Expected impacts from construction of Road PR-22 on the cattle and dairy farms of Puerto Rico

By

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Acknowledgments

I must thank my family without whose help this project, and the degree conferred along with it, would ever have been possible. Special thanks to my husband, Jose Luis, who encouraged me and had lots of patience during the past two years.

I also like to thank my advisor, Dr. Norman Christensen, for his wisdom and patience in dealing with an unconventional schedule of work.

For my boys, Gabriel and Nicolás; may this serve as an example that you can accomplish anything in life, you just have to set your mind upon it.
Abstract

The dairy industry is the most important economic sector of Puerto Rico’s Agriculture. Statistics indicate that during the 2010-2011 fiscal year it had a gross income of $235.1 MM, corresponding to a total of 29.8% of the total agriculture market. It employs some 25,000 people and supports other businesses such as cheese, hay sale and meat production. The industry is upheld by the dairy cattle ranchers, many of which are family-owned businesses.

A threat to the industry was declared by the Departamento de Transportación y Obras Públicas (DTOP) when in 2010 it re-issued its intent to construct a road through areas on the northwest of the island. These areas are known for being the island’s top milk-producers.

The objective of this Masters Project was to identify the expected impacts the road construction can have on the dairy cattle industry. This objective was pursued by understanding the current state of the industry, review DTOP’s stated need for construction, evaluate direct and indirect impacts to the industry, and review interviews to stakeholders provided by “Transecto Socio-Ecologico del Karso Norteño”.

The result of the research leads to an industry whose production volumes, pasture areas, and amount of farms are already in decline. Stakeholders interviewed by Transecto foresee an industry weakened by parcel segregation that would make them impracticable for cattle grazing. As a result many milking facilities and ranches may have to close.

For an industry in decline and with many operational complications, this project will likely have a big impact on dairy farms and may push the industry to the verge of collapse.
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<th>Abbr.</th>
<th>Spanish</th>
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<tr>
<td>AC</td>
<td>Autoridad de Carreteras</td>
<td>Roads Authority</td>
</tr>
<tr>
<td>AAPR SGL</td>
<td>Asociación de Agricultores de Puerto Rico, Sector Ganado Lechero</td>
<td>Puerto Rico Farmers Association, Milk Cattle Sector</td>
</tr>
<tr>
<td>ACT</td>
<td>Autoridad de Carreteras y Transportación</td>
<td>Puerto Rico’s Transportation and Highway Authority</td>
</tr>
<tr>
<td>CCAM</td>
<td>Colegio de Ciencias Agrícolas de Mayagüez</td>
<td>Mayaguez Agriculture Science College</td>
</tr>
<tr>
<td>DA</td>
<td>Departamento de Agricultura de Puerto Rico</td>
<td>Puerto Rico's Department of Agriculture</td>
</tr>
<tr>
<td>DIA</td>
<td>Declaración de Impacto Ambiental</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>DRNA</td>
<td>Departamento de Recursos Naturales y Ambientales de Puerto Rico</td>
<td>Puerto Rico's Department of Natural and Environmental Resources</td>
</tr>
<tr>
<td>DTOP</td>
<td>Departamento de Transportación y Obras Publicas</td>
<td>Department of Transportation and Public Works</td>
</tr>
<tr>
<td>JP</td>
<td>Junta de Planificación de Puerto Rico</td>
<td>Puerto Rico Planning Board</td>
</tr>
<tr>
<td>NGO</td>
<td>Organización no-gubernamental</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>ORIL</td>
<td>Oficina para la Reglamentación de la Industria Lechera</td>
<td>Dairy Industry Regulation Office</td>
</tr>
<tr>
<td>RUM</td>
<td>Recinto Universitario de Mayagüez</td>
<td>Mayaguez University Campus</td>
</tr>
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</table>

Conversion factors

cuartillo 1 cuartillo = 32 oz. or 0.946 liters of milk

cuerda 1 cuerda = 0.9711 acres

Note: All translations from Spanish to English were made by the author.
Introduction

The dairy industry occupies an important position in Puerto Rico’s economy. According to the Department of Agriculture (2012), in 2011 the dairy industry was ranked as the principal agribusiness in Puerto Rico (p. 2). It also provided the highest employment and supported indirect industries such as meat and cheese products (Department of Agriculture [DA], 2012, p. 2). The industry also supports traditional family values, as individual facilities many times are a family owned business.

As of 2011, the DA (2012) reported there were 324 dairy cattle ranches and milking facilities in operation (DA, 2012, p.2). The area most commonly known for its dairy production is located to the northwest of the island. This area has not been heavily impacted by urban sprawl and has particular traits that make it advantageous for dairy cattle ranches.

The northwest region of the island is geographically dominated by limestone plains. The dairy cattle industry benefits from the flatlands, which ease cattle movement, and soils that are not excessively erodible or saturated with water during the rainy season (Lugo et al., 2001, p. 71). In addition, the area’s largest aquifer provides groundwater for animal consumption (Lugo et al., 2001, p. 69). However, many of these qualities also make the area attractive for urban expansion.

In 2010, the Department of Transportation and Public Works (DTOP, its Spanish acronym) renewed its intentions to build an extension of highway PR-22. The agency contracted the services of many experts to prepare a preliminary design and develop a revised Environmental Impact Statement (DIA, its Spanish acronym) for public review and comments. The proposed road alignment would cross undeveloped areas of the northwest part of the island.

The proposed road project raised many concerns among the citizens, which include the possible impact on the region’s aquifer, urban sprawl, a decline in economic activity along the PR-2 road corridor, and habitat loss for threatened or endangered species. Possible impacts to the operations of the dairy cattle ranches located in the region represent a particular concern and are the focus of this research.
Background of Puerto Rico’s Dairy Industry

The dairy industry in Puerto Rico has a rich history that stretches back to 1505 when Spaniard conquistador Vicente Yáñez Pinzón imported the first cattle to the island; it consisted of pigs and goats (“Curiosidades”, 2009). Five years later, Juan Ponce de León, the island’s first Spanish-appointed governor, imported the first cows from neighboring Dominican Republic in the island of Hispaniola (“Curiosidades”, 2009). By the late 19th century, milk men took the cows to people’s houses and milked them in front of the consumer (“Curiosidades”, 2009). In this manner, dairy industry began its slow development on the island.

