

## **Eggs Incubators for the Poultry Industry in Nepal**

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#### **Background of Nepal:**

Nepal is a small country with a total area of 147,181 km<sup>2</sup>. It is located between India and China in the continent of Asia (Map of the World, 2016). Nepal has a total population of 28,962,006 people consisting of 49% male and 51% females. In Nepal, 81% of the population live in rural areas and farm as a source of livelihood. The other 18% of the population live in cities (Country Meters, 2016). Kathmandu is the capital of Nepal, with a population of 1 million people. It is the center for economic activity and where businesses and markets are located. This city is the main hub for transportation and the location of the Tribuvan International Airport, which is the main airstrip. Many families in the city have backyard farms with vegetables and livestock, such as goats and chickens. Nepal is divided into three different regions based on climate, altitude and types of livestock and crops. The mountain region has a cool climate with a very short growing season because of high altitudes, harsh temperature and the inability to irrigate the land. The mountain is isolated from the rest of the country accessed only by small trails, using cattle and mules as transportation (Bioversity International, 2016). The hills region has a subtropical climate and very little flat land. Rice farming is done on terraces and crops are planted on the hillside (Paudel, 2016). Parts of the hills region have no roads like the mountain region and are isolated as well. Lastly, the Terai region has a subtropical climate good for growing tropical fruits and vegetables. The region has highly fertile soil, and 57% of the land can be irrigated. There is not much livestock farming in this region. Two religions in Nepal are Buddhism and Hinduism. Hinduism is the main religion for the majority of people in Nepal. Hindus worship cows and pigs, and use vegetables and chicken meat as their alternative source of food (Rochow & Benno, 2009).

#### **The Poultry Industry in Nepal:**

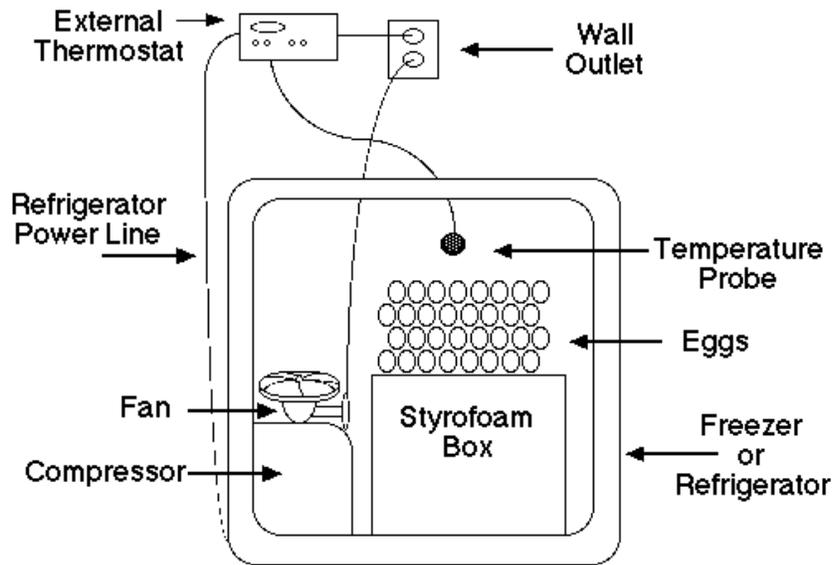
The poultry industry accounts for 3-4% of Nepal's GDP per year. Nepal is ranked 112<sup>th</sup> in the world for chicken meat production and 92<sup>nd</sup> in the world for egg production. Family backyard poultry production is most common for urban and rural farmers throughout the country.

Over the past few years the corporate poultry sector has expanded rapidly. Corporate poultry farms employ around 70,000 people and produce 150,000 kg of chicken meat per day (Shrestha, 2014). Between 2002 to 2012, the number of birds in the poultry industry increased from 21.37 million to 45.17 million birds (Shrestha, 2014). With the growth in the poultry industry in Nepal, there is now a total of 98 different hatcheries. Annapurna Hatchery and Hatchery Nepal are examples of two major hatcheries in Nepal (Directory of Nepal, 2016).

