White meat cluster

-Pre-feasibility Study-

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1. Introduction

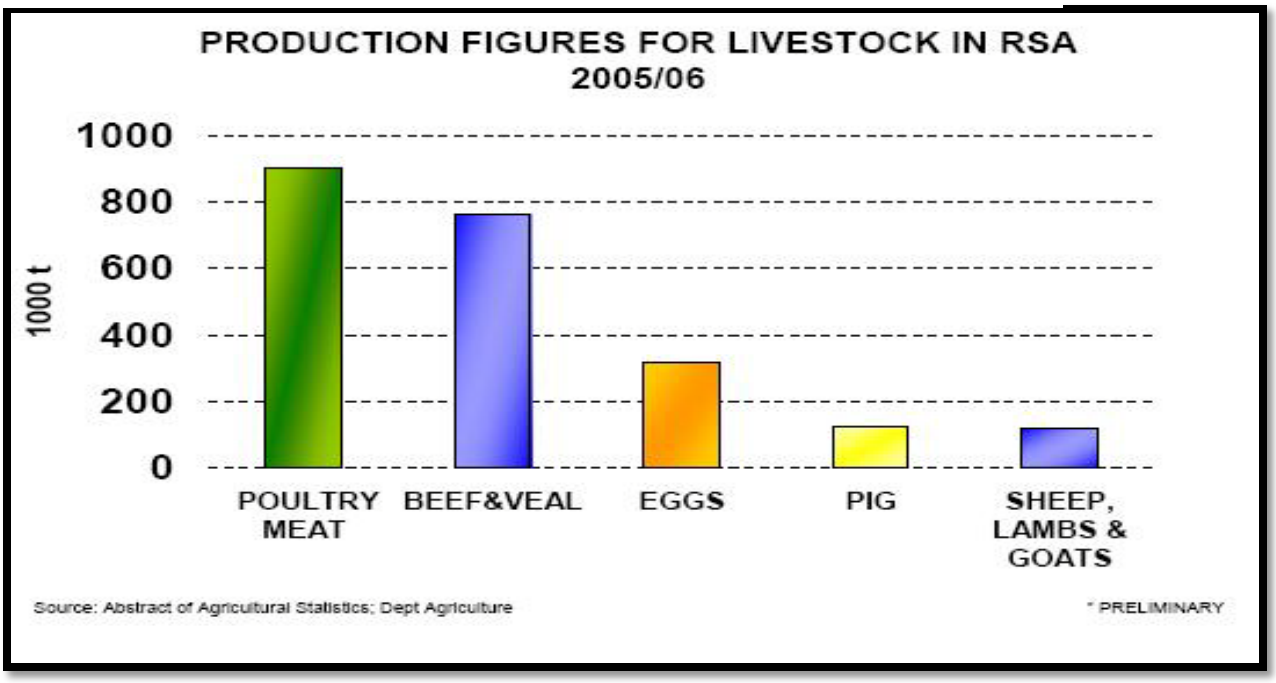
The aim of the pre-feasibility study is to investigate the use of existing infrastructure in the Lebowakgomo Industrial Park as well as any other infrastructure available in and around Lebowakgomo which could contribute to the development of a white meat cluster. The purpose of this report therefore is to determine if a Chicken Cluster could be a profit driven, financially viable entity that incorporates the existing infrastructure and provides job opportunities to the community.

2. Development Description

2.1 BACKGROUND TO THE WHITE MEAT INDUSTRY

The poultry industry dominates the South African agricultural sector, as can be seen from the figure. The Department of Agriculture recorded that turnover at producer level was R 15,729,909,000 in 2006, comprising R 11,924 billion for broilers and R 3,806 billion for eggs. At retail level, these turnovers increase to a total of R 22,684,630,500 (Stats SA, 2005).