In the 20th century the industry began to formalize itself and prospered. In 1944 the first machines/equipment to milk cows were installed on the island (“Curiosidades”, 2009). By 1948 the milk industry was second in importance only to sugarcane (Guillermety, 2005, p. 10). This prosperity coincided with the industrial development that occurred during the 1940s when the government of Puerto Rico implemented a program called “Operación Manos a la Obra”, also known as Operation Bootstrap. The objective of the program was for Puerto Rico to become an industrialized society and grow economically in a short time period (Carrión, 2009, p. 1). This program marked the beginning of the industrial development program based on “external capital and tax exemptions” (Carrión, 2009, p. 1).

When the program was conceived, the island’s economic base was agriculture, with small cities and villages spread throughout the island. Sugarcane, the main crop, was in the hands of several private entities. The coastal plains were mainly used for sugar planting. Worker and general living conditions were very poor. There was a high level of illiteracy in the population, communications were slow, and there were few, if any, environmental laws and policies.

Operation Bootstrap encouraged many families to leave the island and look for jobs in the U.S. (Rivera & Zeig, 1986). This resulted in the emigration of over 1/3 of the Puerto Rican agrarian workforce (Rivera & Zeig, 1986). This emigration was justified by the government as a “necessary, but temporary way of alleviating unemployment rates” until the Puerto Rico’s industrial plans were fulfilled (Rivera & Zeig, 1986). As a result, many farm workers were displaced, and much of the coastal plain regions of the island were occupied by petrochemicals.
or industrial facilities. One of the direct consequences of this program was the loss of thousands of acres of fertile land and the destruction of miles of mangroves and other forms of marine life (Rivera & Zeig, 1986). These social and environmental losses were justified in the name of new jobs and new economic drivers (Rivera & Zeig, 1986).

The success of the industrialization program can be measured from the historical data and statistics. Carrion (2009) indicated that the Gross National Product (GNP) in 1950s was 5.3 percent and it rose to 7 percent the following decade (p. 3). This growth was accompanied by a notable growth in the per capita GNP, from $154 in 1940 to $342 in 1950, and to $716 in 1960 (Carrion 2009, p. 3). The manufacturing sector’s share of the economy grew from 16 percent in 1950 to 48.1 percent in 1980 (Carrión, 2009, p. 3). On the other hand, the GNP from agricultural sector declined from 18 percent in 1950 to 3.6 percent in 1980 (Carrión, 2009, p. 3).

Because it met its objectives of both rapid industrialization and economic growth, Operation Bootstrap might be viewed as a success. It created a middle class, moved people from the rural areas to the cities, reduced poverty, increased literacy and improved living conditions for most of the population. People were able to afford houses, cars and spend money on other commodities. The program was seen as a model for industrialization in other Latin American countries (Rivera & Zeig, 1986). However, the social and environmental problems that resulted from the program, along with its primary mechanism for economic growth -depending on external capital- are still evident in the Puerto Rico of the twenty first century.

The prosperity of the milk sector was due primarily to the abandonment traditional crop practices and the “industrialization” of milking facilities with new equipment. Yet, while the dairy industry was still developing in the 1940s, there was fierce and unfair competition among milk producers. Milk was purposefully spilled, transportation trucks stolen and milk bottles broken (“Curiosidades”, 2009). As a result, industry owners and operators requested government intervention to regulate the industry (“Curiosidades”, 2009).

The Oficina para la Reglamentación de la Industria Lechera – Dairy Industry Regulation Office - (ORIL) was created by virtue of Law No. 106 in June 28, 1956 and continues to operate today. Its main objective is to “have high quality milk produced in sufficient quantities to meet
local demand, at fair and reasonable prices to the consumer, and ensure reasonable profits to all sectors of the industry, which includes production, processors and distributors” (DA, 2012, p. 1). Another of ORIL’s tasks is to determine the price of milk at consumer level (Díaz, 2012).

Under the ORIL, the industry continued to prosper and expand. By 1967, the Food and Drug Administration determined that the milk produced in Puerto Rico met the prerequisites for interstate trade and Grade A milk was certified in 1991 (“Curiosidades”, 2009). This action allowed locally produced milk to be served in school cafeterias and be sold to airlines and military bases (“Curiosidades”, 2009).

Currently, milk production is the top grossing sector of the agriculture industry. In the 2010-2011 the Gross Income of the dairy sector was $235.1 million USD, which corresponds to 29.8% of the total income of the agriculture sector (DA, 2012, p. 1). The local dairy industry is able to produce milk to satisfy the needs of the island’s population, directly and indirectly it provides some 25,000 jobs, and it supports other industries such as meat and cheese production.

Despite its ranking, the industry faces big economic and management challenges. In the period of 2001-2011, the production of milk and the overall cattle pasture areas have declined. Also, the amount of dairy cattle ranches has also been reduced. Yet, one of the biggest challenges the dairy industry faces is in light of the proposed construction of a road which will cross areas currently used for pasture and milking facilities. The goal of this research project is to evaluate the possible impact this road will have in the dairy cattle sector.

**Location importance**

The proposed project for the extension of road PR-22 will impact the location of the dairy industry in the northwest region of the island. This area is geographically dominated by limestone plains. According to Lugo et al. (2001), the alluvial soils in this area are some of the “finest soils” for agriculture activity (p. 71). The dairy cattle industry benefits from the lack of slopes, which eases cattle movement, and soils that are not excessively erodible or saturated with water during the rainy season (Lugo et al., 2001, p. 71). This area is also one of the few in the island where there are large expanses of unpaved terrain. These large expanses of land are
needed by the dairy cattle industry for animal grazing. In addition, the northern karst area has the largest aquifer in the island and provides groundwater for animal consumption (Lugo et al., 2001, p.69). However, many of these qualities also make the area attractive for urban expansion.

The municipalities that will be directly impacted by the proposed cross-country extension of road PR-22 include Hatillo, Camuy, Quebradillas, Isabela and Aguadilla. The statistics office of the DA published in the agency’s website the ranking of each municipality according to the economic contributions to the agriculture sector (DA, 2011a). In this ranking, Hatillo figures as #1, Camuy as #4, Isabela is #8, and Quebradillas is in at #17. Hatillo is also known as the number one milk producer in the island. According to the report by Guillermety et al. (2005), the dairy cattle ranchers in Hatillo produce between 25 to 30% of all the milk production in the island (p. 14). Thus, this region’s milk production is tied to its geographical location are important to the dairy industry.

