
04 Oto hırsızlığı					
05 Kapkaç					
06 Yankesicilik					
07 Gasp					
08 Uyuşturucu satıcılığı					

56. Mahallenizde son 2-3 yıl öncesi ile karşılaştırdığınızda, suç oranları hakkında ne düşünüyorsunuz?

01 Bir değişiklik görmüyorum
02 Suç oranları arttı
03 Suç oranlarının azaldığını düşünüyorum
04 Fikrim yok

57. Yaşadığınız yakın çevreyi dikkate alarak (yürüme mesafesinde olan yerler) <u>gece saatlerinde</u> suç işleme açısından değerlendirme yapsanız, nasıl tanımlarsınız?

01 Oldukça güvenli bir yer olduğunu düşünüyorum
02 Çok emin değilim bazen güvenli geliyor, bazen güvensiz
03 Kesinlikle güvensiz bir yer
04 Fikrim yok

58. Yaşadığınız yakın çevreyi dikkate alarak (yürüme mesafesinde olan yerler) <u>gündüz saatlerinde</u> suç işleme açısından değerlendirme yapsanız, nasıl tanımlarsınız?

01 Oldukça güvenli bir yer olduğunu düşünüyorum
02 Çok emin değilim bazen güvenli geliyor, bazen güvensiz
03 Kesinlikle güvensiz bir yer
04 Fikrim yok

59. İnsanları hırsızlık gibi suçları işlemeye iten EN ÖNEMLİ 2 neden ne olabilir?

01 Yoksulluk
02 Karakter bozukluğu
03 Cahillik
04 Allah korkusu olmaması
05 Aile ortamının bozukluğu
06 Aile ve akraba iliskilerinin zayifligi
07 Arkadas cevresi
08 İşsizlik
09 İnsanların tedbirsiz olması
10 Madde bağımlılığı
11 Diğer (belirtiniz)

60. İnsanları kapkaç gibi suçları işlemeye iten EN ÖNEMLİ 2 neden ne olabilir?

01 Yoksulluk
02 Karakter bozukluğu
03 Cahillik
04 Allah korkusu olmaması
05 Aile ortamının bozukluğu
06 Aile ve akraba iliskilerinin zayifligi
07 Arkadas çevresi
08 İşsizlik
09 İnsanların tedbirsiz olması
10 Madde bağımlılığı
11 Diğer (belirtiniz)

61. Bir kadının temizlikçi veya gündelikçi olarak çalışmasının EN ÖNEMLİ 2 nedeni ne olabilir?

01 Mecburiyet
02 Toplumda bir yer edinmek
03 Namuslu ve onurlu yaşamak
04 Ailesine daha iyi bir hayat sunabilmek
05 Evden dışarı çıkabilmek
06 Para biriktirebilmek
07 Sosyal güvence
08 Başka (belirtiniz)

62. Bir genç insanın asgari ücretle çalışarak yaşamasının EN ÖNEMLİ 2 nedeni ne olabilir?

01 Mecburiyet
02 Toplumda bir yer edinmek
03 Namuslu ve onurlu yaşamak
04 Ailesine daha iyi bir hayat sunabilmek
05 Evden dışarı çıkabilmek
06 Para biriktirebilmek
07 Sosyal güvence
08 Başka (belirtiniz)

63. Son 2-3 yıl içinde size karşı bir suç işlendi mi?

01 Evet 02 Hayır

64. Evet ise aşağıdaki hangi tür olaylara maruz kaldınız?

01 Evden hırsızlık .....
02 İşyeri hırsızlığı .....
03 Otodan hırsızlık .....
04 Oto hırsızlığı .....
05 Kapkaç .....
06 Yankesicilik .....
07 Gasp .....
08 Hiçbiri .....

65. Maruz kaldığınızda ne yaptınız?

……
……

V. TEDBİRLER VE GÜVENLİK

66. Hafta içi bir günde evinizde hiç kimsenin olmadığı (akşam saatleri dışında kalan zaman) zaman ortalama kaç saattir?

.....(saat yazılacak)

67. Gece evde yalnız kaldığınızda kendinizi ne kadar güvende hissediyorsunuz?

01 Güvende hissediyorum
02 Bazen güvende bazen güvensiz hissediyorum
03 Güvensiz hissediyorum

68. Sokağa çıktığınız vakit herhangi biri tarafından cüzdanınızın çalınabileceği endişesini hissediyor musunuz?

01 Evet, her çıktığımda bu endişeyi yaşıyorum
02 Evet, ama nereye gittiğime göre değişiyor, kalabalık yerlerde endişem artıyor
03 Evet ama hangi saatte çıktığıma göre değişiyor, hava karardıktan sonra endişe ediyorum
04 Hayır ben güvenli bir şehirde yaşadığımı düşünüyorum

69. Evinizi ve işyerinizi hırsızlara karşı nasıl koruyorsunuz?

Tedbirler	**01 Evet**	**02 Hayır**
01 Hırsızlık sigortası yaptırmak		
02 Çelik kapı taktırmak		
03 Alarm sistemi kurdurmak		
04 Pencereleri demir taktırmak		
05 Allaha emanet etmek		
06 Kapıya fazladan kilit ve sürgü yaptırtmak		
07 Açık balkonları kapatmak, panjur yapmak		
08 Balkon kapılarını kilitlrmrk-sürgülemek		
06 Geceleri lambaları bırakmak		
07 Komşulara emanet etmek		
08 Özel güvenlik		
09 Diğer:		

70. Yaşayacağınız evi seçerken (kiracı veya ev sahibi olarak) <u>hırsızlık riskine ilişkin olarak</u> nelere dikkat ettiniz/edersiniz? (birden fazla cevap olabilir) ANKETÖR DİKKAT: Cevapları kişiye okuyabilirsiniz.

01 Mahallenin güvenli bir yer olup olmadığını soruştururum
02 Evin yakınındaki komşuların kim olduğunu soruştururum
03 Evin bir site içinde olmasına dikkat ederim
04 Göç almayan bir muhit olmasına dikkat ederim
05 Tek önemli olan evin fiyatıdır. Bütçeme uygun olursa dikkat etmem

06 Evin giriş veya zemin katında (düz ayak) olmamasına dikkat ederim
07 Diğer (Belirtiniz): .....

Arabası olanlara sorulacak:

71. Arabanızı olası bir oto hırsızlığına karşı nasıl korursunuz?

01 Alarm
02 Direksiyon kilidi
03 Sigorta
04 Hiçbiri

VI. DEĞERLER / ALGILAR

72. Sokakta genç bir kadının bir erkek tarafından rahatsız edildiğine tanık oldunuz. Ne yaparsınız?

01 Kendim duruma müdahale ederim
02 Etraftan yardım isterim
03 Başıma dert almak istemem, görmezden gelirim
04 Genç kadınını kılık-kıyafetine bakarım. Buna göre hak edip haketmediğine karar veririrm
05 Polisi ararım
06 Diğer (belirtiniz): .....

73. Sokakta hırsızlık yapan birini gördüğünüzü düşünün, ilk olarak ne yaparsınız?

01 Hemen polisi ararım, durumu anlatır, adresi veririm
02 Başıma dert açabileceğini düşünür, derhal oradan uzaklaşırım
03 Çevredekileri durumdan haberdar eder, müdahale etmek için çaba sarf ederim
04 Diğer (belirtiniz): .....

74. Bir komşunuzun evine hırsız girdiğini gördüğünüz, ilk olarak ne yaparsınız?

01 Hemen polisi ararım, durumu anlatır, adresi veririm
02 Başıma dert açabileceğini düşünür, derhal oradan uzaklaşırım
03 Çevredekileri durumdan haberdar eder, müdahale etmek için çaba sarf ederim
04 Diğer (belirtiniz): .....