**Product Description:**

The main purpose of an egg incubator is to hatch eggs when there is no hen present or when there is not a safe area for the chicken to nest, such as in an industrial farm with battery cages (Adid, 2008). An egg incubator is a plastic dome or rectangular box used to hatch chicks from eggs. The incubator has clear plastic viewing window to observe the eggs in order to remove them from the incubator once they have hatched. A heating light is attached to the top of the incubator to provide warmth to the developing eggs for an average of 21 days at a constant temperature of 37 degrees Celsius. (Upson, 2016).

Fig 1



Source: <http://www.epress.com/w3jbio/vol3/boatright/fig1.gif>

The common structure of an industrial egg incubator is shown in (fig 1). The incubator has a built-in fan to circulate the heat, and a temperature gage to either raise or lower the temperature based on the external temperature surrounding the incubator. Egg incubators range in size. Small incubators can hold up to seven eggs at a time and are used for single backyard farms. Medium-sized incubators can hold around 48 eggs and are used for larger poultry farms in rural areas. Lastly, large incubators can hold hundreds of eggs at a time and are used for corporate poultry farming (Chicken Eggs DIY, 2016). Incubators come as manual or automatic. The automatic incubators are preferable since a computer turns the eggs at a specific time twice a day rather than the farmer turning each egg by hand (Chicken Eggs DIY, 2016). Incubators have shelves in order to maximize the space and fit more eggs at one time. Shelving also gives the chicks room to move around once they have hatched. Attached to the shelves are plastic carton-like holders to hold the egg in place so the egg can develop properly and the embryo is not harmed. (Upson, 2016)

### **Manufacturing of Egg Incubators:**

Egg incubators are primarily manufactured by Deelat Industrial, which is a company that focuses on industrial equipment and farming equipment. The company's main market is the United States and Canada. Deelat Industrial is an American company based in Miami Beach

Florida, with an office branch in Calgary, Alberta. The Canadian office branch employed 20 people as of 2012 with an expected increase in the amount of new employees hired. The Canadian office branch makes around \$5 to \$10 million in revenue per year (Canadian Business 2015). Warehouses in Canada store products imported from the United States before being shipped to market. They also store specialty equipment such as lamp parts for projectors, egg incubators and other industrial equipment (Better Business Bureau, 2016). The materials used in manufacturing an incubator are plastic, stainless steel metal sheets, screws, insulation, a motor, a fan, and an electronic package with a microprocessor to control temperature (Sokolo, 2016). The incubators are manufactured on an assembly in a factory. One section of the assembly line focuses on bending the metal, painting and adding insulation, while another section works on the control panel and electrical devices. Once manufactured, the incubators are cleaned, tested, and released to market (Sokolo, 2016).

#### **Cost and Inputs Required:**

A Nepalese Rupee is \$81.18 per \$1 Canadian (Exchange Rates 2016). The price of an egg incubator depends on the size. Small household incubators that can hold 7 eggs costs around \$50 or 4055.62 Nepalese Rupees. Medium sized egg incubator that can hold 48 eggs cost \$191.40 Canadian or 15,542.93 Nepalese Rupees. A large incubator that can hold 112 eggs costs \$244.20 Canadian or 20,000 Nepalese Rupees (Deelat industrial, 2016). The larger egg incubators have a primary market of the corporate hatcheries in Nepal since the heating lamps require constant electricity in order to operate properly. Since there are many blackouts in Nepal, only corporations could afford a backup generator that could provide enough power to keep the heat lamp running. If the heat lamp were to shut down, the developing eggs would die. There is minimal intense labour associated with manufacturing an egg incubator. The farmer has to gather the eggs, place them in the holders on the shelves, and monitor the temperature. Instructions on how to operate a temperature can be provided to farmers and workers through a picture manual.

#### **Market for Egg Incubators:**

The small egg incubators would be cheap enough for a group of families in Kathmandu to purchase. In the city, people have access to electricity more so than the people living in the rural parts of the country. People would need access to electricity or giant batteries in order to have enough energy to constantly keep the heat lamp on while the chick is developing. Medium-sized eggs incubators could be purchased by a community and rented amongst farmers. Once the

eggs have hatched the incubator can be cleaned and sent to the next farm. The farmers would have to have electricity in order to have the incubator. The large industrial incubators have a market for corporate hatcheries in the Nepal poultry industry. Corporations such as Annapurna Hatchery and Hatchery Nepal would be one of the few that would be able to afford a large incubator. Industrial incubators rely solely on electricity and could not be substituted with battery power. During a blackout, the corporations must utilize a backup generator which is very expensive for an average farmer to purchase.

