Droughts, Morality, State Politics and the Brazilian Semiarid Landscape:

A Study of the São Francisco River Integration Project

by

Claudia Pastor Almeida Soares Bjørgum

Thesis for the degree of MPhil in Development Studies, specializing in Geography.

Department of Geography

Norwegian University of Science and Technology

Trondheim, Norway

June, 2008

Acknowledgement

This thesis is a late work which represents the fullfillment of an old objective. It was a long and confused way which seems to be finally concluded with this thesis. Now I feel ready to start new challenges in my life. In this process I was influenced and helped by lot of different people who I would like to acknowledge here.

First I would like to thank my supervisor Gunhild Setten for her important remarks during the supervision process, for her respect for this Brazilian style of writing a thesis, and for her important contributions to the work. I could not have made it with someone else. Second I would like to thank Markus and Bodil from the Geography Department for their helping spirits. It was so good to know you were there to support my bad health days. I also want to thank Professor Ragnhild Lund for all the support through the difficult journey of writing a thesis in a different country and on a different language.

I also want to acknowledge the fundamental influence of Professor Michael Jones in my first semester in Dragvoll. During his lectures I was introduced for first time to the works of Gunhild Setten, Kenneth Olwig, Denis Cosgrove and Don Mitchell, which became the most importance influences in this thesis. During Professor Michael Jones lectures this quite proud Brazilian historian, discovered her geographer soul, which gave me a great joy. However, if this thesis honors the influence of Professor Michael Jones is something I can not guarantee.

On my long way before Dragvoll I received support and help from a lot of different people and I would like to thank to Jurandir Malerba, Marcel Burzstyn, Jose Roberto Securatto, Renato Winter Ribeiro, Renata Marson Andrade for their support and help. I would like to thank Vera Lucia do Amaral Ferlini and Antonio Penalves Rocha from History Department at University of São Paulo to whom I carry great admiration and respect for their influence and support when I most needed.

I am very grateful to my family for their support, specially my aunt Regina Machado and uncle Luiz Burzstyn for their help in many stages of this thesis. I own a great debt to my parents Daisy and Horacio Soares not only for their help and support but

for their love and for teaching me how to understand and to love the distant Northeast region. It seems that I finally found a way to honor my Northeastern blood, since my mother is the ‘carioca’ daughter in a big family from the state of Maranhão.

Most of all I must thank to my husband Per Olav Bjørgum for his pacience, support, help and for financing this thesis project. At this time of our lives this project was a family investment that costed family time and a large amount of family money. It is not easy to do research without grants but we have manage to do it all together. My daughter I own my greatest debt to my daughter Estela for her pacience and care for her busy and tired mother at the expense of her time.

Dedication

This thesis is dedicated to my parents, Daisy and Horacio, to my husband Per Olav Bjørgum and to my adored daughter Estela Andreetta, the most important people of my life.

Table of Contents

List of abbreviations

ANA - National Water Agency
ASA - Articulation in the Semiarid
CBRSF - São Francisco River Basin Committee
CODEVASF - Cooperative for Development of the São Francisco and Parnaíba Valleys
CPT - Land Pastoral Commission
CSF - São Francisco River Caravan
DDC - Drylands Development Centre
DNOCS - National Droughts Combat Department
FUNDAJ - Joaquim Nabuco Foundation
FNE - Northeastern Fund
IBAMA - Brazilian Environmental Institute
IBGE - Brazilian Institute of Geography and Statistics
IHGB - Brazilian Historical and Geographical Institute
IOCS - Inspetoria de Obras Contra as Secas
IPCC - Intergovernmental Panel on Climate Change
MAB - Displaced by Dams' Movement
MIN - National Integration Ministry
MMA - National Environment Ministry
MST - Landless Workers Movement
PM - Manuelzão Project
RIMA - Environmental Impact Report
SFIP - São Francisco River Basin Integration with Basins of the Septentrional Northeast Project
SUDENE - Northeast Development Superintendence
UNDP- United Nations Development Program

Conversion:

US$ 1 = R$ 1,70

Abstract

The poorest region of Brazil, the Northeast is prone to devastating multi-annual droughts, an inherent part of its geography. The Brazilian state attributes the poverty of the Northeast to the semiarid landscape and a supposed water deficit. The state defends a water diversion project on the biggest river of the region that is rejected by the local population and civil society organizations, as a definitive solution for the water deficit of a section of the semiarid landscape. Based on a large volume of secondary data, primary data collected through open interviews with key informant and participant observation in sections of the semiarid landscape in the state of Ceará, this thesis argues that the problem of the Northeast is not water deficit. Some of the poorest areas of Brazil, in both Northeast and North regions, are abundant in water resources. Droughts have been used as an excuse to intervene in the landscape while drought oriented policies have for a long time divided and sub-divided the region, contributing to the alienation of other structural problems. Poverty and inequality are the most serious problems of the Northeast, inside and outside the limits of the semiarid landscape, just like in the other four regions of Brazil. The São Francisco river integration project (SFIP) reproduces the drought combat discourse and hide the economical intentions of the project. Surrounded by contradictions and certain disregard for Brazil's Constitution the governmental project benefits from the alienation of the other regions of the Northeastern reality and of the indifference of the National Congress to the conflict. The SFIP analyzed as an example of the historical relationship of interdependence between the central government and the local elite.

List of Figures

Chapter 1 - General Introduction

1.1 Introduction

The Northeast is the poorest region of Brazil registering the lowest life expectancy and per capita income, the highest illiteracy rate and is home to half of the country's poor population (Duarte, 2002). The portion of Northeast in the Brazilian GDP in 2005 was 13,1% while the GDP per capita in the region corresponds to 56% of the mean GDP per capita of Brazil (IBGE 2007). The Northeast is an agricultural region marked by land concentration and contrast between the grandeur of mono-cultural large estates and the absolute poverty of micro-properties of subsistence agriculture. Prone to devastating multi-annual droughts the Northeast region also faces the growing threats of desertification as a result of soil vulnerability to intensive deforestation, farming, grazing, mining and climatic conditions. The complex weather system of the region, characterised by extremely irregular rainfall levels, might expose the region to the negative effects of climate change in the future by reducing up to 25% the levels of rainfall (Magrin, Garcia, Choque, Gimenez, Moreno, Nagy, Nobre and Villamizar, 2007).

The current situation of the Northeast, struck by poverty with the lowest human development levels of Brazil, reflects the persistence of unequal political and social structures that did not allow significant changes even in face of the efforts invested to modernize the region during the last 50 years (Castro, 1992:16).

The Brazilian state attributes the poverty of the region to the climate and a supposed low level of water storage in the reservoirs of the Northeast, supporting a widely accepted assumption that access to large water resources, i.e. high levels of water storage capacity in large reservoirs, facilitate the development and development will contribute to poverty alleviation (Mc Nully, 2006)

Defending the existence of a water deficit in sections of the Northeast region the federal government launched in 2004 the 'São Francisco River Basin Integration with the

Basins of the Septentrional Northeast' (SFIP), a water diversion project that is expected to provide water security to the largest water reservoirs of the Northeast and promote the development of the northernmost part of the Northeast region, i.e. the *septentrional* Northeast [1].

Behind the name SFIP lays a renewed version of an old project that was first commissioned by Brazil's Emperor D. Pedro II to engineer Henrique Guilherme Fernando Halfeld in 1852 which primarily consisted of a channel to divert water from the São Francisco river in the province of Pernambuco and deliver it to the Jaguaribe river in the province of Ceará, the main intermitent river basin in the septentrional Northeast [2].

About the SFIP, released in 2004, the National Integration Ministry (MIN) informs that the water to be diverted will supply the demands of the urban population of the septentrional Northeast:

"the SFIP will provide water security in 2025 to 12 million inhabitants of small, medium and big cities of the states of Ceará, Rio Grande do Norte, Paraíba and Pernambuco by taking 26,4m3/s of water from the São Francisco river, an amount that represents 1,4% of the river discharge of 1.850m3/s guaranteed by Sobradinho reservoir in the section of the river where the water will be taken. **The water will be destined to supply the demands of urban population in 390 municipalities of the 'agreste' and 'sertão' in the septentrional Northeast**". (MIN,2008)[3].

The SFIP seeks a model of development based on giant infra-structure projects dominant in the 20th century which demanded the investment of extremely high sums of capital in "*river engineerings that sought to transform entire regions through the generation of hydropower for industries and diversion of water to irrigate commercial farms"* (McCully, 2006:4) while ignoring the needs of the poor rural population.

Despite the fact that big engineering projects remain dominant in the 21st century and dozens of gigantic dams and water diversion projects are under construction in the

---

[1] Septentrional is originated from the word 'septentrion', an old form of referring to the North. According to Random House Unabridged Dictionary (2006) it was originate in the period 1350–1400; from '*ME Septemtrio(u)n < L septemtriōnés, septentriōnés the seven stars of Ursa Major, the north, equiv. to septem seven + triōnés (pl.) plowing oxen*'.

[2] The idea to divert waters of the São Francisco river was first defended in 1847 (Villa, 2001)

[3] Translations made by the author.Emphasis added by the author.

world in 2008, it becomes widely recognized that to combat poverty and raise the human development levels it is necessary to introduce small scale cost effective water solutions destined to serve the demands of the poor rural populations, guarantee the water supply that will increase food production in the micro-properties and generate some economic growth that will reduce poverty (McCully, 2006).

In Brazil, 'family agriculture' characterised by extremely small properties represents 62,2% of the rural properties, occupying 7,9% of the total arable land. 'Family agriculture' produces 80% of the products that compose the '*basic staples*' of the Brazilian population while this form of production can generate one job position at every five hectare and represent the livelihood of 90% of the rural population. The large commercial farms represent 2,8% of the rural properties but occupy 56,7% of the arable land while demanding 223 ha to create one job position [4]. The concentrated land structure of Brazil is related to the fact that 73% of the rural population lives under the poverty line with annual income around US$ 260,00 [5]. The micro-properties of the 'family agriculture' and subsistence agriculture are the most vulnerable to the effects of the climate being the most affected by droughts, floods or frosting.

In the Northeast, which accounts for more than 40% of the country's rural properties, close to 50% of the agriculture workers and around 20% of the arable land, the effects of the structure of the land are as significant to the reduced yield than the volume of water accumulated water reservoirs.

The SFIP is taking an opposite direction from what is suggested by new water management approaches oriented to poverty alleviation. Besides, there are high costs of project, and it represents a risk to the environment of the semiarid landscape and to the region of the basin where the project will reduce the water availability in the region of the low São Francisco and the volume of energy production. (that concentrates 90% of the energy production in the Northeast). There are also threats of inter-basin water diversion to aquatic life in the recipient basins, together with other environmental risks.

---

[4] Information from CPT (Comissão Pastoral da Terra) registered in 2007

[5] Source: CPT, 2007.

The discussion over the risks and costs of the SFIP has been marked by an extraodinary component in the process: the personal commitment of President Luiz Inácio Lula da Silva to the realization of the project. The SFIP is announced as the biggest infra-structure project of President Silva's government despite the opposition of civil society organizations and social movements[6]. The support of the President to the a project which was previously defended by the military government of General João Batista Figueiredo and the former president Fernando Henrique Cardoso, the main political adversary of President Lula, demonstrating that the party of President Lula did not have a project for the development of the Northeast region.

President Lula, a leader of the Workers Party (PT) was once on the same side of the social movements that now oppose the SFIP. The President's decision to support the project of his new political allies have brought confusion to the party's traditional support of the social movements. The President is being accused by traditional allies of stepping to the side of the heavy lobby of engineering companies and the interests of the regional oligarchies by supporting the a project that has always represented the interests of the Northeastern elite, that President Lula used to combat and be the worst enemy of.

In his speeches the President defends the SFIP as his obligation to offer "*a mug of water to relieve the thirst of the our brothers of the semiarid hinterlands*"(Estado de S.Paulo, 18/12/2007) alluding to the social side of the project in search of approval from the Brazilian society. The President usually refers to his personal history as it is apparently implicit that it confirms his commitment to the interests of the Northeastern peasants. President Lula, born and raised in the semiarid Northeast, was a drought migrant who found his way into politics as a labor leader in the periphery of São Paulo. He commanded history making strikes in the 1980's, and now stands on the opposite side of his long time supporters: the social movements, NGO's and organizations of the Catholic church.

The SFIP is opposed by the social movements and organizations of civil society in the Northeast and the traditional communities in the region of the São Francisco river

[6] Social movements is the term used to describe the movements organized by the citizens or categories that community based.

basin, i.e. indigenous populations, fishermen, fisherwomen and communities of 'quilombolas' directly affected by the project [7].

The movement of opposition to the SFIP and the resistance of the local communities did not, however, attract the attention of the national media and the political authorities. The two hunger strikes performed by bishop Dom Luiz Cappio, from the Diocese in the municipality of Barra, on the banks of the São Francisco river in the state of Bahia, called the attention of the country to the conflict that was going on in the Northeast around the São Francisco project. The extreme acts of the priest, a long time friend of the President and supporter of his political party, exposed the contradictions of the government and absence of the unanimity advertised by the federal governemnt. The strikes of Bishop Cappio showed that the Northeast is divided and that there is urgent need to investigate the history of the conflict that has struck the region.

1.2 Study Area

Brazil is the largest country in South America as shown in Map 1, and the fifth largest country in the world, with a territory of 8.514.876.599 square kilometers that occupies 20,8% of the surface of the Americas (IBGE,2000). The larger area of the territory (92%) is located in the tropical zone with predominantly warm tropical climates with temperatures over 20˚C. From equatorial type in the Amazon area with warm and humid climate, the coast of the Northeast and the central highlands have tropical climate, tropical of altitude in the regions of the South and Center West, tropical atlantic on the coast of the Atlantic ocean, sub-tropical in the South and semiarid tropical in the hinterlands of the North. The semiarid climate is a warm and dry tropical climate with average levels of rainfall between 800 and 1000 mm/year concentrated in three months of the year

[7] The quilombolas are the members of the former illegal communities of runaway slaves established during the time slavery was legal. Quilombolas communities are descendents of those runaway slaves that have their rights to the land of their ancestors guaranteed by the Federal Constitution.

Figure 1 - Political map of South America with Brazil pictured in grey on the East coast by the Atlantic Ocean. Source: World Map Finder at:http://www.worldmapfinder.com/En/South_America/

Brazil is the former Portuguese empire in the Americas which remained united after independence. The united territory of Brazil is the outcome of the efforts of the Portuguese monarchs and the Emperors of Brazil to maintain the territory united, which included a long and a complicated relationship of interdependence between the central government and the local agrarian oligarchies. The large territory has also given Brazil strong regional features and extremely diversified cultural manifestations, adding complexity and richness to the country.

Figure 2: Brazil and its five political regions in different colors. Source: IBGE

A federative republic with 26 states and one federal district, Brazil is divided in five political regions: North, Northeast, Center West, Southeast and South as shown in Map 2. The country is ruled by the 1988 Federal Constitution, the first constitution published after the end of the military dictatorship that ruled Brazil between the years 1964 and 1985.

In 2007 the Brazilian population was 183.987.291[8] (IBGE, 2007) mostly concentrated in large and medium urban areas. In the year 2000, 81,2% of the Brazilian population was living in urban areas (IBGE,2000).

Inequality is the most striking characteristic of Brazil, predominant in all states and political regions of the country and between states and regions. The states of the

[8] The Brazilian population counted 183.987.291 in December 2007 which represents a growth of 8,4% from the year 2000 when the population was 169.799.170.

Southeast and South regions concentrate political, economical and financial influence and in those regions the Human Development Index (HDI) have the levels of the developed countries (UNDP,2007).

1.3 The Northeast Region

The Northeast is the third largest region of Brazil with 1.561.177.8 sq.km, (IBGE, 2007) comprised of nine states as showed in Figure 3. The region counted 51.534.406 inhabitants in 2007 (IBGE,2007) and 1.787 municipalities (IBGE, 2007).

(Figure 3: Map shows the nine states of the Northeast region of Brazil.Source: IBGE at: http://www.ibge.gov.br/brasil_em_sintese

Climate has had fundamental influence on the process of formation of the Northeast. Andrade stresses that: "*the complex origins of landscapes do not allow anyone to admit the exclusive influence of one single element in the process of formation of any landscape (...) however, in each region of Brazil one element has had prominence, in the Northeast it was the climate*" (2004:37). In the first centuries of colonization there were not any mention of the climate in the Northeast even if droughts were registered since the 16th century. The Portuguese Jesuit Fernão Cardim described the drought he experienced in 1583 during a visit to the Province of Pernambuco. Cardim described the hunger, the destruction of the manioc and sugar plantations that stopped the water mills that did not work that year and the native population that ran to the coast escaping from the hunger in the hinterlands. Cardim

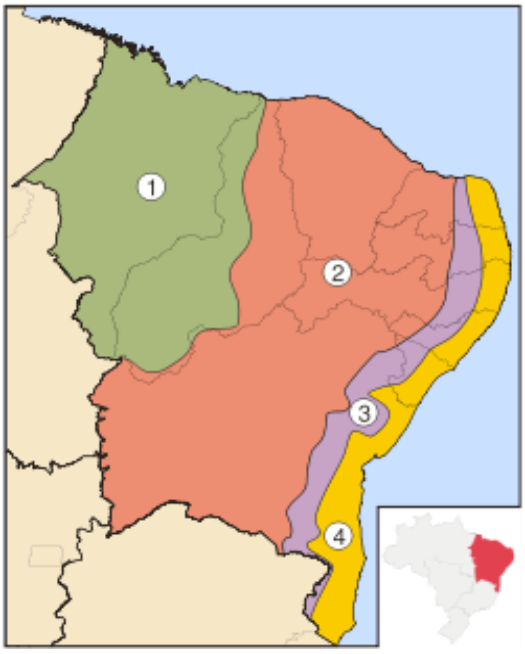

Figure 4 - Map shows the four sub-regions of the Northeast region of Brazil. Source: Wikipedia,2008

mentions that "the dryness and sterility was something rare in the Province that is a land used to intense rains" (Cardim, 1583/1980: 162).

In the 19th century the region was impoverished after the constant loses of sugar and cotton, the main products of the region, in the international market. The droughts of the 19th century intensified the crisis of the region, which did not receive the aid necessary to recover. The coffee farms were expanding in the Southeast and all the attention of the central government was concentrated in the development of the new industry.

The Northeastern society was structured around the large plantations with strong connections to the land, and it was the political power provided by the large estates that can explain the survival of the social and economical structures of the region in face of the sugar crisis (Bursztyn, 1990).

Throughout the 20th century, along with the efforts of the drought combat organisms the region was consolidated as the poorest region with the worst human development levels. Tables 2, 3 and 4 shows some of the human development.

1.4 Regional Geography

The Northeast is divided in four different geographic sub-regions, as shown in Figure 4, defined according to the characteristics of the geographies of those environment. The sub-regions have different soils, vegetation, relief and climate i.e. different rainfall levels. Sub-region 1 is called Middle-North (*'Meio-Norte'* in Portuguese) a transitional area located between the Amazon biome to the West, the '*Sertão*' (sub-region 2) to the East, and '*Cerrado*' biome to the Southwest. Middle-North has characteristics from the three

surrounding regions (Andrade, 2004). The Middle-North has humid and sub-humid climate zones, exuberant vegetation constituted by different types of palm tree forests and not very fertile soils. The vast '*babaçu*' forests have stimulated the establishment of an incipient '*babaçu'* oil industry during the 1980's for food and cosmetics industry that keeps growing despite intense competition from Asian palm oil (WWF Brazil, 2008). Land use in the Middle North is characterized by both subsistence and commercial agriculture, the latter includes rice production on the banks of the Parnaíba river, the second biggest river in the Northeast, and the remains of a once large and nationally important animal husbandry that still characterize this sub-region (Andrade, 2004).

Sub-region 2 is called '*sertão*', a Portuguese word that most generally means 'hinterlands', 'interior' or 'countryside'. However, in reference to Northeast Brazil the term '*sertão*' is used to refer as '*the arid and remote areas of the interior*' (Weiszflog et al, 2007). The sub-region *'sertão*' shares great similarity with the 'semiarid landscape' described in this thesis. Hence, the difference between the two will be provided in the chapter 1.4. Sub-region '*sertão*', represents around 49% of the Northeast region occupying mostly of the hinterlands, the septentrional coast i.e. the coastal line of the states of Ceará, Piauí and Rio Grande do Norte as seen in Figure 4. The traditional economical activity of this sub-region, since colonial times, is animal husbandry and cotton. Subsistence agriculture characterizes most of the properties of this sub-region but some irrigated commercial agriculture has been developed close to the region's main rivers, i.e. São Francisco and Parnaíba. The '*sertão*' has a hot tropical semiarid climate, with average temperature between 25º-27ºC and two very distinct seasons, one rainy and one dry (Andrade, 2004). It is a landscape prone to droughts of different types due to irregular levels of rainfall that can vary in time and space (Suassuna,2007). Droughts can last for five years and occur in quite regular periods of ten years (Coelho, 1985) affecting the entire Northeast region (Andrade, 2004). The droughts in the sub-region '*sertão*',

intensified by the occurrence of the ENSO[9] phenomenon, devastate the landscape leaving serious social scars. We will return to droughts in later chapters.

Sub-region 3 is known in Portuguese as '*agreste*', a word without adequate translation in English. A quite unique natural environment, '*agreste'* is another transitional area, between '*sertão*' (sub-region 2) and '*forest zone*' (sub-region 4), with a hot sub-humid climate, chains of mountains, lots of swamps, very fertile soils and quite vulnerable to droughts due to low rainfall levels in areas of this sub-region (Andrade, 2004). As a transitional region '*agreste*' has very humid regions, just like '*forest zone*' and very dry regions, just like '*sertão*'. The existence of different environments are created by the chains of hills, where the dominant Borborema Plateau ('*Chapada Borborema'*), interfere in the wind system dividing the '*agreste*' (Andrade, 2004).

The '*agreste*' also experience water problems; outside the swamps areas the crystalline soils do not allow accumulation of rain water on the superfaces explaining the absence of perennial rivers in areas of this sub-region. Most of the rural properties in the '*agreste'* are very small, dedicated to subsistence agriculture and animal breeding for milk production while most of the land is concentrated in a small number of large properties dedicated to commercial agriculture. The commercial farms in the '*agreste*' have traditionally produced cotton and sugar cane.

Sub-region 4 is the '*forest zone*' (in Portuguese '*zona da mata'*), a long and narrow land strip along the coast extending from the state of Rio Grande do Norte to the State of Bahia, which was named in reference to the tropical forest known as Atlantic Forest (in Portuguese '*Mata Atlântica*') that originally covered this sub-region (Dean, 1995). The 'Atlantic forest' has been extensively deforested since the first years of the Portuguese colonization and the establishment of the first villages and sugar cane plantations in the 16th century. '*Forest zone*' has always been the most important sub-

[9] The ENSO phenomenon is largely known as *El Niño* is the oscillation of the temperature of the waters of the Pacific ocean, that cause effects all over the world and mostly affects South America whether with more intense rain or with drier seasons. It is said to cause or intensify the droughts on Northeast Brazil. For more on the influence of El Niño see: Davis, Mike (2001) Late Victorian Holocausts: El Niño Famines and the Making of the Third World.London, Verso.

region of the Northeast, it has the largest population, concentrates the industries and six out of nine of the region's state capitals. The main activity of the 'forest zone' is agriculture and sugar cane remains as the main product since colonial times. Tobacco and cocoa are also cultivated within the limits of the '*forest zone*' in the state of Bahia. The climate in this sub-region is tropical humid with average temperature of 25˚C and high levels of rainfall of 2.000 mm/year (Andrade, 2004).

