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EDUCATION

THE TRADEOFFS OF CONSERVATION AND ECONOMIC DEVELOPMENT IN
JERICOACOARA NATIONAL PARK

RAYMOND CHAPPETTA
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Reviewed and approved* by the following:

Theodore Alter
Professor of Agricultural, Environmental and Regional Economics
Thesis Supervisor, Honors Adviser

Frans Padt
Senior Lecturer in Agricultural Economics, Sociology, and Education
Thesis Second Reader

* Signatures are on file in the Schreyer Honors College.

ABSTRACT

Brazil is a country with a large tourism industry. Brazil practices tourism development as a strategy of both environmental conservation and economic development. However, these two goals can be at odds with each other. This thesis explores the dilemma of environmental conservation and economic development in the Village of Jericoacoara (Jeri) and the Jericoacoara National Park (JNP) which surrounds it. Using a case study method grounded in the analysis of primary and secondary documents related to the park and town, I explore this dilemma in the research site. Ultimately I identify issues of concern and make recommendations in improving park management that may be of use in both JNP and other national parks in Brazil.

Table of Contents

List of Figures	iii
Acknowledgements.....	iv
Introduction.....	1
The Dilemma of Conservation and Development.....	4
Methodology	7
Research Questions	7
Case Study Method	8
Choosing the Case Study	11
Resource Types	13
Participant Observation.....	14
Human and Environmental Interactions in Jeri and JNP	16
Physical Geography	16
Climate.....	21
Regional History	21
Political Geography.....	23
Economy	24
Demographics	25
Findings and Discussion	27
Managing Biodiversity.....	27
Social Marginalization	32
Creating a Tourism Corridor.....	37
Conclusion	42
Bibliography	45

List of Figures

Figure 1. Location of Ceará within Brazil	17
Figure 2. Location of Jericoacoara within Ceará	17
Figure 3. A Simple Map of the Village of Jericoacoara	20
Figure 4. Duna Pôr-do-Sol, the Sunset Dune.....	20
Figure 5. Pedra Furada, the Burrowed Hole	21
Figure 6. Border of the JNP in relation to local Municipal Boundaries.....	24

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Introduction

The largest country in South America, Brazil has shown great economic growth over the last decade, which indicators such as GNI per capital increasing by over 300% since 2000 (World Bank, 2014). Fueling this growth comes in part from the country's healthy tourism industry. It offers global cities with vibrant cultures like Rio de Janeiro and Salvador. Additionally, it offers amazing natural resources. Brazil contains about 40% of the Amazon Rainforest, thousands of miles of coastline, mountainous regions, and the Pantanal, the largest wetland region in the world. As global tourists have begun to more value environmental and eco-tourism, it is understandable that Brazil has pursued increased such touristic ventures to meet demands. The revenues from such activities are large, and in order to sustain this influx of capital, the commodity that is being sold—the environment—must too be sustained and properly managed.

Geographically Brazil is partitioned into five main regions, the North, Northeast, Central-West, South East, and South. Each has its own physical and economic characteristics. The North and Central-West regions re dominated by rainforest and wetland ecosystems, some of the largest in the world. These provide fertile lands for agriculture, natural areas of environmentally-based tourism, and even proper geology for extraction industries like mining. In the Southeast, Brazil three largest cities: São Paulo, Rio de Janeiro, and Belo Horizonte set the region as the financial capital of the country. In the South agriculture and industry are both big. In the Northeast, where this study is focused, however, tourism is the largest industry, without as much input from financial and agricultural sectors. With a string of smaller states lined mostly close to the maritime

border with the Atlantic Ocean, this region brings images of the beach and resort cities to mind. For the most part, each of the regions seems to meld into each other. However, there is one particular area along the north Atlantic coast of Brazil that seems to stand out between the cities of Belém and Fortaleza. Along Brazil's north coast, the country transitions from the tropical North Region to the semi-arid tropics of the Northeast Region. Unlike the east half of Brazil's Northeast, the north coast area of the Northeast is much more sparsely populated. While this region can be difficult to travel through, it may possess touristic potential that could be utilized to improve the quality of life in the area.

It is in this area where one finds the village of Jericoacoara (Jeri), Brazil and the surrounding Jericoacoara National Park (JNP). This village and park occupy a unique space at the intersection of geography, politics, and tourism. Forty years ago, Jeri was an isolated fisherman village. Located 310 km west of Fortaleza, the town sustained itself through artisanal fishing and informal economic activities. With the discovery of this town and recognition of its features of natural beauty, the village began to develop and integrate into regional and national economy. Through time, with the establishment of an environmental protection area and later a national park, Jeri has become internationally popular based on its perceived relaxed atmosphere in conjunction with the beauty of its beaches, dunes, and other natural features.

This development has brought big changes to this once isolated village. The introduction of tourism can have different effects on an area. On one hand, tourism can bring much needed capital into a community, allowing economic growth and development to occur. On the other, opening up a community to the presence of outsiders through tourism can have unexpected impacts of an area's environment. Through the

course of this research paper, I will explore the development history of the village of Jeri and JNP with the goal to describe the tradeoffs of environmental conservation and economic development as they manifest here. The paper will continue first with a more detailed discussion of tourism development. Then it will describe my research methodology, followed by an in-depth description of Jeri and the JNP viewed through the interaction between humans and the environment. I follow this description with a discussion of several policy issues pertinent to the development of Jeri and JNP, and end with a conclusion where I discuss the situation of Jeri and JNP in full and suggest recommendations for moving forward.

The Dilemma of Conservation and Development

National parks and tourism development play important roles for many countries. As conservation units, national parks seek to both preserve and conserve natural resources. They may preserve resources through prohibiting development and resource extraction. They may conserve these resources by managing possible extraction, such as sustainable logging or mining ores in conjunction with reforestation.

By zoning land as a national park a country can reap various benefits. In the conservation examples above, national parks can be utilized for economic development. By providing jobs, local people may experience growth in their quality of life and see human capital begin to develop as well. New money enters local economies supporting new enterprises.

Like national parks, tourism promotes economic development. International tourism between countries is especially important as it provides an injection of capital into a country that has often been generated elsewhere in the world. This allows tourism in one country to subsidize its costs with the money of another country, making it a very economically viable given a country's touristic potential. With a growth of interest in environmental and eco-tourism, low-income, less developed countries are capitalizing on the fact that they generally have large areas of undeveloped land and large amount of available labor. This injection of capital can be seen on the regional scale, such as from one state to another, or more locally from one town to another.

In Brazil, which has been steadily growing economically for the past decade

(World Bank, 2014), the federal government has used national park and tourism development to promote environmental conservation and economic growth. Brazil is well known as having vast natural resources of economic and aesthetic value. It is known for beautiful areas of beach, forest, and wetlands as well as for vast agricultural, mineral, and silvicultural output. Designating land for national parks allows Brazil to create jobs in resource management and tourism.

