ENVIRONMENTAL INJUSTICE IN BRASÍLIA:

WHO ARE THE PEOPLE LIVING IN ESTRUTURAL AND WHY?

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WHO ARE THE PEOPLE LIVING IN ESTRUTURAL AND WHY?

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This thesis is a detailed analysis of the factors that contributed to the emergence of environmental injustice in Estrutural, Brasilia. It evaluates the current socio-spatial configuration of people and waste in this urban area by drawing a longitudinal comparison showing how hazards and people's relationship to hazards have changed overtime. In order to evaluate environmental inequities in Estrutural, first, this thesis addresses the motives that caused socio-spatial segregation and environmental degradation in the city of Brasilia by developing a historical-geographical evaluation of Estrutural. Second, it asks who these people are and what their motives are for living in Estrutural by using open-ended questions to interview eleven residents. The goal of this thesis is to contribute to the conceptual framework of environmental justice and to develop a methodology to study environmental injustice in Brazil.

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Chapter 1: Introduction

This thesis analyzes the motives that contributed for the emergence of environmental injustice in Estrutural, Brasília, by evaluating the current socio-spatial configuration of people and waste in this metropolitan area. In order to evaluate environmental inequities in Estrutural, first, I address the motives of the socio-spatial segregation and environmental degradation occurring in the city of Brasília by developing a historical-geographical evaluation of Estrutural. Second, I question who these people are and what their motives are for living in Estrutural by using open-ended interviews to interrogate eleven residents. The goal of this paper is to contribute to the conceptual framework of environmental justice and to develop a methodology to study environmental injustice in Brazil. I applied two qualitative methodologies to investigate who lives in Estrutural, Brasília and why: (1) historical case specific analysis and (2) community interviews.

The continuous movement of residents of rural areas to urban settings has created a variety of problems around the world and Latin American countries are no different. The most risky areas often emerge outside large metropolitan cities and present a profile of great environment degradation, thus threatening the sustainability of the host metropolis and the well being of the people living in the risky area (Hardoy & Satterthwaite, 1989; Satterthwaite, 1997). In Brazil, the area of Estrutural near the metropolitan area of Brasília is an example of this scenario. Estrutural emerged outside the capital of Brazil and presents a profile of great environmental degradation, which is threatening the sustainability of the metropolitan area of Brasília and the well being of the

people living in Estrutural. In 2002, Cabral, from the BBC, reported the existence of an illegal settlement of 30,000 poor people living in Estrutural near the main dumpsite for the entire Federal District, the Joquei Clube. This community is exposed to water, air and land contamination from the dumpsite. Estrutural lacks a sewer system, it has a pipeline (kerosene) five feet beneath ground that crosses the area and suffers from soil erosion caused by disordered settlement patterns

The settlement of this area began at the same time the operation of the dumpsite Joquei Clube in 1961, and after the inauguration of Brasília, the new capital of Brazil. At that time, ten families were living in this area and working in the landfill. Thirty years later 135 shacks were erected and an estimated population of 500 people lived in the area named Old Village. In the 1990s, significant population growth occurred in Estrutural, and 3,966 households were counted (Corrêa, 2002).

In 2001, the Brazilian government acknowledged the problems existing in Estrutural, because of the great environmental impact of this area on the metropolitan area of Brasília. In 2002, after a few attempts to remove the invaders, the Federal Government (GDF) was forced to legalize the area and brought up its status to RA (Administrative Region). This decision increased both vote-trading corruption and the invasion of public lands by homeless populations (Dugger, 2004).

In 2004, Estrutural had a population of 30,000 people and 6,000 households. The Federal government now supplies water and electricity to the area, but neither sewer systems nor paved streets are provided. As this area becomes more populated and its density reaches 250 habitants per hectare, it has begun to seriously threaten the quality of

the underground water that supplies fresh water to the residents of Brasília. At the same time, the expansion of this settlement is affecting the ecosystem of the National Park which limits the north boundary of Estrutural (Fonseca & Lima 2004, AS-18).

In the mean time, more people are moving into and settling the area, hoping to also acquire a parcel of rent-free land. The residents of Estrutural are hoping for the Federal government to allow the whole community to remain in Estrutural. They are concerned because a government plan to re-urbanize Estrutural for the year 2005/2006 is in discussion. Estrutural's project is part of the Sustainable Brasília Program funded by the Federal District government and the World Bank (Campos, 2004, A-25 & Secretária de Comunicação Social, 2004, 3187 & 6005).

With the increased media attention of Estrutural, more attention is being paid to it, especially by people concerned about the environmental issues related to this area. One such a group is the environmental justice researchers and advocators who believe that all people and communities have the right "to equal protection of environment and public health laws and regulations" (Bullard & Johnson, 2000 p.556). These groups are concerned about Estrutural because marginalized populations bear most of the environmental burdens of the Federal District without enjoying the same economic benefits of those that produce waste.

Another issue is the landscape of socio-spatial segregation occurring in Brasília which is a result of complex interactions over long periods of time. The emergence of Estrutural obeyed three levels of motives: economic (the modernization plan of Brazil in the 1950s), environmental (lack of a comprehensive urban planning for the Federal

District) and social (individuals' motivations and decisions to move to Brasília). The socio-spatial segregation patterns of Brasília and the environmental degradation of the Federal District contributed to the emergence of Estrutural as a case of environmental injustice.

This thesis discusses the formation of environmental injustice in Estrutural and is presented in six chapters and appendixes. This chapter introduces the history and environmental injustice in Estrutural, Brasília. In Chapter 2, I summarize relevant literature review on the topic of Environmental Justice Movement. In Chapter 3, I describe the methodologies used to develop my study. In Chapter 4, I discuss my findings on the history of Estrutural. In Chapter 5, I discuss my results from the residents' interviews. Finally in Chapter 6, I present the discussion and conclusion of my thesis

Chapter 2: Literature Review

Urbanization and Environmental Degradation

The increased rate of urbanization world wide is sometimes accompanied by environmental degradation to certain areas located by the cities. Researchers are studying the motives that are taking some people to live in these degraded and unhealthy urban areas. They stated that one third of the total world population is living in poor urban areas. These studies also found that certain segments of the society are unequally exposed to the costs of the economic development. These marginalized groups are deprived of affordable housing, access to basic public services and social benefits, and are living in unhealthy environment (Hardoy & Satterthwaite, 1989; Satterthwaite, 1997; Warner, 2002 & Wheeler, 2000).

According to some researchers, the existence of toxicity and the lack of public services to some regions are often due to racist or classist zoning decisions and the lack of a comprehensive urban planning (Bartone, 1991; Maantay, 2002; Pellow, 2000 & Pulido, 2000). These motives result in the unequal disposal of waste and the confinement of marginalized populations to degraded urban areas, such as landfills, incinerators, trash transfer stations, abandoned disposal facilities, and inefficient factories. These degraded urban areas became a threat to the health of the people living in those areas and to the sustainability of the whole metropolitan region because they lack proper management of waste (Anderton, Oakes & Egan 1997; Bryant & Mohai, 1992).

Environmental Degradation

In Brazil and other Latin American countries the migration process from rural to urban areas has been more pronounced than in developed countries. People move to urban areas to search for employment and better living conditions because work is not available in rural areas (Bartone, 1991 & Szasz & Meuser, 1997). Many feel that these changes are caused by the capitalization process as the elite population and international investments naturally migrate to urban areas and force out the lower economic residents, such as the case of the Brazilian capital, Brasília (Holston, 1989; & Potter & Evans, 1998).

The lack of planned urban growth causes environmental degradation as cities sprawl over agricultural and public land. Urban sprawl consumes fertile soil, erodes streams, and pollutes lakes in order to support the great number of people living in the city. This process impoverishes the natural environment and destroys the rural areas threatening the sustainability of the cities. As the urban fringe spreads, creeks and rivers become contaminated affecting the water quality of lakes and the underground water supplying the cities. Stopping urban sprawl is difficult and costly because basic infrastructure, land use, and zoning ordinances are the result of decisions made when the cities were first developed (Hardoy & Satterthwaite, 1989; Satterthwaite, 1997 & Violich, 1987).

Environmental degradation of urban areas generates poor living conditions, which result in violence, stress, and the spread of illnesses. The city fringe is the area where the conflicts of interests over changes in land uses and dispute of zoning ordinances occur

and also where the squatter settlements emerge due to the lack of affordable housing and employment (Satterthwaite, 1997 & Wheeler, 2000).

The impact of sprawl on the urban environment differs from region to region, because of the specific historical circumstances and development of each region. The case of Brasília is similar to many other examples of large cities in Latin America -- the lack of housing and infrastructure in central areas caused poor people to move away from the center and settle in the rural areas around the cities. In developing countries most of the poor populations inhabit the city's periphery. They are segregated and marginalized to the outside of the cities, portraying spatial and social polarization between wealth and poor (Holston, 1989; Epstein, 1973; Evenson, 1973 & Violich, 1987).

Segregation and environmental burden

Poor urban centers are built on degraded or ecologically fragile areas, prone to earthquakes, soil erosion and floods. These areas become unwanted lands and attract disadvantaged groups because of low land cost and at the same time are targeted with waste disposal and polluted industries. The segregation of poor population and environmental burden follows a developmental pattern of socio-spatial stratification based on uneven income distribution and fewer civil rights (Agyeman, Bullard & Evans, 2002).

New urban politics and a comprehensive urban plan can be effective in dealing with the environmental problems and spatial segregation occurring in Latin American cities. However, some authors have pointed that the political and economical conditions of developing countries along with international interests, have led to planners not

attaining successful measures for solving urban problems such as sprawl and unequal

distribution of good and bad resources (Hardoy et al., 1989 & Violich, 1987).

The Environmental Justice Movement (EJM)

The disparity of living conditions between social groups in urban areas was a

concern of professionals from developed and developing countries. In the US, the urban

poor's living conditions were addressed by student-activist groups that diverted from the

civil-rights and anti-war movements of the late 1960s (Cutter, Holm & Clark, 1996).

Later, students and environmental activists inspired by the Earth Day movement set their

goals to bring environmental equality to urban centers. In the 1980s, environmental

activists and environmental researchers focused their studies on the evaluation of

environmental inequality and the discriminatory distribution of hazardous waste and

public services in different poor urban areas in the US. Their results confirmed a strong

correlation between race, ethnicity, and toxic sites. A new national consciousness

emerged and the environmental justice movement was formed, and a variety of

methodologies were used and discussed by researchers and professionals (Bullard &

Johnson, 2000).

An example of the social power of environmental justice is the case of Love

Canal in New York. The city was built on the grounds of a former dump site for

hazardous materials from the Hooker Chemical Company. In the 1950s, this company

covered the canal with earth and sold the site to the city, where a school and

approximately one hundred homes were built. In 1970s large incidents of cancer and

birth defects were reported from this community. A soil and water analysis showed traces

of 88 chemicals in the site. As a response to Love Canal and other emerging

environmental problems, the United States created the Environmental Protection Agency

(EPA) in 1970 to control the emission of pollution and hazardous disposal (Fung &

O'Rourke, 2000).

Another important case that empowered the environmental justice movement in

the US took place in 1982 in Warren County, North Carolina. Civil Rights activists and

environmentalists demanded the environmental rights of minority groups and low-income

neighborhoods that had their neighborhoods sited for the dumping of toxic waste. As

people became aware of this incident, more attention was given to sites that were near

industries and abandoned or active dumps. Organizations around the US began

organizing groups to protect communities against environmental degradation.

Environmental groups sprouted in poor and minority neighborhoods. These groups were

supported by scientific researchers and information services. Through environmental

justice activists, communities became aware of their exposure to toxicity (Bullard, 1993).

In 1983, environmental researchers observed and reported the correlation between

populations with certain socio-economic characteristics and the location of toxic sites

(Bowen, Salling, Haynes & Cyran,. 1995). In 1987, the United Church of Christ reported

that toxic waste and hazardous sites were normally located in low income communities

around the country (Anderton et al., 1997; Bullard, 1993; Cutter et al.,1995 & Downey,

1998). In 1994, the Executive Order on Federal Actions, executive order number 12898,

by President Clinton, required governmental programs and policies to consider toxic

waste and pollution problems especially when they affected poor and minority

neighborhoods (Cutter et al., 1995; Lipschutz, 2004 and Bowen, 2002).

Environmental Justice Framework

The framework of environmental justice in the US lays the blame for inequities

on two concepts: environmental racism and environmental inequality (Pellow, 2000).

Environmental racism implies a set of regulations and policy decisions made by

governmental officials and corporations with the intent to confine certain communities of

color to unwanted lands (Anderton et al.,1997; Bryant et al., 1992; Downey, 1998;

Bullard, 1993; Maantay, 2002 & Pulido, 2000). Environmental inequality involves the

unequal distribution of amenities such as affordable housing, public service and jobs

location, causing distress and health risks to the community if they are not provided

(Callewaert, 2002 & Pellow, 2000).

In order to evaluate the existence of these conditions, researchers employ

quantitative (geographical information system analysis and statistic analysis) and

qualitative (historical analysis and community participation analysis) methodologies.

Data is gathered from multiple sources including census tracts, zip codes, governmental

reports and surveys. The US environmental justice movement utilizes intricate

methodologies and demographic information (Bowen, 2002 & Weinberg, 1998).

The history of the environmental justice movement in the US can be divided into

three periods and current trends. The first period occurred between the early 1970s and

the 1980s. During this period, researchers observed a strong relationship between race

and ethnicity and toxic sites in urban areas (Bullard, 1996; Cutter, Hodgson & Dow 2001; Szasz et al., 1997 and Weinberg, 1998).

The second period occurred between the 1980s and the 1990s. This period is marked by great research accomplishment, which proved the correlation of race and income with degraded urban environment. This period was of great importance for this movement because gained political and public support (Anderton et al., 1997 & Bowen et al., 1995). The US Congress mandated industries to release annual reports – Toxic Release Inventories - of pollution emitted and make them available to the public. It was during this period that the environmental justice movement increased its empirical studies (Boone, 2002; Bowen et al.,1995 & Fung et al., 2000).

The third period began in the middle of the 1990s. This is a period of conflicting empirical results. It was found that not only race but class, education, ethnicity, language and political power were also variables influencing the discriminatory location of toxic waste and public services. The problems of segregation and gentrification of urban populations were not well defined, which made the environmental justice research unreliable to be used for policy decisions (Anderton et al.,. 1997; Been & Gupta, 1997; Bowen, 2002; Downey, 1998; Cutter et al., 2001; Pellow, Weinberg & Schnaiberg, 2002).

The conflicting results of research prompted environmentalists to question the conceptual framework of environmental justice, the efficiency of employed empirical methods, the definition of the unit of analysis (neighborhoods, jurisdictions and zip codes or censuses tracts) and the geographical scale of analysis used (local, regional, national

and international) applied to case-studies (Agyeman et al., 2002; Anderton et al., 1997;

Bowen et al., 1995; Kurtz, 2003; Mennis, 2002; Bolin, Nelson, Hackett, Pijawka, Smith,

Sadalla, Matranga, & O'Donnell, 2002; Cutter et al., 1996; Towers, 2000 & Williams,

1999). In order to address these limitations, researchers were called to perform more

qualitative methods based on institutional models, such as discriminatory procedures in

housing markets, on lower than average income for minorities in institutional settings, on

deficient access to resources and decision making, and the political powerless of minority

groups when evaluating socio-spatial contexts of specific geographic regions and urban

development (Bowen, 1999; Cutter et al., 2001, pp. 31; Downey, 1998; Pulido 2000;

Szasz et al., 2000; Williams, 1999 &Weinberg,1998).

Two qualitative methods surfaced as a response to the criticism of quantitative

methods and empirical results: the historical place-specific analysis and community

interviews methodologies. Researchers argue that these methodologies when applied to

environmental justice case studies assist on the interpretation of empirical results by

revealing and interpreting the developmental patterns of inequity emerging in urban areas

(Bolin, et al., 2002; Boone & Modarres, 1999; Bowen, 2002 & Bullard et al., 2000).

Environmental Justice Movement in Brazil

Whereas the American environmental justice movement has its origin in the

1970s, the Brazilian movement only began to form in 2001, after the International

Colloquium on Environmental Justice held in Niteroi, Brazil. This colloquium was

organized by government personnel, non-profit organization agencies, and

environmentalist groups from different countries. As a result of this event, agencies were formed in Brazil to defend the environment and marginalized communities (Ascerald, 2004).

Environmental justice in Brazil is a recent concept created from the need to address environmental issues in urban areas. The development of the environmental justice movement in Brazil began with the shift in political power in 1964. This shift was supported by transnational corporations installed in Brazil that were unhappy with the political and economic direction of the Brazilian administration. With the change in power, a new caste of techno-bureaucrats was formed, which led the forces behind developmentalism or the modernization processes for Brazil. Their approach to environmental policies did not facilitate citizens' participation and gave priority to economic needs over environmental issues (Miller, 1995).

In the 1970s, a decree was signed by the National Council of Brazil, which three years later served as the basis for the creation of the Secretaria Especial do Meio-Ambiente (SEMA). This agency is equivalent to the EPA in the US, in theory. This agency was formed to control the community's complaint against a wood-pulp industry located in the city of Porto Alegre in the south of Brazil. This characteristic of SEMA, as a controller of environmental problems, reduces environmental policies to a question of "techno-bureaucratic expertise" as opposed to allowing a democratic community's participation in policies (Guimarães, 2002, pp. 239).

From the 1970s to 1980s due to the military government, environmental movements in Brazil did not exist. Recently, environmental problems in Brazil have

become recognized as needing to be part of developmental planning, however without the
community's participation. In the 1990s, public involvement began to emerge based on
environmental movements prior to the Brazilian military coup of 1964 (Paixão 2004).
The outcome of this environmental awareness was based on questions of racial and social
equity, as it was observed that governmental projects detrimental to the environment only
occurred near low-income and minority groups' barrios (Acselrad, 2004).

In 2000, the environmental justice movement in Brazil began to materialize. A
watershed moment happened as a result of a project called "Sindicalismo e Justiça
Ambiental" (Environmental Justice and Syndicalism) supported by the Central Única
dos Trabalhadores (CUT), the Instituto Brasileiro de Análise Sociais e Economicas
(IBASE), and the Instituto de Pesquisa e Planejamento Urbano e Regional
(IPPUR/UFRJ), with the support of the Fundação Henrich Boll. The goal of this project
was to stimulate the participation of workers on environmental issues. At the same time
labor unions such as Sindicato dos Quimicos de São Paulo e Sindicato dos Quimicos do
ABC began fighting for better environmental conditions at their workplace.

In 2001, a colloquium on environmental justice took place in Niteroi, Rio de
Janeiro, promoted by the Comissão Nacional do Meio Ambiente da CUT, Fase and the
Projeto Brasil Sustentável e Democrático. The outcome of this colloquium was the
creation of the Rede Brasileira de Justiça Ambiental with the proposal to build a political
agenda in favor of environmental justice and to identify international cooperation. This
group's agenda is to address environmental problems and work-related issues (Acselrad
2004). Brazilian cities, in fact all cities in the developing world can only raise the

standards of living of their populations if their approach to development is an integral

process of social, economical, and environmental solutions (Joseph, 2001).

Brazil inherited the socio-economic attributes of its colonial development, and

presently has severe income, racial and environmental problems (Furtado, 1999 &

Guimarães, 1993). It was in the face of these problems that recent researchers began to

address environmental issues. Researchers are articulating the need to engage in the

question of justice and environment and their relationships with marginalized groups of

people in Brazilian cities (Bocuhy, 2004; Firpo, 2004; Oliveira, 2004 & Paixão, 2004).

Little work has been published, and although the Brazilian movement has gained support

from researchers, trade unions, governmental agencies, grassroots movements and non-

governmental organizations (NGOs), researchers argue for the need to develop a new

methodology able to acquire an overall understanding of the urban environment problems

in Brazil in order to create a more well-defined conception of environmental justice in

Brazil (Nunes & Freitas, 2004 & Giannasy, 2004).

As a response to conflicting results within the environmental justice literature: (1)

improvements in the US environmental justice conceptual framework and methodologies

(Bowen, 2002; Downey, 1998 & Weinberg, 1998) and (2) a methodology to study

environmental justice in Brazil (Acselrad, 2004; Nunes et al., 2004 and Giannasy, 2004;

Oliveira, 2004 and Paixão, 2004). Two new methodological approaches were proposed

and validated by researchers in the US: historical case-specific analysis and community

interviews (Boone, 2002; Bullard et al., 2000; Pellow, 2000 & Szasz & Meuser, 2000).