### **Benefits to Canada:**

Canada would benefit from shipping egg incubators to Nepal because it would increase the profit of the export market and boost the Canadian economy. If Deelat industrial have an increase in sales and manufacturing, then the company will be able to expand and add more office branches and storage warehouses in Canada. There would be an opportunity to create more jobs for Canadians within the company who are unemployed. Manufacturing the incubators would also have a domino effect on the employment of the Canadian based shipping company air logistics partnered with Nepal shipping. More employees will be hired in the shipping company in order to bring the incubators overseas to Nepal. Lastly, Deelat Industrial has guaranteed that they will partner with existing smaller manufacturing companies that specialize in industrial and farming equipment (Deelat Industrial, 2016) If the partnership successfully occurs then a Canadian company could be in charge of processing egg incubators on behalf of Deelat industrial. This would not only expand the smaller Canadian manufacturing companies, but also other Canadian companies that supply the raw materials for the incubators such as metal, light fixtures and the electrical components.

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## Part 2

### **Transportation Logistics:**

Nepal is a landlocked country in the middle of India and China. However, the best way to ship the egg incubators is by sea using the company's Air Logistics and Nepal Shipping. A ship can hold larger, heavier crates beneficial to transport medium-sized and large incubators for corporate poultry farming. A plane is better for transporting smaller urgent products. Nepal Shipping is a company based out of South Asia and covers shipping to countries in surrounding areas, partnering with Air Logistics in Toronto (Nepal Shipping, 2016). The companies have their own warehouses situated in Katmandu to store the items before they are delivered using

Nepal Shipping's door to door delivery services. From Katmandu, the products can be delivered to urban and rural poultry productions (Nepal Shipping, 2016). The cost to ship a 40ft crate to Nepal is approximately \$3,010 from Canada to a port in Mumbai, India taking around 13-20 days to be delivered (MoverDB, 2016).

### **Boarder/Customs Restrictions:**

Nepal has not banned the importing egg incubators over the border into the country and it does not require a special license or permit (Department of Customs Nepal, 2016). Nepal Shipping handles all of the customs from India to Nepal and usually takes 1 day for a delivery create to make it through the border. The company also handles port clearances as soon as the ship arrives in India (Nepal Shipping, 2016).

### **Cost Analysis:**

The cost of living in Nepal is 100 Nepalese rupees or \$1.15 per day which is very low. There are different class of income earnings in Nepal. A low income earning is around 100-500 rupees per day or \$1.24-\$6.18 Canadian dollars. These jobs are housekeeping and manual construction. Middle income jobs are waiters, taxi drivers, teachers and government workers. Their income ranges from 100 rupees a day to 20,000 rupees per month or \$1.24- 247.03 in Canadian dollars. Lastly, examples of upper income job are government jobs, bank manager and engineers making 45000-100000+ rupees per month or 555-1235 per month (Dave, 2013). Some farmers in the rural sections of Nepal have no money or income and live solely off the land for food, clothing and shelter. All in all, Nepal is a very poor country and there is not much potential for incubators as they are expensive and few families and corporations will be able to afford the product. Using a medium-sized egg incubator that can hold 48 eggs costs \$191.40 Canadian dollars or 15,542.93 Nepalese rupees along with the shipping costs for Canada to Nepal which averages \$3,010 Canadian dollars or 234,691 Nepalese rupees. A shipping container can hold approximately 12 egg incubators at a time and 3 crates would be shipped which would bring the total shipping cost up to \$9030. In order for an average family to buy this product, the cost of shipping must be lowered.