1.5 The 'Sertão' and the Semiarid Landscape

Andrade (2004) considers '*sertão*' the typical Northeastern landscape since it is the only type of environment that can not be found in other regions of Brazil. The '*caatinga*' , one of the six major Brazilian biomes, is the predominant environment of the '*sertão*'. *'Caatinga',* or '*caatingas*', as there are two main types of '*caatingas*', is a native word which means '*white forest*', and is believed to be connected to the image of the landscape during a period of drought (Andrade, 2004). '*Caatinga'* is characterized by semi-deciduous and deciduous forests of xerophilous vegetation of shrubs, resistant to extremely dry conditions, and to shallow crystalline soils that do not allow accumulation of superficial water. During the periods of droughts the *caatinga* vegetation appears to be dead with naked branches, but when the first rain falls the vegetation immediately becomes green again bringing life back to the forests of the*'caatinga'*. The '*caatinga*' defines the limits of the traditional semiarid landscape, but not the limits of the 'sertão', as the '*sertão*' stretches outside the limits of the *caatinga* biome.

The 'semiarid' was a creation of the engineers of the IOCS and became the term used in regional policies, and designated a landscape with a problem, in need of technical intervention (Ribeiro, 2001). The semiarid and the '*sertão*' are thus two sides of the same landscape, i.e. representations of an imaginary landscape. The semiarid being the official landscape, measured in millimeters of rainfall and levels of aridity while the '*sertão*' became the landscape of the epical narratives constructed with the elements of regional history and geography. The semiarid is a landscape victimized by droughts while the

'*sertão*' is a landscape of social injustice, of extremely poor people who resist the vicissitudes of a complex environment.

The official limits of the semiarid landscape comprise areas of semiarid and sub-humid climates since it also comprises areas of the 'Middle North' and '*agreste*' sub-regions. The semiarid landscape stretches across 982.563 sq. km, around 12,5% of the Brazilian territory within 1.133 municipalities in nine states. The population of the semiarid in 2005 was around 20.068.264 (Ministério da Integração Nacional, 2005). Most of the semiarid is located in the Northeast region of Brazil but the 54.670 sq.km are in the State of Minas Gerais in the Southeast region. Some of the Northeastern states, like Ceará, Rio Grande do Norte and Paraíba (see figure 4) have their territories almost completely within the limits of the semiarid landscape what make them the most vulnerable states to droughts. In Ceará and Rio Grande do Norte the limits of the semiarid (*sertão*) lays on the coast, 50 meters from the Atlantic Ocean (Andrade, 2004).

The terms '*sertão*' and 'semiarid' are completely intermixed today. '*Sertão*' being the romantic term, used by the simple local people, adopted by the arts, while 'semiarid' is the landscape which is the site of official policies and of political struggle. The '*sertanejo*', the inhabitant of the '*sertão'* is a victim, of both nature and the local agrarian oligarchy, described in the literature as a brave person, able to resist the difficulties of the life in the '*sertão*'. However, the search of the '*sertanejo*' for social justice has transformed this character into a cruel, religious fanatic, i.e. the victim turned into the perpetrator of the violence which marks the region. Marked by violence and injustice, which are not characteristics exclusive to the this region of Brazil, the Northeast is the result of a complex mix of natural, social and political factors. The Northeast is thus the region that comprises both the *sertão* and the semiarid as dominant trademarks of a more complex region.

The so called semiarid is a landscape of sub-humid and semiarid climate which must be demarcated every ten years as determine a federal law[10] to guide the use of

[10] In 27th december 1989 the law 7.827 defined the conditions for use of the resources of the Northeast Fund (FNE) according to the definition of semiarid as defined by the SUDENE.

resources of the Northeast Fund that must be invested for the development of the semiarid landscape. In 2005 this demarcation was commanded by the MIN and MMA.

Figure 5 : Limits of the new semiarid landscape released in March, 2005. Source: National Integration Ministry at http://www.integracao.gov.br

Until 2005 the limits of the semiarid landscape[11] was defined by the registered levels of rainfall under 800mm per year. Since 2005 the criteria have been actualized and the semiarid is defined by rainfall levels under 800mmm per year, aridity index and water deficit . Figure 5 shows the limits of the semiarid landscape released in March 2005.

1.6 Theoretical Framework

The theoretical framework guiding this research is some of the concepts developed by French sociologist Pierre Bourdieu around his theory of practice. In addition, notions of landscape and moral landscape, are employed for analytical purposes.

A moral landscape framework helps emphasize the relationship between landscape and ideologies, and between landscape and moral values, demonstrating that landscape representations reflect values and ideologies of the group that have produced the representations (Smith, 2000). Landscape representations also reflect the position of this group across social space. The notion of the moral landscape helps this research to understand representations of the semiarid landscape as a way of seeing, as a judgement carried out by a powerful social group.

In his theory of the state Bourdieu (1998) stresses that states have the power to produce and impose categories of thought and knowledge through objective structures controlled by the state, i.e. institutions such as justice system, the school system and the energy policy. For the current research this theory was employed to shed light on the construction and control of the semiarid.

Pierre Bourdieu is furthermore interested in overcoming the division between objectivsim and subjectivism, and structured the concept of habitus to bridge this division. Bourdieu is also concerned about the condition of production and reproduction

---

[11] The 1988 Constitution created a special fund known as FNE (Fundo de Desenvolvimento do Nordeste) to promote social and economical development of the Northeast. The FNE direct 50% defined percentage of the resources to investments inside the semiarid. This fund is composed by 3% of the total revenue over taxation of personal incomes and the money is transfered straight from the National Treasure to BNB (*Banco do Nordeste do Brasil*) a bank created to administrate the money of the fund.

of knowledge and discourses. In the state discourse about the nature of the semiarid landscape, how is certain discourse reproduced in order to justify the execution of the SFIP? The use of the concept of habitus also contribute to demonstrate the role of historically established practices.

This research has thus aimed to demonstrate that there are different discourses about the semiarid, that the image of the semiarid with a water deficit is the official discourse that has been reproduced by the regional elite closely connected to the federal government. This discourse of the state reproduces the representations of the groups associated with the state, which again serves as a channel for such groups. The semiarid landscape thus becomes a landscape that needs interventions.

1.7 Research Hypothesis

The main hypothesis to be confirmed by the present research are:

1. Different social groups have different perceptions about the landscape;
2. Landscape is a site of social struggle, where different groups clash over rights to the landscape;
3. The groups that accumulate more 'capital' controls the landscape according to their own interests, and the landscape becomes a representation of the dominant groups;
4. The São Francisco Basin Integration Project (SFIP) is a project that reproduces the interests of the dominant group;
5. The SFIP reinforces the traditional alliance between the state and the regional political elite which accumulate the political capital traded at the national level.

Based in these hypothesis this research the following questions have been formulated:

1.8 Research Questions

I. What are the problems of the semiarid landscape as described by the government to justify the realization of the SFIP?

II. What are the main problems of the semiarid landscape according to the groups who oppose the realization of the SFIP ?

III. What are the contradictions in the representations of the semiarid landscape in the discourses of the government and the opposition of the government?

1.9 Justification of the Study

Table 1: Participation of Products in Brazilian Exports - 1821-1841		
Product	**1821**	**1841**
Coffee	18,7%	45,4%
Sugar	23,1%	25%
Cotton	22,5%	9,3%
Source: Guimarães, 1963 in Bursztyn, 1990.		

This research unfolds a set of issues related to the semiarid landscape of the Northeast region of Brazil, and demonstrates how different groups have different perspectives on the landscape and how those perspectives guide their relationship with the landscape.

This research shows how the semiarid Northeast was shaped as a troubled landscape by the groups who benefited from it, confirming the establishment and the continuation of certain ideologies and of the structures demanding "*the creation of very specific geographies*" (Mitchell, 1996:3).

This study also shows the existence of different discourses claiming their right to change the landscape. New discourses defend that the problem of the semiarid is bad water management, support the introduction of small scale water resources solutions mostly based in water harvesting and deny the existence of water deficit in the region.

1.7 Structure of the Thesis

This thesis is organized in eight chapters. Chapter one introduces the study area research problem, the analytical framework of the study, the hypothesis, the research questions, the justification of the study and a description of the structure of the thesis.

Chaper two presents a brief history the Northeast region and the semiarid landscape. It also presents the 'political economy of droughts'.

Chapter three provides a description of the theoretical and conceptual framework of the research. Firstly it introduces the concept of landscape and how landscape has been used in human geography, as well as the framework of moral landscape that guide this thesis. The chapter closes with an introduction to Pierre Bourdieu's theory of practice and the key concepts developed around this theory, i.e. habitus, practice, field, capital and doxa.

Chapter four presents the research methodology, how this research was conceived, the research design, the decision to work with a case study, and the methods used to elaborate this research.

Chapter five presents the case study that orientate this thesis, with an introduction of the São Francisco river basin and a presentation of the São Francisco river basin integration project with the basins of the septentrional Northeast and the constraints of the project.

Chapter six presents the dicourse of the opponents of the governmental project, presenting some of the data collected during fieldwork and the secondary data collected with activists and NGO's. This chapter also presents alternatives water solutions for the semiarid landscape.

Chapter seven analyze the issues introduced by this research which are droughts, morality, state politics and the semiarid landscape.

Chapter eight presents a conclusion of the thesis with a brief summary of the content of the thesis and a critical review of this content. It also presents recommendations in relation to the problems analyzed in this thesis.

Chapter 2 – Aspects of the Northeast History

2.1 Introduction

This chapter presents some aspects of the history of the Northeast region with focus on the 19th century and the droughts that hit the region during that period. It also presents the process of engineering the region, and in effect to the creation of the semiarid landscape. The chapter ends with a brief history of one of the droughts in the Northeast region.

2.2 The Northeast Region

Figure 6: The Cedro pond constructed between 1881and 1915 in the municipality Quixadá in the state of Ceará.

The Northeast region has not always been the poorest region of Brazil. In the 16th century the Northeast was the birth place of Brazil, ground to the first Portuguese settlements, the first villages, cities and the first capital. On the grounds of the Northeast was organized a society dedicated to the production of sugar that would generate the '*sugar civilization*', one of the fundamental trademarks of the Brazilian society and culture [12]. Long before the transformations promoted by the development of the coffee industry the colony was forged by the Northeastern sugar industry.

In the 18th century, while the Brazilian sugar started to lose positions in the ultra competitive and lucrative world market, the discovery of gold mines in the Southeast region concentrated the interests of the Portuguese government of the colony. With the

[12] 'Sugar Civilization' is the term largely used as definition of the patriarchal slavery based society established around the operations for sugar production in Northeast Brazil. For more on 'Sugar Civilization' see Ferlini (1986).

fall of the sugar the impoverished Northeastern provinces gradually lost importance in the Brazilian economy (Ferlini, 1986). Along with the sugar crisis that directly affected the Northeast, during the 19th century the region was hit be a series of droughts (1824-1825, 1845, 1877-1879) that devastated the region and killed around 5% of the Brazilian population (Villa, 2001). Table 1 shows the participation of products in Brazilian exports in the first half of the 19th century, before the droughts of 1845 and 1877-1879. Sugar and cotton were products from the Northeast and shows that the region was the leading exporter region until the drought of 1824-1825. The droughts of the 19th century affected the entire region, but most severely the province of Ceará which concentrated the cotton production as showed in the table, while the sugar plantations were concentrated on the coastal areas, less affected by droughts.

The drought of the period 1824-1825, the first to hit Brazil as an independent nation, devastated the province of Ceará what forced the government of the province to call the Emperor[13] for aid. Those were turbulent years when Brazil was involved in a war known, as '*Cisplatina War*' (1825-1828) fighting for its Cisplatina Province which demanded independence from the Empire of Brazil. Even in face of the tragic events caused by the drought the province of Ceará did not receive any aid, instead the province was obligated to send 3.000 men to fight the war in Cisplatina[14]. The only aid sent by the Emperor reached Ceará in the end of the year 1827 and was comprised of an insignificant shipment of 4.000 bags of beans, manioc, corn and rice (Villa, 2001).

In 1834 the Empire of Brazil approved for the first time the use of public resources to combat the effects of droughts in the areas affected by this natural disaster. The government announced the construction of artesian wells, artificial ponds ('*açudes*' in Portuguese) and puddles, a small type of open air reservoir ('*cacimba*') in the provinces of Ceará, Pernambuco and Paraíba. A bank, the Bank of the Province of Ceará, was also created to give financial support to the provinces affected by droughts. However, between 1834 and 1845 very little of what was announced by the central government was

[13] Brazil gained independence from Portugal in 1822 remaining as a monarchy until 1889 when the Republic was established.

[14] Brazil lost the war for Cisplatina which became the independent Republic of Uruguay in 1828.

effectively done (Villa, 2001:23). When another drought reached the Ceará in 1845 the province remained unprepared. Villa stresses that in 1845 the province of the Ceará was largely unknown to the rest of the country as a consequence of its reduced economical significance of the country with the fast decadence of the cotton, but also because the successive droughts in this province affected the occupation and exploitation of large parts of the '*sertão*", the hinterlands of the region (Ibid:21).

In 1859 the Emperor D. Pedro II announced his decision to travel around the country to 'rediscover' Brazil[15]. During the travel the Emperor made his first visit to the North provinces of Alagoas, Sergipe, Bahia, Paraíba and Pernambuco. (See Figure 3). It was also in 1859 that a scientific commission created by Brazilian Historical and Geographical Institute arrived in Ceará to investigate the natural environment of the 'old North'[16] (Lemos, 1996). The Northern provinces (Northeastern included) were unknown to the members of the commission who lived in the capital Rio de Janeiro in the Southeast. 'The Ceará Commission' thus functioned like a scientific commission to a foreign country (Pinheiro, 2002)

The natural scientists that comprised the commission were the first specialists to indicate the existence of water deficit in the province and recommended the construction of 30 ponds with capacity to one million m3 of water (Gabaglia, 1877). One of the members of the commission, Guilherme S. Capanema, wrote articles about the droughts in Ceará where he referred to the soils of the province as fertile and the population as backward, uneducated and not in interested in hard work (Pinheiro,2002). The work of Capanema, written in 1878 and 1901, was very controversial since he indicated that the problem of Ceará was more the people than the climate, expressing a racism typical of the 19th century toward the population of Ceará where the majority of the population at that time was composed by indigenous populations and mixed ethnical groups between Europeans and the indigenous populations (Villa, 2001).

---

[15] The decision of the Emperor to re-discover the country is an allusion to the discovery of Brazil by his Portuguese ancestors in 1500.

[16] In the beginning of the 20th century Brazil was divided in North and South regions. The so called provinces of the 'old North' comprised the states of the actual North, Northeast and Center West regions.

2.3 The Political Economy of Droughts

The occurence of droughts were registered in the provinces of the North from the end of the 16th century but it was not until the end of the 19th century, after 4% of the Brazilian population died in the drought of 1877-1879, that droughts would become a national issue [17]. Villa stressed that the so called 'the great drought'[18] started in March 1877 after the rainy season failed in the region of the hinterlands. The rural population of the hinterlands was the first to be affected and forced to migrate to larger towns in search of food. The presence of a large numbers of people created a situation of terror in the occupied towns, with threats of pillages and attacks on private properties, shops, houses and farms in face of the dramatic conditions of the people. Trying to reduce the risks of rebellions and crimes in the occupied towns, local authorities organized emergency work fronts mostly dedicated to give the migrants some occupation and "*naturally jails started to be constructed*" (Villa, 2001:46).

By the end of 1877 the drought had worsened and the bigger towns in the states of Ceará, Paraíba and Rio Grande do Norte were occupied by hungry beggars. Almost all the people in the municipalities in the hinterlands were affected; where there were not anymore stocks of food or money left. With their harvest completely lost, the people abandoned their houses, or their farms, to beg for food on the streets of the biggest towns. The press reported that the situation in the coastal towns was critical, streets filled with seminude beggars on the imminence of violent attacks[19]. Small and medium land owners were also affected by the drought in 1877 and forced to abandon their land and their slaves, or trading the slaves for food. (Villa, 2001).

---

[17] It is estimated that 500.000 people died in the Northeast region from the effects of the 1877-1879 drought (Villa, 2001).

[18] The drought of the years 1877-1879 is known as 'the great drought'of the 19th century.

[19] The hungry people was forced to trade their own clothes for food. Villa describes a the story of family that had to travel (walk) naked to the state capital and for that reason they traveled at night (2001: 48).

In the surroundings of Fortaleza, capital of the province of Ceará, it was estimated that more than 50.000 hungry migrants occupied the streets demanding food and by the end of 1877 there were around 100.000 people living on the streets of the biggest towns only in the state of Ceará. The combination of drought and hunger brought diseases such as thyphoid fever, yellow fever, cholera and smallpox that were spread due to contaminated water and extremely unhealthy living conditions.

The drought that started in the beginning of 1877 in the states of Ceará, Paraíba and Rio Grande do Norte before the end of the same year reached the states of Pernambuco, Alagoas, Sergipe and parts of Bahia. The newspaper *Diario de Pernambuco* in 1877 estimated the number of people affected by the drought in the provinces: Ceará 700.000; Bahia 500.000; Paraíba 400.000; Pernambuco 200.000; Piauí 150.000; Rio Grande do Norte 117.000; Alagoas 50.000 and Sergipe 30.000 (Villa, 2001:63).

The province of Piauí was affected by the drought in its South region while the North region served as recipient site for migrants escaping from the drought in Ceará. The presence of the migrants collapsed the economy of the province of Piauí. Villa (2001) reported that threatened by the growing number of migrants the government of Piauí escorted groups of migrants to the mouth of the Parnaíba river from where they were sent to the Amazon region by ships. The migrants did not agree to the forced transference and resisted. Their resistence did not influence the decision of the authorities though. Thousands of victims of the 1877-1879 drought were forced to migrate to the provinces in the Amazon region, and also from Fortaleza. Between January and June of 1878 around 35.000 people left Ceará for the province of Pará, where the natural rubber activity was flourishing after the discovery of the vulcanization process. The international demand for natural rubber raised the interests for the product in Brazil. The central government offered to pay the tickets for the families willing to migrate to provinces of Pará and Maranhão, and thus, reduced the portion of food aid sent to the victims of drought in Ceará, which contributed to force the migration (Villa, 2001:63). The

conditions offered to the migrants in Pará were not much better than the life they had left, but that people did not have a choice[20].

In 1877 slavery was still legal in Brazil, while the international slave trade was abolished in 1850. During the drought the large estate and slave owners traded their slaves in lucrative deals with the coffee plantations in the Southeast. The Northeastern '*latifundio*' adopted the hungry migrants as labor, the cheapest alternative available to substitute the slave arms. Desperate migrants assumed the extremely hard work conditions left by the slaves in the sugar plantations and mills. The drought intensified the inter-regional slave trade and by the time slavery was declared illegal in Brazil, in 1888, there were no slaves in the Northeast region. The effect of droughts thus somehow contributed to the proletarization of the migrant in the coastal plantations in the Northeast, in the rubber industry in the Amazon and in the growing coffee farms in the Southeast region (Bursztyn, 1990).

Villa (2001) stresses that it was the indifference of the state, the church, the merchants and the large land owners, the groups that compose the elite of the region, who made migration the only alternative available for the population affected by droughts. The local press controlled by the urban elite openly defended a central government promoted migration to the Amazon. However, Ribeiro (2001) demonstrates that, in the discourses of the parliament of the province of Ceará, the political leaders, mostly land owners, expressed their concern about the large number of migrants leaving the province. The land owners feared the region was losing its work force. In their speeches the presidents of the province of Ceará insisted, for some decades, that the province had a healthy climate and fertile soils, arguing that the Amazon forest was an unhealthy environment. This situation demonstrates that the groups of the elite were divided in their views on migration. While the urban elite defended the migration, the land owners were determined to keep the workers in the region from the moment the drought ended.

In September 1878 an epidemic of smallpox hit the provinces of Ceará, Rio Grande do Norte, Paraíba and Alagoas. According to Villa (2001) Fortaleza looked like a city at

war, dead bodies accumulating on the streets, beggars everywhere, isolated houses. The city had at that moment 130.000 inhabitants, from which 110.000 were drought migrants, where at least 500 people died every day. In one single day, 10th November 1878, 1.004 bodies were delivered at the cemitery. In Mossoró, the province of Rio Grande do Norte, 31.000 people died between January and October 1878. In December food and financial aid arrived from Rio de Janeiro but the situation was out of control (Villa, 2001).

The drought migrants experienced not only hunger and disease. Violence was everywhere. The press reported countless cases of violence committed by the police against the defenceless population. Members of the church were accused of exchanging food for sexual favors. Priests, politicians, merchants and suppliers became rich by serving as intermediaries of the aid provided by the government.

In March 1880, the drought was considered over by the local authorities, who demanded the migrants to abandon the cities within 15 days. Around 80.000 people left Fortaleza where at least another 70.000 died. The estimated number of deaths only in the province of Ceará may vary from 200.000 to 300.000 deaths depending on the source while the estimated number of migrants was three million people. At least 500.000 people lost their lives in the region between March 1877 and March 1880 from the effects of drought, this represented 4% of the Brazilian population at that time (Villa, 2001:83).

The economy of the Northeast was devastated after the 1877-1879 drought that destroyed the cotton and cattle farms dominant in the hinterlands (Abreu, 1979). The cattle farms never recovered the importance they once had while the region, which was already empoverished by the decadence of the sugar and cotton, became more isolated.

Before the end of the 19th century, power relations had changed in Brazil, where the Southeastern coffee farmers concentrated economical and political power.

The isolation of the region exposed the non-existence of a project for the Northeast that after the 1877-1879 drought started to be identified as a troubled region (Villa, 2001). The economy of the provinces were ruined, the structures of the local governments completely destroyed after three years of droughts, and the public employees did not received their wages for more than a year.

Differently from the previous droughts (1824-1825 and 1845), when the region was able to recover and find alternatives to reconstruct its losses, after the 1877-1879 drought the Northeast was not able to find local solutions to the problems of the region. Politically the region was restricted to support political groups from the South in exchange for secondary positions in the central administration, which increased the region's vulnerability to interventions of the central government (Bursztyn, 1990). The inexistence of any project to reconstruct the region turned it into a source of labor for the other regions of the country. The region was thus passive or absent from the most important political discussions at the end of the 19th century, such as the end of slavery and the construction of the federative republic (Villa, 2001), while the Northeastern migrant became the cheapest substitute to the slave in the other regions of the country.