This thesis evaluates the emergence of environmental injustice in Estrutural, Brasília by answering two questions: (1) who lives in Estrutural and (2) why these people are living in a degraded urban area?

The goals of this study are two: (1) to contribute to the theoretical framework of environmental justice in the US and (2) to develop a methodology to evaluate environmental injustice in Brazil.

Chapter 3: Methodology

Three reasons prompted me to choose Estrutural as the location to study environmental justice: (1) the easy access to historical-geographical material in Brasília (2) because Estrutural is a single defined jurisdiction and (3) the community of Estrutural can be used as the unit of analysis. Brasília, a planned capital, has a large repertoire of easily accessible sources and data to develop a historical analysis (Boone, 2002 & Pellow, 2000). Estrutural as a geographic area offers the possibility to generate conclusive results on environmental injustice (Kurtz, 2003 & Mennis, 2002). The similar demographic traits of the individuals living in Estrutural define concisely the unit of analysis for this study (Bowen, 2002 & Williams, 1999).

Figure 2.1 illustrates my research question on the case-specific study of Estrutural, Brasília. My questions are who lives in Estrutural and why. Who includes variables contributing to environmental injustice and why includes factors that have contributed to the emergence of environmental injustice in Estrutural. These variables and factors directed my research. Within the local scale there are specific factors that contributed to the formation of environmental injustice in Estrutural. The investigation process took me to different sources in the US and in Brazil. In Brazil, I spent three weeks gathering data. This trip was necessary because interviews have to be conducted and academic and governmental research had to be accessed from different Brazilian agencies.

Figure – 3.1

Research Questions

(1) Who lives in Estrutural?

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│Origin│ │Education│ │Income│ │ Race │ │ Age │ │ Power │
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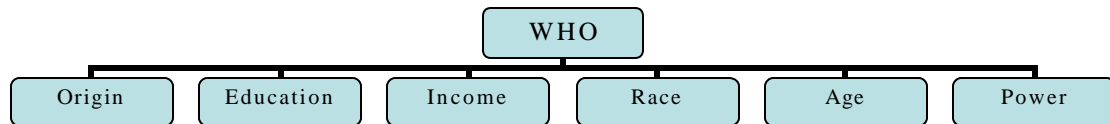
(2) Why these people are living in Estrutural?

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                         ┌───────┐
                         │  WHY  │
                         └───┬───┘
      ┌──────────┬──────────┴──────────┬──────────┐
 ┌─────────┐ ┌─────────┐         ┌─────────┐ ┌────────┐
 │ Global  │ │National │         │Regional │ │ Local  │
 │ Scale   │ │ Scale   │         │ Scale   │ │ Scale  │
 └────┬────┘ └────┬────┘         └────┬────┘ └────────┘
 ┌───────────┐ ┌───────────┐ ┌──────────────────┐
 │Colonization│ │Target Plan│ │Land Appropriation│
 └─────┬──────┘ └─────┬─────┘ └────────┬─────────┘
   ┌──────────────┐ ┌─────────┐   ┌───────────┐
   │Modernization │ │Brasília │   │  Lack of  │
   └──────────────┘ └─────────┘   │ Planning  │
                                  └─────┬─────┘
                                    ┌─────────┐
                                    │  Power  │
                                    │  Shift  │
                                    └─────────┘
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┌──────────────┐
│ Local Scale  │
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  ├── ┌────────────────────┐
  │   │ Affordable Housing │
  │   └────────────────────┘
  ├── ┌────────────┐
  │   │ Employment │
  │   └────────────┘
  ├── ┌────────────────┐
  │   │ Ease of Access │
  │   └────────────────┘
  ├── ┌───────────────────┐
  │   │ Built Environment │
  │   └───────────────────┘
  ├── ┌────────────────────┐
  │   │ Building Community │
  │   └────────────────────┘
  └── ┌───────────────────┐
      │ Land Availability │
      └───────────────────┘
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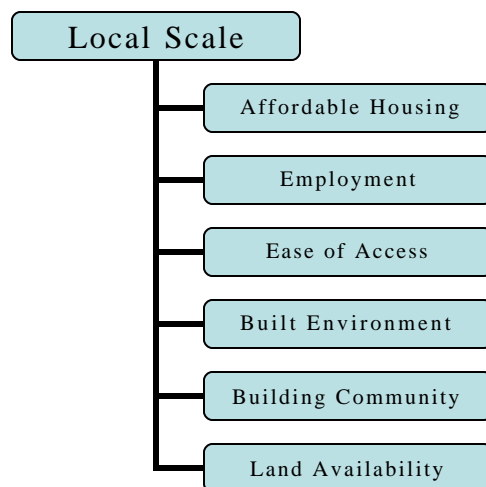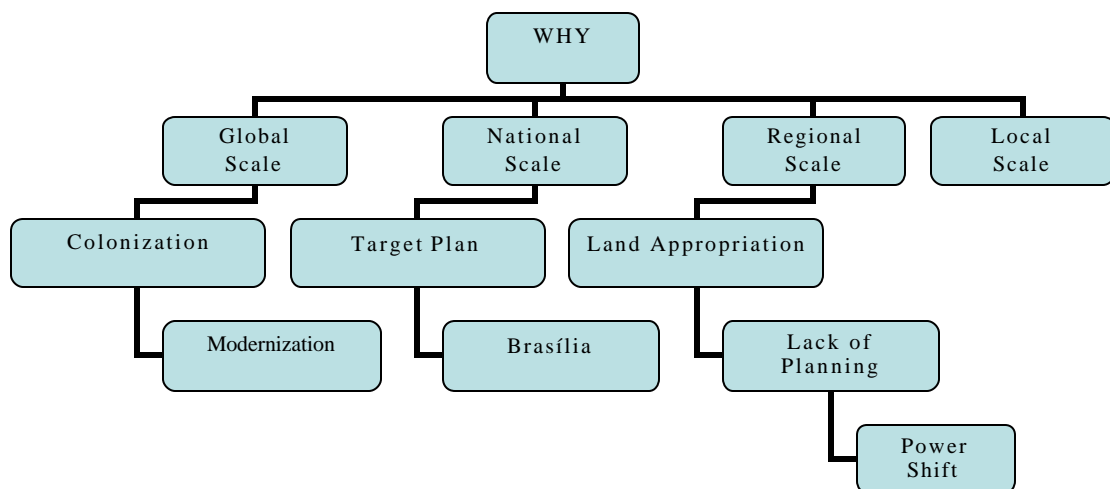
This chapter discusses my data collection in Brazil. First, I overview the historical and present-day sources I used and the main themes developed through my literature review. I focus on two specific types of sources: interviews with professionals and Estrutural community members. Second, I go more in depth into the professionals that I spoke with as well as the data they provided me with. Third, I explain the interview procedures I used for Estrutural community members and the information they provided. Fourth, I discuss main themes from the data gathered from the interviewees to understand individuals' motives for living in Estrutural.

Overview of sources used and research themes

Historical place-specific analysis is performed with contemporary sources, such as academic research, governmental documentation, books and newspaper articles (Boone, 2002). This data provides basic information for examining the emergence of urban environmental degradation in a specific region. For quality purposes, it is important to focus environmental justice studies on a specific region because studying a large geographic area may result in inaccurate conclusions of variables and factors contributing to the results (Bowen, 2002). The sources I used offered an overview of Brasília's urban development, which influenced the development of Estrutural (Boone et al., 1999, Bowen et al., 1995 & Pellow, 2000).

In order to access specific data for Estrutural prior to leaving the US for Brazil, I contacted Brazilian organizations involved directly or indirectly with Estrutural. These included IBGE (Instituto Brasileiro de Geografia e Estatisticas), UNB (Universidade de Brasília), Non-Governmental Organizations (IDA - Instituto do Desenvolvimento

Ambiental and AFAN - Associação de Amigos do Parque Nacional), Federal District

Government agencies (ASSEP – Assessoria de Planejamento Estrategico, CODEPLAN -

Companhia de Desenvolvimento do Planalto Central, SITURB – Sistema de Informação

Territorial e Urbana do DF, SEDUH - Secretaria de Desenvolvimento Urbano e

Habitação do DF and Bellacap - Landscape and Urban Maintenance Company of the

Federal District), CDS (Centro de Desenvolvimento Sustentável), IBAMA (Brazilian

Institute of the Environment and Natural Resources), BCE (Biblioteca Central da

Universidade de Brasília), the UNB bookstore and Newspapers (BBC and Correio

Brasiliense).

Table 2.1 identifies the sources and the data collected. The data described in this

table is important in revealing community demographics, historical events, zoning

decisions, law ordinances and urban planning projects that were issued and affected the

land use of Brasília. I collected this information in order to identify potentially racist and

classicist governmental decisions or policies, which could have contributed to the

marginalization of certain groups to degraded areas (Been, 1994; Boone et al., 1999;

Boone, 2002; Bullard, 1996; Burningham & Thrush, 2003; Callewaert, 2002; Maantay,

2002; Pastor, Sadd & Hipp, 2001; Pellow et al., 2002; Pulido, 2000; Szasz et al., 2000 &

Towers, 2000).

Table – 3.1

Sources and Data. Highlighted blocks indicate resources used for the research.

Source & General Data	IBGE	UNB	NGOs	GDF	CDS	IBAMA	Library & Books	Newspapers	Interviews
Demographics	▨	▨	▨	▨		▨	▨		▨
History of Brasília		▨	▨	▨	▨	▨	▨	▨	
Urban Planning for Brasília		▨					▨		
Land Uses Decisions for Brasília		▨					▨		
Zoning and Law for Brasília		▨					▨		
History of Landfill		▨		▨		▨		▨	▨
History of National Park								▨	
History of Estrutural		▨	▨	▨				▨	▨

Sources 1: Interviews with Professionals

The professional interviewed provided me with the background information on issues and problems which I needed for my interviews of the residents of Estrutural (Gilbert, 1993).

Instituto Brasileiro de Geografia e Estatisticas

IBGE provided me with demographic data for Brasília. However, demographic data for Estrutural was not complete and population data included other administrative regions of Brasília that I was not studying.

Universidade Nacional de Brasília

Dr. Ercilia Torres from the Geography Department introduced me to dissertations and books that were related to the area of Estrutural and gave me satellite photos of Brasília (1973, 1984, 1994 and 2000) and maps of Brasília.

Dr. Otto Ribas from the Architecture Department advised which books to acquire and described the urbanization process of Brasília and the lack of urban planning if the Federal District.

Non-governmental Organizations

Deputy Assistant Gustavo Souto Maior, president of AFAN, provided me with a general position of Estrutural within the political maneuvers of Brasília, introduced me to researchers and gave me a copy of his research on the area of the SCIA (Industrial and Commercial Sector), which Estrutural is part of.

Luiz Mourão, the President of IDA, provided me with newspaper articles from Correio Brasiliense about Estrutural, assisted me in filming Estrutural and the landfill and also introduced me to other researchers.

Governo do Distrito Federal

I contacted the following agencies of the Federal Government in Brasília: SEDUH, ASSEP, SITURB, CODEPLAN and Bellacap. Mr. Vitor Freire, architect from SEDUH, provided me with demographic information of the Federal District through the PDAD (Pesquisa Distrital por Amostra de Domicílios) and maps of Estrutural. Mr. Emmanuel Cavalcante Porto, a manager for ASSEP, provided me with the latest study of the environmental impact document (EIA/RIMA) of Estrutural. Dr. Laura Soares, Technician of SITURB, provided me with computerized geographical information on Estrutural. Mrs. Iraci Maria Peixoto, a technician from CODEPLAN, provided me with the demographic information of Estrutural through the PDAD. Mr. Claudio Rachid, a manager of Bellacap, provided me with the authorization to film and take photographs of the Joquei Clube Landfill.

Centro for Desenvolvimento Sustentável

Dr. Izabel Zanety, a researcher from the CDS, introduced me to books and to the other professionals at the center.

Instituto Brasileiro do Meio Ambiente

Sr. Elmo Monteiro, a manager of the Brasília National Park, provided me with a tour of the park and a jeep with a driver to film and photograph Estrutural and the park. Dr. Cristina Horowitz, an environmental analyst of IBAMA, provided me with a copy of

her document regarding the law 530, which approved and legalized the land division of Estrutural satellite city.

Libraries

The library from UNB provided me with periodicals, books and dissertations related to land uses of Brasília. The library from SEDUH provided me with governmental research on Estrutural.

Bookstore

I bought from the UNB bookstore books on urban planning, housing administration and environmental controversies of Brasília.

Correio Braziliense

Mrs. Katia Marsicano Corrêa, a former journalist with Correio Braziliense, provided me with her dissertation on the urban occupation of the surrounding area of the National Park of Brasília, which includes Estrutural, accompanied me to interviews and introduced to the woman organizer of the woman art-crafts coop for Estrutural.

Source 2: Interviews with Community Members

The community interviews became a main method guiding my research because they highlighted important information on the motives that caused the individuals of the community to live in Estrutural (Bowen 2002, Freire 1970 & Pellow 2000). The methodological framework of the interviews is to first understand the experience of the individuals. Second is to enable the disclosure of hidden sources of individuals' motives, decisions and perceptions. Last is to privilege the voices of marginalized groups (Smith, 1999 & Whitson, 2005).

In order to gather data from interviews, I developed a model that is both a survey style and open-ended questions (see Appendixes A & B). My intention was to gather demographic data and understand the specific motives and decisions of the interviewees that influenced their choice to move to and stay in Estrutural. The interviews with community members add to my historical data. To date, little research on urban studies has included community interviews because researchers have a tendency to overlook the importance of this data (Bullard, 1993; Burningham et al., 2003; Giannasy, 2003 & Pellow, 2000).

Sampling Procedure

I met the first interviewee on my first visit to Estrutural. The other interviewees were referred to me from previous contacts. Interviews were performed individually and in groups. Most of them occurred at an individual's home or place of employment, which was done to reinforce the spontaneous character of the interview (Whitson, 2005). As continuity is crucial (Freire, 1970), I performed all eleven interviews.

I divided the period of 1960 to 2004 was divided into three periods: (1) 1960 to 1990, (2) 1990 to 2000 and (3)2000 to 2004 – longitudinal approach. These periods were useful so I could capture the differences of experiences and perceptions among individuals within the life-cycle existence of Estrutural.

The longitudinal approach to community interviews also provides information on the main motives involved in environmental inequities and their role in Estrutural's emergence (Bullard et al., 2000 & Pellow, 2000). This discussion format employs an evaluation of spatial dynamics (not a snapshot) between socio-economic facts and

environmental hazard emergence. It also allows the integration of qualitative results with

theories of urban structure, resulting on a more dynamic model (Boone, 2002; Bowen,

1995 & Szasz et al, 2000).

Chapter 4: Demography and Global, National and Local Scales

In this chapter, I discuss the population of Estrutural demographic and three geographical scales that contributed to the emergence of environmental injustice in Brasília: global, national and regional scales. The results were obtained by addressing two main questions: (1) Who are the people living in Estrutural and (2) Why are they living in Estrutural. This chapter also briefly discusses the government's re-urbanization project for Estrutural. The results are based on historical-geographical data acquired from professionals working in Brasília and community interview data from the residents of Estrutural.

Research Question 1: Who lives in Estrutural?

In this section of the paper I show the results of the demographics of the people living in Estrutural: their origin, education, income, race, age and political power. The demographic characteristics of the population are factors influencing the emergence of Estrutural.

A- Population Characteristics of Estrutural

Origin

Table 4.1 identifies the origin of the population of Estrutural by percentage. Most of the people living in Estrutural came from the Federal District area and the Northeast region of the country. The Federal District population is composed of migrants from the different regions of Brazil, but particularly from the Northeast and North regions of Brazil, which are the poorest areas of the country (CODEPLAN, 2004 & IPEA, 2000).

Table – 4.1

Origins of Estrutural's Population

Regions	Percentage
Federal District[6]	42.70%
Northeast[2]	37.30%
Southeast[3]	7.00%
Center-west[5]	6.50%
North[1]	4.20%
Federal District Periphery[7]	1.90%
South[4]	0.40%

Source adapted: SEPLAN/CODEPLAN –

1 - Amazonas; Pará; Rondônia; Tocantins.
2 - Alagoas; Bahia; Ceará; Maranhão; Paraíba; Pernambuco; Piauí; Rio Grande do Norte.
3 - Espírito Santo; Minas Gerais; Rio de Janeiro; São Paulo.
4 - Paraná.
5 - Goiás; Mato Grosso.
6 - Brasília; Gama; Taguatinga; Brazlândia; Sobradinho; Planaltina; Núcleo Bandeirante; Ceilândia; Guará; Cruzeiro; São Sebastião.
7 - Águas Lindas; Alexânia; Cabeceiras; Formosa; Luziânia; Padre Bernardo; Pirenópolis; Planaltina de Goiás; Santo Antônio do Descoberto; Unaí.

Table 4.2 identifies by percentage the places that the population of Estrutural

lived prior to moving to the area of Estrutural. Again, most people came from the

Federal District area and the Northeast region of the country. Ninety-seven percent of the

population that moved from the Federal District area to Estrutural came from Ceilandia

and Samambaia, which are the two poorest administrative regions of the Federal District

(CODEPLAN, 2004). Most of the people living in Estrutural came from very poor

regions.

Table – 4.2

Residence Prior to Estrutural

Regions	Percentage
Federal District[6]	63.1%
Northeast[2]	18.6%
Federal District Periphery[7]	9.0%
Center-west[5]	5.7%
North[1]	2.6%
Southeast[3]	1.1%
South[4]	-

Source adapted: SEPLAN/CODEPLAN –

1 - Amazonas; Pará; Rondônia; Tocantins.
2 - Alagoas; Bahia; Ceará; Maranhão; Paraíba; Pernambuco; Piauí; Rio Grande do Norte.
3 - Espírito Santo; Minas Gerais; Rio de Janeiro; São Paulo.
4 - Paraná.
5 - Goiás; Mato Grosso.
6 - Brasília; Gama; Taguatinga; Brazlândia; Sobradinho; Planaltina; Núcleo Bandeirante; Ceilândia; Guará; Cruzeiro; São Sebastião.
7 - Águas Lindas; Alexânia; Cabeceiras; Formosa; Luziânia; Padre Bernardo; Pirenópolis; Planaltina de Goiás; Santo Antônio do Descoberto; Unaí.

Education

According to CODEPLAN (2004), 49% of Estrutural's population is illiterate. Table 4.3 identifies in percentages the level of education of the population residing in Estrutural. Half of the population of Estrutural has not completed elementary school. Only 9.1% of population completed high school. According to studies developed in Brasília, the degree of education of the people living in Estrutural is ranked as one of the lowest in the Federal District (CODEPLAN, 2004).

Table – 4.3

Level of Education of Estrutural's Population

Grade	Percentage
Kindergarten	1.6%
Pre-School	2.3%
Elementary School incomplete	51.1%
Elementary School complete	9.1%
Middle School incomplete	5.4%
Middle School complete	6.3%
High School incomplete	0.2%
High School complete	-
Master	-
Doctorate	-

Source adapted: SEPLAN/CODEPLAN

Income

According to CODEPLAN (2004), only 30% of Estrutural's population is

employed and 55% of this population works odd jobs. Table 4.4 identifies in percentages

the average income of families residing in Estrutural. The monthly minimum salary in

Brazil is R$260.00. A middle class monthly salary in Brazil is around $2,500 reais. A

salary less than of $500.00 reais is ranked as very poor. As can be seen in the table, most

percentage of the population of Estrutural receives an income of $525.00 reais per month

or less, which is considered to be very poor (http://noticias.aol.com.br).

Table – 4.4

Income of Estrutural's Population

Monthly Income	Percentage
Up to R$262.50	25.8%
R$262.50 to R$525.00	48.1%
R$525.00 to R$1,312.50	22.9%
More than R$1,312.50	3.2%

Source adapted: SEPLAN/CODEPLAN

Race

The percentages of the race of the people living in Estrutural are 26.2% white and 73.8% people of color. Most of the people living in Estrutural are people of color (CODEPLAN, 2004).

Age

Table 4.5 identifies the age groups of Estrutural's population in percentages. The population of Estrutural is considered to be young with almost half of its population below the age of 18.