Beyond the nature of regions like the Brazil Amazon, coastline, and Pantanal wetlands, cultural events like Carnival in cities like Rio de Janeiro and Salvador attract thousands of visitors. In the northern city Belem, the world's largest Christian celebration, Círio, attracts more than 2 million visitors every October. Soccer and sporting events are other large draws. Brazil was host to the 2007 Pan-American games and will soon host the 2014 World Cup and the 2016 Olympics in Rio de Janeiro, the first Olympics ever to be held in South America.

However, inherent in the combination of national park and tourism development is a dilemma. National parks work to preserve and conserve natural resources. But, increased tourism development can degrade the environment. Tourism development encourages elements of a built environment to develop, such as roads, sewers, and buildings in general. Vegetated areas, however, may be razed and animal habitats may be destroyed.

Conservation suggests a sense of management, but this does not mean that proper manage is practiced Issues of financing other social issue in a country like poverty and food insecurity might take priority over funding national park staff. That calls into question the area's designation as a national park. In name a national park seeks to

promote conservation, but in practice, recreational and touristic use may undermine this goal if not managed properly.

Addressing this dilemma at several scales is important for attaining goals of natural resource conservation and economic development. The main problem is rectifying the inherent conflict in an area's role as both a conservation unit and tourism destination. Its classification as a conservation unit means it works to preserve land from residential and other types of development and land use, but it does not guard against degradation caused by general human activities.

Methodology

Research Questions

This research seeks to answer several questions. These include: How does the dilemma between conservation and economic development manifest itself in Jeri and JNP? What are the biggest areas of concern regarding this dilemma in Jeri and JNP, and how might these concerns be rectified? These same questions can then be asked at a larger scale. Instead of containing the question to this national park, one can ask the same questions regarding the region and the country as a whole, since tourism development is practiced throughout the country. Ultimately, the goal is to identify which issues occur in Jeri and JNP, to describe their context, and recommend how can these issues be solved or mitigated. In that way, the findings from studying Jeri and JNP can be used to gain insight on and suggest ideas about current and future park development and management projects in other parts of Brazil. Such insight can be used as a tool by professionals as they study development projects. Drawing from the example of Jeri and JNP may be helpful in managing similar problems elsewhere and could lead to the implementation of new park policies.

Case Study Method

The primary research method used in this study is the case study. Case study is a research method that explores phenomena within a real world context. It is in-depth, multifaceted, intentionally large, and conducted in great detail (Feagin et al., 1991). Ultimately case studies work to “illuminate a decision or set of decisions, why they were taken, how they were implemented, and with what result” in a situation in which the researcher has little or no control (Schramm, 1971, p.5).

Case studies tend to rely more heavily on qualitative research methods than quantitative ones. However, the case study researcher still often employ methods like surveys and experiments in addition to ethnography, participant observation, and biography. This allows the researcher to place the unit of analysis, whether a single person, population of people, or area in a more real-world context.

Whereas a survey or experiment probes specific questions to test clearly defined variables, counting other factors as too far removed, the case study seeks to identify all factors on the unit of analysis to place it in a more realistic context. The former methods study one finger, but not the hand as whole or how all the fingers work together. The latter highlights these interactions to give a fuller picture of the finger beyond itself.

According to Feagin et al. (1991), the case study conveys four central elements: 1) it grounds observation in a natural setting at close range, 2) allows holistic study of complex social action by drawing on varied source-types from various time periods, 3) enables the researcher to examine continuity and change, and 4) facilitates theoretical innovation and theoretical generalization. Yin (2009) simplifies the criteria for when an

investigator is apt to use a case study method as when “a how or why question is being asked about,” the case deals with “a contemporary set of events,” and the investigator has little or no control over the happening of those events (p.12). Ultimately, the use of the case study “is essential if social science is to grapple with major social issues on both the historical and contemporary scenes” (Feagin et al., 1991, p.28).

Case studies have a number of values that make them appropriate for this study. First and foremost, they use a real world example. Case studies reflect real-world situations. This means that there are few assumptions to be made or pre-designed. Rather, the research must take into account all aspects of the situation as they are, no matter how dissimilar different aspects are. By placing a phenomenon within an existing context, the researcher can achieve results that better reflect how phenomena develop and behave given the complex realities that exist outside of a lab.

Case studies are also beneficial in studying more marginal or inaccessible types of populations. Some social scientists contend that research methods are alien to the interests to highly powerful and the highly disadvantaged and that ultimately these groups can only be studied through case study-like methods. For instance, the highly disadvantaged may not respond well to surveys as they are more likely to be less literate. This would skew who could actually respond. Conversely, the elite may be educated enough to purposely mislead survey questions to maintain their status quo.

Case studies can also be used in conjunction with larger research projects. By first completing a case study, the researcher explores as much of the situation and site as possible. These include factors like local history, industries, economics, climate, and environment. Some may emerge as being more important than others. As such, case

studies work well as preliminary tools to help researchers identify areas for future study. It ultimately helps form the correct question that the researcher should be asking for future research purposes. Conversely, it may also be used following another research study in order to provide more detail to certain subjects.

One often-stated limitation to the case study method is that data only applied to one case. The results obtained from one case study will not match the result of any other case study experiment. This singular-ness and the often complex narrative of the case study make it difficult to generalize the data beyond the study and suggest that any findings lack substantial scientific backing. Because many case studies are performed over a long period of time with the collection of a lot of data, it calls into question the work put into a case study if the results may only have limited use and relevance.

However, Bent Flyvbjerg (2006) questions the importance of generalization as a sole research goal in his paper, "Five misunderstandings About Case Studies." While he concedes that case studies are hard to generalize, he challenges that the ability to generalize is only one tool a researcher has at his disposal. "That knowledge cannot be formally generalized does not mean that it cannot enter into the collective process of knowledge accumulation in a given field or in a society," he writes, "A purely descriptive, phenomenological case study without any attempt to generalize can certainly be of value in this process and has often helped cut a path toward scientific innovation" (Flyvbjerg; 2006: 227). Knowledge can be generated and presented in many different ways. Just because case studies may present knowledge in a way that is hard to generalize does not mean that they lack useful knowledge at all.

Another limitation stems from the way that case studies tend to be conceptualized and written. Often the case study researcher presents his work as a narrative, which broad descriptions not common in more quantitatively based work. This calls into question bias. The same data used by different scientists could yield completely different narratives, with each researcher trying to tell his own story. Again, Flyvbjerg challenges this, standing firm that bias in case study and other qualitative methods is no greater than in quantitative methods. He cites the possibility for bias in survey questionnaires and in the choice of variables for an experiment. Ultimately Flyvbjerg advocates that the researcher bases his understanding of the context of his case. He states “Only in this way can researchers understand the viewpoints and the behavior, which characterize social actors” (Flyvbjerg; 2006: 236). Therefore, by allowing some subjectivity the research can create more comprehensive conclusions and interpretations.