Figure 1: Production figures for livestock

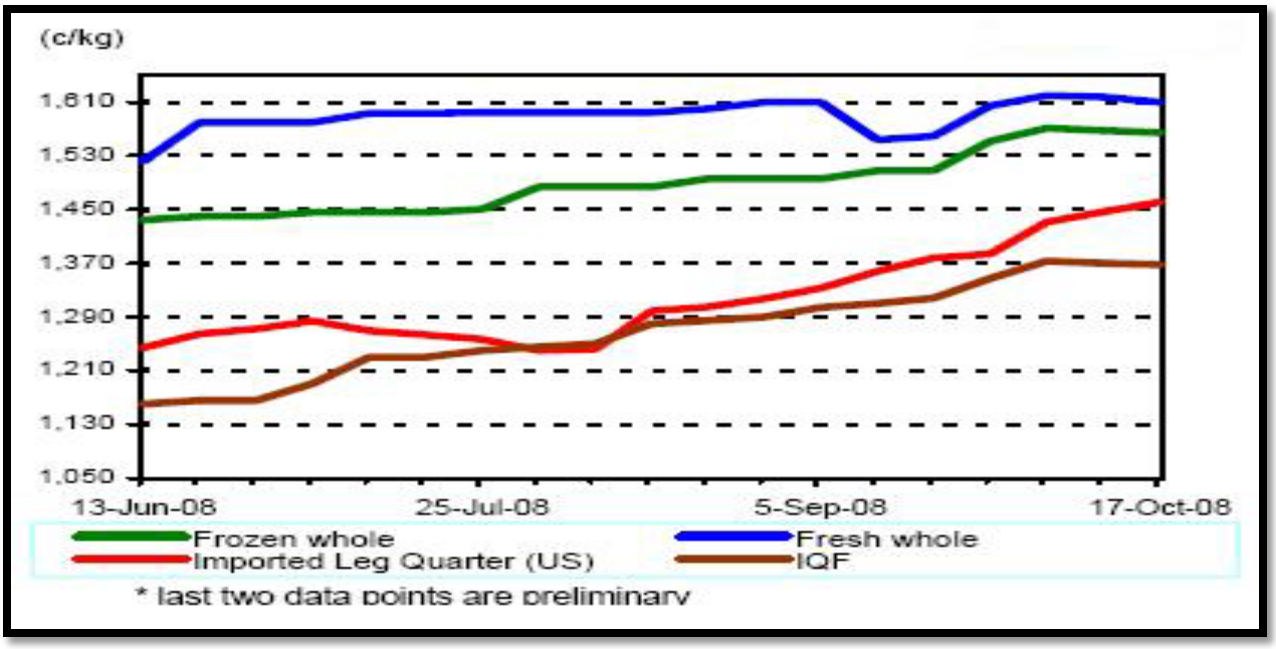


Source: South African Poulty Industry Profile, 2006

According to the South African Poultry Association, the poultry industry provides about 58% of all animal-product protein consumed in South Africa. In 2006, the poultry industry supplied 1,225,000 tonnes of poultry meat and 350,000 tonnes of eggs.

In addition to its importance as a source of food and its contribution to the nation's Gross Domestic Product (GDP), the SA poultry industry is an important contributor to job creation and employment opportunities. The South African Poultry Association's Industry Profile for 2006 indicated that the broiler industry employs an estimated 60 000 people, the egg industry employs 10 000 and the chick producer industry employs approximately 7 000 people.

Figure 2: Poultry price trends



Source: FNB Agri-Weekly, 2008

The domestic poultry prices continued to strengthen as can be seen from Figure 2. Demand for chicken remains strong as it is relatively cheap compared to other meat types (see Figure 3). The narrowing gap between import parity and domestic prices is also helping to lift prices and as a result prices are slowly catching up with input costs which remain relatively high despite the lower price of maize.

Figure 3: Producer prices

Producer prices for selected livestock commodities 03 October 2008	Beef	Mutton	Pork	Poultry
Open market: Class A / Porker / Fresh whole birds(R/kg)	21.20	34.08	15.87	15.72
Open market: Class C / Baconer / Frozen whole birds(R/kg)	19.15	26.87	15.20	16.20
Contract: A2/A3* / Baconer/ IQF (*includes fifth quarter) (R/kg)	21.64	34.30	15.51	13.73
Import parity price (R/kg)	21.95	18.44	18.67	14.37
Weaner Calves / Feeder Lambs (R/kg)	12.23	15.27		

2.2 PROJECT DESCRIPTION

The aim of this chapter is to define each component that forms part of a chicken cluster. The chicken business can be simplified into three main components, namely:

- Production
- Processing
- Marketing

The existing Lebowakgomo Industrial Park addresses the aspect of processing. Each component will be explained in the subsequent sections in order to ensure that a clear understanding of each component of the business is created and to clarify all the aspects that must be addressed in order to ensure the creation of a complete and financially viable chicken cluster.

2.2.1 PRODUCTION

The production component entails raising broilers that are used for processing.