### **Benefits to Nepal:**

Shipping egg incubators to Nepal would increase the production of industrial poultry farms along with the large scale hatcheries. The country would see an increasing trend in the amount of birds in their production system. Nepal would be able to export more chicken meat to

surrounding countries as well as a greater number of eggs from more hens. The poultry industry in Nepal will bring some wealth to the country. The poultry industry could account for 5-8% of the country's GDP instead of the current rate of 3-4% (Shrestha, 2014). With an increase in industrial production, the hatcheries could employ more than the current 70,000 Nepalese people and rural farmers could begin to have a steady income to provide for their families (Shrestha, 2014). Furthermore, the money from the exports of chicken meat can be used to build infrastructure and better roads so rural poultry farmers have access to city markets. The country could implement social programs and build a better school system for proper education. Lastly, families with backyard chicken farms can sell excess chicken meat at the market to buy the family vegetables and improve their housing or send their children to school.

### **Regional Competition:**

China and India are the main countries bordering Nepal with large poultry industries. India has a rapidly growing poultry industry expanding by 8-10% per year. India is 5<sup>th</sup> in the world for eggs with 133 million laying hens and 18<sup>th</sup> in the world for chicken meat. With a billion people the market for chicken is huge, driving the price for chicken down to match the price of chicken meat with the rest of the world. India's main exports concerning poultry are eggs, meat and live birds. The Indian poultry sector employs around 1.6 million people and is still increasing (Metha & Nambiar, 2002). China has a rapidly increasing poultry sector as well. China has around 50 million birds in the meat sector along with 4000 employees (Bingsheng & Yijun, 2016). As of 2010, the annual revenue from broiler meat in China was around 3.84 billion dollars. China is ranked 1<sup>st</sup> in the world for largest chicken producers (World Knowing 2016). Nepal is very far behind India and China in terms of poultry production since Nepal is ranked 192 in the world. India and China have a large market and their giant poultry industries can sustain the country. Nepal is not large enough to compete in the regional market and would need to find a different country with a smaller poultry industry to export chicken meat.

### **Summary and Product Criticism:**

Egg incubators are not a cheap product to sell for use by an average family in a developing country like Nepal. Small egg incubators would help backyard family farmers but there would not be an abundance of meat to sell at the market. Since there is a 21-day hatching period and the incubators can only hold seven eggs at a time, the meat will most likely be beneficial to feed the family for the month. It is very unlikely that an average family will be able

to afford a medium or large incubator for backyard or rural farms higher in the mountains. Incubators need constant electricity in order to work, not possible in most parts of Nepal since there is no electricity. Cities like Kathmandu have electricity but continuously suffer from constant blackouts. The egg incubator would be an excellent purchase for Nepalese hatcheries since they have hundreds of eggs and a market to sell their product. Since they are industrial hatcheries they can afford to buy generators so blackouts are not a problem. Also heating light bulbs on the incubators need to be changed when they burn out along with other electrical parts. Industrial poultry farms can afford the extra cost in parts and potentially pay someone to fix the incubator. There are very little people in Nepal that are capable of fixing electronic machinery and it would be very hard to find spare parts for the incubator unless the farm is close to Kathmandu. Family farms in rural parts of the country will most certainly stay with the traditional way of hatching eggs and not consider purchasing an incubator. With expensive shipping cost and small market, it would not be worthwhile to constantly ship egg incubators to Nepal from Canada. If the industrial hatcheries wanted egg incubators, they could purchase it from a company in China which would be cheaper in manufacturing and shipping since China is right above Nepal.

### **Conclusion:**

In conclusion, egg incubators are beneficial on farms where there is no proper nesting for hens. The main parts of an incubator are a clear plastic window on the top for viewing the eggs, along with a heating lamp, a temperature gauge, a fan and shelves with plastic egg holders. The incubators can be very beneficial to the poultry sector in Nepal. They can increase the amount of chicken meat and egg being produced which will increase exports along with the country's GDP. Unfortunately, incubators are not cheap to purchase or ship and require constant electricity and spare parts. Industrial hatcheries would be the only real market for incubators since the average income is very low. Rural farmers would not be able to afford the incubator on their own and do not have electricity to run the incubator. It would not be beneficial to ship egg incubators from Canada to Nepal. Farmers will continue to hatch eggs with hens and not consider using the incubator.

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