Choosing the Case Study

In my case the unit of analysis is the village of Jericoacoara (Jeri) and the Jericoacoara National Park (JNP). I use primary and secondary documents such as park manuals, research articles, periodical articles, and census data to construct a sociobiography of Jeri. This is in addition to participant observation that I was able to perform on site in the summer of 2013.

Jericoacoara is a suitable site as the natural resources it is conserving is mostly of aesthetic value. Therefore, degradation of the land means it is destroying the very essence

that encourages visitors. Furthermore, because it has been fairly recently established it suggests how future national parks may be developed. The study of Jericoacoara and this dilemma as it manifests here may help understand how to better the intersection of national parks and tourism development in future projects. Additionally, suggestions and recommendation of this case may be able to be applied to Brazil's older parks as a way of evaluating how this dilemma exists in relation to other cases.

Because the events in Jeri are contemporary and ongoing, having started roughly fifty years ago, a case study of Jeri will allow the examination of continuity and change. Key contemporary changes are easily identified, such as the 1984 establishment of a Jeri environmental protection area and the 2002 establishment of the PNJ. These show that Jeri is dynamic, not static, and has not yet fallen into the realm of "history" for its methodology.

Additionally, Jericoacoara is an applicable site for case study use because it presents unique features and history. As previously described, its location nearby major cities, mixed with aesthetic value and geographic isolation have lent themselves to Jericoacoara's growth. Its development raises questions in the broader context of Brazilian national park and tourism development, as described in earlier sections.

Another reason to perform a case study is that Jeri could be described as a marginalized community. It is mostly marginalized on account of its geographic isolation. Its institutions are rudimentary: a small health center, one primary and secondary school, no military police, and no bank. Illiteracy is high and there is a stark socio-economic contrast between the generally-lower class local residents and the wealthier middle class Brazilians and international tourists that visit Jeri. Due to the local

population's lack of familiarity with certain institutions, lower education rates, and a slightly oppressed nature the use of a survey method might be culturally inappropriate (Fonteles, 2005).

By looking into the case of Jeri we can look at this dilemma between tourism development and conservation at a smaller scale. Doing such allows me to generate ideas and recommendations of what issue might exist and what solutions might be proposed in other similar cases in Brazil.

Resource Types

This project uses secondary document analysis as a way to conduct this case study. Two general types of resources are utilized in my research: park management documents and research papers dealing with the area. By analyzing this history and drawing from more general sources that the research begins to answer "why" Jericoacoara has developed as it has by placing it in a larger context. Additionally, the research draws from personal observation while in Jericoacoara from June to August 2013 to add details to claims found in research.

The park management documents are a collection of over 500 pages spread over half a dozen documents detailing the intricacies of Jericoacoara environment, human presence, laws, and development. Produced by the Brazilian federal government, these documents display detailed research into all aspects of the Jericoacoara National Park and the surrounding areas. These documents tend to focus more on formal aspects of the national park, such as borders and laws. They are highly localized.

The second type of documents—research done in and around Jeri and JNP—give additional context to the case. These tend to provide more data regarding human populations. For instance, one piece looks into the development of an artisan handicraft cooperative in Jericoacoara. This gives more detailed knowledge into local economic development than is present in the park management documents. Also, since humans are the main actors in spurring Jericoacoara’s development, it is important to have data reflecting their actions in the area. These research documents vary from being very local to Jericoacoara, to reflecting larger areas that encompass the area, or are highly local to nearby places. The comparison with the park documents allow the researcher to expand analysis to a greater scale in the hope of placing Jericoacoara in a larger context.

Document analysis is useful for analyzing trends, patterns, and changes over time. It can also allow the reader to draw from previously performed research in areas that they cannot perform themselves due to qualification, time, and money restraints. However, document analysis can be limiting as data is restricted to what already exists. Drawing from pre-existing material may also mean that the data does not reflect current site realities if the data is exceedingly old. Using participant observation I was able to mitigate the scope of these limitations.

Participant Observation

During the summer of 2013, I spent approximately two months living in Jeri. In my research, I draw from this experience through unstructured observation and interaction with the site and the people who travel and live there. This observation is

useful for adding more timely information to my analysis. As the town is dynamic, some research documents make references to buildings or institution that do no longer exist or have changed in some way. I can use evidence from my time there to note these changes. Additionally, because my time there was spent primarily interacting with town residents and travelers, I was able to experience the town in a way no often written about in research documents: with people. Research and park documents do consider the travelers and residents, but they can be excluded when talking about animal biodiversity or park ecosystems. Since my own experience dealt mostly with interpersonal relationships, it allows me to inject the social, human-side of the park back into the discussion when it is missing. This is important because these residents and tourists are main stakeholders in the park and need to be included. In the following sections I include anecdotal evidence as a way to clarify points and broaden the scope of research recommendations.

The information of this section provides the grounding that will be used in exploring policy issues in Jeri and JNP. As I will describe in the next section, sometimes researchers provide recommendations that deal with specific aspects of the park or Jeri. However, because the people and environment of Jeri and JNP are dynamic and interlinked, specific recommendations may have unintended consequences. The management of these recommendation and the broad consequences they have is key to understanding and managing socio-environmental tradeoffs.

Human and Environmental Interactions in Jeri and JNP

In order to fully understand the situation in Jeri, it is important to have a broad background on the region. This section explores many facets of society in Jericoacoara, including geography, demographics, and history. In doing so it gives the region a context from which to work with throughout the paper.

Physical Geography

Jeri and JNP are located along the northern coastline of the state of Ceará in northeastern Brazil. Jeri lies 300 km northwest of Fortaleza, the capital of Ceará, and 500 km east of São Luis, capital of neighboring Maranhão state. Its distance from major economic centers has left it fairly isolated. Due to national park regulations, there are no paved roads within Jeri and also none to connect it with the nearest town and seat of the local government, Jijoca de Jericoacoara, which lies 20 km to the south.

In order to access Jeri, roads are available until Jijoca de Jericoacoara. From here, any cars must navigate informal, unpaved, sand roads until the entrance to the town of Jericoacoara. Only authorized vehicles are allowed in the town. All others must be parked outside in a designated parking lot. Many tourists opt to take a six hour bus ride from Fortaleza to Jijoca de Jericoacoara. From there they may transfer into Jeri on an authorized truck, buggy, or specialized bus for further transportation to Jeri.



Figure 1. Location of Ceará within Brazil



Figure 2. Location of Jericoacoara within Ceará

Jeri has many natural features that have great aesthetic appeal. It is notable for having a west-facing beach. Since Brazil faces east along the Atlantic Ocean, west facing beaches are relatively rare in the country. This means that residents and visitors can view the sunset, which is a large touristic draw. The western, main beach is relatively shallow with calm waters. There is a second, less used beach on Jeri's northern shore. This beach is rockier, deeper, and has rougher waters. Throughout Jeri there are also high dunes, some upwards of 40 m in height. These create an appealing faux-mountainous landscape that is both classic and slightly alien. One particular dune, Duna Pôr-do-Sol or "Sunset Dune" directly lines the west beach, allowing for residents and visitors to climb it and observe the sunset from an elevation.