2.3.1 The Coffee Republic

By the end of the 19th century the economic power was transferred from the sugar to the coffee plantations, but politically the power remained with the land owners. The coffee plantation was organized in the same ways as the sugar plantation; large estates worked by a large number of slaves and commanded by a patriarchal figure. The consolidation of the coffee industry represented once more the triumph of the agricultural oligarchies that held considerable amount of political power in the 19th century (Bursztyn,1990).

Throughout the 19th century the central government tried to reduce the power of the oligarchies of land owners at the regional level but did not succeed. After independence in 1822 the central government was determined to centralize the decisions and reduce the influence of the oligarchies of land owners at the municipality level.

In 1840 the political structures remained decentralized, with the power on the hands of the land owners who had total control over the municipalities. The control of the land owners was facilitated by the creation of the National Guard (1831) and the establishment of the new Criminal Code (1832). The National Guard, created to be a military force of citizens under the command of the central government, became one

more instrument of the power of the local oligarchies. The land owners occupied the command positions in the forces, as 'colonels' of the National Guard, from where the term '*coronelism*'[21] (colonelcy) originates, used to refer to the power of the land owners at the local level. The establishment of the "*criminal code provided the land owners the right to choose judges, a powerful instrument for the criminal impunity of the land owners, which shadowed the growth of armed forces of banditry that restored the territorial 'caudillo*" (Faoro, 1979:156). The consolidation of the power by the land owners occurred all over Brazil but became emblematic of the Northeast region.

In 1850 the central government published the 'Law of the Land' (Lei de Terras) to stimulate the agricultural production in face of the imminent end of slavery and the beginning of European immigration. The law established that land must be used for production, in an attempt to restrict the areas of the large estates to their planted areas. The new law provided economical value to the land to stimulate the fragmentation of the large estates in order to change the structure of land ownership. The power of the land owners was based on the political power provided by the land and the slave. By selling part of the land, extremely valued by the growing demand, the oligarchy reduced its political influence (Bursztyn, 1990).

In 1889 the Republicof Brazil was established by a group military officers. The republic was a result of the demands of the local oligarchies which opposed the centralized monarchy, than of an organized political movement. The republican government reduced the influence of the new federal government in the newly created states (former 'provinces') and once more provided the local oligarchies the autonomy to make decisions at state level. The republic also increased the political power of the coffee farmers, meaning that the coffee producing states of the Southeast concentrated the power in the republican federal government[22].

The interests of the coffee producing states were subject to priority of the republican government while the other regions were left behind. In 1891 the first

---

[21] For more about 'colonelism' see: Leal, Victor Nunes (1949) "Coronelismo, enxada e voto" a book that became a classic of the sociology of the Northeast region organized around the power of the colonels.

[22] After Brazil became a federative republic the 'central' government became 'federal' government

republican constitution transfered to the state the responsibility to provide the funds for all administrative expenses, while the federal government would provide aid to the states in case of natural disasters and other public calamities in what was called 'federative pact' (Villa, 2001).

During the first years of the Republic (1889-1897) the Northeast was not mentioned in the presidential messages sent to the National Congress, demonstrating the isolation of the region (Villa, 2001:89). The local oligarchies had assumed the control of the governments of the states in the entire country and established constitutions for the states that served the interests of the local families. The local oligarchies had positioned themselves above the law and the structure of the states were organized to serve the interests of the oligarchic families that also occupied the job positions at the local governments (Burzstyn, 1984).

When the first drought hit the republican Northeast, in the years 1898-1900, the country did not have a plan to help the region overcome the effects of drought. The governor of the state of Ceará was the first to call for presidential help arguing that "*without a regular plan of action for the region and resources to finance the investments it is not possible to neutralize the effects of droughts in the region*" (Borges, 1898 quoted in Villa, 2001:91). The actions of the federal government once more were restricted to free transportation for those willing to abandon the region and start a new life in the other regions of the country, what in fact represented a second round of forced migration of the Northeastern population to the states in the Amazon region.

The republican state aimed at removing the population affected by droughts to work in other regions and depopulate the hinterlands. President Campos Sales in a speech in 1900 defended that "*the rural population of the region affected by droughts must be moved to other regions and states that can offer the conditions for the vocation to hard work of the migrants*" (Sales, 1900 quoted in Villa, 2001:91). Between March 1900 and March 1901 around 40.000 people abandoned the state of Ceará to work in other regions of the country (Teófilo, 1922:226).

2.4 Engineers in the Semiarid Northeast

In 1906 a new elected President Afonso Pena defended that the federal government must provide the Northeast with the structure to 'combat' the effects of droughts. The new government introduced new faces to the political scene, among them engineer Euclides da Cunha, author of '*Os Sertões*' ('The Hinterlands') one of the most influential books about life in the hinterlands of the Northeast published in 1902. Da Cunha, who worked as an advisor to the new government, proposed in another book '*Contrastes e Confrontos*' ('Constrasts and Confrontations') the construction of artificial ponds to perenize the intermitent rivers of the region, the construction of wells, railways, reforestation and the transposition (diversion) of the waters of the São Francisco river basin in the state of Pernambuco to the Jaguaribe river basin, in the state of Ceará. The diversion of the waters of the São Francisco river was extensively discussed in the press in the beginning of the 20th century. Da Cunha insisted that "*droughts are the only predictable facts in our national life*" defending "*continued efforts of long and patient studies (...) strategic plans instead of improvisation"* (Da Cunha, 1906:141).

President Afonso Pena travelled the country in 1906 accompained by a large group of journalists and visited the state of Ceará where he inspected the constructions of wall of the Cedro pond that would permit the accumulation of 125 millions m3 of rain water for the establishment of irrigation channels. The construction of the Cedro pond in the municipality of Quixadá had started in 1881 and in 1906 it remained unfinished. Figure 2 shows the Cedro pond which was the first large reservoir constructed in the Northeast.

Alvaro Silveira, one of the journalists who traveled with the president published a book about the trip. In the book Silveira reported that between Fortaleza and Quixadá President Afonso Pena was impressed by the fact that there were no men in the region where even agriculture was worked by the women (Silveira, 1906 cited in Villa, 2001) this showed the effects of the forced migration in the region in the beginning of the 20th century.

After the trip to Ceará the President established special commissions to study solutions to combat droughts. The commissions led to the establishment in 1909 of the

IOCS, *Inspetoria de Obras Contra as Secas (Inspectorship of Solutions Against Droughts)* a federal institution established to develop solutions for drought affected areas. The creation of the IOCS was influenced by the 'Reclamation Service' created by Theodore Roosevelt in the United Stated in 1902 (Villa, 2001).

The IOCS was created to act upon delimited areas of the Northeast region identified with a semiarid climate that was considered different from the rest of the country which needed the interventions of the state (Ribeiro, 2001). The identification of the semiarid landscape played a role in the process that would establish a new regionalization of the country in the following years, when the Northeast would become a region separated from the North (Ribeiro, 2001).

At the same time that the new landscape influenced the creation of a new region in the country, it also justified the creation of the IOCS to act upon that semiarid landscape (Ribeiro, 2001). The droughts produced a troubled landscape where droughts were the problems to be combated. Drought became a problem for the federal government because there was a demand that was influenced by landscape representations. The IOCS, responsible for those representations, created not only the semiarid landscape, but also the Northeast, the region of the semiarid landscape (Ribeiro, 2001:16).

The structure erected around the IOCS involved large sums of public resources, hundreds of jobs in the public sector and represented the institutionalization of drought combat activities financed by the federal state. The construction of dams, ponds, reservoirs commanded by IOCS (later DNOCS) established what is called the 'drought industry' (Burzstyn, 1984:71).

IOCS was the first of a series of federal institutes, agencies, superintendencies and banks created by the state to coordenate drought combat activities, promote the development of the Northeast region and finance these initiatives. The organisms were regularly used as currency in political agreements in exchange for support to the federal government in the National Congress (Bursztyn, 1984).

Figure 7: DNOCS building semiabandoned in Fortaleza, capital of Ceará. Photo by the author.

By trading political support in the National Congress with the federal government the Northeastern politicians guaranteed their control over the region and positions in the federal institutions in the region, like IOCS. Through the IOCS the federal government promoted significant changes in the semiarid landscape of the Northeast even if those changes were restricted to technical solutions for water storage. The IOCS, and later DNOCS, commanded the construction of dozens of thousands of dams for the perenization of all the rivers of the region, which have transformed the geography Northeast.

The constructions of these reservoirs used 'drought labor', the short term very cheap contracted person, unemployed during the periods of droughts, hired through the emergency fronts organized by the federal government during the periods of droughts. The constructions coordinated by IOCS changed the face of the landscape, and became a fundamental instrument for the reproduction of the political and social relations dominant in the region. The Northeastern oligarchies were doubly benefitted with the alliances with the government, first as owners of large monocultural estates which demanded large quantities of water and workers, they had the IOCS; second, as politicians they benefited from the power of the alliance with the federal government (Bursztyn, 1984).

2.5 The Development Talk

The interventions of the state in the Northeast, sometimes through the construction of reservoirs inside the large estates, contributed significantly to the reproduction of the social structure of the region organized around the large agricultural estate owned by the political oligarchies that controlled the region since the 16th century. In periods of droughts the government intervened through the 'work fronts' when the state hired the unemployed population released by the '*latifundio*' to stop the unemployed labor from migrating. The 'work fronts' kept the workers busy until the drought ended and they were able to return to the latifundio (Bursztyn,1984:72). However, the 'work fronts' took the workers far from their home place, from where they migrated to another region, never returning to the plantation. To control the migration the federal government established the 'emergency front' which during the periods of drought kept the worker in the latifundio working on improvements of the property financed by the state. Locked in the latifundio, the worker was stopped from migrating (Burszty, 1984:75). This exposes the nature of the relationship between the state institutions of drought combat and the regional elite and demonstrate how the federal state benefited the large land owners contributing to the reproduction of the unequal social structure of the Northeast.

From the 1940's, development becomes a central issue in the capitalist world. In the 1950's the establishment of ECLAC (Economic Comission for Latina America and Caribbean) created a large forum for the debate of alternatives for the development of Latin America. The first theories of ECLAC argued that industrialization was the solution for the development of the poor regions of the continent. Inside ECLAC another group investigated the nature of the dependence that characterized the relationship between the developed countries in the center of the capitalist economy and the under-developed countries in the periphery of the system.

The analyses presented by the dependence theory at the international level were adapted to the national level and some of the most significative studies about the Northeast followed the dependence perspective (Castro, 1992:62). One of the effects of

the theories of ECLAC and dependency was the creation of SUDENE (Superitendence for the Development of the Northeast) in 1959.

The establishment of SUDENE re-structured the region by redefining its limits and increasing the area of the region[23]. SUDENE released a new discourse that proposed the modernization of the Northeast and the removal of the conservative social structure. According to Castro (1992) SUDENE did not however, contribute to new structures, but rather adhering to the old regional discourse which characterized the region, stressing that *"the creation of SUDENE legitimated and institutionalized the old regional battle conducted by the cotton, sugar and cattle oligarchies"* (1992:62).

The ideas and the actions proposed by SUDENE aimed at reducing the differences between the regions by promoting the development of the region. However at the level of SUDENE the old inter-regional relations that were considered product of backwardness and the organism was not able to identify the capacity of continuation and renovation even in face of changes (Castro, 1992:63).

During the 1960's changes in the Brazilian political scene among them the establishment of a military dictatorship which affected the programs and the priorities established by SUDENE.

Along the 1960's until the 1980's the structure of the Northeast did not change very much except for the process of consolidation of the region as agricultural. The urban population in the region went from 26,3% in 1940 to 21,8% in 1980, while the rural population went from 39,0% in 1940 to 44,7% in 1980.

In the 1980's, 44,7% of the Brazilian rural population was in the Northeast, a region that throughout the 1980's became strongly rural (Castro, 1992) showing very little effects of the efforts of modernization.

[23] The new limits of the Northeast region as defined by SUDENE included the state of Maranhão which differently from the others is not prone to droughts.

Chapter 3 – Theoretical and Conceptual Framework

3.1 Introduction

This chapter presents the theoretical framework, concepts and assumptions over which the hypothesis presented were established, and is divided in three sections. The first section defines 'landscape' and how this concept is used in this thesis. The second part describes the recent development of two sub-fields known as moral geography and moral landscape respectively, the result of multiple transformations of the understandings of geographical knowledge and of landscape. The notion of moral landscape opens space to the discussion of the role of law and justice in the landscape.

The third section introduces Pierre Bourdieu's theory of practice as the social theory used to analyze the hypothesis presented. The section includes a short explanation of Bourdieu's concepts of habitus, field, doxa and capital (1977, 1990, 1992, 1998). Since these concepts are better grasped in reference to the theory it belongs to, the chapter also introduce the main assumptions of Bourdieu's (1977, 1998) his theory of practice and theory of state where he explains the emergence and functioning of the contemporary bureaucratic state and the ways the state works to consolidate its powers in society.

3.2 Through Landscape

Landscape '*is a social production*'(Mitchell, 1996:31), a site of political struggle, an '*ideologically-charged and a very complex cultural product*' (Cosgrove, 1984:11). Landscapes are political, constructed through usurpation and transformation, where the physical world becomes a reflection of the political landscape. (Olwig, 2002).

Landscape is a very ambiguous concept which makes it one of the most complex among the geographical concepts. The complexity of landscape is a result of its multiples

definitions and approaches and of the wide and diverse use of the concept. Despite that, landscape remains mostly identified as a scenery, as an aesthetic creation connected to the natural environment, a definition promoted through art and architecture since the 16th century. In relation to the assumption that landscape is a product of 16th century Europe, Olwig (2002) has argued that landscape as scenery is a creation of the 16th century, but the roots of the word landscape are found in Medieval Northern Europe where in various old Germanic languages, English included, the word landscape was used to designate an area, or region and meant the same as country and was captured in the German concept '*Landschaft*'. The meaning of word '*Landschaft'* must be understood in geographical and historical terms because of the complex organization of the old German territories before the unification in the 19th century (Olwig, 1996).

The meaning of the word landscape was also close to that of law. In Sweden landscape meant literally '*landscape laws*' (Jones, 2006). In Medieval Northern Europe '*Landschaft'* was regulated by customary laws which gave the peasants a unique degree of freedom and independence which existed in opposition to the manorial system of feudalism, which explain the blank spaces of Scandinavia in the map of European Feudalism (Bloch, 1961). "*Customary law represented the expression of particular local and national communities and their rights to those lands*" (Olwig,1996:634).

Scenes from a '*landschaft'* (country) can be seen in paintings, like those painted by the flemish painted Pieter Brughel the Elder, which were called '*landschaft'* : "*Somehow the idea of natural scenery has become so firmly attached to landscape that many apparently assume that landscape is inherently pictorial and that its primary subject, from the beginning has been natural scenery*" (Olwig, 2002: xxv).

Denis Cosgrove (1984) demonstrates that between the 15th and 19th centuries the concept of landscape was developed in two different ways: first as an artistic and literary representation where it was constructed as a scenery, an image, something to be observed by a spectator, and second it is related to environmental studies where landscape is an expression of the connection between the natural and the human environment.

Landscape as art, as a picture representing natural scenery gave it the subjectivity (Cosgrove, 1984) that characterizes the landscape described within current geographical works. Therefore, landscape goes beyond the meanings of 'region', 'area' or 'territory' because it includes what can not be seen. As Cosgrove puts it: *"landscape is not only the world we see, it is a construction, a composition of that world (..) a way of seeing the world"* (1984:13). Cosgrove demonstrated landscape as a way of seeing in the way Renaissance Italian art used linear perspective to construct its way of seeing the world that created a '*visual ideology*' of realism (Mitchell, 2000)

Different groups have different perceptions of the landscape and landscape represents the historical differences of those groups, their specific ways of understanding the environment and for being specific some landscapes are meaningful to certain groups and not to others. This leads to Cosgrove's fundamental assertion, that "*landscape is an ideological concept, because it represents the way in which certain classes have signified themselves and their world through their imagined relationship"* (1984:15).

Cosgrove argues that geographers who work with the concept of landscape have involuntarily assumed a *'unconsciously' taken over an historically produced and ideologically - dyed view of the external world whose implications raise many of the philosophical and methodological problems confronted but not necessarily resolved in contemporary human geography*" (Cosgrove, 1984: 20).

In human geography landscape is a connection with the world of social science since it exposes the complexities of the geographical investigation. "*It is history, a strong historical sense rather than any formal method which seems to account for the success in evoking the nuances and complexities of human relations in society and place which give rise to characteristics areas, or landscapes* (Cosgrove,1984:34). Landscape, like the concept of habitus, does not represent the natural world, and like the concept of habitus, landscape is also a product of history, a path dependent representation.

Current landscape studies have showed an increase in the number of different topics related to landscape, such as inequality, social justice and environmental justice. The connection between landscape and social justice reinforced the duality of landscape

exposing that it is a work, constructed through the physical effort of humans and works as an institution to the reproduction and development of the society that have constructed the landscape (Mitchell, 2000)

Mitchell demonstrates that landscape incorporates the social relations and is the materialisation, the outcome of this relations*"landscape (as form, meaning and representation) actively incorporates the social relations that go into its making. Landscape (in all its senses) is both an outcome and the medium of social relations, both the result of and an input to specific relations of production and reproduction*" (Mitchell 2004:49) what indicates that *"landscape works ideologically to alienate 'those who belong to it', it is something outside them; it is property owned or controlled by someone else"*(Barrell 1980; Berger 1971; Blomley 1999; Helsinger 1994; Pugh 1990; Williams 1973 quoted in Mitchell 2004: 52).

According to Mitchell, landscape then *"establishes the geography of production and works to naturalise that geography, to make it seem inevitable that those who build the landscape are not the same as those who own the landscape*" (Mitchell 2004: 51).

3.3 Moral Geography and Moral Landscape

Like other sciences, geographical knowledge is produced under the influence of moral beliefs. The construction of geographical concepts, such as landscape, are products of moral beliefs, ideologies and values. There is a strong connection between geography and morality even if this is not assumed, accepted or accounted for by most geographers.

The concept of moral landscape exposes the connection between morality and landscape and "*how particular symbolic and material landscape both shapes and reflects notions of right/wrong, good/bad, appropriate/inappropriate and natural/unnatural in relation to particular people, practices and things*" (Setten & Brown, 2008:4). The notion of moral landscape acknowledges that the evaluation and the judgement of landscapes involve normative values, that '*landscape provoke aesthetic reactions, an approving or disapproving gaze (..) such interpretations have a moral content, reflecting*

what is considered good (or bad) in human life in a geographical context" (Smith, 2000:45).

The power of morality is the result of the interrelationship between morality and power. According to Nietzsche (1994) *"morality is a human construction, an extension of power, wealth, and civilization*", an assumption that stresses the role of power in the establishment of a dominant morality. Nietzsche held that "*every system of morals is a sort of tyranny against 'nature' and also against 'reason'. (...) What is essential in a system of morals is that it is a long constraint*" (Nietzche, 1997:57).

According to Karl Marx, morality mystify and discipline since "*morality is an historically specific ideological institution functioning to mystify and discipline people in accordance with the oppressive and exploitive needs of class society*" (Marx quoted in Thompson, 1978:369). Values, an important element of morality, are "*neither thought nor 'hailed', they are lived and they arise within the same nexus of material life and material relations as do our ideas. They are the necessary norms, rules, expectations learned within the 'habitus' of living and learned, in the first place, within the family, at work and within the immediate community*" (Thompson, 1978: 367).

Like Nietzsche, Marx, and Thompson, Smith & Lee stress that morality are products of the social relations in time, and place: "*moralities are profoundly geographical products of the uneven developments of social relations among people and between people and nature (..) moralities are in short constructed through geographically articulated social interaction*" (2004:7),

Smith & Lee define morality as what people believe and what they do in pursuit of it, as a reflection of personal conceptions of good and bad. (2004:3).

Morality furthermore determine the type of relationship people establish with the land, how people see the land, what people expect from the land, in a way that may weaken or strengthen the people living on the land. Setten & Brown argues that: "*notions concerning the 'use' and 'misuse' of land, and competing formulations of appropriate behaviour in the landscape, reflect moral assumptions about environment and society, and are influential in shaping particular landscapes*" (2008:5). Consequently, landscape

becomes *" a representation of what is and what can be (..) a physical form, a concrete materialisation of social relations, and not 'merely' a representation, important as representations can be and are* (..) *Landscape works ideologically to establish the very conditions of what is 'natural' or 'right' in a particular place"* to a particular group of people (Mitchell 1994 quoted by Mitchell 2004:50).

Setten&Brown (2008) have identified four ways of working with moral landscape which are: '*conduct in place*' where landscape forms the stage upon which moral judgements of people and practices are made; *'moral practice and landscape*' which is based on assumptions that the relationship between people and their environment is expressed through practice and moral judgements about such practice; '*landscape as polity*' where landscape is no longer a territory or a scene but an expression of morality, justice and law; and '*landscape and social justice*' where landscapes are made through labour exploration.

The moral discourse thus reflects a way of seeing the landscape, ideologically constituted and a product of specific time and place. The moral discourse furthermore orientates the practices in the landscape that define the social structure and the ways people live their lives in the landscape, the social relations and the reasons why people choose to abandon, or stay in, the landscape. The moral discourse over landscape is connected to its creator, it reflects the moral values of the creator, which also reflects the position of the creator in the society. The practices in the landscape are those 'consented' by the dominant morality.

Moral interpretations of landscape might be contested by competing or opposing moral discourses both as a result of the changes experienced in the society or as part of the democratic institutions (Smith,2000). In the semiarid landscape of Northeast Brazil the dominant moral discourse, that emerged between the end of the 19th century and the beginning of the 20th century around assumptions about the dryness of the landscape, is being contested by social groups that carry a different discourse over that landscape.

This thesis expands the discussion of the effects of morality over landscape in the next chapters. However, before moving to further discussions, this chapter introduces the second part of the theoretical framework.

3.4 Theory of Practice

Bourdieu's theory of practice was conceived after a fieldwork in Kabylia, Algeria in the years of 1950's. Some elements of the theory were introduced in Bourdieu's first works[24], but the theory of practice is presented in details in the book '*Esquisse d'une Theorie de la Pratique, Précédé de Trois Études d'Ethonologie Kabyle'* published in France in 1972 and had its first English translation as '*Outline of Theory of Practice'* published in 1977.

The theory of practice was the result of Bourdieu's concerns about the conditions of the social sciences in France, specially with the dichotomies that according to him dominated the social sciences. The theory of practice was conceived to transcend the conflict between objectivism (an attempt to "e*xplain the world focusing on the objective conditions which structures practice independent of human consciousness*" (1999:999) and subjectivism (he defines it as "*the form of knowledge based on the perceptions of the individuals*" (1993: 3) in the social sciences. What Bourdieu calls "t*he common sense duality between the individual and the social*" (Wacquant, 2005:316). Bourdieu thus defended an integrated approach by demonstrating that subjective perceptions and objective structures belong together and can not be separated.

