

Canadian Export to Nepal
Tasvax 8 Vaccine

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Benefits of Exporting Tasvax 8 Vaccine from Canada to Nepal

With new innovations in research and development with regards to animal health, vaccines that fight diseases have become readily available throughout the world. Modern age vaccines have enabled societies to have healthier and higher quality producing cattle, goats and sheep that are able to build a resistance to infectious diseases (Clarke, 2009). The potential export product to Nepal is the vaccine Tasvax 8 for cattle, sheep and goats which would aid in protecting against multiple diseases (MSD/Schering -Plough Animal Health, 2015). The vaccine Tasvax 8 contains the immunization antigens used in the defence against clostridium chauveoi, haemolticium, and perfringens type B, C and D (Merck Animal Health, a 2015). Utilizing one vaccine, such as Tasvax 8 for multiple disease has been proven to be beneficial in various ways for farmers by the means of convenience, efficiency and cost. Exporting Tasvax 8 from Canada to Nepal will introduce synergies between multiple companies by working together with regards to transportation, health of animals, manufacturing and continued relations with Canada and Nepal. This paper will investigate the potential export of Tasvax 8 from Canada to Nepal and the process and requirements to ensure benefits to both countries.



(Merck Animal Health, 2015)

PART 1: PRODUCT INFORMATION

Tasvax 8 Information

MSD/Schering - Plough Animal Health is an established company in Upper-Hutt Wellington, New Zealand who is responsible for the manufacturing and distribution of various vaccines, including Tasvax 8 (MSD/Schering- Plough Animal Health, 2015). MSD/Schering - Plough has several international divisions around the world including a Canadian division that is referred to as Merck Animal Health (MSD/Schering- Plough Animal Health, 2015). Merck Animal Health is located in Kirkland, Quebec and is responsible for the receiving of vaccines such as Tasvax 8 from New Zealand (MSD/Schering- Plough Animal Health, 2015). The third partner involved in the distribution of Tasvax 8 is Kane Veterinary Supplies, they have two locations in Canada - Edmonton, Alberta and Cambridge, Ontario. Kane Veterinary Supplies is currently responsible for the distribution of Tasvax 8 across Canada.(Kane Veterinary Supplies, 2015).

Currently Kane Veterinary Supplies distributes Tasvax 8 to veterinarians and farmers only in Canada (Kane Veterinary Supplies, 2015). The export of Tasvax 8 to Nepal could increase sales of the vaccine internationally for Kane Veterinary Supplies, by utilizing their Cambridge office for shipping. The international distribution of Tasvax 8 could be an extremely beneficial opportunity for Kane Veterinary Supplies to expand their distribution across the globe as well as potential growth for new warehouse locations.

MSD/Schering-Plough Manufacturing Plant

Tasvax 8 is manufactured by MSD/Schering - Plough in Upper-Hutt Wellington, New Zealand (MSD/Schering-Plough, 2015). MSD/Schering-Plough has a unique advantage in manufacturing vaccines for animal health because of the country's "disease free" status (MSD Animal Health, 2015).



(Merck Animal Health, 2015)

Although there is limited information regarding the manufacturing process of Tasvax 8 vaccine MSD/Schering-Plough Animal Health has provided a generalization of manufacturing methods for the vaccine. The information given by the MSD/Schering-Plough Animal Health manufacturing plant indicates a six step process to prepare vaccines for exportation across the globe (MSD/Schering-Plough, 2015). The six steps include: media, fermentation, processing, blending, filling, and packing (MSD/Schering-Plough, 2015).

Product Information

Tasvax 8 is applicable for beef and dairy cattle, sheep and goats. The application of Tasvax 8 is to vaccinate animals against the following diseases; clostridium chauvoei (black leg), haemoliticum (red water), and perfringens type B, C and D (alpha, beta and epsilon toxins) (Merck Animal Health, 2015). Tasvax 8 is supplied in various volumes to accommodate for various sizes of herds; 50mL, 100mL, 250mL, and 500mL (Merck Animal Health, 2015).