Furthermore, along Jeri's northern coast are rocky hills and outcrops. They provide a vantage point to observe the ocean from a higher elevation. The outcrops are of interest in themselves, showing colorful stratification that sparkle due to the sedimentation of sandstone and quartz. Of particular interest is Pedra Furada or "Burrowed Hole," a well-known natural arch in the area. Crowds often gather at Pedra Furada to observe the sun setting through the arch.

Another class of important natural features is freshwater lagoons that populate the national park and surrounding regions. Fed mostly by groundwater and rainwater, these lagoons provide another destination for tourists to explore. A popular one, Lagoa Paraíso, lies directly north of the town of Jijoca. These lagoons provide fresh water areas for swimming and sailing. Small tourism development like guesthouses and restaurants surrounding lagoons provide a place outside of Jeri to funnel tourists during the day. It also allows economic development to spread through areas beyond the boundaries of the

town as well as alleviating the town from stress of high population influxes during the heights of the tourism season.

Jeri encompasses an area of about 6 km². The main part of the town is comprised of four main roads traveling from west to east. Smaller streets and the coastline connect them. In this main part of town lie most of the hotel and small businesses of the town. Further away from the beach are the homes of local residents, as well as a local school and health center.

JNP encompasses 8,850 ha (88.5 km²) of various ecosystems. In the western side of the park the the park, one can find mangrove forests. Mangroves are a unique tree capable of withstanding the salinity of the ocean. Through the southeast are lagoons. Covering he majority of the national park are a mixture of similar, but distinct ecosystems characterized as fixed dunes, inter dune areas, sandbanks, which are dune close the edge of a body of water (Coelho: 2009). Overall, Jeri is categorized as a costal ecosystem. It is a mostly sandy environment with features like sandbanks, dunes, and mangroves being of high ecological importance.



Figure 3. A Simple Map of the Village of Jericoacoara



Figure 4. Duna Pôr-do-Sol, the Sunset Dune



Figure 5. Pedra Furada, the Burrowed Hole

Climate

Jeri is characterized as having a hot, semi-arid climate. It has two main seasons, rainy and dry season from January to May and June to December, respectively. Average temperature is 27°C (80.6°F). Annually the municipality receives about 827 mm (32.5 in) of rainfall. Wind is important to the climate, as they are a draw for recreational activities like wind and kite surfing. During the dry season winds generally originate from the southeast and sustain a constant flow. (Contextualização, 2011).

Regional History

Occupancy in Jeri can be traced back to the early 1600s. By this time, Portuguese colonists had begun moving northwest along the north South American coastline to the

Amazon rainforest. Its far distance from existing economic centers and its few resources beyond aquaculture had meant that its development potential was always low (Plano de Manejo 3, 2011). Pre-colonial, indigenous people lived in the area. In the early 1900's Jeri was incorporated into the local municipality of Jijoca de Jericoacoara.

Until the 1960s and 1970s, traditional fishing was the main economic activity. Starting in the 1980s, tourism and land speculation began to grow in the region. In 1984 a 5,480 hectares environmental protection area was established. The main rationale behind this was to mitigate the possibility of uncontrolled development of the area that may threaten the natural landscape (Ferreira de Sales, 2009). This environmental protection area was reestablished as the Jericoacoara National Park in 2002. Under such designation the construction of buildings and road infrastructure was further restricted.

Starting in the latter half of the twentieth century, Jeri's special geography was noticed and the wheels were set in motion to develop that area for tourism. Through the 1970s and 1980s, access to Jeri remained difficult. Tourism activity was most contained to very adventurous backpackers. But, as the 1980s drew to a close, more interested spurred Jeri's tourism development. Land speculation began as newspapers like the Washington Post published articles celebrating the area's beautiful beaches and landscapes. In 1987, the Washington Post listed Jericoacoara as one of the top ten beaches in the world (Fussman, 1987). Around this time is the turning point in Jeri's development from small village to international beach hotspot.

Political Geography

Jeri is a part of the Jijoca de Jericoacoara municipality. JNP encompasses areas in both the municipalities Jijoca de Jericoacoara and Cruz. Jijoca is the main town located south of the national park border. Although within the boundaries of the national park, the town of Jericoacoara is not subject to national park regulations. In Figure 6 on the next page, one can see how the boundary of the park, shown in green, becomes concave to accommodate the town. Jeri still maintains classified as an environmental protected area and thus is subject to more environmental regulation than Jijoca de Jericoacoara and other towns in the municipality. JNP, being subject to different laws, is administered by the Brazilian government through a group called the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio).

The village of Jericoacoara does not have a local government of its own. It is incorporated as a part of a greater municipality of Jijoca de Jericoacoara, which has a municipal government. However, it does have its own community council which works with residents in issues of planning, infrastructure and which helped guide the village through transition as the great majority of the 1984 area established as an environmentally protected area transitioned to national park (Molina, 2007).

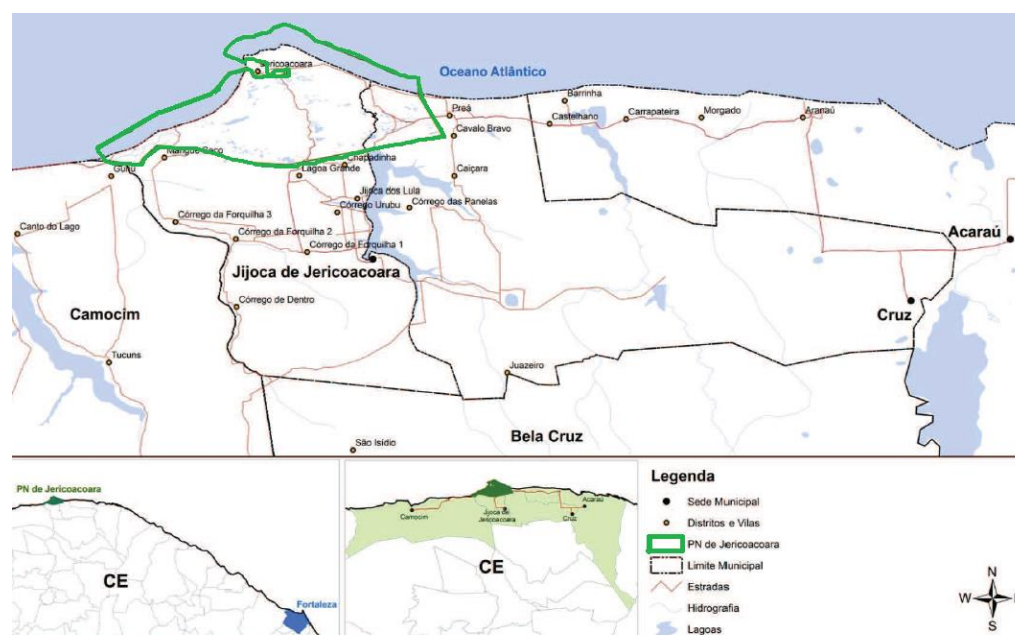


Figura 3-1 - Localização e acesso ao Parque Nacional de Jericoacoara, Ceará.

