

Canada-Nepal Export Report: Poultry Identification Leg Bands

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PART I: PRODUCT INFORMATION:

Introduction of Product

Poultry leg bands are a product used to establish an identification program, which will be investigated for export to Nepal. The bands can be sized to fit native and exotic poultry species at all life cycle stages. The use of an identification system will benefit hatcheries, broiler, and layer farms throughout all regions of Nepal. This paper will investigate two different Canadian companies, which distribute leg bands and provide a thorough cost analysis of the products and shipment logistics from Canada to Nepal. This paper will critically analyze benefits of implementing leg bands into the Nepal poultry industry and to assist in the improvement of the Nepalese agriculture sector.

Description of Companies:

Berry Hill Limited is based out of St. Thomas, Ontario, which is located two hours south west of Toronto (Berry Hill Limited, 2014). The company has been a distributor of a variety of farm and outdoor supplies across Canada and worldwide for over 60 years (Berry Hill Limited, 2014).

Ketchum Manufacturing Inc., is a globally recognized Canadian livestock identification product company (Ketchum Manufacturing Inc., 2014). Since establishment in 1913, the production of livestock identification tags has increased to be the primary product sold by Ketchum. The company currently operates out of Brockville, Ontario and is competitive within the majority of international markets (Ketchum Manufacturing Inc., 2014).

	Company 1: Berry Hill Limited	Company 2: Ketchum Manufacturing Inc.
Number of Employees	8	50
Total Sales (CAN)	\$1,000,000-\$4,999,999	\$5,000,000-\$9,999,999
Export Sales (CAN)	\$1-\$99,999	\$1,000,000-\$4,999,999

Figure 1: A brief comparison between both companies in terms of number of employees and total sales and export sales. Information retrieved directly from Government of Canada – Industry Canada – Canadian Company Capabilities webpage with some modifications.

Description of Product(s):

Berry Hill Limited offers adjustable aluminum identification leg bands with fold over tabs for security. The bands come in four different sizes and are priced at \$17.99 for 100 bands with visible, engraved numbers (Berry Hill Limited, 2014).

Ketchum Manufacturing Inc. also offers aluminum leg bands, which are manufactured with an open button at one end and a hole at the opposite end. Specifically, the No.3 Adjustable Band is a three-hole band that can be adapted for the use of many avian species (See **Appendix B**) (Ketchum Manufacturing Inc., 2014). The holes are 79 mm by 10 mm wide with space to add extra holes (Ketchum Manufacturing Inc., 2014). Three initials or a short name can be stamped onto the aluminum or a longer name, address, or trademark can be stamped onto the material with a special dye at an additional cost (Ketchum Manufacturing Inc., 2014). The pricing differs in terms of quantity and detail, that is, having alphanumeric identification stamped on the band (See **Figure 2a**). It should be noted that application pliers from Ketchum are strongly recommended, at an additional cost. (Ketchum Manufacturing Inc., 2014).

Another option from Berry Hill Limited involves plastic leg bands that come in a variety of sizes and colours (See **Appendix A**). The bands are a spring clip, plastic celluloid material that retains their shape to fit a variety of avian species. (Berry Hill

Limited, 2014). Prices range from \$5.45-\$7.99/package of 50 single colour bands (See **Figure 2b**) (Berry Hill Limited, 2014). It should be noted that the durability of the plastic bands are less resilient after multiple uses than the aluminum bands, which are guaranteed to last through numerous uses (K. Fox, Personal Communication, September 29, 2014).

The Ketchum plastic spiral leg bands have many similarities to the Berry Hill Limited design. These bands are sized from 1/4" in diameter up to 1" in diameter and are priced from \$116.00/1000 bands to \$167.00/1000 bands (See **Figure 2b**) (Ketchum Manufacturing Inc., 2014). The leg bands come in ten different coloured plastic rods that are robust and flexible with a full lap attachment (Ketchum Manufacturing Inc., 2014).

A third option includes Ketchum's poultry neck tags, which is a highly customizable method for identification and strongly recommended for use in Nepal (K. Dalrymple, Personal Communication, September 29, 2014). The poultry tags can be applied to a day old chick and have exceptional retention for 12-16 weeks (K. Dalrymple, Personal Communication, September 29, 2014). The tags could have an official logo applied to certify that they passed inspection processes (Dalrymple, 2014). The plastic tags come in sizes 1-5/8" x 5/8" and can display alphanumeric lettering (Ketchum Manufacturing Inc., 2014). Tags are produced in a variety of colours and require a gun applicator for attachment to the skin fold of a chick (Ketchum Manufacturing Inc., 2014). The tags are produced on site with a fast turn around time, thus, affordably priced at \$85.10/1000 tags with an additional cost of \$26.30 for the applicator gun (See **Figure 2c**) (Ketchum Manufacturing Inc., 2014).

