Potential for poultry slaughterhouse near states with large number of laying hens

by

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ABSTRACT

This thesis addresses the need for a community slaughter facility for poultry. By definition, a slaughterhouse is a place where animals are killed and processed for consumption. The location of the slaughterhouse is located in an area with more than 55% of the Mexican national egg production. This creates an issue regarding disposal of old hens.

Old hens create a problem for the industry because their production decreases with age and directly affects the cost and expenses of the operation resulting in a loss of profitability for birds that are not producing at an economic level. In the current situation, hens are discarded, but not in the best ways. Sometimes chickens are killed by asphyxia en masse, or are killed individually by workers. Slaughtered chickens are either buried or burned in big ovens. This current method constitutes a waste product and has negative environmental effects.

These issues are corrected via the development of an avian slaughterhouse that will use 100% of hens that are no longer profitable, including the crest, neck, breast, wings, and legs. Products that have been identified for development from "waste" include blood and feather flour; meat flour using the head and intestines; and pasta made from the bones and carcass of the bird.

This thesis illustrates the economic feasibility for building the slaughterhouse. In the current environment, value added developments such as this could greatly impact and improve the poultry market in Mexico by increasing competitiveness and benefitting the communities in which such facilities are located.

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To all of you, God bless you!

CHAPTER I: INTRODUCTION

The Goverment often takes suitable integrated actions to promote health to the public. It desires to provide the population basic sanitation services to preserve the ecology, hygiene and cleanliness; to stimulate behaviors and healthy lifestyles and to seek equity and organize health services to meet the challenge of prevention, treatment and rehabilitation.

Goverment responsibilities include providing specific provisions that meet public needs. The government often uses regulation. Companies within the context of regulation must balance these reulations with low cost, efficiency, and sustainibility. This thesis is focused on a slaughterhouse that provides facilities for slaughtering, dressing, storage and distribution of meat and meat products to achieve proper conditions of hygiene consistent with regulation.

The slaughterhouse constitutes a public service that has traditionally been provided by the government in Mexico, under the constitutional responsibility of municipalities. Municipal authorities should direct their actions to improve, restructure existing facilities or build new ones that have the minimum services necessary to meet the demands of users. Additionally, a slaughterhouse must adapt their processes so that adverse environmental impacts caused by the removal of untreated wastewater generated during the various operations of slaughtering and processing animals are minimized. In most cases certain deficiencies or unsuitable facilities occur that do not meet the hygiene standards required for operation.

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This thesis will explore the management of a poultry slaughterhouse. The management of involved the slaughterhouse must delegate persons who are responsible for the activities to enable them to meet the targets set for this public service.

This thesis consists of adding value to poultry waste (old laying hens) by transforming them into meat products for human consumption (pasta for turkey ham, nuggets from the muscle mass of the bird) and pet food products. A new products portfolio is developed and a new nitch market is found.

Poultry processing is a complex combination of biology, chemistry, engineering, marketing, and economics. While producing human food is the main goal of poultry processing, other areas that should be considered include waste management, non-food uses of poultry, and pet/livestock feed. When considering the global marketplace, poultry refers to any domesticated avian species, and poultry products range from a slaughtered carcass to a highly refined product such as a frankfurter or nugget.[1]

Within the animal kingdom, birds play a large role providing proteins consumed by man. They provide nutritional benefits through the presence of vitamins B3 and B12, folic acid, iron, zinc, phosphorus and potassium. A flour, made of processing feathers, blood, flesh, fat and skin, results in a rich digestible protein that is easily assimilated, turning it into a cheap food ingredient that is easy to use because it can be integrated into various formulations for animal consumption.

The productive phase of laying hens (egg shell) is about 60 weeks, depending on the breed. Once the hen ends their productive cycle, they are removed from the farms to be slaughtered.

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[1] Alan R. Sams, Ph.D., *Poultry Meat Processing* (Department of Poultry Science, Texas A&M University College Station, TX,2001), 1.

Sams explains the common classes of commercial poultry (Table 1.1). He mentions that it might vary between proccesors but it provides a background for the market of this thesis.

Table 1.1 Common Classes Of Commercial Poultry

Class Of Poultry	Age (weeks)	Specifications
Cornish hen chicken	<4	≥25% Cornish and <2.0 lb processed
Broiler or fryer chicken	6-8	Most common commercial chicken
Roaster chicken	8-10	Large bird for whole holiday meals or boneless meat
Stewing hen chicken	52+	Breeder hen that no longer produces eggs at an economical rate
Fryer turkey	9-16	Young turkey usually sold whole
Roaster or young Hen/Tom turkey	16-24	Most common form of turkey; sold whole, in parts, or as boneless meat
Hen/ Tom turkey	52+	Breeder bird that no longer reproduces at an economical rate

Alan R. Sams, Ph.D., *Poultry Meat Processing* (Department of poultry Science Texas A&M University College Station, TX,2001) ,1.

In 2010, the Mexican poultry population flock was 142 million birds. A goal of the processing facility includes processing 27,858,000 birds representing 20% of the flock. By 2011, the company processed 29,514,000 birds, 9% higher than what was expected.

It is estimated that with the improvement of some equipment in the future production can increase over 7 years by 29% (Table 1.2).

Table 1.2 Increasing Poultry Production Over 7 Years Inside the Facility

Concept	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Total of Processed Poultry	30,104	30,707	31,628	32,893	34,537	36,264	38,078

Poultry is an important item of national livestock in Mexico. Poultry has adopted technology and uses the most recent genetic advances. However, the Mexican poultry insudtry has survived several crises. For example, the most recent one is avian flu. It was

found in April 2012 and in period of 4 months killed around 40,000,000 chickens, 31% of a flock of 130,000,000. It was the most severe crisis in poultry business. It was difficult to remain in business because all the farms were full of animal feed for the hens that they normally buy using debt. With the egg production, farmers paid the debt. Without hens to feed and no egg production, some of the farms went banckrupt.

The growth of the poultry industry, especially egg production is estimated to occur at a rate of 2.5% per year according to the National Poultry Union,.With the expected growth, the slaughterhouse at the end of 7 years would represent 23.45% of the national flock, an increase of 19.65% compared to 2010. To achieve this, it is necessary to build the slaughter process facility and replace the existing facility.

1.1 Actual situation of Poultry in Mexico

GDP (gross domestic product) increased by 8.3% at an annual rate in real terms in 2011. The national poultry industry recorded a growth of 3% in the 2011. It is estimated that the national poultry industry grew another 1.5% in 2012 taking in to account the production of eggs and chicken meat.