Figure 6. Border of the JNP in relation to local Municipal Boundaries

Economy

In Jeri, touristic activities are the base of local income generation. As previously stated, the region offers great natural beauty to explore. Visitors explore such nature while staying at small luxury hotels and boutique resorts. Based on my time there, the main patronage seems to be middle and upper class Brazilians and Western Europeans. Recreational sports also draw tourists. Jeri is well known internationally as having great conditions for surfing, wind surfing, and kite surfing.

Because tourism-related enterprises are the main economic driver, the service sector is large. There are many restaurants, bakeries, gift shops, and clothing stores.

76.57% of the population works in service-related field whereas just 11.92% and 11.51% work in agriculture and industry, respectively (Ferreira de Sales, 2009).

Some businesses are very formal, such as upscale restaurants and hotels that cater to wealthier visitors. Others are more in the range available to typical middle class tourists, and there are cheaper locales more frequented by locals and backpacker tourists. As the costs of services decreases, so does the formality. There are many small, individually operated kiosks that travel the town. During the daytime, vendors may sell deserts and savory treats from their carts. During nights and weekends, kiosks will line the beach offering alcoholic drinks and small snacks.

There is not a well-established public sector. The town has a small health center and public elementary school. Some government entities have offices, such as ICMBio, which is responsible for managing the park, and SEMACE, the Ceará State Secretary of Agriculture, which covers other environmental regulations. There is no formal military police force in Jeri, but there are some Tourism Police officers.

Demographics

The municipality of Jijoca de Jericoacoara has a population of about 16,447 inhabitants. About 2,500 of these residents are found in the town of Jericoacoara. In 2005, the municipality's GDP per capital was about USD\$1,000, compared to a GDP of about USD\$12,000 for Brazil as a whole. Illiteracy and poverty are high, being 43.21% and 53.46%, respectively. (Ferreira de Sales, 2009). The majority of residents are locals. However, some residents, usually managers of more prominent hotels and restaurants, are

transplants from other parts of Brazil as well as foreign countries.

The two major populations that visit Jeri are the Brazilian middle and upper classes and European travelers. The Brazilian middle and upper classes tend to favor the more expensive hotels. European travelers include families that will also tend towards these types of accommodation. However, the European crowd—and to a lesser extent, Brazilian visitors—constitutes a larger percentage of adventure seekers and backpackers. These visitors tend to opt for cheaper accommodation like hostels and camp grounds.

Findings and Discussion

In this section I detail and discuss the findings for three major topics regarding park management problems in Jeri and JNP at the local and regional scale: biodiversity, social change, and regional tourism development. I draw from research done in Jeri and the region to further understand the tradeoffs between environmental conservation and economic development. In some cases, the cited documents present issues and their own recommendations. In my discussion, I analyze the given recommendations and work to evaluate how effective they may be. For instance, in some cases I try to take into account social actors that researchers may have not considered when forming their recommendations and go on to reimagine their suggestions with new actors in mind.

Managing Biodiversity

As a conservation unit and national park, JNP is charged not only with preserving environmental feature like the cleanliness of the ocean and stability of dunes, but also the richness of biodiversity. Over the past decade a few studies have been performed in JNP to document and describe local biodiversity. In addition to describing present species, these studies also identify challenges to maintaining biodiversity and make recommendation to address these challenges.

In November 2009, a group of researchers met in Brasília to share reports concerning the zoology, climatology, and socio-economics of JNP. Included in these

were reports concerning biodiversity across different forms of life, such as mammals, reptiles and amphibians (herpetofauna), birds, and vegetation.

Wellington de Araujo Coelho's report on herpetofauna identified 24 different species of animals like frogs, lizards, and snakes. The collected data suggested that more species may be present, but not observed during the study time. Of the documented species, two were endemic frogs. The researcher noted that high vehicle traffic along long stretches of JNP pose a threat to the conservation of this animal group. Particularly herpetofauna are at risk of being run over. But, the researchers admitted that "it is unknown how much this traffic impacts herpetofauna population in the park" (Coelho, 2009, p.17).

This report made several recommendations to protect this group of animals. These include increased or broader studies of reptiles and amphibians to better understand their population dynamics within the park, monitoring access points into the park including studying the effect of vehicle traffic on herpetofauna populations, and increased environmental education for permanent and temporary residents.

A second study by Marcelo Lima Reis looked at terrestrial mammal species. It ultimately documented twenty-five wildlife species and eight domesticated species and identified different challenges than the herpetofauna report. Reis's study listed habitat degradation as a main threat to biodiversity. It referenced agricultural development as another problem, especially in forest areas where larger mammals require larger swaths of land. Although not discussed, vehicle traffic can exacerbate this effect. Informal roads fragment forested areas and compact soil, which disturb the natural environment.

Another main threat to biodiversity was the presence of domestic animals and

other introduced species. In JNP there is a large presence of stray dogs and cats. There are also populations of ownerless donkeys, cows, goats, pigs, and some horses that roam fairly freely. These animals compete with native species for resources. In particular, cats and dogs may prey on native species and pigs can be a vector for disease. Grazing animals may also suppress the growth of native vegetation which is in further competition with introduced species.

As main recommendations, the mammal study suggested further research for longer durations, the removal of domesticated animal species, increased environmental awareness education, and the fencing of JNP's perimeter. Other suggestions included more formal, marked transportation routes, rather than allowing vehicles to drive where they please, no private vehicles being allowed into JNP, and greater regulation of the tourist population and amount of touristic activities that go on within the park.

As identified by these studies, there are several challenges in managing diversity in JNP. While not all of these are directly related to tourism and economic development, they are still tied by indirect connection. Additionally, by addressing these challenges, there could be positive or negative impacts on economic and tourism development depending on how the challenges are met.

One mentioned challenge that is particularly obvious is vehicular traffic. As it currently functions, local, individually owned vehicles are not allowed within Jeri, but may enter JNP to make it to the Jeri. These vehicles must be parked in a lot just outside of the town. However, with lax enforcement, some vehicles may still pass into the town. Taxi cars that are a part of a cooperative and vehicles required for services like waste collection are allowed within the town limits. Because there are no paved roads with

JNP, there is no set route to get from nearby towns into Jeri. As such, many different paths are seen through the park. In some places, the path can only fit one car, in other areas the path expands to many meters in width. As the studies reported, it may cause animal mortality by being run over. However, the soil compaction of vehicular traffic erodes the sand and destroys vegetation. This causes habitat degradation and fragmentation.

