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**Major Qualifying Project**

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## **ABSTRACT**

Barriers preventing the Brazilian organic agro-industry from expanding are the focus of this study. I concluded that poor availability of organic produce is the greatest barrier. Creation of an association of farmers, implementation of subsidies and educational programs are recommended.

## **EXECUTIVE SUMMARY**

In this paper I study potential reasons for the laggard development of the Brazilian organic industry. Brazil possesses ample arable land and tropical weather, and yet organic farming practices are still at a very primitive stage.

When talking about sustainable agriculture, I discuss three pillars: environment, society, and agriculture. Environmental sustainability means that we are not only preoccupied with profit, but also with the impact of the industry on the environment and the use of natural resources in agriculture. Society is the second key element, as it shapes demand and supply. For this study, I have looked into a few social movements that impact this industry such as vegetarianism and green consumption. Finally, from an economic standpoint, I analyzed logistics, the value chain, prices, and availability. I have also studied two major US retailers in the organic sector, Trader Joe's and Whole Foods, and what lessons could potentially be replicated in Brazil.

Upon studying many of the variables related to the organic industry and sustainable agriculture, I developed a methodology to assess which of the factors were actually preventing the organic industry in Brazil from growing. I interviewed consumers, farmers and supermarket managers in order to gather data to elucidate my hypotheses.

I have concluded that availability is the most pressing reason behind the slow development of the organic market. Brazilians do not have easy access to fresh organic produce. Other barriers are the lack of proper labeling, awareness about sustainable agriculture and lack of support from local and federal governments.

Based on the results gathered, I suggested the foundation of an association of local farmers, the implementation of subsidies for local organic producers and finally a campaign to educate people about sustainable agriculture.

## 1. INTRODUCTION

The largest country in South America in terms of land area, Brazil showcases the most robust economy in the continent and seventh largest in the world by nominal GDP and purchasing power parity (IBGE, 2014). Its 200 million people make Brazil the 5th most populated country on Earth (IBGE, 2014) and its generous tropical weather and fertile soils set the nation as the top producer of sugar cane, soybean and oranges in the world (FAO, 2012). Agriculture is the most important industry in the country and it accounts for XX% of Brazil's GDP. Despite the impressive statistics on its agricultural industry, Brazil still lags behind Chile and Mexico when it comes to organic agriculture. In a country where agriculture plays such an important role in the economy and in the everyday lives of its people, it puzzles me how the idea of organic produce is so scarcely diffused.

Developed regions, such as Europe, are pioneers at adopting sustainable agricultural practices. But whether in the streets of Stockholm, Mumbai or Rio de Janeiro, one can often hear jargons such as “green”, “sustainable”, “recyclable”, “organic”, or “fresh”. People are slowly coming to realize the importance of maintaining and preserving the environment when it comes to food production.

There are many perspectives on what constitutes “sustainable food” and even on what the term “sustainability” means. In cultural studies, sustainability refers to how a culture can be nurtured and perpetuated through generations. In ecology, environmental sustainability refers to how biological systems remain diverse and productive. When bringing this to the agricultural concept, sustainable agriculture refers to practices that guarantee that the



consumption of our resources is not greater than that of which the Earth is capable to replace (Loreck and Fuchs, 2010).

In this paper, I intend to investigate why this is happening and suggest ways to make organic produce more widely available in Brazil. In order to do that, I will first discuss what comprises organic and sustainable produce, starting with the definition of sustainability and its many facets and connotations. Upon reiterating my hypothesized explanations, I will touch upon the methodology developed to test the possible explanations, and lastly I intend to analyze my results and make recommendations.

Producing food sustainably could be a way to secure soil fertility and to ensure that Brazilian farmers are earning a living. Sustainable agriculture could also be a way to secure abundant, clean water (more than 1.4 billion people around the world live where water cannot meet their needs) (Environment European Commission, 2014). I believe that these practices guarantee enough food production to meet growing needs, to ensure energy production, and consumption that Brazil can sustain.

So, why then are sustainable practices not widely seen throughout Brazil? What are the key factors that could foster this kind of movement? Why are people still largely consuming produce that has been grown using non-sustainable practices, such as the use of petroleum-based pesticides? When trying to tackle such questions, it is crucial to think about the factors playing a role in this scenario in Brazil. Among the top ones comes lack of education and awareness about sustainability. There could be a correlation between the educational level and the consumption of organic produce, as it is believed that people that have stayed long

in school would logically have had more opportunities to be exposed to concepts of sustainability.

I see socio-economic background of consumers is an important factor driving the consumption of organic produce, as it tends to be more expensive than food produced under regular practices. When talking about socio-economic characteristics of Brazil's population, it is wise to take into account that developing areas of Brazil have for decades faced hunger and extreme poverty. It might be hard to conceive being very selective about how the food is being produced when millions face starvation. This however is no longer the situation faced in Brazil.

Dramatic changes have taken place since the administration of Luis Inacio Lula da Silva in 2001. Ten months after electoral victory, President Lula implemented a program called Fome Zero ("No Hunger"), which has removed more than 30 million Brazilians out of poverty (IPS News, 2013). Furthermore, Food and Agriculture Organization (FAO) experts believe that extreme poverty in Brazil can be eradicated by 2015 (Marques Porto, 2013). This is a strong signal that the nation has some of the key basic elements a region should have to produce food sustainably: policies that foster such practices, fertile land, producers and a robust potential market.

With that in mind, three pillars need to be in harmony in order for a system to reach a sustainable, long-term equilibrium: environment, society and economy (Magee, Scerri et al., 2013). Thus, when talking about sustainability in agriculture, it makes sense to look into how these three areas are addressed.

Several variables could be considered when solving the problem statement: Brazil and its social, political and geographical background; the price and availability of sustainable produce; the market and the market's strategies in technology and marketing; logistics and supply chain management; best practices from major US organic-food retailers; society and its movements (vegetarianism, how does society perceives organic production, the green revolution) and finally the social impact of non-sustainable practices. All of these items are categorized into one of the three sections: environment, society, and economy.

## 2. Background

### ***2.1. Environment***

In this section, I analyze the impact of the current agricultural business on the environment, as well as how a more environmentally sustainable sector could have a very positive impact on our nature. It is important for the population to understand the value chain in the agricultural sector in to realize its current challenges regarding sustainability and therefore take decisions that reflect such understanding.

Before diving into the Brazilian context, it is worth taking a look at a region that has been a pioneer in implementing sustainable practices in agriculture. Studying the European market gives us insights about the challenges and tangible benefits around the implementation of sustainable practices in agriculture. Due to its climate and small land area, the European Union is more than 90 % dependent on imports (Environment European Commission, 2014). Looking at the EU helps us see how a region with many limiting factors has coped to become a world-wide reference on sustainability while countries located in tropical weather regions, holding large arable land and not dependent on imports struggle to implement a sustainable practices in agriculture. I believe that some of the practices implemented in Europe could serve as a model to Brazil.