	Company 1: Berry Hill Limited	Company 2: Ketchum Manufacturing Inc.		
Product 1	No. 3 Adjustable Aluminum Bands – sizes 9/16”, 5/8”, 11/16”, and 3/4” inside diameter **Qualify for free shipping	Aluminum Bands		
Price (CAD)	\$17.99/100 bands 1 band = \$0.17 100 orders of 100 bands=10,000 bands = \$1,799	# of Bands	#’s Engraved Only	#’s and Letters Engraved
		100	\$45.16	\$80.95
		500	\$85.35	\$117.80
		1000	\$110.50	\$139.25
		**K12 Leg Band Plier: \$43.35		
		10,000 bands (#’s only) = \$1,105 10,000 bands (#’s and letters) = \$1,392.50		

Figure 2a: A price comparison of aluminum bands between the two companies. If 10,000 bands were to be shipped to Nepal, the cheapest product would be the numeric engraved bands from Ketchum priced at \$1105 *before* tax and transportation costs. Prices retrieved from Berry Hill Limited and Ketchum Manufacturing Inc. official webpages.

	Company 1: Berry Hill Limited			Company 2: Ketchum Manufacturing Inc.		
Product 2	Spiral Leg Bands **Qualify for free shipping **Quantities of 50 bands			Plastic Spiral Leg Bands **Quantities of 1000 bands		
Price (CAD)	Size (inside diameter)	Price	Price/10,000 bands	Size (inside diameter)	Price	Price/10,000 bands
	1/4"	\$5.45	\$1090	1/4"	\$116.00	\$1160
	5/16"	\$5.45	\$1090	5/16"	\$119.00	\$1190
	3/8"	\$5.65	\$1130	3/8"	\$122.00	\$1220
	7/16"	\$5.65	\$1130	7/16"	\$126.00	\$1260
	1/2"	\$5.99	\$1198	9/16"	\$131.00	\$1310
	9/16"	\$6.19	\$1238	11/16"	\$137.00	\$1370
	5/8"	\$6.25	\$1250	3/4"	\$144.00	\$1440
	11/16"	\$6.25	\$1250	7/8"	\$167.00	\$1670
	3/4"	\$6.40	\$1280	1"	\$174.00	\$1740
	7/8"	\$7.29	\$1458			
1"	\$7.99	\$1598				

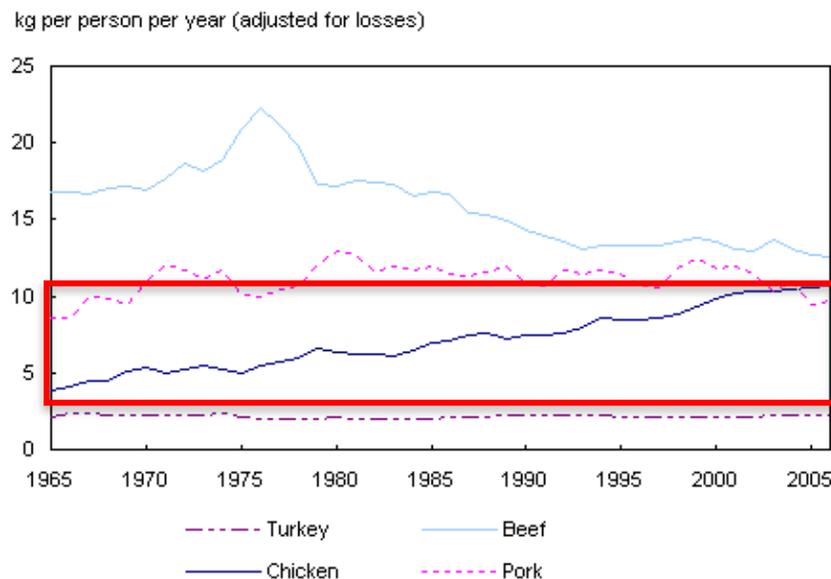
Figure 2b: A price comparison of plastic bands from Berry Hill Limited and Ketchum Manufacturing Inc. If 10,000 bands were being shipped to Nepal, Ketchum Manufacturing Inc. would be more cost efficient according to the above price comparisons *before* tax and transportation costs. Prices retrieved from Berry Hill Limited and Ketchum Manufacturing Inc. official webpages.

	Company 2: Ketchum Manufacturing Inc.
Product 3	XKT-2951-066 Versatile Plastic Neck Tags **Minimum order of 5000 tags ** Recommended 895BB-149 Applicator Gun priced at \$26.30
Price (CAD)	1-5/8" x 5/8" = \$85.10/1000 tags \$425.50/5000 tags \$851.00/10,000 tags

Figure 2c: Pricing of Ketchum Manufacturing Inc. plastic neck tags. Out of all the products, this would be the cheapest product *before* tax and transportation costs. Prices retrieved from the official Ketchum Manufacturing Inc. webpage.

Brief Description of the Poultry Industry in Canada:

The poultry industry in Canada is a thriving business combining meat and egg production of broilers, layers, turkeys, ducks, and geese (Agriculture and Agri-Food Canada, 2013). In 2013, 2.4 billion dollars of chicken products contributed to 4.5% of farming cash receipts (Agriculture and Agri-Food Canada, 2013). In 2013, 533,000 kg of meat per poultry farm was produced and provided to supermarkets, restaurants, fast-food chains, hotels, and other institutions (Agriculture and Agri-Food Canada, 2013).



Source: Statistics Canada, CANSIM, table 002-0011.

Figure 3: Amount of turkey, chicken, beef, and pork consumed by Canadians from 1965-2005 retrieved directly from Statistics Canada. As shown above, chicken consumption has had relatively consistent growth with few fluctuations.