Table – 4.5

Age Groups of Estrutural's Population

Age Groups	Percentage
up to 4 years old	14.7%
5 to 9 years old	15.6%
10 to 18 years old	20.4%
18 to 24 years old	9.9%
25 to 34 years old	18.3%
35 to 59 years old	19.3%
60 years old and more	1.8%

Source adapted: SEPLAN/CODEPLAN

Political Power

According to Brazilian law voting is compulsory for literate men and women over 18 years of age. Voting is optional for the illiterate, for people 70 years of age or older and for young adults between the ages of 16 and 18 years (www.sampaonline.com.br./htm). Data collected from the CODEPLAN, (2004) shows that 49% of Estrutural's population is illiterate and 49.3% of the population can vote. These two factors denote that political power in Estrutural is weak.

Political power has assisted low-income populations in Brasília to assure their homeownership over invaded lands, because of their influence on governmental policies as they vote. Another determinant factor on land ownership of invaded lands is the number of years that the population has been living on the land. According to the Federal administration, the title for home ownership is only granted to individuals that have been

living in the invaded area for more than five years. In Estrutural, 95% of the population

has inhabited the area for more than five years (CODEPLAN, 2004).

Population living in Estrutural

The population of Estrutural is considered young, with 50% of its population

below 18 years of age. Almost half of the population was born in the north and northeast

regions of Brazil, areas that are generally poor and uneducated. Almost 21% of the

population residing in Estrutural moved directly from the north and northeast regions of

Brazil to Estrutural, and 63% moved from other poor areas within the Federal District

(CODEPLAN, 2004). The population of Estrutural is poor and uneducated. The level of

education of the people living in Estrutural is ranked as one of the lowest in the Federal

District. Only 21.1% finished elementary school and none has finished high school

(CODEPLAN, 2004).

According to Brasília Sustentável report (2004), 30% the population of Estrutural

is employed, 600 of which are registered as scavengers working in the landfill. Most

people of Estrutural are poor Five percent of the population in Estrutural has been living

in the area for less than five years.

Research Question 2: Why are these people living in Estrutural?

In this section of the paper I show the results of the historical data gathered from documents, research and interviews. The historical-geographical data reveals the influence of past and present factors influencing the motives of people inhabiting the area of Estrutural. In order to have a complete picture of the emergence of Estrutural it is important to evaluate four historical geographical scales: global, national, regional and local. Each geographical scale has intrinsic factors contributing to the existence of environmental injustice in Estrutural, Brasília. The evaluation of these factors increases the knowledge and understanding of the environmental justice framework and the knowledge of this movement endeavor (Boone, 2002; Bullard et al., 2000; Pellow, 2000 & Szasz et al., 2000).

B - Historical-geographical Scales of Estrutural

In Brazil, researchers have addressed the urbanization problems of Brasília through studies disclosing the effects of zoning and law ordinances in the socio-spatial segregation of Brasília (Evenson, 1973; Holston, 1989; 1999; Ludwig, 1980; Pinto, Sant'Anna & Lima, 1988 & Paviani, 1987). They also have illustrated the failure of urban planning decisions in containing urban sprawl (Acioly, 1994; Epstein, 1973; Heuzé, 1986 & Paviani, 1998). Some other studies have concentrated on socio-geographical factors assisting the occurrence of the environmental degradation in the Federal District area (Andrade, 1999; Araújo, 1996; Correa, 2002; Franco, 1996; Horowitz, 2004 & Paviani, 2003). However, these studies have failed to approach these factors disclosing the formation of environmental injustice in Estrutural, Brasília. This

paper addresses the emergence of environmental injustice in Estrutural as the consequence of four historical geographical scale factors.

Table 4.6 identifies the four factors influencing the appearance of Estrutural, Brasília.

Table – 4.6

Factors to the Emergence of Estrutural

Global Scale Factors	1. Colonization Process 2. Modernization Process
National Scale Factors	• Modernization of Brazil: 1. Target Plan 2. Brasília
Regional Scale Factors	• Federal District Area: 1. Land appropriation 2. Non-existence of planning 3. Political power shift
Local Scale Factors	• Estrutural: 1. Affordable housing 2. Employment opportunities 3. Ease of access 4. Built environment 5. Building community 6. Land availability

Before these four scale factors are discussed, this section presets a few socio-economic and geographical information of Brazil. This data's goal is to provide a general idea of the current context of Brazil for the completion of the scale factors' understanding. First, I prepared a socio-economic map of Brazil (see Figure 4.1), where I ranked this country's regions according to their socio-economical status.

Figure – 4.1

Brazil: Socio-Economic Regions
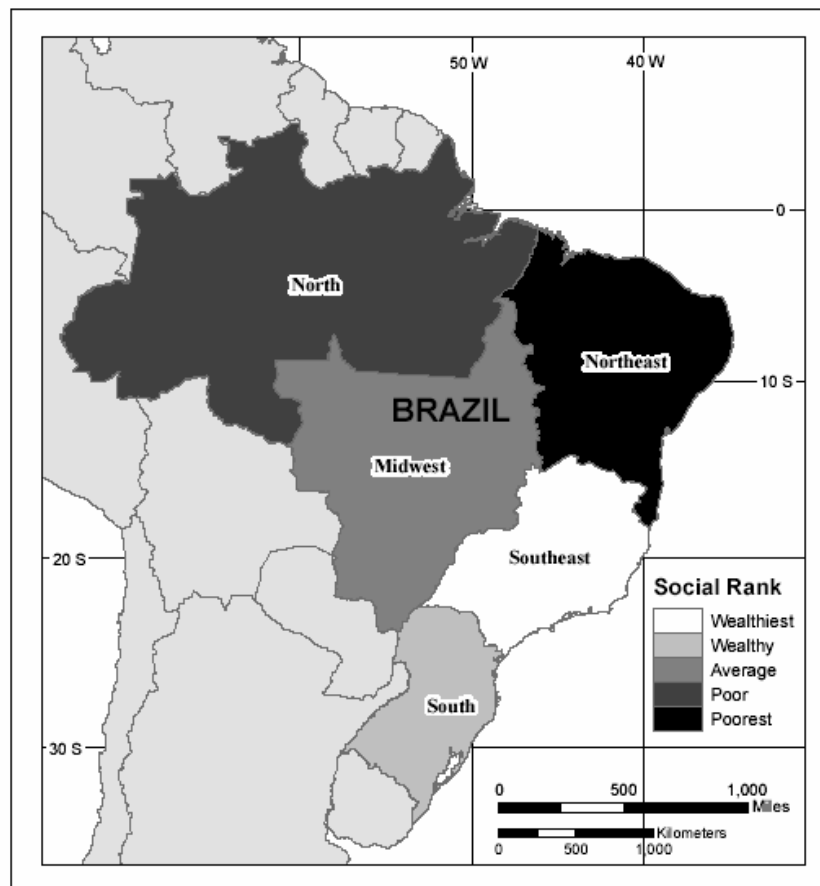
Source: http://www.geocomm.com & other sources

Brazil is located in eastern South America, bordering the Atlantic Ocean. Its area is 8,511,965 sq. km, the largest country of the continent. Its climate is mostly tropical, but temperate in the south. The population of Brazil is roughly 184,000,000. The literacy rate of the population aged 15 and over is 86.1% for the male population and 86.6% for the female population. The ethnic groups are 55% white, 38% mixed white and African Brazilian, 6% African Brazilian and 1% other (www.cia.gov/cia/publications/factbook/geos/br.html). The geographical position of Brazil has facilitated its colonization and exploration by other nations throughout history. Its position has also favored Brazil's expansion and population's concentration along the coastline (Kubitschek, 1975).

Global and National Scales Factors

In this section, I discuss how the global/national scales have contributed to environmental injustice in Estrutural through the creation and conceptualization of Brasília to modernize Brazil, the administration's decisions to make Brasília the center pole of development for the country and the idea to build a solely politico-administrative capital.

One definitive motive to transfer and build a new Brazilian capital in the interior of the country was the administration's decision to modernize Brazil in the 1950s. However, other events and motives collaborated in justifying the capital transfer. Some of these motives were national identity, national security, mystical visions and national expansion. In this section, I relate the main events and motives throughout Brazilian history that contributed to the transfer of the federal capital and the final decision to build

a new capital in the interior of the country as the means to initiate the modernization

process in Brazil.

Creation and Conceptualization of Brasília

In the mid 18th century, Brazil, a colony of Portugal, had two coastal capitals:

Salvador, a military capital, and Rio de Janeiro, a politico-administrative capital. Later, a

decision was made to have Rio de Janeiro as the only capital of Brazil (Evenson 1973).

The first attempt to move Brazil's capital from the coast to the interior of the

country was in 1789. The attempt took place during the period of the independence of

Brazil from Portugal. The revolutionaries of the *Inconfidencia Mineira* (conspiracy

against the Portuguese Crown) intended to move the capital to the interior of the country,

so that it would be away from foreign influences and would foster a national identity for

Brazil (Epstein, 1973; Holston, 1989 & Vianna, 1970). However, they failed in their

attempt to move the capital.

Then, ten years later another attempt was made. The Imperial family of Portugal

stated the need to move the capital away from the hot swampy climate after they searched

for refuge in Rio de Janeiro during the Napoleonic's invasions of the Iberian countries

(Evenson, 1973 & Ludwing, 1980). Once again, though, no change was made.

However, the proposal kept re-surfacing.

In 1823, the patriarch of the Brazilian independence, Jose Bonifacio de Andrada e

Silva, presented a proposal to the Assembly moving the capital to the interior of Brazil

(Vianna, 1970). Later, the diplomat Varnhagen also supported the idea of a new capital

for the country in order to preserve the country's identity as a new nation (Holston, 1989 & Ludwig, 1980).

In 1833, father Don Bosco from Turin, Italy had a mystical vision of a new city emerging in the center of Brazil. He saw a land of "milk and honey" between the parallels of 15 degrees and 20 degrees, the actual location of the Brasília (Holston, 1889 & Orico, 1961).

In 1889, Brazilian administrators articulated the need to transfer the Brazilian capital to the interior of the country for national security reasons during the Proclamation of the Brazilian Republic. In 1890, this intention was written in the new constitution. A total of three commissions were formed to map a broad site for the future capital.

The first commission was addressed in the Constitution of 1891. Its goal was to explore the geography of the Central Plateau of Brazil. It was led by Luiz Cruls. As a result, an area of 14,400 square kilometers was designated for the capital (Holston, 1989, Heuzé, 1986 & Ludwig, 1980).

The Brazilian Constitution of 1946 emphasized the western march and the unification of the country as a form to bring national development to the nation through the appropriation of backland areas. A plan of occupation of the center-west was based on the development of two axes: (1) the industrial axis between Goiania-Anapolis and (2) the residential axis north of Goias (Stumpf & Santos, 1996). As a result, a second commission was organized in 1948 to determine a more precise location for the new capital (Epstein, 1973).

The Congress sanctioned Law number 1803 in 1953, which authorized the Executive Power to develop the studies for the final location of the new capital. This law certified the administrative goal to modernize the country. As a result, a third commission was formed and directed by General Caiado de Castro, whom, with the help of the American firm D.J. Belcher and Associates Incorporated, surveyed the Central Plateau for a new capital. This commission selected five possible sites for the Federal District (Epstein, 1973 & Silva, 1983).

In 1955, President Café Filho chose the *sitio castanho* (brown site) as the site for the new capital, because it offered a sloped terrain, near optimum flat areas for the localization of an airport, the confluence of three rivers, fertile soil and a pleasant climate. In this report, Belcher also mentioned in detail the potential erosion and infiltration problems of the area due to the region's soil type (Pinto et al., 1987).

Table 4.7 describes the time period of the main historical motives that contributed to the transfer of the Brazilian capital to the interior of the country.

National security, national identity and national territory were motives that influenced the transfer of the capital to the interior of the country throughout Brazilian history. However, it was the intention to compete globally in the international economy of the turn of the 20th century that determined the final step to build a modernist capital for Brazil in the center of the country. Brazilian administrators were motivated by the forces of capitalism and the national elites to industrialize the country, to expend the national territory towards the west and to build a new capital for Brazil (Furtado, 1967).

Table – 4.7

Historical Events of Brasília

Year	Motive
1763	National Security
1789	National Identity
1791	Climate
1823	National Identity
1833	Mystical Vision
1889	National Security
1890	National Security
1891	Location for new capital
1946	National Territorial
1948	Site determination
1953	Power of the State
1955	Five Sites
1955	The Site
1956	National Development

Source: compiled from different sources

Brasília: Center Pole of Development and Politico-Administrative Capital

As an attempt to modernize the country, in September of 1956, the recently elected President Juscelino Kubitscheck ratified the site decision for the new federal district and pushed the country to take the first steps to build Brasília. The new administration had two goals: the implementation of the Target Plan and the construction of Brasília as the new capital of Brazil (Deckker, 2000; Heuzé, 1986 & Katzman, 1977).

Table 4.8 shows the main goals of the Brazilian administration in building the new capital of Brazil in the Central Plateau located in the interior of the country.

Table 4.8

Goals for Building Brasília

The center pole of Brazil's development
The catalyst point connecting the country's backland with the coast
The pioneer city for territorial expansion towards west
A solely politico-administrative capital
The modernist city portraying the country's new image

The Target Plan of Kubitschek aimed to have Brasília as the focal point of its industrialization project. Brasília became the center pole of development for the nation. It had a central location (see table 4.9), served as a catalyst point connecting the country's backland with the rest of the nation and facilitated territorial expansion towards the west. Kubitschek also used the prophetic vision of Don Bosco of a promised land in the center of the country to argue his decision to build Brasília (Epstein, 1973).

Table – 4.9

Distance from Brasília to Main State Capitals

Distance (miles)	São Paulo	Rio de Janeiro	Belo Hori-zonte	Rio Branco	Porto Alegre	Forta-leza	Manaus	Maceio
Brasília	890	940	725	2280	1650	1660	1950	1455

Source: compiled from different sources

In order for Brasília to fulfill its role as the center of the national integration of Brazil, a new planned city was proposed by administrators and planners. During the first years of the capital's construction, a network of highways, railroads and an airport were immediately built.

Table 4.10 identifies the main transportation systems built in Brasília and the year they were inaugurated.

Table – 4.10

Transportation Systems in the Federal District (1960)

Date	Description
1956	Goias Railroad and main highway connecting Goias to Brasília
Oct-56	Airport construction and highway Anapolis-Goiania improvement
1956	Highway Brasília-Fortaleza approximately 1,000 miles in length
Jun-58	Highway Brasília-Anapolis approximately 80 miles in length
Nov-58	Highway Santos-Brasília approximately 700 miles in length
Jan-59	Highway Belo-Horizonte-Brasília approximately 1,600 miles in length
Feb-59	Highway Belem do Para-Brasília approximately 1,400 miles in length
Sep-60	Highway Brasília-Acre approximately 2,000 miles in length

Source: compiled from different sources

The construction of the new capital was based on the ideas of modernist architecture and expressed in the project of the Pilot Plan: a rational and modernist project with the determination to bring a new order of public work, quite different from the old capital of Rio de Janeiro. The Pilot Plan was zoned in two main areas: administrative and residential/commercial. The shape of the Pilot Plan was an airplane (see Figure 4.2), where the politico-administrative organs were situated in the main body of the plane and the residential units were located in the north and south wings. Brasília's design represented a break with the colonial past of Brazil. Its role was to perform a solely politico-administrative function. For that reason, the residential units were designed to be inhabited by the public-administrative employees. According to planners, the city was not designed to accommodate migrant construction workers (Katzman, 1977; Kubitschek, 1975; Deckker, 2000 & Holston, 1989).

Figure – 4.2

Pilot Plan

Residential
Wing North

Brasília

Politico-Administrative Center

Lake
Paranoá

Residential
Wing South

North
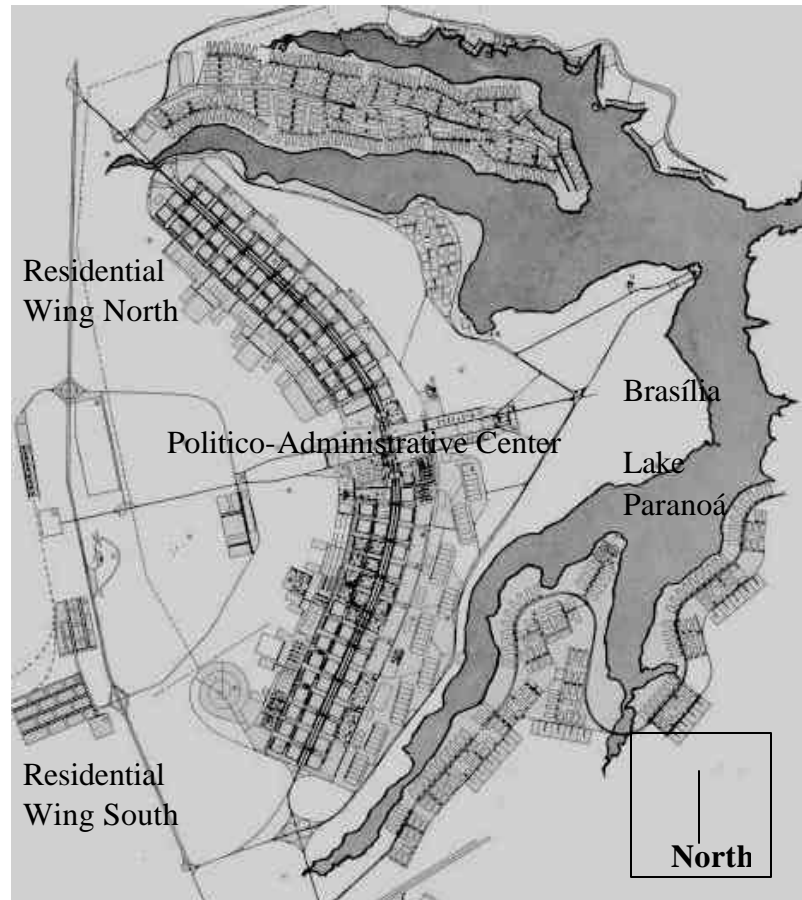
Source: www.arch.tudresden.de/ibad/Baugeschichte/lehrmaterialien.html

The construction of the lake at the eastern side of Brasília controlled the

metropolitan sprawl in this direction, and encouraged urban expansion to the west. At the

northwest corner of the Pilot Plan, an area of approximately 30,000 hectares was reserved

in 1961 for Brasília's national park. This conservation area also stopped the metropolitan

expansion of Brasília in the north. These two land uses forced the urban expansion of Brasília toward the southwest corner of the Federal District area.

The new capital of Brazil, Brasília, became the symbol of the modernization processes of the country and of the nation as a global capitalist economy. These processes contributed to industrialization, the use of the automobile, the mechanization of agriculture, the introduction of new building materials (concrete and glass), the centralization of the government and development of a national identity (Holston, 1989).

The modern socio-economic guidelines for the country were based on imported models from developed nations and greatly impacted urban areas as cities grew at a very fast pace. This growth was a result of technology substituting workers and generating unemployment in rural areas. The unemployed, poor and uneducated rural workers migrated to urban areas in search of work and better living conditions. Brasília was especially popular because of its easy accessibility and job feasibility. It attracted a great number of migrants that came from the different regions of Brazil, particularly the poorer areas of the north and northeast regions (Escobar, 1995; Furtado, 1967 & Paviani, 1998).

Most of the people that continuously migrated to the Federal District were not able to find employment in Brasília, because Brasília remained a tertiary city, meaning heavy industries were not permitted in the Federal District area. This area was considered a strategic reserve for the administrative capital (Bursztyn, 2000 & Steinberger, 1998).

However, the population of the metropolitan area constantly increased, because Brasília continued to offer employment opportunities to the rural and poor population displaced in the rest of the county (Paviani, 1987).

Figure 4.3 illustrates the population growth of the Federal District and compares the population growth trends between Brasília and the satellite cities. As the total population increased over the years in the Federal District, the less advantageous population settled in satellite cities that emerged outside the capital. Therefore, the population of Brasília decreased as the population in satellite cities increased over the years.