#### **2.1.1. THE WAY THE AGROBUSINESS HAS DEVELOPED IN BRAZIL**

Contemporary agricultural practices impose a major challenge on the environment. Food production today uses large amounts of chemicals, fossil fuels and water (Sustainable Food Lab, 2014). As a result, half of the habitable land on earth is farmed and we are losing arable

land at an alarming rate (Sustainable Food Lab, 2014). Areas of high agricultural output tend to have the highest extent of habitat destruction. In the United States, less than 25% of native vegetation remains (Stein et al., 2000). Similarly, only 15% of land area remains unmodified by human activities in all of Europe (Primack, 2006). Biodiversity impacts human health on a variety of ways (Sala et al., 2009), so much so that the UN has dedicated this decade to biodiversity.

Agriculture is the most important industry in Brazil. From the book *Brazil: Equitable, Competitive, Sustainable – Contributions for debate* (World Bank, 2006), agriculture and related sectors represent 27% of Brazil's GDP, 33% of its exports and over a third of the country's employment capacity. Comparatively, in the US agriculture composes less than 2% of the GDP (Loreck and Funchs, 2013). In order to increase profit and produce output, this large industry has become heavily dependent on non-sustainable practices, such as the usage of petroleum-based pesticides/ ammonia world-wide (Stewart, Dibb et al., 2005; Gowariker et al., 2009). These chemicals damage arable land, annihilate the ecosystem and jeopardize biodiversity.

It is imperative that less environmental-damaging practices are implemented in order to preserve Brazil's natural resources and policies might be an effective way to enforce such practices.

### **2.1.2. FOOD POLICIES**

Food policies are often responsible for shaping the agricultural sector in a country. For instance, in the United States about \$20 billion per year is paid to farmer as direct subsidy

(Stephen Vogel) and nearly 35% is destined to corn production. Since the corn subsidy has been implemented, the production of corn in the US has increased dramatically. Such incentive explains, for example, the use of high fructose corn syrup as a cheap carbohydrate in the majority of industrialized food in the US. Corn syrup is much cheaper than sugar, so it is largely used in a vast variety of processed foods.

In Brazil, the government has put forth many programs aiming at eradicating hunger – especially under Lula’s administration. The Bolsa Família is the world’s largest conditional cash transfer program. It provides a source of income to 12.7 million families (approximately 50 million people) in poverty (World Bank, 2010). By connecting “Bolsa Família” with other social programs, financial benefits are only given upon access to health, education, and food in order to effectively diminish poverty (Oxfam). This taps into important food policies that have been fostering local farming.

One of these programs is the Alimentação Escolar (*school meal*), a governmental program that provides 47 million free school meals every day in Brazil (CONSEA, 2009). Such programs support local farming in the sense that local schools purchase food produced in the same region, often just a few miles from the school. Consequently, they also foster the development of small-farming and consumption of locally grown produce.

The Fortalecimento da Agricultura Familiar (*strengthening family agriculture*) is another program developed by the Brazilian government in order to empower small-scale and family-based agriculture. This would help increasing quality and quantity of food supply, but would also support increased incomes for rural households (Oxfam). The initiative features subsidized

credit, training, technical assistance and insurance for small-scale and family farmers (Oxfam). The Programa de Aquisição de Alimentos da Agricultura Familiar (PAA) (Family Agriculture Food Procurement Program) is aimed at securing a market price for produce from small-scale farmers (Oxfam). That is achieved by buying local food products for public feeding programs or for local food banks (Oxfam) . From a sustainability perspective, these programs are important incentives to create an ecosystem favorable to sustainable agriculture in Brazil, which tends to be small-scale and local.

Projects fostering different types of agriculture have also been implemented. By 2000, over 50,000 projects in 1,400 cities had been completed at the cost of US\$ 800 million (Oxfam). In the past fourteen years Brazil has made a significant progress in removing millions out of poverty. Strategies for reducing rural poverty include: intensifying agriculture in the small-farm sector and revitalizing commercial agriculture to increase employment and reducing poverty by directly absorbing workers and indirectly by fostering growth of more advanced stages of the value chain. These projects need to continue to re-shape today's sector. Policies play a major role when it comes to measures being implemented and long-term impact. Many of such policies address GMO production in Brazil. Would genetically modified crops be a sustainable solution?

### **2.1.3. Genetically Modified Organisms - GMOs**

In the past 20 years, when the first genetically modified (GM) crops were implemented, there have been several debates on the applications of gene manipulation. Nowadays, the

development of GMO crops has raised many concerns. I believe that genetically modified crops are playing a key role in developing countries where small-scale local farmers cannot compete with the market price. On the other hand, it is important to realize if organic sustainable agriculture can produce the amount of food that developing areas demand. Organic crops are known for having a less rapid growth and an overall smaller output. Lastly, some also question whether GMO crops can co-exist with organic farming (Azadi et al., 2010).

Why should one care about GMOs? According to the Non GMO Project (Azadi et al., 2010), more than 80% of all GMOs grown worldwide are engineered for herbicide tolerance. As a result, this resulted in a 1500% increase in the use of toxic pesticides since GMOs were introduced. “Super weeds” and “super bugs” were also a result of wide spread of GMO crops (Azadi et al., 2010). These organisms that can only be exterminated with poisons such as 2,4-D, which is one of the compounds present in Agent Orange (Azadi et al., 2010).

According to the Non-GMO Project: “The long-term impacts of GMOs are unknown, and once released into the environment these novel organisms cannot be recalled.” (Azadi et al., 2010)

How the agricultural market has evolved in Brazil relates to food policies implemented, and other factors such as the wide use of GMOs. These three topics capture some important features of the sector and also place us in a position where we can now discuss the economy-related topics when analyzing why sustainable practices are not widely seen in the country.



## **2.2. ECONOMICS**

In this section, I discuss variables related to the food market. As in the previous section, environment, the intent with this part of the paper is to analyze into greater detail the many factors associated with sustainable agriculture but this time under an economic perspective.

When speaking of sustainable agriculture, many indicators can be analyzed in order to determine whether practices are economically profitable or not. Reasons that lead many experts to think that the current system is not adopting sustainable practices include, for instance, the falling of crop prices, which puts stress on the market as well as farmers and farm workers as millions of them live in poverty.

As it has been previously mentioned, it is at the best interest of the Economy not to have the industry trespassing the Earth's carrying capacity: the point at which we can no longer replace the resources we utilize at the same pace that we consume them. When talking about the economic side of the sustainable food sector, it is important to address how the market is affected by the adoption of sustainable practices.