Figure 4: Poultry projects in Lepelle-Nkumpi

Area	Capacity	Type of poultry
Ga-Kekana	3 Chicken batteries with approximately a 500 chickens on each battery.	Broilers
Makweng	2 Chicken batteries with approximately 1 000 chickens on each battery	Broilers
Magatle	1 chicken battery with approximately 1 000 chickens	Broilers
Sekgopokgopong	2 chicken batteries with approximately 1 000 chickens	Broilers
Habakuk Industrial Place	A number of chicken batteries which hosts 1 000 chickens each.	Broilers
Moletlane	2 chicken batteries with approximately 1 000 chickens	Broilers
Ga-Ledwaba	2 chicken batteries with approximately 1 000 chickens	Broilers
Sekele	2 chicken batteries with approximately 1 000 chickens	Broilers
Ga-Molapo	A number of chicken batteries	Egg-laying
Lepelle-Nkumpi	15 chicken batteries with approximately 13 500 chickens	Broilers
Ga-Mphahlele	13 chicken batteries only three operational	Broilers

Source: LED, 2006

The chicken cluster could help with the development of communities of the area through the production component of the chicken cluster. The broilers should be in a position to meet the demand of the abattoir to function at full capacity.

Existing broilers can also merge and function as a co-operative. The rationale behind starting a co-operative is to buy raw materials in bulk and distribute it to the chicken broilers that form part of the co-operative. This means that the expenses incurred to buy raw materials will be cheaper than purchasing them separately.

2.2.2 PROCESSING

According to the Meat safety Act, Act No. 40 of 2000, the processing components of a chicken business consist of the slaughtering of the broiler and the altering of the meat, other than cutting and portioning, dicing and mincing to enhance meat.

Therefore, an abattoir is a facility where processing takes place. There are three types of poultry abattoirs, namely:

- Rural Poultry Abattoir
- Low Throughput Poultry Abattoir
- High Throughput Poultry Abattoir

2.2.2.1 LEGAL REGULATIONS

According to the Act, a rural poultry abattoir may not process more than fifty chickens per day. A low throughput abattoir can only process a maximum of two thousand chickens each day and high throughput abattoir processing potential is determined on an hourly throughput depending on the available equipment, facilities and chiller capacity.

The Lebowakgomo abattoir has the capacity to slaughter 15,000 chickens a day.

The chicken slaughtering process creates significant logistical requirements and public health concerns. Most religions stipulate certain conditions and requirements that must be adhered to for the slaughtering of broilers. The abattoir of the chicken cluster should adhere to all the legal requirements that were set out by the Department Of Veterinary and Food Safety, which are subsequently:

- Poultry Final Regulation
- Meat Safety Act
- Essential National Standards

- Abattoir Construction Guidelines (2004)
- Health Certificate

The content of each legal consideration has been used to formulate a checklist that was used to identify gaps that the abattoir must address with the aim of becoming completely legally compliant. (See annexure A).

From the results of auditing done by Urban-Econ for a similar project, it is clear that the abattoir requires the following:

Facilities

- A facility where poultry transport trucks can be sanitized after offloading
- Storage facilities for packing material
- Laundry facilities for protective clothing
- Storage facilities for chemicals and cleaning materials.
- The storage facility for clean empty bags needs renovation
- Bulk storage facilities must be provided for packing material and needs renovation.

Construction

- Ceiling in change rooms
- Lockers for ablution block

Equipment

- Spin-Chiller
- Freezers
- Live bird scale

Machinery

- Hose pipe
- Air conditioners

Hygiene

- Hand drying facilities
- Germicidal liquid soaps
- Hygiene Management Programmes (HMP) to prevent, eliminate or reduce hazards needs to be implemented.
- Personnel must undergo training in hygiene procedures
- Chairs and tables for personnel
- Soap dispensers

Uniform

- Replace Aprons (uniforms)