Uses in Canada:

The use of poultry identification bands within Canada is to primarily enhance biosecurity and livestock management practices (Agriculture and Agri-Food Canada, 2011).

According to Agri-Food Canada, knowing the exact location of livestock/poultry and having an outlined procedure to contact operators, producers, or owners is a fundamental

aspect to having an efficient, accurate, and cost effective response to animal epidemics or food safety issues. In Canada, the poultry identification program is a way to reduce response times and act efficiently in a case of disease. Another benefit of the program is identifying any animal at any given point within the supply chain (Agriculture and Agri-Food Canada, 2013; Agriculture and Agri-Food Canada, 2011).

Manufacturing Information of the Product:

Currently, there are no leg band manufacturing markets known in Canada. At Berry Hill Limited, products are manufactured in the United States before being exported to Canada for selling (K. Fox, Personal Communication, September 29, 2014). A small quantity of products from Ketchum Manufacturing Inc. are manufactured directly on site, yet, similar to Berry Hill Limited, most of the products are purchased in the USA, then shipped back to Canada (K. Dalrymple, Personal Communication, October 2, 2014). Both companies were unable to disclose USA manufacturer names and contact information due to confidentiality and liability purposes.

Inputs Required:

The aluminum bands are sourced from rolled aluminum material that is a specific hardness and width (K. Dalrymple, Personal Communication, November 5, 2014). Much of the smelting of aluminum occurs in Canada because of the large, affordable amounts of available electricity (Chevalier, 2006). Recycled aluminum could be used to manufacture leg bands as an environmentally friendly, cost-efficient approach. Thus, if Canadian-produced aluminum could be utilized to produce identification bands, not only would the USA-Canadian dollar conversion be avoided, but shipping and handling fees to export to another nation would be reduced.

The spiral plastic bands are made out of coiled pieces of sturdy, resilient plastic (Berry Hill Limited, 2014; Ketchum Manufacturing Inc., 2014). If Canada were to open a manufacturing market, using recyclable plastics for the production of these leg bands, is a cost effective and environmentally sustainable approach for the manufacturing process.

Machinery Required:

For the production of the aluminum bands, a large, 40 tonne punch press is required (K. Dalrymple, Personal Communication, November 14, 2014). This press needs to be equipped with dyes to punch out a specific shape and bend the material (K. Dalrymple, Personal Communication, November 14, 2014). The press must contain a numbering head to stamp numbers and letters onto the tag (K. Dalrymple, Personal Communication, November 14, 2014).

For the production of neck tags, the tags are first coloured with dyes and then printed with an ink jet printer. Following this process, they are punched out using the same 40 tonne press required for the aluminum bands (K. Dalrymple, Personal Communication, November 14, 2014).

The spiral bands are produced using a plastic injection machine, which cuts and shapes the plastic (K. Dalrymple, Personal Communication, November 14, 2014).

One operator is required for each of the following machines: the punch press, ink jet printer and plastic injection machine. (K. Dalrymple, Personal Communication, November 15, 2014).

Market Opportunity and Benefits to Canada:

The Canadian manufacturing share of any production activity has been steadily declining over recent years (Stat Canada, 2012). A specialized service, such as leg band manufacturing, prevents on site mechanization and instead increases employment in other areas of the company (Stat Canada, 2012). Society values education, health care, and financial amenities more than manufactured products, thus, it can be difficult to open new manufacturing markets within Canada (Stat Canada, 2012). However, if a Canadian business, such as the leg band companies, can have access to certain foreign export markets with free trade agreements, it can ease the process of opening new markets with more opportunity to profit (Government of Canada, 2012).

By opening a manufacturing market in Canada, it would create new jobs at the manufacturing company, the aluminum refineries, and the plastics company where the inputs for the bands are sourced. Overall, this would help to stabilize the Canadian economy and create more jobs for Canadian citizens.

By developing this marketing project, it would emphasize the importance of aiding producers in the agriculture industry not only in Canada but also in underdeveloped countries.

PART II: EXPORT POTENTIAL TO NEPAL**Brief Description of Nepal:**

Nepal is a small country located in Asia that is landlocked between India and the Tibet Autonomous Region of China with the capital city being Kathmandu (Proud, 2013).

Nepal has a population of over 27,227,000 individuals and is one of the poorest, under-developed countries in the world (World Bank, 2014).

Nepal is divided into three distinct regions: the Terai, the hill-mid hill regions consisting of the Churia foothills and Inner Terai area, and the Himalayan mountains (Proud, 2013). The Terai region is the richest area for farming land, making it densely populated (Proud, 2013). The Terai connects to the marshy grasses of the foothills, which are ideal for food grains cultivation (Proud, 2013). Much of the country is made up of the mountainous region from the river plain of the Ganges to the tallest peak of Mount Everest, which make transportation and farming a challenging task (Proud, 2013).

Agriculture in Nepal contributes to over 39% of the GDP; thus, it is an occupation individuals heavily rely on for income (Government of Nepal Ministry of Agriculture Development, 2014). Development and growth of the agriculture sector in Nepal is fundamental to help sustain the economy and decrease food hunger and poverty (Government of Nepal Ministry of Agriculture Development, 2014).