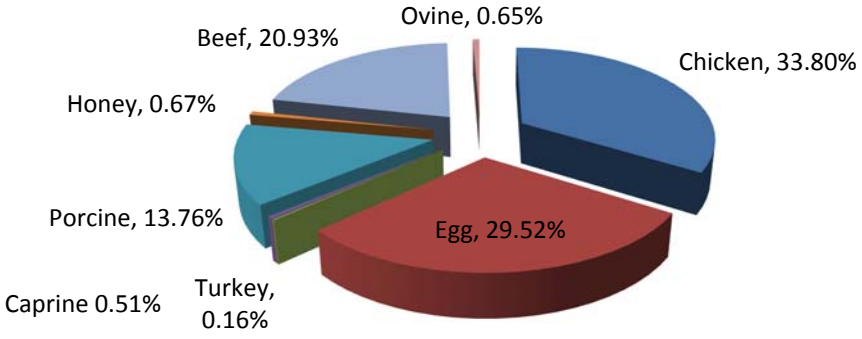
Poultry produced in 2011 was more than 5.4 million tons with a value greater than $94 billion pesos in 2011 ($7 billion USD). Mexico is the 5th largest chicken egg producer worldwide, and is first in the per capita consumption of fresh eggs globally at 22.4 kg.

Table 1.3 Poultry Products in Mexico, 2015

Product	Volume	Production value
Egg	2,534,137	$ 35,450,159
Chicken	2,906,214	$ 58,385,839
Turkey	13,103	$ 694,459
Total	5,453,454	$ 94,530,457

In Table1.3 the actual poultry production in Mexico is reported. Mexico produces the quantity of 2,534,137 tonnes of eggs with a value of $35,450,150 dollars. Another 2,906,214 tonnes of chicken meat with a value of $58,385,839 dollars are produced. but With a lack of infrastructure for turkey, only 13,103 tonnes of turkey with a value of $694,457 dollars were produced

Figure 1.1 Poultry Important for the Mexican Farm Industry



Source UNA (National Poultry Association) Mexico (2015)

Chicken meat production in 2011 was 2,899 million tons. Mexico ranked as the fifth largest producer of poultry meat in the world, after China, USA, Brazil and the European Union.

Figure 1.1 shows the distribution in Mexico. It provides an idea of the importance of the Mexican poultry industry. It occupys a large place in the Mexican economy as well as being a major factor in the Mexican diet.

Figure 1.2 Jobs Generated by the Poultry Sector

Source UNA (National Poultry Association) Mexico

Figure 1.2 indicates the quantity of jobs that the poultry industry generates. It has been constant in recent years. If additional facilities are built or improved jobs, will increase. Unemployment in the country registered at 3.4% of the Economically Active Population (PEA). This is similar to that reported prior to the 2008 crisis, according to the National Institute of Statistics and Geography (INEGI). In Mexico, there is a record of 1.7 million workers that did not count in employment surveys at the end of 2016.

At the same time, the INEIGI reported that the national unemployment rate was lower than that of the same month of 2015, when it was located at 4%, with the most educated people with the highest percentage of unemployment.The report indicated that 19.9% of the unemployed did not complete high school.

With regard to population employed in informal work, the report found that the rate of informal labor fell to 56.6% of the employed population in December 2016. Compared to 57% in the previous month, considering seasonally adjusted figures, it was lower

compared to December 2015, when it was 58.1%. Despite the decline in informal labor, 29.5 million workers are still in these conditions, that do not have access to labor benefits such as social security.Thus it is important to invest in poultry, not only because it is profitable but it also increases formal employment.

1.2 Problems and Oportunities

Poultry production in Mexico is facing major challenges and difficulties that must be solved rationally, logically and intelligently. These challenges and difficulties include the application of solution-oriented strategies of growing demand in the per capita consumption of chicken meat (GDP), vulnerability in imports due to tariff exemptions as well as the modernization of the industry and subsidies in countries with aggressive promotion policies. Health issues, food safety and globalization all lead to a need for a higher level of competitiveness.

Among the opportunities for Mexico is the growing international demand for meat products under strict sanitary measures that ensure food safety and animal health security. Mexico, through its Federal Inspection system, can certify produce for the international markets, and it is expected that domestic demand for poultry meat products by consumers will be maintained.

Over time, the agricultural sector has played an important role in the economic and social development of the country as it is a source of added value, foreign exchange and employment. Mexico is a basic producer of food, raw materials and inputs for industry and export, and ensures food security. Among its main activities is livestock, which in turn concentrates on the production of the three most important consumer meats in Mexico: cattle, pork and poultry.

In recent years, agricultural and livestock activity has been affected by trade. The production of the Mexican agricultural sector is facing a greater number of competitors that offer better quality and lower prices. Another important factor is the lower cost of poultry compared to other meat products results in consumption.

The meat with the greatest consumption in Mexico of chicken, pork and then beef. In the period 2005-2009 per capita consumption showed a growth of 10% for chicken meat, 2% for pork and a 11% decrease for beef. In 2009, the per capita consumption of chicken, pork and beef was 29.6, 16.8 and 15.0 kilograms, respectively. In 2009 the apparent consumption of chicken, pork and beef was 3.29, 1.66 and 1.88 million tons, of which 15% of chicken meat, 31% of pork and 13.5% of beef were imported in Mexico (Gaviña 2010).

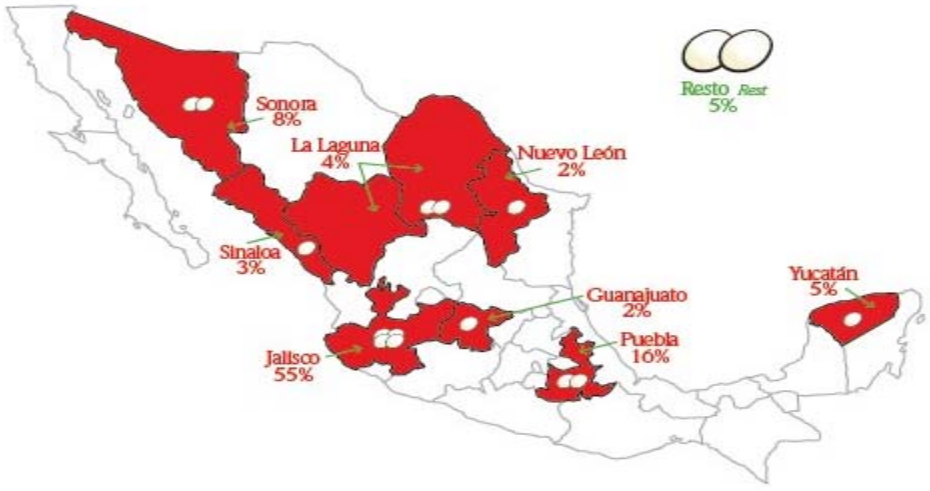
The processing of poultry waste is vital to ensure the continuation and strengthening of the poultry industry. Dynamism of technological advances in genetics, nutrition, management, health and especially in equipment have allowed the chicken production industry to increase productivity and competitiveness. Consequently, there is a need for modernization of equipment to ensure lower costs of production and wealth in the Jalisco region of Mexico. Jalisco produces 55% of the national egg supply. This leads to a large population of birds at the end of their productive lives. They need to be harvested under TIF (Federal inspection) certification to absorb the hens. Proper harvesting reduces the spread of animal disease. A Establishment Federal Inspection Type (TIF) is a facility of slaughter of animals that refrigerates industrialized products and meat by-products subject to ongoing health inspection. The facilities and processes must be verified that they comply

with the SAGARPA (Secretaria de Agricultura, Ganaderia, desarrollo Rural, Pesca y Alimentacion) regulations so that the food is safe.

