

Egg Transportation in Nepal, Problem and Solutions

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The country of Nepal has numerous agriculture opportunities. By utilizing what already exists and improving methods, Nepal can become even more prosperous and develop a more sustainable agriculture system. In Nepal, approximately 80 percent of the farmers are subsistence farmers, growing enough food to meet the nutritional needs of their family. Many farmers plant multiple crops and have small numbers of various species of livestock and do not focus on a single one. This means that time and energy is not focused on egg production and egg transportation systems. Poultry and egg production in Nepal is on the rise due to religious acceptability of poultry meat and eggs (Dhaubhadel, 1992). Egg production in Nepal is small compared to neighboring China and India but has great importance for small Nepalese farmers. Most farmers in Nepal rear a small number of chickens around the homestead and the chickens consume feed consisting of a scavenging diet (Dhaubhadel, 1992). Over half of the egg production in Nepal (615 million eggs) is by non-commercial, small farmers that do not have easy access to egg cartons or trays for transportation to market (Banshi, 2010). When eggs are broken during transport, it is a waste of resources and decreases the efficiency in an already inefficient process. Large egg production systems are increasing in Nepal, but the sustainability of small production Nepalese farmers is very important to egg production in Nepal. For eggs to be transported without damage, egg trays or cartons are crucial. For farmers to have access to egg cartons or trays, they need to be economical, available and useable. Providing Nepalese farmers with egg cartons and trays can be achieved through two methods. The first method involves importing and distributing egg cartons or trays throughout Nepal. The second option is manufacturing egg cartons and trays in Nepal in either large or small scale operations. This paper will discuss the logistics of each method as well as the benefit to Nepal and exporting nations.

Only pulp egg cartons and trays will be discussed in this paper due to the many disadvantages of plastic egg cartons and trays. Plastic egg cartons and trays are not biodegradable, so if broken, they cause harm to the local environment. Also, a study from Thailand states that “drug-resistant strains of Salmonella may be spread on reusable egg trays”. This causes health and safety issues (Utrarachkij et al. 2012). Plastic egg trays also cost more and because Nepal is a cost sensitive market, plastic egg trays are out of the price range. Therefore, pulp egg cartons are the safest, easiest to produce and most beneficial for Nepal.

Large scale production farmers in Nepal have access to egg cartons and trays but many small production Nepalese farmers who really need them, are not getting them. The first option is to import egg cartons and trays from countries that can produce them efficiently. To benefit trade between Nepal and Canada, egg cartons could be made in Canada and exported to Nepal. Canada has many companies that manufacture egg cartons and trays that would be suitable for export. Wellington Wood Products from Mount Forest, Ontario manufactures one dozen egg cartons for 29 CAN cents per piece, but depending on the quantity ordered, this price could be reduced. Two thousand egg cartons fit on a skid and weigh approximately 275 pounds (Doug Hill WWP, personal communication, September 30, 2014). CKF incorporated manufactures egg cartons in Etobicoke, Ontario for 12 CAN cents per carton and 11 cents per carton if a container load is purchased (Ian Craig CKF, personal communication, November 6, 2014). Uline, a manufacturing company from Brampton, Ontario, manufactures egg trays that hold 30 eggs for 22 CAN cents per unit for paper trays and \$1.64 CAN dollars per plastic egg tray (Uline, 2014). The Canadian companies mentioned here can all produce large quantities of egg cartons or trays and have shipping logistics to export egg cartons or trays. Buying egg cartons or trays from a Canadian company would benefit the Canadian economy and would support economic growth.