Brief Description of the Poultry Industry in Nepal:

The poultry industry in Nepal is increasing at an annual rate of greater than 4.25% (Dhabhadel, 1992). This industry is composed of 20% exotic breeds including the New Hampshire, Rhode Island Red, White Leghorn, Black Minorca, and the Australorp, while 80% of the poultry population is made up of the native Sakini breed (Dhaubhadel, 1992). The exotic breeds are reared and managed under an intensive system close to cities and established markets (Dhaubhadel, 1992). In contrast, the majority of farmers rear the Sakini breed close to the homestead within scavenging or semi-scavenging systems (Dhaubhadel, 1992). These birds are free to roam allowing farmers to spend minimal

time and money raising them. The majority of production is concentrated in Terai and city areas, while consumption occurs in the hill and mountain regions due to unfavourable farming land (Dhaubhadel, 1992).

Needs and Benefits to Importing Nation:

It is imperative that Nepal increases productivity to meet the rising demand of poultry production within all sectors of the industry. By implementing the use of leg bands, it could provide jobs for Nepalese individuals to track birds throughout the supply chain, inspect bird health, and aid in the management of poultry farms.

In Nepal, Foot and Mouth Disease and Avian Influenza are two pathogenic diseases that can spread to humans causing major economic losses in rural communities (Neupane et al., 2012). Specifically, in 2003, the total number of cases compared with outbreaks of certain diseases reported in all prone species for Avian Influenza and Foot and Mouth Disease were greater than 12/1966 and 57,076/2078 respectively (Food and Agriculture Organization of the United Nations, 2005). The most recent outbreak of Avian Influenza in Nepal occurred on February 13, 2014 (PHAC, 2014). If Nepal could implement the use of identification bands, they could foster a similar biosecurity process to that of Canada and reduce response times in the case of an epidemic.

With over 3.3 million layers and 6.4 million broilers, there is a huge opportunity to increase the quality and quantity of meat and eggs, which are exported to nearby countries through implementing the use of leg bands. By applying an identification system, it will intensify the importance, awareness, and actual practice of poultry health amongst Nepalese farmers (Dhaubhadel, 1992).

It is important for the poultry industry to have a reliable tracking system so all birds can be traced back to the original owners to maintain food security and prevent any criminality between farms. Although in an intensive practice, the birds are kept in enclosed housing, in the scavenging and semi-scavenging production systems, the birds are free-range, emphasizing the need for leg bands to help identify a particular farmer's flock (Dhaubhadel, 1992).

	Number of birds	Meat Production (mt)	Egg Production	Average egg production per hen per year
Total poultry birds	6,472,675	2,871	-	-
Layers	3,311,491	-	265,451,000	80
TOTAL	9,784,166	2,871	265,451,000	80

Source: DFAMS (1988)

Figure 4: Total poultry meat and egg production in Nepal. Table retrieved directly from the FAO Corporate Document Repository.

Transportation Logistics:

Company 1: Berry Hill Limited	Company 2: Ketchum Manufacturing Inc.
From St. Thomas, ON → Pearson International Airport, Mississauga, ON via FedEx: **25 boxes containing 10,000 bands each, 1.5 lbs/box, 44 cm x 28 cm x 28 = 250,000 leg bands total <u>Transportation Charges:</u> Base Rate: \$216.25 <u>Additional Charges:</u> Fuel Surcharge: \$14.00 Canada Ontario Harmonized Sales: \$29.93 = \$260.18	From Brockville, ON → Pearson International Airport, Mississauga, ON via FedEx: **25 boxes containing 10,000 bands each, 1.5 lbs/box, 44 cm x 28 cm x 28 = 250,000 leg bands total <u>Transportation Charges:</u> Base Rate: \$242.50 <u>Additional Charges:</u> Fuel Surcharge: \$15.75 Canada Ontario Harmonized Sales: \$33.57 = \$291.82
From Pearson International Airport, Mississauga, ON, CAN → Tribhuvan International Airport, Kathmandu, NP via UPS Air Freight Consolidated: <u>Quantity:</u> 25 loose items <u>Dimensions:</u> 44 x 28 x 28 cm <u>Weight (each):</u> 1 kg <u>Actual Weight:</u> 25 kg <u>Dimensional Weight:</u> 144 kg <u>Billable Weight:</u> 144 kg = \$520.88 CAN	From Pearson International Airport, Mississauga, ON, CAN → Tribhuvan International Airport, Kathmandu, NP via UPS Air Freight Consolidated: <u>Quantity:</u> 25 loose items <u>Dimensions:</u> 44 x 28 x 28 cm <u>Weight (each):</u> 1 kg <u>Actual Weight:</u> 25 kg <u>Dimensional Weight:</u> 144 kg <u>Billable Weight:</u> 144 kg = \$520.88 CAN
GRAND TOTAL: \$781.06	GRAND TOTAL: \$812.70

Figure 5: *Estimated costs of transportation involved in shipping the leg bands to Nepal. Berry Hill Limited is slightly cheaper since it is closer to Pearson International Airport. Quotes directly sourced from FedEx and UPS.*

Once the poultry identification leg bands reach Nepal, Eastern Cargo Movers Pvt. Ltd., a shipment trucking company located in Tis Hazari, Delhi will transport the packaged product directly to smallholder farms, rural markets, and/or farming supply stores. If transportation routes are not feasible, horses or people with carts or small wagons could be used to transport this commodity to the farms/markets in the rougher terrain areas. This would also be an opportunity to provide transportation jobs to Nepalese individuals.