TIF Establishments are designed to obtain optimal hygienic quality products since they have inspection systems and high level controls that promote the reduction of risks of contamination of their product. This is achieved through the application of systems of inspection by the authorized officer or trained personnel.

The TIF system minimizes the risk that products and meat by-products may be a source of zoonosis or disseminators of disease to other animals, reducing the effect on public health, animal health, the economy and the national supply. This certification brings a number of benefits to the meat industry, allowing movement of the products within the country. Similarly, it opens the possibility of international trade, as the TIF are the only establishments eligible to export.

Figure 1.3 Main Egg Producers in Mexico



Source UNA (National Poultry Association) Mexico 2016

Figure 1.3 illustrates the states that are large producers of eggs in Mexico in red. It is easy to see the need of a slaughterhouse given the large population of birds in those states.

Jalisco provides 55% of the egg production having more than 65,000,000 laying hens while no other state has more than 16%. It is clear that there is a business opportunity along with an environmental opportunity if there was a way to dispose of the spent hens and add value to them. Some industries require certified raw materials from a federally registered slaughterhouse so it must be designed so it can be profitable. Companies cannot turn to international markets if the requirements are not met.

CHAPTER II: PROJECT GENERAL INFORMATION

The project is located in San José de Gracia, situated on the south Altos region in the state of Jalisco, 95 km from the city of Guadalajara, heading northeast of the town of Tepatitlan. Its neighboring towns are Capilla de Guadalupe, San Ignacio Cerro Gordo, Arandas, St. Francis of Assis, Tototlan and Atotonilco (Figure 2.1).

Figure 2.1: Geographical Location of the Project

Land Use

Most of the land in San Jose de Gracia is for agricultural and livestock use, in addition to agave plantings. The land tenure corresponds mostly to private ownership.

Hydrology

The area belongs to the hydrologic region Lerma - Chapala - Santiago, Santiago to Guadalajara and Zula River subbasin watershed. Within this major watershed, the stream is identified as the Ants latter Zula runoff and flows into the river. The place is characterized by the potential of groundwater availability.

Topography

In the area is relative flat with slopes of 0 to 2% and occupy most of the surface to the west, south, and southeast. The area is unsuitable for urban development due to

stormwater runoff. The slopes are 5% to the north, northeast and southwest and are suitable for urban development. Slopes of 5 to 15% are to the north and northeast on the slopes of Cerro Chico. This is appropriate for urban development. The construction of the slaughterhouse allows the zone to grow and gives opportunity to the people to improve their way of living with better job prospects. There are slopes greater than 15% located north and northeast of the area on the slopes of Cerro Chico with an altitude of 1,950 meters above sea level.

2.1 Technical Description of the Project

This project consists of adding value to poultry waste (laying hens), transforming them into meat products for human consumption (pasta and muscle mass of the bird) and animal products consumption as pet foods. Due to the global need to produce foods to supply the world's population, avoiding the current problems in which it is estimated that there are one billion people in the world who go hungry every day according to the FAO. It is estimated that almost the entire population are undernourished in developing countries.[2]

Poultry meat consumption in Mexico has dramatically increased in recent decades to the point where it is the largest per capita consumption of any meat type. Several factors have contributed to this increased appeal of poultry.

- The fat in poultry is almost exclusively associated with the skin and is easy to remove to meet dietary guidelines for reducing dietary fat.
- The industry has been very responsive in developing new products to meet the changing consumer needs. For example, chicken breasts that are sold in the support

[2] Barbara Burlingame, Sandro Dernini,*Sustanaible diets and biodiversity*,(nutrition and consumer protection division, FAO)

market. A mold is filled with the pasta and cooked to produce consistent chicken breasts.

- Poultry is an extremely versatile meat, a factor that has possibly contributed to the product development efforts.

Economic production through vertical integration, favorable meat characteristics, and product innovations to meet consumer needs have all contributed to the poultry industry's success.[3]

2.1.1 Process and technology to be used

The process begins with the receipt of spent hen at the slaughterhouse and then passes to manual hanging in a dark area to prevent agitation of the bird. In the production line, any formed egg is removed. A string passes the bird in a tunnel where hen gets wet and an electric shock is applied so that the bird faints. A proper electrical stun will produce about 60 to 90 seconds of unconsciousness during which the bird is unable to stand or right itself when removed from hanging shackle and placed on the floor. This is the suggested method of evaluating the effectiveness of the stun[4].

The dazed hen comes to a series of rotating bars that grab the wattles and lower neck skin to hold and guide the head into the machine for proper presentation to the cutting blade. The killing machine uses a rotating circular blade to cut the jugular veins and carotid arteries on one or both sides of the neck of the bird. The bird is allow to bleeds for 2 to 3 minutes. During this period, the bird loses about 30 to 50% of its blood that eventually causes brain failure and death.

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[3] Alan R. Sams, Ph.D., *Poultry Meat Processing* (Department of poultry Science Texas A&M University College Station, TX,2001) ,3.

[4] Alan R. Sams, Ph.D., *Poultry Meat Processing* (Department of poultry Science Texas A&M University College Station, TX,2001) ,20.

Next the hen is moved via a chain to three scalders where the first temperature is 56.0° C, the second is 57.3° C, and the third is 59.5° C. This facilitates the feather removal of the hen. The feather removal of the hen is performed using rotating clusters of flexible, ribbed, "fingers"[5] that have plastic and are inversely rotating at high speed.

Hooks passed the neck of the chicken into a V-shaped base that separates the head. The head falls in a plastic box to be sent to the court peak (the head is used for meat flour). After removing the feathers, all hens are passed through a burner that eliminates existing micro feathers.

Evisceration is the removal of edible and inedible viscera from the carcass. Once birds have been converted into processed carcasses, they can be packaged and marketed whole or they can be converted into some other form such as parts or boneless meat.

After cutting all the parts, many configurations can be obtained from a carcass. It can be simply cut in two halves for grilling, or it can be cut into many pieces. Cutting the carcass into parts is profitable because it adds value to the product, and the consumer is willing to pay the added value. Cutting poultry carcasses into parts can be done manually with a knife or a table saw, or automatically with a wide variety of available machines.

[5] Alan R. Sams, Ph.D., *Poultry Meat Processing* (Department of poultry Science Texas A&M University College Station, TX, 2001) ,23.