Economic growth of those companies in Canada would support the Canadians working in the manufacturing plants and also the affected businesses. At the moment, no egg carton or tray exports from Canada are going to Nepal from these companies, and by exporting egg cartons or trays through them, new exporting possibilities could be developed. The companies exporting egg cartons or trays could export to Nepal, but could also compete in India and Asian markets because of larger market opportunities. If a new egg carton design was developed in Canada, the shipping networks would already be in place for Nepal and surrounding markets. Nepalese small farmers would also benefit because they would have access to egg cartons and trays to safely transport their eggs. The disadvantage of exporting egg cartons and trays from Canada is the expensive shipping costs. Shipping costs would include transportation from the Canadian manufactures to a Canadian port, ocean transport and transportation to Nepal from an Indian port. A Canadian shipping company would be needed to ship the egg cartons from various manufacturers to Canadian ports which would provide more economic benefit to Canada. As well as shipping costs, tariffs and taxes would also be applied. No exact cost for shipping was calculated because the exact weight and number of containers would have to be determined and as well, the cost would vary depending on the type of product. Ian Craig from CKF Incorporated stated that because the cost of egg cartons and trays are so cheap, the freight cost will end up costing more than the cartons themselves (Ian Craig CKF, personal communication, November 6, 2014). Although exporting egg cartons and trays from Canada would benefit Canadian manufacturers and Canadian transport companies, the egg cartons and trays would become too expensive for small Nepalese farmers. In theory, exporting egg cartons and trays would benefit both Canada and Nepal, but in reality, the cost disadvantage outweighs the benefits.

The second option of exporting egg cartons and trays to Nepal would be from Indian or Chinese manufacturers. Egg trays and cartons made in India or China are less expensive to produce than other places in the world because of cheaper input costs. A company from Guangxi, China, called Just-Tin, manufactures one dozen egg cartons in packs of 2,000 for 8 cents US per carton and egg trays for 30 eggs in packs of 1000 for 10 cents US per tray (Just-Tin, 2014). Another Chinese company called Anping County Baiyi Metal Wire Mesh Products Company manufactures egg trays in packs of 1,000 for 7.5 US cents per tray (ACBMWMP, 2014). Haiyue Wire Mesh Manufacturing & Trading Co., Ltd, an Indian company, manufactures egg trays in packs of 40,000 for 6.8 US cents per tray (HWMM, 2014). Exporting from China or India would economically benefit each country and produce a greater market for Chinese and Indian egg cartons and trays. Exporting egg cartons and trays from a variety of companies in China and India would not just benefit one company but multiple companies and their employees. Increased trading between Nepal and India or China would also open new trading opportunities between these companies and Nepalese farmers. Many of the companies listed make egg cartons and trays, as well as other products associated with egg and poultry production. By networking through egg cartons and trays, these companies could also supply Nepalese farmers with other products needed to more efficiently produce eggs. Shipping between India or China and Nepal already exists and the companies and shipping networks are already in place. Shipping companies like New York Cargo already operate in Nepal and ship between China and India (NYC, 2014). Also, shipping cost to Nepal is greatly decreased from India or China compared to Canada because the distance is much shorter and because products can be shipped by land instead of by water or air. Overall, exporting egg trays and cartons from

China and India is a viable option because they are less expensive to produce and the shipping cost is lower.

Exporting egg cartons and trays to Nepal provides benefit to Nepalese farmers as long as the farmers can actually access the egg cartons and trays. If an importing system were to be set up in Nepal, a crucial component of it would be in the form of a distribution center. For the highest benefit to Nepalese farmers, multiple distribution centers would be set up throughout farming regions of Nepal. The more distribution centers set up, the lower distance farmers would have to travel to get egg cartons and trays. The distribution center could become a new business for Nepalese entrepreneurs who want to help farmers by facilitating distribution of the egg cartons and trays. Multiple distribution centers could be independently owned and operated but linked to one larger distribution center that facilitates the importation of mass quantities of egg cartons and trays. By having one large distribution center supplying the smaller ones, it prevents price fixing and creates an equal price throughout Nepal. Great economic benefit could come to those operating the distribution centers as well as the overall Nepalese economy. The disadvantage to having distribution centers in Nepal is that it in turn increase the cost of the egg cartons and trays to Nepalese farmers, but is the only option to allow Nepalese farmers access to egg cartons and trays. Without distribution centers, Nepalese farmers would need to have a direct relationship with egg carton or tray manufacturers and would not be able to purchase and ship the desired amount.