75. Aşağıdakileri suç işlemeye iten nedenler olarak kabul edersek bunların önemlerini belirtir misiniz?

	Önemli	**Kararsız**	**Önemli değil**
Yoksulluk			
İşsizlik			
Ailevi sorunlar			
Arkadaş çevresi			
Yaşanan çevre			
Ahlaki/toplumsal değerlerde zayıflama			
Zengin olma hırsı			
Televizyon dizileri			
Cezaların yetersizliği			
Genel aflar			
İnternet			
Madde Bağımlılığı			
Cahillik, eğitimsizlik			
Diğer			

76. Aşağıdakilerden hangileri bir insanın suç işlemesini önemli ölçüde önler?

	Önler	**Kararsız**	**Önlemez**
Aile-akraba Bağları			
Eğitim			
Dini inançlar			
Arkadaş çevresi			
Yaşanan çevre			
Ceza sistemi			
Toplumsal değerler			
Ekonomik durumun iyi olması			
Diğer:			

77. Suçu önlemek vatandaşın sorumluluğu mudur?

01 Evet 02 Hayır 03 Kararsız

78. Daha güvenli bir çevrede yaşamak için daha fazla vergi ödemeyi kabul eder misiniz?

01 Evet 02 Hayır 03 Kararsız

79. Sizce kuvvetli dini inançları olmadan da iyi bir insan olunabilir mi?

01 Evet 02 Hayır 03 Kararsız

80. Herşeyin kader olduğuna inanıyor musunuz?

01 Evet 02 Hayır 03 Kararsız

APPENDIX B

SUMMARY OF SURVEY QUESTIONS IN EIGHT HEADLINES

Table B. 1 Summary Of Survey Questions – Socio Demographic

SOCIO ECONOMIC DEMOGRAPHIC INDEX VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_magdu		# Residents in househols Hanede yaşayan kişi sayısı			
SUM_Okumab SUM_Okumabil	7(01)	Are you literate Okur yazarmısınız?		1 0	Yes No
SUM-hicoku	8(01)	Have you studied in any school? Herhangi bir okula gittinizmi?		1 0	Yes No
SUM_ilkok SUM_ortaokul SUM_lise SUM_univ	9 (A) (1,2,3) 9(A)(4) 9(A) (5,6)	Which school are you graduated from? Hangi okuldan mezunsunuz?	Prim sch Secondary sc High school University&Master	1 0	Yes No
SUM_diplom	10(01)	Are you graduated from any school? Diplomanız varmı?		1 0	Yes No
SUM_maasli SUM_ücretli for Sum_owner and Sum_other are excluded (no sufficient answers) SUM_emekli(retired) addded	13(01) 13(02) 13(03) 13(04)	Ocuppation Statue Çalışma Statusu	Salary-Maaşlı Paid –Ücretli Owner of business İşveren Others-Diğer Retired-Emekli	1 0	Yes No
SUM_evli SUM_bekar	16(01) 16(02)	Are you married? Hane reisinin medeni durumu nedir?	Married-Evli Divorced- bosanmıs single-Bekar	1 0	Yes No
SUM_evkim SUM_evkim1	24(01,03,05) 24(02,04)	Who is the owner of house you live in? Oturduğunuz ev kime ait?	Himself/Kendisi Including (relatives)	1 0	Yes No
SUM_evkim1	24(02,04)		Rent/Kira Including (02,04) (lojman)	1 0	Yes No
SUM_evtür	25(01)	What is the type of house of living? Oturdugunuz evin tipi nadir?	Apartment/ Apartman (01)	1 0	Yes No
SUM_evtur1	25(02)		Squarrel/ Gecekondu (02)	1 0	Yes No
SUM_evtür_1	25(03)		Private building Müstakil ev	1 0	Yes No
SUM_kalori	27(04)	Which of the items do you own at home? Hangi şıklar evinizde bulunmaktadır?	Radiator Kalorifer	1 0	Yes No

Table B. 1 (Cont'd)

SOCIO ECONOMIC DEMOGRAPHIC INDEX VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_intern	27(07)		Internet	1 0	Yes No
SUM_digitu	27(08)		Digiturk	1 0	Yes No
SUM_fazlat	28(01)		More then 1 TV Birden fazla TV	1 0	Yes No
SUM_188	28(03)		Dish washing mach Bulaşık Mak.	1 0	Yes No
SUM_189	28(04)		Computer Bilgisayar	1 0	Yes No
The system excluded no sufficient answers	28(05)		DVD_VCD	1 0	Yes No
SUM_evad	29	How many properties do you own? Sahip oldugunuz gayrimenkullerin sayısı nadir?	0-1 flats/house 0-1 daire/ev	1 0	Yes No
SUM_evad1	29		2 more houses 2ve fazla ev	1 0	Yes No
The system excluded since there were not enough answers	29		Field/Tarla	1 0	Yes No
SUM_bahce	29		Garden/bahce	1 0	Yes No
SUM_arsa	29		Building lot/Arsa	1 0	Yes No
SUM_koop	29		Cooperative/ Kooperatif	1 0	Yes No
SUM_arac	30 (01)	Do you own a automobile? Araç sahibimisiniz?		1 0	Yes No
SUM_gelir	31(01)	What is net income of your household? Ailenizin net geliri ne kadardır?	Below 500 500 Altı	1 0	Yes No
SUM_gelir1	31(02)		501-1000tl	1 0	Yes No
SUM_gelir_1	31(03)		1001-2000tl	1 0	Yes No
SUM_gelir_2	31(04)		2001-4000tl	1 0	Yes No
SUM_gelir_3	31(05)		Above 4001 4001 Üstü	1 0	Yes No
SUM_241	36	Did you take any help cash or property in last 2-3 years? Son 2-3 yılda ayni veya maddi yardım aldınızmı?		1 0	Yes No
SUM_252	39	Comparing last 5 years with today how do you consider your economic situation ? 5yıl öncesi ile bugünü karşılaştırdığınızda ekonomik durumunuzu nasıl değerlendirirsiniz?	Better Daha iyi	1 0	Yes No

Table B. 1 (Cont'd)

SOCIO ECONOMIC DEMOGRAPHIC INDEX VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_ecocsy	39		Worse Daha Kötü	1 0	Yes No
SUM-ecobsy	40(01)	Estimating next 5 years how do see your economic situation after 5 years? 5yıl sonrasını düşündüğünüz vakit ekonomik durumunuzun nasıl olacağını düşünüyosunuz?	Better Daha iyi	1 0	Yes No
SUM_ecobs	40(02)		Worse Daha Kötü	1 0	Yes No
SUM_ecob_1	40(03)		Nochange Fark yok	1 0	Yes No
SUM_issiz	43	If you are unemployed how many months are you unemployed? İşsizseniz kaç aydır işsizsiniz?	0-6 month/ay	1 0	Yes No
SUM_issiz_	43		>6 month/ay	1 0	Yes No

Table B. 2 Summary Of Survey Questions – Solidarity

SOLIDARITY VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_dayani	44 (01)	With who doy you meet more often? Gündelik hayatınızda ensık kimlerle görüşürsünüz?	Neighbours/ Komsularla	1 0	Yes No
SUM_daya_1	44 (02)		Relatives/ Akrabalarla	1 0	Yes No
SUM_daya_2	44 (03)		People from native land Memleketten kişilerle	1 0	Yes No
SUM_daya_3	44 (04)		Dont meet anyone Görüşmeyiz	1 0	Yes No
SUM_daya_4	44 (05)		Kids friends families Çocukların arkadaş aileleri	1 0	Yes No
SUM_daya_5	44 (06)		Colleages İşyerinden ark	1 0	Yes No
SUM_hergun	45	How often do you meet with them? Ne sıklıkta görüşürsünüz?	Everyday/ Hergün	1 0	Yes No
SUM_hafta1			Once a week/ Haftada 1	1 0	Yes No
SUM_seyrek			Rare/ Seyrek	1 0	Yes No
SUM_cum1_1	46 (01)	I have someone with me when ı need. İhtiyacım oldugunda yanımda olan özel bir insan var.	Absolute yes	1 0	Yes No
SUM_cum1_2			yes	1 0	Yes No
SUM_cum1_3			Yes and no Evet ve hayur	1 0	Yes No
SUM_cum1_4			No/Hayır	1 0	Yes No
SUM_cum1_5			Definetly no Kesinlikle hayır	1 0	Yes No
SUM_cum2_1	46(03)	I have neighbours tos hare my problems Sorunlarımı paylaşabileceğim komsularım var	Absolute yes	1 0	Yes No
SUM_cum2_2			yes	1 0	Yes No
SUM_cum2_3			Yes and no Evet ve hayur	1 0	Yes No
SUM_cum2_4			No/Hayır	1 0	Yes No
SUM_cum2_5			Definetly no Kesinlikle hayır	1 0	Yes No
SUM_oykula	50	Do you ever attend these activities? Belirtilen aktivitelere hiç katıldığınız oldumu?	Voting Oy kullanma	1 0	Yes No
SUM_sendik			Trade union Sendika toplantıları	1 0	Yes No
SUM_okulai			School org Okul aile birliği	1 0	Yes No
SUM_sivilt			Non profit org Siviltoplum örg.	1 0	Yes No
SUM_hemser			Native meetings Memleket toplantı	1 0	Yes No
SUM_sivilt			Non profit org Siviltoplum örg.	1 0	Yes No