What is the market for sustainable food in Brazil? Who are its customers? What role do supply chain management and logistics play? Those are some of the questions we would like to address in this section.

### **2.2.1. PRICES & AVAILABILITY**

The FAO have classified the current time as a "new era of rising food prices and spreading hunger," noting that "food supplies are tightening everywhere and land is becoming the most sought-after commodity". Seven years ago, Brazilians used to spend almost 500% more of their income on food than Americans (USDA, 2008). When comparing Brazil to

other South American countries, food in Brazil seems to be indeed exorbitantly expensive. In other words, it is not only important to produce food sustainably, but that needs to be done at a price that is similar or lower to the one at which regular produce is purchased.

When talking about price, we look into costs. When talking about costs, we look into the supply chain of the agricultural industry, such as packaging and distribution. We have to consider the logistics of the sector.

### **2.2.2. LOGISTICS**

In remote areas, such as the Amazon or other stranded locations, the variety and availability of healthy food might also be limited. As far the logistics of the more used means of transportation, 2013 was set to be a very difficult year for agribusiness logistics in Brazil (Rabobank, 2013). Transport costs in the country raised significantly due to a few reasons: new legislation impacting the working hours of truck drivers, a sharp increase in diesel prices and rising export volumes for major commodities (Rabobank, 2013). Trucks are still responsible for the majority of the transportation of produce in the nation, but only 13.5% of the roads in Brazil are paved (World Bank, 2014).

If produce cannot be locally grown, is it then impossible for that region to have sustainable produce? Would it be worth transporting organic produce from a different part of the country? Would home-delivery be an option as for making people eat better, healthier, locally grown food in Brazil? (Cirns, 1996; Asemir et al.,2009). The findings of a study suggested that if a customer drives a round-trip distance of more than 6.7 km in order to purchase their organic vegetables, their carbon emissions are likely to be greater than the emissions from the system of cold storage, packing, transport to a regional hub and final

transport to customer's doorstep used by large-scale vegetable box suppliers (Coley, 2009). Home-delivery is becoming rather popular in Brazil in the past 5 years. Such strategy could be seen as an interesting competitive advantage to main retailers. Itinerary projects, such as food trucks could be an example of such projects in action.

In countries such as Kenya, urban consumers and rural smallholders have good reason to want alternatives to agrichemical dependency, as well as marketing channels and food of uncertain safety. One attempt to provide an alternative is a pilot box scheme launched by the Kenya Institute of Organic Farming (KIOF) in 2007 as they tried to connect organic smallholders to consumers in Nairobi. Such initiatives exemplify smarter ways to overcome logistical challenges in the distribution of food.

### **2.2.3. CHANGES IN SUPPLY CHAIN**

Changes in supply chain affects the way produce moves around the country and is displayed at the stores. There has been a change in the food market by moving from being supply-driven to being mainly demand-driven. The current model aims to provide food at the lowest possible price. This is not a sustainable practice and tends to lead to greater food waste and unnecessary usage of resources. This contributed to a shift in power in the supply chain, with bargaining power more concentrated in the retail sector than before, with primary producers taking on a subordinate economic role (Environment European Council, 2014). As lower prices become the single most important factor, small, local producers are severely affected by major producers that adopt heavy chemicals and high-end technology in order to achieve greater produce output at lower costs.

For some low income countries, smallholder development is a key option (Lipton, 2009). In

the case of Brazil, a very large country, keeping the supply chain local is not only smarter, but more affordable. Local farming makes it possible to reduce costs with transportation, preservatives, and with the overall logistics of the agro-business. Most of the 4 million farms in Brazil are small and produce for their own subsistence. “Family agriculture” represents 70% of Brazil’s food production and a significant share of food exports.

The production of local food also facilitates its distribution within the region. In 2009, 72% of consumers bought organic products in supermarkets and hypermarkets, 31% in organic specialized stores, 42% in markets, 24% at farms and 21% from artisans (Hamzaoui-Essoussi et al., 2013). This hints that customers who purchase sustainable, healthy produce are willing to visit alternative retailers to buy food. When it comes to fresh produce, there seems to be an analogy that more rudimentary establishments (street markets and etc) offer a fresher option (Chamhuri et al., 2012). This also corroborates that, if there were a larger market for local, organic produce, small farmers would not only have a greater chance of survival, but it would also diminish the bargaining power of major retailers.

#### **2.2.4. Marketing**

In many European countries, several different organic labeling schemes exist in the market. Researchers tried to identify whether consumers prefer certain organic labeling models over others to give recommendations for market actors in the organic sector (Janssen et al., 2012). The Brazilian label for organic products has been developed by the Ministry of Agriculture and is on most industrialized ones organic products in Brazil. The situation becomes more complicated when talking about the labeling of fresh organic produce. It is also recommended that organizations owning an organic label put some effort into measures for increasing consumer awareness of the label (Janssen et al., 2012). If a private label for

organic produce is put forth, would this facilitate the commercialization of sustainable, organic food in low income areas of Brazil? It is advisable to label organic products with well-known organic certification logos that consumers trust (Janssen et al., 2012). Would such label be useful to educate Brazilians about sustainability and sustainable food?

### **2.2.5. COMPARING US RETAILERS IN THE ORGANIC SECTOR**

The organic, healthy, sustainable food market in the United States is, along with the European one, the largest one worldwide. Major retailers, such as Trader Joe's and Whole Foods, have been around for decades. Although models cannot be simply replicated from one country to another, there might be important lessons to be learned from the two companies.

Trader Joe's and Whole Foods are grocery retailers who have managed to take novel ideas and scale them across the US. However, the method in which each chain has decided to bring products to consumers has varied greatly (MIT Sloan). But what has made these two chains so successful is what they have the most in common: their commitment to their customers, to their employees, and to their definitions of quality (MIT Sloan). Trader Joe's has thrived by targeting middle-class, health-conscious consumers as they offer a limited amount of distinctive products that are proven sellers. They provide excellent customer service, and inspire employees and customers to trumpet the brand. [46]

When proposing a solution to be applied in Brazil, it is important to spend sometime looking into what has been done in the sector by the two American giants. Even though the context, geographical area and socio-economic characteristics are completely different, one

might learn from the technological advances and strategies that the two chains have developed in order to expand the market and overcome its challenges such as transportation and marketing. Such know-how could be partially applied in other projects, initiatives, and regions, such as Brazil.

### ***2.3. SOCIETY***

After Environment and Economy, I would like to elaborate on social phenomena that affect the consumption of sustainable produce in Brazil. This last pillar of the triad encapsulates the behavior that shapes consumers.