Figure – 4.3

Population Growth: Brasília and Satellite Cities

Population Growth in the Metropolitan Area of Brasilia

		Satellite Cities
		Brasilia
		Total
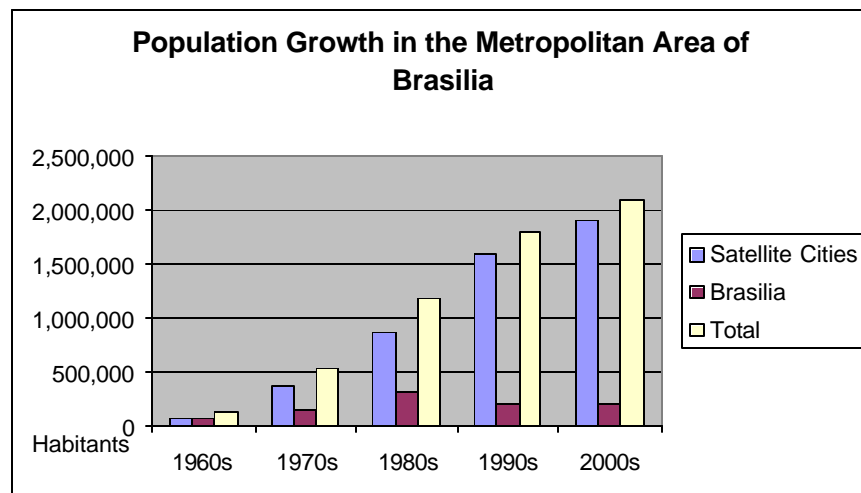
Source: compiled from different sources

The population growth in the surrounding areas of Brasília occurred because planning authorities wanted to ensure that the Pilot Plan remained unchanged. Planners and administrators living in Brasília controlled the laws and zoning ordinances for the Pilot Plan, and created a situation that resulted in a high cost of living in Brasília (housing and transportation costs), which became too expensive for the low-income population. The poor population was forced to leave Brasília and settle in the outskirts of the capital. This movement to the periphery of the city led to the current spatial and economic segregation patterns of Brasília (Paviani, 2003).

In summary, the socio-economic spatial segregation of Brasília was partially attributed to the result of global and national factors. The main point of the global /national scales in favoring the emergence of environmental injustice resides in the colonization and modernizations processes that occurred in Brazil through the action of developed nations and local elites, which focused on their own economic interests. These processes contributed for the appearance of unemployed, uneducated and poor rural people in Brazil.

These unemployed populations saw in Brasília an alternative for better conditions of living. In Brasília, they were victims of discrimination and became segregated to the outskirts of the city. Brasília portrayed through its urban configuration the conflict of interests between the needs of the Brazilian people and the goals of the national elites, who preserved their power and control over the administration of the city.

Other factors have contributed for the emergence of environmental justice in Brasília. Regional and local factors have also affected the urban environment of the

Federal District and Estrutural. In the next section of this chapter, this thesis evaluates the

regional factors that resulted from global and national contexts. Once Brasília was built

in the Central Plateau of Brazil, the environment, the economy and the society developed

in Brasília gave the right conditions for the movement and settlement of low-income

people and the consequential environment depletion of the natural area of the Federal

District.

Regional Scales Factors

In this section, I discuss the three regional geographical factors that contributed to

the emergence of environmental injustice in Estrutural: (1) land appropriation for the new

Federal District, (2) non-existence of urban planning for the whole Federal District area

and (3) the political power shift within the Federal District government. These three

factors favored the increment of less advantageous population in the Federal District,

their settlement in the surrounding areas of Brasília, the degradation of the natural

environment, and eventual invasion of Estrutural by unemployed, uneducated and poor

people.

Figure 4.4 identifies geographical and population dispersion that occurred in the

Federal District form 1960 to 2004: The total population of the Federal District increased

dramatically over the years, however, the city of Brasília's population decreased as the

number of people inhabiting satellite cities increased.

This figure identifies the number of satellite cities that emerged over the years. It

also shows that most of the urban sprawl of Brasília occurred during the 1990s and

2000s, which coincides with the period of post-military dictatorship of Brazil and the

shift of political power in Brasília. This graph also attempts to illustrate the socio-spatial

segregation characteristics of the Federal District. The white bars identify the satellite

cities by their numbers and the percentage of the population inhabiting the satellite cities.

The black bar identifies the percentage of Brasília's population.

Figure – 4.4

Brasília's and Satellite Cities' Growth Overtime
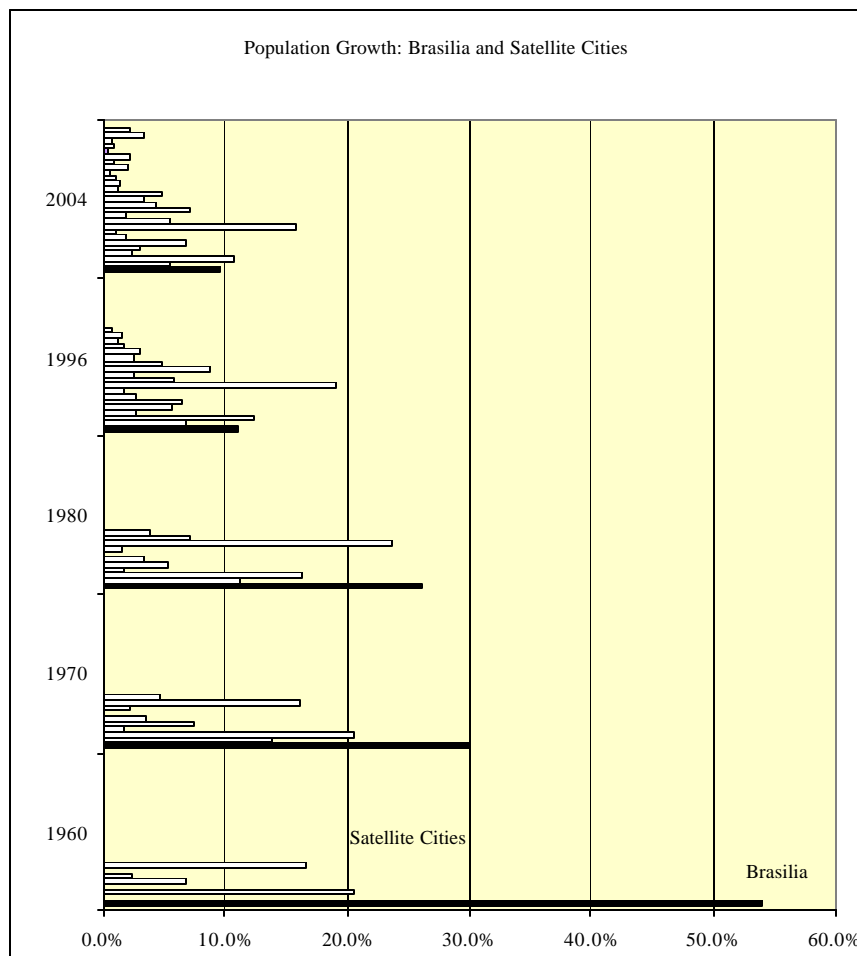
Source: compiled from different sources

Land Appropriation and Management

The land appropriation law for the Federal District was issued in 1953. Law number 1803 approved an area of approximately 5,000 km^2 in the shape of a quadrilateral within the state of Goias. These lands became the property of the Union, making the government not only a land owner but also responsible for the decisions on land uses, such as the renting or selling of lots, the construction of public buildings, low-income homes and basic infrastructure for the whole metropolitan area of Brasília. The government is also responsible for the construction of low and middle income homes in the periphery of Brasília. Finally, the government has the power to approve credits for private investments and construction firms in the metropolitan area of Brasília (Heuzé, 1986; Paviani, 2003 & Pinto et al.,1987).

Almost 60% of the Federal District land belongs to the government. These lands are divided into public lands, lands in the process of becoming appropriated by the Union and private lands. Because of these different types of lands, the metropolitan area of Brasília emerged with many urban centers connected by highways crossing urban and rural zones (Lima, 1996). The appropriated lands around the Pilot Plan were classified as rural zones and areas of environmental patrimony (APAs). They formed a sanitarium belt around the Pilot Plan, which inhibited the horizontal urban expansion of Brasília and facilitated segregation and the emergence of poly-nucleus configuration. This green belt favored a high population density in the satellite cities and put the lands within the APAs in danger (Heuzé 1986 & Penna, 2003).

Within the APAs, some of the lands belong to private owners. In the state of Goias, ranchers and farmers owned part of the lands prior to the territorial appropriation for the new Federal District area. At the end of the 17th century these lands were used for cattle ranching and mining. In the 18th century the territory was divided into large private farms and finally in the 19th century, cattle ranching dominated the territory after the end of the mining cycle (Pinto et al., 1987).

The Federal government enacted Law 2874 in 1956 creating Novacap (Companhia Urbanizadora da Nova Capital do Brasil), an agency responsible to administer the government lands. This law also prohibited private lands to be marketed and sold. Eventually, this prohibition created disagreements and litigations between private owners and the government, which contributed to the sprawl of illegal settlements outside Brasília. These litigations were also obstacles in the legalization process of the emerging illegal settlements (Heuzé, 1986 & Holston, 1989). It was only in 1992, under Law 353, that the market of these private lands was legitimized and their owners were able to divide the lands in urban lots and sell them (Epstein, 1973 & Paviani, 2003).

In 1960, the federal government issued Law 3751, giving power to Novacap to urbanize and administer the innumerous illegal settlements that emerged outside Brasília during its construction. The intention of Novacap was to create agricultural patches to supply food for the Federal District region. These small holdings varied from 60 to 150 acres. The most successful urban oriented development was the one located in the city of Taguatinga near the area of Estrutural. The satellite city of Taguatinga developed quickly and in 1970, the Estrutural Highway was built to ease the heavy traffic between

Taguatinga and Brasília. In order to control the growth of this area, the federal government was forced to regulate and manage Taguatinga under the protest of its residents. In 1958, the first satellite city of Taguatinga was built (Heuzé, 1986; Holston, 1989 & Ludwig, 1980).

Some of the satellite cities had begun as camps improvised to shelter the migrant workers and technicians involved in the construction of Brasília. Considered illegal, these settlements appeared near official settlements. The GDF measures to control these illegal settlements were to bulldoze them and to transfer the residents to distant, undeveloped plots with minimal infrastructure. These new subdivisions eventually became satellite cities (Acioly, 1994).

The sprawl of the satellite cities was not constant over time. It had peaks in different time periods due to political and urban decisions of the Federal District government. Although the government was the main agent affecting the urban/rural decisions, other stakeholders have had strong input upon the developmental patterns of this area. For example, construction firms, real-estate agencies and the population have also contributed to the spatial segregation of the region's environment because of the land appropriation processes (Heuzé, 1986; Holston, 1989; Paviani, 1987 & Steinberger, 1998).

Up to today a total of twenty-six satellites are registered as RAs (administrative regions) of Brasília and managed by the government. The satellite cites are the result of the GDF difficulty in controlling the land uses around the Federal District. Some of the APA lands were not seized in the beginning of the construction of the capital and they

still belong to private owners. The Federal Government of Brasília doesn't have any power over these lands even under the Law 2874. These areas area considered vulnerable and can be occupied and divided by the real estate market. In 1998, Law 1869 and the CONAMA's (Comissão Nacional do Meio Ambiente) resolution 001/86 stated that prior to the regularization of satellite cities in RAs, the concretization of the EIA/RIMA (Estudo do Impacto Ambiental) project of these areas was necessary. This decision was to improve the quality of Brasília's urban areas (Paviani, 2002 & Penna, 2003).

Table 4.11 identifies the Federal laws issued by year and description. These laws contributed to the emergence of illegal settlements in Brasília.

Another contributing factor to segregation is the drastically increase of land costs in the Pilot Plan and the consequential movement of middle income populations towards the periphery of Brasília. This movement to nearby satellite cities from the Pilot Plan is displacing the less advantageous groups that are forced to migrate even further to affordable areas of the Federal District peripheries (Acioly, 1994).

Table 4.11

Federal Laws for the Federal District Area

Year	Law #	Description
1953	1803	Authorize the Federal Government to appropriate the lands for the new FDA
1953	1803	Prohibited the sprawl of squatter settlements in the FDA
1956	2874	Creation of Novacap as a federal agency managing the Union lands
1956	2874	Private lands within the FDA were not allowed to be divided and marketed
1960	3751	Gave power to Novacap to urbanize and administer all satellite cities
1979	6766	GDF has the means to authorize the regularization of illegal settlements
1992	353	Private Lands owners were allowed to dived and market their lands
1998	1869	Environmental Impact Assessment prior the regularization of administrative regions

Source: compiled from different sources

Terracap, created in 1972 to replace Novacap, developed a system of land registration and delivered land to the private and public sectors. Terracap uses land auctions to generate financial resources for its management and for Federal District construction projects. An efficient and sustainable land policy was never addressed for Brasília (Acioly, 1994).

In addition to land appropriation and the management of lands contributing to the socio-spatial segregation of the Federal District, another contributing factor is the lack of a comprehensive urban plan.

Lack of comprehensive urban plan

This section focuses on the plans developed by administrators and planners to control the urban sprawl of the metropolitan area of Brasília. These plans tried to fix the damages caused by the lack of a comprehensive urban plan for the surrounding areas of the Pilot Plan, at the time of Brasília's conception. This section describes the main urban planning projects in five periods of Brasília's development: (1) 1950-1960, (2) 1960-1970, (3) 1970-1980, (4) 1980-1990 and (5) 1990-2000.

1950-1960

The first period is characterized by the initial conception of Brasília's planner Lucio Costa, who estimated that the capital would reach 500,000 inhabitants by 1980 in an area of near 5,000 km^2; his projection was wrong since by 1970, the population of Brasília had already reached 500,000. Costa's planning did not foresee the continuous migration of construction workers to Brasília and the decision of the migrants to remain in the city once its construction was finished. Costa stated that after 1980 satellite cities would emerge; however, he did not provide any guidelines for their development. The lack of a comprehensive urban plan for the whole area of the Federal District caused sprawl of labor camps and illegal settlements (Paviani, 2003).

The urban poor in Brasília had to struggle to achieve the right to have a home or a place to live. NOVACAP was in charge of developing housing projects for the Federal

District populations and worked with the financial bank BNH (Banco Nacional da Habitação) to manage urban projects. The BNH's resources came from IAP (Instituto de Aposentadoria e Pensões) and COHAB (Companhia Habitacional). The programs for the urbanization of the peripheral areas of Brasília were under COHAB and SHIS (Sociedade de Habitações de Interesse Social). SHIS was created in 1962 and dealt mainly with families with a monthly income below R$650.00 reais. Later SHIS was changed to SEDUH (Setor de Desenvolvimento Habitacional). In spite of the governmental effort to build affordable homes, the critical housing shortage remained unsolved because housing projects were out of reach for the needy population. This shortage of low-income homes took the less advantaged pollution to invade public lands and forced them to find alternative places to live (Holston, 1989; Heuzé, 1986 & Kubitschek, 1975).

<u>1960-1970</u>

The period of 1960 to 1970 was characterized by the conquest of the Federal District territory and the solidification of pre-established land uses. The goal of the GDF was to consolidate the foundation of the new capital in the Central Plateau. The high number of migrant workers greatly impacted the urban environment as their need for housing transformed the rural and conservational areas surrounding Brasília into improvised urban areas. The satellite cites that were supposed to wait to emerge until after the natural saturation of the Pilot Plan, in fact began sprouting at great speed even before the inauguration of Brasília in 1960 (Acioly, 1994 & Pinto et al., 1987).
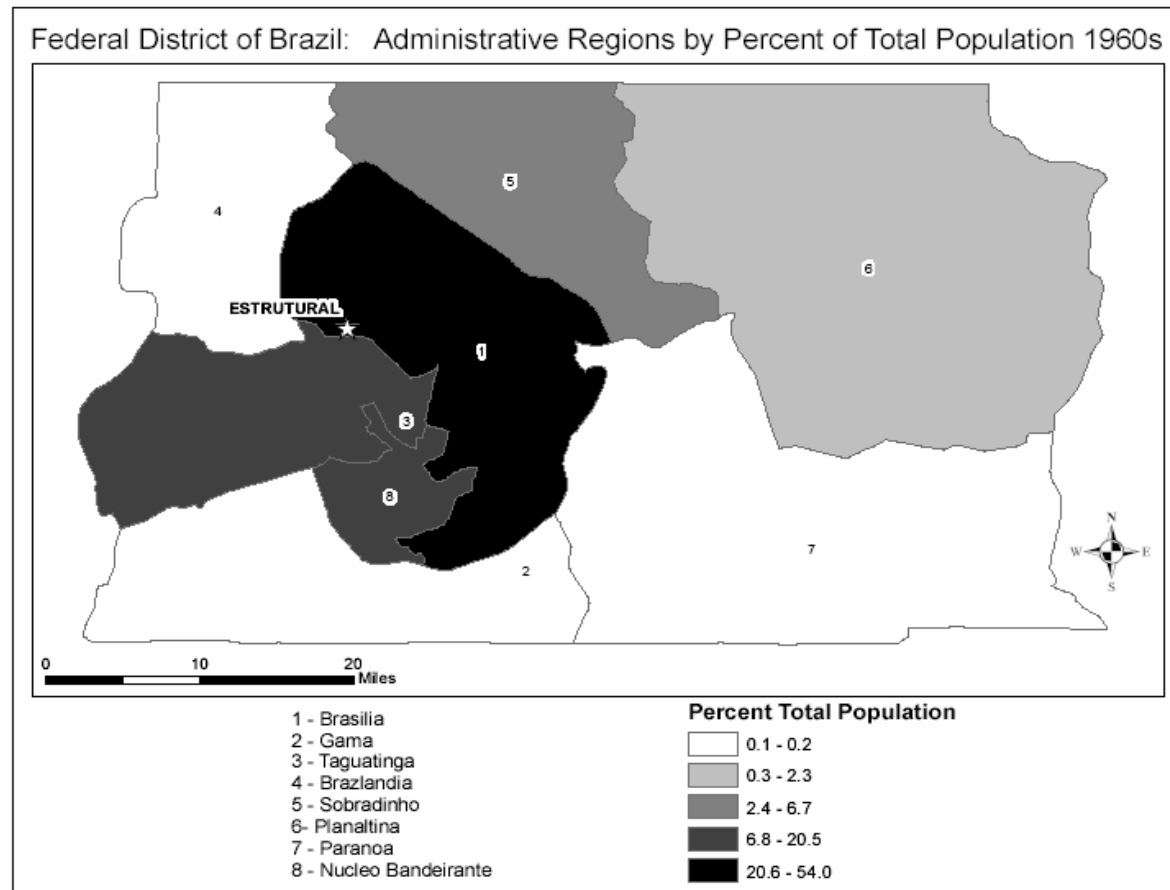
A total of seven satellite cities emerged during the construction of Brasília (Taguatinga, Gama, Brazlandia, Sobradinho, Planaltina, Núcleo Bandeirante and

Paranoá). Some were planned and others evolved from land invasions. The sprawl of the

satellite cities occurred along the railroad and the highway that connected Brasília to

Anapolis. At the end of this period there were 22,422 squatter homes built in the

peripheral area of Brasília with nearly 70,128 people, the equivalent of 11.5% of the total

population of the Federal District (Heuzé, 1986 & Steinberger, 1998)

 Figure 4.5 identifies the eight administrative regions of the Federal District in the

late 1960s.

Figure – 4.5

Federal District Administrative Regions 1960s

Federal District of Brazil: Administrative Regions by Percent of Total Population 1960s

1 - Brasilia
2 - Gama
3 - Taguatinga
4 - Brazlandia
5 - Sobradinho
6- Planaltina
7 - Paranoa
8 - Nucleo Bandeirante

Percent Total Population
0.1 - 0.2
0.3 - 2.3
2.4 - 6.7
6.8 - 20.5
20.6 - 54.0

Source: compiled from different source

<u>1970-1980</u>

The continuous population growth of the Federal District caused the administrators to develop ways to control urban growth in Brasília. In the beginning of the seventies, the government created the CEI-Slum Clearance Commission to eradicate invasions of public lands. This commission was responsible for designing low-income housing projects and controlling the emergence of squatter settlements in the metropolitan area of Brasília (Acioly, 1994).