A direct quote would be required to estimate shipping costs from Kathmandu to the final destination.

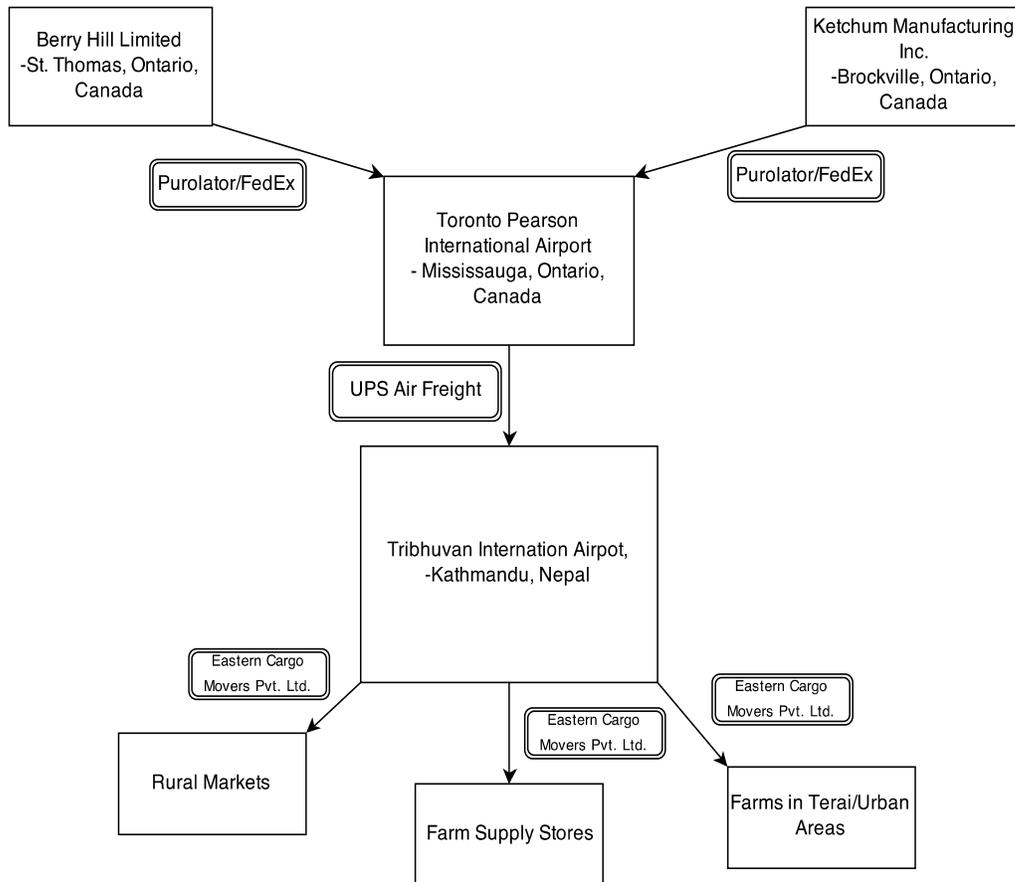


Figure 6: Transportation flow chart of planned shipping route with listed companies.

Import/Export Documentation Required:

Documentation Required for Import Clearance	Documentation Required for Export Clearance
<ul style="list-style-type: none"> • Nepal custom import declaration form. • Letter of authority for clearing agents to act on behalf of the importer. • Air way bill. • Performa Invoice. • Packing list. • Certificate of origin (this is required only for tariff concession for goods originating in Tibet Autonomous Region of People’s Republic of China, SAPTA member countries and MFN rate of countries having bilateral agreements with Nepal). • Certificate of Insurance Policy. • Foreign Exchange Declaration Form of Nepal Rastra Bank. • Certified copy of L/C. • Company registration certificate. • VAT/PAN registration certificate. • Import license if applicable. <p>*All the above documents except three and additional following documents are required to import for third country by sea:</p> <ul style="list-style-type: none"> • Bill of lading. • Custom transit declaration. • Transit declaration invoice for good it transit in India/Bangladesh for import from third country. 	<ul style="list-style-type: none"> • Customs Declaration Form • Packing List. • Certificate of Origin. • GSP Certificate if applicable • Copy of letter of credit or advance payment statement received from the bank. • Foreign Exchange declaration Form of Nepal Rastra Bank. • Copy of Firm/company Registration Certificate. • Copy of income tax registration certificate or VAT registration • Airway bill • Letter of authority to clear the consignment • Phytosanitary Certificate for agricultural products/plants • Certificate of origin from local chamber of commerce <p>*All the above documents except the airway bill and additional following documents are required for export to third country by sea/land:</p> <ul style="list-style-type: none"> • Transport manifesto, one copy per truck (for sea cargo) • Custom transit declarations (for sea cargo) • Transit declaration invoice for goods in transit via India/Bangladesh to third country destination. (For sea cargo).