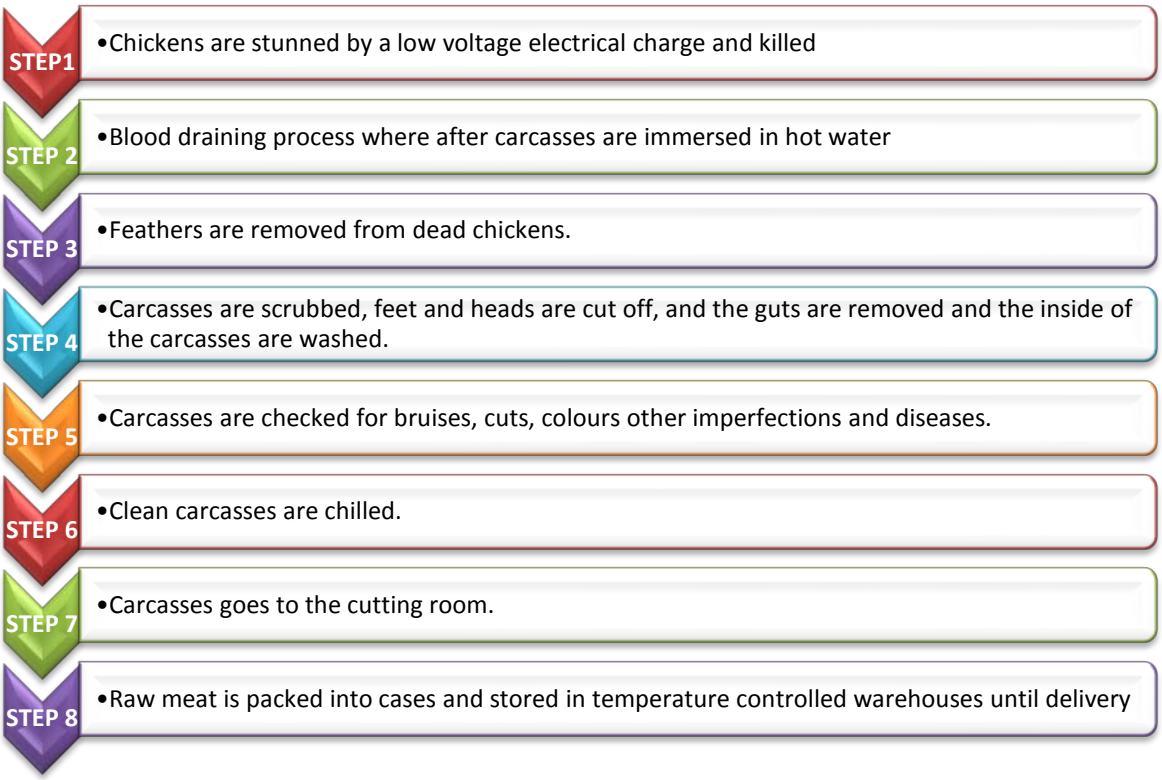
The compliance to legal requirements ensures the chicken business's access to the market. The subsequent section provides an overview of the chicken market as well as the processes involved in finding potential offset points (markets).

Compliance to legalities is of utmost importance and is pre-requisite to gain access to potential markets.

2.2.2.2 CHICKEN PROCESSING PROCESS

The diagram provides an overview of the processes involved in chicken processing:

FIGURE 1: CHICKEN PROCESSING PROCESS



Source: Urban-Econ, 2008

2.2.2.3 TECHNICAL SYSTEMS

The section links the chicken processing process to the machinery required. The machinery utilized for the processing is as follows:

First Operational Room

- Stunner (A low voltage electrical charge used to kill the chickens)
- Scalding tank (Water)
- Defeathering Machine (Also called a plucker used to remove the feathers from the bird)
- Hangers (To hang carcasses to move to the Second Operational Room)

Second Operational Room

- Evaporation Trough (Carcasses are scrubbed, the feet and heads are cut off, and the guts are removed and the giblets and livers of the carcasses are washed out).

Third Operational Room

- Spin Chiller (Used for frozen chicken)
- Portioner (Used for cutting carcasses in portions)
- Stainless Steel Table (Packaging)

2.2.3 MARKET

A market of a product has two sides, the demand side and the supply side. For this study's purpose, the market can be defined as the offset point where chickens are supplied to intermediaries (such as retailers or wholesalers) in order to reach the consumers or end users (demand).

Established local wholesalers and retail outlets in the Study Area are the potential markets. It is assumed that the abattoir will be working at full capacity (i.e slaughtering 15,000 chickens daily) once all the required aspects have been dealt with. It is also assumed that a daily amount of 15,000 chickens will be processed and supplied to these target markets. These established wholesalers and retail outlets serves as a sustainable market that would ensure an offset for the maximum output which also means that income (revenue) will be generated.

3. Market Analysis

This section broadly examines the supply and demand in the chicken industry.