In summary, importing egg cartons and trays from Canada would increase economic benefit for Canada and Nepal, but because of shipping costs, it puts egg cartons and trays out of the desired price point. A more reasonable approach would be to import egg cartons and trays from China and India because of the economic benefit to both countries and for future trade

opportunities. No matter where the egg cartons and trays are sourced from, some distribution system would need to be set up for Nepalese farmers to access egg cartons and trays. Figure 1 is a summary of the cost of egg cartons and trays.

Figure 1.

Comparison of Price Per Unit in Cents Between Canada, China and India

Canadian Company	Chinese Company	Indian Company
Wellington Wood Products Carton 29 ¢ CAN	Just-Tin Carton 8 ¢US	Haiyue Tray 6.8¢ US
Uline Tray 22¢ CAN	ACBMWMP Tray 7.5¢ US	
CFK Inc. Carton 11¢ CAN		

The other option, in contrast to importing egg cartons and trays, is to manufacture them in Nepal. There are many benefits to manufacturing egg cartons and trays in Nepal, but the main one is the direct boost to the local economy. Egg carton and tray production can be either a large or small scale operation. There is no manual tools for making egg cartons or trays, so regardless of the system, it has to be in an industrial setting.

A large production system would require a higher overall investment but would provide higher economic benefit. A pulp moulding egg carton or tray machine works by vacuum that pulls pulp fibers from a water mixture onto a steel mesh and then forms it into an egg carton or tray. The egg cartons or trays are then dried, and sometimes sprayed with chemicals to make them more durable. An option for manufacturing egg cartons in Nepal would be to import large production equipment from Canada. Emery Machines in Markham, Ontario sells and installs egg carton and tray production systems internationally. Machine suppliers would produce the

machine, transport it, install it and provide warranty services. A large production facility includes a large building that can process scrap paper products into pulp with a certain consistency, a rotary forming machine, a dryer and a packer. Exporting a production system from Canada would benefit the Canadian economy as well as the employees at Emery Machines. This would provide ongoing economic benefit in two ways. Firstly, Emery Machines fixes and repairs their own machines, so Canadian involvement in the project would continue after the sale. Secondly, if new technology is developed by Emery Machines in Canada, it could be installed in an existing Nepalese production facility in the future because the business network has already been established. Also, it would provide new trade between Canada and Nepal as a possibility for trade of other types of machines. Emery Machines specialize in large, high quality systems that run at maximum efficiency, wasting as little energy and water as possible. A production system from Emery Machines can produce up to 364 million egg cartons or trays per year (Emery International, 2014). The production system needs to be in a large building, close to resources like electricity, water, human resources and scrap paper. It would have to be in an urban setting where all of these are close by. Real estate would have to be purchased that would fit all the necessary requirements from Emery Machines. Nepal does not have enough egg production to utilize this large egg cartons or tray production capacity, but extra cartons or trays could be sold to Chinese and Indian markets. By having a large production facility, the cost per unit greatly decreases and savings could be passed on to the small Nepalese farmers. Getting the egg cartons and trays to small Nepalese farmers would require distribution centers, similar to the importing option. One problem associated with a large production facility is the start-up costs and the logistics of where and how to run it. The start-up cost for this system would be very high because the building, machines and maintenance would cost millions of dollars. To fund this project, a

business plan would have to be established concerning market evaluation and sourcing of inputs. Financial support would be needed from the Nepalese Government as well as the Canadian Government. A project of this size would also need private funding. Once a business plan was prepared, return on investment could be calculated to generate revenue for third party investors. Another large obstacle would be supplying enough scrap paper to make pulp. A large production system requires large amounts of paper. A study done by Asian Development Bank states that almost all municipalities in Nepal have no recycling collection at all but that 23% of commercial waste and 9% of household waste is paper that could be recycled (ADB, 2013). Figure 2 shows the distribution of household waste in Nepal.

Figure 2.