Planning for PR-22: Infrastructure to Support Industrialization

In 1965, the Autoridad de Carreteras (AC) -Roads Authority- was established as a public corporation to direct the development of a road network throughout the island (Departamento de Transportación y Obras Publicas [DTOP], 2009). One of the objectives of the AC was to encourage the industrialization through the creation and management of a road network (“Historia de la carreteras de Puerto Rico” [Historia], 2006). Later, the AC was reorganized, became part of the Department of Transportation and Public Works (DTOP), and changed its name to Autoridad de Carreteras y Transportacion (ACT) -Transportation and Highway Authority-, as it is known today (DTOP, 2009).

In the 1960s, at the request of the AC, various engineering firms developed plans to construct a road that would connect the municipalities located in the northern part of the island (DTOP, 2010, p. 1-1). Another island-wide study in 1968 recommended the development of a strategic toll-road system that would serve the infrastructure needs of the island and connect almost every municipality (DTOP, 2010, p. 1-1). It was then that road PR-22 proposed as being “necessary and vital” in the road plan. The formal recommendation of building the
road cross-country originated in a 1971 study that provided continuity to the development plans for a highway network that encircled the entire island (DTOP, 2010, p. 1-1). Thus, the extension of road PR-22 has been in the government’s plans for at least 45 years.

Construction of the existing highway PR-22, also known as De Diego Highway, began in 1969 and was finalized in the 1990s (DTOP, 2009). Along its current route, Highway PR-22 travels west from San Juan through 9 municipalities. Prior to the construction of PR-22, road PR-2 was the primary road that connected San Juan to municipalities to the West of the capital city. PR-2, a four lane road with traffic lights, is still in use for local traffic and is located parallel to PR-22.

The proposed extension of PR-22 will continue its westerly direction, crossing the municipalities of Hatillo, Camuy, Quebradillas, Isabela, Moca and Aguadilla where it would connect with existing road PR-2. As in the existing layout, PR-2 will be parallel to the PR-22 highway. The approximate length of the proposed portion of the road is 46 km (28.6 miles) and it will have a right-of-way approximately 90 meters (295 feet) wide (DTOP, 2010, 2-3). The total impacted area is estimated in 505.46 hectares (1,248 acres). Figure 1 provides an illustration of the proposed route (in red).
Research Objectives

The main objective of this research is to identify what are the expected impacts on the dairy cattle industry as a result of the proposed construction of PR-22 highway extension. The following supporting questions were formulated to guide this research:

- What is the current state of the dairy cattle industry in Puerto Rico?
- What is the need for construction of highway PR-22?
- What are the likely direct impacts of PR-22 on dairy cattle ranches?
- What indirect impacts might PR-22 have as a consequence of its impact on dairy cattle ranches?
- How do various stakeholders view the need of PR-22 and its impact to the dairy cattle industry?

The Methods and Materials section below describes how these questions were addressed. The Results and Observations section provides the results of the research performed.
Materials and Methods

Literature review

ORIL Reports

The ORIL is the regulating body for the dairy industry under Puerto Rico’s Department of Agriculture. Its objectives are to ensure there is sufficient milk to meet the local demands, that milk maintains a reasonable price for the consumer and to ensure economic benefits for all sectors of the dairy industry (producers, manufacturers and distributors) (DA, 2012, p. 1). Another important function of the ORIL includes compiling, analyzing and publishing data. The most relevant information is published yearly in a report that summarizes the state of the industry. The most recently available yearly reports were 2008-2009, 2009-2010 and 2010-2011.

The yearly 2010-2011 report consists of several sections and an appendix of tables. The section on the Agriculture phase includes information on the amount of dairy cattle ranches, occupancy areas, and production information. The Industrial phase section describes the milk sales and income of the milk elaborator and distributors along with volume projections and sales. There are other sections in the document that include the activities performed by ORIL and other programs that are in place to support the industry, such as the dairy cattle health program, milk quality program, and rancher assistance program. Finally, there is a section on the future plans of the industry followed by tables and statistics. The reports from previous periods follow the same organization and format.

ORIL reports and statistics provided information to evaluate the current state of the industry and establish growth trends. Some of the information obtained from the reports was graphed in order to easily identify trends.

Newspaper Articles

Information was gathered from several news sources that are distributed in the island and also electronic publications. Sources include Noticel, Caribbean Business and El Nuevo Día. The latter is the newspaper with the largest circulation in the island which also has an online version. Newspaper articles used for this research provided information of food security,
variations in milk prices, current situation of the Department of Agriculture, and the legal issues that affect the dairy industry.

A principal source for understanding the economic impact of the agriculture industry and its state was an article published in Caribbean Business, dated September 13, 2012, titled *Agriculture, the essential missing link*. The article provided information on the background of the agriculture industry, the consumption trends in the island, the niche of the industry and possibilities for future expansion. Statistics in the article show the trends in the past 50 years regarding agriculture’s decline as industrialism grew, and the issues of food security in the island.

**Information on the Karst region**

*Puerto Rican Karst-A Vital Resource*, was published by the US Department of Agriculture, Forest Service division. This publication, dated August 2001, contains technical information on the limestone regions of the island, all of which have karst features. According to the report, karst is defined as “a terrain in which subterranean drainage follows cavities in readily soluble rocks”. This drainage pattern creates a particular landscape that includes limestone hills (known locally as mogotes), sinkholes, and caves.

The report places particular emphasis on the natural attributes of the karst regions and their importance to the economy and sustenance of the population. The largest of the karst regions is known as the northern karst belt. This “belt” spans from east to west on the north coast of the island and constitutes the largest fresh water aquifer. This element is important in the evaluation of impacts to the dairy industry because the region offers particular benefits that are not available in other regions on the island.

**DIA Review**

DTOP published the preliminary DIA for the PR-22 highway expansion project on June 8, 2007. This date opened a public review period to gather comments and suggestions. After this period, the Environmental Quality Board (EQB) evaluated all the information and required DTOP to revise and present an updated DIA.

On August 2010 the DTOP issued an updated version of the DIA and a new public comment period was initiated. The updated DIA was reviewed to understand the proposed
project and obtain information for its justification. Some of the data reviewed from the DIA included transportation and population information.