Some sort of formal, demarcated route would help alleviate this degradation. But, it would be very difficult to implement. In order to make sure the route is followed, the perimeter of JNP would most likely need to be fenced to control certain entrance points. Additional fencing may be needed to make sure traffic does not veer from the path. Yet there would need to be some small breaks to allow present animals to traverse the park.

Socially this project would most likely meet much opposition. Having a set path would cause some congestion that would make trips between Jeri and other locations take longer. Since taxi drivers depend on making many trips to generate greater income, they would probably see a drop in income. They may need to increase rates which may receive opposition from town residents and tourists. Financially the project may not be currently feasible.

A more appropriate solution may be increasing environmental awareness education. This education would educate local taxi and service drivers-who make up the bulk of the vehicular traffic-about how current driving patterns adversely affect the environment. Using the cooperative as a base, the JNP officials may be able to also consult with them to find solutions, such as demarcating two or three of the best paths,

informally making them with guideposts, and improving the quality of those paths, such as working to level them.

Another interesting problem is that of domesticated animals. Within Jeri one can easily find many stray dogs and cats. While some residents may keep pets, many of these street animals have no true owners, although they may have some humans that they are familiar with. Along with degrading native biodiversity through predation and grazing, domesticated animals are also a nuisance in the town. At many restaurants, street dogs and cats beg for scraps. All of the animals, especially the donkeys and cows, navigate the town and surrounding area freely, often leaving their feces and urine. Of course this does not pair well with the aesthetic beauty that attracts so many visitors to the area.

The studies simply call for the removal of these animals. This would be a fairly straight forward task. Short term labor could be employed to collect the majority of the street animals. Many of the animals are slightly feral, but with the proper equipment, the collection of dogs and cats would be fairly simple. The collection of donkey, cows, goats, and pigs may be more difficult as they are much larger and stronger.

Socially the collection of cats and dogs may be the most problematic since human are most likely to form bond with these two types of animals. The study does not delineate between house pets and ownerless-domestic animals. The underlying issue is growing animal population, so as long as these house pets animals are properly sterilized, their impact is reduced. Street animals should be removed for their added nuisance to tourist populations.

The mammal study makes one interesting suggestion regarding donkeys. It suggests that a small population of sterile donkeys could be kept as a sort of tourist

attraction. The donkey is a sort of symbol of the Brazilian northeast, with souvenirs often found in its image. The maintenance of some donkeys could help give Jericoacoara a better sense of identity in the face of its rapid change over the past 30 years.

Furthermore, donkeys can also be employed in touristic activities as a form of transportation to traverse the beach, dunes, and nearby hills. While some donkeys are employed as such, the majority appear to be in the ownerless, feral group.

In summary, ecological reports note that the human presence in Jeri competes with local species of reptiles, amphibians, mammals mostly in the form of space. Domesticated animals brought in by humans threaten the local ecosystem through predation and can be a nuisance for the human population. Researchers present fairly logical solution to the problems that they present. However, these solutions do not always take into account their effect on human stakeholders, such as having only one route for local drivers. By including human stakeholders in a more participatory way, a community-lead solution may be achievable and be better maintained than a strict solution presented by researchers and park management professionals.

Social Marginalization

Authors José Osmar Fonteles and Fábio Silveira Molina suggest that Jeri's development from isolated village to national park and tourism destination has brought about the marginalization of the area's traditional population. They demonstrate this in both political and socio-economic realms.

To start, one may suggest that native inhabitants of Jeri have always been

marginalized due to the isolation of their location. As stated earlier, until the early 1980s, Jeri was an isolated fisherman's village with little infrastructure. Inaccessibility due to sand and dunes and distance from other major urban centers meant all modern development in Jeri has happened only recently. Unfortunately, even with this recent development various authors suggest that native inhabitants have remained marginalized through politics and socio-economics, even though they are now integrated into the global tourism industry.

Fonteles, in a paper titled "Reconstruction and Territories of Identity: a Look at Jericoacoara- Ceará" explores the preservation and creation of a Jeri identity. He writes that political manipulation occurred in the Jeri community as far back as 1983 with the establishment of Jericoacoara as an environmentally protected area. The author writes, "The local populations, while not knowing the significance of the EPA, approved its creation thinking that it would receive social benefits" (Fonteles, 2005, p.49). He suggests that residents were misled into believing that there would be the construction of a maternity center.

In his research paper "Tourism and Production of Space—the Case of Jericoacoara, CE", Molina (2007) brings up another similar instance where the local residents were dismissed, this time in the time range of about 1999-2001. Again this was a time of transition, as the EPA was transitioning to a national park. Molina writes about the procedures that the Jericoacoara community counsel employed to give residents a say in the transition. During this time the village was creating a Direct Plan of Urban Development. Such a document was meant to describe the village as it was, identify infrastructure needs, and create strategic planning for the realization of these needs. In

the case of Jeri, this plan would work with ideas about the construction of a public market, a daycare center, sanitary systems, and a health post, among other things.

By February of 2000, a commission elected by the Jeri community was established to manage participatory processes to gain local input for such projects and planning. In about a ten month period, the commission and local residents met to discuss planning proposals of which “a great majority...were approved by the community” (Molina, 2007, p.95). However, the community also suggested some alterations of the text based on their own observations. Ultimately, through community sessions that included discussion and voting on proposed park management strategies, the community and commission had an analysis report of more than 1,000 pages. That November a counter-proposal was submitted in a timely manner to the government body that was leading the planning project. In this case it was the Secretary of Infrastructure of the State of Ceará. According to Molina (2007), the counter-proposal was not considered by the secretary or the local government at all.

Frustration with the process manifested shortly after in December 2000 with the proposed construction of a visitors' information center. The selected location for the building was in the town's main street within close distance to the beach. Its location was opposed by local residents who said it interrupted their view of the sea and sunset. Being a relatively rare, Brazilian, west-facing beach, the sunset over the Jeri ocean horizon is largely regarded as one of the natural beauties of the area. Residents and tourists alike watch it from the beach or their doorsteps and porches. Despite public disapproval, the center was built anyway. By 2007, Molina (2007) writes that it later became the office for the local park managers and later the office for a buggy-taxi association. However, by

2013 it appears that this building has been dismantled, as during my time there I noticed no such building on the main road near the beach.

These examples demonstrate political marginalization experienced by the local community as a whole, not limited only to native inhabitants. Despite the fact that Jeri's residents are the main community stakeholder in the park, it appears that the local community is not held in high regard by park and other government officials at least in the time before the national park was established.