The period of 1970 to 1980 is characterized by a rapid rise in urban population, at a rate of 117.2%. The main concern of the Federal District administrators was to organize and contain sprawl over the land that had been invaded illegally. At the same time, the new military government, installed after 1969, had the goal of creating a strong and unified highly hierarchic government. The expansion and occupation of the national territory was emphasized, as was the consolidation of the new capital as the center of the country's administrative and economic decisions (Heuzé, 1986 & Pinto et al., 1988).
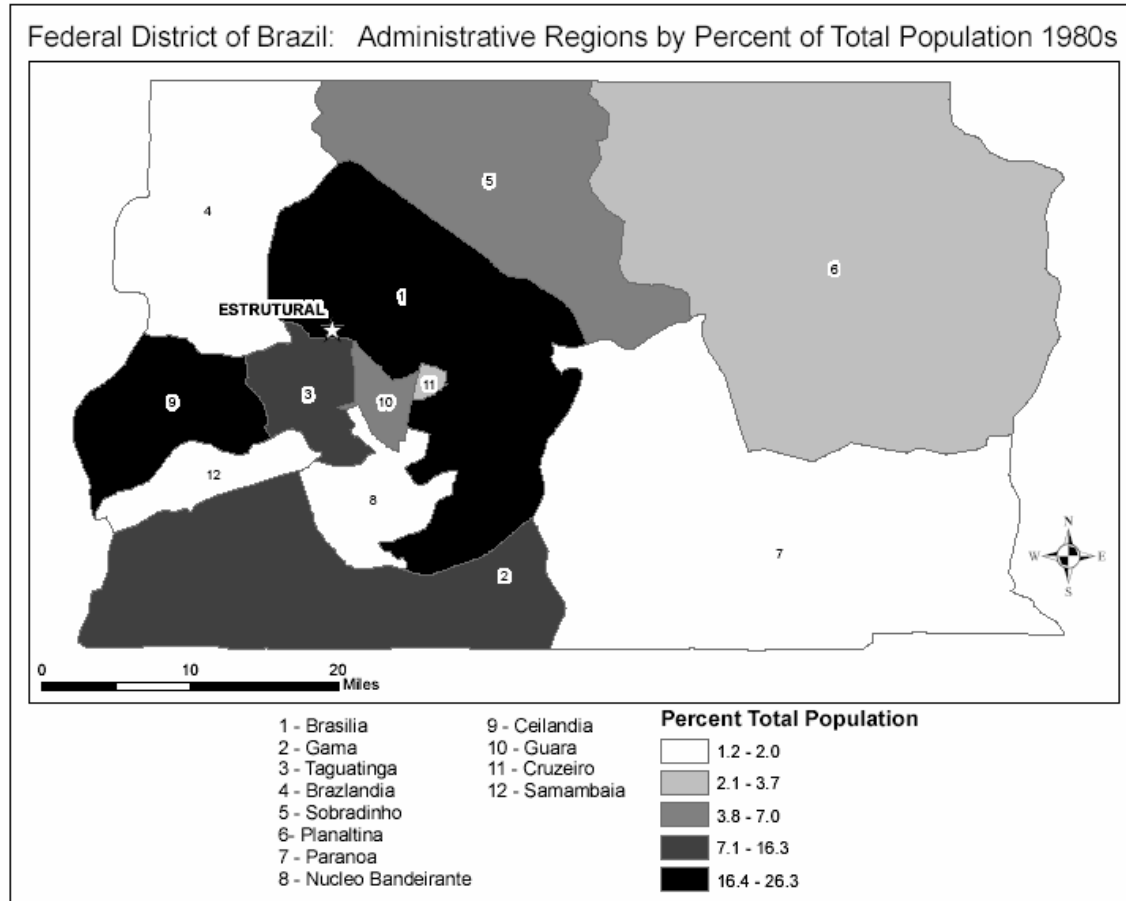
During this period only four satellite cities were built (Guará, Cruzeiro, Samambaia and Ceilandia). The Federal government created new urban plans for Brasília, such as the Planidro (Plano Diretor de Água, Esgoto e Controle da Poluição) in 1970 and the PEOT (Plano Estrutural de Organização Territorial) in 1977, (Paviani, 1987; 2003 & Silveira, 1998). The focus of the government was to expand and increase the population density of the existing satellite cities. They moved families that were living in slums or invasions to low-income condominiums. These plans reinforced the poly-nucleus configuration of Brasília, maintained untouched the green belts around

Brasília, favored the spatial segregation and encouraged the spread of urban growth

towards the southwest corner of the Federal District (Acioly, 1994 & Steinberger, 1998).

Figure 4.6 identifies the eight administrative regions of the Federal District in the

late 1980s

Figure 4.6

Federal District Administrative Regions 1980s

Federal District of Brazil: Administrative Regions by Percent of Total Population 1980s

1 - Brasilia	9 - Ceilandia
2 - Gama	10 - Guara
3 - Taguatinga	11 - Cruzeiro
4 - Brazlandia	12 - Samambaia
5 - Sobradinho	
6- Planaltina	
7 - Paranoa	
8 - Nucleo Bandeirante	

Percent Total Population

- 1.2 - 2.0
- 2.1 - 3.7
- 3.8 - 7.0
- 7.1 - 16.3
- 16.4 - 26.3

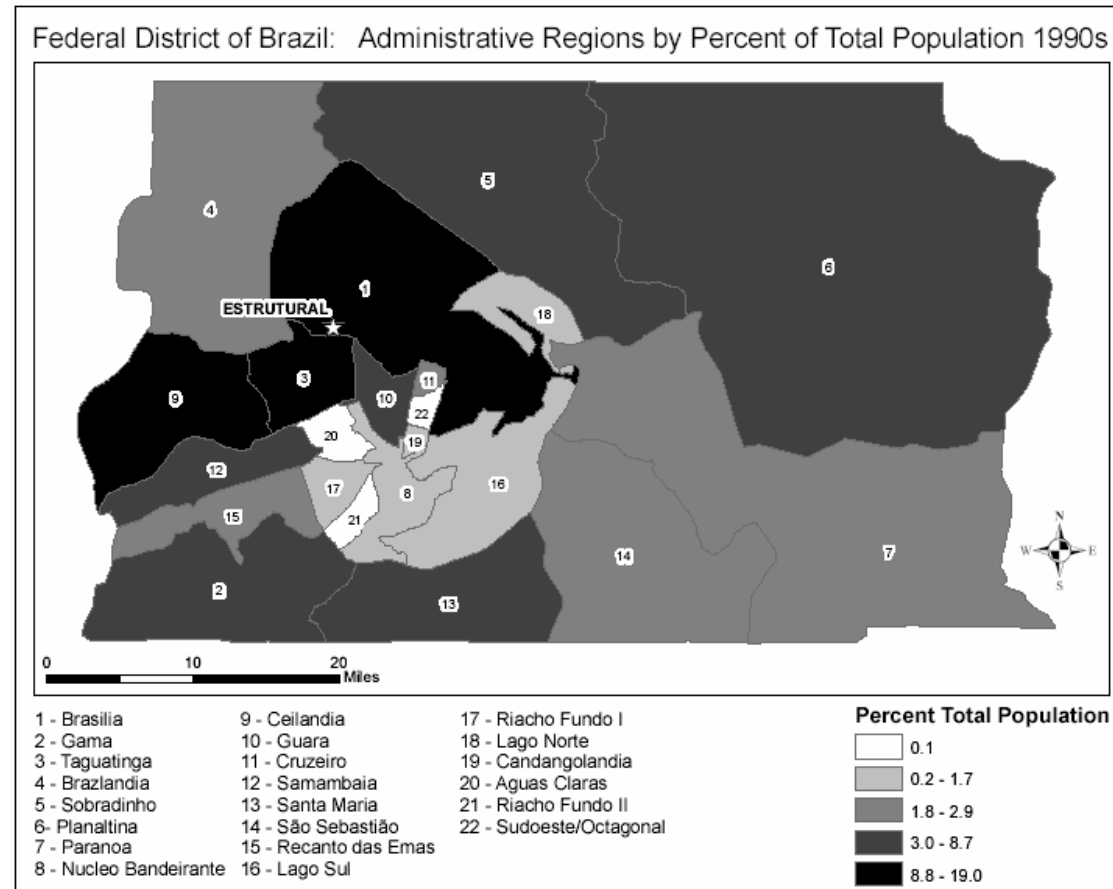Source: compiled from different source

1980-1990

The period between 1980 and 1990 is characterized by the acknowledgment of the urban sprawl of Brasília's metropolitan area. In 1982, a housing program (PAPE – Programa de Assentamento Populacional de Emergencia) designed by the GDF was set to provide houses for the low-income population living in squatter settlements. The agency created to execute this program was called GEPAFI (Grupo Executivo de Assentamento de Favelas e Invasões). This program failed to fulfill the growing demand for affordable housing in Brasília, because of the continuous migration of low-income and uneducated people to the Federal District area (Acioly, 1994)

In this period, the population growth of the periphery increased from 120,000 to 300,000 habitants and ten satellite cities emerged (Lago Sul, Riacho Fundo I, Lago Norte, Candangolandia, Sudoeste/Octagonal, Aguas Claras, Santa Maria, Riacho Fundo II, Recanto das Emas and São Sebastião). The recognition of the urban growth brought to life the old urban plan of Brasília (the Plan Director – Pilot Plan), which was revised by planners in 1988. After its revision other plans were designed such as the PDOT (Planos Diretores de Ordenamento Territorial) in 1992, which consolidated three previous plans: POT (Plano de Ocupação Territorial) of 1985, POUSO (Plano de Ocupação do Uso do Solo) of 1986 and Brasília Revisitada of 1957-1985 (Silveira, 1998 & Steinberger, 1998).

Figure 4.7 illustrates the distribution of the administrative regions of the metropolitan area of Brasília in 1980. Note the density growth of the southwest corner of the Federal District, in which six new regions emerged. This process took away part of the territory designated for Brasília and moved in the direction of Estrutural.

Figure – 4.7

Federal District Administrative Regions 1990s

Source: compiled from different source

1990-2000

In the period of 1990 to 2000, a great number of illegal settlements continued to emerge in the vulnerable areas existing in Brasília. The master plans were not able to curb the urban sprawl or to supply sufficient low-income housing to the population. For this period, it was estimated that 25% of the total Federal District population or around 450,000 people, was residing in illegal settlements. In order for the GDF to control the spread of illegal settlements in Brasília, in December of 1995, Law 992 was created, which places the responsibility of the irregular lots to the real interested agents, who are the buyers. This measure by the GDF brought the consolidation of lots within a geographic area called *bairros,* or residential sectors, and contributed to the spatial stratification of the metropolitan area of Brasília (Malagutti, 1998).

The regularization of these residential lots follows the guidelines established by law 6.766/79. This process may take a long time to be completed. First, the GDF has to approve the urban plan project and authorize an environmental impact license. Second, the Legislative Chamber has to approve the occupation by quantifying the number of people allowed to live in the settlement. Third, the settlement is registered in the notary's office. At this time other people may proclaim this settlement as their property, which may take many years to settle. When all the possibilities are exhausted in the court, then the settlement is registered and the sale of lots begins (http://cidadão.correioweb.com.br/avulsas.htm?valor=1767). At the present time, Estrutural is under a similar process for its regularization.

In 1997, PDOT presented a proposal favoring the process of conurbation of the metropolitan area in order to consolidate and administer the many urban pockets of Brasília. This proposal divided the area into three axes of development: (1) Pilot Plan, Ceilandia, Taguatinga, Samambaia and Aguas Claras, (2) Samambaia, Recanto das Emas, Gama and Santa Maria, and (3) Northeast of the Federal District area. One year later another planning proposal, Ride (Região Integrada de Desenvolvimento do Entorno), was issued to achieve the urban integration of the whole Federal District region (Silveira, 1998). Ride's goal is to incorporate the Federal District area plus another 22 municipalities, 19 from Goias and three from Minas Gerais (SEDUH, 2004).

Figure 4.8 identifies four new administrative regions (Varjão, SCIA/Estrutural, Parkway and Sobradinho II). Note that the result of new plans for the metropolitan area of Brasília followed the old pattern of moving in the southwest direction. Estrutural has been in the path of Brasília's sprawl.

Figure – 4.8

Federal District Administrative Regions 2000s
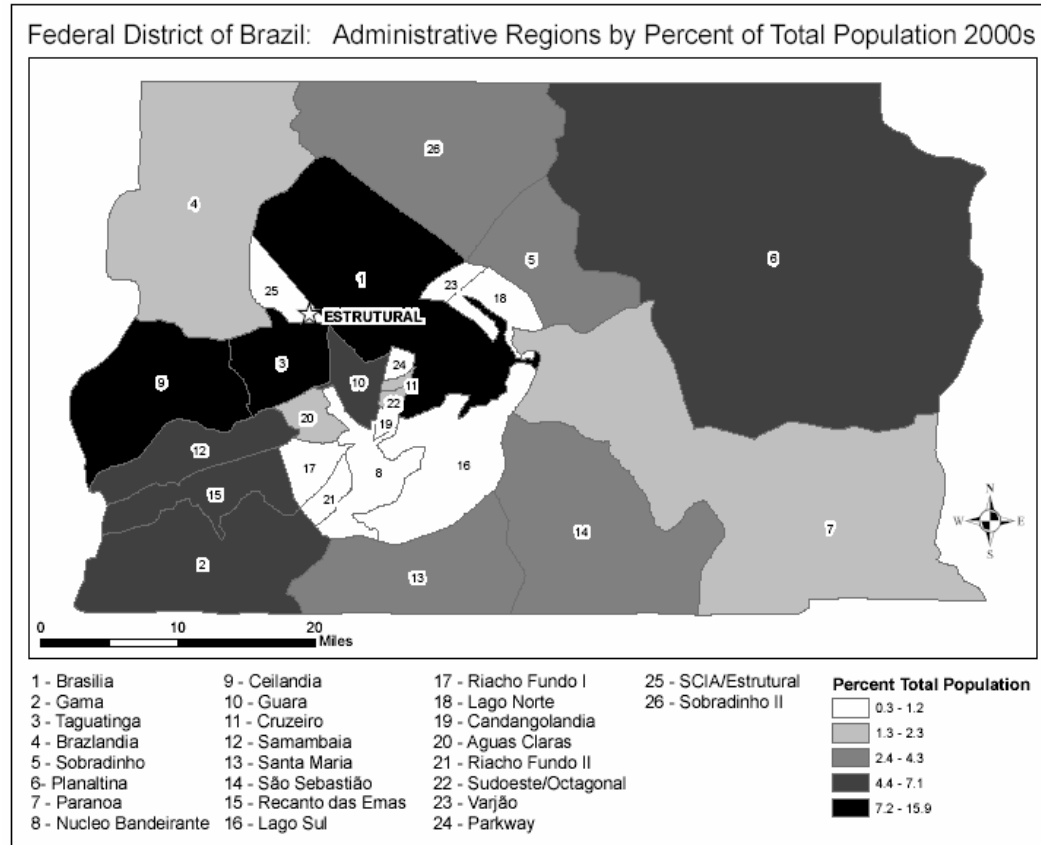
Source: compiled from different source

A recent proposal for a subway system was initiated during the Roriz year's administration and once again is concentrated in the southwest direction. As the subway is built, land valorization is occurring in Guara, Taguatinga, Ceilandia, Samambaia and the South Wing zone (Lima 1998). This project is affecting Estrutural by increasing the value of its land.

The lack of plan for the metropolitan area forced urban sprawl to occur in the southwest direction, towards the capital of Goias. As the metropolitan area of Brasília grew in this direction, it motivated the homeless population to settle in this region, which caused land speculation and environmental degradation as large number of people inhabited and developed illegal camps.

Moving from the second factor, the third factor contributing to the Federal District's segregation is the power shift in the administration of the metropolitan area of Brasília that occurred in the beginning of the nineties.

Power Shift of the Federal District Administration

An administration shift in the Federal District occurred in the early 1990s, when the position of governor of the Federal District became more powerful within the country. Two changes occurred: (1) the governor position became an elected position instead of being nominated, and (2) the city of Brasília was upgraded to being a state-member, thereby receiving much more funding and power. This increased power of the governor's office led to increased corruption and contributed to the segregation of the Federal District in two ways: (1) vote trading and (2) the rise of *grileiros*.

Vote trading is a corruptive system set up by politicians where public land is given to poor people in exchange for electoral votes. In order to understand how vote trading came about and contributed to segregation and environmental injustice, some background is needed. After the end of the authoritarian political period of 1985, Brazil moved towards democratization. In the 1988 Constitution the image of Brasília as the Republican capital and the center of popular movements played an important role. In this constitution the Federal District is to be composed of legislators (district deputies) and the governor elected by the people. The municipality was a member of the federal union, delegating a higher level of administrative-political power to the governor of the Federal District. Brasília's status became almost that of a state-member (Cidade, 2003).

However, in the first years after the end of the military power, the governors of the Federal District were not elected, but were nominated by the President. From 1985 to 1988 the nominated governor was José Aparicio de Oliveira (1985-1988). During this period public power did not offer many homes and the administration's goal was in favor of increasing the density of the existing urban nucleus; therefore, not many lands were given away.

Vote trading politics began during the administration of Joaquim Roriz. Roriz was first nominated governor (1988 to 1990). Later, Roriz was elected governor (1991 to 1994). His administration was considered populist and demagogic. It is during Roriz that the vote trading politic materialized; housing programs and illegal settlements regularization in the metropolitan area of Brasília multiplied (Gouvea, 1996).

From 1995 to 1998 the elected governor was Cristovam Buarque. His administration did not support the vote trading policy used by Roriz. The Buarque administration proposed the removal of land invaders to housing projects. In 1996, Buarque ordered the removal of Estrutural's invaders; however, it was a failure (Bursztyn, 1998 & Gouvêa, 1996)

From 1999 to today the elected governor, for the fourth time is Joaquim Roriz, who has continued with the vote trading politic supported by district deputies (Cidade, 2003; Corrêa, 20002 & Gouvêa, 1996).

From 1977 to 1996 the urban space of the Federal District changed from 23 thousand hectares to 40 thousand hectares because of the vote trading and *grileiros* politics supported by district deputies and governors (Alves & Leitão, 2003 & Arrais, 2003). The definition of *grileiro*, according to Penna (2003), is any person who takes over public or conservation lands around the metropolitan area with the intention to divide and sell them to the public. In order to gain clienteles, *grileiro*s advertise through the media or mouth-of-mouth the sale of lots. The *grileiro*s are sometimes influential people that can determine the decisions in the notary's office where the legalization of the lots is done. The vote trading and *grileiro* politics have attracted more poor migrants to the Federal District in the hope to find affordable housing (Araújo, 2000).

The socio-economic spatial segregation of Brasília was the result of global, national and regional factors. The main point of the regional scale factors favoring the emergence of environmental injustice resides in the lack of affordable housing in the metropolitan area of Brasília, which has increased continuously as the city attracts more

migrants to its core. Also, the vote-trading and *grileiro* politics supported by Federal District governors have contributed to population growth, land invasion and the consequential environmental degradation outside Brasília. The sprawl of illegal condominiums for low, middle, and high classes has created different urban patches. According to Penna (2003) and Steinberger (2003), these patches are configuring socio-spatial segregation in the landscape of the Federal District area.

The spatial segregation of Brasília's metropolitan area is also the result of local factors. They contributed and defined a specific case of environmental injustice in Estrutural by giving details of the precise motives for environmental inequities and inequalities. The local geographical investigation of who lives in Estrutural, and why these people are living in a degraded area of Brasília, assists in pointing out specific reasons of Estrutural's emergence, which helps define the framework of environmental justice and proposes a methodology for evaluating the emergence of environmental injustice in Brasília, Brazil.

Chapter 5: Local Scale Factors

In this chapter I present six local factors contributing to the emergence of environmental injustice in Estrutural: (1) affordable housing, (2) employment opportunities, (3) ease of access, (4) built environment, (5) building community and (6) land availability. First, I give a concise history of Estrutural. Second, I evaluate the intrinsic factors of the local scale assisting in the formation of inequities and inequalities in Estrutural. Third, I comment briefly on the re-urbanization project for Estrutural designed by the GDF. Data gathered for this chapter were historical-geographical and community interviews from Estrutural and Brasília.

History of Estrutural

According to IDHAB (1997), there were families inhabiting Estrutural prior to the government's decision to use this area as a dumpsite for the whole Federal District territory. These families were taking advantage of the rubbish deposited in the area from the construction of Brasília. The trash attracted the people living in the area, and assisted in the continuous invasion of Estrutural nearby the Joquei Clube Landfill.

This migration has not stopped since the late 1950s, when 150 people lived and found the means to survive at the waste site. For more than ten years the first residents lived in the Old Village, located in the landfill. Today, the landfill extends west of the village (see aerial photo 1); this area is now considered part of Estrutural (Horowitz, 2004). .

The first residents settled in small holding and developed self-sustained agricultural patches along the boundaries with the National Park of Brasília. In the 1980s

the population in Estrutural increased to 89 families, and almost 300 residents (SEDUH, 2004). In 1991, ninety families inhabited the area (Corrêa, 2002).