Table 2.1 Products and Sub-products

Product	Cut	Container	Packaging
Meat paste	Casing	Polythene bag	Carton Box
Leg and thigh	Pulps leg and thigh	Polythene bag	Carton Box
Breast	Breast pulp	Polythene bag	Carton Box
Fat stabilized	Gizzard	Polythene bag	Plastic Bucket
Feather and blood meal	Feathers and blood	Bulk	
Meet and Eggs meal	Waste of flesh	Bulk	
Fat for animal consumption	Waste of meat	Bulk	
Poultry Skin	Skin cut	Polythene bag	Carton Box
Chicken Carcass	The whole carcass	Polythene Bag	Carton Box

Yield is a measure of efficiency. It is generaly defined as the amount of output obtained for every unit of input and is expressed as a precent.

$$\text{Yield} = \text{efficiency} = (\text{output/input}) \times 100$$

There is only one type of yield, and many definitions but one has its particular measure of efficiency for use in managing the processing plant. An average value for chicken yield is 70% to 75%, and is slightly higher when the giblets are with the carcass than when the carcass is sold without giblets.

2.2 Market Analysis

Between 2013 and 2023, global economic growth is forecasted to average 3.2% per year. It is expected to be relatively weak in developed countries and stronger in developing nations. World meat consumption, according to OECD and FAO projections is expected to

average 36.3 kg in retail weight by 2023, an increase of 2.4 kg compared to 2013. Some 72% of the increased meat consumption will come from poultry. Although consumption growth in developed countries will be slower than in developing countries, average uptake by 2023 of 69 kg per person will remain more than double that in developing countries. Increases in poultry consumption are primarily linked to four key factors namely population growth, improvements in incomes, chicken prices relative to those for competitive meats and dietary preferences. Global poultry meat uptake is forecast to increase by 1.7 kg per person from around 13.2 kg to in 2013 to 14.9 kg in 2023. These retail weight figures are equivalent to around 88% of the eviscerated or ready-to-cook weight. Thus, the 2013 poultry uptake was around 15 kg per person on a ready-to-cook or eviscerated weight basis, while the equivalent estimate for 2023 will be almost 17 kg (The Poultry Site 2015).

Table 2.2 Poultry Meat Consumption According to FAO

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Africa	4.3	4.4	4.5	4.7	4.7	4.7	4.8	5.2	5.5	5.6	6.1	6.2
Americas	31.5	31.8	32.8	33.1	34.7	34.1	35.3	36	37.1	35.9	37.6	38.6
Asia	6.6	6.6	6.7	7	7	7.4	7.6	8.1	8.5	9	9.2	9.4
Europe	15.9	17.8	18.5	18.2	19	19.2	19.2	20.2	21.3	21.7	21.4	21.7
Oceania	30.1	30.1	32.2	33.5	33.4	35.6	35.7	36.8	35.4	35.6	37.4	42.1
WORLD	**11**	**11.2**	**11.6**	**11.8**	**12**	**12.2**	**12.5**	**13.1**	**13.6**	**13.7**	**14.1**	**14.4**

Source: www.thepoultrysite.com [6]

[6] http://www.thepoultrysite.com/articles/3324/global-poultry-trends-2014-growth-in-chicken-consumption-in-americas-slows/

Total poultry meat consumption in the United States in 2013 was 99.2 lb (45 kg). The broiler part of this figure was assessed on a retail weight basis, while that for turkeys was on a ready-to-cook basis. Broiler uptake was aproximately at 81.9 lb (37.2 kg). For 2015, the consumption of chicken in the United States is expected to average 85.3 lb. While the long-term forecast for 2023 is currently 43 kg retail or 50 kg ready-to-cook.

During the economic recession, total meat consumption in the U.S contracted by 9%. Although for poultry comsumption, the reduction was closer 6%. Broiler uptake slipped from 85.2 lb (38.7 kg) in 2007 to 80.4 lb (36.5 kg) retail in 2012. Since then, the U.S. economy has turned the corner and broiler consumption has recovered to around 85 lb (38.6 kg). While improvements in incomes are the prime factor for this consumption increase, a reduction in production costs reflected to a certain extent at the retail level, has also proved a positive stimulus to demand.

Broiler meat consumption in Brazil is forecast by a USDA GAIN Report to expand by some 2% this year, which would be reflected in a more than 1% rise in per-person uptake to about 45.6 kg. However, there is concern as to how the high level of indebtedness among consumers, high inflation and greater competition from other meats, primarily beef, might dampen the anticipated increase in domestic broiler uptake.

Estimates of broiler consumption in Mexico in 2015 show some variation but, in broad terms, it estimated to be in the region of 3.9 million tonnes. According to the National Poultry Union (UNA)[7], per-capita uptake will see sustained growth, primarily because of the chicken price advantage. People are expected to increase their consumption

[7] Direccion de comunicacion intitucional, Union Nacional De Avicultores (National Poultry Committee)

per capita from 25.5 kg of 2014 and 25.1 kg in 2013. There is pontential for chicken to increase market share compared to other meats.

2.2.1 Supply of Raw Materials

Under the terms of the contract, the producer (grower) provides land, labor, housing, equipment, utilities, and litter, while the company provides the birds, feed, and fuel to the slaughterhouse. The company pays the producer according to the bird performance.[8]

The required spent hens are sourced from different farms around the area that are owned by shareholders of the Poultry Processor Plant. Many poultry farms are located in the town of Tepatitlan and surrounding municipalities of the Jalisco state. Raw material from the shareholders or to the minority producers depends on supply and demand.

2.2.2 Distribution and Sales Channels

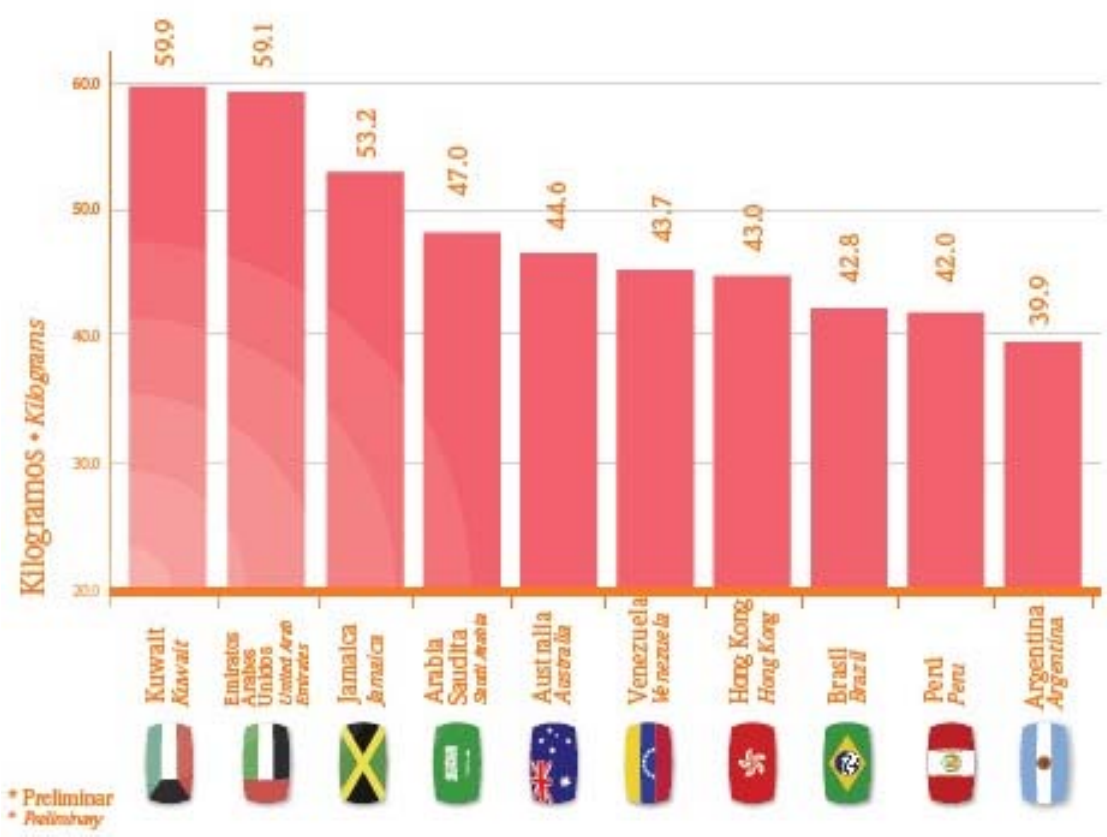
The distribution channel in Mexico is direct to customers in the food industry. This is an easy way of getting the raw material, but there is a very important window of opportunity at both the national and international level. Acording to the Economist - *Mexico will become the largest importer of chicken meat in the world next(2016) year and will also be the largest global importer of corn in 2024, according to projections of the United States Department of Agriculture.* [9]