Figure 7: The above table lists all the applicable documentation that is required for import/export into/from Nepal. An importing license is not required to ship products into Nepal. This chart was retrieved and modified from the Nepal Freight Forwarders Association (NEFFA) website.

Regional and Global Competition:

The majority of the regional competition occurs within China. The providers of the leg bands are primarily located on the mainland of Guangdong, which is roughly 2967 km from Nepal.

The 2014 New Style Crown Poultry Leg band was amongst the first of four products examined from the China-based markets. The first band is manufactured at Dongguan Tangxia Yuzhu Plastic Products Factory, located in Guangdong, China (Dongguan Tangxia Yuzha Plastic Products Factory, 2013).

The bands are made of eco-friendly aluminum and plastic material that can have letters or a drawing stamped onto the surface for easy identification (Dongguan Tangxia Yuzha Plastic Products Factory, 2013). These bands come in a variety of colours and sizes and are packaged in quantities of 100 pieces, 1000 pieces, or 10,000 pieces (Dongguan Tangxia Yuzha Plastic Products Factory, 2013).

The second product is manufactured at Dongguan Dalang Geshifeng Hardware Products Factory. This company manufactures pigeon rings and bird bands that are exported internationally (Dongguan Dalang Geshifeng Hardware Products Factory, 2013). The bands can be packaged in a small bag of 100 pieces or a carton containing 10,000 pieces (Dongguan Dalang Geshifeng Hardware Products Factory, 2013). The band has an inside diameter of 9-21 mm and an outside diameter of 24 mm (Dongguan Dalang Geshifeng Hardware Products Factory, 2013).

The plastic bands make use of Radio Frequency Identification (RFID) technology and support ISO 11774 animal tracking data standards and 11785 animal tracking electrical standards (Dongguan Dalang Geshifeng Hardware Products Factory, 2013). Each band

has a TK 4100 chip with a memory capacity of up to 2048 bits inserted into the band, which is then connected to database software (Dongguan Dalang Geshifeng Hardware Products Factory, 2013). Canada has adopted this technology for an efficient and accurate method of tracking birds within large poultry operations (RFID Canada, 2014). Although it may not be currently feasible in Nepal to make use of RFID technology, it could be a long-term goal in the future to implement a reliable and organized system similar to that in Canada.

The third kind of band is manufactured in Guangdong and is called Top Quality All Size Poultry Foot Rings. These bands are made with durable aluminum and come in a variety of colours. The bands are sized from an inside diameter of 2 mm-28 mm (Shenzhen Geshifeng Technology Co. Ltd., 2013). The bands can have letters, a drawing, or the year stamped onto the surface (Shenzhen Geshifeng Technology Co. Ltd., 2013). Similar to the above products, the bands can come in quantities of 100 pieces or up to 10,000 pieces (Shenzhen Geshifeng Technology Co. Ltd., 2013).

The fourth and final product investigated from China is the 2014 Personalized Poultry Leg Band made of high quality plastic material. The bands come in a variety of colours and can have a telephone number or name engraved onto the band using laser technology (Dongguan Dalang Geshifeng Hardware Products, 2013). These bands come in sizes of 5.5-16 mm inside diameter (Dongguan Dalang Geshifeng Hardware Products, 2013). The bands come in packages of 100 or 1000 pieces or a carton of 10,000 pieces (Dongguan Dalang Geshifeng Hardware Products, 2013). This product is also manufactured at Dongguan Dalang Geshifeng Hardware Products factory in Dongguan City (Dongguan Dalang Geshifeng Hardware Products, 2013).

Brand of Leg Band	Cost (CANADIAN)		Cost (NEPALESE RUPPEE)	
2014 Style Crown Poultry Leg Band	1 piece	\$0.34	1 piece	30.04 NR
	100 pieces (min. order)	\$34	100 pieces (min. order)	3003.75 NR
	1000 pieces	\$340	1000 pieces	30037.48 NR
	10000 pieces	\$3400	10000 pieces	300374.81 NR
Poultry Leg Bands for Duck/Chicken	1 piece	\$0.52	1 piece	45.94 NR
	100 pieces (min. order)	\$52	100 pieces (min. order)	4593.97 NR
	1000 pieces	\$520	1000 pieces	45939.68 NR
	10000 pieces	\$5200	10000 pieces	459396.77 NR
Top Quality All Size Poultry Foot Rings	1 piece	\$0.56	1 piece	49.47 NR
	100 pieces (min. order)	\$56	100 pieces (min. order)	4947.35 NR
	1000 pieces	\$560	1000 pieces	49473.50 NR
	10000 pieces	\$5600	10000 pieces	494734.98 NR
2014 Personalized Poultry Leg Band	1 piece	\$0.18	1 piece	15.90 NR
	100 pieces (min. order)	\$18	100 pieces (min. order)	1590.22 NR
	1000 pieces	\$180	1000 pieces	15902.20 NR
	10000 pieces	\$1800	10000 pieces	159021.96 NR

Figure 8: Comparison of prices (in both the Canadian and Nepalese currency) between four poultry leg band products manufactured in China. Note: The costs listed above are *before* associated tax and transportation costs.