In 1994, the Grupo Executivo de Assentamento de Favelas e Invasões (GEPAFI) counted more than five hundred families living in the village. In 1995 there was an increase to 860 homes in Estrutural. Only scavengers and their families inhabited the area (Gouvêa, 1998). The federal government initiated the removal of residents (Corrêa, 2002). The intrinsic reasons for the mass invasion of Estrutural were explained by one of the residents interviewed:

"There was a deal between ASMOES (Associação de Moradores da Estrutural) and GDF – so Buarque (governor) could remove the families residing near the park to the area by the highway. At the time of the negotiations, there were 830 families…. Terracap worked with one family at a time but took too long. When the removal of these 830 families was done there were another 1730 recent families in the area to be removed. They removed one shack and two were built. When he (Buarque) was done removing the 1730 families, it was election time and Estrutural increased from 1700 to 2500 families, according to the statistics of 1998. At this time Buarque was transferring 900 families to Recanto das Emas, Planalto 2, Planaltina e Santa Maria. But there were still 2500 families to be removed" (Leandro, personal communication, December 2004).

The population growth occurring during the 1990s was continuous and drastically increased after the GDF's attempt to remove the existing residents. The removed residents were placed in other areas of Estrutural or to plots located further away from Brasília and designed by Terracap. The decision to remove Estrutural's residents came

from the GDF together with IBAMA. Their goal was to develop a project for the expansion of the SCIA (Setor Comercial & Industrial Area), which reached the Old Village. At this time approximately 3,000 residents of Estrutural were employed in the landfill (Corrêa, 2002).

The population of Estrutural protested their removal and for two years the Buarque administration tried to transfer the invaders but they resisted and increased in numbers. In 1999 a total of 3,966 homes in Estrutural were counted (Costa, 2004; Gouvêa, 1998 & Horowitz, 2004). During this year, Jose Edmar, District Deputy, gives his support to Estrutural's population by proposing the regularization of Estrutural. His proposal was not approved because the occupation of public lands is illegal according to law (Corrêa, 2002).

However, the continuous invasion of Estrutural forced the federal government to acknowledge the area. In 2001, a federal decree created a commission within the regional administration of Guara responsible for the expansion of Estrutural. In January of 2002, the federal government sanctioned the regularization project of Estrutural as a city. Federal Law 530 declared Estrutural an area of social interest (ZEIS) under the cities statutes, which allowed land tenure regularization and subsequent titling of lots. This action promoted the occurrence of more invasions in Estrutural (Corrêa, 2002 & Horowitz, 2004).

In August of 2003, an elementary school and the health center in Estrutural were inaugurated (Correio Brasiliense, 2003, A-27 & 2003, A-24). The inauguration of these two services attracted other homeless people to Estrutural.

The population increase has contributed to Estrutural's environmental changes during the last decades. The area's environment has degraded drastically; with contamination, diseases, erosion, and floods having become serious problems to the habitants of Estrutural. Eventually, Estrutural was classified as an area of high risk according to Federal Decree 25.088 on September of 2004 (SEDUH, 2004).

The lack of infrastructure in Estrutural is illustrated in the photo below. The streets are not paved and there is no storm sewer. Figure 5.1 was taken during a rainy day in Estrutural in December of 2004. At this time the children were waiting for the school buses.

Figure – 5.1

Main Street Estrutural

Source: Thornton (2004)

In order to evaluate the environmental risks and the health of the residents of Estrutural, a commission was created by the GDF. The commission found that Estrutural is an urban area that needs public investments to improve the living conditions of its residents and that its degradation is threatening the quality of the water supplied to Brasília. The landfill and the city developed above the underground water that goes to the water reservoir located in the national park, which feeds Brasília (Horowitz 2004). Different academic studies proved that the underground water is contaminated in various points of Estrutural (Araújo, 1996 & Franco, 1996).

Government research evaluated the contamination of the underground water and proposed other sites for the landfill (Andrade, 1999). An environmental assessment was performed and the GDF is developing solutions for the problems encountered in the area, such as the removal of the landfill from Estrutural and the re-urbanization of the city. The re-urbanization plan is a contract between the GDF and the World Bank focusing on Estrutural and another five urban areas of Brasília that were considered areas of great environment impact. These areas are characterized by low-income population living in urban areas without proper infrastructure and exposed to degraded environment (SEDUH, 2004). In the meantime, the people residing in Estrutural are not certain of their future. They are concerned about the possibility that they will be removed to distant areas and lose all the investments they've made so far (Corrêa, 2002).   At the local scale, these people have assisted and influenced the formation of Estrutural and they don't want to see their hard work destroyed (interviewees, personal communication, December 2004).

Table 5.1 identifies main events of Estrutural overtime.

Table – 5.1

Chronological Events of Estrutural

	1960	1980	1991	1994	1995	1996	1997	1998	1999	2001	2002	2003	2004
Population	150	300	1500	3000	Fluctuation: invasions & removals				12000	Continuous invasions			30000
Mobilization						Residents want Estrutural legalized			Law legalizing Estrutural is denied		Estrutural Is legalized		
Services	none								electricity		water	School & Health Center	Sewer Services Began to be installed
Health						Diseases strike population							
Projects									Topographic Study of the area				Re-urbanization of Estrutural to begin in 2005/2006

Source: compiled from different sources

Local Factors

        In this section, I discuss the six local geographical factors that contributed to the emergence of Estrutural, Brasília, based on research and statements made by interviewees residing in the area. These factors are: (1) affordable housing, (2) employment opportunities, (3) ease of access to Estrutural, (4) built environment, (5) building community, and (6) land availability.

        The discussion of the factors is done through a longitudinal approach of the community interview data, which provides comparable information of the main motives involved in environmental inequities and their role in Estrutural's emergence (Bullard et al., 2000 & Pellow, 2000). This discussion format employs an evaluation of spatial dynamics (not a snapshot) between residents' needs and environmental conditions for its emergence. It also allows for the integration of qualitative results gathered from historical-geographical analysis and community interview data, which provides a more dynamic model of study (Boone, 2002; Bowen, 1995 & Szasz et al, 2000).

        Main themes surfaced from the interviews, and from these themes, six local factors emerged as main contributors to environmental injustice in Estrutural. The tables below identify the information gathered during the interviews

        Table 5.2 identifies the themes that emerged during the resident interviews. The interviewees' names were omitted.

        Table 5.3 identifies and correlates the specific themes that emerged from interviews and main factors contributing to the formation of Estrutural at the local scale.

Table – 5.2

Themes from Interviewees

Interviewees Themes	A	B	C	D	E	F	G	H	I	J	K
Year Settled	2004	2001	2002	1979	1960	1998	1997	2004	1995	1990	1992
Origin	Center west	Northeast	Center west	Southeast	Center west	Northeast	Northeast	Center west	Center west	Southeast	Center west
Reasons to settle in Estrutural	House Sitting	No Rent	No Rent	Work	No Rent and Work	No Rent	No Rent	No Rent	Family	Work	No Rent
Relatives in Estrutural	No	No	No	No	Yes	No	No	Yes	Yes	No	No
House Quality Satisfaction	No	No	No	Yes	Yes	Yes	No	No	Yes	No	N/A
Employment in Estrutural	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Satisfaction in Estrutural	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No
Bought Lot	No	Yes	Yes	No	No	N/A	Yes	Yes	N/A	N/A	N/A
Ease Accessibility of Estrutural	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes	N/A
Risks in Estrutural	Crimes	Crimes	Violence	Yes	Crimes	Fire	Possible Removal	Crimes	Possible Removal	Possible Removal	Crimes
Vote-trading and Grilagem in Estrutural	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sense of Community	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Sources: compiled from residents' interviews

Table – 5.3

Specific Themes from Interviewees

FACTORS Themes	AFFORDABLE HOUSING	EMPLOYMENT OPPORTUNITIES	EASE of ACCESS	BUILT ENVIRONMENT	BUILDING COMMUNITIES	LAND AVAILABILITY
Year Settled	*	*	*	*	*	*
Origin		*			*	
Reasons to settle in Estrutural	*	*	*	*		*
Relatives in Estrutural				*	*	
House Quality Satisfaction	*		*	*		
Employment in Estrutural		*		*	*	
Living Satisfaction	*	*	*	*	*	
Bought Lot			*	*	*	*
Ease Accessibility of Estrutural			*			
Risks in Estrutural					*	
Vote-trading and Grilagem				*		*
Sense of Community			*	*	*	

Source: compiled from resident's interviews

In order to evaluate each local factor, I classified the interviewees in three time periods: (1) 1960 to 1990, (2) 1990 to 2000 and (3) 2000 to 2004.

Table 5.4 identifies six local factors as a result of the community interviews. These factors are ranked from high to low importance for motivating the residents to move to Estrutural. The residents are grouped according to the time they settled in Estrutural.

Three groups of interviewees were classified as older (1960 to 1990), old (1990 to 2000) and recent (2000 to 2004) residents, and ranks the value of the residents' groups for each local factor contributing to their settlement in Estrutural. The higher the number, the more influential this factor has been upon residents' decisions to settle in Estrutural. The use of three periods of time was useful to capture the differences of experiences and perceptions among individuals within the life-cycle existence of Estrutural. This way, this thesis evaluates in a longitudinal fashion how these individuals contributed to the materialization of environmental injustice in Estrutural.

Table – 5.4

Six Local Factors

Settlement Period	3 Recent				2 Old					1 Older	
Interviewees & Six Factors	A	B	C	H	G	F	I	J	K	D	E
Affordable Housing	H	H	H	H	H	A	A	A	A	L	L
Employment Opportunities	L	L	L	L	A	H	A	H	A	H	H
Ease of Access	H	H	H	H	H	A	A	A	A	L	L
Built Environment	H	H	H	H	H	H	H	H	H	A	H
Building Communities	L	L	L	L	H	H	H	H	H	A	A
Land Availability	H	H	H	H	H	H	A	A	A	H	H
Ranking Importance - H= high A= average L= low											

Source: compiled from residents' interviews

Affordable Housing

The lack of affordable housing in the Federal District has driven the low-income population to settle in the outskirts of Brasília. According to resident interviews, since the inauguration of the landfill Estrutural has provided affordable housing and rent-free living conditions. Paying rent is a hardship for the people living in Estrutural because the majority is unemployed. All the interviewees had rented before they moved to Estrutural. They saw in Estrutural an opportunity to own a lot and house to improve their socio-economic status.

Older Residents

The older residents' goals were to find affordable housing, grow food and be free of rent in Brasília. They invaded Estrutural and formed small holdings near the national park; this area was called Old Village. Together with close relatives and friends they built their homes from recycled materials from the landfill.

Figure 5.2 illustrates the type of houses built in Estrutural. Trash is reutilized for the construction and maintenance of their homes and life-style.

Figure – 5.2

Recycled Trash House

Source: http://cyber.law.harvard.edu/blogs/static/lixo/dumpassociation.jpg

The first residents interviewed moved to Estrutural because they did not want to
pay rent and their relatives were already living in the area and working on the landfill.
They talked about their option to grow their own food on vacant land.

"First we lived in Aguas Claras, where I lived with my sister. She and her
husband came here first……Myself and my brother-in-law…..we built a *chacrinha*
(small holding), we plant yucca, corn and so forth…." (Pedro, scavenger).

Figure 5.3 illustrates a small holding in Estrutural. The homes are made of
pressed wood and leftover trash. The lot is larger than the ones near Estrutural Highway.

Figure – 5.3

Small holding Near National Park

Source: http://cyber.law.harvard.edu/blogs/static/lixo/dumpassociation.jpg

Old Residents

The people that invaded Estrutural in the 90s wanted to obtain a lot during the

years of Estrutural's formation as a city. Their goal was to persuade the federal

government to legalize Estrutural as has happened to other squatter settlements in the

Federal District. Most of the existing satellite cities began as illegal settlements that

eventually were regulated when their residents demanded it from the GDF.

The old residents talked about their experiences living in Brasilia and how they moved from one satellite city to another. They stated their need to find affordable housing and settle down.

Figure 5.4 illustrates a street located near the landfill in Estrutural. Homes are made of cardboard and pressed wood. The narrow and winding streets are unpaved and cover with rubbish from the landfill the streets.

Figure – 5.4

Street Near Landfill

Source: www.vitruvius.com.br/minhacidade/mc086/texto.asp

"….I came here (from Recanto das Emas) because I did not want to pay rent. I had no job….I have a ten year old son and another 5 years of age. Two boys…." (Lidia, ex-bar owner).

"….I lived in Vila Buriti, Planaltina….later in Sobradinho, Sobradinho II, as they were created. Later, I moved to Ceilandia. I arrived in Estrutural in 1990…." (Rui, bar owner).

"…. I have been living here for the past eight years. I lived in Luzitana, Goias, before…I am from Ceará (Northeast region)….I lived with my brother in Paranoá….then I met my husband. We paid rent for more than a year, it was to heavy for us to pay rent, we have a baby girl, and then we met a sergeant that called us to come here…he said that if we wanted he would find a lot for us…we paid $400 reais for our lot" (Luisa, informal worker).

"I came to Estrutural because I never owned a house before" (Luiz, baker).

Recent Residents

The recent residents said that before they moved to Estrutural their socio-economic status was deteriorating quickly as they had to pay rent living in Brasília.

"…I moved from Ceilandia, I rented. It was very difficult to pay rent. We saved some money and then my husband bought here; I helped him to buy this lot. I had a job then…We paid $3,500 reais for this lot" (Maria, housewife).

"….We lived in a lot (Núcleo Bandeirante) that was inheritance from my grandfather….my grandparents were pioneers here in Brasilia. He got a lot because he worked in the construction of Brasilia. But, my aunts expelled us from the lot…after

that, our life has been to pay rent…I had a job…we worked hard, but there came a time when we could no longer pay rent….we've been paying rent for almost six years. It has been two years since I came to Estrutural" (Sofia, housewife).

 "….I met my husband in Tocantins…then we moved back here (Brasília). We stayed here for awhile and we saw that things were not working out…we went back to Tocantins to be near relatives to get help…but it was a mistake, things were bad there. We came back here now in June. Now, we are trying to settle down here in Estrutural. We are selling everything we have….stereo, video, we sell in exchange for a lot…..we had no place to live, we were homeless, but now, we are here in Estrutural, in the expectation that we will gain a lot" (Sara, housewife).

Figure 5.5 illustrates a street in Estrutural near the highway. The homes located towards the entrance of the city are better built than the ones near the landfill. In the far background is the crossing ramp for pedestrians (Correio Brasiliense, 2004).

Figure – 5.5

Street Near Highway

Source: Correio Brasiliense (August, 2004, AS-17)

Employment opportunities

The employment opportunities factor was not constant during the time period
from 1950s to 2000s, as it was affordable housing for the settlers moving to Estrutural.
The type of employment searched by the settlers moving to Estrutural changed for the
three groups of residents.

Older Residents

In the 1960s, the settlement in Estrutural by low-income families occurred because of employment opportunities generated by the Joquei Clube Landfill. The landfill occupies 190 hectares and employs approximately 1,000 people who reside in Estrutural. The scavengers make around $200.00 reais per month (Horowitz, 2004). The GDF has plans to close the landfill within two years and to open other facilities around the Federal District area (Andrade, 1999).

According to Julia, a scavenger, she and other people working in the landfill made more money before the government's decision to recycle the trash prior to transferring it to the Joquei Clube dumpsite. She added that if the government removes the landfill, more social problems will rise in Estrutural, because, besides making money from recycled trash, the scavengers use the landfill as their means to survive.

"I live from what I get from there (landfill)…I gather scrap, cans, food to give to the pig" (Rui, scavenger).

Figures 5.6 & 5.7 illustrate scavengers working in the Joquei Clube landfill. Men, women and children gather and separate the trash for their own use or for selling to recycle companies.

Figure – 5.6

Woman and Trash

Source: http://blogs.law.harvard.edu/lixo/stories/storyReader$134

Figure – 5.7

People, Animals and Trash

Source: http://blogs.law.harvard.edu/lixo/stories/storyReader$134

Old Residents

For the residents that settled in the area during Buarque's removal program of Estrutural, the emergence of this city brought opportunities for employment because of the great number of invaders moving into the area.

"When I arrived here I had a bar…I put together a bar and worked in this bar for four years. Now I am only here in the school (working), but I want to put a bar together again" (Lidia, ex-bar owner).

"I am a baker….I spent many years working….I am thinking about opening a bakery here" (Mario, ex-baker).

"I fix pots and pans in the whole city of Estrutural. I leave with my car that everyone knows it, is yellow and blue. The reason that I came here (Estrutural) was to work….any time you don't have money, you come to Estrutural and you make money. I just have to go out with my car and people know…I fix everything (Celio, informal worker).

For some of the women, the Catholic Church in Estrutural has provided a chance to work by forming cooperatives. They take classes, produce crafts and sell them in Brasilia. They stated their gratitude and optimism with the possibility to work informally.

"Now, it is better here, because we wanted to work before we did not have the means to do it. Now with these people that came to help us, and thank God, we are becoming professionals. Many mothers wanted to work and help with the family income, but there were no possibilities before…." (Leticia, informal worker).

Recent Residents

Recent residents stated that it is very hard to find work in Estrutural. They moved from satellite cities where they worked as maids, cashiers in supermarkets and hair cutters. Moving to Estrutural, in order to find affordable housing, they had to leave their old jobs. They complained that to maintain their old occupation, it took to much time and money because of lack of transportation in Estrutural They felt trapped in Estrutural.

Their level of education is higher than the residents that first settled in Estrutural and worked in the landfill. They stated the nuisance of the landfill. They know the role that the landfill plays in Estrutural as an opportunity for employment, but they dislike the pollution, which is affecting the quality of life in Estrutural. They would rather work in odd jobs outside Estrutural.

"I used to work in the grocery store *Superci* in Recanto das Emas. But, after I came here, and here, there is none (job) and they (*Superci* administrators) would not pay for the bus. Now I have to stay here, inside the house. If they (grocery store managers) would pay for my transportation, I would be working…it is too difficult" (Dora, housewife).

"Here, you just find job as cleaning lady for homes…and the monthly salary is very low, R\$150 reais. Is too little, is not worth the trouble…it is better to stay home…I'd rather work outside Estrutural" (Nadia, housewife).

"The landfill bothers a lot of people. Particularly at night because of the fumes, it is terrible…understand? For us that have been here for a short time, it is difficult to accept…if Estrutural is going to become a city, then the landfill has to go….however,

there are many people that depend on the landfill; it is how some families survive from,

and then the situation becomes difficult. The landfill is the worst problem of Estrutural"

(Madalena, informal worker).

Figure 5.8 illustrates a child being transported with the trash in a wagon. This

child and other children work and help their parents with the recycle and re-use of trash.

Figure – 5.8

Child and Trash

Source: http://www.lixoecidadania.org.br/lixoecidadania/imagens/carroca4.JPG

Ease of Access

Although, Estrutural's prime location near Brasília has attracted some of the people to the area, the ease of access of Estrutural was not a major factor influencing the residents to move to the area. At the present moment Estrutural's accessibility is costly for the residents that depend on public transportation. During the Roriz administration, a plan for a subway line connecting Brasília to Taguatinga was designed and a station near Estrutural was proposed. The idea of new public transportation has brought high hopes to the people living in Estrutural.

As it happened to the employment opportunities factor, the ease of access factor was distinct to each group of residents.

Older Residents

For the older residents, the ease of access of Estrutural was provided by the existence of the landfill. Estrutural highway was not built then, but the constant traffic of garbage trucks near the Pilot Plan created a path to access the area. The same path created for the dump of the waste provided the access of the area by poor people. Beside the landfill, the national park also called the attention of these first invaders who saw the possibility to work the land and attend domestic animals for their basic nourishment.

Because, the landfill and the natural environment supplied most of their needs, transportation and accessibility of the area were not issues as they became established in Estrutural. They were able to find most of the things they needed in the dumpsite, which was considered good quality trash during that time period (Rui & Julia, scavengers).

Old Residents

The residents that moved during the great invasion of Estrutural accessed the area through the high traffic road that connected Taguatinga to Brasilia. Taguatinga is located in the southwest corner of Brasília. In the 1970s, Taguatinga was the most populated area after Brasilia and Estrutural Highway was built to comfort the traffic flow of the southwest corner of the Federal District. These residents saw many opportunities to develop their own business because of Estrutural's location near the highway and Brasilia. The interviewed residents owned a car and other means of transportation and they agreed that Estrutural would be a prime location within the Federal District, if public transportation was improved. They saw the ease of access of Estrutural as a commodity.

"I like to live here, it is a good place to live, is near everything…" (Luisa, informal worker).

Recent Residents

Recent residents stated that Estrutural is not easily accessed because of the supplied bus lines. They state that there is no direct connection from Estrutural to Brasília and passengers have to catch at least two buses to reach their destination. The interviewees expressed great concerns about the cost and time spent on their transportation and on their children's school transportation. These residents believe that the GDF eventually will provide better public transportation for Estrutural.