According to UN predictions, global population is predicted to increase to nearly eight billion by 2030 and more than 9 billion by 2050 (United Nations, 2015), with an even faster growing middle-class, creating demand for more varied, high-quality diet requiring additional resources to produce. On the other hand, a significant share of the world's population is suffering from under-nutrition or malnutrition. It has been estimated that between a third and a half of all food produced around the world is lost or wasted – in other words, up to 2 billion tonnes of food (Sustainable Food Lab, 2015). This goes very much against sustainable practices.

Eating habits and the availability of healthy, sustainable food play a role in how society perceives sustainability. Recent decades have seen a trend towards less sustainable and less healthy diets, with people consuming too much fat and sugar, and salt. While overeating also seems to be a problem, the amount of salt and sugar in industrialized, processed food has exponentially increased in the past years (Moss, 2013). Michael Moss won a Pulitzer Prize for his investigative articles. He showed how companies have been using sugar, salt and fat to

make people addicted to the food they produce. Moss also talked about the link between ever-high obesity rates and the processed food industry. A diet based on industrialized goods and refined sugars leads to chronic health problems (coronary diseases, diabetes, high blood pressure.)

Activists have created social movements such as vegetarianism, green consumption and veganism. Even though these movements are not necessarily against the processed food industry, their followers preach about the importance of eating raw foods, less animal products and organic produce. As such social factors also have an impact on the market, sustainability receives more attention in the media and ethical consumerism has become trendy. The generic term describes anyone who purchases goods based on the dollar-voting concept (Giesler et al, 2014). Broadly speaking, an ethical consumer is someone who buys environmentally friendly products and produce while boycotting company-based purchasing (Why buy ethically, 2007)– such consumer believes that there is a moral liability to anything you acquire.

### **2.3.1. EDUCATION**

It is still rare to find a college graduate in developing areas of Brazil – only 11% of the population has gone to college (OCDE). I expect that educational level in developing areas of Brazil tends to contribute to the lack of awareness about the importance of eating healthily and from a sustainable source. In a study conducted in Brazil, it was revealed a correlation between eating organic produce and having a healthier, better life (Soares et al, 2014). In the same study, scientists were also able to notice that consumers of organic food have a higher income in comparison to the ones that do not. This corroborates other studies

in different parts of the world that have shown similar correlations (Ulf Hjelm; Schleenbecker, Hamm 2013).

It has also been shown that the main influence factors on consumer choice behavior regarding green products include psychological benefit, desire for knowledge, novelty seeking, and specific conditions, and do not include functional values, price and quality (Schleenbecker, Hamm 2013). Due to limited access to education or other pressing issues, such as famine, it is questionable whether the majority of the people living in the developing areas of Brazil are concerned about the usage of pesticides, industrialized fertilizers, and the handling of their food between the crops and the dining table.

Recent social science scholarship on “green” consumption has connected it to social status, positioning it as an opportunity for consumers to signal their social status. It is shown that the practice of green consumption is indeed appealing to the relatively well-educated.

### **2.3.2. VEGETARIANISM**

Trends have been noticed between sustainable consumption and vegetarianism, as well as between vegetarianism and higher levels of education and socio-economic levels. Both are low in Brazil compared to other developed countries, which could rectify our intuition that green consumption in the country is low because of low educational levels.

A study conducted in the United States, Canada and the UK showed that vegetarianism is not only a diet, but also a way to create identity (Fox et al, 2008). This highlights that diets are closely correlated to education and awareness to the benefits of having a healthy diet.

The similar phenomenon seen in Brazil, in which people with higher educational and socio-



economic levels tend to consume more organic produce.

Little research has been published concerning the differences between health-oriented and ethically oriented vegetarians (Hoffman et al, 2013). Hoffman et al showed that ethical vegetarians are more convicted of it than health vegetarians, this group also stayed vegetarian for longer and nutrition knowledge did not change between the two groups of vegetarians (Hoffman et al, 2013). This reveals that ethical vegetarians potentially have stronger motivation and purchase fewer animal products than health vegetarians.

This highlights the affect that education and awareness have on people's choices. A more educated population tend to think about their impact on the environment.

### **2.3.3. GREEN CONSUMPTION**

Like vegetarianism, ethical consumption and veganism, green consumption plays an important role when talking about expanding the sustainable food market in a region. It has been observed that permanent financial incentives were more effective than informational campaigns at fostering green purchases if the green product is inferior to the non-green substitute, while the temporary ones are shown to be an ineffective tool to encourage the long-term market success of any green product (Kauffman, 2013).

### **2.3.4. SOCIAL IMPACT**

As stated in the introduction, society stands as one of the three pillars of sustainability.

Taking into consideration the findings of Piketty in his *Capital in the 21<sup>st</sup> Century* and also

inspired by *Business Solutions for the Global Poor*, social impact is an important factor when talking about a sustainable way to make food available to low income areas of Brazil. The creation of social value is directly related to the creation of business at the bottom of the pyramid (Sinkovics, 2014).

The practice of green consumption is appealing to the more educated, but green consumption also causes some sort of social differentiation (Poetics, 2013), Being a female, having children eighteen, and identifying oneself as someone who is concerned about the environment are ways to predict sustainable consumption (Poetics, 2013).

The information provided in this section of the paper was used in order to develop methods to test the assumptions that educational background, availability, and price, for instance, could be barriers to a wide consumption of organic produce.

### **3. METHODOLOGY**

As previously stated, there are several potential reasons for the low consumption of sustainable food in Brazil, ranging from logistics, pricing, and marketing to education and availability. Methods were developed to assist assessing the different barriers that could be preventing the Brazilian organic industry from expanding.

In this study I used two methods: face-to-face oral surveys and telephone interviews. The oral surveys were used to interview shoppers, supermarket managers, and farmers. I chose this method because it is direct, practical to be administered, and inexpensive. Surveys are also time-effective as the data can be quickly gathered and easily compiled later. The survey was designed to be brief, taking about 3 minutes per subject. The telephone interviews were longer, lasting up to 90 minutes each. The two methods allowed me to acquire the data I needed to assess the obstacles faced by the current Brazilian market for organic produce.

For all three groups interviewed in person (shoppers, farmers, and managers), the initial approach consisted of explaining the purpose of my study followed by an invitation to participate in the study. Paper questionnaires for the oral surveys, telephone, and the computer platform *Skype* were the only tools used in this study. A pencil was used to record the data while interviewing Brazilian shoppers in person. The long interviews were recorded and used as reference.

All of the in person interviews were conducted in Boqueirao, Brazil, the city where I grew up and have more familiarity with geographically speaking. The town is located in the northeast of Brazil in the state of Paraiba.