Table B. 3 Summary Of Survey Questions – Security

SECURITY VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_ Gece_3	61(03)		Fell not safe/Güvende hissetmiyorum	1 0	Yes No
SUM_ Gece_4	61(04)		I dont know Bilmiyorum	1 0	Yes No
SUM_Gund_1	61(01)	Do you feel safe when you walkaround home in the daytime? Gündüz evde cevresinde yürürken kendinizi güvende hissediyormusunuz?	Feel safe/güvende hissediyorum	1 0	Yes No
SUM_Gund_2	61(02)		Sometimes yes, Bazen evet	1 0	Yes No
SUM_Gund_3	61(03)		Fell not safe/Güvende hissetmiyorum	1 0	Yes No
SUM_Gund_4	61(04)		I dont know Bilmiyorum	1 0	Yes No
SUM_evdegu	77(01)	Do you feel safe when you are home alone in the evening? Gece evde yalnız kaldığınızda kendinizi güvende hissediyormusunuz?	Yes,always Evetherzaman	1 0	Yes No
SUM_evde_1	77(02)		Yes, crowded places Evet kalabalık yerler	1 0	Yes No
SUM_evde_2	77(03)		Yes,late night Evet ,gec saatte	1 0	Yes No
SUM_guvsok	78(01)	Are you worried to be robbed on street? Sokakta soyulacağınız endişesi varmı?	Yes,always Evetherzaman	1 0	Yes No
SUM_ guvsok _1	78(02)		Yes, crowded places Evet kalabalık yerler	1 0	Yes No
SUM_ guvsok _2	78(03)		Yes,late night Evet ,gec saatte	1 0	Yes No
SUM_ guvsok _3	78(04)		No,ı feel safe Hayır, güvendeyim	1 0	Yes No
SUM_ guvsok _4	78(05)		I dont carry wallet Cüzdan taşımıyorum	1 0	Yes No
SUM_ guvsok _5	78(06)		Not safe but ı am not worried Güvenli değil ama endişe etmiyorum	1 0	Yes No
SUM_ guvsok _4	78(05)		I dont carry wallet Cüzdan taşımıyorum	1 0	Yes No

Table B. 4 Summary Of Survey Questions – Precaution

PRECAUTION VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_		How many hours a day your house is empty? Haftaici eviniz kaç saat boş kalıyor?	0-2hour/saat	1 0	Yes No
SUM_kimyok			2-4hour/saat	1 0	Yes No
SUM_kimy_1			More 4 4 üstü	1 0	Yes No
SUM_ksig	83(01)	How do you protect your house against burglary? Evinizi hırsızlığa karşı nasıl koruyosunuz?	İnsurance/ Sigorta	1 0	Yes No
SUM_celik	83(02)		Steel door Celik kapı	1 0	Yes No
SUM_iron	83(04)		İron cage demir parmaklık	1 0	Yes No
SUM_ozelguv	83		Private security Özel güvenlik	1 0	Yes No
SUM_balkon	83(08)		Close balkony Balkonu kapatmak	1 0	Yes No
SUM_gecelamp	83(06)		Night lamp Gece lambası	1 0	Yes No
SUM_allah	83(05)		Allah protect Allah korur	1 0	Yes No
SUM_gelenek	83(07)		Traditional meth Geleneksel yöntemler	1 0	Yes No
SUM_silah	83(01)		Gun/ Silah	1 0	Yes No
SUM_kilit	83(06)		Lock/kilit	1 0	Yes No
SUM_mahall	84(01)	Which items do you consider while you choose the house to live? Yaşadığınız evi seçerken nelere dikkat edersiniz?	Safe region Güvenli mahalle	1 0	Yes No
SUM_seckom	84(02)		Neighbours Komsular	1 0	Yes No
SUM_site	84(03)		Site housing Site olması	1 0	Yes No
SUM_secgoc	84(04)		No migration Göç almamasına	1 0	Yes No
SUM_tekon	84(05)		Only price important Yalnız ücret	1 0	Yes No
SUM_aracal		How do you protect your car? Aracınızı nasıl koruyorsunuz?	Alarm	1 0	Yes No
SUM_direks			Steering Wheel lock direksiyon kilidi	1 0	Yes No
SUM_aracsig			Insurance Sigorta	1 0	Yes No
SUM_evgir			Park in front door Kapı onu park ederim	1 0	Yes No

Table B. 5 Summary Of Survey Questions – Attitude Towards Crime

ATTITUDE TOWARDS CRIME VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
	86(01)	If you see a woman disturbed by a man on street what will you do? Sokakta bir kadının taciz edildiğini görseniz naparsınız?	Interfere situation Duruma müdahale ederim	1 0	Yes No
	86(02)		Ask for help Yardım isterim	1 0	Yes No
	86(03)		Pretend not to see it Görmezden gelirim	1 0	Yes No
	86(04)		Look womans dress Kadın kılıgına bakarım	1 0	Yes No
	86(05)		Call police Polisi ararım	1 0	Yes No
	86(06)		Depends on situation Duruma göre değişir	1 0	Yes No
	86(07)		Get mad Kızarım	1 0	Yes No
	86(08)		Get sad Üzülürüm	1 0	Yes No
	86(09)		Blame them Ayıplarım	1 0	Yes No
	87(01)	If you see a robbery on street what will you do Sokakta hırsızlık görseniz ne yap.?	Call police Polisi ararım	1 0	Yes No
	87(02)		I run away Kaçarım	1 0	Yes No
	87(03)		Warn people aroun Çevredekileri uyarırım	1 0	Yes No
	87(04)		Depends on situation Duruma göre değişir	1 0	Yes No
	87(05)		Cant move Donar kalırım	1 0	Yes No
	87(06)		Get mad Kızarım	1 0	Yes No
	87(07)		Interfere situation Müdahale ederim	1 0	Yes No
	88(01)	If you see neighbours house is robbed what do you do Komsunuzun evinin soyuldugunu görseniz ne yaparsınız	Call police Polisi ararım	1 0	Yes No
	88(02)		I run away Kaçarım	1 0	Yes No
	88(03)		Warn people around Çevredekileri uyarırım	1 0	Yes No
	88(04)		Depends on situation Duruma göre değişir	1 0	Yes No
	88(05)		Cant move Donar kalırım	1 0	Yes No
	88(06)		Interfere situation Müdahale ederim	1 0	Yes No
	101(01)	To prevent crime is responsibility of citizens Sucu önlemek vatandasın görevidir	Agree/katılıyorum	1 0	Yes No

Table B. 5 (Cont'd)

ATTITUDE TOWARDS CRIME VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
	101(02)		Disagree/katılmıyorum	1 0	Yes No
	101(03)		No comment Kararsızım	1 0	Yes No
	102(01)	I accept to pay higher tax to leave in safer region. Daha güvenli bir bölgede yaşamak için daha fazla vergi ödemeyi kabul ederim.	Agree/katılıyorum	1 0	Yes No
	102(02)		Disagree/katılmıyorum	1 0	Yes No
	102(03)		No comment Kararsızım	1 0	Yes No
	104(01)	I believe everything is destiny. her şeyin kader olduguna inanıyorum.	Agree/katılıyorum	1 0	Yes No
	104(02)		Disagree/katılmıyorum	1 0	Yes No
	104(03)		No comment Kararsızım	1 0	Yes No