According to the theory of practice "*the objects of knowledge are constructed, not passively recorded (..) that the principle of this construction is the 'habitus', which is constituted in practices and is always oriented toward practical functions*" (Bourdieu, 1996:52) denying that knowledge can be acquired through passive observation, refusing the assumptions that knowledge is reduced to 'a mere recording'. The practical world

[24] Bourdieu (1962) and Bourdieu & Sayad (1964)vvvvv

results from the relationship with the *habitus* which, as Bourdieu insists, functions as a system of dispositions that has its reach, it has its rules, its procedures and its ends

The *habitus* functions as a key concept in the theory of practice that is structured around a group of concepts which, according to Bourdieu, only function together, in association with each other. The concepts around the theory of practice are *habitus*, field, capital, *doxa* and symbolic power.

3.4.1 Habitus and Practice

The concept of *habitus* is not new, it is a re-creation of the Aristotelian-Tomist notion of *habitus*, a very old notion originated from Aristotle's '*hexis'*, developed by the Greek philosopher in his doctrine about virtue, "*meaning an acquired yet entrenched state of moral character that orients our feelings and desires in a situation, and thence our actions*" (Wacquant, 2005:315).

The Aristotelian *hexis* was translated to Latin by Italian philosopher and theologian Thomas Aquinas as '*habitus*'. In Aquinas' *Summa Thelogiae* the *habitus* acquired an "*added sense of ability for grown through activity, or durable disposition suspended midway between potency and purposed action*" (Wacquant, 2005:316). Aquinas' notion of *habitus* was largely used before Bourdieu by Emile Durkheim, Max Weber, Marcel Mauss, Thornstein Veblen and Edmund Husserl. Norbert Elias, a student of Husserl, wrote about the '*psychic habitus of civilised people*' in his book 'The Civilizing Process' and Maurice Merleau-Ponty recalled Husserl's '*habitual knowledge*' in his notion of '*habit*' (Wacquant, 2005).

Pierre Bourdieu reconstructed the old notion of *habitus* to explain the functioning of the social space and to overcome the duality between objectivism and subjectivism. In Bourdieu, '*habitus'* functions as a mediation that performs the "*internalization of the externality and the externalization of the internality*" (Wacquant, 2005:316).

The '*habitus*' of Pierre Bourdieu is a product of the structures that constitute a "*particular type of environment (e.g. the material conditions of existence characteristic of class conditions)*" (1977:72), a set of dispositions that rise from the structures of the

social space which helps explain the inclination of a certain group, in a certain space, toward certain practices. Those dispositions are historically constructed and survive across space and time, guaranteeing the '*active presence*' of past experiences, in '*each organism*' (Bourdieu, 1990:54).

'*Habitus*' produces practices, that Bourdieu defines as "*activities and competencies learned and carried out by individuals in the social space*" (1990:54) in conformity with history but not as some sort of '*mechanical reactions'* that resulted from old traditions. Practices are not incorporated consciously, neither are they unconsciously learned, they are the result of integration, adaption, of being "*shaped in a particular type of environment*" (Bourdieu, 1977:72).

Habitus is a system of dispositions that produces practices, but it is also a *'system of perception and appreciation of practices'* (Bourdieu, 1989:19). As a system of appreciation it selects the practices adopted inside that '*habitus',* which reflects the conditions of existence, beliefs and values that have constituted that '*habitus'*. The limits of the *habitus,* its extent, is defined by the '*doxa*'. '*Doxa*' is specific to one '*habitus'* meaning that what is '*doxa*' to one '*habitus*' might not be '*doxa*' for another '*habitus'*. Different '*doxa*' is what makes one '*habitus*' different from another even if the different *'habituses*' are products of the same social structure (Chopra, 2003). '*Habitus'* can be individual or collective, but '*circumscribed by a group homogeneity*' functioning as a way of seeing the world, with its specific morality. "*Habitus is what lies on the basis for enacting the world view through practices"* (Chopra, 2003: 425-426).

However, as Bourdieu has showed, it takes the dispositions and the positions in the social space to make the '*habitus*' function. The logic of the positions is demonstrated by the notion of 'field'.

3.4.2 Field

According to Bourdieu the relationship between '*habitus'* and 'field' is critical because neither '*habitus'*, nor 'field' can act alone. It is the meeting of 'disposition' and 'position' that produce practices. The relationship between '*habitus*' and 'field' functions

in two ways, first "*the field structures the habitus which is the product of the embodiment of the immanent necessity of the field*" (Bourdieu & Wacquant, 1992:127) and second as a "*relation of knowledge or cognitive construction* (..) *habitus contribute to constituting the field as a meaningful world, a world endowed of sense and value*" (Ibid).

While the '*habitus'* explains the functioning of the social space '*in particular and homogeneous environment shared by groups of people*' (Chopra, 2003:427), 'field' explains the functioning of the social space '*across a society*'. 'Field' can be described as different areas of action and practices that integrate the social space (Bourdieu & Wacquant, 1992). The different fields are structured by action and power relations. The functioning of the fields results from what is considered as of value, i.e. 'capital', by the group that is dominant in that 'field', which is the group that possesses the most capital in that 'field'. Inside the 'fields' different social groups act according to the amount of 'capital' each group possesses. The structure of the 'field' is organised through power relations that serve the interests of the groups that accumulate more 'capital'.

The functioning of a field is arbitrary, determined by the '*nomos*' which Bourdieu defines '*as the fundamental law*' (2000:96) that regulate the 'field'. '*Nomos'* functions independently of any forces acting in the 'field' because it is constituted by the structure of the 'field'. '*Nomos*' is another historically constituted notion that '*reflects the interests of the groups that hold dominant positions inside the field"* (Chopra, 2003:427).

Nomos defines the viewpoint that regulate the 'field', what makes 'nomos' the 'doxa' of the 'field'. Just like 'doxa', 'nomos' can not be contradicted, as Bourdieu stresses: "*once one has accepted the viewpoint that is constitutive of the field, one can no longer take an external point on it (..) The 'nomos', a thesis which (..)can not be contradicted since it has no antithesis"* (2000:97). This means that all groups that compose a certain field accept the logic of the '*nomos*', by agreeing that it is through negotiations, exchange and contestation in the 'field' that one can increase 'capital' which reinforces the structure of the 'field' (Chopra, 2003).

The '*habitus*' is completely adapted to the 'field' it inhabits and "*the immediate fit between 'habitus' and 'field' is only one modality of action*"(Bourdieu & Wacquant, 1992:131).

3.4.3 Doxa

'*Doxa*' is the established truth, the taken for granted that exist in every society. However, before 'doxa' was established as truth it was just a point of view, *"the point of view of a dominant group which imposes itself as the universal point of view - the point of view of those who dominate by dominating the state and who have constituted their point of view as universal by constituting the state* (Bourdieu, 1998:57).

The 'world of tradition' is often taken for granted as part of the natural world while it is actually part of a non-natural world established by the political order. Bourdieu explains how the establishment of collective practices, like the organization of time, were products of the objective structures to reproduce the social order, hiding the divisions within, and quotes Hegel who defines tradition as '*realized morality*'(1977:163) to demonstrate the connection between tradition and values.

When life is understood as always been the way it is, there is not any threat to the '*doxa*'. On other words, "*the established cosmological and political order is perceived not as arbitrary*" (Bourdieu,1977:166) but as a truth.

'*Doxa*' sets the limits to what goes into a '*habitus*' and must not be questioned or contested. "*What counts as radical, conservative, liberal or orthodox is all within the realm of the thinkable, that is, within the ambit of what does not challenge the 'doxa*" (Chopra, 2003:426).

3.4.4 Capital and State

What can guarantee the power inside the 'field' is the amount of capital brought into the field by the groups, or negotiated and accumulated in the field. However, the 'capital' that is negotiated inside the 'field' must not necessarily be understood as 'economic capital'. Each 'field' is characterised by a different type of 'capital' ('cultural

capital', 'educational capital', 'social capital', 'political capital', 'economical capital') and each one of the capitals is bearing a distinct value, the most valuable type of 'capital' being the one that can be converted into other forms of 'capitals'.

There is not formula that explain how one 'capital' can be converted into another since in every society one type of capital tend to be valued more than others. According to Bourdieu the most important institution to interfere in the valuation of 'capital' is the state that through the establishment of policies set exchange rates to capitals altering the power relations between fields. To better understand the role of the state and its relationships with 'capital' and 'fields' it is required some information about Bourdieu theory of state.

Bourdieu stresses that the state is the '*culmination of the process of concentration of different types of capital: capital of physical force and instruments of coercion (army and police), economical capital, cultural capital or informational capital and symbolic capital*" (2000:41). Even if a society is structured in fields and the social groups share the capital inside these fields, the state remains the owner of significant amounts of capital in each one of the fields. This ownership of different capitals of the fields provides the state with a '*meta capital*' which guarantees the state authority over the fields and the capitals. Finally, by owning significant amounts of capital in the fields the state also accumulates the power over the exchange rates of capital conversion (2000:41). The negotiation within the fields will be structured by the state that will also influence in the '*nomos*' that will be formed to serve the interests of the state. Most states use their meta capital to establish the institutions that compose the structures of the states which are: schools, universities, judiciary organs, all sort of administrative and economical institutions such as national banks and tax systems or finance regulatory agencies.

The state is the outcome of the history shared between the state and the people, what Bourdieu (1998) defines as the struggles over the capital in the different fields of the social space. In relation to the construction of the state Bourdieu describes that:

"*The construction of the state is accompained by the construction of a sort of common historical transcendental immanent to all its subjects. Through the framing it imposes upon practice, the state establishes and inculcates common forms and categories of perception and*

appreciation, social frameworks of perception or of understanding of memory, in short state forms of classification. It thereby creates the conditions for a kind of immediate orchestration of habitus which is the foundation of consensus over this set of shared evidences constitutive of national common sense" (Bourdieu, 1998:54).

Inside the fields where the social groups struggle to accumulate the capital and power, it is understood that the functioning of the 'field' is determined by the state. This understanding of the state rules is demonstrated by the acceptance of the '*nomos*' defined by the state in the different fields (Chopra, 2003).

Finally, according to Bourdieu (1998) it is the state that forms the structures of perception and cognition in the society it controls.

3.5 Conclusion

Setten (2008b) stresses that human geographers have only to a minor degree engaged in the theories of Pierre Bourdieu, even if the uses of the 'habitus' have been observed in a wide range of topics. By demonstrating its objectives on the basis of the social theory of Pierre Bourdieu this research benefits from the consistent explanations provided by his social theory.

Chapter 4 - Research Methodology

4.1 Introduction

This chapter presents the research design and the research methodology. First it describes the research design, then it presents qualitative methodology and why this methodology was selected to conduct the research. It then presents the methods used to collect data, explaining the use of interviews and the decision to use of key informants. It also describes the process of collecting and selecting secondary data. The chapter also explains the benefits of working with a case study and the methods used to analyze the both primary and secondary data. The chapter ends with a brief summary of the whole chapter.

4.2 Research Design

This research was conceived in order to unfold some of the aspects of the relationship between the federal government of Brazil and the semiarid landscape of Northeast Brazil. I see the semiarid as the most unique of the Brazilian landscapes. This uniqueness is not related exclusively to the different environment that constitute the semiarid landscape, neither is it related to the extremely poor conditions of existence that characterizes the landscape. The uniqueness of the semiarid, to me, comes from the evidence that in the harshness of a historically constructed environment, some of the poorest people of Brazil constructed a society that is pure poetry. A differentiated society, that is dense, rooted, mixed, and 'simple'. While I see beauty, others might see it as miserable, backward and illiterate.

Independently of the way I see the landscape, the semiarid is different by the fact that it is the only landscape where nature imposed some barriers to the national project based on intensive nature exploitation. It does not mean that the semiarid landscape remains untouched, protected from the ferocious exploitation of its natural resources. The semiarid, like the coastal region of the Northeast, was subject to extensive deforestation, introduction of invasive species for commercial purposes, intensive mining and farming;

practices introduced by the Portuguese in the 16th century that still prevails. Prone to droughts that every 20, or 30 years, devastate the land and the people, the semiarid is labeled as a troubled landscape.

The research methodology needed to be customized since I wanted to investigate both objective and subjective aspects of the semiarid landscape with an interdisciplinary perspective that the topic demanded. The research evolved around a qualitative methodology base, using open interviews and historical methods to collect and analyze secondary data in archives and governmental websites.

In a landscape of more than 900.000 sq. km I chose to conduct fieldwork in a section of the semiarid in the central region of the state of Ceará in June and July 2007[25]. The center point was the municipality of Quixeramobim where we (my husband and I) arrived after a few days and interviews in Fortaleza and pit stops in the municipalities of Canindé, Choró, Madalena and Quixadá.

Quixeramobim, a municipality of 65.000 inhabitants (IBGE, 2007) is located in the center of the state of Ceará [26]. After some time observing the region my attention was directed to the discussions exhibited by the media about the polemic start of the construction of the channels that will divert water from the São Francisco river (a river that was more than 700 km away from where we were) to the Jaguaribe river, a former non-perennial basin that was a few kilometers away from where we were driving.

Since 1961 the Jaguaribe river, that once was referred to as the largest dry river of the world, became perennial. The water flow of the Jaguaribe is guaranteed by the Orós dam that created a reservoir with capacity to hold 1.9 billion m3 of water. We did not have time to reach the Orós dam since out time schedule was tight and it was quite distant

---

[25] The region known as 'sertão do Quixeramobim' comprises the municipalities of Quixeramobim, Quixadá, Madalena, Choró, Ibaretana, Boa Viagem and Banabuiú in the center of the territory of the state of Ceará.

[26] Quixeramobim was the hometown to Antonio Vicente Mendes Maciel, known as Antonio Conselheiro, the controversial leader and founder of the village of Canudos, site of dramatic events of the Brazilian history known as 'The War of Canudos'.

from Quixeramobim[27]. Without time to drive to the municipality of Orós to check the high Jaguaribe river and the Orós dam, as I had wished, we made a long curve toward the region of the low Jaguaribe river before following our way back to Fortaleza. We did not have enough time to spent the night because we had a bus to catch to Sobral from Fortaleza on the next morning. Therefore, all we could get was a quick glimpse of the Jaguaribe river before night fell, on the region of the municipality of Limoeiro do Norte, from where we drove to Fortaleza.

The semiarid I experienced during fieldwork corresponded to the semiarid I have experienced in my previous trips to Ceará, green, completely green, without any signs of drought. Since 1906, when the Cedro dam was inaugurated in Quixadá, the landscape of this state changed significantly and the territory of Ceará is currently filled with thousands of large, medium and small ponds and reservoirs. The semiarid Ceará looks more like a touristic landscape surrounded by beautiful ponds, inviting for moments of leisure. As we drove through Ceará we crossed, admired and photographed maybe dozens of different ponds and reservoirs, most of them made out of dams.

After we left Ceará I could not avoid thinking about the water diversion project which was being constructed to carry water through 700 km of channels, crossing threatened areas of *caatinga* biome, to deliver 16m3/s of water to a state that, as I have just seen, was already filled with water. The contradictions of the project were everywhere, and it was when that I noticed that I had to include the water diversion project in my research topic.

In the semiarid landscape of Ceará we found some breath-taking ponds, humanly made, that did not, however, solve the human made poverty that strikes the state. It became clear to me that the efforts to raise the levels of the reservoirs will not promote the changes the landscape demands. To demonstrate that the demands of the poor population of Ceará are beyond the levels of the state's reservoirs, I had to design a more complex research.

---

[27] The exact distance between Quixeramobim and Orós is 170 km which demands at least five hours to cover both ways by car.

What follows is a research methodology organized in two parts. The first part is a historical narrative based on large volume of secondary data to present the history of droughts in the Northeast region during the 19th century to explain the origins of the water deficit assumption. The second part a qualitative research based on open interviews with key informants to confirm the hypothesis that there is not a water deficit in Ceará to justify the São Francisco River Integration Project, and to uncover the reasons why the federal government chose to divert waters instead of small scale infrastructure solutions that would allow the water stored in the reservoirs to reach the poor population.

Before the end of 2007, between 28th November and 21st December 2007, a second hunger strike carried out by Catholic bishop Dom Luiz Flavio Cappio in opposition to the SFIP introduced new facts which influenced the decision to include and prioritize the discourses of the bishop as secondary data in the research[28]. A lot of secondary data was collected, with help of one of the key informants, to cover these episodes.

4.3 Qualitative Methodology

The reason why this research was set over a qualitative methodology approach is that qualitative research is a political act, it is related to personal believes and to the way the researcher believes the world should be (Smith, 2001). Qualitative researches carry an inherent normative statement which "*presume the world to be an assemblage of competing social constructions, representations and performances*"(Smith, 2001:25)

Qualitative research offers countless possibilities through a set of diversified research methods which make this methodology accessible and attractive since it allows the simultaneous use of different methods. The methods of qualitative research facilitate the access and the understanding of complex social spaces, exposes contradictions, permit the identification of exceptions, and challenge established truths. Qualitative knowledge is both a product and a tool for the understanding of normative issues since

[28] Bishop Cappio carried out a 11 days hunger strike in 2005 to force the government to negotiate the project with the population in region of the São Francisco river basin.

the starting point of qualitative research is the existence of differences, different moralities, different values, different ideologies and different interests.

Qualitative research has challenged established ideas of validity, reliability and generalization and as Kvale (1995) stresses, some have ignored the need of those claiming the right to establish a creative and liberating qualitative methodology. New dimensions of validity have been introduced, among those new understandings of validity is found in the constructed validity outside the traditional positivist approach.

Kvale advices the researcher that in the relationship between validity, reliability and generalization " *there are multiple ways of knowing and multiple truths, and the concept of validity indicates a firm boundary line between truth and non-truth'* (Kvale, 1995:).

The concept of validity refers to "*the believability of a statement or knowledge claim*" (Polkinghorne, 2007:474), one of the main issues consuming time and effort from qualitative researchers. If qualitative knowledge is a social construct so is the validity of it. Kvale stresses that the whole issue of validity of qualitative research is complicated since "*what is valid knowledge of the social world involves the philosophical question of what is truth*" (1995:23). Kvale holds that validity is as much a constructed notion as knowledge is, stressing that the natural sciences are not guided toward the notions of validity, reliability and generalization the way the social sciences have been, attributing to the dominance of the positivist perspective among the social sciences, before the advent of the qualitative methodology, for the permanence of what he calls the '*holly trinity*' of the positivist science: validity, reliability and generalization (1995: 20).

4.4 Case Study Approach

Case study is a qualitative method which has been used in all social sciences in order to investigate in depth. It aims to raise the knowledge about a certain fact, event, place or phenomenon of real life.

Most of the criticism directed to case studies claim that research based on a single case or on a small number of cases do not represent the reality of social space, and as a

consequence, the findings of a case study may not fit outside the case that has generated it. Ruddin stresses that "*it is exact that the case study is a detailed examination of a solitary exemplar, but it is false to utter that a case study cannot grant unswerving information about the broader class"* (2006:797).

Another problem with case study is, however, mostly related to the difficulties in making generalizations out of their findings and/or wrongly constructed generalizations over the findings of a case study. Ruddin (2006) argues that case studies findings do not necessarily have to be generalized and this assumption is one of the "*misunderstandings regarding the nature of case study as a research method* (..) *it is essentially a problem of positivism, to take it into consideration may be inimical to the very nature of the case study enterprise*" (Ruddin, 2006: 797-798).

In this research the decision to add a case study was made considering that the SFIP is a timely example of how morality, droughts and state politics have contributed to the construction of the semiarid landscape.

4.5 Open Interviews with Key Informants

Open interview with key informants was the method I used to collect primary data during and after my fieldwork. Interviews are considered the main tool of the qualitative researcher, a widely used method that permits the researcher collect large amounts of data in a short period of time, and since it is possible to collect a lot of data through one single interview.

However, it does not mean that the decision to conduct interviews will not bring any difficulties. It can be very difficult to conduct interviews, difficult to design the interview you want, difficult to select the interviewees/key informants and, most of all, it can be very difficult to contact and conduct interview with key informants. It can also be difficulty to decide if you want to have a more structured interview, with the conversation tight to your interview guide, or if you want the interviews to be open, conducted like a conference with your key informant, without structured questions, when you let your

informants say whatever they want to say about the topic that have connected the two of you on first place.

Open interviews can produce large amount of data and eventually be longer than the structured interviews because they give more freedom to the informant. Open interviews are also a great solution to avoid the impact between researcher and informant. Bourdieu recommends researchers that work with interviews to acknowledge the impact of the researcher over the interviewee, stressing that the impact affects the results of the research as well. Bourdieu (1996) calls this 'reflex reflexivity', a stage that goes on full time while the interview is taking place. Bourdieu defends that there is a clear asymmetry in the interview process and '*this asymmetry is underlined by a social asymmetry which occurs every time the investigator occupies a higher place in the social hierarchy of different types of capital, specially cultural capital*' (1996:19)

The asymmetry in this research occurred on the opposite direction since the selected key informants are specialists and activists who, as Bourdieu puts, '*occupy a higher place in the social hierarchy*' than the researcher. The effects of asymmetry became clear during the period when I was trying to establish contact with the key informants. The experience was quite exhausting since one type of key informant did not answer telephone calls or emails, some others could not be reached directly only after a previous contact with an assistant who selected the interviews. Another type of key informant was open and interested in helping in everything. One of the key informants spontaneously served as a sort of 'gate keeper' to the informations I needed, and sent me a large amount of secondary data.

The key informants were all males, specialists in water resources, meteorology, engineers, agronomist and activists. During the period of fieldwork some of the informants were busy and some others were thousands of kilometers away from Fortaleza, São Paulo and Rio de Janeiro, what made it quite difficult to meet them. Four key informants were interviewed personally, three of them in their work places and one at out hotel. Some others were interviewed by email and telephone, which were the only ways to reach some of the key informants.

The fact that Brazil is a very large country, there was no time to drive around the entire region, the key informants were in different places, distant from each other, and the research did not have any financial support made it very difficult to meet all the key informants personally[29]. The email interviews functioned as a source of data but the interviews were more restricted.

4.6 Fieldwork Observation

I believe that some of the most valuable information was gathered outside the interviews, through casual observation while driving, walking around and living in the state of Ceará. The informal data, gathered during field work observation, consisted of hundreds of pictures and notes made after informal conversations.

Living the local life, what included attending some of the local June parties[30], was fundamental part of the work since it allowed me some insights on how to conduct the rest of the research. It is difficult to describe the benefits of the time spent in the field since it is more than a data collecting, it is an experience that connects forever the researcher with the study place. It is a sort of unrealized love affair.

4.7 Secondary Data

The research has used a large volume of secondary data, which constitutes a fundamental source of information to the research. The secondary data is divided in two distinct groups of information. The largest volume is composed by official governmental data, i.e. reports and articles about the semiarid landscape and the Northeast region. The most useful data being released by National Integration Ministry which include the São Francisco Project, the 'Environmental Impact Report of the São Francisco Project' (RIMA), the 'Strategic Plan for Sustainable Development of the Northeast

[29] I am a self-financing student and I did not receive any financial aid for the fieldwork. The little resources I had did not allow me to travel to meet all the key informants.