Comparison of Household Waste in Nepal



Most municipalities in Nepal do not collect waste paper or have any system in place to reuse waste paper (ADB, 2013). High quantities of waste paper and a large production system that would use large amounts of waste paper is a distinct advantage. Multiple business in India operate on the basis of collecting scrap paper and baling it to sell to pulp manufacturers. Another Nepalese entrepreneur could start a waste paper collection business and sell paper bales to the large production facility and also to other pulp manufacturers in China and India. These hidden

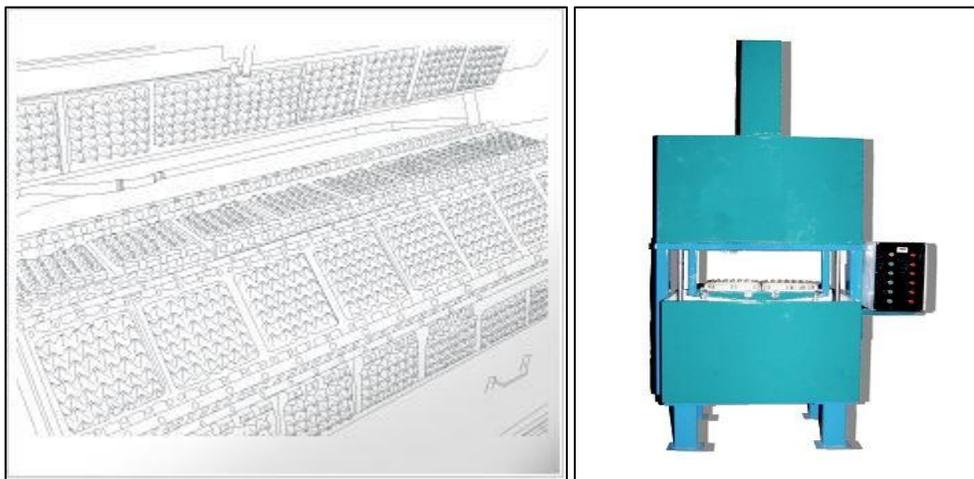
business opportunities associated with a large production facility could help to offset the initial cost. Also, an environmental assessment would need to be done before starting a large production facility project because of the large amounts of water and energy required. In conclusion, a large production facility would be a large project with high investment costs but with potentially high economic and social benefits for Nepal.

The other option, in contrast to a large production system in an urban setting, is multiple small production machines spaced throughout Nepal. A company from Taran, India called Leopak Industries manufactures a small production egg carton and tray machine. The small production machine produces 700 egg trays per hour or 2 million egg cartons per year at full capacity and costs only \$16,500 USD for the entire production system (Sukhraj Kairon, Personal Communication, October 3, 2014). The small production system works on the same basis as the large production system except that the large production system has a rotary pulp forming machine and the small production machine has a reciprocating forming machine. The entire production system includes a pulp forming machine, hydra pulper, agitators for the pulp tank, pulp pump, vacuum pump and an automatic water control system. The total energy needed for one system would be 35 horsepower or 26.11KW. One of the benefits of this small production system is that egg trays can be dried out in the sun on racks and don't need large high energy dryers. Each machine would require smaller amounts of water and scrap paper. A one metric ton bale of scrap paper would supply one small machine for a month. Each machine could be run by one or two Nepalese farmers or villagers working in a co-operative. Only one machine would be needed to service many farmers in one area. This would drastically reduce shipping costs into and throughout Nepal because the machines would be closer to the farms. The cheaper distribution cost would benefit the Nepalese farmers buying the egg cartons and trays as well as

the producer. Each small production machine could serve as a supplementary income for the Nepalese farmers involved. The difficulty with having the machine closer to the farmers is the ability to get inputs to the machine. Scrap paper, electricity and water would all have to be close to the proposed location of the production facility. Figure 3 shows both large and small production machines (Emery, 2014) (Sukhraj Kairon, Personal Communication, October 3, 2014). Figure 4 shows a professional quote from Leopack Industries on page 14.

Figure 3.