Table B. 6 Summary Of Survey Questions – Migration

MIGRATION VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_mahsur	23	How many years you leave in this region? Bu mahallede kaç yıldır otumaktasınız?	Less than 10years 10 yıldan az	1 0	Yes No
SUM_mahs_1			More then 10 years 10 yıldan fazla	1 0	Yes No
SUM_ilankd	22	Are you from Ankara? Ankaralımısınız?		1 0	Yes No

Table B. 7 Summary Of Survey Questions – Victimization

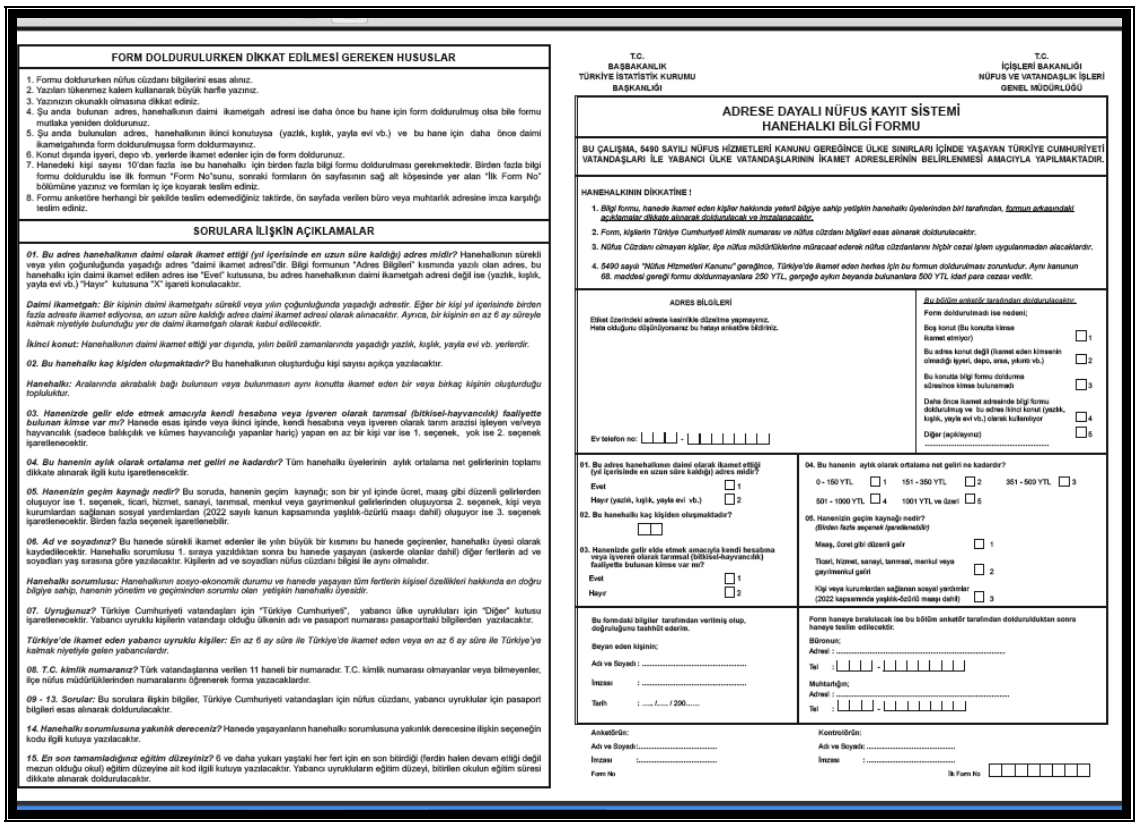
VICTIM VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
SUM_sizesu	63	Have you faced any crime in last 2-3 years? Son 2-3 yılda suca maruz kaldınız mı?	Yes/Evet	1 0	Yes No
SUM_size_1			No/Hayır	1 0	Yes No

Table B. 8 Summary Of Survey Questions –Crime Victimization Types

BURGLARY VARIABLE CODE	QUEST. NO	VARIABLE	MULTIPLE CHOICE		
	55	Which of these creimes happen in your region often? Mahallenizde hangi suc türleri sık olmakta?	Burglary Evden hırsızlık	1 0	Yes No
			Work robbery İşten hırsızlık	1 0	Yes No
			Property theft from auto Otodan hırsızlık	1 0	Yes No
			Auto theft Araba hırsızlığı	1 0	Yes No
			Robbery Kapkaç	1 0	Yes No
			Pickpocketing Yankesicilik	1 0	Yes No
			Extort/Gasp	1 0	Yes No
			Drugs/uyusturucu	1 0	Yes No
				1 0	Yes No

APPENDIX C

ADDRESS BASED POPULATION REGISTER SYSTEM
ABPRS SURVEY FORM



FORM DOLDURULURKEN DİKKAT EDİLMESİ GEREKEN HUSUSLAR

1. Formu doldururken nüfus cüzdanı bilgilerini esas alınız.
2. Yazıları tükenmez kalem kullanarak büyük harfle yazınız.
3. Yazınızın okunaklı olmasına dikkat ediniz.
4. Şu anda bulunan adres, hanehalkının daimi ikametgah adresi ise daha önce bu hane için form doldurulmuş olsa bile formu mutlaka yeniden doldurunuz.
5. Şu anda bulunulan adres, hanehalkının ikinci konutuysa (yazlık, kışlık, yayla evi vb.) ve bu hane için daha önce daimi ikametgahında form doldurulmuşsa form doldurmayınız.
6. Konut dışında işyeri, depo vb. yerlerde ikamet edenler için de form doldurunuz.
7. Hanedeki kişi sayısı 10'dan fazla ise bu hanehalkı için birden fazla bilgi formu doldurulması gerekmektedir. Birden fazla bilgi formu doldurulduysa ise ilk formun "Form No"sunu, sonraki formların ön sayfasının sağ alt köşesinde yer alan "İlk Form No" bölümüne yazınız ve formları iç içe koyarak teslim ediniz.
8. Formu anketöre herhangi bir şekilde teslim edemediğiniz taktirde, ön sayfada verilen büro veya muhtarlık adresine imza karşılığı teslim ediniz.

SORULARA İLİŞKİN AÇIKLAMALAR

01. Bu adres hanehalkının daimi olarak ikamet ettiği (yıl içerisinde en uzun süre kaldığı) adres midir? Hanehalkının sürekli veya yılın çoğunluğunda yaşadığı adres "daimi ikamet adresi"dir. Bilgi formunun "Adres Bilgileri" kısmında yazılı olan adres, bu hanehalkı için daimi ikamet edilen adres ise "Evet" kutusuna, bu adres hanehalkının daimi ikametgah adresi değil ise (yazlık, kışlık, yayla evi vb.) "Hayır" kutusuna "X" işareti konulacaktır.

Daimi ikametgah: *Bir kişinin daimi ikametgahı sürekli veya yılın çoğunluğunda yaşadığı adrestir. Eğer bir kişi yıl içerisinde birden fazla adreste ikamet ediyorsa, en uzun süre kaldığı adres daimi ikamet adresi olarak alınacaktır. Ayrıca, bir kişinin en az 6 ay süreyle kalmak niyetiyle bulunduğu yer de daimi ikametgah olarak kabul edilecektir.*

İkinci konut: *Hanehalkının daimi ikamet ettiği yer dışında, yılın belirli zamanlarında yaşadığı yazlık, kışlık, yayla evi vb. yerlerdir.*

02. Bu hanehalkı kaç kişiden oluşmaktadır? Bu hanehalkının oluşturduğu kişi sayısı açıkça yazılacaktır.

Hanehalkı: *Aralarında akrabalık bağı bulunsun veya bulunmasın aynı konutta ikamet eden bir veya birkaç kişinin oluşturduğu topluluktur.*

03. Hanenizde gelir elde etmek amacıyla kendi hesabına veya işveren olarak tarımsal (bitkisel-hayvancılık) faaliyette bulunan kimse var mı? Hanede esas işinde veya ikinci işinde, kendi hesabına veya işveren olarak tarım arazisi işleyen ve/veya hayvancılık (sadece balıkçılık ve kümes hayvancılığı yapanlar hariç) yapan en az bir kişi var ise 1. seçenek, yok ise 2. seçenek işaretlenecektir.