Interviewees said that Estrutural's location on the path of Brasília's sprawl made the area an alternative for invasion; Estrutural became known by homeless people as the

metropolitan area extended towards the southwest corner of the Federal District and when the media published the acts of invasion of public land by homeless people.

"I have to get a bus that takes to another place; because from here I have to go to Guara and Cruzeiro…it costs R$5.00 reais (both ways) for the ticket. Now, others have to go to Recanto and then Guara, (we) pay R$2.50 (each way)…it takes too long and is expensive to leave Estrutural" (Dora, housewife).

"There is a bus that takes the children and brings them back from Guara (where the school is located)…because the school here is too small. My son arrives home almost 7:00 pm" (Sofia, housewife).

"The bus takes too long. Yesterday, I had to go to Recanto das Emas to solve a problem; it took all day. And the ticket was too expensive" (Nadia, housewife).

"I've been here for three years and Estrutural is improving, soon we will have more infrastructure and better transportation" (Madalena, housewife).

Figure 5.9 illustrates Estrutural and Estrutural Highway, which connects the interior of Goias to Brasilia. Estrutural emerged on a prime location, only a few kilometers from the Pilot Plan.

Figure – 5.9

Estrutura Highway and Estrutural

Source: Thornton (December, 2004)

Built Environment

The existence of a built environment in Estrutural formed by the first settlers, the

landfill and the natural environment provided the basic infrastructure for the emergence

of the Old Village. This built environment contributed to the constant movement of low-

income, unemployed and homeless populations to this area. Recently, a school and a

health center were built and the new residents felt better about living in Estrutural. Today,

Estrutural has water and electricity, a subway line is being built near the city, but sewer and paved streets have not been supplied yet.

Older Residents

The older resident interviewees spoke of three factors contributing to their settlement into the area: the existent of relatives living in the area, the existence of good quality trash and the resources of the untouched natural environment.

"My father realized that paying rent was not going to work out, so he came first to work here in the landfill…short time after that, I move with my sister and her husband and we built a small holding" (Rui, scavenger).

Old Residents

The old residents were attracted to the transformation of the area's status from an invasion to a city. They acquired lots in Estrutural and later they built their homes. They mentioned in their interviews their contribution to the implementation of Estrutural's infrastructure. They said that as they built homes and created the streets, the federal government had to provide water and electricity to the residents of Estrutural.

"I arrived in Estrutural in 1990….here the narrow streets are not well made, but if you analyze the situation, the community built everything…." (personal communication, December, 2004).

"There was no water or electricity. There were no streets, only alleys of one meter…There was no people to complaint to. Now, there are only two streets to be opened. The sewer is going to be installed soon" (Lydia, ex-bar owner).

Recent Residents

The recent residents were attracted to the built environment because as they moved to Estrutural the commercial and residential areas and the streets were built. School and health centers were provided by the government. They said that the GDF has plans to soon install a sewer system in Estrutural. However, they complained that water and electrical bills are out of their reach. A few of them said that they were not able to pay the bills and the city cut their services. Others complained that the cost of the lots were too high for what they make.

"We heard about Estrutural before we went back to Tocantins, we heard on the news. When we came back, we heard about a lot for sale in Estrutural…then, we bought it…It was difficult to pay for the lot…and we have the electric bill to pay; R$32 reais" (Dora, informal worker).

"When I moved to Estrutural, two years ago, there was no water supplied to the block where I live….there was a water pump in front of my house. My hope now is that they (government) fix and improve Estrutural" (Sofia, housewife).

<u>*Building Communities*</u>

The goal of building a community by residents greatly influenced the formation of Estrutural. Community organization is fundamental to the process of Estrutural's regularization as a city and for the legalization of the lots invaded and settled.

At the present moment, Estrutural has 29 community associations, 20 administrative groups representing residential blocks, three community organizations, 50

commercial buildings and 25 churches (IDHAB, 1997 & SEDUH, 2004). Most of the interviewees were associated with a congregation.

Older Residents

The first settlers are organized and represented by two types of associations: the residents and the scavengers. These residents are represented by ASVALO (Associação dos Chacareiros do Cabeceira do Valo). Because, most of these residents work in the landfill, they are also represented by Viver and Ambiente (Rui, personal communication, December, 2004). Although, these associations lack organization and some of the interviewees feel discourage about them, for these residents those organizations can help them assert their rights as scavengers and owners of small holding lots in Estrutural.

"There is an association (of scavengers) that is large and (the participants) are unified. But, when one of them wants what the other doesn't want, when one signs and the other doesn't sign….there is no organization, then I do not know if is good or not" (Pedro, scavenger)

"It (Estrutural) used to be safe, but since they started building a village, the situation is bad, we are not sure what is going to happen…I am just waiting" (Pedro, scavenger).

Old Residents

The old resident interviewees expressed their intention to create and nourish organized groups representing the inhabitants of Estrutural. They want to build and organize communities to empower the residents of Estrutural, so they can guarantee the legalization and regularization of the village.

The formation of community organizations occurred as the population of Estrutural increased in the beginning of 1990. In 1992, ASCOVE (Associação da Vila Estrutural) represents the older residents of the village and was formed with the goal to improve the quality of life of Estrutural. In 1995, ASMOES (Associação dos Moradores da Estrutural) represents recent residents that moved to Estrutural and settled along the new roads opened during the Roriz administration (interviewees, personal communication, December, 2004). The dynamic of Estrutural is reflected on the innumerous associations emerging daily in Brasilia.

In the last five years, other associations were created in Estrutural, such as the "Associação Comunitária Rádio Difusora, radio comunitária, and another 20 new associations….women association, associations for everything that is possible…when we walk in Estrutural we see that the associations are written on paper, but they are not in action…there is no organization in Estrutural" (Rui, personal communication, December, 2004).

The old residents talked about safety concerns, as they have plans to bring new values to the inhabitants of the village and to build a strong community. They mentioned the need to make Estrutural's residents aware of the vote-trading and *grileiros* politics of governors and the traps of the welfare system established by the GDF.

"The political infrastructure of Estrutural has problems, because the politicians are buying away the people that have intentions to do social work in the city…this happens because Estrutural is a target of politicians. The problem in Estrutural is the low level of education of the population, even within the leaders; it is difficult to make them

more conscious of their roles as leaders to bring benefits to the community" (Rui, personal communication, December 2004).

This group wants to alert the population of the blackmail system of trading lots for votes. They also want to make residents aware of the weakness of Estrutural as a community since its members become fragmented when they become loyal to the many political parties of the GDF. They also question the validity of welfare as they noted that some of the residents were losing their motivation to work and relying on the meager government check arriving at the end of the month.

"This stuff of giving R$130 reais a month to the people…I would not give….I would do the following: I would open a school there, down below (pointed to the end of the street) and I would give R$130 reais for the people that would take classes….I doubt if anyone (of those people receiving the governmental allowances) would show up! This money in fact is making people poorer. Give a hoe…it is much better than giving money. Give a fishing pole …but the government is doing the opposite, is giving the fish" (Rui, personal communication, December, 2004).

Recent Residents

For the recent residents, the building of communities has a different connotation. They saw in Estrutural the opportunity to organize themselves as a community to build a sense of place, and to assert their rights to own a house. In spite of being discriminated and marginalized by friends and relatives for living in Estrutural, they feel their suffering will be paid off as they gain homeownership and build a community.

These recent residents took a risk as they moved to Estrutural, because Estrutural was known as a marginalized and dangerous place. They left old communities, where they had friends, relatives and sometimes employment to live the uncertainties of Estrutural

"People say bad things about Estrutural, but I feel like I've been living here for 10 to 15 years…because I always wanted to have a roof (a house)….it doesn't matter how, for instance we live there in a wood shack…but I always wanted to have a place that was mine. This stuff of paying rent, rent…rent is not for yours…now, I feel happy and fulfilled for having a roof (a house)" (Dora, housewife).

"There is a lot of discrimination…the people that live in Estrutural are discriminated against. After I moved to Estrutural, my life changed. My relatives don't come here to visit me here. You know, I am revolted…I don't feel well living. But I live, you know, I try to not talk about it to my husband, because he doesn't like me to…But, all the sacrifice is worth to have a place that is yours…" (Sofia, housewife)

Interviewees said that once they moved to Estrutural, they became ostracized by relatives and friends because they were living in an area known by crimes and violence. They lost contact with family members and old communities. The recent residents mentioned that is difficult to form communities but they think that through the existing organizations and cooperatives they can change Estrutural.

Figure 5.10 illustrates a small celebration among the craft-women after one year of work and great achievements. The event took place at the multi-activities room at the Catholic Church in Estrutural.

Figure – 5.10

Women Cooperative in Estrutural

Source: Thornton (December, 2004)

Land Availability

The area of Estrutural located near a dumpsite remained vacant for many decades as other public lands were being seized and settled by low-income populations. Four factors explain the existence of available land in Estrutural: (1) the area is near land that is unwanted by higher income populations, (2) the area is within the conservation buffer zone for the national park, (3) the area is under Federal Law 6.766/79, which prohibits its

subdivision and (4) the area belongs to the GDF and was designated for commercial and industrial uses.

Older Residents

The first residents of Estrutural saw an opportunity to appropriate this vacant land located near the National Park of Brasilia as a means to build their homes and access the natural resources of the area to grow food. They also state the possibility to re-use the trash from the landfill. Eventually, they were able to recycle and sell the trash to recycling companies.

Old Residents

The residents that moved to Estrutural during Buarque's administration saw an opportunity to take over public land and make it private by educating fellow residents to fight for the regularization of the city. They base their hope on the cultural process of camps that were legalized in the past. The eventual regulation of the satellite cities occurred when their residents organized and protested against GDF administration measures.

"In my vision, I think that we need more people like you. As more people (outsiders) come to study Estrutural, more people know about us. More people know about us, easier to have Estrutural legalized" (Rui, personal communication, December 2004).

"I was elected the president of the commercial association. Today, we want to request that independently of what kind of government is in power, politicians must help

Estrutural to become regularized as a city. My goal is to make the people of Estrutural learn how to separate the politics and the obligation of politics" (Rui, bar owner).

Recent Residents

Recent residents moved to Estrutural as they heard through the media of available public land in the Federal District. Estrutural was one of the last resources to find affordable housing near Brasilia. These residents were aware of the delicate circumstances involving the landfill, the national park and Estrutural, but they hope for their right to remain in the city and gain land ownership.

"I heard on the television (about Estrutural)…a public land being invaded by homeless people….Recently, I heard that people living 100 meters from the landfill have to be removed because it is not good for their health…I don't know what is going to happen. They also talk about IBAMA…there are many things that need to be regulated in Estrutural to become a city…there are still many things…we hope that everything end well and we can stay here. Because, if we have to leave, I don't know of any public land to go; (we) want a house…everyone wants a house" (Dora, housewife).

All the five scale factors have contributed to the exposure of people of color, low-income and uneducated populations to the environmental hazards of the landfill, the pipeline and the soil erosion of Estrutural. In the next section, this thesis presents a brief discussion of the re-urbanization plan for Estrutural to improve this urban area.

Re-urbanization Project of Estrutural

The overall environmental degradation of Estrutural, its health and safety risks to the people inhabiting the area and the contamination of the underground water supplying

Brasília prompted the Federal government to take measures to meliorate its conditions.

In 2004, an agreement was signed between the Federal government administration and

the World Bank for the re-urbanization of Estrutural. This project was given the task of

improving the poor living conditions of Estrutural and of four urban sites located in the

Federal District (Campos, 2004, A-25). Figure 5.11 identifies an aerial photo of

Estrutural taken in 2004.

The problems assessed in Estrutural were many: the existence of the landfill

contaminating the soil, water and air, the occurrence of erosion and floods, the existence

of methane gas underneath the ground and the existence of a pipeline buried five feet

below the surface and crossing the settlement. The settlement expansion also invaded the

lands reserved for the Commercial and Industrial sector which causes disputes over land

uses. Housing quality in Estrutural is precarious; most houses have one room and are

settled in small lots of 72 m^2, they are constructed with cardboard or *madeirite* (pressed

wood and only a few are made of brick) (Horowitz, 2004)

Figure – 5.11

Estrutural Aerial Photo, 2004

Source: SEDUH, 2004

Urban violence is also a great problem affecting the people living in Estrutural. According to Goulart & Rocha (2004, AD-29) crimes and drug dealing are ubiquitous in the city. People living in Estrutural say that gangs take over homes, force out their residents, and then sell the lots to other people (Nadia, personal communication, December, 2004).

In order to solve these problems, a re-urbanization project was proposed by the GDF. In December of 2004, a final draft of the environmental impact analysis was issued and the Brasília Sustentável program was drafted. Three proposals for the re-urbanization of Estrutural resulted and they followed the guidelines observed in the Social Inclusion and Poverty Reduction and the Federal law 6.766/79. This law has a number of requirements. First, that no residential lot can be assigned to contaminated land until the soil is reconditioned (Fonseca, 2004; SEDUH, 2004 & Horowitz 2004). Second, all the areas for vehicle circulation, sewer, communal centers, and green spaces for public use cannot take less than 35% of the total area. Third, that residential lot sizes have to be around 125 m^2 with a minimum of 5 meters frontage. And fourth, buffer zones to be maintained: a 15 meter buffer zone along creeks, rivers and highways, and a conservation buffer zone guideline of 300 meters between the village and the National Park of Brasília (PROGEA, 2004).

Looking at a re-urbanization proposal for Estrutural (see Figure 2.12), from Q-1 to Q-12, these areas are to receive sewer and circulation improvement. Plan 1 indicates the areas where residential removal will take place: conservation and removal areas; these areas are going to have their soil reconditioned, because they were part of the landfill.

In order to establish a unified federal plan, several things are necessary, including a new landscaping design for Estrutural, the construction of new homes, the installation of water drainage and the re-settlement of families. Therefore, the proposal calls for the removal of 715 residential lots both near the national park for the conservational buffer zone and ones built on top of contaminated soil (the old dump site). Part of the removed families would settle in expanded areas of Estrutural and others would be relocated to satellite cities. This project is supposed to be implemented in 2005/2006 (Secretaria de Comunicação Social, 2004, September, 20; 2004, December, 1; 2005, January, 31; & PROGEA, 2004).

Figure – 5.12

Estrutural re-urbanization Proposal
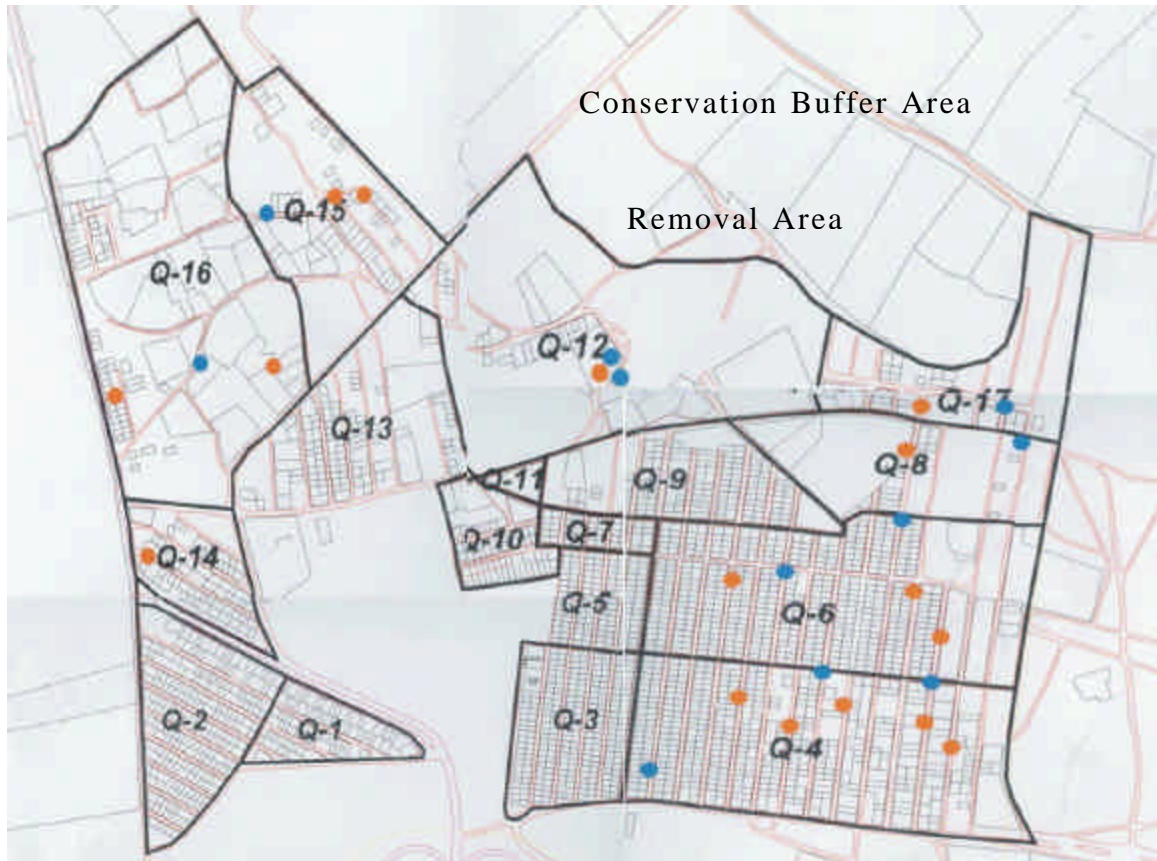
Source: SEDUH, 2004

The danger of this proposal is the occurrence of gentrification in Estrutural. The last attempts to improve Estrutural by supplying water and electricity made it economically difficult for some residents to stay, because bills were too high. In the future, as sewer and streets pavement are implemented, property tax and other bills will exclude other less advantaged residents from Estrutural.

Chapter 6: Discussion and Conclusion

The two research questions that guide this thesis are: (1) Who lives in Estrutural? and (2) Why are these people living in Estrutural? This study employs two qualitative methodologies to answer the questions: (1) historical case-specific analysis and (2) community interviews. To answer the first question, I use statistical data gathered from documents collected in Brasilia. For the second question, I use historical-geographical data gathered in Brasilia and information from interviews with residents of Estrutural.

Discussion

Emergence of Estrutural

The occupation of Estrutural by poor, uneducated people of color was due to several factors, such as the availability of public and conservation land near Brasília, the easy accessibility of Estrutural's nearby main transportation systems and the landfill, the need of low-income people to find affordable housing, the necessity of uneducated people to look for employment opportunities in the landfill, the existing built environment provided by the national park and the landfill, and the goals to build a community to acquire power and gain homeownership by deprived people; all these factors gave the conditions for disadvantaged people to settle in Estrutural.

Since the construction of Brasilia in 1956, poor migrants have inhabited the outskirts of the capital because of the lack of affordable housing in the Pilot Plan, the lack of urban planning for the surrounding areas of Brasília and the existence of strict laws and zoning ordinances written by the political-administrative elite of Brasilia, who

wanted to maintain the original design of the city and to keep poor populations outside

the capital. The result was the socio-spatial segregation of the Federal District area.

The urban expansion of Brasília's metropolitan area has drastically increased over

the years and it is attributed to the continuous migration process into the area by

unemployed rural workers. These workers lost their jobs as Brazil opted to respond to

the outcome of its colonization by modernizing the country, hoping to compete with the

global economy of the 1950s. On the national scale, Brazil had to expand and unify its

territorial occupation as a means to exploit new resources for the country's new economic

approach.

At the regional scale, the lack of planning contributed to the existence of vacant

lands in the Federal District area; however, it was the shift of political power in the

federal government in the 1990s that promoted the great migration to Brasilia. The

Federal District governors took advantage of poor people's need for affordable housing

and set up vote-trading politics to remain in power. First, *grileiros* divided and sold

public land to poor people, and then later, politicians regulated the lands and issued

ownership to the illegal residents in exchange for votes. In Estrutural this scenario is

repeating itself. At the present moment, the population residing in Estrutural celebrated

the legalization of the village, but they are still uncertain of their future as they wait for

the final approval of the re-urbanization project of this area.

Estrutural is delimited by the boundaries of the National Park of Brasilia (north

boundary), Estrutural Highway (south boundary), the SCIA – Commercial and Industrial

Sector (east boundary) and Cabeceira do Valo Creek (west boundary). Estrutural has 215

hectares. The population of Estrutural is approximately 25,000 people. The landfill is located in the extreme north of this area nearby the national park (SEDUH, 2004 & interviewees, personal communication, December, 2004).