[30] The June parties are held during this month all over Brazil to celebrate the saints of June: Anthony, John and Peter. In the Northeast the June parties are big celebrations, with famous dance competitions and the most important party of the year in the municipalities of the Northeast. The June parties are also very traditional parties mostly organized by the local Catholic church.

Region', the 'Strategic Plan for Sustainable Development of the Semiarid', the 'New Limits of the Brazilian Semiarid' are some of these reports. Another important governmental report was the 'National Report' presented in 2006 at the United Nations Convention to Combat Desertification (UNCCD) released by the Environmental Ministry and contains a lot of valuable information about land degradation in the Northeast region.

The second largest volume of secondary data used is composed by newspaper articles, interviews with the key informants published in newspaper and internet sites, articles written by some of the key informants and articles written by activists and specialist not interviewed by the research.

The secondary data allowed this research to follow the work of the key informants after fieldwork, while they process of the SFIP continued. Some of the secondary data gathered after fieldwork was sent to me by post and email by one of the key informants, and constitute an important volume of information for the research. The articles and interviews of those who were not interviewed during fieldwork (since it was not possible to interview all the key informants as planned) were valuable pieces which served to complement the primary data.

4.8 Analysis and Interpretation

This research shared two methods of data collection. Primary data collect through open interviews with key informants during fieldwork and review of secondary data collected both during fieldwork and after fieldwork. Some of the key informants were contacted by email after fieldwork and asked to answer one more question in relation to the new events in the process of the SFIP, one of informant answered this late solicitation.

The analyzes of both primary and secondary data were made through interpretation of texts which used as reference the theoretical framework selected in this thesis and presented in chapter 3 .

4.9 Interdisciplinarity

This research was designed to be constituted through the use of both geographical and historical knowledges and methods. Geography and history have a long history marked by intense conviviality as the logic of 'space and time' contribute to strengthen this tie.

The work of landscape geographers have long been connected to history and historical geography approach. About the relationship between 'space and time' that characterize the historical investigation Michel de Certeau stressed that **'***all historical research is articulated over a socioeconomic, political, and cultural place of production' it is in terms of this place that its methods are established, its topography of interests can be specified, its dossiers and interrogation of documents are organized***'** (1988:58).

4.10 Historical Narrative

Historical knowledge is produced through data interpretation. The historical method is mostly based on text interpretation while the definition of what is a text is more abstract. All sorts of objects from a certain time can be interpreted as a text. For the historian everything can be used to reconstruct life in a certain period in a certain place. Paintings, sculptures, weapons or kitchen utensils tell precise stories about the society that produced them.

The historical data is exclusively secondary data that can be collected or investigated for example in archives, libraries, excavations and museums. The historical object is thus mostly a past event, a short time or a long time past event, since history has unresolved issues with the present time. Historical interpretation is based on choices, by selecting the information that tells the more precise history according to what is relevant to the historian.

According to Hayden White a "*historical narrative is thus necessarily a mixture of adequately and inadequately explained events, a congeries of established and inferred facts, at once a representation that is an interpretation and an interpretation that passes*

Figure 11: Irrigated agriculture in the region of the Medium São Francisco river. Photo: Source: National Integration Ministry at: http://www.mi.gov.br/saofrancisco/)

for an explanation of the whole process mirrored in the narrative"(1978:51).

The historical interpretation tradition was established primarily through the work of four European theorists, Hegel, Croce, Droysen and Nietzsche, who in the 19th century rejected the idea of 'the innocent eye' of the historian, as defended Leopold Von Ranke. German Ranke defended that the practice of history should be performed with scientific rigor. The work of Ranke should not be completely forgotten, however, since it was also Ranke who demanded respect for the logics and values of the past, to avoid anachronism, the greater mistake of the historian to judge the past with values of the present.

Historical narrative is a very important tool to help translate specific historical data. Hayden White wrote that "*we may not be able fully to comprehend specific thought patterns of another culture, but we have relatively less difficulty understanding a story coming from another culture, however exotic that culture may appear to us*" (1987:XX).

The challenge of the historical narrative is that as an interpretation of text it is partially assuming that historical narratives are partial interpretations. Like the other social sciences, the historical knowledge is challenged by the normative statement.

4.11 Conclusion

This chapter described the methodology used to conduct this research, with a focus on the research design and the methods used to collect data during fieldwork and

after fieldwork. The challenges faced by the researcher, before, during and after fieldwork, were described along the chapter and not in a separated topic.

One of the challenges of the topic is related to the fact that the SFIP is alive, the protests have continued, and the interventions of the project in the landscape have continued, but in a very slow pace. The São Francisco river and the SFIP will be presented in the next chapter.

Chapter 5 - The São Francisco River and the SFIP

5.1 Introduction

Brazil has 12% of the world's fresh water reserves, 3% of that water is in the Northeast region and mostly concentrated in the São Francisco river basin that represents 2/3 of the fresh water in the region. The São Francisco river was fundamental passage during the process of occupation of the hinterlands, i.e. the 'sertão'. This chapter presents the São Francisco river basin and the São Francisco River Basin Intergration Project (SFIP) analyzing the benefits and constrains of this water diversion project.

5.2 São Francisco River

The São Francisco river is the fifth biggest river of Brazil and the 20th biggest river of the world with a drainage area of 634.000 sq. km and 2.863 km[31] of extension and around 2.800 m3/s [32] average discharge. The basin is divided in 32 sub-basins, 168 tributaries where 99 are perennials and 69 are intermittent rivers. The São Francisco crosses the territories of five states: Minas Gerais, Bahia, Pernambuco, Alagoas e Sergipe and has 504 municipalities in its area of influence and 101 located on its banks, while the area of influence of the basin reaches seven states of Brazil, including Goiás and the Federal District (MMA, 2008).

Americo Vespucio discovered the mouth of the São Francisco river in 1501 and named it after the Italian saint Francisco (Andrade,2004). The river was very important in

---

[31] The extension of the São Francisco may vary according to different sources from 2.700 km to 3.300 km. This thesis uses the number 2.863 km as used by the Brazilian Environment and Natural Resources Ministry (MMA).

[32] The average discharge value has changed during the last decades and may vary depending on the source. Until the years of 1980's the average discharge was between 3.000 and 3.300 m3/s but since the construction of the large dams in the years 1980's regulated the average discharge to 2.600 and 2.700 m3/s as referred by the CBRSF.

the first centuries of the colonization for the occupation of the hinterlands of the Northeast and for the communication between the Southeast, Center West and Northeast regions. Because of its strategic position it is called as the 'national integration river'(MIN,2006).

(Figure 8: The meeting of the waters of Das Velhas river (on the left) and the São Francisco river with brown water in the region of the Southeastern state of Minas Gerais. Source: CODEVASF)

The São Francisco river is 'born' in the Canastra hills in the Southwest region of the state of Minas Gerais and before it reaches the Atlantic Ocean it crosses four different biomes (Cerrado, Caatinga, Atlantic Forest and Costeira). The diverse environment provides the rain that feeds the river. The extension of the river crosses more than one state of the country which makes the São Francisco a federal river[33]. The federalization of the São Francisco is the result of the law 9733/97 that suspended the private rights over the waters of the Brazilian river basins. The law also applies for the tributaries of the São Francisco. The waters of the São Francisco river produce 90% of the energy of the Northeast region in six power plants installed in the basin of the São Francisco [34]. The capacity of power plants that compose the CHESF system is 10.618.327 kW(CHESF,

[33] Federal rivers are those whose extension crosses the territories of more than one state being under the jurisdiction of Federal government while the state rivers are those whose basin stays inside the limits of the territory of one state which is responsible for the exploration of the waters The federalization of the river means that the rights over management and commercial exploitation of the waters and the lands on the banks of the river belong to the federal government.

[34] Três Marias, Sobradinho, Paulo Afonso, Traipu, Luiz Gonzaga and Xingó are the power plants on the São Francisco

2008). Sobradinho is the largest dam reservoir in the region of the São Francisco river with 34,1 billion m3 of water accumulated in the state of Bahia (CHESF,2008).

The São Francisco river basin is characterized by the contrast between the different regions of the river along its 2.863 km. In the region of the Upper São Francisco river (*Alto São Francisco*) in the Canastra Hills 50% of the water of the basin is generated (MIN,2007). This region is densely populated, industrialized and also agricultural, which generates for all sorts of pollution to the waters impacting on the quality of water for use in the region of the Medium São Francisco, an agricultural region (Andrade, 2002). The Medium São Francisco (*Medio São Francisco*) suffers from the effects of the pollution caused by urban and industrial areas in the state of Minas Gerais and also suffers the impacts of the dams located downstream (jusante) and upstream (montante) which regulate the river, controlling discharge and floods for energy productions. The use of the waters of the São Francisco for energy production have reduced the flow and impacted on the reproduction of fish since the dams do not allow the fish to perform the '*piracema*' a movement of the species upriver for reproduction, affecting the livelihood of the fishing communities on the banks of the river in the regions of the Medium and Low São Francisco.

(Figure 9: Dam in the municipality of Bom Jesus da Lapa on the medium São Francisco river. Source: National Integration Ministry

The dams in the São Francico river basin have also devastated the vegetation on the banks as a consequence of the control of floods and the reduced water flow, generating a large amount of

Figure 13 - Map of the São Francisco river basin and the two lines of channels connecting the donator basin and the receptor basins. Source: RIMA

sediments. The region of the Medium São Francisco is a very poor region on the banks of the river which lacks proper water systems and the communities living at a short distance

from the banks of the river do not have access to proper water services or sanitation, being forced to carry water in buckets for domestic use (Andrade, 2006).

Figure 10: Sobradinho reservoir in the region of the Medium São Francisco river. Source: National Integration Ministry

http://www.mi.gov.br/saofrancisco/

Finally, the region known as low São Francisco (*Baixo São Francisco*) comprises the last kilometers of the river that divides the states of Sergipe and Alagoas, until the mouth of the river in the Atlantic Ocean. The low São Francisco faces the most severe effects of the multiple uses of the waters of the São Francisco river, mostly because of the controlled water flow for energy production. In the region of the Low São Francisco are the poorest municipalities of the basin that also do not have acess to water facilities even if very close to the river.

In 2001 the São Francisco basin experienced one of the lowest levels of rainfall of all times, the volumes in Sobradinho were reduced to 5% of its capacity. The reduced levels in Sobradinho threatened the Northeast with energy shortage and impacted on the entire country being the starting point of the largest energy crisis in Brazilian history. The reduction of the water levels in Sobradinho caused heated discussions about the effects of the energy crisis for the development of the Northeast region. Energy production in the region of the São Francisco river basin is one of the bottlenecks of the region, challenging the project of diverting the waters of the São Francisco.

The region of the São Francisco river basin is extremely poor. Land irrigation projects have been installed on the banks of the São Francisco river in the semiarid region since 1998, to promote the development in the region. According to the government, the region of the basin can support one million hectares of irrigation projects (CODEVASF). Land irrigation projects on the region of the São Francisco basin are coordinated by CODEVASF (São Francisco and Parnaíba River Valleys Development Company), a company established in 1974 by the federal government to promote the development in the regions of the São Francisco and Parnaíba river basins with focus on land irrigation[35]. However, only 1/3 of the area is installed, i.e. around 340.000 hectares, which are dedicated to the production of fruits, such as mangoes, grapes, papaya and melons for export. The irrigated perimeters of the Medium São Francisco, in the heart of the semiarid landscape of the states of Bahia and Pernambuco, have contributed to the development of a new discourse about the nature of the semiarid. This 'new discourse' defends the high potential of the landscape for 'agribusiness' through irrigated agriculture. According to the 'new discourse' the 'aridness' of the landscape is a benefit. This 'new discourse' is constituted in clear opposition to the dominant 'old discourse' where the semiarid nature, i.e. climate, is the cause of all the socioeconomic problems that characterize the region (Castro, 1984: 2).

According to Castro both discourses are produced by the regional actors, different regional actors with different interests. The so called 'old discourse' is reproduced by the groups of the political elite and remains dominante, while the 'new discourse' is restrict to a small group of entrepreneurs and specialists in the public administration who see in the strong sun which characterizes the region a benefit for tourism and irrigated agriculture, which can make the region of the Medium São Francisco the California' of the future (Castro, 1984: 3).

In the region of the Medium São Francisco the main irrigation projects are Irerê with 60.000 hectares and Salitre with 30.000 hectares in the state of Bahia and Pontal

[35] CODEVAF was created in 1974 to substitute SUVALE, Superitendence of the São Francisco Valley created and 1968 to substitute CVSF, the Commission of the São Francisco Valley. Source: CODEVASF.

with 10.000 hectares in Pernambuco. The land irrigation projects are located few kilometers from Sobradinho, where are the best soils for irrigated agriculture.

(Figure 12: Irrigation areas on the banks of the medium São Francisco river in the limits between the territories of the states of Pernambuco and Bahia. Source: National Integration Ministry at: http://www.mi.gov.br/saofrancisco/)

Canzian (2006) has demonstrated that the region around the Salitre Project, state of Bahia, did not benefit to the poor population of the region. Horto do Salitre is extremely poor, the population living a short distance from the river do not have access to water facilities and sanitation. The region is dry and the families are forced to walk around six kilometers to get water from the river which is carried home in buckets.

'Few kilomenters from Horto do Salitre a giant channel looks like a snake of concrete cutting the semiarid. The irrigation project is also dry. The water taken from the São Francisco river for the Salitre Project did not go far. After eight years the channel is completely abandoned because the resources are finished even if a great part of the constructed is ready' (Canzian, 2006)

The president of CODEVASF Carlos Everton de Farias informed that in 2005 the federal government invested R$ 750.000 in the construction of the Salitre channel, but in 2006 CODEVASF was waiting for a private partner to continue the project. Meanwhile the poor farmers survived with the little money conceded by governmental programs (Canzian, 2006).

The abandon of some of the irrigation projects in the Medium São Francisco is one of the reasons why the population in the region of basin and representatives of civil society organizations and NGO's doubt the government's capacity to conclude the SFIP.

5.3 The São Francisco River Integration Project

The São Francisco river integration project (SFIP) is a project of the federal government of Brazil, being developed by the National Integration Ministry (MIN), that will divert water from the São Francisco river basin and deliver the diverted water to basins located in the northernmost part of the Northeast region, called by '*septentrional*' Northeast. The governmental project has been the center of intense and passionate discussions where the government is accused of supporting a dated project that can bring countless risks to the São Francisco river basin, while the government advertises that the SFIP will end the water deficit in the northernmost part of the Northeast.

The project is comprised of 720 km of channels divided in two axis, North and East, to divert water from the São Francisco river downstream of the Sobradinho reservoir. The North axis will divert water in the municipality of Cabrobó, state of Pernambuco, and take it through 440 km of channels to the Salgado river and Jaguaribe river basins in State of Ceará; to the Apodi river basin in state of Rio Grande do Norte and to Piranhas-Açu river basin in the states of Paraíba and Rio Grande do Norte. The North axis will cross the state of Pernambuco and_ before reaching the states of Ceará, Rio Grande do Norte and Paraíba_ inside this state another 110 km of channels will deliver part of the diverted water to 'Entre Montes' and 'Chapéu' ponds in the '*agreste*'[36] of Pernambuco (MIN,2008). See map XX for details.

On its website the Ministry advertises the finality of the water to be diverted:

"the North axis is projected for a maximum capacity of 99 m³/s with a continuous discharge of 16,4 m³/s to be **destined to human consumption**" (MIN, 2008) [37]

---

[36] 'Agreste' is one of the sub-regions of the Northeast region. More information about the 'agreste' will be provided in the next chapters.

[37] All emphasis in the following quotes have been added by the present author.

The East axis will divert water from the Itaparica pond of the Luiz Gonzaga Hidropower_ in the municipality of Floresta, state of Pernambuco_ and through 220 km of channels deliver the diverted water in Paraíba river, Pajeú river and Moxotó river basins in the states of Paraíba and Pernambuco. Another line of 70 km of channels will take parts of the diverted water from the East axis to Ipojuca river basin to supply the water demands in the 'agreste' of Pernambuco (MIN,2008). Map XX shows the basins involved in the SFIP. About the volumes to be diverted by the East axis the MIN informs:

"The East axis is projected for a maximum capacity of 28 m^3/s but will functions with a continuous discharge of 10 m^3/s to be **destined for human consumption**"(MIN, 2008).

In describing the route of both axis the Ministry declares on its website that the diverted water will be available for human consumption which apparently is in agreement with what was determined by the CBHSF (São Francisco River Basin Committee) in its decennial plan[38]. The CBHSF have decided in their decennial plan that the priority is for human and animal supply. However, ANA (National Water Agency) has granted the MIN the right to divert 26,4 m^3/s of water (16,4 m^3/s for the North axis and 10 m^3/s for the East axis) for multiple uses, which gives the government the right to offer water for other uses than human and animal consumption. The economical use of water is one of the problems surrounding the project that conflicts with the water resources law in vigor since 1997. Describing how the water will be distributed and the functioning of the project the MIN demonstrate that once the diverted water reaches the ponds in the receptor basins they can be used to supply **multiple uses**, a vague term which includes the economical use of water for irrigation as described above:

"With the SFIP the great ponds (Castanhão in state of Ceará, Armando Ribeiro Gonçalves in state of Rio Grande do Norte, Epitácio Pessoa in state of Paraíba, Poço da Cruz in state of Pernambuco and others) of the septentrional Northeast will be able to guarantee water supply for the **mutiple uses** of the populations. In the states benefited by the SFIP several distribution systems are in use, under construction, or being studied, with the objective of delivering water from these strategic reservoirs to supply the cities and the **irrigation perimeters**" (MIN, 2008).

---

[38] The water resources law (9433/97) have decentralized the management of river basins which are now managed by their own committee that decide the priorities for supply in the level of the basin.

The government justify its decision to finance the SFIP based on a supposed contrast in the volumes of water per/inhabitant/per year in the two areas of the Northeast region and the contrast in the population density that, according to the government, is 10 inhabitants /sq km in the region of the São Francisco basin and 50 inhabitants/sq km in the septentrional Northeast. The explanation of the MIN openly emphasize the water availability:

"These contrasts, under the perspective of the water availability, divide the semiarid landscape in two: the semiarid of the São Francisco river basin, with **2.000 to 10.000 m³ per inhabitant/ per year of water availability** from a perennial river and the semiarid of the septentrional Northeast that comprises part of the state of Pernambuco and the states of Paraíba, Rio Grande do Norte and Ceará with little more than **400 m³ of water/per inhabitant/per year of water availability** from ponds contructed on the intermitent rivers and aquifers with limited water quality and quantity" (MIN,2008).

The government uses as reference for comparison the minimum amount of water/ inhabitant proposed by the UN, and justifies its decision in favor of the SFIP as an effort to guarantee proper water supply to the septentrional Northeast as explained in the website of the MIN: " In face of the described reality and using as a reference 1.500 m³/s established by the UN as the minimum volume of water availability to supply water for the multiple uses of a society, the SFIP establishes an interconnection of the **São Francisco river basin that presents relative water abundance** (1.850 m³/s average discharge guaranteed by the Sobradinho reservoir) with the basins in the septentrional Northeast which **water availability limits the socio-economical development** of the region"(MIN,2008)

The basins to receive the waters diverted from the São Francisco river are Brígida, Terra Nova, Pajeú, Moxotó and Agreste basins in the state of Pernambuco; Jaguaribe and Metropolitanas in the state of Ceará; Apodi and Piranhas-Açu in the state of Rio Grande do Norte; Paraíba and Piranhas in the state of Paraíba".(MIN,2008). The distribution of the water will be conducted through the largest ponds contructed in the region. According to MIN, in Ceará, the most affected state to the effects of droughts, the water distribution will be:

"In the state of Ceará the reservoirs system, that supply the **metropolitan region of Fortaleza (RMF)** through the reservoirs Pacajus, Pacoti, Riachão and Gavião, is connected to the Jaguaribe river by the Worker Channel (Canal do Trabalhador) with capacity for 5 m³/s. Since will be necessary to deliver more water from the Jaguaribe river basin to the **RMF**, the government of

state of Ceará is building the Integration Channel (Canal da Integração) with capacity for 22 m³/s that will interconnect the Castanhão reservoir with Banabuíu and Metropolitanas basins" (MIN, 2008)

In the state of Rio Grande do Norte:

" The reservoir Armando Ribeiro Gonçalves is responsible for the supply for a large number of municipalities of the Piranhas-Açu, Apodi and Ceará-Mirim basins through four big water main systems that are in operation: Mossoró, Sertão Central/Cabugi, Serra de Santana and Médio Oeste. The water main Alto Oeste, in project stage, will serve the greatest part of the municipalities of the Apodi basin by taking water from the Santa Cruz pond, another reservoir receptor of the water diverted by the SFIP" (MIN, 2008).

In the state of Paraíba:

"The East axis of the SFIP will permit to increase the water availaility in several municipalities in the basin of the Paraíba river served by the Congo, Cariri, Boqueirão and Acauã water mains. The North axis will permit the supply of several municipalities in the basin of the Piranhas river, served by the water main systems such as Coremas / Sabugi and Canal Coremas / Souza" (MIN, 2008).

And finally in the state of Pernambuco the water diverted from the São Francisco river will be distributed as follow:

"Axis North and East cross the state of Pernambuco and will serve as water source for the existing water systems, and for new water distribution systems projected to be constructed to serve the population in the sertão and agreste: Adutora do Oeste, Adutora do Pajeú, Adutora Frei Damião and Adutora de Salgueiro" (MIN, 2008).