04. Bu hanenin aylık olarak ortalama net geliri ne kadardır? Tüm hanehalkı üyelerinin aylık ortalama net gelirlerinin toplamı dikkate alınarak ilgili kutu işaretlenecektir.

05. Hanenizin geçim kaynağı nedir? Bu soruda, hanenin geçim kaynağı; son bir yıl içinde ücret, maaş gibi düzenli gelirlerden oluşuyor ise 1. seçenek, ticari, hizmet, sanayi, tarımsal, menkul veya gayrimenkul gelirlerinden oluşuyorsa 2. seçenek, kişi veya kurumlardan sağlanan sosyal yardımlardan (2022 sayılı kanun kapsamında yaşlılık-özürlü maaşı dahil) oluşuyor ise 3. seçenek işaretlenecektir. Birden fazla seçenek işaretlenebilir.

06. Ad ve soyadınız? Bu hanede sürekli ikamet edenler ile yılın büyük bir kısmını bu hanede geçirenler, hanehalkı üyesi olarak kaydedilecektir. Hanehalkı sorumlusu 1. sıraya yazıldıktan sonra bu hanede yaşayan (askerde olanlar dahil) diğer fertlerin ad ve soyadları yaş sırasına göre yazılacaktır. Kişilerin ad ve soyadları nüfus cüzdanı bilgisi ile aynı olmalıdır.

Hanehalkı sorumlusu: *Hanehalkının sosyo-ekonomik durumu ve hanede yaşayan tüm fertlerin kişisel özellikleri hakkında en doğru bilgiye sahip, hananin yönetim ve geçiminden sorumlu olan yetişkin hanehalkı üyesidir.*

07. Uyruğunuz? Türkiye Cumhuriyeti vatandaşları için "Türkiye Cumhuriyeti", yabancı ülke uyrukluları için "Diğer" kutusu işaretlenecektir. Yabancı uyruklu kişilerin vatandaşı olduğu ülkenin adı ve pasaport numarası pasaportlaki bilgilerden yazılacaktır.

Türkiye'de ikamet eden yabancı uyruklu kişiler: *En az 6 ay süre ile Türkiye'de ikamet eden veya en az 6 ay süre ile Türkiye'ye kalmak niyetiyle gelen yabancılardır.*

08. T.C. kimlik numaranız? Türk vatandaşlarına verilen 11 haneli bir numaradır. T.C. kimlik numarası olmayanlar veya bilmeyenler, ilçe nüfus müdürlüklerinden numaralarını öğrenerek forma yazacaklardır.

09 - 13. Sorular: Bu sorulara ilişkin bilgiler, Türkiye Cumhuriyeti vatandaşları için nüfus cüzdanı, yabancı uyruklular için pasaport bilgileri esas alınarak doldurulacaktır.

14. Hanehalkı sorumlusuna yakınlık derecesiniz? Hanede yaşayanların hanehalkı sorumlusuna yakınlık derecesine ilişkin seçeneğin kodu ilgili kutuya yazılacaktır.

15. En son tamamladığınız eğitim düzeyiniz? 6 ve daha yukarı yaştaki her fert için en son bitirdiği (ferdin halen devam ettiği değil mezun olduğu okul) eğitim düzeyine ait kod ilgili kutuya yazılacaktır. Yabancı uyrukluların eğitim düzeyi, bitirilen okulun eğitim süresi dikkate alınarak doldurulacaktır.

T.C.
BAŞBAKANLIK
TÜRKİYE İSTATİSTİK KURUMU
BAŞKANLIĞI

T.C.
İÇİŞLERİ BAKANLIĞI
NÜFUS VE VATANDAŞLIK İŞLERİ
GENEL MÜDÜRLÜĞÜ

ADRESE DAYALI NÜFUS KAYIT SİSTEMİ
HANEHALKI BİLGİ FORMU

BU ÇALIŞMA, 5490 SAYILI NÜFUS HİZMETLERİ KANUNU GEREĞİNCE ÜLKE SINIRLARI İÇİNDE YAŞAYAN TÜRKİYE CUMHURİYETİ VATANDAŞLARI İLE YABANCI ÜLKE VATANDAŞLARININ İKAMET ADRESLERİNİN BELİRLENMESİ AMACIYLA YAPILMAKTADIR.

HANEHALKININ DİKKATİNE !

1. *Bilgi formu, hanede ikamet eden kişiler hakkında yeterli bilgiye sahip yetişkin hanehalkı üyelerinden biri tarafından, formun arkasındaki açıklamalar dikkate alınarak doldurulacak ve imzalanacaktır.*
2. *Form, kişilerin Türkiye Cumhuriyeti kimlik numarası ve nüfus cüzdanı bilgileri esas alınarak doldurulacaktır.*
3. *Nüfus Cüzdanı olmayan kişiler, ilçe nüfus müdürlüklerine müracaat ederek nüfus cüzdanlarını hiçbir cezai işlem uygulanmadan alacaklardır.*
4. *5490 sayılı "Nüfus Hizmetleri Kanunu" gereğince, Türkiye'de ikamet eden herkes için bu formun doldurulması zorunludur. Aynı kanunun 68. maddesi gereği formu doldurmayanlara 250 YTL, gerçeğe aykırı beyanda bulunanlara 500 YTL idari para cezası verilir.*

ADRES BİLGİLERİ

Etiket üzerindeki adrese kesinlikle düzeltme yapmayınız.
Hata olduğunu düşünüyorsanız bu hataya anketöre bildiriniz.

Ev telefon no: [ ][ ][ ] - [ ][ ][ ][ ][ ][ ][ ]

Bu bölüm anketör tarafından doldurulacaktır.
Form doldurulmadı ise nedeni;

Boş konut (Bu konutta kimse ikamet etmiyor) ☐ 1
Bu adres konut değil (ikamet eden kimsenin olmadığı işyeri, depo, arsa, yıkımı vb.) ☐ 2
Bu konutta bilgi formu doldurma süresince kimse bulunmadı ☐ 3
Daha önce ikamet adresinde bilgi formu doldurulmuş ve bu adres ikinci konut (yazlık, kışlık, yayla evi vb.) olarak kullanılıyor ☐ 4
Diğer (açıklayınız) ☐ 5
.....

01. Bu adres hanehalkının daimi olarak ikamet ettiği (yıl içerisinde en uzun süre kaldığı) adres midir?
Evet ☐ 1
Hayır (yazlık, kışlık, yayla evi vb.) ☐ 2

02. Bu hanehalkı kaç kişiden oluşmaktadır?
☐☐

03. Hanenizde gelir elde etmek amacıyla kendi hesabına veya işveren olarak tarımsal (bitkisel-hayvancılık) faaliyette bulunan kimse var mı?
Evet ☐ 1
Hayır ☐ 2

04. Bu hanenin aylık olarak ortalama net geliri ne kadardır?
0 - 150 YTL ☐ 1 151 - 350 YTL ☐ 2 351 - 500 YTL ☐ 3
501 - 1000 YTL ☐ 4 1001 YTL ve üzeri ☐ 5

05. Hanenizin geçim kaynağı nedir?
(Birden fazla seçenek işaretlenebilir)
Maaş, ücret gibi düzenli gelir ☐ 1
Ticari, hizmet, sanayi, tarımsal, menkul veya gayrimenkul geliri ☐ 2
Kişi veya kurumlardan sağlanan sosyal yardımlar (2022 kapsamında yaşlılık-özürlü maaşı dahil) ☐ 3

Bu formdaki bilgiler tarafımdan verilmiş olup, doğruluğunu tasdiklt ederim.
Beyan eden kişinin;
Adı ve Soyadı : .....
İmzası : .....
Tarih : ...../...../ 200.....