3.1 SUPPLY ANALYSIS

The supply of the chicken market depends on the output targets of all the broiler farms (production) and abattoirs (processing) in the country. In South Africa, Rainbow Chicken is the largest producer and holds a 30% share in the chicken market. Below follows a list of all the broiler supply (producers) and processing farms (abattoirs) found in South Africa:

- Argyle
- Astral
- Early Bird
- Country Fair
- Tydstroom
- Country Bird
- Chubby Chicks
- Rocklands
- Daybreak
- Sangiro

According to the statistics of the South African Poultry Association (SAPA) the current supply of chicken meat does not match the demand and therefore chicken is imported. The total chicken meat import increased by 24% between 2004 and 2005, 300% from 2000 to 2005. Brazil and Canada are currently the main exporters of chicken meat to South Africa.

Total chicken meat import increased by 24% between 2004 and 2005, 300% from 2000 to 2005. Brazil and Canada are currently the main exporters of chicken meat to South Africa. This is due to the growing demands for chicken meat which cannot be met by production and processing suppliers.

3.2 DEMAND ANALYSIS

3.2.1 NATIONAL DEMAND

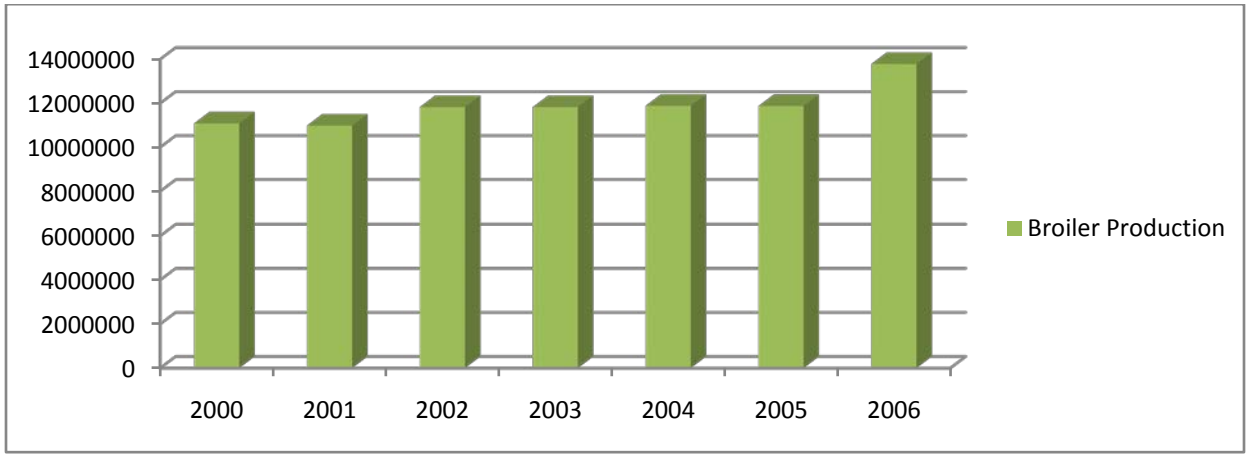
The aim of this section is to provide findings that indicate that securing a market as an offset for chickens is a small problem compared to the other components, namely production and processing. This is based on the fact that there is a high demand for chicken in South Africa, Limpopo and Lebowakgomo.

Chicken is a price sensitive commodity, which basically means that consumers with lower incomes are mainly interested in the price of chickens when purchasing the product. Factors such as branding and packaging do not influence the decision of the consumer. This is mainly based on the fact that chicken is perceived to be a cheaper protein substitute than other kinds of meats, such as red meat, lamb and fish. Chicken is purchased across all income categories and therefore as result is a commodity that is in demand.

The high demand for chicken is supported by the South African Poultry Association, which states that there is a high and growing demand for chicken meat and 2006 has been an exceptional year for producers and other role-players within the supply and demand chain. The growth in the economy also enhanced and supported consumer spending[1]. The figure below illustrates that there has been a growth in demand for chicken meat which is based on growth in broiler production in South Africa.

The following figure illustrates the increase in broiler production as a result of the growing demand for chicken meat from 2000 and 2006.

Figure 5: Demand and growth in broiler production



(Source: www.sapoultry.com)

3.2.2 LOCAL DEMAND

For this study, it is assumed that the local demand displays similar trends as the national and provincial demand. This is due to the findings that chicken is a price sensitive commodity as it influences the consumption patterns and trends.