PART III: FUTURE STUDIES AND CONCLUSIONS:

Unknowns/Future Studies:

Through this critical analysis of poultry identification leg bands, future studies will be required to draw further conclusions and keep prices up-to-date. First off, the costs, models, and manufacturing details of the 40 tonne press, ink jet printer, and plastic injection machine used to produce the aluminum and plastic bands and neck tags will be needed in order to establish a manufacturing market in Canada.

Patent/tariff information was unable to be acknowledged for the products identified in this paper. Further research into the patent program in Canada will be needed for accurate price points. Further study of any trade subsidy barriers for import/export into/out of Nepal will also have to be investigated using economic principles.

Finally, it is recommended that an in depth analysis of Canadian Government or International Loan/Grants Programs be carried out to help financially aid producers in Nepal who will be using the products.

Conclusions:

With a lack of national policy, improvement has been difficult to achieve amongst the poultry industry in Nepal (Dhaubhadel, 1992). This paper has provided an in-depth analysis of the potential to export poultry identification leg bands from Canada to Nepal. Exporting these products will benefit the Canadian agriculture sector through increasing revenue, expanding the trade market, and providing new job opportunities. Identification bands offered by Berry Hill Limited and Ketchum Manufacturing Inc. may be the first step towards increasing national food security, enhancing biosecurity, and inaugurating new opportunities for research at Nepalese colleges and universities. Increasing

productivity amongst poultry farmers will, in turn, open up new markets and create new job opportunities for Nepalese men, women, and young people.

Although implementing the Canadian practice of identifying poultry species is being recommended to the Nepalese poultry industry, in order to successfully help under developed countries, *adapting* to their systems is crucial to help advance and improve techniques and procedures. Trade between Canada and Nepal will emphasize the importance of sustainable agriculture practices to combat world hunger and poverty in developing countries.

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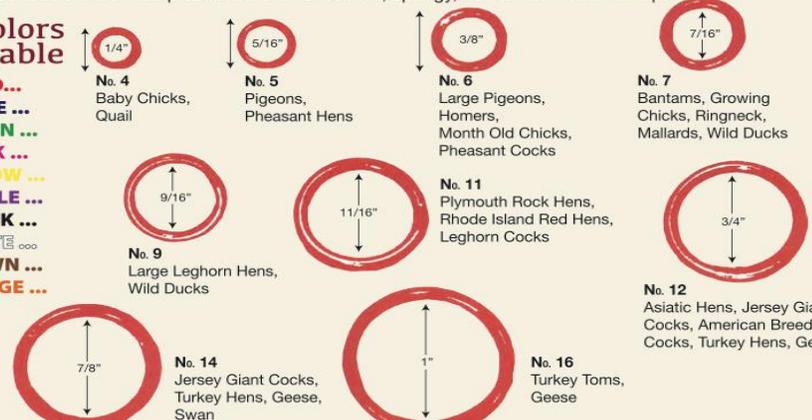


Leg Band Size	Physical Size	Fits
SP4	1/4"	Baby chicks, Small Pigeons, (Squabs, Archangels, Nuns, Tipplers, Rollers, Turbets, Fantails), Doves, Pheasants (1 day-8 days), Adult Quail (large breeds)
SP5	5/16"	Female Pheasants (adult golden & fancy breeds), Medium Pigeons (Homers & Tumblers), Wild Ducks (1 day-6 weeks), Wild Geese (1 day - 4 weeks), Blue Winged Teal, Wood Duck, Hungarian Partridge
SP6	3/8"	Ringneck Pheasant (adult female), Wild Ducks (6 weeks-adult), Wild Geese (4-10 weeks), Ruffed Grouse (female), Chukkar, Gadwell Ducks, Pintail Ducks, Prairie Chickens, Chinese Pheasants, Large Pigeons (Show Homers, English Carriers, English Pouters, Kings)
SP7/BN7	7/16"	Bantams, Pheasants (males, all breeds), Largest Pigeons, Mallard Ducks, Sage Grouse (female), Peacock Pheasant, Pintail Ducks, Ruffled Sage Grouse (male)
SP8	1/2"	English Call Ducks, Sage Grouse (male), Peahens, Chinese Pheasants, Large Ringneck Pheasant (male)
SP9/BN9	9/16"	Leghorns, Games, Ancona, Silke, Domestic Ducks
SP10	5/8"	Minorcas, Wyandotte (hens), Peacocks, Wild Turkeys (female)
SP11/BN11	11/16"	Rock Hens, Wyandotte (male), Rhode Island Red (hens)
SP12/BN12	3/4"	Canada Geese (female), Wild Geese, Wild Turkey (male), Rocks (male), Turkey (hens), Jersey Giant (female), Brahams
SP14	7/8"	Canada Geese (male), Jersey Giant (male)
SP16	1"	Turkey Toms, large Geese

Appendix A: Sizing Chart for the Spiral Leg Bands retrieved directly from Berry Hill Limited website.

Our leg bands are made of the finest material available. Superior quality includes heavy gauge, round design. Leg bands consist of a colored plastic rod that is resilient, springy, non-brittle - with full lap.