The demand is growing because the need for new products, the population growth, and a search for cheap and quality products. The income of the people is directly affecting the consumption and if there is no money, there is no consumption. Chicken products are

[8] Cunningham, D.L., Contract broiler grower returns: A long-term assessment, J. Appl. Poultry res., 6
[9] http://eleconomista.com.mx/industrias/2015/03/24/mexico-mayor-consumidor-aves-maiz-importados

good quality products at a low cost. The main per capita Mexican poultry chicken consuming countries are found in Figure 2.2.

Figure 2.2 Main Chicken Consuming Countries



2.2.3 Marketing Plan and Strategy

A good operation causes benefits to the owners, serves as a source of own income and is a tool to standardize and regulate the supply of meat in the town. In this regard, company authorities may earn additional income to strengthen their finances and whose concepts are indicated by the Municipal Revenue Act.

Some sources of income that can be captured by the Municipal Treasury are:

- Slaughter of all livestock species with the amount being determined by the local and international markets.
- The sale of beddings and waste products.
- Employment obtained from the products and services (direct and indirect jobs) people working for the company and people that receive a job because we have a company in that place.
- Additional fees set by the administration for special services.
- Donations from individuals.
- Permits for the introduction of pastures.
- The rights to health inspection of animals and meat as measurement of quality.
- Fees for scale use.
- Subsidies.

Internationally, there is potential for other countries like Ecuador, Colombia, Guatemala to purchase Mexican poultry because Mexico has trade agreements with these countries. For the domestic market, keeping the current portfolio and the extent of the increase in production to meet customer demand and position the product is a good strategy because Mexico is well positioned world wide and can expand to make good quality products.

CHAPTER III: METHODS AND RESULTS

Project evaluation is a necessary step to manage resources and thus know whether a project is viable. There are several steps in the project evaluation process including:

1. Investigate similar projects to gain an estimate of project costs.
2. Validate the project costs.
3. Make necessary adjustments to the project's technology either through improvements or replacement.
4. Analyze local sourrondings.
5. Set the main details.
6. Determine the capacity of the project.

In this case the research was done looking at other facilities, but few exist in the market. Thus, it is difficult to adapt costs for this project. After estimating costs, an Excel spreadsheet was created to analyze the project. To determine the production levels of the facility, 30% of the bird population in the region was used as estimation of full capacity. The quantities of output that could be derived from the number of hens were determined. Next, a financial evaluation of the project and cash flow were determined based on expected sales. The maximum and minimum of the project and its equilibrium is established using a pro forma balance sheet that were simulated to determine the risk of the project.

In the end, only the financial indicators of the project were used to indicate whether it is profitable. Once it was established that the plant is profitable, the last question was how much investment is needed. The price from the construction company was

established. The process of carrying out the project is long, thus profit will not arise in the first year. Numbers are adjusted to see how it can affect the project.

3. 1 Increased Capital Levels

During the life of the project, no dividends are removed. Dividends are not touched or removed from the project until it matures, because this is a strategic project and can enhance the regional and national economy not only domestic industry. By having a certificate slaughter, international prospects arise, and a new source of revenue and new products to the industry using the disposal laying hens of the share holders as raw material (old laying hens) will occur.

3.2 Expected Percentage Increase in Production Volume

Table 3.1 Processed hens growth

Concept	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Processed Hens	**30,104,434**	**30,104,434**	**30,706,523**	**31,627,718**	**32,892,827**	**34,537,468**	**36,264,342**
% Annual increase	**0.00%**	**2.00%**	**3.00%**	**4.00%**	**5.00%**	**5.00%**	**5.00%**
Total processed hens	**30,104,434**	**30,706,523**	**31,627,718**	**32,892,827**	**34,537,468**	**36,264,342**	**38,077,559**

At full maturity of the project, an increase from 30,104 to 38,078 thouseand birds is expected (Table 3.2). Poultry in Mexico is growing, although it suffered from the bird flu some years ago. The producers who survived were greatly strengthened thanks to the strategies created by the National Association of Poultry in Mexico. It is easy to expect that there is and there will be raw material available (old laying hens) in the region.

3.3 Number of New Jobs to Be Created

With the construction of the slaughterhouse at 100%, there will be 517 jobs, comprising 250 women and 267 men where 13% are young adults, 85% are adults, and 2% are seniors.

It is important for a project or an industry to generate employment sources. The plant is focused on creating jobs that are essential for the local economy. Entrepreneurs are responsible for the livelihood of many families as a social responsibility to the community. Thus, providing a source of stable and dignified work for people in the community, indicates a level of trust. This creates a productive balance between the company, the worker, and the community.

3.4 Estimated Cost Reduction

At full maturity of the project, a reduction of 5.91% of the cost in relation to year zero is expected. This is assumed because the costs are the same whether 10 chickens or 1000 chickens are processed. Economics of scale are expected as processing levels increase.

3.5 Analysis of Environmental Situation

The consideration of the environment is important. The investment should not pollute or damage the local ecosystem. It is best for industry to create a balance between the ecosystem and the project. The project will build a water treatment plant that will clean the water used. Process waste such as blood, feathers, etc, is sent to the rendering plant to

produce fodder flour to be used as a protein in pet food. The process water and wastewater are treated in a plant under Official Mexican Standards.

3.6 Financial Resources

The resources required for remodeling or the establishment of facilities can be obtained either with resources from the municipality, the state or federal governments and/or through loans. In any case, it is necessary for a pre-investment study to examine the convenience and profitability of the work, taking into account the needs of the population and the income generated from the operation. This ensures that the investment is sustainable.