Large Rotary Machine from Emery and Small Machine from Leopack Industries



With the goal of benefiting small production Nepalese farmers, the advantages and disadvantages of each solution have to be weighted. Importing egg cartons and trays to Nepal is a lower initial cost and a lower risk option but does not benefit the Nepal economy in the long term and may not be sustainable. It would be better to keep the money in Nepal by making egg cartons and trays in Nepal. To benefit the Canadian

economy and Canada-Nepal trading networks a large production system installed by Emery machines would provide the most advantages for big business in Canada as well as big business in Nepal. The disadvantage to a large production system is that the focus on small production Nepalese farmers is lost. Because so much money and oversight is needed for such a large project like a large production facility, less could be focused on actually ensuring that small production Nepalese farmers have access to the egg cartons and trays. To benefit small production Nepalese farmers the most, the best solution is to import a few small production machines from India and have them spread throughout Nepal. This way the money stays with small production Nepalese farmers and the egg cartons and trays are closer to the farmers who need them.

For future trade with developing agriculture based nations, Canadian companies should invest time and money into producing small scale and efficient machines to make egg cartons and trays in places where transport is limited because of geographical challenges. Egg production has many benefits in contrast to other sources of protein and micronutrients and is important for developing nations. Producing egg cartons and trays close to farmers would provide economic benefit for both the host country and Canada. As agriculture develops in the host country, Canada would already have trade options open and would be ready to expand exports beyond just egg carton and tray making machines.

To accurately assess the egg transportation system in Nepal, more information is needed. Further research is needed to assess the accessibility of egg cartons and trays in Nepal as well as future requirements. If egg production is expected to rise in Nepal, it would affect the preferred option to get egg cartons and trays to Nepalese farmers. If

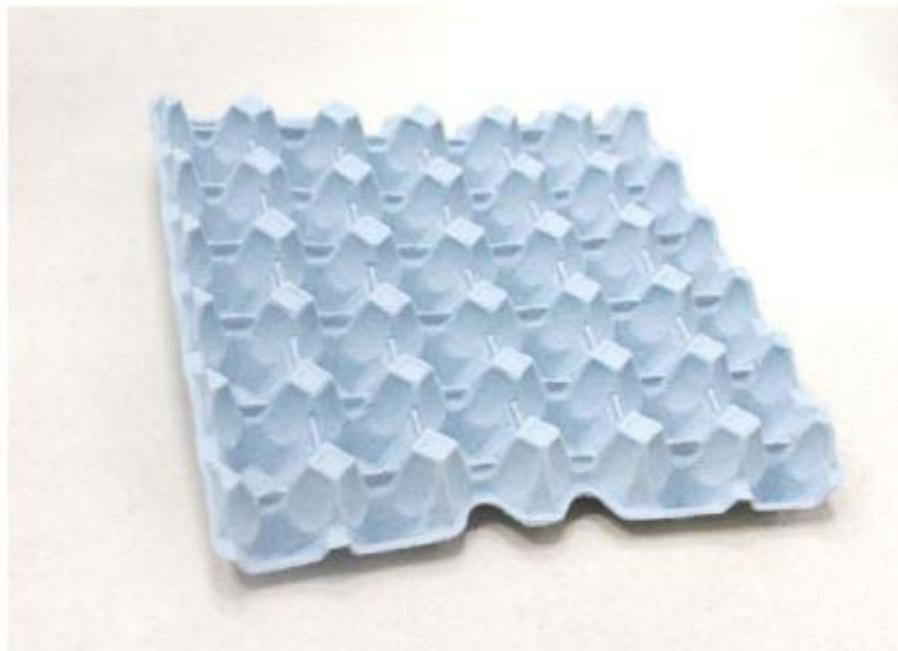
importing egg cartons and trays was the selected option, different shipping options would need to be analyzed. If multiple agriculture related products were needed in the same area, they could be shipped together reducing logistical issues. Also, potential locations for distribution centers would have to be researched. Distribution centers have to be accessible for most of the small production Nepalese farmers, as well as have access to a good transportation system. If a large production facility was the option selected, research would have to assess market demand and availability of inputs as well as start-up costs. If a small production facility was the option selected, research would have to locate optimal sites for facilities, as well as transportation accessibility. Most importantly, the research would provide evidence as to whether money and resources for this project could be better spent on other projects with a greater impact on small Nepalese farmers.