The updated DIA included a study, commissioned by the DTOP, to determine the impact to dairy cattle ranches located on the municipalities of Hatillo, Camuy and Quebradillas. The study was performed by Guillermety Ortiz y Asociados, a firm of engineers, architects and planners. The objective of the study was to gather information, identify and delineate the location of properties and facilities dedicated to breeding and raising cattle for extraction and sale of milk that would be impacted by the construction of the proposed PR-22 highway extension (Guillermety et al., 2005, p.4). This report utilized the preliminary road design to determine the direct impact on the facilities.

**Documentary**

A historical review of the industrialization period was deemed necessary to understand how the dairy industry surpassed the sugar industry in importance. This historical review was facilitated by a 1986 documentary titled *Manos a la obra: The story of operation bootstrap*. This documentary was prepared by the Center for Puerto Rican Studies of the Hunter College of the City University of New York. The documentary is freely available via the internet using the YouTube website.

**Interviews**

The publication of the revised DIA raised concerns among citizens of the impact of the project on the natural and man-made resources of the region. These concerns centered on loss of habitat, aquifer quality and impact on agriculture areas, including the dairy cattle. There was also an underlying concern about social displacement from communities established in the area.

The concern over the impact of the PR-22 extension led group university students to develop a project to document the existing conditions along of the proposed route. The project was called “Transecto Socio-Ecologico del Karso Norteño”¹ (*Transecto*). During the period of February 2-15, 2011, a group of four persons walked the 28.6 miles of the proposed route. During the journey, they documented the flora, fauna and landscapes they encountered using film and photos. They also interviewed citizens that live and work in the area as they came in

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¹ The *Transecto* Project was developed by Waldemar Alcobas, Joel A. Mercado, Miriam Toro Rosario, Mariana Roca, Joaquín González and Marayda Cabrera.
contact with them. Other stakeholders were interviewed separately; this included a university geology professor, leaders from NGOs, Department of Natural and Environmental Resources (DRNA) scientists, and an ACT employee, among others.

Upon request of the author, the Transecto project provided electronic transcripts of 22 interviews for use in this research. After reviewing the transcripts, the interviews were grouped in two: 20 interviews of area residents and 12 interviews of other constituents that were not directly on the route. These interviews did not follow a specific format; they were more akin to conversations. But it was evident that the interviews of area residents were different in content from the interviews made to other stakeholders, also considered by the author as subject matter experts.

The interviews of residents were intended to understand the level of information or knowledge of the project and where that knowledge came from (word of mouth or factual data). They also sought a notion of the resident’s sense of place - a relationship and identity with the environment that surrounds them- and what alternative they could identify instead of the cross-country route. Of these interviews, three (3) were conducted to cattle ranch workers and one (1) to hay producer.

The interviews of other constituents were performed in a more relaxed setting and with more time to spare. The constituents were subject matter experts in various areas. For example, are among the interviewees is a geologist that worked in the Puerto Rico’s Department of Natural and Environmental Resources (DRNA), the director of ACT’s environmental studies area, a planner, an agronomist from the Colegio de Ciencias Agrícolas de Mayagüez, and the president of an NGO called Citizens of the Karst. The topics of most of these interviews were related to the DIA process, their area of expertise in relation to the project, and the impacts to various sectors of society. Only one dairy cattle ranch owner was interviewed.

Because the interviews did not follow a standard format, and because the objective of this research centers on the dairy cattle industry, the interviews were meticulously reviewed to extract the information that could aid this study. The review was guided by several specific questions to be “answered” with the interview transcripts. The objectives of these questions
were to understand if the public interviewed was well informed, determine how they perceived the need of the project, and identify the expected impact of the road on the dairy cattle sector. The guiding questions were:

- Are you well informed on what the project consists?
- Do you think this project is necessary for the economic development of the region?
- Will the dairy industry have a negative economic impact as a result of this project?
- Will this project directly impact your dairy operations? If so, how?

These questions were meant to be answered with a “Yes”, “No” or “No Answer”. The “No Answer” was recorded in the cases when the answer was not clearly stated or could not be inferred based on the information provided.

The answers were not always clearly stated in the interview and some were inferred when the interviewee was giving enough information. For example, with the question “Are you well informed on what the project consists?” many residents said they were informed because they heard it on the news or by word of mouth. Others indicated that they knew about it but could not provide information on what the different alternatives were. In these instances the answer was presumed to be “No” because it was clear that they were not well informed.

In the case of the last two questions, only the interviewees that work with the cattle industry had clear answers to the questions. However, since the questions were not directly asked in the real interview, some of them did not directly address the topic. In these instances, a “No Answer” was recorded for the question.

Information from the interviews was also used to determine the direct and indirect impacts the project may have on the dairy cattle industry. The evaluation of the data is provided in the sections below.
Results and Observations

Current state and trends of the industry

Over the past 45 years the agriculture sector in Puerto Rico has experienced dramatic declines. The industrialization process left the agricultural sector in peril when workers found better pay in less physically demanding jobs. According to information published by Caribbean Business (2012), the agriculture sector represents less than 3% of Puerto Rico’s GNP (also see Figure 2). This declining trend is proportional to agriculture-related jobs which, according to the article, are down to 15,000 in 2007 from more than 40,000 in 1947.

The ORIL annual report for 2010-11 fiscal year indicates that dairy production is the “principal agribusiness” on the island and had a gross income of $235.1 Million. This corresponds to 29.8% of the total agriculture market (DA, 2012, p. 2). This ORIL report goes on to state that “due to its important role in both the health and economy of our country, it is necessary to make all efforts within our reach to ensure a continuous, efficient and orderly development of this industry” (p. 1).

In spite of economic incentives, of being the top grossing of the agriculture industry, direct and indirect employment yield, secondary industry support and its importance for food security, the future of Puerto Rico’s dairy industry can best be defined as uncertain (Quintero 2013).
The information published by ORIL’s yearly reports present an industry that is experiencing decline in number of cattle ranches in operation, total ranch area (include grazing and pasture growth), and the number of cattle in production. Figure 3 presents data that ORIL tabulates but does not graph or analyze in depth. It can be observed that all three variables show declining trends. Area used for dairy cattle ranch has stabilized somewhat in the last 4 periods; this may be due to consolidation of properties for the same use.

In terms of production, the dairy cattle industry’s output also has declining trends. ORIL documents the amount in milk delivered by producers to the elaboration/processing centers. For the period of 2000-01 to 2010-11, there was a decline of 87,465,000 less cuartillos

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2 A “cuartillo” is the equivalent to a U.S. quart, 32 oz. or 0.946 liters of milk.
delivered for processing, which means there is less milk being produced at the milking facilities (see Figure 4).