### **3.1.SAMPLE GROUPS**

#### **3.1.1.SHOPPERS**

I visited seven supermarkets in Boqueirao, Brazil. All of them are located in the downtown area of the city. Shoppers were approached as they were leaving or entering the store. The population was mostly composed of women appearing to be between 25 and 50 years old. Surely there were limitations to the selection of subjects, but I believe that the group of shoppers was representative of the Brazilian market for organic produce in small and medium-sized towns (up to 100,000 inhabitants). First, the objective was not to have a demographically diverse sample, rather one that accurately captures the shopping habits in Brazil, where housewives usually buy groceries. Second, since each supermarket appeals to a different market tier, even though I cannot assure that this actually happened, there seemed to be interviewees from a variety of socio-economic statuses.

There was a total of 11 questions asked for shoppers (Appendix). They were meant to assess how familiar with sustainable produce Brazilians are (questions 1 – 6), consumer trends (question 7), and the influence of price (question 8), accessibility (question 9), and educational background (questions 10, 11).

I faced no issues approaching shoppers in Brazil. The data was gathered in a span of two weeks and I interviewed 32 shoppers.

#### **3.1.2.FARMERS**

Farmers gave me an interesting perspective on agricultural practices, how consumer trends impact production, the difficulties with logistics in Brazil, and the lack of governmental subsidies. The format and approach was very similar to the one I used when interviewing shoppers. Questions were also grouped similarly, with the exception of questions specifically

related to the issues mentioned above.

There are crops within a 20-minute drive from downtown of Boqueirao. I used a motorcycle to access some of the locations, as the quality of the roads was not optimal. In order to interview a few farmers, however, I needed to take a canoe and cross the local river. I had the help of two other people from the area. Farmers were kind and willing to help. Some of them left the work they were doing to dedicate the time for the interview. Some I interviewed while they were doing manual work in the farm.

Even though the farmers I interviewed might have a limited knowledge of economics, they talked eloquently about the local market and its drivers. My questions intend to capture an understanding of how the farmers see the market for sustainable food.

### **3.1.3 SUPERMARKET MANAGERS**

I decided to interview managers because they would be able to share a unique view on consumer trends, and the logistics of sustainable produce in the northeast of Brazil. Most supermarkets in the region are located downtown. Out of all the supermarkets I visited, I was able to talk to three managers.

## 4. RESULTS

I have divided my results chapters into two sections: qualitative and quantitative analysis. As I interviewed 5 farmers and 3 managers, it made more sense to have a qualitative approach to the data gathered from these two groups. On the other hand, I am quantitatively analyzing the shoppers' data due to the much larger pool of 32 subjects.

### ***4.1 Qualitative Analysis***

#### **Farmers**

Interviewing farmers includes an important stakeholder in the scenario. Most, if not all, of the producers I interviewed live under very strenuous conditions. They lead a family business with low profitability, feeling exploited by large distributors that buy the produce at a very cheap price. They also feel forgotten by the local government for not providing them with training, technologies or subsidies. My region, and several others in Brazil, currently face a severe drought. The farmers were obligated by the local government to stop pumping water from the nearby reservoir to irrigate their crops. They had to dramatically decrease their production and have received no indemnity in return.

Most of farmers knew the meaning of organic produce, but not of sustainability. Most of the farmers I interviewed do not grow organic produce and mainly because they are not aware of governmental incentives or subsidies to organic produce, but also because the regional demand is low. They agreed that price is also a barrier for organic produce. Organic food is more expensive to produce, people would not be willing to pay a higher price for the organic produce. Farmers would most likely have a loss. however all of them are also concerned with

the use of pesticides and fertilizers due to health issues generated by such products. On the other hand they admit that the use of pesticides and fertilizers guarantee a more profitable business. All of the interviewed farmers have answered that market prices are too low and costs of production too high (even for non-organic produce).

All the interviewed said that they have never learned nor been exposed to sustainable farming practices. Some of them explained that what they have learned have been passed from older generations, or they have “learned by doing”. When asked about some techniques that could make farming more sustainable, most of them have mentioned “dropping” and “micro-expressor”, which are agro-techniques used in in order to reduce the amount of water used in agriculture. The farmers also believe that the demand for organic produce is yet limited to bigger markets as in bigger cities. Lastly most of the farmers sell their produce to Campina Grande, which is the second biggest city in the state. However, some of them also sell it locally. Farmers do not charge a premium for organic produce.

Even though the purpose of my visit was far from analyzing their living standards or market, it was an eye opening experience to realize that much needs to be done in order for them to lead a more decent life.

## **Managers**

When collecting the data throughout the months of December 2014 and January 2015, I visited 10 supermarkets in my hometown. In total, I interviewed 4 managers. There are a few trends spotted: most of the produce being sold does not come from local farms, they come from a major distribution center that sells produce from several neighboring states such as

Rio Grande do Norte, Bahia and Pernambuco. One of the managers mentioned that, when possible, they do try to prioritize local produce over out of state. The other managers seemed not be concerned about where the food comes from.

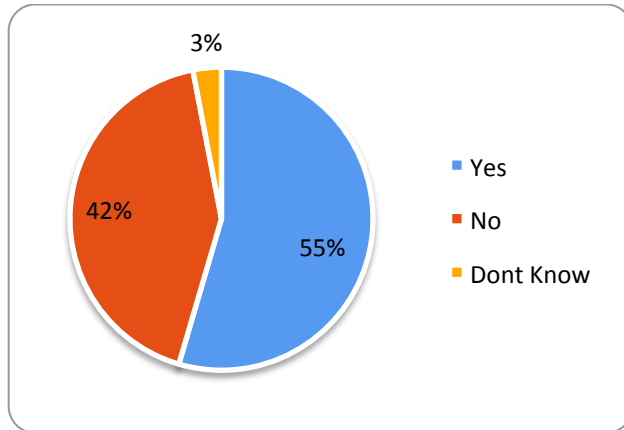
All of the managers that I interviewed seemed concerned with health-related aspects of the produce. All of them seemed to be aware of the risks of using pesticides and fertilizers both to producers and consumers. The diversity of organic produce at the each of the shops varied greatly. One of the shops only offered organic fruits, such as mango, while other had a greater variety of produce ranging from tropical fruits to legumes and leaves: banana, green beans, lettuce, cilantro, kale, and mint. One of the supermarkets I visited did not have organic produce on sale.

As far as demand, the manager of the supermarket that had no organic produce on sale said that “people don’t ask for it”, “very little demand”. At another supermarket they said that they have seen an increase in demand as people become more aware of the risks involved in handling and consumed produce that has been grown with the help of pesticides.