According to the MIN, the SFIP is a structural project that will provide water security for sections of the states in the septentrional Northeast which the government considers to be the most vulnerable to droughts. However, in describing the benefits, the Ministry stresses that the water is being diverting for the socio-economical development of the drought vulnerable states what demonstrates that the SFIP is a developmental project:

"the SFIP is the most important structure action in the level of the national water resources policy, with the objective of guaranteeing water for the socio-economical development of drought vulnerable states (Ceará, Paraíba, Rio Grande do Norte and Pernambuco) at the same time guaranteeing long term water supply to the largest cities (Fortaleza, Juazeiro do Norte, Crato, Mossoró, Campina Grande, Caruaru ad João Pessoa) and to hundreds of small and medium towns inside the semiarid. The project benefits areas of the interior with moderate economical potential which are strategic for the government's **policy to decentralize the development which currently is concentrated almost exclusively in the state capitals**" (MIN,2008)

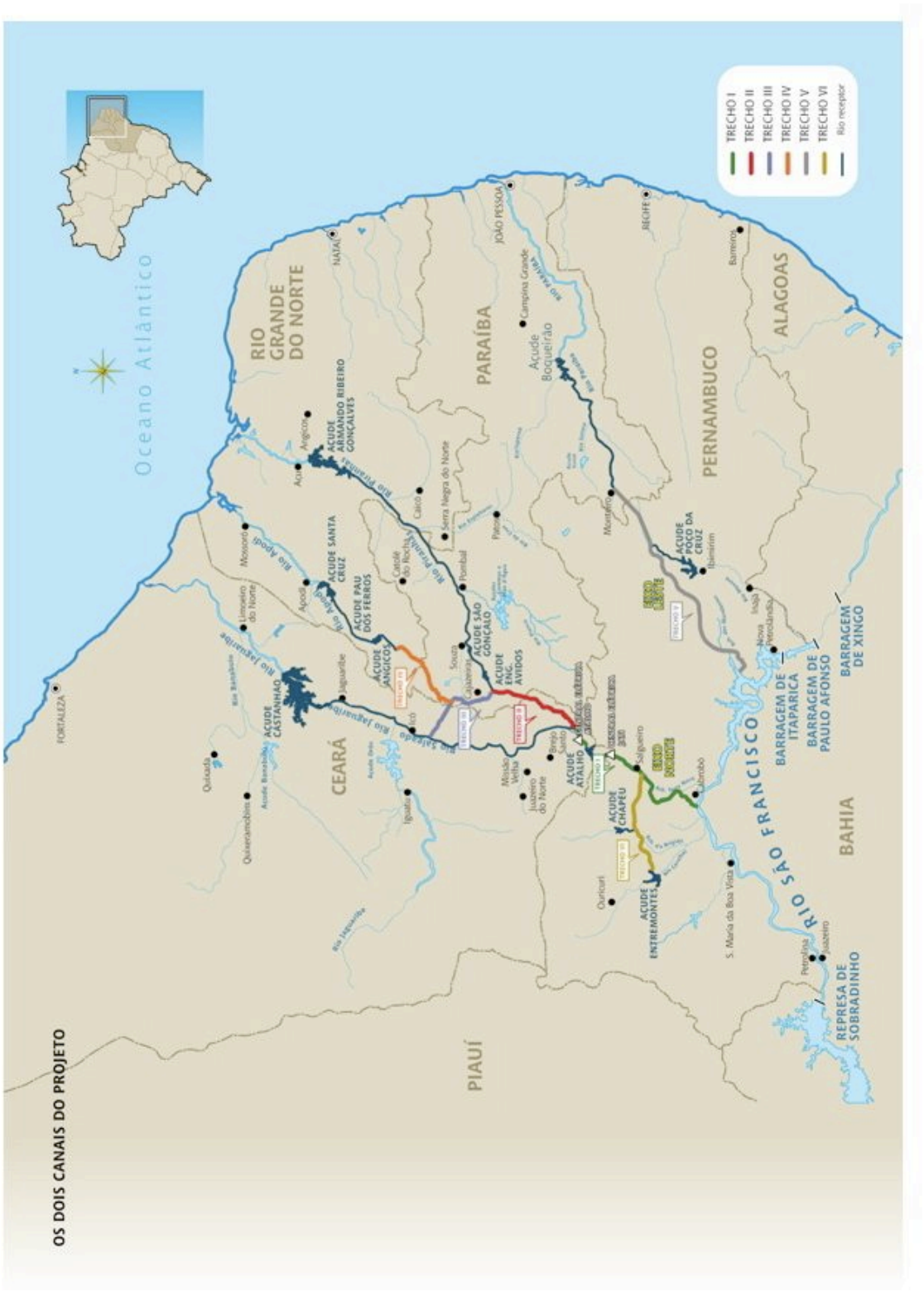

Figure 14: The map shows the two channels of the SFIP. Each part of the project is shown in different color. Source: RIMA, 2006

As seen above, the MIN stresses that the realization of the SFIP is a 'structure action' to 'decentralize the development' of the region which is concentrated at the state capitals. However, as the ministry describes below, in the state of Ceará the multiple uses of the capital Fortaleza, which is outside the 'official limits' of the semiarid landscape, will be supplied by the SFIP. As the waters of the São Francisco supply the capital of Ceará, the water accumulated in the ponds of the semiarid, which currently supply the demands of the capital, will be able to supply the demands of the small municipalities in the semiarid:

"In the state of Ceará the SFIP will increase water availability and **provide water for multiple uses of the 'larger' part of the population** of Jaguaribe and Metropolitanas basins (5 million inhabitants in 2025); will reduce the conflict between Jaguaribe and Metropolitanas basins, a consequence of **the progressive increase of water transfers to supply the metropolitan region of Fortaleza**; will allow a better and fairer spacial distribution of the water served by the ponds Orós and Banabuíu, benefiting the populations in the semiarid areas of the state of Ceará, because **with the SFIP these reservoirs will be released from supplying the partial demands of the Medium and Low Jaguaribe and the Metropolitan region of Fortaleza**" (MIN,2008).

According to the MIN, in the states of Rio Grande do Norte, Paraíba and Pernambuco the benefits of the SFIP are restricted to a small increase of water availability in some sections of those states, which is supposed to reduce the number of conflicts for water in these states with a better and fairer spatial distribution of water and a safer water supply in several municipalities served by the reservoirs/ponds which will receive the diverted water of the São Francisco river. However, in the state of Pernambuco, to be crossed transversally by both channels, another benefit of the project according to the MIN is the opportunity to share with the other three states part of the costs of the water supply for both the '*agreste*' and the '*sertão*' in this state.

Through the MIN the federal government announces that:

"The SFIP will have wide scope, supply the rural population, **whether through hundreds of kilometers of channels that will make perennials the intermittent rivers of the semiarid or through the water mains for the supply of a group of the localities**" (MIN,2008).

The benefits announced by the MIN, responsible for the project, to justify the SFIP are also dependent on the execution of many complemetary actions at the level of the local states, to be financed by the local states.

The local population and NGO's working in the Northeast disagree with the government project. However, before the introduction of the arguments of the opponents of the government, a brief introduction of the main risks presented by the SFIP.

5.4 Risks and Constrains of the SFIP

The execution of the SFIP has been surrounded by risks and constraints partially analyzed in the RIMA (2004), the report of the environmental impacts of the project to the São Francisco basin and to the receptors basins.

The first, more obvious, constraint is related to the high costs behind the project, to be entirely financed by the federal government, and how effective this cost can be. According to the MIN (2008) the estimated cost of the SFIP is R$ 4.500.000.000 (four and a half billions of Brazilian reais)[39]. The cost effectiveness of the SFIP, and its benefits, are challenged since cost announced by the government did not include the costs of the construction of a water distribution structure, such as water mains, which will allow the diverted water to reach the poor populations. Among the critics is the World Bank (WB), an organization characterized by its traditional support to dams and water diversion projects. In a study dedicated to inter-basin water transfers in Brazil, released in 2005, the specialists of the WB argued that in the short run the construction of local infrastructure to deliver water from the ponds would be more effective [40]:

"Considering that exists an infra-structure of reservoirs/ponds that can guarantee a regular water supply for a greater part of the semiarid it is reasonable to admit that short and medium time actions should priorize the construction of infra-structure of water

[39] In 30/04/2008, US$1,00 was equivalent to R$ 1,70. Source: UOL Economia at: http://economia.uol.com.br/cotacoes/

[40] Azevedo, Luiz Gabriel Todt de; Porto, Rubem La Laina; Mello Junior, Arisvaldo Vieira; Pereira, Juliana Garrido; Arrobas, Daniele La Porta; Noronha, Luiz Correia e Pereira (2005) A Transferência de Água entre Bacias Hidrográficas no Brasil. Banco Mundial, Brasília.

mains for the distribution of the accumulated water and the implementation of better water management systems. This is fundamental specially considering that the poor population of Northeast is disperse in a vast semiarid region (...) a program with those characteristics has the advantage of presenting results in short time with reduced costs" (World Bank, 2005)

A second constrain is related to the environmental risks presented to the river basins. The receptor basins will experience threats to their acquatic life considering that these basins (Jaguaribe, Piranhas-Açu, Apodi, Paraíba, Terra Nova, Moxotó and Brígida, the last two are sub-basins of the São Francisco) are poorer in biodiversity than the donor basin (São Francisco). The fish fauna in the São Francisco river is composed of 250 to 300 species where 200 are known and described in scientific literature, while the receptor basins have a much poorer fauna with 53 native species but a higher endemism with 23 of the 53 species been endemic to the receptor basins. The SFIP threatens the fauna of the receptor basin with the introduction of hundreds of exotic species that will be diverted from the São Francisco river (in forms of eggs and larva). The introduction of exotic species is the second largest cause of biodiversity loss and considered as a crime by the Brazilian environmental law (Alves, 2005). The WB also referred to the introduction of harmful species and the loss of biodiversity as the most negative effects of the SFIP:

"the most important negative effects identified by the RIMA of the SFIP are: the fragmentation and reduction of native vegetation, reduction of natural habitats and reduced biodiversity of the fauna (...) change of the water quality and aquatic life and introduction of harmful species" (World Bank, 2005:64).

The risks of the SFIP to the donor basin are related to the overuse of the water of a stressed basin filled with dams for energy production, since the São Francisco basin produces 90% of the energy of the Northeast region. The SFIP will reduce the water discharge which will reduce the availability in the region of the basin. According to the RIMA (2004:16) this reduction will affect the energy production, and cause a reduction of 2,4% in the energy production in the system of the CHESF (Companhia Hidreletrica do Rio São Francisco). This reduction might be compensated by the energy produced by new termoelectric power plants installed in the region since 2001. The region will consume hydroelectricity produced in river basins in other regions of Brazil that will be

Figure 15: Region of the Low São Francisco river in the municipality of Propriá, state of Sergipe where the reduced levels of the river can be seen in the bridge. Photo: João Zinclair.

'diverted' to the Northeast through the ONS (National System Operator), (RIMA, 2004:26). The discussion of energy production is wide and complex, demanding an entire thesis to provide full details. The point here is to account for the risks of the SFIP to energy production in the region of the São Francisco river basin as described in the RIMA and complexity of the energy production which can increase the demands for energy in other regions of Brazil[41].

Another effect of the reduction of the average discharge is the increased risk to the livelihood of community of river dwellers, mostly fishing communities, in the region of the low São Francisco river, which is one of the poorest regions of the Northeast. The reduction of the average discharge in the region of the Low São Francisco will reduce the quantity of fish. The drama of the reduced water volume has been experienced on many occasions during the last decade by the sedimentation that also threatens the region of the mouth of the river. Picture XX shows the situation in the region of the Low São Francisco, in the municipality of Propriá, state of Sergipe in March, 2008. The constant reduction in the volume of the river, to guarantee energy production in the region of the Medium São Francisco, have led to a discharge of 1.000m3/s[42]. Picture XX also shows the marks left by the water on the walls of the bridge over the São Francisco river in Propriá. This region might suffer the negative effects of climate change since it may the

[41] This assumption is based on the fact that Brazil has an integrated energy system which distribute nationally the energy produced by the power plants spread around the country.

[42] CHESF has determined the reduction of the discharge because of the low levels of water accumulated in the pond of the hydropower plant Sobradinho. Source: CHESF, 2008.

reduce rainfall levels in the region up to 20%. The reduced rainfall what will impact the region of the Low São Francisco because the river is regulated by the dams in the Upper and Medium sections of the São Francisco.

Another constraint of the SFIP is related to the benefits of diverting 26,4 m³/s of water, equivalent to 1% of the volume of water discharged in the Atlantic ocean (MIN, 2008) from a river basin over a distance of 400 to 700 km, and transfer this water under the extremely hot sun, submitted to high levels of evaporation under the tropical sun of the semiarid climate, and then to be divided between seven different river basins. Manoel Bonfim, a former director of DNOCS stresses that:

"there is no need for the water to be diverted, not any necessity for this water at all. Only in the eights main ponds of the septentrional Northeast, constructed to retain the water of the intermittent river basins, accumulate more than 13 billion m³ of water and these are the pluri-annual ponds that will receive the thin 2 billion m³/year (127 m³/s) removed from the transposition channel. The annual rate of evaporation is 4 billions, double the amount of the water diverted from the São Francisco river" (Bonfim, 2007)

Another conflict around the SFIP concerns the disagreement over the exact volume of water available to the multiples uses authorized by ANA. The conflicting volume of the river announced by the government is fundamental to understand the risks and how restricting the SFIP will be for new projects with the water of the São Francisco river. The mean water discharge is supposedly 2.600 m³/s (ANA,2007) where XXXX is granted to multiple uses leaving XXXX m³/s water available for new uses. João Abner has argued that the water available is XXXX, while the government based the SFIP on XXXX m³/s is the volume of water available for different uses including the new project (Abner, 2007).

Finally, a great constraint is related to the social benefits of the project. The opposition to the project insists that the project serves political interests and does not challenge the unequal structure of the region and does not democratize the access to water resources in the region. The opposition stresses that the SFIP is one more intervention to guarantee water resources for economical projects, mostly in the state of Ceará, that are unsuitable to the nature of the semiarid. i.e. irrigated agriculture for

export, shrimp farms and metallurgy that do not reach the poor population of the semiarid. The opponents of the project are representantives of the social movements, civil society organizations, water resources specialists and politicians of the Northeast region arguing that the SFIP will cause more damage than benefits.

5.5. Summary

This chapter presented the São Francisco river basin and some of the main problems the basin is facing due to the multiple uses and the construction of six hydroelectric power plants. This chapter also presented the São Francisco River Basin Integration with the Basins of the Septentrional Northeast Project (SFIP) and the constraints of the project as denounced by the critics of the project. The discourse of the critics of the SFIP is presented in chapter six.

Chapter 6 - Claiming the Landscape

6.1 Introduction

This chapter presents the discourses carried out by the oppostion to the SFIP which is integrated by activists, water resources specialists, members of civil society organization, NGO's and the social movements of the Northeast. This chapter introduces these main opponents and the reasons why they stand against the SFIP. This chapter also presents some of the projects defended by the opponents of the SFIP. The projects defended as alternatives to the SFIP are based on the acquaintanceship with the semiarid environment, based on sustainable practices, proposed and developed by civil society organizations in the nine states of the Northeast region, not only in the semiarid landscape.

6.2 Claiming the Landscape

A large number of social movements and the civil society organizations working in the Northeast region and in other parts of the country oppose the execution of SFIP. These groups have a different opinion about the problems of the Northeast region and the semiarid landscape and disagree with the government that the SFIP will bring changes to the landscape.

The most distiguished opponent of the SFIP is Bishop Dom Luiz Flavio Cappio, a Franciscan friar who has been working in the region for 40 years and in 2005 started an open battle against the project to force the government to listen the claims of the social movements and the population of the São Francisco basin about the SFIP. Bishop Cappio went through two hunger strikes to press the government. The first hunger strike lasted 11 days in June 2005 and was meant to force the government to dialogue with the local population of the São Francisco basin, to find new solutions for the problem the septentrional Northeast.

The second hunger strike lasted 24 days, between 27th November and 21 December 2007, but ended without ay results expected by the bishop. The government have denied any dialogue and ignored the demands of the local population to stop the construction of the channels. In support to the attitude of the bishop the population of the region of the São Francisco basin followed Dom Cappio during his protest, with vigil in the chapel in Sobradinho, where the bishop stayed during the hunger strike. People followed the bishop with prayers and some of his supporters fasted with him.

After the end of the second strike bishop Cappio, who was a friend and supporter of President Lula for more than 20 years, became the symbol of the opposition to the SFIP and main critic of President Luiz Inacio Lula da Silva. On 21 December 2007, after the end of the hunger strike, Bishop Cappio declared to newspaper Folha de S.Paulo:

"Lula is dead, we are in the government of Mr Inácio da Silva. In the government of Mr Inácio da Silva the social movements were suffocated, lost their place of expression and today they are abandoned and put aside" (Cappio, Folha de S.Paulo, 22/12/2007)

During a visit to São Paulo Bishop Cappio spoke to newspaper Folha de S. Paulo and directed his speech to the President, who he blamed as the only responsible for the continuation of the SFIP. The bishop accused President Lula of forgetting the social movements and governing for the elite:

"The social movements succeed to put him there, where he is, when he reaches the power, he turns his back on the social movements, he forgets the social movements. I would say that he spits on the plate he has eaten (...) Lula is governing Brazil for the elites" (Cappio, Folha de S.Paulo, 21/01/2008).

Dom Cappio accused the government of "*complete insensibility (..) with the clamour of the people*". Speaking about President Lula's project '*Bolsa Família*' the Bishop declared that the "'*Bolsa Família' is an instrument to buy votes (...) the government did not choose the life of the poor, but a project that is the death of the poor*" (Cappio, Folha de S. Paulo, 21/01/2008).

In a forum of Brazilian bishops at National Conference of the Brazilian Bishops (CNBB) bishop Cappio explained his opposition to the SFIP, where he made comments about the ministers who have participated with him in public audience in the Federal Senate in 14/02/2008. Dom Cappio expressed his indignation in face of the 'lies' told by the government in the advertisement of the SFIP as the declarations of the minister and former minister of National Integration confirmed. It is important to note that bishop Cappio refers to the SFIP as a 'transposition project' which is a form of referring related to the former São Francisco project[43]:

"the National Integration Minister, Geddel Vieira Lima and the federal deputy Ciro Gomes, the former National Integration Minister, have assume publicly the economical uses of the diverted waters as the priority of the project; exposing the lies that were being announced in the official advertisements where the priority of the 'transposition' project was to serve the poor; and affirmation such as ' those who are thirsty support the project of the government'. The government has finally assumed the truth about its project" (Cappio, CNBB, 08/04/2008)

Another opponent of the SFIP is Roberto Malvezzi, a member of the Comissão Pastoral da Terra (CPT), argues that there are thousands of reservoirs in the entire region but the water of the reservoirs is not democratically distributed. Malvezzi stresses that the SFIP represents the privatization of the water resources in the Northeast:

"There are 70.000 reservoirs constructed in the entire region which keep water that are not democratized because the systems for its distribution are never constructed. The weels constructed with public money are locked in private propeties of the latifundios. Finally, if the government finish the transposition of the São Francisco, the water in the large receptor' ponds will be privatized, both the accumulated rain water _ 37 billion m^3_ and the water diverted from the São Francisco. The Northeastern elite will finally manage to establish the first big 'water market' in Brazil, just like the World Bank wished in the decade of 1990's. (Malvezzi,2007)

Malvezzi fights for a completely different semiarid and the widespread introduction of simple, sustainable and democratic solutions of water management based on rain water harvesting, and adapted to the demands of the poor population of the

[43] The former name of the SFIP was "São Francisco river transposition project".

semarid. Speaking about the alternative solutions he mentions the P1MC, a program for the construction of one million rural cisterns and the democratic access to water resources[44]:

"When we build around 300 thousand cisterns, when we propose the harversting of rain water for food production, when we defend the construction of water mains proposed by the 'Northeast Atlas', we are proposing water security for millions of people and the socialization of a natural resource that constitutionally still belongs to all the Brazilians. It would be the beginning of the water reform, beginning in the Northeast" (Malvezzi, 2007).

About the risks presented by the SFIP to the São Francisco river basin Malvezzi declared:

"We have always said that the equation of energy production, population supply and the transposition of the São Francisco river is being made superficially. Effectively there is not a 'safe water discharge of 1.850 m³/s' of the river from Sobradinho, like the government and the supporters of the transposition defend. It is just an average. Right now the discharge is 1.100 m³/s. But if the river flow continue to be reduced, what will happen if Sobradinho reservoir do not get filled again this year? The river will reach the discharge of 400 m³/s like it did in the year 2001" (Malvezzi,2008).

In his speech during a public audience in the Federal Senate which was published earlier this year, Dom Cappio spoke about the reasons why he is an opponent of the government, emphasizing that his opposition to the model of development for the Northeast defended by the federal government:

" **The São Francisco river transposition project (SFIP) represents a retrograde way of water management. It is a project going on the opposite direction of history, which represents the type of development we don't wish for the Northeast**. It is a consensus in the world that the priority of water supply water must be human and animal and the guarantee of biodiversity"(Dom Cappio in the Federal Senate, 14/02/2008)

Dom Cappio argued that the diffuse population of the semiarid must be the priority of the government:

---

[44] More information about the P1MC and other water resources solutions will be presented further in the chapter.

"In the Brazilian semiarid we have 2,2 million families dispersed around the rural areas, aproximately 10 million people, called 'diffuse population'. This population don't have access to water with biological security. Biological security means two litres of water per person per day. Not even domestic security. Domestic secutrity means 40 litres of water per person per day". "**From an ethical point of view, the diffuse population must be the priority of the public investment on water supply**. **The São Francisco transposition project doesn't prioritize human and animal supply** like the government advertise as the objective of the project, because if human and animal supply was the objective of the **transposition project** we would support it" (Dom Cappio, in the Federal Senate , 14/02/2008).

Dom Cappio rejected the arguments of President Lula in defence of the SFIP criticizing the advertisements of the project that according to him are false advertisements that use the needs of the poor people to serve economical interests:

"The people is used to hear the president say 'one mug of water for the thirsty people' or 'the thirsty people of the sertão support the project'. This is not true. **It is a false advertisement,** anti-ethical advertisement that abuses of the good will of the people, that uses the necessities of the poor people to impose a project in which the priority is not the poor people. **The truth is, the diverted water will be destined to shrimp farms, industrial use and other economical uses, inverting the priority of the water supply and of the utilization of public resources**" (Dom Cappio in the Federal Senate, 14/02/2008)

In his critics Dom Cappio emphasized that the scope of the project is insignificant, that it will reach only 7% of the area of the semiarid and will not reach the diffuse population. The Bishop stressed that the diffuse population that live without access to water in the 'receptor states' today, states abundants in ponds, will continue to live without access to water after the project, just like the diffuse population in the region of the São Francisco basin which does not have access to water even living close to the river.

*"***The scope of the project is insignificant in the context of the semiarid**. The transposition project, according to the RIMA (Environmental Impact Report) **will reach an area of 7% of the semiarid. More than 90% of the territory of the semiarid and its populations will continue to live the same situation of abandonment and indigence they find themselves today**. The diffuse population will continue to be marginalized in water supply. **I live in the mucipality of Barra, on the banks of the São Francisco river,** however, **if I walk 500 meters in the direction of the 'caatinga' I find**

communities without access to water. The diffuse population in the states crossed by the São Francisco river, Bahia, Pernambuco, Alagoas and Sergipe don't have access to water supply. The diffuse population in the states of Ceará, Rio Grande do Norte and Paraíba, abundants in water reservoirs, don't have and will continue without access to water supply*"* (Dom Cappio in the Federal Senate,14/02/2008)

Bishop Cappio in his speech in front of the senator demonstrated to agree with the all the argument of the specialists opponents of the projects, that there is abundant water in the semiarid and what is needed is the democratization of the access to water resources, an equal distribution of the water. The bishop also stressesd that the SFIP is not viable financially and opposes the solution defended by President Lula to reduce the costs of the diverted water for the rural population through 'crossed subsidies', i.e. the urban population pays for the costs of the diverted water indirectly subsidizing the water for irrigated agriculture:

" **We have abundance of water. What we don't have is a fair, equal distribution of this water, democratization of the water. Water is not charged in the Northeast today. The cost of the water in agriculture today involves only the costs of bombing the water. However, the transposition project will charge a high price for the water diverted.** This fact might reduce significantly the penetration of the products from the region of the receptor basin in the highly competitive globalized market. Under this perspective the project is not viable financially for family agriculture. **To guarantee water for economical use the project will use the 'crossed subsidy' through which the urban population will pay the high costs. What means that the poor urban communities will assume the costs of the economical use of the water"** (Dom Cappio, 14/02/2008).