An important source of funding for the credit route is the Banobras. This institution provides resources to municipalities for the financing of the project. It is appropriate that municipal presidents address the delegation of Banobras so those in the entity know what the requirements and terms of payment are. The plant equipment inventory is in table 3.2.

Table 3.2 Equipment Necessary for the Poultry Slaughterhouse

Concept	Installed Capacity	% Capacity Real	Capacity Real	Unit	Value of Equipment USD/EUR	Exchange Rate	MNX	Useful life Years	Depreciation Annual
Boiler	**1,000**	**85.00%**	**850**	**Pzas / Hour**	**$ 458,186**	**$ 12.70**	**$ 5,818,960**	**10**	**$ 581,896**
Foot scraper	**9,000**	**100.00%**	**9,000**	**Pzas / Hour**	**$ 28,303**	**$ 17.02**	**$ 481,717**	**10**	**$ 48,172**
Scaler	**9,000**	**100.00%**	**9,000**	**Pzas / Hour**	**$ 85,645**	**$ 12.70**	**$ 1,087,692**	**10**	**$ 108,769**
Scaler	**9,000**	**100.00%**	**9,000**	**Pzas / Hour**	**$ 72,534**	**$ 12.70**	**$ 921,182**	**10**	**$ 92,118**
Feather dresser	**9,000**	**100.00%**	**9,000**	**Pzas / Hour**	**$ 30,845**	**$ 12.70**	**$ 391,732**	**10**	**$ 39,173**
Plucking	**9,000**	**100.00%**	**9,000**	**Pzas / Hour**	**$ 77,870**	**$ 12.70**	**$ 988,949**	**10**	**$ 98,895**
Plucking	**9,000**	**100.00%**	**9,000**	**Pzas / Hour**	**$ 97,405**	**$ 12.70**	**$ 1,237,044**	**10**	**$ 123,704**
Freight and installation	**9,000**	**100.00%**	**9,000**	**Pzas / Hour**	**$ 40,275**	**$ 12.70**	**$ 511,493**	**10**	**$ 51,149**
Total Invesment							**$ 11,438,767**	**100%**	**$ 1,143,877**
PROVAR							**$ 5,000,000**	**43.71%**	
CREDIT							**$ 538,767**	**4.71%**	
BUSINESS ASSOCIATES							**$ 5,900,000**	**51.58%**	

The initial investment is $ 11.4 million pesos to purchase of the necessary equipment for the slaughter process. Table 3.2 shows the equipment inventory necessary for the start of the project together with the financial plan for acquiring resources, where five million pesos will be provided by the government to support the project since the government is interested in a specialized place for the disposal of birds. The other 5.9 million pesos are contributed by the project partners equally as an equity investment. Only 538,000 pesos are requested as bank credit. It was established in this way so the government contribution was taken into account since it would be the most important amount. The contribution of the partners is also important.

Below are two scenarios considered, a scenario shows the investment needed to start the project and scenario two shows that the benefit of the reinvestment and updating assets with the purchase of new machinery, enlargement of building. These are necessary for the updating and continuous improvement of the company. Both scenarios show profitability. This is logical since the company is located in an area with the largest poultry production in Mexico.

The expected and scheduled production began in 2010, the national flock was 142 million birds and expected to produce 20% of the national flock processed, with annual increases to reach 5% per year 5.

Table 3.3 shows the income statement of the project. An income statement is one of the main financial statements and provides the information that allows to identify the level of efficiency the company is having when analyzing the income against the costs and expenses. It is the compass needed to guide decision making.

The sales expected are listed, and although they seem to be very high and good, the process of managing the product is expensive. Although large revenues do not emerge during the first 4 years, from then on, the process of maturation of the company begins where it is more stable and with better practices.

Table 3.3 Income Statement Scenario One for the Poultry Slaughterhouse

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Income								
Net Sales		$ 93,998,536	$ 95,878,507	$ 98,754,862	$ 102,705,057	$ 107,840,310	$ 113,232,325	$ 118,893,941
Economical support	$5,000,000							
Credit	$538,767							
Aportation	$5,900,000							
Working Capital	$ 1,671,021							
Income sum	$13,109,789	$93,998,536	$95,878,507	$98,754,862	$102,705,057	$107,840,310	$113,232,325	$118,893,941
Expenses								
Costs		$ 66,259,144	$ 73,607,886	$ 75,755,887	$ 78,724,682	$ 82,597,633	$ 86,727,514	$ 91,063,890
Expenses		$19,479,992	$19,479,992	$19,479,992	$19,479,992	$19,479,992	$19,479,992	$19,479,992
Suppliers								
Documents to pay					$0	$0	$0	$0
investment	$11,438,767							
Support reintegration			$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	
Interest		$33,498	$0	$0	$0	$0	$0	$0
Amortization		$538,767						
ISR y PTU		$423,387	$610,513	$876,314	$1,241,349	$1,715,894	$2,214,166	$2,737,351
Expenditures Sum	$11,438,767	$86,734,788	$94,698,390	$97,112,193	$100,446,023	$104,793,518	$109,421,672	$113,281,233
Flow	$1,671,021	$7,263,748	$1,180,117	$1,642,669	$2,259,034	$3,046,791	$3,810,653	$5,612,708
Beginning balance								
Total balance	$1,671,021	$8,934,769	$10,114,886	$11,757,555	$14,016,589	$17,063,381	$20,874,034	$26,486,742

Table 3.4 is the cash flow of the project that analyzes the liquidity of the project. This analyzes the company's ability to generate and the company's ability to pay for the inventory necessary for the start of the project draft.

The investment is in positive cash flow in year 5 which is the maturation of the project.

Table 3.4 Cash Flow Scenario of Poultry Slaughterhouse

Operation Year	Total Revenue	Total Discharges	Investment	Working Capital	Residual Value	Working Capital	Net Flow	Net Acumulative Flow
0			$11,438,767				-$11,438,767	-$11,438,767
1	$93,998,536	$92,219,580					$1,778,957	-$9,659,811
2	$95,878,507	$93,818,862					$2,059,646	-$7,600,165
3	$98,754,862	$96,296,514					$2,458,348	-$5,141,817
4	$102,705,057	$99,699,157					$3,005,900	-$2,135,917
5	$107,840,310	$104,122,592					$3,717,717	$1,581,800
6	$113,232,325	$108,767,200					$4,465,125	$6,046,926
7	$118,893,941	$113,644,038			$3,431,630	$ -	$8,681,534	$14,728,460

The financial indicators indicate that the project has a net present value of $3,750,420 at the end of the 7 years, with an internal rate of return of 19.40%. This provides which gives us a cost-benefit of 1.33 (Table 3.5).

Table 3.5 NPV, IRR, and Break Even Volume for the Poultry Slaughterhouse

NPV	**$3,750,420**		
TIR	**19.40%**		
Benefit/Cost	**1.33**	**$**	**3,750,420**
Breakeven (Hens)	**28,590,655**		

In the second part of the Project it is analyzed from the perspective of reinvestment after the 10-year useful life. Depreciation of the project for the updating of machinery is reinvested to help efficiency so a highger yield on the raw materials like the waste chicken is realized.