Additionally, Molina suggests socio-economic marginalization of native residents by residents that come from other parts of Brazil or from abroad. According to his data, native residents only owned 25 of 105 motels in the town, the other 80 being owned by non-native Brazilians and foreigners (Molina; 2007, p.60). It seems native inhabitants have been out-competed by new residents from outside the area. This socio-economic marginalization has also caused many traditional residents to leave homes in the traditional town center for several blocks south, in a neighborhood known as Novo Jeri. Here the homes are smaller and less modern. According to these residents, they sold their homes and business to move slightly farther away because "of the feeling that they cannot compete with the new entrepreneurs that are installing themselves in the village" (Molina; 2007, p.62).

Ultimately, the role of local populations is important to the inherent goals of national park development. Morally, just as local biodiversity and topographic features are given existence values, perhaps so should the local human population. They hold local cultures and knowledge that need and deserve as much protection as biodiversity. The marginalization of Jeri's native inhabitants also brings into question the park's goal

of economic development. On one hand, perhaps the economic development of the area has reduced absolute poverty. For instance, nowadays residents have access to amenities like electricity, a health post, and employment opportunities that they lacked before. However, the influx of tourism through national park has also created class stratification that did not exist when Jeri was just a fishing village. As such, inequality in Jericoacoara has risen or was even created in the first place (Fonteles, 2005).

This creation of winners and losers—some portion of total population that benefits and another that does not--seems to contradict the park's goals and more broadly the idea of tourism introduction to an area. Tourism is generally considered a logical way to increase an area's economic growth. As tourists visit, they inject their capital, which was gained where they live, into the place that they are visiting. However, if the residents that own the businesses are from outside of the community, the economic surplus may not be staying in Jericoacoara. Although some will certainly stay in the community through local purchases and the payment of employees, it is also possible that a greater amount is withheld from local circulation and sent to family and investments elsewhere.

Additionally, general business logic would suggest much of this money could be reinvested into the owner's business. However, Jeri's location in an EPA places limitation on how businesses can expand. There are strict limitations on the dimensions of buildings, and many buildings are not permitted to expand, such as adding another floor. Therefore businesses are limited in the investment they can make in their businesses. Especially since much of the business in Jeri is through hotel, motels and house rental, these building limitations likely have a substantial impact.

Overall, in Jeri it appears that the introduction of tourism has created winners and

losers across the population of Jeri. Once a more egalitarian, trade-based community, tourism development has brought massive change to the community. Now a mix of native and non-native inhabitants, community members have experienced individual and collective dismissal from governmental bodies that do not seem to value participatory practices and community input. Furthermore, socio-economic stratification of the local community has occurred with the influx of non-natives, who outcompete locals in entrepreneurship, leading to social-stratification not seen before in the community.

Creating a Tourism Corridor

On a larger scale, managing its national parks is one way that Brazil manages its tourism development. The case of Jericoacoara is a prime example. First developed as an environmental protection area to guard against over-development and natural resource degradation, the establishment of Jericoacoara as a national park in 2002 worked towards diversifying tourism in that area of Brazil. The sparsely populated northern Brazilian coastline has vast beauty and tourist potential, but lacks infrastructure. By establishing Jericoacoara as a national park, it works towards bridging the coastline between two major cities, São Luis and Fortaleza. From São Luis one can travel to Belém, which signifies a geographic change to Brazil's North Region. Moving Southwest from Fortaleza one find more developed tourism industries along the east horn of Brazil, where coastal cities are larger and closer together.

This corridor creation is in conjunction with another national park and an environmentally protected area, Lençóis Maranhenses National Park (LMNP) and

Parnaíba, respectively. Parnaíba lies approximately 150 km west of Jeri and LMNP approximately 150 km west of Parnaíba and 200 km east of São Luis. Like JNP, these areas are known for their great beauty. Parnaíba lies along a delta as the Parnaíba River empties into the oceans. LNMP is much like JNP, but its dunes also host many more lagoons and oases.

As demonstrated by Molina (2007) and Gabriela Arantes Ferreira de Sales (2009), developing this corridor has been a goal in the region for at least the last 25 years. Molina documents the shift in corridor planning from just the coast of Ceará state to the greater Northeast region. He writes that in 1989 was the creation of the Ceará state program, Ceará Coastline Tourism Development Project (PRODETURIS). PRODETURIS was understood as “a set of actions and guidelines for the long-term planning of coastal, touristic land use” (Molina, 2007, p.77).

Within just two years in 1991, PRODETURIS was reimagined as the Program for the Development of Tourism in Ceará (PRODETUR-CE) as a part of a larger, federal level program called the Program for the Development of Tourism in the Northeast (PRODETUR-NE). According to Molina, this project followed an “urbanization policy” focused on increased tourism through the development of infrastructure that would increase accessibility to different area of the region and increase basic sanitation systems and was financed by the Inter-American Development Bank. The majority of an initial investment of about US\$166 million was used for the construction of an international airport in Fortaleza, improvements of basic sanitations systems in the region, and increase in road and highway infrastructure in the region (Molina, 2005, p.81).

Ferreira de Sales's work demonstrates that by 2008 these foundational programs have become much more specific in regards to JNP. By this time the connection between JNP, Parnaíba, and LMNP was labeled the "Route of Emotions." As a part of a new Regionalization of Tourism macro-program, the deferral Ministry of Tourism was working with government entities like the Agency for Regional Sustainable Development in order to diversify touristic offerings in Brazil, increase competition in tourism, and add greater quality to tourism. By this period, aspects of conservation and sustainability had been incorporated into these programs. Whereas the goal of PRODETUR-NE was all based on economic growth and development, by 2008 the Ministry of Tourism had begun to take into account environmental and socio-cultural sustainability in municipalities as evaluation criteria (Ferreira de Sales, 2009, p.26).

A tourism corridor could be beneficial to the region for various reasons. First, it can bring economic growth and development to the area. Communities along this coast are much as Jeri was decades ago: small, underdeveloped, and lacking access to capital and education. The introduction of tourism through guesthouses, hotel, tours, and restaurants provide new economic opportunities for populations that tend to lack such opportunities. Tourism is especially suited for low socio-economic communities as it can easily absorb a work force with low skills and utilize skills that locals already have. For instance, eco-tourism can expand from traditional fishing or crabbing activities. Since locals already know how to fish and where to locate native species, this local knowledge can be translated into tourism through tours through natural areas. Other people can gain new jobs working in restaurants and hotels. Those with a more educated skillset can be trained towards hospitality management.

Additionally, tourism can add value to environmental awareness if properly managed. In the case of Jeri this entailed the creation of a national park to limit unregulated development. If tourism can be developed along ecological lines rather than economic ones, development may be able to occur without environmental degradation. This works in tandem with another positive aspect of creating a tourism corridor: creating a great supply of space to alleviate tourism pressure in one area and redistribute it elsewhere. Creating a tourism corridor across this region could take the shape of numerous small towns that have some sort of tourism sector. By offering a mix of development and tourism between more traditional tourism as seen in big cities like Fortaleza, small but high-class areas like Jeri, and small and barely developed areas, travelers have a wider range of options to choose from.