Form haneye bırakılacak ise bu bölüm anketör tarafından doldurulduktan sonra haneye teslim edilecektir.
Büronun;
Adresi : .....
Tel : [ ][ ][ ] - [ ][ ][ ][ ][ ][ ][ ]
Muhtarlığın;
Adresi : .....
Tel : [ ][ ][ ] - [ ][ ][ ][ ][ ][ ][ ]

Anketörün:
Adı ve Soyadı: .....
İmzası : .....
Form No

Kontrolörün:
Adı ve Soyadı: .....
İmzası : .....
İlk Form No [ ][ ][ ][ ][ ][ ][ ]

Figure C. 1 Address Based Population Register System ABPRS Survey Form-P. 1

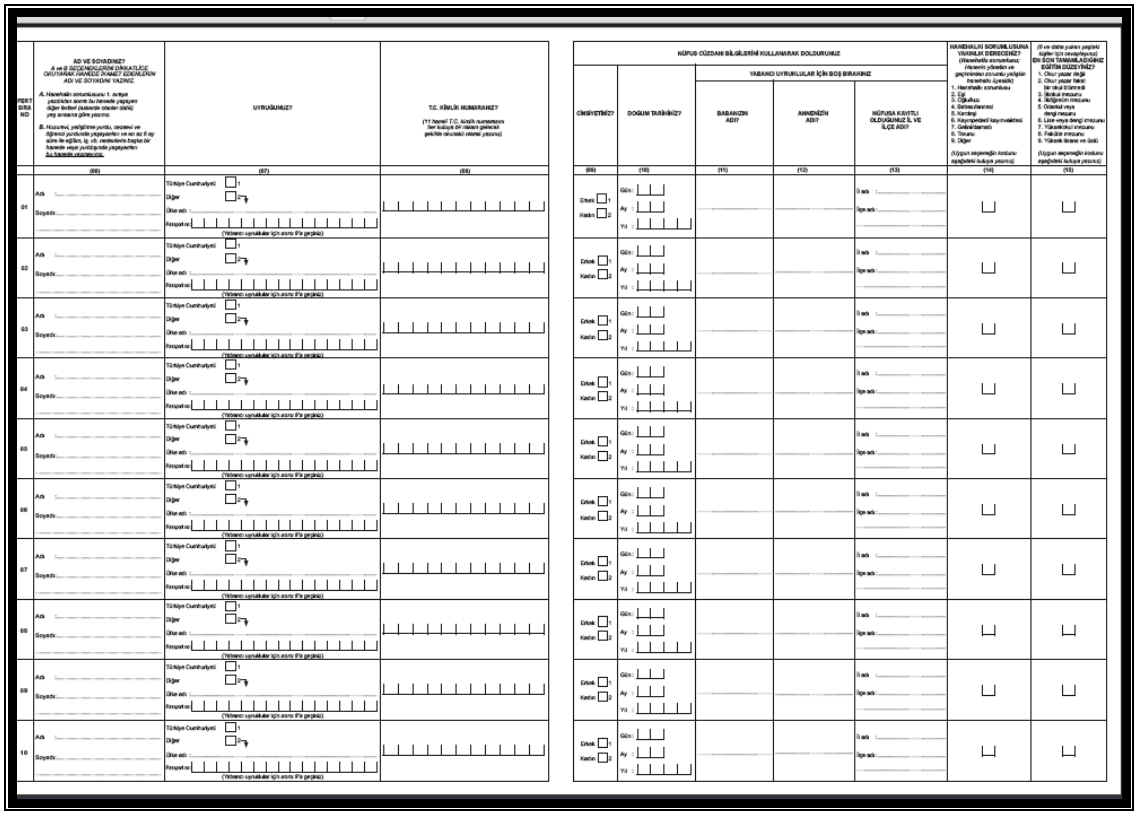


Figure C. 2 Address Based Population Register System ABPRS Survey Form-P. 2

APPENDIX D

VIEW OF BUILDING ATTRIBUTE TABLE

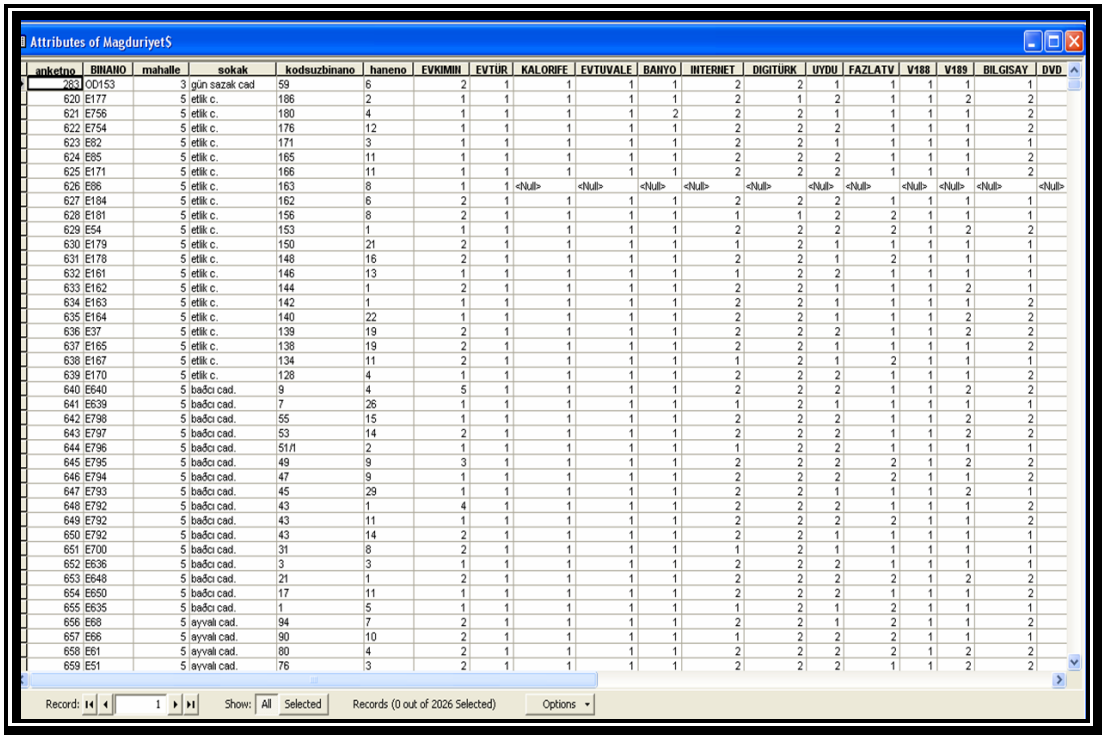


Figure D.1 View of Building Attribute Table

APPENDIX E

VIEW OF SMALL STATISTICAL AREA'S ATTRIBUTE TABLE

Attributes of bolge_ecoun_COUNT

FID	Shape	Join_Count	BARDPlanID	SUM_POP	MEAN_UDIST	MAX_BARDPI	MEAN_C_ind	STD_C_ind	BARDPlan_1	SUM_evkim	SUM_evkim1	SUM_evtur	SUM_evtur1	SUM_evtu_1	SUM_kalori
0	Polygon	1	1	2124	0,049922	1	-0,376592	1,656378	1	17	3	20	0	0	20
1	Polygon	1	2	1992	0,047041	2	0,179793	1,846968	2	11	0	10	1	0	10
2	Polygon	1	3	1988	0,042154	3	-1,078262	1,441526	3	15	7	22	0	0	21
3	Polygon	1	4	1968	0,048083	4	-0,474994	2,409017	4	14	7	20	1	0	13
4	Polygon	1	5	1968	0,050733	5	-2,112907	1,452046	5	20	3	18	3	0	20
5	Polygon	1	6	1984	0,050537	6	-1,136666	1,928093	6	14	7	20	0	0	20
6	Polygon	1	7	1968	0,058265	7	0,80254	2,223265	7	13	2	15	0	0	13
7	Polygon	1	8	2184	0,060334	8	-0,562558	2,133641	8	12	8	20	0	0	18
8	Polygon	1	9	2056	0,051521	9	-0,166175	2,09666	9	13	1	14	0	0	14
9	Polygon	1	10	2000	0,055899	10	-0,879407	2,06068	10	15	8	23	0	0	22
10	Polygon	1	11	2232	0,038181	11	-1,19895	1,87173	11	12	10	19	2	1	19
11	Polygon	1	12	2136	0,052499	12	-0,596237	1,620813	12	9	8	17	0	0	15
12	Polygon	1	13	1980	0,039069	13	-1,071418	2,147367	13	11	6	16	0	1	15
13	Polygon	1	14	1972	0,049469	14	-1,835536	1,650822	14	14	6	20	0	0	21
14	Polygon	1	15	2032	0,053106	15	-1,267344	1,810087	15	10	3	12	1	0	9
15	Polygon	1	16	2028	0,049816	16	0,137985	2,406236	16	9	2	11	0	0	9
16	Polygon	1	17	2220	0,053642	17	0,089338	2,248741	17	15	8	23	0	0	16
17	Polygon	1	18	2048	0,052088	18	-1,304141	2,500062	18	14	7	21	0	0	17
18	Polygon	1	19	2320	0,053738	19	0,288098	1,613979	19	14	10	23	1	0	17
19	Polygon	1	20	3060	0,058059	20	0,550547	4,188703	20	16	6	21	0	0	22
20	Polygon	1	21	928	0,036397	21	-1,79355	1,221363	21	3	1	3	1	0	2
21	Polygon	1	22	184	0,051929	22	-0,527291	1,591476	22	1	0	1	0	0	1
22	Polygon	1	23	2064	0,050345	23	2,318405	2,588586	23	15	5	20	0	0	20
23	Polygon	1	24	2008	0,048524	24	2,141271	2,463322	24	14	6	18	0	0	20
24	Polygon	1	25	2020	0,046589	25	1,855316	2,082663	25	15	6	20	1	0	18