Table 3.6 is a simulated general balance of the project where the machinery is priced after 10 years.

Table 3.6 Balance Sheet of the Poultry Slaughterhouse

ASSETS			***LIABILITIES AND CAPITAL***		
CURRENT ASSETS	**79,210,382.39**	**35.02%**	**Liabilities**	**23,596,751.60**	**10.43%**
Banks	10,967,209.68	4.85%	Suppliers	23,185,852.72	10.25%
Fixed found	20,000.00	0.01%	Customer Advances	208,000.00	0.09%
Customers	33,627,598.49	14.87%	Taxes to pay	143,028.00	0.06%
Various Debtors	0.00	0.00%	I.V.A. por pagar	0.00	0.00%
Advances to suppliers	17,898,127.67	7.91%	Employee Participation in profit	59,870.88	0.03%
Inventory	9,205,409.94	4.07%	Saving fund	0.00	0.00%
Bad accounts	(982,094.67)	-0.43%			
Tax Credits	1,833,599.12	0.81%	**C A P I T A L**	**204,456,708.08**	**90.41%**
Taxes in favor	6,168,132.00	2.73%			
Investments in securities	472,400.16	0.21%	Capital Variable	153,251,340.60	67.76%
FIXED			Capital Fixed	100,000.00	0.04%
	130,205,296.40	**57.57%**	Contribution pending capital	260,227.00	0.12%
			Results of the provious year	(32,096,039.44)	-14.19%
Fixed assets	281,643,386.82	124.53%	Bonus on sale of stock	1,793,690.00	0.79%
Depreciation and amortization	(151,438,090.42)	-66.96%	Exceso Ins./Act. Capital	0.00	0.00%
DEFERRED			Profit or loss for the year	36,882,269.91	16.31%
	16,740,735.47	**7.40%**	Income tax	2,801,126.55	1.24%
			Capital update	41,464,093.46	18.33%
Advance Taxes	10,047,719.62	4.44%			
Impac	4,199,414.27	1.86%			
Wage subsidy	0.00	0.00%	**Profit for the year**	**(1,897,045.42)**	**-0.84%**
Deposits in guarantee	706,240.44	0.31%			
Amortizable expenses	8,682,818.69	3.84%			
Amort. de Gastos Amortizables	(6,895,457.55)	-3.05%			
Total Assets	**226,156,414.26**	**100.00%**	**Total Liabilities and Capital**	**226,156,414.26**	**100.00%**

Assets	281,643,386.82	
Depreciation	(151,438,090.42)	
Amoritizable Expenses		
Amortization		
Net Investment	**130,205,296.40**	
Depreciation	$ 13,020,530	10

Once the information of the balance sheet was analyzed, the income statement that shows the projected sales is examined.

The highlight of this statement is that the government's contribution is the same $5 million and the credit is also the same as the previous one. The reinvestment comes directly from the account of banks of the company, something that catches the attention is that the sales grow as well as the expenses but the plant is still very profitable.

Sales grew thanks to the updating of the machinery so that more products are produced from the hens that generate more income. Consequently the costs also grow because the price of hens is higher (Appendix A).

The financial results are a NPV of $ 33,256,535 and an internal rate of return of 17.82% . This provides security although it is a little lower than the rate of scenario 1.

Table 3.7 Financial Indicators for Scenario Two for the Poultry Slaughterhouse

NPV	**$33,256,535**		
TIR	**17.82%**		
Cost/Benefit	**1.23**	**$**	**33,256,535**
Breakeven Point	**28,865,870**		

Taking the results in Table 3.7, the number of hens that were taken are the same as at the beginning of the project (Appendix B).

It is also necessary to take into account the unit cost in scenario 1 is $3.12 and in scenario 2 is $15.15 that indicates more performance from a hen with this machinery updates.

CHAPTER IV: CURRENT SITUATION OF THE COMPANY

The company is currently operating. It is not working at the level that was planned. During 2016 26,630,075 hens were processed obtaining the following results (Table 4.1).

Table 4.1 Yields Per Old Hen

Product	Yield x Hen in Gr	Total Yield Kg	Sales Price/Kg	Contribution $
Pasta B	399	793,960	$9.42	3.76
Breast	160	319,358	$42.18	6.76
Leg and Thigh	85	171,708	$15.33	1.31
Thigh	40	78,886	$19.14	0.75
Skin	14	27,893	$2.14	0.04
Egg	0	10	$0.94	0
Mix Flour	37	70,340	$1.41	0.26
Hydrolyzed Flour	55	110,570	$6.95	0.42
Meat and Bone Flour	167	335,532	$9.08	1.51
Chicken Oil	105	209,920	$8.83	0.93
Bucket Fat	26	52,201	$17.02	0.44
Bulk Grease	-	-	$0.00	0
Neck	11	22,480	$12.50	0.14
Crest	1	2,654	$0.80	0
Leg	8	16,398	$15.14	0.14
Thigh and Leg with breast	8	17,030	$4.50	0.13
Paw	-	-	$0.00	0
Wing	-	-	$0.00	0
Cut Bird	15	29,755	$13.12	0.19

The company is getting the best performance from the waste chicken. The company maintains its employees in addition to creating a positive influence in the region.

The company is stable in many aspects, with a great variety of products. The demand for certain parts that are not consumed in the local country is being exported around the world.

CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

Agricultural activity in the Mexico has been very important as a basic part of the economy and is one of the primary activities in the Mexican countryside. Poultry is facing major challenges that must be solved efficiently due to the growing consumer demand for chicken, vulnerability in imports of meat products, health problems and especially strong competition from international markets due to modernization of equipment and processes.

Mexico is expected to rapidly increase livestock production over the next 20 years due to growing demand for food and the rapid growth of the world population. Thus, the trend is still continuing in the production of animal protein, as population continues to increase. This exerts pressure on food production around the world and Mexico is not an exception.

The importance of building a poultry slaughterhouse makes this project strategic in developing a poultry processing company that provides value to primary products and strengthens the poultry industry in the region. The creation and preservation of jobs in the sector plays in the socio-economic development of the region thus reducing population migration.

The main indicators support the viability and profitability over the life of the project. Mexico must compete every day with low value-added products, health standards and international animal health standards under the scheme Federal Inspection Type (TIF). This means that they must be regulated by the government and be using best practices as indicated by the Mexican government and USDA. If the Mexican agricultural sector supports new projects in an objective way, Mexico has a bright future in the poultry sector.

The recommendation depending on the specialization of each person, is there was a need to close a cycle in a lasting way. One problem should not be removed by bringing another. That is why the decision was made to evaluate the project taking into account all the risk. Thus the situation in a region that has a large production of eggs. This is the core business, but a secondary problem arose.

Since there is a large amount of raw material, it is important to create the project. The projects have to be analyzed in a detailed way. There are several simple and complex methods of analysis, and there has to be a relationship in a company with nature and employees.