This diversification of the tourism experience can help manage environmental degradation by more appropriately distributing people through the region. Because there are currently few spots along Brazil's north coast, areas that depend on tourism must attempt to cater to many different types of travelers. On one hand are wealthy travelers seeking a luxury resort, and on the other are backpackers willing to sleep in hammocks. Developing more towns at varying levels across the north coast may ensure that no one place becomes over developed. If this can be balanced and community-led, then it also suggests that economic development could also be even distributed rather than accumulating in just a few well-known, popular destinations. This would be, at least at this hypothetical level, a win-win situation, rather than being subject to tradeoffs as discussed in earlier sections.

Conversely, if not managed properly, problems seen in Jeri like threatened

biodiversity and social marginalization could spread throughout the region. One additional issue in this development may be speed. Jericoacoara, although vastly changed, has been able to still maintain some local, pre-development characteristics due to regulations that limit development such as paved roads and its unique local geography. Its transformation is measured in decades. But, with a precedent set in Jeri and Brazil's growing economy, the government and tourism industry can afford to develop this corridor faster than overall several decades. Communities without Jeri's atypical geography may have much less regulated development, which could amplify the issues of environmental and social degradation.

Ultimately the prospect of a tourism corridor has exciting potential in producing diversified touristic experiences. By diversifying the types of experiences offered, economic development can spread through the region while ideally not overburdening local environments. In order to ensure such an idea situation, the development of this corridor will need to be well planned and closely managed. It is not feasible that the entire north coast of Brazil be transformed into a national park. With much of this area lacking the strict regulation imposed on Jeri and JNP, the risk for development to bring adverse environmental effects is increased.

Conclusion

In Jeri and JNP a unique geography has spurred the development of what was once a sleepy fisherman village into a bustling town of boutique resorts and international tourists. Through the establishment of the JNP, the government has sought to regulate development so that the tourism industry enacts economic growth without unknowingly destroying the environment that attracts tourists in the first place. However, compromise must take place, and some degradation is a necessary tradeoff when utilizing nature-based tourism to gain capital.

While park regulations have done a good job at understanding and describing JNP, the park's establishment and its growing tourism industry have had unintended consequences. As tourism has brought new businesses, new business owners have also come, creating competitions with native inhabitants and creating new social-economic stratification. While park regulations do not allow roads to traverse JNP or Jeri, ecosystem fragmentation has still occurred through the heavy use of vehicles to transport tourists in and out of Jeri, which disrupts stable dune ecosystems. Ultimately Jeri and JNP may fit into a wider regional plan of tourism development in Brazil's north costal region. This plan, with proper management, has the potential to bring economic growth to the region while maintaining its environmental resources, but could backfire if not closely managed.

Taken as a whole this case study can be used to share insight into the position of stakeholders in national park development. In the case of managing biodiversity, social

marginalization, and regional tourism development, local populations have large stakes in how their communities are developed. While an existence value is often placed on abiotic and animal members of an ecosystem, in Jeri it appears that the native human population has been excluded from this consideration. Recommendations on maintaining biodiversity conflict with the livelihood of native human inhabitants and the introduction of industry to Jericoacoara has changed social dynamics in the town. An economic study of tourist in Jeri, found that tourists would pay about \$30 as a park tax to visit Jeri and JNP (Martins, 2005). If one can determine the existence-use value of the park, perhaps moving forward researchers should try to estimate the value of a local population.

This suggests that human and social issues should be of greater importance to national park and tourism development. This human and social aspect can be applied in working towards development that does not disturb local populations' local economies and quality of life without their consent. It also means consulting local communities about policies that at the surface may not concern themselves with human, but could have indirect effects.

Policies could be approach in a few different ways. In Jeri, a community-based council was effective in engaging the local community involvement with its national park development. However, the work of the council fell flat when it was dismissed by the people managing the park. Perhaps there needs to be a set liaison between local communities and government park officials that is hired jointly by the government and community to engage such issues.

Moving forward, I predict that the human element of park and tourism development will become more important. As Brazil grows economically there will be

set of people calling for increased development, and those who are against it. People with low socio-economic status in Brazil's Northeast may look to Jeri to say seek the same type of development that can help raise them from absolute poverty. At the same time, Brazil has social movements like the Landless Peoples' Movement that may reject policies to modernize land-use in the areas they reside in. Brazil's many indigenous populations largely reject Brazilian governmental encroachment and regulation of their lands, but could gain greater political agency if they could accrue capital by engaging in tourism.

Ultimately, Brazil is a country of diversity. It has five diverse regions filled with diverse geographies, climates, and resources. Most importantly Brazil is comprised of a diversity of people who may benefit or may not from the moves their government makes. In Jeri, tourism development has radically changed a community, bringing basic sanitation, electricity and public institutions, but also social stratification and possible environmental degradation. Win-win possibilities may exist, but realizing them will require the cohesive efforts of government stakeholder, local stakeholders, as well as a speaker for the environment.

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ACADEMIC VITA

Raymond Chappetta

229 Locust Lane • State College, PA 16801 • Mobile (215)806.2790 • rmc5308@psu.edu

EDUCATION

Fall 2010-Present
University Park, PA

The Pennsylvania State University – Class of 2014

College of Agricultural Sciences | Schreyer Honors College

Bachelor's of Science in Community, Environment, and Development

- International Development Option

Minors in International Agriculture and Environmental Soil Science

Fall 2012

Belém, Pará, Brazil

The School for International Training

Amazon Resource Management and Human Ecology

Thesis: "Creating a Food Secure Belém: Government Actions, Goals, and Challenges"

- Performed independent research with a local mentor
- Studied modern and sustainable development
- Promoted American values as a youth ambassador

WORK EXPERIENCE

8/13-present

University Park, PA

The Interinstitutional Consortium for Indigenous Knowledge (ICIK)

Public Relations and Marketing Intern

- Collaborated with marketing professional to promote ICIK events
- Publicized ICIK events through print and digital media, as well as word-of-mouth
- Managed and created content for the ICIK webpage
- Aided in the preparation for and running of ICIK events

Summer 2012

Goldsboro, NC

The Center for Environmental Farming Systems

Agricultural Research and Extension Intern

- Initiated sunflower research with a university professor
- Established and maintained agricultural research plots
- Taught local youth about agriculture and nutrition in weekly workshops
- Received training in sustainable agricultural production

LEADERSHIP

Jan. 2011-Dec. 2011

State College, PA

Delta Upsilon Fraternity-PSU Chapter

Vice President of Member Education

- Achieved higher chapter accreditation through coordinating educational events
- Developed and initiated a member evaluation system
- Participated as a member of the undergraduate executive board
- Initiated a new Associate Member Education curriculum
- Participated in regional and national leadership conferences

PROFICIENCY

Microsoft Word, Excel, and PowerPoint, Prezi, Adobe Fireworks

LANGUAGES

Portuguese (Advanced), Spanish (Intermediate)