In conclusion, the two methods of getting egg cartons and trays to small production Nepalese farmers is to import and distribute them or to manufacture them in Nepal. There are advantages and disadvantages to both methods, and each provides different opportunities to exporting nations and to Nepal. The option that seems to provide the most benefit for Nepalese farmers and the Nepal economy is multiple small production machines. Evidently, more research needs to be done to assess the situation and to determine the best possible solution.

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EGG TRAY PLANT QUOTATION



LEOPACK INDUSTRIES
1-A, FOCAL POINT, TARN TARAN-143401(PB.) INDIA
PH. +91-98882-04945; +91-98720-12922 +91-1852-222922
EMAIL: suhrajkairon@gmail.com; info@eggtrayindia.com

EGG TRAY PLANT QUOTATION**(CAPACITY 700 EGG TRAYS PER HOUR)**Date : 03-10-2014
Q. No : 2014100301**Martin Metzger**
NEPAL.

Dear Sir,

Thank you very much for your above referred inquiry. We are pleased to submit quotation as per your requirement:

Machine: Complete Egg Tray Plant**Molding Machine Type:** Reciprocating**Platen Size:** 400mm x 800mm**Capacity:** 700 egg trays/hour**Price:** Rs. USD 16800 (Ex. factory)**Offer Validity:** 30 days from date of quotation**Technical Details:** As per sheet attached

We await your valuable order.

LEOPACK INDUSTRIES.

TECHNICAL DETAILS

S. NO.	MACHINE DESCRIPTION	QUANTITY
1.	Pulp Molding/Forming machine (Capacity 700 egg trays/hour) with SS pulp tanks	1 UNIT
2.	Hydra Pulper fitted with EN-8 shaft, SS screen, including motor.(Body of pulper made on sight, in RCC)	1 UNIT
3.	Agitators for Pulp tanks, complete with reduction gearboxes, MS shafts, SS blades and motors (Pulp tanks to be made on sight in RCC)	2 UNITS
4.	Pulp Pump with 3 HP motor	1 UNIT
5.	SS pulp valves	3 UNITS
6.	Vacuum pump (parts coming into contact with water made of SS), with motor, Vacuum tank and Silencer	1 UNIT
7.	Monoblock pump set 3HP with automatic water control system (for discharging water from vacuum tank)	1 UNIT

POWER LOAD

S. NO.	MACHINE	POWER LOAD
1.	PULPER	10 HP
2.	VACUUM PUMP	7.5 HP
3.	AIR COMPRESSOR (Not Included)	7.5 HP
4.	PULP PUMPS	2 HP
5.	GEARBOX FOR AGITATORS (2HPX2)	4 HP
6.	MONOBLOCK PUMP	2 HP
7.	TUBEWELL (NOT INCLUDED WITH MACHINE)	2 HP
	TOTAL INSTALLED LOAD	35 HP or 26.11 KW

EGG TRAY PLANT QUOTATION | LEOPACK

CONSUMPTION DATA :

PRODUCTION CAPACITY	700 EGG TRAYS/HOUR
AVERAGE WEIGHT OF TRAY	70 GMS
ELECTRICITY CONSUMPTION	22 KWS/HOUR
WASTE PAPER	50 KG/ HOUR
DIRECT LABOUR REQUIRED	4 PERSONS PER SHIFT

TERMS & CONDITIONS:

Scope of Supply: Ex Works

Delivery: Within 4 weeks on receipt of firm order with advance

Warranty: One year for all manufacturing defects from date of supply

Installation Charges: To be paid by buyer including travelling, lodging and food expenses of engineers.

Payment: 35% advance with firm order, balance at time of delivery

Exclusions: All Civil work, RCC pulp tanks, RCC pulper body, Molds, Air Compressor, excluded.

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