![Milk cuartillos received by processing plants](figure4.png)

**Figure 4 – Milk cuartillos received by processing plants**
*Source: ORIL 2013*

ORIL data also register an overall reduction in the sale of processed milk (pasteurized/homogenized). Between 2001-02 and 2010-11, there was a difference in sales of approximately 64,000,000 cuartillos of milk (DA, 2012, p. 54).

Although the ORIL reports show increasing trends in Gross Income for the milk production industry (see table 1), the increase in income may be due to increases in prices that the different sector receive. This is reflected in the prices of milk at the consumer level, which increased by 40% between 1993 to 2012, according to data published by the Department of Agriculture (DA, 2011a).
### Table 1 – Milk Production Gross Income

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>Gross income (in million dollars)</th>
<th>Percent of the agriculture sector</th>
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<tbody>
<tr>
<td>1999-00</td>
<td>188.5</td>
<td>23.3%</td>
</tr>
<tr>
<td>2000-01</td>
<td>Information Not Provided</td>
<td></td>
</tr>
<tr>
<td>2001-02</td>
<td>Information Not Provided</td>
<td></td>
</tr>
<tr>
<td>2002-03</td>
<td>192.2</td>
<td>26.1%</td>
</tr>
<tr>
<td>2003-04</td>
<td>Information Not Provided</td>
<td></td>
</tr>
<tr>
<td>2004-05</td>
<td>185.1</td>
<td>23.1%</td>
</tr>
<tr>
<td>2005-06</td>
<td>184.8</td>
<td>22.1%</td>
</tr>
<tr>
<td>2006-07</td>
<td>Information Not Provided</td>
<td></td>
</tr>
<tr>
<td>2007-08</td>
<td>183.9</td>
<td>23.2%</td>
</tr>
<tr>
<td>2008-09</td>
<td>224.0</td>
<td>28.0%</td>
</tr>
<tr>
<td>2009-10</td>
<td>215.0</td>
<td>26.2%</td>
</tr>
<tr>
<td>2010-11</td>
<td>235.1</td>
<td>29.8%</td>
</tr>
</tbody>
</table>

### Recent legal issues

In the past ten years, a legal suit has been in dispute which involves the milk processors/distributors vs. the government of Puerto Rico. The dispute over “fair compensation” began in 2004 and seemed to have been resolved during the end of 2013 (Rivera y Parés, 2013; Martinez, 2013). This resolution, however, seems to benefit more the processor/distribution companies leaving the milk producer to make do.

Their allegations from the milk processors/distributors in the island (Tres Monjitas and Suiza Dairy) are that, when ORIL set the milk prices, their compensation was not in accord with their operation costs when compared to dairy cattle ranchers and retail sales. In September 2013, ORIL stated that there was an agreement between them and the milk processor/distributors in which the later will receive a $50 Million in special funding to promote the investment in the industry, operational efficiency and a reasonable price (Rivera y Parés, 2013).

The cited news article also indicates that the farmers/ranchers would benefit from a measure in the lawsuit that ensures they will earn a minimum of 80 cents per liter of milk when at the present time they earn 78 cents (Rivera y Parés, 2013). However, cattle ranchers refuted

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3 Source of information: ORIL yearly reports from each period indicated.
these benefits later by stating that instead they will lose millions of dollars as a result of this agreement (Martinez, 2013). They estimated a loss of 15% of their income and indicated that the agreement left programs that benefited the industry “up in the air”. This includes programs for quality and promotion (Martinez, 2013).

Because of lower income, the dairy cattle ranchers will inevitably reduce their milk production. As a consequence, as quoted by Mr. Rivera –president of the Cattle Rancher Association- this may lead to “imports of fresh milk that is of lower quality and more expensive” (Martinez, 2013).

**Need for PR-22 Expansion**

DTOP (2010) outlines the objectives for the construction new road in the DIA. The objectives include (p. 1-12):

- Provide an alternate and highly efficient route for emergency or disaster situations
- Provide continuous vehicle transit service along an expressway from San Juan to Aguadilla
- Continue the efforts to complete the “Strategic Road Plan” for the island
- Considerable reduction in travel time, operating and maintenance costs of vehicles
- Reduce peak hour travel time from Hatillo to Aguadilla from 66 minutes to 26 minutes
- Increase road user reliability
- Allow PR-2 to provide better service and operation continuity for local traffic for existing institutions and businesses
- Provide an alternate high capacity route to encourage the economic and social development in the western region of the island

In the project’s DIA, the DTOP (2010) provided justifications for developing this project. Primarily, DTOP was concerned about increasing population projections and its related vehicle increase. According to the DTOP, in 2005 the transit on road PR-2 fluctuated from 36,000 to 69,000 vehicles per day (vpd) (page 1-11). Their projections to 2030 indicate that vpd will increase to 62,000 to 120,000 vehicles per day (page 1-11), which corresponds to an increase of 91.7% to 93.5% percent increase.
Yet, according to US Census Bureau data (2006), the population projections for the entire island during the 2000 to 2005 were expected to have a 2.7% increase. Updated population trends from the United Nations, Department of Economic and Social Affairs (2012), present a different picture. According to the UN, population in Puerto Rico declined during 2000-2005 period by -0.19% and during 2005-2010 by -0.28%. They project that population in the island will continue a declining trend up to year 2020 (UN).

A source for traffic increase, as stated by the DTOP in the DIA, is the “work centers” identified in the region. The DIA specifically mentions the Rafael Hernandez Airport, San Antonio Industrial Park and the Universities in the area as high traffic generators for both people and cargo. Information researched indicates that several industries cited in the DIA - Hewlet Packard, Celestica de PR and Tyco Safety Products- closed their operations in 2008 (“Cierra Celestica” 2008; Associated Press 2008).

From the security standpoint, DTOP also expressed concern of having the PR-2 as the only roadway that connects the western municipalities in the event of a major disaster. Since this is the only major road in the area, it serves local as well as long distance traffic, making it essential for the transportation of goods and service providers. In the event a major disaster renders this road unusable, the recovery process could be significantly delayed.

Other issues concerning the use of PR-2 include drainage problems, limited vehicle speed due to proximity of schools and many traffic lights, and crowded infrastructure adjacent to the road such as parallel access roads, residences and buildings. The DIA also mentions that the agriculture and dairy industries also contribute considerable traffic to increase congestion along road PR-2 (p 1-9).