25	Polygon	1	26	2076	0,052248	26	1,059531	2,222206	26	11	8	19	0	0	19
26	Polygon	1	27	1996	0,052825	27	0,574295	2,157787	27	15	4	19	0	0	13
27	Polygon	1	28	2036	0,047042	28	2,38394	2,316574	28	11	8	19	0	0	18
28	Polygon	1	29	2016	0,053534	29	1,584833	1,763448	29	17	5	22	0	0	17
29	Polygon	1	30	2020	0,050044	30	2,379344	1,848876	30	13	9	22	0	0	17
30	Polygon	1	31	2224	0,053312	31	1,143806	2,205159	31	13	13	25	0	0	26
31	Polygon	1	32	2036	0,042272	32	1,404037	1,616019	32	12	4	13	1	0	11
32	Polygon	1	33	2020	0,043338	33	1,780191	2,092926	33	13	10	23	0	0	20
33	Polygon	1	34	2020	0,046671	34	1,444052	2,517455	34	9	10	18	0	0	17
34	Polygon	1	35	2032	0,039427	35	0,798637	3,660425	35	17	4	21	0	0	17
35	Polygon	1	36	2396	0,039621	36	1,527051	3,324603	36	15	5	19	0	0	17
36	Polygon	1	37	2212	0,055927	37	2,759993	6,130609	37	15	3	16	2	0	13
37	Polygon	1	38	1172	0,049116	38	3,174332	1,391199	38	3	2	5	0	0	4
38	Polygon	1	39	1620	0,035345	39	-0,060371	2,052891	39	7	3	9	1	0	9
39	Polygon	1	60	2088	0,06369	60	-0,159663	1,976929	60	1	0	1	0	0	1
40	Polygon	1	61	2260	0,061887	61	1,226827	2,392071	61	16	5	20	0	1	21
41	Polygon	1	62	2664	0,062173	62	1,678056	2,185514	62	16	8	23	0	0	24
42	Polygon	1	63	2016	0,058231	63	3,508744	1,805834	63	12	9	19	0	0	19
43	Polygon	1	64	2116	0,06063	64	-0,646469	2,484449	64	20	5	25	0	0	25
44	Polygon	1	65	2000	0,057167	65	2,137317	2,539502	65	9	11	20	0	0	19
45	Polygon	1	66	3628	0,061874	66	0,476375	3,45774	66	20	7	27	0	0	26
46	Polygon	1	67	2008	0,057541	67	3,849136	1,5264	67	11	3	13	0	1	14
47	Polygon	1	68	2232	0,058146	68	2,599344	2,067349	68	17	4	21	0	0	21

Record: 1 Show: All Selected Records (0 out of 98 Selected) Options

Figure E.1 View of SSA's Attribute Table

APPENDIX F

TABLE OF SCALE CORRECTION

BARDPlan ID	POPULATION	# QUESTIONNAIRE	POP QUESTIONED	POP_ HHOLD	# HHOLDS	SURVEY/ HHOLDS
1	2124	20	81	4,0500	524,4444	0,0381
2	1992	11	36	3,2727	608,6667	0,0181
3	1988	22	88	4,0000	497,0000	0,0443
4	1968	21	85	4,0476	486,2118	0,0432
5	1968	22	93	4,2273	465,5484	0,0473
6	1984	21	81	3,8571	514,3704	0,0408
7	1968	14	48	3,4286	574,0000	0,0244
8	2184	20	78	3,9000	560,0000	0,0357
9	2056	14	57	4,0714	504,9825	0,0277
10	2000	22	92	4,1818	478,2609	0,0460
11	2232	22	84	3,8182	584,5714	0,0376
12	2136	17	64	3,7647	567,3750	0,0300
13	1980	17	61	3,5882	551,8033	0,0308
14	1972	21	74	3,5238	559,6216	0,0375
15	2032	13	45	3,4615	587,0222	0,0221
16	2028	11	35	3,1818	637,3714	0,0173
17	2220	23	90	3,9130	567,3333	0,0405
18	2048	21	90	4,2857	477,8667	0,0439
19	2320	24	86	3,5833	647,4419	0,0371
20	3060	22	75	3,4091	897,6000	0,0245
21	928	4	14	3,5000	265,1429	0,0151
22	184	4	4	1,0000	184,0000	0,0217
23	2064	22	66	3,0000	688,0000	0,0320
24	2008	20	68	3,4000	590,5882	0,0339