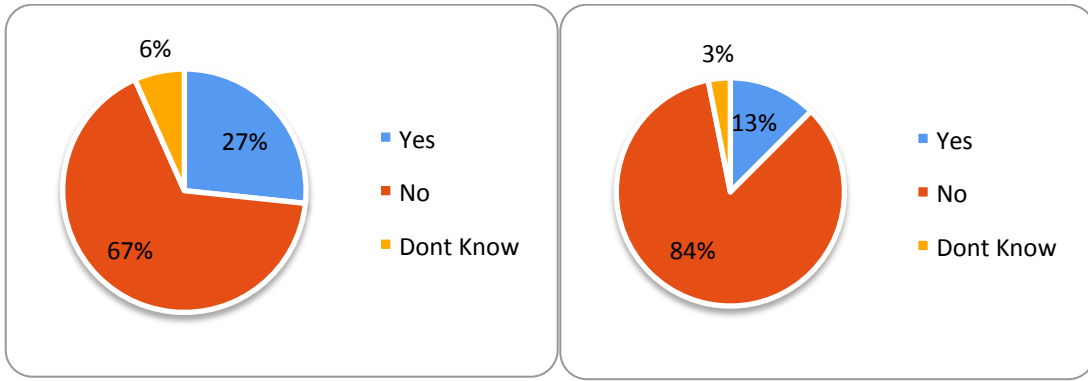
## 4.2. Quantitative Analysis

In this section I intend to analyze the quantitative data gathered in Brazil. I interviewed 32 shoppers in the city of Boqueirao, PB, Brazil. Over half of the interviewees mentioned to face barriers when it comes to purchasing organic produce (Figure 1).



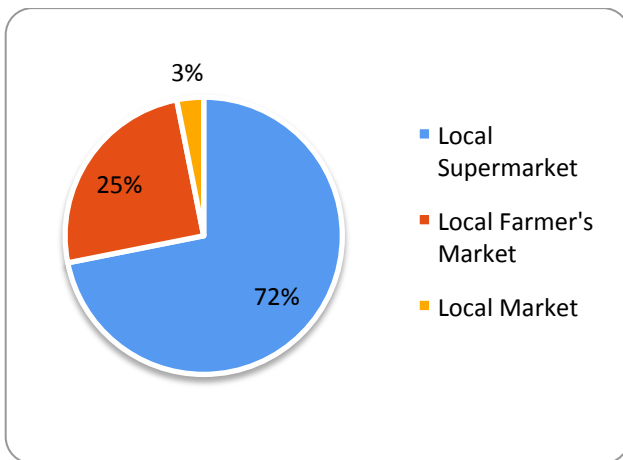
**Figure 1 Percentage of shoppers that believe there are barriers to obtaining organic produce**

From an economic perspective, price does not seem to be a major issue as much as availability is (Figures 2 and 3). In most countries in North America and Europe, organic produce tends to be more expensive than regular non-organic produce. This question intended to check whether this was also true in Brazil. It is not. Only a quarter of the interviewees perceive price as a barrier (Figure 2). This shows that either the producers do not charge more for producing organic food or that there is indeed no difference in productivity between organic and non-organic crops to farmers in Brazil. That is, the costs of both types are very similar. As far as availability, more than 80% of the people I interviewed said that organic food was not easily available to them (Figure 3). Many mentioned that it was very difficult to find organic food at the local supermarket. Proper labeling was also an issue. Some local farmers plant organically but do not label their produce as such.



**Figure 2 Shoppers who perceive price as a barrier**  
**Figure 3 Shoppers who have easy access to organic produce**

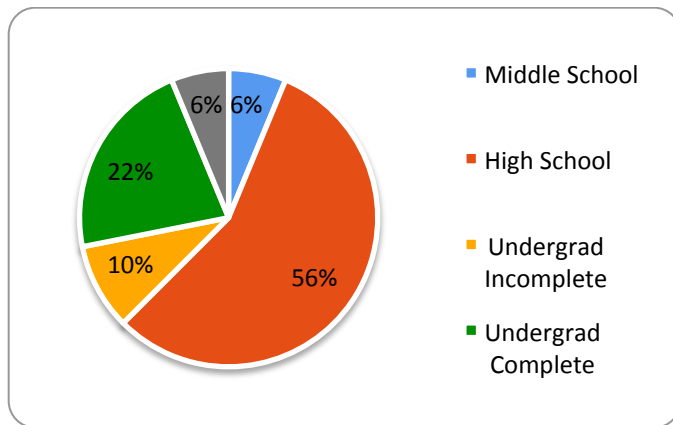
Another important economic factor is the place where shoppers buy groceries. When trying to assess the organic consumption in Brazil, I found it important to know where people shop. This addresses some of the discussion related to supply chain and logistics of how the produced is shipped from a place to another. The data shows that the majority of the people shop at the local supermarkets in the area (Figure 4). About a quarter of the people shop at the farmer’s market and a small percentage of shoppers at the local market (Figure 4).



**Figure 4 Where shoppers purchase fresh produce**

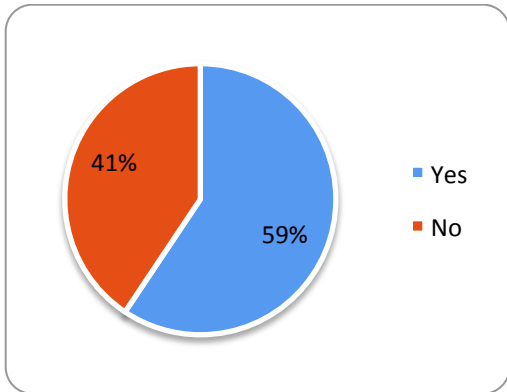
At the beginning of this research, I hypothesized that educational level and awareness about sustainable agriculture could be correlated. The implication of that, taking into account low

educational levels, would be a low demand of organic produce. In order to assess such correlation, people were asked their educational background. Over half of our subjects had only completed high school (Figure 11). Since over 90% of the shoppers had indeed heard about organic produce, even though only 10% had an undergraduate diploma, this shows that educational background is not necessarily as important as some other factors, like availability (Figure 8).



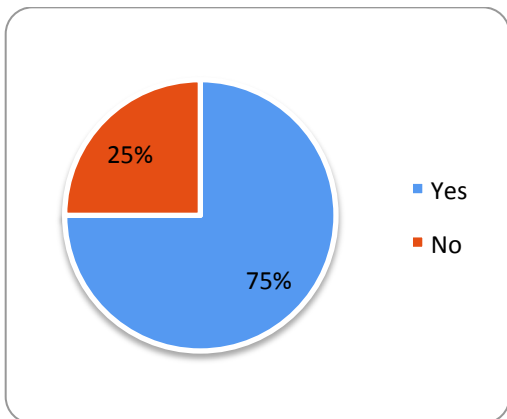
**Figure 5 Educational Level of Shoppers**

About 60% of the people had someone in their household that consumes some kind of organic product (Figure 7). This could be fresh produce, but not necessarily: granola bars, rice or beans were also mentioned. This shows that over half of the interviewed population is somewhat aware of the benefits of eating organic produce, as they care to purchase it in the first place.