According to the Expenditure and Income Survey of Statistics South Africa (StatsSA) the following statistics prevail:

1 www.sapoultry.co.za

- 32% of total cost of meat and meat products are spent on chicken (urban areas)
- 44.5% of the total costs of meat and meat products are spent on chicken (Non-urban areas)

The components of meat and other meat products category are as follows:

- Beef and veal
- Mutton, lamb and goat
- Pork
- Other meat-including game shot by the households
- Boerewors
- Sausage
- Processed meats (Vienna, ham and polony)

The total costs of meat and meat products in relation to income are as follows:

- 0.34% (urban)
- 0.47% (non-urban)

Therefore poultry consumption in relation to income is as follows:

- 0.11% (urban)
- 0.21% (non-urban)

The demand for chicken is determined using these figures, ceteris paribus (all other things remain constant).

3.2.2.1 CONSUMPTION TRENDS OF CHICKEN

Product consumption refers to the consumption of the product by different consumers. Due to the fact that the product is price sensitive it is assumed that all income groups spend 32 %(urban) and 44.5 %(non urban) of their total meat consumption on chicken. This theory also assumes that all households in Lepelle-Nkumpi (51,242) eat chicken.

Table 1: Demand for chicken in Lepelle-Nkumpi

Income category (grow 2001 income category with inflation rate to 2008)	% Income distribution	Total HH income	Demand derived from this income group
R0 – R595	11%	R 1,679,826	R 184,781
R596 – R7,146	25%	R 49,591,381	R 5,455,052
R7,147 – R14,292	14%	R 76,901,693	R 8,459,186
R14,293 – R28,583	8%	R 87,874,362	R 9,666,180

R28,584 – R57,167	6%	R 131,842,163	R 14,502,638
R57,168 – R114,334	3%	R 131,798,519	R 14,497,837
R114,335 – R228,668	1%	R 87,808,768	R 9,658,964
TOTAL:	**100%**	**R 567,496,711**	**R 62,424,638**

Source: Quantec, Urban-Econ &LED, 2008

The number of households was used in a midpoint calculation to determine the average household income. Using this estimate, the demand for chicken was derived. There is a total demand of R 62,424,638.

3.2.2.2 NET EFFECTIVE DEMAND

The net effective demand of the chicken market quantifies the gap between the chicken supply and the chicken demand in the Study Area. The sensitivity and lack of data available for the Study Area resulted in the difficulty of quantifying the net effective demand. Chicken is a consumable commodity.

It is assumed that there is a demand in the Study Area based on the following assumptions:

- In South Africa an increasing number of Africans are buying chicken as a result of their improved lifestyle. They are moving away from staple diets
- A 6% average annual growth in chicken product sales meaning that the growth in sales (6%) is greater than the South African population growth rate. It is therefore safe to say that more people are eating chicken than before
- Domestic consumption is expected to reach 1.65 million tons in 2014[2]
- In the long-term consumers are expected to increase the amount of chicken eaten at an average additional 900g of chicken per person[3]per year
- The 300% increase in importing chicken meat from Brazil and Canada during 2000 and 2005
- Approximately R 62,424,638 of the total annual household income in Lepelle-Nkumpi is spent on chicken
- Retail Outlets (Pick N Pay) requires that the abattoir passes South African Food Safety Inspection Services (SAFSIS) criteria with at least 80%
- Local wholesalers in the Study Area are in need of a constant chicken supplier

From the aforementioned statistics it is assumed that there is an increasing demand of chicken meat in the Study Area.

2 Bureau for food and agricultural policy,2007

3 Bureau for food and agricultural policy,2007

4. Secondary uses

A processing business could possibly be an additional unit to the chicken business and be located in the Industrial Park. Urban-Econ identified possible processing opportunities that can be utilized from the chicken, namely:

- Fertilizers
- Dog Food
- Value-added Chicken Products

The aforementioned products are subsequently discussed.

Fertilizers

Fertilizers are natural and synthetic materials, including manure and nitrogen, phosphorous and potassium compounds, spread on or worked into soil to increase its capacity to support plant growth. Chicken manure could be used to enrich fertilizers.

Dog Food

The Pet Food Industry looks at recycling by-products from food produced by human consumption. By-products from human food production are meatless animal and poultry carcasses, waste from crops such as the husks, cobs and stalks. This process of recycling by-products is termed “rendering”.