The bishop thus rejects the SFIP since it reproduces the cruelty dominant in the history of the Northeast, where the interests of the poor are mentioned as a strategy, to finance the projects of the dominant oligarchies that control the irrigated commecial agriculture. Dom Cappio insists that the poor population could have been served by the water which is already available in the septentrional region of the SFIP, exposing the contrasts of the region:

"**Again it is the poor serving the table for the rich. History repeating itself. The transposition project privileging the big in detriment of the small. The government claims that 12 million people, the population around the receptor basins, will be**

benefited by the transposition. However, in fact the population around those basins could have been supplied by the water that is already there. In fact, ¾ of that population live in towns where more than 90% of the residences have access to public water services. I would like to demonstrate something very interesting and intrigant: the metropolitan region of São Paulo, state of São Paulo, has 18.5 million inhabitants. The water availability there is 201 m³ per inhabitant per year. The metropolitan region of Fortaleza, state of Ceará, has 3 million inhabitants and the water availability there is 242 m³ per inhabitant per year. Each inhabitant of Fortaleza has 41 m³ of water per year more than the inhabitant of the metropolitan region of São Paulo. The actual infrastructure of this state has capacity to distribute the diverted water to only ¼ of the population. The route of the water diverted by the transposition project will cross hundreds of kilometers of more indigent regions" (Dom Cappio in the Federal Sentate, 14/02/2008).

Speaking for an audience of senators Dom Cappio argued that the project violates the rights of the traditional populations[45] and reminded that the 1988 Constitution guarantees the rights of those populations to be heard and reinforced that only the National Congress can authorize the use of natural resources in the land of indigenous population. The bishop accused the government of acting arbitrarily, of not inviting the National Congress to participate at the discussions, abstaining from directly criticizing the Senate, one half the Congress, for their submission to the decisions of the president:

"The transposition project violate the rights of the traditional populations. The RIMA (Environmental Impact Report) didn't consider the existence of **34 indigenous populations, 156 quilombos and around 100 communities of river dwellers in the region of the basin,** completely ignoring their interaction with the São Francisco river basin, their culture and their history of respect for the environment. **The 1988 Federal Constitution guarantee to those populations, in article 231, the right to be formally heard in case of utilization of natural resources in their land. While art. 49 paragraph 16 of the constitution determine that it is competence exclusive of the National Congress to authorize the utilization of natural resources in the land of indigenous populations.** The National Congress was not invited to speak about the topic. The transposition project is being conducted arbitrarily. A project like this demands the participation of the civil society. The dialog of the government with the civil society never took place. The government refers to the population of the basin or to any other Brazilian citizen who opposes the project as 'selfish', 'liars', 'non-informed', 'political

[45] Traditional population of the São Francisco river mentioned by Dom Cappio is composed by 34 indigenous groups, 156 quilombos and 100 communities of river dwellers.

oppositors', without showing any respect to those who don't agree with the project"(Dom Cappio in the Federal Senate, 14/02/2008)

The bishop made a bold critique of the acts of the government and stressed that the state (1) ignored the rights of the traditional populations on the region of the basin; (2) ignored the Federal Constitution on indigenous land; (3) ignored the right of the National Congress to decide about the uses of natural resources on the land of the indigenous people; and (4) ignored the decision of the São Francisco Hydrographic Basin Committee (CBHSF) as determine the Water Resources Law number 9433/97, which decided the priority for the use of water in case of proved water deficit:

The project also contradicted the Law 9433/97 of water resources which determinate that the management of the water resources must be decentralized and the uses of water established in the basin plan aproved by the Basin Committee. The São Francisco River Basin Committee (CBHSF) decided in its decenial plan for the uses of water for human and animal supply in case of proved water deficit (Dom Cappio in the Federal Senate, 14/02/2008).

Bishop Cappio demanded answers from the government about the decision not to start the other water solutions in the Northeast, such as the projects of the 'Northeast Atlas', produced by the governmental National Water Agency (ANA), that are more cost effective than the SFIP, demonstrating that there are questions to be answered by the government:

" Why not priorize the other projects of water supply? The National Water Agency (ANA) released the 'Northeast Atlas' with water supply solutions for the population of the entire Northeast, and the North section of the state of Minas Gerais. The Semiarid Articulation (ASA) proposed simple solutions of water supply for the rural areas. While the project of the government proposes to supply only 12 million people, while for half of the costs of the 'transposition project' the other projects can supply 44 million human beings. While the project of the government serves 397 municipalities, for half the cost of the SFIP the other projects reach 1356 municipalities. While the project of the government will serve four states of the federation, (Pernambuco, Paraíba, Rio Grande do Norte and Ceará), the other projects will serve ten states of the federation, (Minas Gerais, Bahia, Pernambuco, Sergipe, Alagoas, Paraíba, Rio Grande do Norte, Ceará, Piauí e Maranhão)". (Bishop Cappio in the Federal Senate, 14/02/2008).

According to bishop Cappio the priorities for the Northeast are the revitalization of the São Francisco river basin with reforestation, control of pollution and solutions focused on the need of the diffuse population:

"First we urgently need the revitalization of the São Francisco river and its tributaries and the revitalization of the complex of ponds and reservoirs through reforestation, recomposition of the forests bordering the rivers, investments in sanitation to avoid the sewerage of chemicals and waste matter au naturel in the rivers and ponds; second the construction of a net of water mains to distribute the water concentrated in the reservoirs before the water evaporates, as planned by the alternative projects which we defend. The diffuse population, that live spread around the semiarid, are the people who needs the water the most, they must be the true beneficiaries of the resources available to supply water demands" (Bishop Cappio, Estado de S.Paulo 06/04/2008)

The accusations directed to the government by bishop Cappio, did not result in investigations or a political embarrassment for senators. Everything remained the same way after the audience, what demonstrates the level of indifference of the senators to the poor population of region of the São Francisco river basin, represented by Dom Luiz Cappio. It also demonstrated the disregard of the senators to the laws of the country in face of a clear example of disrespected to the Constitution[46].

João Suassuna, a specialist in water resources and researcher at Fundação Joaquim Nabuco, is another opponent of the SFIP and one of the key informants of the research. Asked about the decision of the government to ignore the rights of the population of the basin, Suassuna declared:

"It is very common in Brazil that a mega projects like this are started without the participation of the public opinion. This was evident when the federal government announced the São Francisco River Integration with the Basins of the Septentrional Northeast Project, largely known as São Francisco Transposition Project. Many are the situations when development actions are communicated by the authorities when they are already established and functioning" (Suassuna,2007)

[46] The 1988 Constitution established in article 231 that the local population have the right to be heard in case of exploration of the natural resources in their lands and article 49, paragraph 16 determinate that it is an exclusive competence of the National Congress to authorize the use of natural resources in the lands of the indigenous population.

About the effects of the SFIP João Suassuna argues that the SFIP will bring more social problems to the region:

"The local populations wait with hope for the water promised by the government, a water which can not reach its destiny, and also for the land reform promise in the areas along the channels, raising the risk of migration of the population to the areas close to the channels, which can not be served by the water, populations whose livelihood is based on fishing in the São Francisco which will be affected by the dams" (Suassuna, 2007).

João Suassuna also stressed that the semiarid has water to supply the demands of the population of the region, the problem is that the water resources of the region are not being used, or are not properly used, contradicting the information of the government:

"There is a great potential of ground water in the semiarid, despite the fact that most of the soil of the semiarid is crystalline, where is not possible to create new reserves of ground water. However, it is not possible to forget the potential of the sedimentary geology of the region where 70% of the water of the Northeast is located. The sedimentary basins are mostly concentrated in the states of Maranhão and Piauí but 30% of the sedimentary soils are spread around the region" Suassuna, 03/06/2007)

According to Suassuna the water solutions defended by civil society organizations are more cost-effective and suitable for the regions of crystalline soils because they are based on rain water harvesting solutions. The solutions presented by ASA were conceived for the rural areas of the Northeast region where the rainfall is concentrated during three or four months of the year. These projects defend a 'acquaintanceship of the semiarid' and are based on understanding the nature of the climate, where droughts are an inherent part of the semiarid landscape. The projects of ASA propose a rational use of the resources and solutions to harvest the concentrated rainfall, defending the semiarid as a benefit, not a problem. The work of ASA has been partially supported by federal government through the Social Development Ministry. These solutions intend to improve life conditions in the rural areas of the Northeast by providing water for both domestic and agricultural use and aim at fixing the rural population in the Northeast.

Dom Cappio stresses that the government must priorize the 'alternative' solutions:

"The government insists that the alternative projects are complements to the great transposition project. I ask: why not invert this affirmation? First the alternative projects which benefit more people for less costs and are ecologically sustainable, socially fairer

and morally correct, for their respect for the sacred vocation of the water, essencial for life, a human right, i.e., to end the thirst of the human and the animals?" (Cappio, 2008)

Malvezzi argues that the SFIP will not benefit 12 million people, but rather damage the lives of 32 million people of the entire region with the project:

"The government says that the 'transpostion will benefit 12 million people without harming anyone'. But this is only in the government's account. They don't mention the 100.000 people relocated in Sobradinho and Itaparica; the fishing communities which lost their fish; the farmers who lost their land and their islands; without any mention to those who will be relocated one more time for the construction of the Riacho Seco dam; without mention to the indigenous population who suffer all the consequences of those dams and now will have to live with a bomb sucking water on the foot of their island, there is a lot to consider. If the government looked one single instant to the Northeast Atlas produced by the National Water Agency the authorities would see that the transposition project will harm 32 million Northeastern people". (Malvezzi, 12/06/2007)

Malvezzi, just like bishop Cappio, promotes the projects of the 'Northeast Atlas', presented solutions for 1.112 municipalities in the entire Northeast region, instead of a restricted project such as SFIP. Malvezzi stresses that the responsibility of the government is to propose solutions for the entire region:

"the Norhteast Atlas have diagnosticated the water situation in 1.112 municipalities with more than five thousand people and 244 municipalities with less than five thousand people and proposed the constructions necessary to avoid a water collapse in those municipalities until 2015. It is worth mentioning that it involves the entire Northeast region, not only the semarid. What means that big capitals like Salvador, Recife and Fortaleza were also served by the Atlas. **If the federal government don't think about the Northeast as a whole, who will?**" (Malvezzi, 12/06/2007)

Malvezzi furthermore stresses that the decision for the SFIP is a sign that the government's priority is the economical use of water:

"when the government prioritize the transposition it is also prioritizing the economical use of water in detriment of the rest of the Northeasterns who also need water. Therefore, it is inverting the priorities for water supply in Brazil, according to the water resources law 9.433/97. The government answered saying 'but the water of the transposition will supply 12 million people'. We answer: 'the Atlas will serve 1.356 municipalities in nine states of the Northeast region, plus the state of Minas Gerais, which also includes the pretense 12 million people benefited by the **transposition**, totalizing 34 million northeasterns. The water of the project of the Atlas will really reach the families and, for

precaution, will also prepare those municipalities to avoid a water collapse forecasted by the National Water Agency for 2015". (Malvezzi, 12/06/2007).

Manoel Bonfim, argues that there are enough water reservoirs in the Northeast:

"In the underground of the Northeast region there are around 135 billion m³ from which 800 to 900 millions m³ are used through 90.000 wells. A greater part of those wells never received equipments from the water programs. The region can start to use around 20% of the ground water reserves per year (27 billion m³ per year) without losing the pressure because these sources are recharged annually by the rain water that are drained straight to the center of the Earth" (Bonfim, 2007) .

Like Bonfim, Suassuna defends the rational use of ground water as a solution for the states with sedimentary soils which concentrate large quantities of good quality ground water which could supply the greater part of the territory, like Piauí, Alagoas, Sergipe and Bahia. Besides the groundwater, the rain water accumulated in large quantities in the large ponds and reservoir in the states where the crystalline soils are predominant, like Ceará, Paraíba, Pernambuco and Rio Grande do Norte where the sedimentary soils in the coast produce small quantity of ground water with high salinity. Suassuma presented the situation of water resources in the nine states of the region.

About the states of Maranhão and Piauí Suassuna stresses that those are the states with the best water supply in the region and are respectively the poorest (Maranhão) and the third poorest (Piauí) states of the country[47]. The water availability in these states is the highest in the region, a situation that challenges the assumption that povery in developing countries is related to low volume of water resources and low capacity of water reservoirs (McNully, 2006). About the situation in the Northeastern states of Maranhão and Piauí, Suassuna describes:

"The state of Maranhão has a pre-Amazonian climate and as a consequence its territory is outside the 'droughts polygon'[48]. Besides it is very rich in ground water reserves, its sedimentary basin accumulates around 17,5 millions km³/year which put Maranhão as the water richest state in the Northeast, with a capacity to offer 17,2 thousand m³ for each

[47] The rank of HDI of the Brazilian states have positioned the states of Maranhão, Alagoas and Piauí in the three bottom positions respectively.

[48] The so called 'drought polygon' is an outdated term used to defined the drought vulnerable areas of the Northeast region.

one of its inhabitans per year. The state of Piauí has greater part of its territory in sedimentary geology and, together with Maranhão, accounts for 70% of the ground water of the Northeast region, a great richness. Piauí has the second largest and most important river basin of the region, the Parnaíba river, making Piauí a rich water supply state offering its population 9.600 m³/ inhabitant/year" (Suassuna, 2007).

About the state of Bahia, Suassuna described that:

The state of Bahia experiences a limit situation. It can offer around 3.000 m³/inhabitant/ year. Bahia also has important sedimentary areas with good volumes of ground water which are sparsely distribute around the state and the São Francisco river as its main ally, which crosses the entire territory of the state of Bahia, from South to North (Suassuna, 2007).

About the structure of the state of Rio Grande do Norte:

"The state of Rio Grande do Norte has important sedimentary areas that, for example, supply the town of Mossoró for both human consumption and agriculture production. The state has the second largest dam/pond of the Northeast (Armando Ribeiro Gonçalves) which accumulates around 2,4 billions of m³ and according to the information released by the I Plan of Water Resources of the Rio Grande do Norte, can alone supply with 200 liters/inhabitant/day the entire population of this state in the next 20 years" (Suassuna, 2007)

The situation in the state of Paraíba according to Suassuna is:

"The state of Paraíba, except for the thin strip in the coast with sedimentary soils which crosses the states of Rio Grande do Norte, Paraíba e Pernambuco accumulates aproximately of 230 km m³/year, while the rest of the territory has crystalline geology. This fact influences in the low accumulations of ground water in the state which is mostly of bad quality due to high levels of salt. However, the semiarid of the state of Paraíba has two large dams/ponds, Coremas and Mãe D'água, which are connected by a small channel and share a potential to accumulate 1,3 billions m³ of water. Besides the fact that this state has serious water supply problems, Paraíba could supply a greater part of the population of the semiarid with water of good quality from these two ponds if this state decides to invest in systems of distribution' (Suassuna, 2007) [49]

Pernambuco is the state with the worst levels of water supply in the country even if the state is crossed by the São Francisco river, as shown in Map XX, and is the donor of the water to be diverted to both axis of the SFIP. About the state of Pernambuco Suassuna

[49] The situation in the ponds Coremas and Mãe D'água, which remains without water distribution systems, was cited by the World Bank as an examples of the greater importance of investments in distributions systems than in project to raise the volume of the water accumulated in the ponds.

decribes some of the structural problems related to the conservation of the structures of ponds and reservoirs in his home state:

"The state of Pernambuco is the state champion of precarious water supply. With a geology similar to the state of Paraíba _ with 80% of crystalline soils_ Pernambuco faces a more complicated situation because it does not have significant volumes of water accumulated in its territory. The total volume of water accumulated in Pernambuco is 3,4 billions m³, a volume equivalent to one and a half time the water accumulated in the pond of Orós dam, the second largest pond in the state of Ceará. While Poço da Cruz, the largest pond in Pernambuco, with accumulation capacity of 500 millions m³, suffers the problems of abandonment and accumulates less than 30% of its capacity. Poço da Cruz demands fixing in its structure specially because of drippings in the comport that guarantees the discharge, which causes involuntary releases of 20 millions m³ of water in periods of shortage during the dry season. Between second half of December 2001 and the end of January 2002 this dam have accumulated 160 millions m³ and in June 2003 it had 140 millions of m³ of water" (Suassuna, 2007).

The geography of the states of Alagoas and Sergipe according to Suassuna facilitate the introduction of solutions for water supply in greater parts of the territories of these states. However, their semiarid regions have some of the worst levels of water availability of the country, even if the São Francisco river, which defines the limits between these states, crosses the semiarid landscape of both states:

"Alagoas and Sergipe are states with smaller territories with a significative strip of sedimentray soils in the coast with good reserves of ground water. It is estimated that the sedimentary area of Alagoas/Sergipe has an approximate volume of 100 km³/year. In those states the problem of supply is located in their semiarid regions that have the lowest levels water availability according to WHO[50]. The actions commanded by NGO's concentrated on supply through rain water harvest solutions, including the cisterns, have introduced solutions to the semiarid areas for the entire region"(Suassuna, 2007).

About the geology of the state of Ceará, historically the most affected state by the effects of droughts, Suassuna describes that the crystalline soils are also predominant and a small area of sedimentary are found in the semiarid landscape close to the municipalities of Crato and Juazeiro do Norte. The state of Ceará currently has the best water systems of the Northeast region, with water mains connections between the largest ponds as parts of an integrated system which was designed to serve the entire state

[50] The World Health Organization defined as lowest level of water acceptable for human is xxxx

compensating the supply of the stressed regions with water from other sections of the state with better water availability.

"Ceará, where the extension of the semiarid goes to the coast, has a more consistent structure of water than the other Northeastern states. After the construction of the Castanhão dam, which accumulates around 6,7 billions of m³ of water, the biggest pond of the Northeast, this state has increased its accumulation potential to 16 billion m³. The volume of water accumulated in Ceará corresponds to more than 50% of the total volume of water accumulated in all the Northeastern reservoirs. Besides, the government of Ceará has been working to integrate the different basins in the state. According to Ceará's authorities, the project is to supply the regions with difficulties in water supply with water from other regions of the country with better water conditions" (Suassuna, 2007).

The water structure of Ceará described by Suassuna corresponds to the situation I observed in Ceará during fieldwork. However, it is important to note that even with the largest volume of water accumulated Ceará will benefited with the water to be diverted from the São Francisco river, demonstrating the contradictions of the SFIP in relation to the demands of the other states, such as Alagoas, Sergipe and Pernambuco.

The solutions supported by the opponents of the SFIP for the poor isolated rural areas in the semiarid landscape, and outside the semiarid, are based on rain water harvesting as proposed by ASA: P1MC and P1+2 that are described below.

6.3 P1MC

Since the creation of the IOCS in 1909, it is estimated that 70.000 small, medium and larger reservoirs and ponds and wells were constructed in the region (Ladaque, 1989). The number refers to reservoirs are both public and private reservoirs constructed with public money, even if a greater part of those reservoirs are located in private properties. The policy to construct reservoirs in private property was part of the effort of the federal government to support the production in the large estates to keep the agriculture workers busy during the drought and reduce the attractiveness of migration. This policy never fulfilled its objectives of controlling migration, instead have provided the large estates with their own private water reservoirs while increased the dependence of the poor population on the large estate owners while submitted to the rules of the

production in the large farms. Public ponds and reservoirs were constructed around the semiarid landscape but the governments, both state and federal level, have showed great difficult to construct the systems to deliver the water from the reservoirs to the poor population, specially the diffuse population which live in small villages in remote areas of the landscape. The diffuse population does not have access to water facilities and most of these populations usually does not have access to eletricity, gas, education or health facilities as the absence of water facilities is only one aspect of the situaton of the abandonment of the rural population.

Figure 16: Construction of a rural cistern of the P1MC in the Northeast region. Source: ASA

In order to change the lives of the poor rural population Articulação do Semi-árido (ASA), a pool of around 800 NGO's working to combat poverty in the Northeast, leaded by large Catholics organizations, released in 2000 the P1MC, i.e. One Million Rural Cisterns Program. The objective of the program is provide water to poor rural families spread all over the Northeast region through the contruction, as the name says, of one million cisterns in the rural areas of the rural Northeast. According to ASA's website: "the cistern is the most efficient, cheap and democratic solution to deliver water to the poor rural population since it is a solution based on rain water harvest (ASA,2007). Besides the reduced cost of the cistern which permits the accumulation of 16.000 litres of water which is enough for the rational use of one family, up to five members, during eight months without rain. The cistern is constucted by masons of the community trained in water resource management by ASA, and the family who will benefit with the cistern (ASA,2007).

Figure 17: A rural cistern of the P1MC in the Northeast region. Source: ASA

The introduction of the cisterns has given independency to the families living in the semiarid and has also played an important role in the gender relations in the Northeast region since the work of bringing water from ponds and reservoirs, usually located between two to six kilometers distant, is performed almost exclusively by women and children. The P1MC aims at reaching something between five to ten million people, between one and two million families in the most remote areas of the Northeast. The cisterns area being introduced in the entire region based on the fact that water facilities and sanitation are not accessible to the poor rural population outside the limits of the semiarid landscape which is also dependent on rain water accumulated on the ground (ASA, 2007).

Solutions for harvesting rain water are fundamental in the driest areas of the Brazilian semarid due to the shallow crystalline soils which do not allow accumulation of water on ground. The region also has very limited volumes of ground water which are mostly saline. Rain water harvesting solutions are cheap and decentralized solutions with immediate effects. The P1MC is partially financed by the federal government through the Social Development Ministry, donations and other funds provided by NGO's. The P1MC was released in 2001 and until November 2007 it had built 221.514 of the one million planned. The main face of the program are NGO's of the Catholic church, such as Land Pastoral Commission (CPT) and Brazilian Caritas (CB), the Brazilian section of the large Catholic NGO Caritas which also coordinate the program 'clicksemiarid' (Clique Semi-

árido) in the internet where viewers can click and a sponsor will donate to the cistern program[51].

6.4 The P1+2

The program P1MC was largely accepted by the rural population, even if it did not reach its objective yet (one million rural cisterns). The good results of P1MC allowed ASA to release the program P1+2 (One Land, Two Waters Program) a program complementary to P1MC. Through the construction of family cistern the P1MC aimed at providing the poor rural population living in remote areas of the semiarid Northeast good quality water for domestic use, i.e. drinking and cooking. The 'P1+2' aims at delivering a water solution which will allow the harvesting of rain water for sustainable agriculture destined to food production, providing the poor rural households with food security and a source of income (ASA,2008).

Figure 18: Logo of the program P1+2. Source: ASA

In the name 'P1+2' the number '1' represents 'one' land, large enough to permit the production of food products to feed the family, for seeds, and some extra for commercialization and income generation; while number '2' represents 'two waters', which mean two different water reservoirs for two different uses. One cistern to provide water for domestic use and a second cistern to provide water for animal breeding and agricultural production. The P1+2 was conceived to provide better life conditions to the poor rural population of the Northeast whose livelihood is based on subsistence agriculture which is fully dependent of rainfall in a region prone to droughts (ASA,2008).