Figure F.1 View of Table of Scale Correction

APPENDIX G

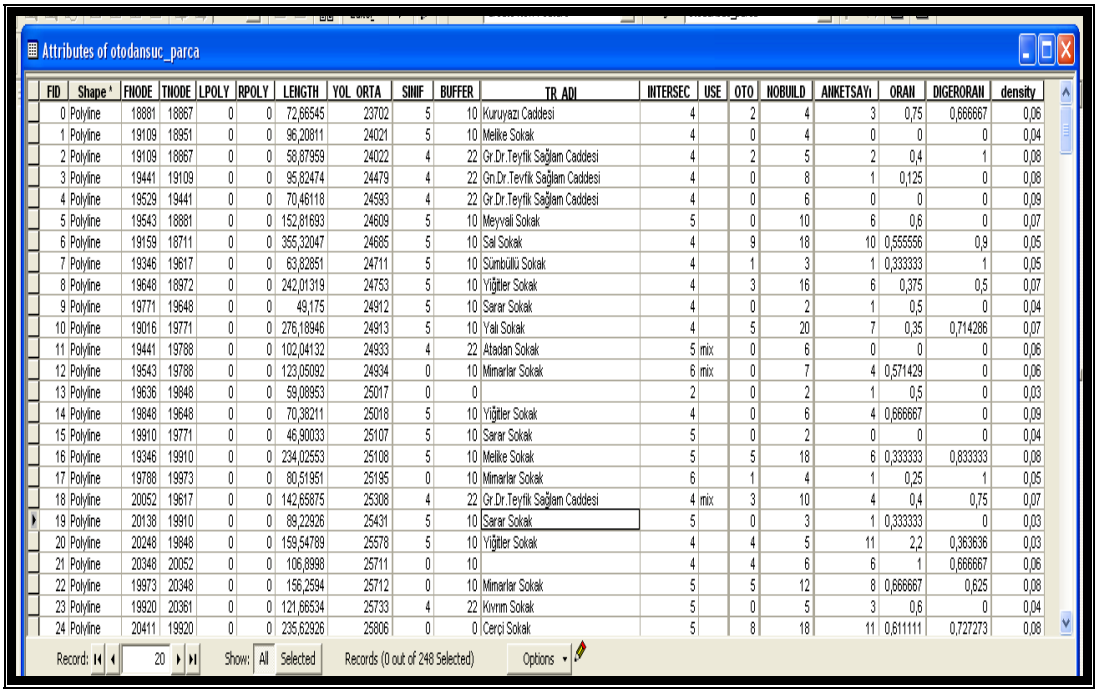
EXAMPLE OF SCALE CORRECTION – ECONOMIC INDEX

BARDPlan_1	SUM_ evkim	SUM_ evkim1	SUM_ evtur	SUM_ kalori	SUM_ intern	scale_K	R_ owner	R_ Own1	R_ htype	R_ kalori	R_ inter
1	17	3	20	20	8	**0,038**	0,646	0,114	12,92	0,76	0,304
2	11	0	10	10	3	**0,018**	0,198	0	1,98	0,18	0,054
3	15	7	22	21	5	**0,044**	0,66	0,308	14,52	0,924	0,22
4	14	7	20	13	6	**0,043**	0,602	0,301	12,04	0,559	0,258
5	20	3	18	20	7	**0,047**	0,94	0,141	16,92	0,94	0,329
6	14	7	20	20	6	**0,04**	0,56	0,28	11,2	0,8	0,24
7	13	2	15	13	6	**0,024**	0,312	0,048	4,68	0,312	0,144
8	12	8	20	18	8	**0,035**	0,42	0,28	8,4	0,63	0,28
9	13	1	14	14	9	**0,027**	0,351	0,027	4,914	0,378	0,243
10	15	8	23	22	7	**0,046**	0,69	0,368	15,87	1,012	0,322
11	12	10	19	19	5	**0,037**	0,444	0,37	8,436	0,703	0,185
12	9	8	17	15	8	**0,029**	0,261	0,232	4,437	0,435	0,232
13	11	6	16	15	5	**0,03**	0,33	0,18	5,28	0,45	0,15
14	14	6	20	21	8	**0,037**	0,518	0,222	10,36	0,777	0,296
15	10	3	12	9	2	**0,022**	0,22	0,066	2,64	0,198	0,044
16	9	2	11	9	2	**0,017**	0,153	0,034	1,683	0,153	0,034
17	15	8	23	16	8	**0,04**	0,6	0,32	13,8	0,64	0,32
18	14	7	21	17	9	**0,043**	0,602	0,301	12,64	0,731	0,387
19	14	10	23	17	2	**0,037**	0,518	0,37	11,91	0,629	0,074
20	16	6	21	22	11	**0,024**	0,384	0,144	8,064	0,528	0,264
21	3	1	3	2	1	**0,015**	0,045	0,015	0,135	0,03	0,015
22	1	0	1	1	1	**0,021**	0,021	0	0,021	0,021	0,021
23	15	5	20	20	6	**0,031**	0,465	0,155	9,3	0,62	0,186
24	14	6	18	20	4	**0,033**	0,462	0,198	8,316	0,66	0,132

Figure G.1 View of Example of Scale Correction – Economic Index

APPENDIX H

A VIEW OF ATTRIBUTE TABLE OF ROAD DATABASE



Attributes of otodansuc_parca

FID	Shape *	FNODE	TNODE	LPOLY	RPOLY	LENGTH	YOL_ORTA	SINIF	BUFFER	TR_ADI	INTERSEC	USE	OTO	NOBUILD	ANKETSAYI	ORAN	DIGERORAN	density
0	Polyline	18881	18867	0	0	72,66545	23702	5	10	Kuruyazı Caddesi	4		2	4	3	0,75	0,666667	0,06
1	Polyline	19109	18951	0	0	96,20811	24021	5	10	Melike Sokak	4		0	4	0	0	0	0,04
2	Polyline	19109	18867	0	0	58,87959	24022	4	22	Gr.Dr.Teyfik Sağlam Caddesi	4		2	5	2	0,4	1	0,08
3	Polyline	19441	19109	0	0	95,82474	24479	4	22	Grı.Dr.Tevfik Sağlam Caddesi	4		0	8	1	0,125	0	0,08
4	Polyline	19529	19441	0	0	70,46118	24593	4	22	Gr.Dr.Teyfik Sağlam Caddesi	4		0	6	0	0	0	0,09
5	Polyline	19543	18881	0	0	152,81693	24609	5	10	Meyvali Sokak	5		0	10	6	0,6	0	0,07
6	Polyline	19159	18711	0	0	355,32047	24685	5	10	Sal Sokak	4		9	18	10	0,555556	0,9	0,05
7	Polyline	19346	19617	0	0	63,82851	24711	5	10	Sümbüllü Sokak	4		1	3	1	0,333333	1	0,05
8	Polyline	19648	18972	0	0	242,01319	24753	5	10	Yiğitler Sokak	4		3	16	6	0,375	0,5	0,07
9	Polyline	19771	19648	0	0	49,175	24912	5	10	Sarar Sokak	4		0	2	1	0,5	0	0,04
10	Polyline	19016	19771	0	0	276,18946	24913	5	10	Yalı Sokak	4		5	20	7	0,35	0,714286	0,07
11	Polyline	19441	19788	0	0	102,04132	24933	4	22	Atadan Sokak	5	mix	0	6	0	0	0	0,06
12	Polyline	19543	19788	0	0	123,05092	24934	0	10	Mimarlar Sokak	6	mix	0	7	4	0,571429	0	0,06
13	Polyline	19636	19848	0	0	59,08953	25017	0	0		2		0	2	1	0,5	0	0,03
14	Polyline	19848	19648	0	0	70,38211	25018	5	10	Yiğitler Sokak	4		0	6	4	0,666667	0	0,09
15	Polyline	19910	19771	0	0	46,90033	25107	5	10	Sarar Sokak	5		0	2	0	0	0	0,04
16	Polyline	19346	19910	0	0	234,02553	25108	5	10	Melike Sokak	5		5	18	6	0,333333	0,833333	0,08
17	Polyline	19788	19973	0	0	80,51951	25195	0	10	Mimarlar Sokak	6		1	4	1	0,25	1	0,05
18	Polyline	20052	19617	0	0	142,65875	25308	4	22	Gr.Dr.Teyfik Sağlam Caddesi	4	mix	3	10	4	0,4	0,75	0,07
19	Polyline	20138	19910	0	0	89,22926	25431	5	10	Sarar Sokak	5		0	3	1	0,333333	0	0,03
20	Polyline	20248	19848	0	0	159,54789	25578	5	10	Yiğitler Sokak	4		4	5	11	2,2	0,363636	0,03
21	Polyline	20348	20052	0	0	106,8998	25711	0	10		4		4	6	6	1	0,666667	0,06
22	Polyline	19973	20348	0	0	156,2594	25712	0	10	Mimarlar Sokak	5		5	12	8	0,666667	0,625	0,08
23	Polyline	19920	20361	0	0	121,66534	25733	4	22	Kıvrım Sokak	5		0	5	3	0,6	0	0,04
24	Polyline	20411	19920	0	0	235,62926	25806	0	0	Cerçi Sokak	5		8	18	11	0,611111	0,727273	0,08

Record: 20 Show: All Selected Records (0 out of 248 Selected) Options

Figure H.1 View of Attribute Table of Road Database

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Yavuzer, İpek
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EDUCATION

Degree Graduation	Institution	Year of
MS	METU Geodetic and Geographical Info. Tech. Dept	2005
BS	METU City and Regional Planning Dept.	2000
High School	Gazi Anadolu High School, Ankara	1996

WORK EXPERIENCE

Year		
2012 – Present	İpek Yavuzer Eğitim ve Org. Ltd.	Manager
2000-2003	Tepe İnşaat	City Planner

FOREIGN LANGUAGES

English, Danish

PUBLICATIONS

Yavuzer, İpek, and Keskin, Fatih and Yenilmes, Firdes and Çolak, Mithat and Düzgün, Şebnem, "Analysis of Traffic Incidents in METU Campus", Procedia and Social Behavioral Sciences, Volume 19, 2011, Pages 61-70

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