The first stage of rendering by-products is pulverizing and transforming bones and other substances into powders. Some of them are dissolved with acids. Sometimes the product is rendered further and processed into ash. Bleaching agents may be used to halt or eliminate the smell of decay.

The second stage consists of the dehydration of moist raw materials, while feathers and other hard-to-breakdown by-products are hydrolyzed. “Hydrolyzing,” simply means the use of heated sulfuric acid under tremendous pressure to dissolve and break down feathers into a base sugar thereby manufacturing a digestible ingredient included in livestock feed (and pet foods) from something previously indigestible.

Thirdly, the raw paste and powder materials are blended together in specified amounts and then transferred to an “expander.” Hot water or steam is added to the expander and the mixture is compacted through intense pressurization and heat.

Fourthly, the mixture is extruded (like using a caulk gun to push caulk out through the narrow opening) and sliced rapidly into individual pieces. Finally, the pieces are sprayed with oils that may contain

flavorings, vitamin supplements or other chemical additives, and then the pieces are dried for packaging, which is dog food.

Value-added Chicken Products

Chicken can further be processed in a number of products, such as:

- Convenience meals
- Chicken pies
- Chicken Polony
- Chicken Viennas
- Chicken Crumbed Burgers
- Chicken Steaklets
- Chicken bites

The aforementioned activities are products that could be manufactured in the Industrial Park.

5. Potential Impacts

The impact of the implementation of the proposed chicken cluster project is assessable in terms of the socio-economic effect it will have on a local and even district level. Socio-economic effects can be determined by the following elements of a project:

- Labour intensiveness
- Permanent job placement
- Skills transfer
- Sustainability

The significance of the project lies within the large number of labourers which will be able to take ownership of the chicken enterprise. All processes involved in chicken farming and chicken processing require manual labour.

Labour intensiveness leads to increased employment opportunities created in the local community. The project will create job opportunities, promote entrepreneurship and curb poverty through income generation and skills training of the labourers of the project. This in turn leads to the bettering of the lives of project owners, their households and those of the community at large.

Furthermore, chicken farming could lead to improved food security, the upliftment of impoverished rural communities and the improvement of those primary and secondary industries that rely on chicken farming enterprises.

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Annexure A

REQUIREMENTS FOR LOW THROUGHPUT POULTRY ABATTOIRS:	YES	NO	NOT APPLICABLE
Premises must be fenced and provided with a gate to control access of people and animals.	X		
Roofed facilities for offloading and holding of live birds must be provided.	X		
A facility where poultry transport trucks must be sanitized after offloading must be provided.		X	
An equipped room must be available, where poultry is stunned, bled, scalded, defeathered, heads and feet are removed, rough offal is dispatched and meat inspection is done.	X		
An equipped room must be available, where carcasses are eviscerated, washed, meat inspection is done and where separate facilities must be provided for further inspection and recovery.	X		
An equipped room where carcasses are portioned, packed and chilled and meat and red offal are dispatched, this function may be done in room (see above requirement)	X No spin-chiller machine		
Air temperature of the room where more than 500 birds are slaughtered should not exceed 12 degree Celsius. (Abattoir does not have an air conditioner).		X	
Rough offal is handled, provided this may be done in a separate area.			X
Facilities must be provided where feathers and inedible products can be kept under hygienic conditions prior to the removal from the abattoir, unless it is removed on a continuous basis.			X
Separate Chillers and freezers must be provided for the daily throughput of; • Carcasses, red offal • Washed rough offal (One of the freezers in the abattoir not in good condition).	X		
Personal entrance to clean areas of the abattoir must be provided and designed as an ante-chamber for cleaning purposes and must be provided with hand washbasins, a boot wash, apron wash, hooks for aprons, refuse container.	X		
Soap dispensers and hand drying facilities for cleaning purposes		X	
Change room, shower, toiler as well as hand wash facilities must be provided on the premises for persons working at the abattoir.	X		
Dining facilities must be provided with tables and chairs and must be situated so that personnel do not sit or lie on the ground or soil their protective clothing during rest periods. (Abattoir lacks chairs and tables)		X	
A storage facility or room for items needed in the daily slaughter process must be provided	X		
Rooms for storage of cleaning equipment and material.	X		

Cleaning and sterilization of fixed and movable equipment.		X	
Sterilization of products crates and storage thereof.			X