10 Colors Available
 RED...
 BLUE...
 GREEN...
 PINK...
 YELLOW...
 PURPLE...
 BLACK...
 WHITE...
 BROWN...
 ORANGE...



- No. 4** 1/4" Baby Chicks, Quail
- No. 5** 5/16" Pigeons, Pheasant Hens
- No. 6** 3/8" Large Pigeons, Homers, Month Old Chicks, Pheasant Cocks
- No. 7** 7/16" Bantams, Growing Chicks, Ringneck, Mallards, Wild Ducks
- No. 9** 9/16" Large Leghorn Hens, Wild Ducks
- No. 11** 11/16" Plymouth Rock Hens, Rhode Island Red Hens, Leghorn Cocks
- No. 12** 3/4" Asiatic Hens, Jersey Giant Cocks, American Breed Cocks, Turkey Hens, Geese
- No. 14** 7/8" Jersey Giant Cocks, Turkey Hens, Geese, Swan
- No. 16** 1" Turkey Toms, Geese

New No. 8
 1/2" diameter bands designed especially for call ducks and other birds of water fowl with similar legs.

No. 10
 Universal size for most chickens plus Pheasants, Ringneck Cocks and Wild Turkeys. Size 5/8" each.

Appendix B: Sizing Chart for the Plastic Spiral Leg Bands retrieved directly from the Ketchum Manufacturing Inc. website.

References:

Agriculture and Agri-Food Canada. (2011). Premises Identification for Livestock and Poultry in Canada – Frequently Asked Questions (Catalogue No. Unknown). Ottawa, ON: Government of Canada.

Agriculture and Agri-Food Canada. (2013). Canada's Poultry and Egg Industry Profile (Catalogue No. Unknown). Ottawa, ON: Government of Canada.

Alibaba.com[®] (2014). *Chicken Leg Bands*. Date accessed: November 16-19, 2014.

Retrieved from

http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=Chicken+Leg+Bands

Aluminum. (2013). In *The Canadian Encyclopedia online*. Retrieved from

<http://www.thecanadianencyclopedia.ca/en/article/aluminum/>

Aluminum Association of Canada. (2012). *110 years of History in Canada*. Retrieved

from <http://www.thealuminiumdialog.com/en/aluminium--2/history/110-years-of-history-in-canada>

Aro, A.R., Ghimire, K., Khanal V., Leppin A., and Neupane, D. (2012). Knowledge, attitudes and practices related to avian influenza among poultry workers in Nepal: a cross sectional study. *BMC Infectious Diseases*, 12(76), 1-7.

Berry Hill Limited. (2014). *Farm & Self Sufficiency*. Retrieved from <http://www.berryhill.ca/category-s/1918.htm>

Dalrymple, K. (2014). Personal communication by e-mail. September 29, 2014-November 14, 2014. K. Dalrymple is the director of Agriculture Sales at Ketchum Manufacturing Inc.

Dhaubhadel, T.S. (1992). *The Role of Monogastric and Small Stock*. Retrieved from <http://www.fao.org/docrep/004/T0706E/T0706E06.htm>

Eastern Cargo Movers Pvt. Ltd. (2014). *Transportation for Bangladesh, Bhutan and Nepal*. Date accessed: November 19, 2014. Retrieved from <http://easterncargo.in/service-packing.html>

FedEx. (2014). *Get Rates & Transit Times*. Date accessed: November 19, 2014. Retrieved from <https://www.fedex.com/ratefinder/standalone?method=goToResultSummaryPage>

Fox, K. (2014). Personal communication by e-mail. September 29, 2014-November 17, 2014. K. Fox is the owner of Berry Hill Limited.

Government of Canada (2012, April 23). Expanding Trade and Opening New Markets. [Web log comment]. Retrieved from <http://actionplan.gc.ca/en/blog/expanding-trade-and-opening-new-markets>

Industry Canada. (2013). Canadian Company Capabilities (Catalogue No. Unknown). Ottawa, ON: Government of Canada.

Industry Canada. (2014). Consumer Products (Catalogue No. Unknown). Ottawa, ON: Government of Canada.

Ketchum Manufacturing Inc. (2014). *Wing Tags/Leg Bands*. Retrieved from <http://www.ketchum.ca/products/poultry/wing-tags-leg-bands>

Ministry of Agriculture Development. (2014). Department of Agriculture (Catalogue No. Unknown). Hariharbhawan, Lalitpur, Nepal: Government of Nepal.

Nepal. (2013). In *Encyclopedia Britannica online*. Retrieved from <http://www.britannica.com/EBchecked/topic/409152/Nepal>

Public Health Agency of Canada. (2013). Avian Influenza (Catalogue No. Unknown). Ottawa ON: Public Health Agency of Canada.

Statistics Canada. (2012). *The Canadian Manufacturing Sector: Adapting to Challenges* (Catalogue No. 11F0027M, no. 57). Ottawa ON: Minister of Industry.

Statistics Canada. (2009). *Turkey industry adapting to new Canadian demographics* (Catalogue no. 96-325-X). Ottawa ON: Minister of Industry.

The World Bank. (2014). *Nepal*. Retrieved from <http://www.worldbank.org/en/country/Nepal>

United Parcel Service Inc. (2014). *Calculate Time and Cost*. Date accessed: November 19, 2014. Retrieved from <https://wwwapps.ups.com/fctc/processweightlimit>