Although generating money is important, it is not the only focus of the business. The employees have to change focus on new businesses that adapt to the environment and create economic sustainability.Whether the risk is greater or less, it is inherent to the investment. Investing is giving up certain satisfactions in exchange for expectations for something that is sure. Therefore, risk and investment are two closely related concepts.

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APPENDIX A

Income Statement Scenario Two for the Poultry Slaughterhouse

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Income								
Net Sales		$433,278,067	$441,943,628	$455,201,937	$473,410,014	$497,080,515	$521,934,541	$548,031,268
Support	$5,000,000							
Credit	$538,767							
Aportation								
Income Sum	$5,538,767	$433,278,067	$441,943,628	$455,201,937	$473,410,014	$497,080,515	$521,934,541	$548,031,268
Expenditures								
Costs		$350,716,656	$357,730,989	$368,462,919	$383,201,436	$402,361,508	$422,479,583	$443,603,562
Expenses		$76,097,521	$76,097,521	$76,097,521	$76,097,521	$76,097,521	$76,097,521	$76,097,521
Suppliers								
Documents per Pay					$0	$0	$0	$0
Invertion	$11,438,767							
Reintegration support		$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000		
Interest		$33,498	$0	$0	$0	$0	$0	$0
Amortization		$538,767						
ISR y PTU		$1,720,590	$2,576,914	$3,866,588	$5,637,740	$7,940,238	$10,357,861	$12,896,365
Expenditures Sum	$11,438,767	$430,107,033	$437,405,424	$449,427,028	$465,936,697	$487,399,267	$508,934,965	$532,597,448
Flow	-$5,900,000	$3,171,034	$4,538,204	$5,774,909	$7,473,317	$9,681,248	$12,999,576	$15,433,820
Beginning Balance	$10,987,210							
Total Balance	$5,087,210	$8,258,243	$12,796,447	$18,571,356	$26,044,673	$35,725,922	$48,725,498	$64,159,318

APPENDIX B

Product and Sales Under Scenario One and Two for the Poultry Slaughterhouse

Concept		CU	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Product									
Processed Hens			30,104,434	30,706,523	31,627,718	32,892,827	34,537,468	36,264,342	38,077,559
	Scenario 1	$ 3.12	$ 93,998,536	$ 95,878,507	$ 98,754,862	$ 102,705,057	$ 107,840,310	$ 113,232,325	$ 118,893,941
	Scenario 2	$ 15.15	$ 456,082,175	$ 465,203,819	$ 479,159,933	$ 498,326,331	$ 523,242,647	$ 549,404,780	$ 576,875,019
Raw Material									
Cost Processed Hens									
	Scenario 1	$ 1.52	$ 45,851,431	$ 46,768,460	$ 48,171,514	$ 50,098,374	$ 52,603,293	$ 55,233,458	$ 57,995,130
	Scenario 2	$ 7.39	$ 222,471,767	$ 226,921,203	$ 233,728,839	$ 243,077,992	$ 255,231,892	$ 267,993,487	$ 281,393,161
Packing									
Packing material									
	Scenario 1	$ 0.09	$ 2,729,990	$ 2,784,590	$ 2,868,128	$ 2,982,853	$ 3,131,996	$ 3,288,596	$ 3,453,025
	Scenario 2	$ 0.44	$ 13,245,951	$ 13,510,870	$ 13,916,196	$ 14,472,844	$ 15,196,486	$ 15,956,310	$ 16,754,126
Expenses									
Variables									
	Scenario 1	$ 0.79	$ 23,701,281	$ 24,175,307	$ 24,900,566	$ 25,896,589	$ 27,191,418	$ 28,550,989	$ 29,978,538
	Scenario 2	$ 3.82	$ 114,998,938	$ 117,298,917	$ 120,817,884	$ 125,650,600	$ 131,933,130	$ 138,529,786	$ 145,456,275
Fixed assets									
Operation									
	Scenario 1		$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828
	Scenario 2		$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828	$ 4,781,828
Wages and Salaries									
	Scenario 1		$ 14,698,164	$ 14,698,164	$ 14,698,164	$ 14,698,164	$ 14,698,164	$ 14,698,164	$ 14,698,164
	Scenario 2		$ 71,315,693	$ 71,315,693	$ 71,315,693	$ 71,315,693	$ 71,315,693	$ 71,315,693	$ 71,315,693
Depreciation									
	Scenario 1		$ 1,143,877	$ 1,143,877	$ 1,143,877	$ 1,143,877	$ 1,143,877	$ 1,143,877	$ 1,143,877
	Scenario 2		$ 24,933,024	$ 24,933,024	$ 24,933,024	$ 24,933,024	$ 24,933,024	$ 24,933,024	$ 24,933,024
Total Fixed									
	Scenario 1		$ 20,623,869	$ 20,623,869	$ 20,623,869	$ 20,623,869	$ 20,623,869	$ 20,623,869	$ 20,623,869
	Scenario 2		$ 101,030,545	$ 101,030,545	$ 101,030,545	$ 101,030,545	$ 101,030,545	$ 101,030,545	$ 101,030,545
Total Expenses									
	Scenario 1		$ 92,906,572	$ 94,352,226	$ 96,564,076	$ 99,601,685	$ 103,550,575	$ 107,696,911	$ 112,050,563
	Scenario 2		$ 451,747,201	$ 458,761,535	$ 469,493,464	$ 484,231,981	$ 503,392,053	$ 523,510,128	$ 544,634,107
Profit Before Financial									
	Scenario 1		$ 1,091,965	1,526,281	2,190,786	3,103,372	4,289,734	5,535,414	6,843,378
	Scenario 2		$ 4,334,974	6,442,284	9,666,469	14,094,350	19,850,595	25,894,652	32,240,911
Financial Interest									
	Scenario 1		$ 33,498						
	Scenario 2		$ 33,498						
Profit Before Tax									
	Scenario 1		$ 1,058,466	$ 1,526,281	$ 2,190,786	$ 3,103,372	$ 4,289,734	$ 5,535,414	$ 6,843,378
	Scenario 2		$ 4,301,476	$ 6,442,284	$ 9,666,469	$ 14,094,350	$ 19,850,595	$ 25,894,652	$ 32,240,911
ISR y PTU									
	Scenario 1		$ 423,387	$ 610,513	$ 876,314	$ 1,241,349	$ 1,715,894	$ 2,214,166	$ 2,737,351
	Scenario 2		$ 1,720,590	$ 2,576,914	$ 3,866,588	$ 5,637,740	$ 7,940,238	$ 10,357,861	$ 12,896,365
Net Profit									
	Scenario 1		$ 635,080	$ 915,769	$ 1,314,472	$ 1,862,023	$ 2,573,840	$ 3,321,249	$ 4,106,027
	Scenario 2		$ 2,580,885	$ 3,865,371	$ 5,799,882	$ 8,456,610	$ 11,910,357	$ 15,536,791	$ 19,344,547