**Direct impacts of road expansion on dairy cattle ranches**

In order to determine the impact of the proposed road construction on the dairy cattle industry, the DTOP commissioned a study. The study was performed by Guillermety Ortiz y Asociados, a firm of engineers, architects and planners and is included as an Appendix of the DIA issued in 2010. The study’s scope is limited to cover the municipalities of Hatillo, Camuy and Quebradillas. They utilized data from government agencies, rancher’s association, and several publications from the internet and other sources. Geo-referenced photos with some
property delineations were also utilized and were corrected and enhanced by surveys and GPS data gathered in the field.

The Guillermety study identified a total of 59 dairy cattle/milk facilities between the strip of land defined by road PR-2 and the cross-country alignment for the proposed PR-22 extension. These 59 facilities are distributed as follows: Hatillo, 28; Camuy, 23; Quebradillas, 8. 35 of these facilities are inside the 1 km-wide strip of land for the proposed road. 17 of these 35 will be directly impacted by the construction, including at least 7 milking facilities. The study estimates that, if the milking facilities are not relocated, the impact will result in the loss of 6.2 million liters of the product.

Although not conducted with the same amount of detail, the study identified a quick survey of dairy cattle ranches in the other three municipalities that will be affected by the project. The tally is: Isabela, 13; Moca, 2; and Aguadilla; 6, for a total of 21 additional ranches that will be affected.

In terms of the area affected, the study stated that some 152 cuerdas\(^4\) (147 acres) of dairy cattle ranches will be impacted (Guillermety et al., 2005, p. 29). The DIA states that the biggest impact to existing dairy operations will be due to segregation of land, but that the total land “compromised" by the road construction is less important (DTOP, 2010, p. 6-15). The impact from land fragmentation is somewhat diminished in the DIA where it states that remnants of agricultural areas, including pasture areas, may continue to be used as they are in the present (p. 5-5). On the other hand, the DIA also states that the “physical alterations of the area may influence the animals and their milk production” (p. 5-5).

Neither the study performed by Guillermety Ortiz y Asociados, nor the DIA, dwell on solutions to alleviate the potential direct impacts to the ranch/cattle farms industry, nor do they describe indirect impacts that may affect the industry as a result of the new land use, such as storm water or air pollution. The mitigation alternatives presented in these documents are summarized as follows:

1) Alignment variation will be considered during the design phase to avoid direct impact to milking facilities.

\(^4\) A “cuerda” is a unit of measure used to define area (1 cuerda = 0.9711 acres).
2) Relocate milking facilities.

3) Include in the design migration corridors for cattle movement between segmented areas.

**Indirect impacts of PR-22 on dairy cattle ranches**

The dairy industry supports other economic sectors can be indirectly affected from impact of the road construction. Some of these include meat production, hay crops sales, and breeding heifers. In interview with *Transecto*, agronomist Gladys Gonzalez, of the Mayaguez University Campus (RUM) pointed out other sectors that will be affected, including bottling package manufacturers, marketing sectors, and artisanal products derived from milk such as local cheese production (Interview *Transecto*, April 8, 2011).

Agronomist Carlos Saaveedra estimated that the dairy industry supplies some 25,000 cows every year for meat production (Interview *Transecto*, April 12, 2011). Saavedra understands that this corresponds to almost half the animals processed in the slaughterhouses of the island. He also mentioned that hay used by dairy cattle ranchers is grown locally. The local hay supplies the cattle rearing facilities and help to level the operation costs from food purchases. In the event of reduction of cattle facilities or cattle heads, the hay suppliers will also decrease their revenues.

Finally, Saavedra pointed out that heifer breeding is another satellite from the dairy cattle industry. Heifers require special care and land use, and Saavedra indicated that not all breeders have adequate conditions for them. Thus, some ranch owners specialize themselves on the rearing of heifers which lasts two years. According to Saavedra, since the ranchers replace 30% of their stock every year, some 35,000 heifers are being raised simultaneously.

DTOP acknowledges in the DIA that urban sprawl may be an indirect effect that the road may have. But the DIA dismisses the impact of sprawl. They state that this issue will be determined by controls that the regulatory agencies impose on land use (p. 6-15). Thus, the construction of the road may place higher demands on the land around it, some of which are pasture areas. This may entice several dairy ranch owners to sell the land and close their facilities.
Other indirect impacts of the road construction include increased dairy cattle rancher operation costs, increase milk costs at the consumer level, and reduced overall food security. These are described in the following sections.

**Operation costs**

Food cost is one of the major concerns for the production sector of the dairy industry. In yearly report 2010-2011, ORIL indicates that concentrated feed represents 44% of the cattle rancher’s operation costs (p. 3). Due to the limited terrain used for cattle pasture and for growing crops, and also due to the geographic location, cattle food in the island is very expensive. As such, efficient and adequate use of pasture areas is necessary and very important to reduce or level operation costs.

Carlos Saavedra, an agronomist with the Mayaguez Agriculture Science College (Colegio de Ciencias Agrícolas de Mayagüez) indicated that the cattle feed consist of grains such as corn, soy and wheat, among others (Interview Transecto, April 7 2011). These grains are imported because they are not harvested locally, thus increasing their price. One of the ways to alleviate these costs, he stated, is to provide cattle farms with large forage/pasture areas where cattle can graze. Grazing helps to alleviate costs because the cattle will consume fewer grains.

**Milk cost**

As a reflection of the predicaments of the dairy industry, the price of a liter of milk at the consumer level has increased by 37% from year 2000, when the recorded price was at $0.99, to year 2010, up to $1.36 (2011b). In fact, the price of a liter of milk in Puerto Rico is an average 30% higher at a global level and almost double the average than in the United States of America (Quintero 2013). Quintero (2013) found that, of all 50 US states, only in Hawaii, where all the milk is imported and sells for $9.00/gallon, is the price of milk is higher than in Puerto Rico where the current cost per gallon in $6.00.

**Food Security**

Due to its insular geography and the threat of natural disasters, such as hurricanes, earthquakes and tsunamis, food security is an important issue in Puerto Rico. Puerto Rico imports 85 to 90 percent of the food it consumes (Banuchi 2012, Govardhan 2007, Caribbean Business 2011). The food is transported to the island via both air and sea, which increase costs
and risks. In the event of a major incident that renders air or sea ports inoperative, the island must rely on local goods to meet population demand. Since the island is located in a hurricane prone area, and can also be affected by a tsunami or a high scale earthquake, such an event is not farfetched.