[51] The Click Semiarid of Caritas Brasileira can be reached at http://www.cliquesemiarido.org.br/default.asp

In January 2007 a demonstrative phase was established and the activities developed in this first phase involved 96 communities in 10 states (the nine states of the Northeast region and state of North region of the state of Minas Gerais) where 144 rain water harvesting solutions, to benefit 818 families, were under construction to be used in food production to help alleviate the rural poverty. The results of this first phase will be used to demonstrate to the donors of the project the benefits of investing in a second phase of the program in larger scale (ASA, 2008).

Figure 19: One of the cisterns for food production contructed by the program P1+2 in the community of Girimun in the municipality of Pio IX in the state of Piauí. Source: ASA

The importance of this type of programs is that it changes the reality in the rural areas of the region strucby absolute poverty. Dedicated exclusively to subsistence agriculture, the poor rural population of the Northeast region, the target of P1+2, is the tool the population needed to live in harmony with their environment.

The 'P1+2' was inspired by the project 1+2+1 which was introduced in China during the 1980's. ASA (2008) reports that until 1992 the Chinese program had served a total of 1.944.000 families in poor rural areas of China. The Brazilian P1+2 is a program developed by ASA with donations provided by private donors and the support of the Social Development and Hunger Combat Ministry, CODEVASF and Agrarian Development Ministry.

6.5 The Northeast Atlas

The Northeast Atlas is a project which has the support of all the opponents of the SFIP. The Northeast Atlas is a study of solutions which can provide satisfatory water conditions for municipalities with more than five thousand inhabitants in the Northeast

region in order to avoid an announced water collapse by 2015. Like the projects P1MC and P1+2, the Northeast Atlas is a project conceived to benefit the population of the entire Northeast region, plus a section of the state of Minas Gerais. The Northeast is a project of the National Water Agency (ANA) an agency of the federal government.

The Northest Atlas is a detailed map of the water availability in the municipalities with more than five thousand inhabitants in the nine states of the Northeast region and part of the state of Minas Gerais. The solutions proposed by the Northeast Atlas have not acquired the status of priorities appearing mostly as alternative solutions because ANA is an agency that provides studies but without a budget to execute the project. The interventions proposed by the Atlas were conceived to improve the basic water supply system in those municipalities. The project focus on guaranteeing the water supply by expanding the capacity of old systems, construction of new water resources systems, new water mains, improving the quality of the water through the establishment of stations for treatment and desinfectation.

The objective of the Atlas was to create a vast profile of the water resources and water systems in the Northeast region to help the local governments to conduct their water resources projects. The creation of the Atlas was based on the fact that the Northeast has the worst levels of access to water and sanitation in the country and is a region with a complex relationship with its water resources due to the occurrence of droughts which has left strong social scars.

6.6 Conclusion

This chapter has presented the discourse carried out by the opponents of the SFIP among them bishop Dom Luiz Flavio Cappio who speaks for the poor population living in the region of the São Francisco basin. It has also present and the solutions proposed as alternatives to the SFIP by the opponents of the project. Next chapter presents the final analyses of the research.

Chapter 7 - Droughts, Morality, State Politics and the Semiarid Landscape

7.1 Introduction

This chapter analyzes some of the issues introduced in the previous chapters. It first analyzes the problem of droughts, second it analyses the role of morality in the conflicts of the SFIP, then it analyzes the role of the state in the conflict around the SFIP and finally it analyzes the semiarid landscape.

7.2 Droughts

As demonstrated in the previous chapters, droughts have been a fundamental element in the history and geography of the Northeast region. Since the end of the 19th century the occurrence of droughts became an element which justified divisions and sub-divisions of the region. The occurrence of droughts has also played a major role in the process of the division of the old North region for the creation of the Northeastern region (Ribeiro, 2001).

The habitus established with the creation of the Northeast region homogenized the region through the occurrence of droughts. Droughts became the element of consensus in the discourse about the Northeast. Droughts were institutionalized as a 'worldview' and droughts became the doxa of the regional habitus, '*an unquestionable orthodoxy that operates as if it were the objective truth*' (Chopra, 2003:421).

Droughts as doxa dominated the discourse and established a doxa-specific way of understanding the Northeastern social space. '*Doxa*' is '*habitus*' specific (Bourdieu, 1977), what makes it very difficult for a member of a '*habitus*' to reject its '*doxa*' since the effects of rejecting the '*doxa*' are similar to that of killing your own mother[52].

[52] This is an example and it is also figurative example.

Droughts as 'doxa' is the second nature, the non-natural force which hides the structural problems of the Northeastern social space. The opponents of the SFIP have challenged the '*doxa*' by defending the obvious: that droughts are not a problem, but an inherent part of the Northeastern environment.

7.3 Morality

The conflict around the SFIP demonstrates how different groups have different perspectives over the landscape and how the groups who accumulate more capital in the social space have more chances of defining which perspective is the 'right' way to see the landscape.

The existing different moralities, expressed in the different ways of seeing the landscape, generate different perceptions of what is a problem and what is not a problem in the semiarid landscape. The government finances a giant project which is justified by the existence of a water deficit in the reservoirs, this water deficit is caused not only by the occurrence of droughts, but also by the high evapotranspiration which characterizes the region.

The opponents of the SFIP reject the perspective carried out by the government thus stressing that the most serious problem of the semiarid landscape is not the water deficit, but the unequal structure of the social space, which can be demonstrated by the concentrated land structure, which is responsible for the poverty of the region. The unequal structure does not democratize the access to the water accumulated in the reservoirs of the region, in the same way that it does not democratize the access to the land.

The opposition established between government and civil society organizations around the SFIP demonstrated to the Brazilian society the existence of different ways of seeing the semiarid. The conflict has demonstrated the existence of different moralities claiming their right to decide the future of the landscape. The conflict has showed that the

semiarid landscape is a site of political struggle where different groups compete for their right to decide the future of the landscape (Mitchell, 1996)

As Mitchell has stresses, "*landscape is best understood as a kind of produced, lived, and represented space constructed out of the struggles, compromises, and temporarily settled relations of competing and cooperating social actors: it is both a thing (..) and a social process, at once solidly material and ever changing*" (Mitchell, 1996:30).

7.4 State Politics

As Bourdieu (1998) has stressed, the state has the power of shaping the social space through the ways it chooses to use its metacapital (statist power). The state has also the ability to "*shape the structures of perceptions and cognition across society it governs*" (Chopra, 2003:430).

That is to say that it is the state has the power to define what is a social problem and what is not a social problem, the power to naturalizating the view of the dominant groups int the society.

7.5 Semiarid Landscape

It is important to bear in mind that landscapes are products of specific historical conditions, that landscape plays a role in reproducing the social relations which have created it (Mitchell, 1996).

The semiarid landscape was constructed as a troubled landscape around the occurrence of droughts, and this construction serves the interests of the group which have created it. The semiarid as a problem, as the cause of the problems of the landscape, contributes to the alienation of other structural problems and the reproduction of the social relations.

The semiarid landscape contributes to make the Northeast look different from the other regions of the country what contribute to weaken the role of this region in fighting other structural problems, such as the concentrated structure of the land.

The SFIP contributes to the characterization of the semiarid as troubled landscape, while the opponents of the SFIP demonstrate that the problems of the semiarid landscape are, as in the other regions of the country, related to the unequal structure of the country.

The state relate the poverty of the region to the semiarid climate, refusing to see the complexity of the relationship between poverty and water. The state refuses to investigate the reasons why Maranhão, the semi-amazonian state is the poorest of the Northeast and the poorest state of Brazil even being 100% outside the limis of the semiarid landscape. While Alagoas, the second poorest state of the Northeast region and of Brazil, which has its territory crossed by the São Francisco river, denying the direct logic between poverty and lack of water.

The relationship between poverty and water is not so simple, actually it is one of the most complex relationship to be observed because there are a lot of other elements that can easily interfere in this relationship, making a great difference.

The semiarid landscape is the Brazilian example of what Cosgrove (1984) indicates as *"very complex cultural product",* a product of a very complex society.

7.6 Conclusion

This chapter presented the analyzes of the different issues introduced in the previous chapter of the thesis, i.e. droughts, morality, state politics and the semiarid landscape. These issues are interconnected and the analyzes of these issues may eventually look entwined.

Chapter 8 - Conclusion

8.1 Introduction

As I struggle to write this conclusion I am informed that 52 '*açudes*' (dam ponds) have flooded in the state of Ceará so far during the Northeastern winter. This information comes to me as a confirmation that I am following the right track. This chapter presents a summary of the content of this thesis which have showed that the way the Brazilian state see the semiarid it can not understand the real dramas of that landscape. This chapter brings some recommendations and analyzes the contraints of the research presented here.

8.2 Summary

This thesis presented the contradictions of the São Francisco River Integration Project, a governmental project based on old assumptions about the landscape, where the responsibility for the poverty and the low levels of development of the Northeast region are related to a supposed water deficit.

This thesis has also showed that there are other discourses about the problems of the semiarid landscape, other discourses carried out by different social groups which claim that there is not a water deficit in the region, thus the problem of the semiarid is the unequal structure of the water resources.

It is not a surprise to find out that a society like the Brazilian society, which has developed one of the most concentrate land structures in the world, also have an extremely concentrated 'water structure'. Land and water are the two sides of the same problem, which explains why those who defends the preservation of the concentrated land structure are also defending the preservation of a concentrated water structure.

8.3 Recommendations

Based on the content presented, this thesis has set the following recommendations.

Besides disaproving the continuation of SFIP, a project based on heavy intervention on the environment of a stressed river basin, this research has concluded that the best solutions for the rural population of the semiarid landscape and the Northeast region are based on rain water harvesting solutions. This research suggest that the simple and cheap rain water harvesting solutions to be prioritize by the government as demand these solutions have demonstrated to be very effective in lifting the rural population of the Northeast from poverty.

The Northeast region is constituted by very complex and fragile environments due to the intense deforestation, farming, mining and the effects of the semiarid climate. The reforestation and revitalization of the semiarid environment must be prioritize in order to protect the water resources, the biodiversity which can guarantee a better environment for the people living in the Northeast and in its the semiarid landscape. The conservation and reforestation of the region is the most fundamental for the preservation of the landscape.

8.4 Final Conclusion

The dominant perspective puts the obstacle to development in natural environment, however, as demonstrated here, nature is not the obstacle for development (Dobie, 2006) but wrong policies are.

References:

Abreu, Capistrano de (1979) Capítulos de História Colonial e o Povoamento do Brasil. Brasília, Editora Universidade de Brasilia.

Nascimento, Dilermando Alves de (2007) Os números contraditórios do projeto de transposição do rio São Francisco. EcoDebate at http://wwwecodebate.com.br accessed in 15/01/2008

Andrade, Manoel Correia de (2004) A Terra e o Homem no Nordeste. São Paulo, Cortez Editora (7th Edition).

Andrade, Renata Marson Teixeira de (2006) The Third Bank of the Lower São Francisco River: Culture, Nature and Power in Northeast Brazil (1853-2003). University of California at Berkeley, PhD Dissertation.

Bloch, Marc (1982) A Sociedade Feudal. Lisboa, Edições Setenta.

Bonfin, Manoel (2007) As Potencialidades do Semi-árido Nordestino. XXX

Bourdieu, Pierre (1977) Outline of a Theory of Practice. Cambridge, Cambridge University Press.

_____(1980) The Logic of Practice. Stanford, Stanford University Press.

_____(1989) Social Space and Symbolic Power. *Sociological Theory*, Vol.7, No.1 (spring 1989), 14-25.

_____(1990) The Logic of Practice. London, Polity Press.

_____(1998) Practical Reason. Stanford, Stanford University Press.

_____(1999) Scattered Remarks. *European Journal of Social Theory* 1999;2(3) 334-340.

_____(2000) Pascalian Meditations. Cambridge, Polity Press

_____(2002) Habitus. Jean Hillier and Emma Rooksby (eds.) Habitus: a Sense of Place. Hants, Ashgate Publising.

Bourdieu, Pierre & Wacquant, Loïc (1992) An Invitation to Reflexive Sociology. Chicago, The University of Chicago Press.

Bursztyn, Marcel (1984) O Poder dos Donos, Planejamento e Clientelismo no Nordeste.

Petrópolis, Editora Vozes.

_____(1990) O País das Alianças. Elites e Continuísmo no Brasil. Petrópolis, Editora Vozes.

Canzian, Fernando (2006) XXXXXXXX Folha de S.Paulo.

Cardim, Fernão (1583/1980) Tratados da Terra e da Gente do Brasil. São Paulo, Editora Itatiaia Ltda/ Editora da Universidade de São Paulo

Castro, Iná Pereira de (1994) Da Seca como Problema à Seca como Recurso. Velhos e Novos Discursos, Velhos e Novos Territórios. *Anuário Geo.* UFRJ, Rio de Janeiro, 1-13.

_____(1992) O Mito da Necessidade: Discurso e Prática do Regionalismo Nordestino. Rio de Janeiro, Editora Bertrand Russell.

Chopra, Rohit (2003) Neoliberalism as Doxa: Bourdieu and the Contemporary Indian Discourse on Globalization and Liberalization. *Cultural Studies* 17(3/4) 2003, 419-444.

CODEVASF (2008) Companhia de Desenvolvimento dos Vales do Rios São Francisco e Parnaíba. Data available at http://www.codevasf.gov.br

Coelho, Jorge (1985) As Secas do Nordeste e a Indústria das Secas. Petrópolis, Ed.Vozes.

Cosgrove, Denis E. (1984) Social Formation and Symbolic Landscape. Madison, University of Wisconsin Press

Cunha, Euclides da (1906/1975) Contrastes e Confrontos. Rio de Janeiro, Editora Record.

Davis, Mike (2001) Late Victorian Holocausts: El Niño Famines and the Making of the Third World. London, Verso.

De Certeau, Michel (1988) – The Writing of History. New York, Columbia University Press.

Dean, Warren (1995) A Ferro e Fogo: A História e a Devastação da Mata Atlântica Brasileira. São Paulo, Companhia das Letras.

Dobie, Philip (2006) Don't Desert Dryland Peoples. *Our Planet: Deserts and Drylands*. Vol 17, N.1.

Duarte, Renato (2002). Seca e Pobreza no Semi-Árido Nordestino. Downloaded in 15/10/2007 at http://168.96.200.17/ar/libros/pobreza/duarte.pdf

Estado de S.Paulo, 06/04/2008 - CNBB discute impacto social das obras no São

Francisco

Estado de S.Paulo, 18/12/2007 - Bispo faz 8 exigências ao governo para encerrar greve de fome

Estado de S.Paulo, 18/12/2007 - Lula cede `a pressão do bispo e aceita parar as obras para negociar (Leonencio Nossa)

Faoro, Raimundo (1979) Os Donos do Poder: A Formação do Patronato Político Brasileiro. Rio de Janeiro, Editora Globo.

Ferlini, Vera Lúcia do Amaral (1986) A Civilização do Açúcar: Séculos XVI a XVIII. Coleção Tudo é História. São Paulo, Editora Brasiliense.

Folha de S.Paulo, 09/10/2005 - Projeto busca manter eleitorado fiel a Lula (Marcio Pinheiro & Rodrigo Rötzsch)

Folha de S.Paulo, 09/10/2005 -Entre doadores e receptores, Nordeste se divide (Marcio Pinheiro & Rodrigo Rötzsch)

Folha de S.Paulo, 09/10/2005 - Política revive projeto de tempos em tempos (Marcelo Leite)

Gabaglia, Giácomo Raja (1877) Ensaios sobre alguns melhoramentos tendentes à prosperidade da Província do Ceará" in "A seca no Ceará: escritos de Guilherme Capanema e Raja Gabaglia". Keila Souza Rios (Ed.) UFC, Fortaleza.

_____(1989) Polêmicas e Controversias sobre a Gênese do Escravismo. *Espacio, Tiempo y Forma*. Serie IV, H. Moderna, t.2, 1989 :13-22.

IBGE (2007) Instituto Brasileiro de Geografia e Estatistica. National data available at: http://www.ibge.gov.br

Suassuna, João 2007a) A Questão Hídrica at http://www.remaatlantico.org/sul/author/suassuna

_____(2007b) Um projeto politicamente desastroso at: http://www.remaatlantico.org/sul/author/suassuna

Jones, Michael (1991) Landscape, Concepts and Approaches. *Norsk Geografisk Tidsskrift* 45, 229-244.

_____(2006) Landscape, Law and Justice. *Norsk Geografisk Tidsskrift* Vol. 60, pp.1-14

Kvale, Steinar (1995) The Social Construction of Validity. *Qualitative Inquiry*. 1;19. Sage Publications

Le Goff, Jacques (1992) – History and Memory. New York, Columbia University Press.

Library of American Congress (2007) Country Study of Brazil. [online] URL: http://memory.loc.gov/

Lemos, Maria Margaret (1996) Mais Vale Um Jegue Que Me Carregue Que Um Camelo Que Me Derrube... Lá no Ceará. *Historia, Ciência, Saúde - Manguinhos*, III (1):50-64 Mar-Jun. 1996.

Malvezzi, Roberto(2007d) Razão Última da Transposição at http://www.adital.com.br

Mc Nully, Patrick (2006) Spreading the Water Wealth, Making Water Infrastructure Work for the Poor. *IRN Report*. International Rivers Network, Berkeley, California.

Magrin, G., C.Gay Garcia, D.Cruz Choque, J.C.Gimenez, A.R.Moreno, G.J. Nagy, C. Nobre and A. Villamizar (2007) Latin America Climate Change: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. M.L. Parry, O.F Canziani, J.P. Palutikof, P.J. van de Linden and C.E. Hanson (Eds.) Cambridge University Press, Cambridge. 581-615.

Ministério da Integração Nacional (2005) Nova Delimitação do Semi-árido Brasileiro. MIN, Brasília, 2005.

Ministério da Integração Nacional (2006) The São Francisco River Integration Project with the Basins of the Septentrional Northeast. Brasília, DF.

Ministério do Meio Ambiente (2008) -

Mitchell, Don (1996) The Lie of the Land: Migrant Workers and the California Landscape. Minneapolis, University of Minnesota Press.

_____ (2000) Cultural Geography: A Critical Introduction. Malden, Blackwell Publishers.

_____ (2003) Cultural Landscapes: just landscapes or landscapes of justice? *Progress in Human Geography* 27, 6 pp 787-796.

_____ (2004) CCCC

Nietzsche, Friedrich Wilhelm (1887/1994) On the Genealogy of Morals. Cambridge, Cambridge University Press.

_____ (1886/1997) Beyond Good and Evil. Mineola, Dover Publications.

Novais, Fernando (1979) Portugal e Brasil na Crise do Antigo Sistema Colonial. São Paulo, Editora Hucitec.

Olwig, Kenneth (2002) Landscape, Nature and the Body Politic: From Britain's Renaissance to America's New World. Madison, University of Wisconsin Press.

_____(1996) Recovering the Substantive Nature of Landscape. *Annals of the Association of American Geographers*, 86(4), 630-653.

Pinheiro, Raquel (2002) As Histórias da Comissão Científica de Exploração (1856) na Correspondência de Gustavo Schüch Campanema. Campinas, Unicamp. Master thesis.

Polkinghorne, Donald E. (2007) Validity Issues in Narrative Research. *Qualitative Inquiry*, Vol.13, N.4: 471- 486. Sage Publications.

Random House Inc (2006) Random House Webster's Unabridged Dictionary. Random House, New York.

Rebouças, Aldo da C. (1997). Água na região Nordeste: desperdício e escassez. Estud. av. , São Paulo, v. 11, n. 29, 1997 . Available at: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-40141997000100007&lng=en&nrm=iso>

Accessed in 19 Feb 2008.

Reymão, A.E & Abe Saber, B. (2007) Acesso à Água Tratada e Insuficiência de Renda: Duas Dimensões do Problema da Pobreza no Nordeste Brasileiro sob a Ótica dos Objetivos do Milênio. *Boletim da Sociedade Brasileira de Economia Ecológica*. Brasília, N.16, 10-17.

Ribeiro, Renato Winter (2001) A Construção da Aridez: Representações da Natureza, Regionalização e Institucionalização do Combate à Seca (1877-1909). Master thesis, Rio de Janeiro, Rio de Janeiro Federal University.

RIMA (2004) Relatório de Impacto Ambiental do Projeto de Integração do Rio São Francisco com Bacias Hidrográficas do Nordeste Setentrional. Ministerio da Integração Nacional, Ecology Brasil, Agrar and JP Meio Ambiente. DF, Brasília.

Setten, Gunhild (2004) The Habitus, the Rule and the Moral Landscape. *Cultural Geographies* 11: 313-339.

Setten, Gunhild & Brown, K.M (2008) Moral Landscapes. Thrift, N. & Kitchin, R. (eds.) *International Encyclopedia of Human Geography*. Elsevier, Oxford.

Silva, Francisco Carlos Teixeira da (2007) XXXXX

Smith, David M (2000) – Moral Geographies, ethics in a world of difference. Edinburgh, Edinburgh University Press.

Smith, David M & Lee, Roger (2004) – Geographies and Moralities: International Perspectives on Development, Justice and Place. Smith, David M. & Lee, Roger (Eds).Malden, Blackwell Publishing.

Smith, Susan (2001) Doing Qualitative Research: From Interpretation to Action. *Qualitative Methodologies for Geographers 23-40.* Limb, M. and Dwyer, C. (eds.) London, Arnold Publishers.

Suassuna, João (2007) Convivência com o Semi-árido. *Boletim da Sociedade Brasileira de Economia Ecológica*. Brasília, N.16: 4-7.

Teófilo, Rodolfo (1922) Secas do Ceará. Rio de Janeiro, Imprensa Inglesa.

Thompson, E.P (1978) The Poverty of Theory and Other Essays. London, Merlin Press.

Travers, Max (2001) Qualitative Research Through Case Studies. London, Sage Publications.

Valentine,Gill (2001) Developing a research design. *Qualitative Methodologies for Geographers 41-54.* Limb, M and Dwyer, C (eds.) London, Arnold Publishers.

Villa, Marco Antonio (2001) Vida e Morte no Sertão: A Historia das Secas no Nordeste nos Séculos XIX e XX. São Paulo, Editora Ática.

Wacquant, Löic (2005) XXXX

Weiszflog, Walter (2007) Michaelis Dicionário Português-Inglês. Walter Weiszflog et al. (Walter Weiszflog Editor) São Paulo, Editora Melhoramentos.

White, Hayden (1978) Tropics of Discourse: Essays in Cultural Criticism. Baltimore,The John Hopkins University Press.

World Bank (2000) Forests in the Balance: Challenges of Conservation with Development p.183

World Bank (2005) Transferência de Águas entre Bacias Hidrográficas. *Série Água Brasil.* N. 7. Brasília, Banco Mundial. June, 2005.

WWF Brazil (2008) Biomas Brasileiros at http://www.wwf.org.br/natureza_brasileira/biomas/index.cfm