Because of high population density in Estrutural, the lack of infrastructure and environmental degradation generated by the landfill, this area was classified as an area of high risk. In September of 2004, Law 25.088 created a commission for the environmental impact assessment of Estrutural. This assessment resulted in the definition of Estrutural as a risky environmental area and the need for immediate attention by the GDF (SEDUH, 2004).   The GDF also pointed to Estrutural as one of the responsible areas for the contamination of the underground water supplying Brasilia. Estrutural was also identified as having its population living in environmentally degraded areas. As a result, the GDF together with the World Bank addressed these urban problems and designed measures to re-urbanize and renovate the area. The implementation of this project is to occur in 2005-2006 (Horowitz, 2004 & IDHAB, 1997).

Who lives in Estrutural?

The profile of Estrutural's residents is similar to the population profile discussed in the environmental justice literature review (Bullard et. al, 2000). The residents of Estrutural are people of color (73.8% is people of color), poor (40% is employed) and uneducated (21.1% finished elementary school).   Three percent of the residents work as registered scavengers at the Joquei Clube landfill; however, another 2% of the population has an income working in the landfill, though they are not registered. They migrated from the poorest regions of Brazil (North and Northeast). These regions have a high

concentration of people of color and illiteracy rates are also high among this population (SEDUH, 2004 & IPEA, 2000).

These migrants first moved to Brasilia during the construction of the city in the mid 1950s. They settled in poor satellite cities within the Federal District territory and eventually invaded Estrutural too, as conditions became favorable to find affordable housing. Today, the majority of the people living in Estrutural came from Ceilandia and Samambaia, two of the poorest satellite cities of the Federal District and from the Northeast states (SEDUH, 2004).

The educational level of these migrants is low. More than half of the population is illiterate and fifty percent has not completed elementary school (SEDUH, 2004). This factor is important for the evaluation of the political power of Estrutural's community because, according to Brazilian law, illiterate men and women are not required to vote (www.sampaonline.com.br./htm). The literature review mentioned the lack of political power of disadvantageous groups and their low participation in socio-political decisions (Bullard, 1996 & Bullard & Evans, 2001). For Estrutural this factor is true; the population is young and illiterate, which results in weak political power for this community.

According to PDAD (2004), more than 50% of the population residing in Estrutural is ranked very poor. Because of their economic status, these people cannot afford to buy a home and prior to moving to Estrutural they had to pay rent, which was out of reach for them. This population was looking for a means to live without having to pay rent and to find work in the landfill. The poor population, free rent and waste as a

means to live has not been found in other studies. The co-existence of homeless people, trash and environmental inequities has not been studied by environmental justice researchers.

The principles of environmental justice state that communities characterized by low-income, uneducated and people of color receive most of the burdens of modernization as they are exposed to toxicity generated by industrial sites, landfill and incinerators (Anderton et. al, 1997 Bullard 1993, Cutter et. al, 1995 & Downey, 1998). This population residing in Estrutural matches this profile and are living in a degraded urban environment with contaminated land, water and air; therefore not receiving the benefits of development. However, the people living in Estrutural are finding a means to survive and build their homes and their community by recycling, re-use and reconditioning trash from the landfill (Bursztyn, 2000).

Why do these people live in Estrutural?

The motives that took these people to live in Estrutural were determined by four scale factors: global, national, regional and local. The global and national scale factors have contributed to the emergence of a poor, rural, uneducated and unemployed population from the poorest regions of Brazil and their migration to Brasília. The regional and local scales provided specific factors, which explained governmental and individuals' reasons contributing to the invasion of public lands by marginalized groups and the consequential emergence of a specific case of environmental in justice in Estrutural, Brasília.

At the local scale, six factors emerged from the residents' interview data. This section discusses these factors according to three residents' groups: 1960-1990 (older), 1990-2000 (old) and 2000-2004 (recent).

Table 6.1 identifies the main motives expressed by the residents on the six local scale factors contributing to the emergence of Estrutural

Table- 6.1

Six Local Factors Overtime

Time Period	Older Residents (1960-1990)	Old Residents (1990-2000)	Recent Residents (2000-2004)
Affordable Housing	Built their homes from recycled trash. Use the natural environment to grow food.	Look for rent-free living conditions. Look for a place to settle down and to legalize Estrutural	Look for rent-free living conditions to improve their socio-economic status and to build their houses on public land.
Employment Opportunities	Found employment in the landfill: recycle trash for personal use and commerce. Trash as the means to survive.	Work at odd jobs in Estrutural, such as fixing, building and selling knickknacks, food and other services; informal work as craftsmen.	Specialized workers and housewives had difficulty in finding employment in Estrutural. They'd rather not work in the landfill.
Ease of Access	Access to Estrutural through garbage truck paths. Once they were established in the village, there was no need to go to Brasília.	Access to Estrutural through the main Taguatinga-Brasília Highway. Roads facilitated their businesses.	Aware of the existence of Estrutural because was near the highway. But, lack of public transportation made it difficult to move in and out of Estrutural.
Built Environment	The first settlers, landfill & natural environment in Estrutural provided the basic infrastructure for more people to move in.	Lots were invaded and houses were built on. Residents built streets and added commerce. They forced GDF to provide water, electricity, a school and a health center	Lots were purchased and some houses have water and electricity. Residents mentioned gentrification – bills were too expensive for them.
Building Communities	Residents want to legalize their profession as scavengers and guarantee land ownership	Residents built and organized communities to empower residents to guarantee their ownership and legalize Estrutural.	Residents fight marginalization and discrimination. They want to build their sense-of-place and the right to own a house.

Table 6.1: continued.

	Residents built homes and used the natural environment of vacant public land.	Residents invaded vacant public land and wanted to mobilize residents to fight for ownership.	Estrutural was their last resources to invade public land and to build their homes near Brasilia.
Land Availability			

First Period: 1960 – 1990(older residents)

The first period is characterized by residents finding affordable housing near unwanted land (Joquei Clube Landfill) and building their homes from recycled material gathered from the landfill. They eventually began working in the landfill. They also used the natural environment of the *cerrado* (bushy natural vegetation of the Central Plateau, Brazil) for growing their food. They accessed the area of Estrutural following the path created by the garbage trucks that dumped the Federal District's trash in the landfill. The *cerrado,* landfill and first settlers formed the built environment of the Old Village; which today is known as Estrutural. These residents created organizations to regulate their profession as scavengers and to acquire their ownership rights to the invaded public lands

Second Period: 1990 – 2000 (old residents)

The second period is characterized by residents looking for rent-free living conditions in Estrutural. They wanted a place to settle down and to acquire land. They worked odd jobs and also participated in informal work in Estrutural. They accessed the area through the main highway that connects the southwest corner of the Federal District to Brasília, Estrutural Highway. They invaded or bought set up lots where they built their

homes. As they built streets and added commercial areas, they developed the village infrastructure. They organized and empowered themselves in community associations and forced the federal government to supply water and electricity to Estrutural. They fight for their ownership over public land and the legalization of Estrutural.

Third Period: 2000 – 2005

The third period is characterized by residents looking for rent-free living conditions and the means to improve their socio-economic status. These residents have more working skills than prior settlers. They are painters, electricians, civil workers, cashiers and hair dressers that worked in Brasília and in other satellite cities. They are not able to find employment in Estrutural and refuse to work in the landfill. They are aware of the important role that the landfill has on the built environment of the village, but at the same time they talked about how they've been marginalized by families, friends and society in general for living in a bad and degraded urban area. They want to fight their marginalization and discrimination by creating a community and finding their sense-of-place in Estrutural. These residents want to acquire land and build their homes on public land to develop a place within Brazilian society.

At the present moment, the population residing in Estrutural is not certain of the legal outcome of the village, as they wait for the final approval of the re-urbanization project of this area. The regularization and re-urbanization of Estrutural doesn't change the character of its context as an environmental injustice case. In fact, even with the execution of the re-urbanization project, Estrutural will remain a case of environmental injustice. The fact that a city is being built on top of degraded urban land and populated

by a marginalized population substantiates this case as environmental injustice in Estrutural, Brasilia.

Conclusion

The employment of two qualitative methodologies -- historical case-specific analysis and community interviews -- in studying Estrutural, Brasília, assisted in the development of a comprehensive and detailed study of the factors influencing the emergence of environmental inequities in Brazil. This thesis agrees with scholars who stated that environmental injustice develops in more complex manners as research have shown (Boone, 2000 & Pellow et. al, 2002). The case-specific study of Estrutural shows how a hazardous waste landfill was accepted and gave the basic conditions to the emergence of a poor, uneducated and people of color community.

This thesis moves away from quantitative analyses to qualitative analyses and proposes a coherent model to evaluate environmental injustice by using four historical-geographical scales: global, national, regional and local.

1. At the global scale it evaluates the importance of transnational decisions by unfolding the history of a nation.

2. At the national scale it evaluates the role of the administrative elite and planners in producing racist and classist laws and zoning ordinances.

3. At the regional scale it evaluates the role of land-use, planning and political power in creating socio-spatial segregation patches in metropolitan areas.

4. At the local scale it evaluates the needs of less advantaged communities and their roles in the formation of environmental injustice.

This thesis brings to light a case of environmental injustice outside the United States, where most of the environmental justice studies have taken place. The methodology applied in this study develops a historical-geographical case specific and a longitudinal evaluation showing how hazards and people's relationship to hazards changed overtime. This study contributes to environmental justice and urban development theory in the following ways:

1. It adds to an understanding of environmental justice in Brazil. This research is unique in that it studied in detail environmental injustice in a developing country which had not been done up to this time. Data on environmental justice in developing countries can lead to the creation of better policies that will minimize environmental inequities in all parts of the world. The methodology and the historical-geographical scale factors approach used in this study can be applied to potential environmental injustice cases worldwide.

2. It highlights the need to be sensitive to differing concepts of justice. In Estrutural, while researchers might regard trash as being detrimental to the community, many residents actually saw the landfill as an opportunity for employment, a resource to construct their houses and the basis to build a community.

3. It adds to the theories of urban development as it analyzes the formation of poly-nucleus cities and urban sprawl based on invasion of unwanted land ownership of public lands by poor migrants facilitated by vote-trading and *grilagem* policies supported by politicians

4. It supports the research philosophy that interviewing communities brings awareness and instruction to both groups: the community's members and researchers. It privileges the voices of marginalized people, by comprehending the experience of the individuals, the disclosure of hidden sources of individuals' motives, decisions and perceptions, and understanding the community's conception of living in the landfill.

The development of this thesis brought new insights into my academic life as a Latin American student and as an architect and urban planner. Implementing a qualitative methodology and working with community members was enriching and provided me with unique view on urban development, sustainability and environmental justice. The study of Estrutural as an environmental justice case has caused me to realize how different historical-geographical scale factors affect and contribute to injustice. The level of poverty of the population inhabiting Estrutural and the means they have developed to survive has assisted me in the understanding that the unnatural and unsustainable manner that we manage the environment must be changed and re-examined if we want to endure as civilized and just people.

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Appendix A: Questionnaire

(1) Land use of Brasília

1. How did **land use** change in Brasilia over time (1960 to 2004)?

2. What **kind of land uses** are in Brasilia? Illustrate them in a map.

3. How did the **changes in land use** affect or contribute to the creation of **noxious sites**?

4. Who are the **people interested** in the change in **land use**?

5. How has **migration** affected land use in Brasília?

6. Has any **labor movement** happened that affected **land use or zoning ordinances** in Brasília?

7. What were **the regulations issued on land uses** in Brasilia? What kind of **land use** was this area before it became a **landfill**?

8. What are the **motives** behind shifts in **land uses**: labor, transportation, concentrated market, waterfronts, railroad, airports or highways?

(2) Zoning of Brasília

9. Who were the **people interested** in the change of **zonings** in Brasilia?

10. Which were the **neighborhoods** that profited by **zoning ordinances** changes? Describe the processes.

11. Does **zoning** differentially protect certain **property values, land uses or people**? Explain.

12. When zoning regulations are passed, do they protect private or public interests? Why? How?

13. Were the **zoning regulations** protecting **property values** of exclusive commercial, residential or industrial?

14. Were **zoning ordinances** issued to avoid court or **nuisance policies or laws**?

15. Were **zoning ordinances** written to **devalue certain areas** and **value others**?

16. Were **zoning ordinances** written to **exclude other people** from public health, safety and welfare?

17. Have *zoning regulations* affected the boundaries of *land uses* over time?

18. Has *zoning* contributed to disproportionate *environmental loading* and perpetuated *environmental injustice* in Brasilia? Why?

19. What interests does *state authority* have in promoting *laws and regulations*? Private or economic interests?

20. Who are the *policymakers* and what are their *standards and values*? What are their *intentions*?

    (3) Comprehensive Urban Planning of Brasília

21. When was the first *comprehensive zoning plan* and *ordinances* addressed for Brasilia? How many more were elaborated?

22. How is *housing market* in Brasilia?

23. How were the issues of housing, sanitation, water fire protection, transportation addressed? How was land uses addressed?

24. Were there any *community or neighborhood activisms* against the location of toxic wastes in Brasilia?

    (4) Community History

25. Did changes in Brasilia's economy affect the *demographics* of Estrututal?

26. Are people from Estrutural aware of the *health risky* for living there?

27. What are the *standards of health* established by Brasilia?

28. What do *authorities* think about Estrutural? What have they done?

29. Does the *political power* of the community matter on decision-makers considerations on where toxic is destined?

30. Does the degree of *education* of the community's member weight on how the waste is distributed among neighborhoods?

31. Do communities *participate in land use planning* and environmental justice measures?

32. What were the *factors that motivated or attracted* people to live in the landfill?

33. What were the factors that contributed for the *population growth* of this area? Were there peaks of *out-migration or in-migration*?

(5) Landfill History

34. Was Estrutural ever categorized as *landfill* through planning or ordinances?

35. What are the *legal processes* for creating a landfill in Brasilia?

36. Did *market dynamics* influence decisions on landfill destinations? How?

37. Were *accessibilities* (agricultural land, transportation, zoning restriction, labor, natural resources, and previous industrial site) factors contributing to the creation of the *landfill*?

38. Is there any relation between the creation of *landfill* and *global events*?

39. Who does manage the *landfill*? Where does the revenue come from?

40. Where does the *waste* come from?

41. Who did own the land before it became a *landfill*?

Appendix B

Individual Interview: Residents of Estrutural

1. When did you come here?
2. Where did you come from?
3. Have you come direct to Brasilia or stopped somewhere before here?
4. Where have you stopped?
5. What were things that happened on your way here?
6. Why did you leave there?
7. Why did you decide to come here?
8. How many were you?
9. All the ones that left with you are here?
10. How do you fell living there and here?
11. What did you do when arrived here?
12. Did you have shelter when you arrived here?
13. Somebody helped you? Who? Why?
14. Did you have problems when you arrived here?
15. Were you treated badly?
16. Did you always live in this place?
17. Were you able to choose this place to build your house?
18. Did you build this house?
19. How did you build this house?
20. How did you obtain material to build this house?
21. Do you have to pay someone for living here?
22. Whom?
23. Did somebody help you? Who? Why?
24. How was the house built?
25. How much time did it take to build this house?
26. How many rooms does it have?
27. Does it have electricity, sewer, water or telephone?
28. Do you cook here?
29. Where does the water and electricity come from?
30. Do you have a garden? What kind?
31. Do you raise animals? What kind?
32. Where do you buy or find food?
33. Where do you buy or find clothes and shoes?
34. They say that the government is giving the rights to property... is it true?
35. Will you have to pay taxes?
36. Is the government supplying water, sewer and transportation also?
37. Have you heard any other comments about this place?
38. Do you like here? Why?
39. How many people live in this household?
40. Who lives here?
41. What is the age of the people that live here?

42. How many children do you have? How many were born here?
43. Did any of them dye due to illness or accidents?
44, Had any other dear ones dye of illness or accidents?
45, Had you worked where you came from?
46. What did you do?
47. Do you work now?
48. What do you do?
49. Do you work for someone?
50. Does someone work for you?
51. Do you exchange favors with neighbors?
52. Do women also work? What do they do?
53. Do older people work? What do they do?
54. And the children? They work? They go to the school or they stay home?
55. How much money do you earn monthly, more or less?
56. There is bus or other type of transportation to go to the city?
57. How many times per week do you go to Brasilia?
58. What do you do in Brasilia?
59. Did you ever go back to the place you came from?
60. Is someone living here that works far away? Who? Why?
61. Where do they work or live?
62. Do you have good neighbors? How do they help?
63. Is there anyone that helps this family at difficult times?
64. Do you help your neighbors?
65. Do you go to church? Which one?
66. Is there a community here?
67. Is there a health center?
68. How do you treat yourself and your family when sick?

69. What do the politicians say about this area?
70. Have they promised to improve this area?
71. Are laws you have to follow, here?
72. If you could change some thing, what is that you would change?

Entrevista Individual: Residentes de Estrutural

1. Quando é que voces vieram para cá?
2. De onde voces vieram?
3. Voces vieram direto para Brasilia ou pararam n'algum lugar antes?
4. Onde pararam?
5. O que aconteceu no seu caminho para cá?
6. Por que é que voces sairam de lá?
7. Por que é que voces vieram para cá?
8. Quantos vieram de lá?
9. Todos que sairam de lá vieram para cá?

10. Como é que voces se sentem por ter deixado lá e vir morar aqui?
11. Voces tinham onde morar quando chegaram aqui?
12. O que voces fizeram quando chegaram aqui?
13. Alguém ajudou a voces? Quem? Por que?
14. Voces tiveram alguns problemas quando chegaram aqui?
15. Alguém os tratou mal?
16. Voces moram neste lugar desde que chegaram aqui?
17. Voces puderam escolher este local para construir sua casa?
18. Voces construiram esta casa?
19. Como voces construiram esta casa?
20. Como que voces conseguiram material para construir sua casa?
21. Voces tem que pagar algum dinheiro para morar aqui?
22. Para quem voces pagam?
23. Alguém ajudou voces? Quem? Por que?
24. A casa foi construida aos poucos?
25. Quanto tempo levou para construir esta casa?
26. Quantos comodos tem esta casa?
27. Voces tem eletricidade, esgoto, água ou telefone?
28. Voces cozinham aqui?
29. De onde vem a agua, eletricidade ou combustivel para cozinhar?
30. Voces plantam para comer? O que?
31. Voces criam animais para comer? Quais?
32. Onde compram ou acham comida?
33. Onde compram ou acham roupas e sapatos?
34. Dizem que o governo vai dar títulos de propriedade para voces...é verdade?
35. Voces vão ter que pagar imposto?
36. O governo vai fornecer água, esgoto e transporte também?
37. Voces ouviram alguma outra coisa a respeito daqui?
38. Voces gostam daqui? Por que?
39. Quantos moram, aqui?
40. Quem mora aqui?
41. Qual é a idade das pessoas que moram aqui?
42. Desde que chegaram aqui quantos filhos tiveram?
43. Voces perderam algum filho ou filha de alguma doença ou acidente?
44. Voces perderam algum outro ente querido por doença ou acidente?
45. Voces trabalhavam de onde vieram?
46. O que é que voces faziam lá?
47. Voces trabalham aqui ou em outro lugar?
48. O que é que voces fazem?
49. Para quem voces trabalham?
50. Alguém trabalha para voces?
51. Há troca de favores e serviços entre as pessoas que moram aqui e os vizinhos?
52. As mulheres também trabalham? O que fazem?
53. Os idosos tamném trabalham? O que fazem?

54. E as crianças? Trabalham? Vão à escola ou ficam em casa?
55. Quanto dinheiro voces ganham por mes, mais ou menos?
56. Tem onibus ou outro tipo de transporte para ir à cidade?
57. Quantas vezes por semana voce vão à Brasilia?
58. O que voce fazem em Brasilia?
59. Voces alguma vez volataram para o lugar de onde vieram?
60. Alguém de voces trabalha longe daqui e só volta de vez em quando? Quem? Por que?
61. Onde é que eles trabalham ou moram?
62. Voces tem vizinhos boms? Que ajudam?
63. Há alguém que ajuda sua familia quando voces tem dificuldades?
64. Voces ajudam seus vizinhos?
65. Voces vão à igreja?
66. Há algum centro comunitário aqui?
67. Há centro de saúde?
68. Como é que voces se tratam quando ficam doentes?
69. O que os políticos falam desta "cidade"?
70. Há promessas de melhorar a cidade?
71. Há leis que voces tem que obedecer morando aqui?