It is said that Puerto Rico has two months of local food supplies. Fresh food supply would be exhausted in as little as ten (10) days; canned and frozen food would be exhausted in about four weeks (Govardhan 2007). However, consumption behavior may further reduce the supply availability.

The dairy industry is concerned about the impact of the proposed road extension may have on food security. During interview, Javier Toledo, dairy cattle rancher, stated his anxiety at what would happen if ships cannot enter the island or there is another incident that threatens food imports (Interview Transecto, February 4, 2011). His position in defense of the dairy industry is based on the “need to grow [more food]” locally to avoid or reduce the impact of food scarcity.

Food security is part of the mission of the DA, which states that the agency must establish agricultural policies “to ensure greater food security” (see DA website). The mission itself is a daunting task for an agency with limited resources and staffing insufficiency, as stated by the head of the department, Myrna Comas, during public hearings in 2013 (Cordero 2013, ENDI).

In order to achieve its mission, Comas indicated, “it is necessary to develop a program aimed at increasing the food production in the entire island” (Cordero 2013). It is stated that the scarce local food production is a result of decades of governmental mismanagement (Santiago, 2013). Thus, it is evident that, in order to increase food security, and reduce dependency on imported food, the island needs to increase its support for the agriculture sector.

Many issues affect food availability and affordability. Some of these issues include world-population growth, global climate change and emerging consumer markets competing for existing food supplies (Santiago, 2012). If food security is not adequately addressed, Puerto Rico can be affected by food source issues. However, there is hope: according to industry
experts, a large portion of the food consumed in the island can be grown or cultivated locally (Santiago, 2012).

**Interviews**

The interviews provided by *Transecto* were revised to find answers to the specific questions generated. The results were tabulated and provide data on how the residents and the subject matter experts view the project. The results are provided in the tables below.

**Table 2 – Results of interview review, general questions**

<table>
<thead>
<tr>
<th></th>
<th>1. Are you well informed on what the project consists?</th>
<th>2. Do you think this project is necessary for the economic development of the region?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area residents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>No</td>
<td>75%</td>
<td>35%</td>
</tr>
<tr>
<td>No Answer</td>
<td>0%</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Subject matter experts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>83%</td>
<td>8%</td>
</tr>
<tr>
<td>No</td>
<td>0%</td>
<td>58%</td>
</tr>
<tr>
<td>No Answer</td>
<td>17%</td>
<td>33%</td>
</tr>
</tbody>
</table>

In general, most of the residents are not well informed about the project, while subject matter experts are. Most of the residents indicated that their knowledge of the project was by word of mouth.

While a direct answer to question two was not evident in 40% of the residents interviewed, the majority of those that did provide an answer believe the project is not necessary. A majority (58%) of the subject matter experts interviewed don’t think the project is necessary for the economic development of the region.
Questions 3 and 4 are directed at the dairy cattle industry, or individuals that have some knowledge of it. Only 4 of the 20 area residents were cattle industry and these questions are answered by them only.

For question 3, all of the dairy cattle constituents interviewed understood that the project will have a negative economic impact on their industry. While question 3 was not directly addressed by subject matter experts, 45% of them made comments from which it was inferred that they understood the dairy cattle industry would be negatively impacted by this project.

Question 4 was regarding the impact or no-impact on the operations, three of the four said they would be impacted while one of them did not provide a clear and direct answer.

*Cattle rancher’s perspective and opposition*

Luis Cordero was one of the subject matter experts interviewed by Transecto. When it comes to the impact of the proposed construction of road PR-22, he believes that the ranches that will be split by the road will be unusable for pasture purposes. He also expects that some dairy cattle farms will close, resulting in less available area for cattle rearing and thus reduced milk production in general. In the long-run, he believes that the milk and milk-related products will have to be imported, raising the overall costs of products available to the consumers.

The cost will rise because the fresh milk must be flown into the island since it can’t be in a ship for a week or more (Interview Transecto, March 25, 2011). Importing milk thus, will likely drive the prices higher and the consumer will not have a saying over. “As soon as the local

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**Table 3 – Results of interview review, questions for dairy cattle industry**

<table>
<thead>
<tr>
<th></th>
<th>3-Will the dairy industry have a negative economic impact as a result of this project?</th>
<th>4-Will this project directly impact your dairy operations? If so, how?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy cattle industry (4 interviews)</td>
<td>100%</td>
<td>75%</td>
</tr>
<tr>
<td>Yes</td>
<td>100%</td>
<td>75%</td>
</tr>
<tr>
<td>No</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>No Answer</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Subject matter experts</td>
<td>45%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes</td>
<td>45%</td>
<td>0%</td>
</tr>
<tr>
<td>No</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>No Answer</td>
<td>64%</td>
<td>0%</td>
</tr>
</tbody>
</table>
industry is gone, the importer will set the price” and it will be up to the consumer to accept it or not purchase it. Cordero believes that people underestimate the value of milk; people should “buy a cow, milk it every day, and then people will know the value of a liter of milk”.

Javier Toledo, a rancher in the Quebradillas municipality, expressed his concerns for the industry. He thinks the road extension project will ruin lots “very good” land destined for agriculture, most of which is currently occupied by dairy cattle ranches (Interview Transecto February 4, 2011). His perspective is also that in a small island like Puerto Rico there are not many areas in which to plant or raise cattle and constructions are taking them away. He expressed uncertainty on whether he will be able to operate or not because the areas that the project will impact directly have not been clearly defined. Thus, he is holding back from investing in his business.

Agronomist Carlos Saavedra argued that the milk industry will be the most impacted by the cross-country route. Dairy cattle ranches need large pastures areas to reduce the operation costs by providing alternate food for the cattle. The elimination of these areas, he says, will make it very difficult for the industry to still have competitive prices. Saavedra went on to say that in Puerto Rico, much like on a global scale, the agricultural sectors have been reducing the size of their operations and their output. Yet milk is the only agricultural commodity that is produced in sufficient quantities to meet the needs of the entire island.