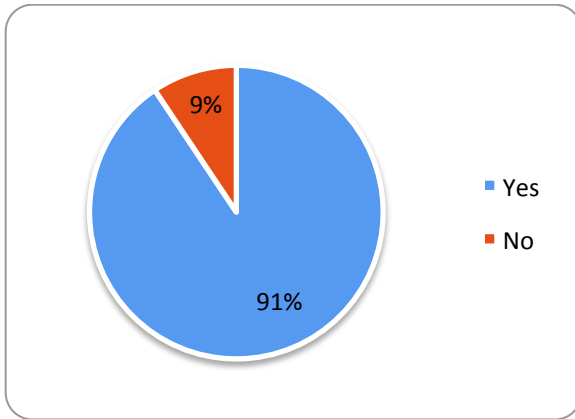


**Figure 6 At least one person in household consumes organic produce**

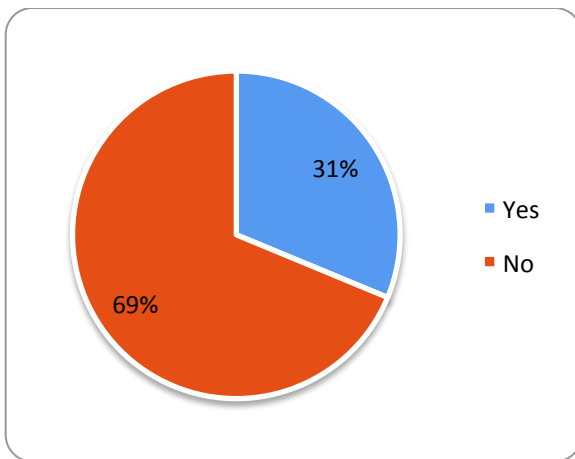
Of the 91% that mentioned that they had heard about organic food before, 16% of them could not define what organic food is (Figures 7 and 8). This shows that even though organic food might have become a buzzword, it does not necessarily mean that people know what it means. A quarter of the population could not define what organic food was (Figure 8). Likewise, about 70% of the population had never heard of sustainable agriculture before (Figure 5) and 10% of those that did hear about it, but could not define it (Figure 6).



**Figure 7 Percentage of shoppers concerned by use of pesticides**

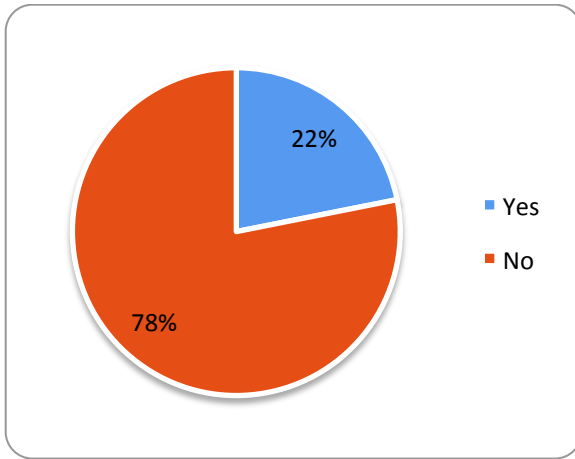


**Figure 8 Percentage of shopper who have heard about organic produce**



**Figure 9 Percentage of population who heard about sustainable agriculture**

This set of data shows the need of some sort of educational program in order to teach people the difference between organic and sustainable. Every sustainable crop is organic, but the opposite is not necessarily true. On the other hand, three quarters of the population seemed concerned with the usage of pesticides in crops (Figure 7). Most of the concerns were associated with health implications. As Boqueirao is a fairly small town (17,000 inhabitants), people would often mention stories of people they know that got intoxicated while handling heavy chemicals in farms in the near area.



**Figure 10 Percentage of shoppers who could define sustainable agriculture**

Only 13% of interviewed consumers have easy access to organic produce. Overall, availability seems to be the most pressing reason pushing the consumption of organic produce down.

## CONCLUSION AND RECOMMENDATIONS

I began this paper sharing my lack of understanding as for why the organic industry in Brazil is still a minor movement when compared to North America and Europe. Brazil has some of the most basic resources to foster a success organic industry: vast arable land and favorable weather. Moreover, I learned about many of the factors involved in the agricultural sector and the impact of each: logistics, value chain, marketing, social trends, price.

In order to better group these factors in a cohesive way, it made sense to me to segment my background research in three pillars: environment, economics, and society. When analyzing the factors that go into the environment, I learned about the impact of agriculture to our ecosystem and how sustainable practices better utilize our natural resources: land and water. I have also touched upon food policies and their influence on the market. Brazil has developed a few policies that have resulted in millions being taken out of poverty. However, there is no major incentive from local and federal governments towards putting forth a strong sustainable agriculture market.

From an economic perspective, I have looked into the broader picture of supply chain and marketing and their impact on the industry, as well as specific sections within each topic such as the logistics of shipping the produce. This was important to understand how multifaceted the industry is and that profit on its own is only a part of puzzle.

Finally, in the section about society I discussed the importance of education and awareness about sustainable agriculture as well as the impact that movements such as vegetarianism, green consumption and veganism have on the market. These movements push the private

sector forward to offer “greener” products and, sometimes, even change some of their non-sustainable practices into more environmentally conscious ones.

Based on the segmentation presented above, I would like to make three suggestions: one for each of the sections described in the background chapter. When thinking about what recommendations could be given, I considered their effectiveness and feasibility.

### ***1. Economics: Creation of a farmers association***

An association could address many of the supply chain issues: raw materials (seeds, water, land), Production (technologies to support the production), packaging/ distribution channels, marketing/ sales.

In my research it became clear that farmers had no other options as far as distribution channels as an output to their production. This means that they were captive of major distributors in bigger cities that bought their produce at a very low margin. Another problem they faced was the lack of training and proper technical know-how specifically about sustainability in agriculture. Lastly, it also became clear through my research that only a small percentage of the population had easy access to organic produce.

Founding an agricultural association would be a way to solve some of the financial and strategic problems faced by local farmers. Such venture would help with distribution, as they would have a greater production output and therefore a higher bargaining power with major distributors. The creation of an association would also bring the community together. It would leverage the existing knowledge about the health implications of the use of pesticides



and fertilizers, as shown in my research, and this could drive a sense of purpose in purchasing locally grown produce. Ultimately, this could also push local sales.