The DA opposed to the construction of the road after reviewing the facts and understanding the impact identified by studies included in the 2010 DIA. DA’s secretary at the time, Salvador E. Ramirez Cardona, stated that of all the alternatives proposed, the DA would endorse the conversion of road PR-2 to an expressway because it would be the one with the least impact to the dairy industry (letter dated September 6, 2007). Several of the municipality mayors of the region (mainly Hatillo and Isabela) also expressed their opposition to the cross-county alignment.
Discussion

The history of Puerto Rico’s dairy cattle industry's spans almost 500 years. The industrialization process initiated by the local government in the 1940s ravaged the traditional agriculture society. As a result, over the following decades, the dairy industry became the number one economic grossing sector under the Department of Agriculture. Their ranking, however, is not exempt from hardship and is currently threatened by loss of land and milking facilities due to the proposed extension of highway PR-22.

The top milk producers in the island are located in the northern coastal plains, also known as the karst belt. This area provides many attributes to the dairy cattle ranchers, including flatlands, adequate climate, groundwater and quick storm water drainage. It would be difficult to move the industry to another location because most of the coastal plains are impacted by developments.

Available statistics from the government’s office for regulating the industry -ORIL- and from the DA show that, while it is the main grossing industry in agriculture sector, available areas, number of productive cattle and ranches in operation for the dairy industry have been in the decline for at least 10 continuous years (from 2001 -2011). Part of this decline is attributed to high operation costs, including food and electricity. Recently (2004-to present), legal battles with milk processors/distributors are also taking a toll in the industry, particularly with the ranches, which seem to be less benefited by the agreements.

The DTOP has stated that the expansion of the road is necessary due to the incremental road congestion during peak traffic hours. This congestion will increase with expected increases in population in the area. However, recent and updated statistics indicate that the population in the area and in the island as a whole is in decline; a trend which is expected to continue for several years.

Another need for the road, as stated by DTOP, is to have an alternate route in the event of an emergency situation. Yet, no indications are made of the emergency situation or crisis that the road impact can have on food security, economic impacts, loss of groundwater resources, and lack of adequate drainage of storm water due from paving vast spans of land. The original need for the road, which is to support industrialization and progress in the region is
also mentioned in the DIA, and embedded into the minds of area residents. Yet the economic decline in the island is also due to closure of industrial facilities, some of which have been identified in the region the road expansion is supposed to benefit.

The Guillermety et al. study of 2005 stated that at least 29 dairy cattle farms will be directly impacted by the proposed cross country road alignment. This means that either pasture area will be eliminated, segregated or the milking facilities are directly in the path of the proposed road. They estimate that 152 cuerdas (148 acres) of dairy cattle land will be lost in the Hatillo-Camuy-Quebradilla corridor alone. This represents 4% of the total area occupied in 2005 by dairy cattle ranches. Based on the production of the milking facilities that are estimated to be impacted, Guillermety et al. projected a total loss of 6.7 million gallons of milk.

Cattle ranchers believe this will be a major blow to the industry. Their expectations are that the road impact will cause a production decrease. Thus, there will be less product available for processing and milk imports will be necessary to meet the island’s demand. The imported milk may be of less quality and more expensive due to shipping fees. In the end, the consumer may be forced to pay higher prices for milk that is of lesser quality and this may, in the worst case, displace the local producers.

Indirect businesses from the dairy industry will also suffer from the proposed PR-22 highway extension. Some local farmers produce hay that serves to complement the diet of the dairy cattle. Also, cows that are retired from dairy production are sold or otherwise processed for beef for local consumption. While neither of these industries fully supplies the local market, they do complement it and provide income that stays in local hands.

When the impact of the proposed road extension to the dairy industry is viewed as a whole, it is evident that it will not be beneficial to the industry. It is not a coincidence that ranch operators believe the impact will be significant. Not only does will it affect directly their daily operations, it does not seem to be in accord with the mission of the DA to develop and promote agriculture.

The current economic situation of the island requires new ideas to aid economic growth. To continue to expect that the road will serve as an economic boost for creating jobs while relying in private investments is to continue with the mentality of the 1950s (ENDI 2013). The
economic outlook for the island in the 1950’s was different, and this alternative does not accommodate the present needs of the dairy industry and of society.

The evaluation of the interviews provided by Transecto provided several interesting discoveries. For example, the residents in the areas that will be impacted are not well informed on what the project consists. Also, while many do not openly express it, they don’t believe this road will benefit the economy in the region. Many also indicated that the government should talk to them, because they will be directly affected by the project. This demonstrates a disconnection between the government and the people it is supposed to protect, benefit and represent. Thus, the social component of this project, while not the center of this research, will evidently have an important impact in its development.

One of the interviews performed by Transecto was to Carmen Alicea, acted as director of the department of environmental studies in the ACT. ACT is the agency promoting the road expansion in their desire to complete the road network that was planned for the island since the 1950s. She stated that the main aspect that is considered for choosing the road alternative is being able to select one that meets the need and purpose the agency has. In this case, the agency needs to provide a road system that helps effectively move goods and also meet the transportation needs. “This is the primary aspect we use in selecting an alternative”. So in spite of the DIA process, which seeks alternatives that have less impact on the environment, the ACTs alternatives are to meet the agency’s programmatic goals. The process, as she described, has nothing to do with selecting an alternative that reduces the economic, natural resources or social impacts.

Mrs. Alicea also indicated that ACT was starting an evaluation of a fifth alternative as a result of the comments they received from the 2010 document. This alternative consists on the conversion of the PR-2 in an expressway, but only in the municipalities of Hatillo and Camuy. The rest of the road would follow the cross-county alignment or a newer version of it. This alternative seeks to reduce the impact in the dairy cattle area. Thus, there seems to be a window of opportunity and discussion in order to reduce some impacts of the project.

Agriculture is of extreme importance to a society. As Gladys Gonzales, an agronomist for the CCAM indicated during the Transecto interview, agriculture is the source of the
economic good that is most important to society because it feeds humanity. She stated that “without agriculture there is no food, because all food essentially comes from agriculture.” It is therefore in the best interest of any country or state to have a healthy and strong agriculture sector.

In the case of the PR-22 expansion, it is evident that the dairy cattle industry will receive a major blow if constructed as it has been proposed. The industry is already in a crisis. This is evident when one evaluates the operational trends and other indicators that show a continuous decline. With less grazing area, there will be further reduction in the amount of cattle and in operation costs. Ultimately, if imports are necessary, consumers around the island will be directly impacted because this will lead to increase in milk and other dairy products. For an industry that is already in decline and has many operational complications, this project will likely have a big impact and may push it to the verge of collapse.
References