## ***2. Environment: Subsidies to support sustainable agriculture***

When interviewing farmers, consumers, and supermarket managers, a majority seemed concerned with the health implications of using pesticides. But not a single person mentioned about the impact of non-sustainable agriculture to the environment. There is still a long way to go in Brazil when it comes to educating people about the value of natural resources.

Federal and local governments should consider subsidizing producers that implement sustainable practices. Such support would not only be an interesting way of instructing farmers about environmentally sustainable practices.

## ***3. Society: Implementation of educational programs***

My research shows that few Brazilians are familiarized with the concept of sustainable agriculture. In order to create awareness about organic produce and sustainable agriculture, I would suggest putting forth an educational program on sustainable agriculture. This program could be either a public or a private initiative aiming to instruct the population about how non-sustainable agro-practices harm the environment and potentially their health.

A private company, in the organic sector, could perceive this as a heavy marketing campaign targeting those three fourths of the market that are already aware of the use of pesticides and could be potential clients of a company that sells organic produce. The public sector could see this as a way to improve people's health and boost the local economy. The educational

programs could be segmented by audience: one for consumers, one for farmers and one for managers and supermarket owners.

Some of the limitations of this paper include the limited number of subjects interviewed. Brazil is a very large country and each region might face unique challenges. A more robust research with interviews collected at different areas of the country could be done.

As a developing nation with a very large population, Brazil showcases a variety of challenges in the food sector. The search and implementation of sustainable practices is an important one. For the very same reasons, it might be smarter to treat each scenario at the regional level, starting locally. Each region is so unique in so many ways, I am afraid that a broad project trying to cover the entire country would not be effective. I believe that these three measures could dramatically impact the local organic industry. They are feasible and address the problem from a multilateral perspective, raising the chances of success.

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## APPENDICIES

### **8.1. Appendix A: Questions from oral surveys to each group**

#### **A.1. SHOPPERS**

1. Where do you usually shop for fresh produce?
2. Does the use of pesticides and fertilizers in Agriculture concern you?
3. Have you heard of organic produce and farming?
4. If yes, could you define what organic food is?
5. Have you heard of sustainable food?
6. If yes, would you define what sustainable food is?
7. Does anyone in your household consume organic/ sustainable food?
8. Are there barriers preventing you from purchasing organic produce?
9. What about price?
10. What about availability? Do you have access to organic produce in your neighborhood/ where you go shopping?
11. What's your level of education?

## **A.2. FARMERS**

1. Have you heard of organic produce and farming?
2. If yes, could you define what organic food is?
3. Have you heard of sustainable food?
4. If yes, would you define what sustainable food is?
5. Do you grow organic produce?
6. Are there governmental incentives for you to grow organic produce? Are there subsidies? Are there tax deductions/ credits?
7. Does price impede you from wanting to sell organic products?
8. Do you think price impedes consumers to buy organic produce?
9. Are market prices too low and costs of production too high?
10. Does the use of pesticides and fertilizers in Agriculture concern you? Why?
11. Does the use of pesticides and fertilizers in your crops guarantee a more profitable business? How?
12. Have you learned/ been exposed to sustainable farming practices?
13. Are you aware of technologies that could make farming a more sustainable practice? What are they?
14. From your experience and observation, do you believe that there is a demand for organic/ sustainable produce in this region?
15. How far from here is your produce being sold?

## **A.3. SUPERMARKET MANAGERS**

1. From your experience, do you believe that there is a demand for organic/ sustainable produce in this region?
2. How long has this shop been selling organic produce for?



3. Does the use of pesticides and fertilizers in Agriculture concern you? Why?
4. Where is the produced being sold here grown?

***Appendix B: Survey results from supermarket managers***

<b>QUESTIONS</b>			
<b>1. From your experience, do you believe that there is a demand for organic/ sustainable produce in this region?</b>			
<b>2. How long has this shop been selling organic produces for?</b>			
<b>3. Does the use of pesticides and fertilizers in Agriculture concern you? Why?</b>			
<b>4. Where is the produced being sold here grown?</b>			
<b>SUBJECTS</b>			
	<b>1</b>	<b>2</b>	<b>3</b>
<b>1.</b>	Yes	No demand	No demand
<b>2.</b>	Just a few products (strawberry)	We don't sell it	banana, lettuce, cilantro, mint, green
<b>3.</b>	Yes (health)	Yes (health)	Yes (health)
<b>4.</b>	From the northeastern region (BA, RN)	States around the region	When possible, locally grown

## Appendix C: Survey results from farmers

QUESTIONS		
1. Have you heard of organic food?		
2. If yes, could you define what organic food is?		
3. Have you heard of sustainable food?		
4. If yes, could you define what sustainable food is?		
5. Do you grow organic food?		
6. Are there any governmental initiatives for you to grow organically? Are there subsidies? Tax deduction/ credit?		
7. Does price impede you from wanting to sell organic produce?		
8. Do you think price impedes consumers from buying organic produce?		
9. Are market prices too low and costs of production too high?		
10. Does the use of pesticides and fertilizers in agriculture concern you?		
10. Does the use of pesticides and fertilizers in your crops guarantee a more profitable business? How?		
12. Have you learned been exposed to sustainable farming practices?		
13. Are you aware of technologies that could make the farming a more sustainable practice? What are they?		
14. From your experience and observation, do you believe that there is a demand for organic / sustainable produce in the region?		
15. How far from here is your produce being sold?		
QUOTES		
SUBJECTS		
1	2	
Yes	Yes	
Without pesticide	Yes	
No	No	
No	No	
No (drought, no water)	Yes	
None of his knowledge.	No	
Yes	Yes, market fluctuation.	
Yes	No	
Yes	Yes	
Yes (health)	No	
Yes (plagues)	No. Slow growth.	
No. We learn with the older ones.	No	
Gotejamento/ micro expensor	"Dropping" "Micro-expensor"	
No, maybe in bigger cities	Maybe in bigger cities	
Campina Grande	Campina Grande	
We are facing a dramatic drought. We have been forgotten by the Government.	No indemnity.	
3	4	5
Yes	Yes	Yes
Yes	Yes	Yes
No	No	No
No	No	No
No	Yes	No
No	No	No
No	No	No
No	-	-
Yes	Yes	-
Yes (health)	Yes (health)	Expensive and dangerous
Yes	No	Yes, it kills insects
No	No, "never"	No
Dropping	Dropping, micro-expensor	No
Maybe	Yes	Don't know
Campina Grande	Local	Campina Grande
	There is no "organic seal", no support, no training	