For Tasvax 8 to remain viable the vaccine should be kept out of direct light and stored in a dry cool area (Merck Animal Health, 2015). Although Nepalese society follows Hindu religion

and would not slaughter the cattle for beef products, vaccination should not occur within 21 days of slaughter (Merck Animal Health, 2015).

Health Information concerning Tasvax 8

Tasvax 8 is classified as a non-hazardous product, according to the criteria of State Workforce Agency (SWA) (Schering –Plough Animal Health, 2015). While using this product it is recommended that the administrator avoids contact with skin. Although it is not mandatory, it is recommended for the administrator to wear personal protective gear when working with the vaccine such as gloves and/or eye protection (Merck Animal Health, 2015).

Recommended Age of Vaccination

To ensure the livestock is properly vaccinated against the bacteria clostridium chauvoei there are age guidelines to achieve effective immunity. It is recommended that cattle are vaccinated with 4 mL around 3 months old with a booster of 4 mL 6 weeks later to avoid future infection (Merck Animal Health, 2015). If the calf is vaccinated before 3 months of age the booster vaccine should be administered at the 4-6 months of age (Merck Animal Health, 2015).

For the greatest prevention against clostridium in sheep and goats they should be vaccinated with a 4 mL dose followed by a booster of 2 mL 6 weeks later (Merck Animal Health, 2015). For pregnant ewes to have the ability to pass on the antibodies to their lambs the lambing flock should be injected 2 weeks before lambing is due (Merck Animal Health, 2015).

Development of Tasvax 8

Tasvax 8 is constantly being adapted to be able to fight the ever changing bacteria by producing adaptations of the vaccine every few years to ensure the antibodies are able to protect against the various diseases (MSD Animal Health, 2015). Currently Tasvax 10 is being developed, as the sister vaccine Covexin 10 was recently released for veterinary use (MSD/Schering-Plough, 2015).

Vaccination Process

Proper vaccination of Tasvax 8 requires a syringe with a needle point and the knowledge of where on the animal to apply the vaccination (Merck Animal Health, 2015). To vaccinate cattle without the use of a head gate, halters are a sufficient substitute of restraint to administer the vaccine (Hall, n.d). Intramuscular

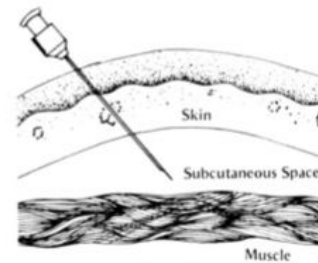


FIGURE 6

(Hall, n.d)

injection is a requirement in the administration of the vaccine, the injection should be in the neck muscle just above the shoulder of the cow (Hall, n.d). For the proper vaccination of sheep and goats injections should be administered through an area of clean, dry skin behind the shoulder (Merck Animal Health, 2015). For sheep and goats an 18 gauge, 0.5-0.75 inch needle is required, and for cattle 16 to 18 gauge 0.5-0.75 inch needle is required (P. Corrente, Canadian Food Inspection Agency, November 26, 2015). The size of the needle is extremely important due to the clostridial vaccines having the possibility of causing reactions and scar the meat (P. Corrente, Canadian Food Inspection Agency, November 26, 2015). Needles also can not be

reused due to the fact that the vaccine has a tendency to cause tissue reaction, one of the more common side effects is swelling, which may occur after the injection (P. Corrente, Canadian Food Inspection Agency, November 26, 2015).

Benefits to Canada by Exporting Tasvax 8

Canada is always exploring new export opportunities with Nepal that could aid in potential relations with the country (CFFN, 2006). Table 1 shows the export and import relationship between Canada and Nepal in 2014. Exporting Tasvax 8 to Nepal could increase the current product trade between the two countries in the Animal Products section (Statistics Canada, 2015). The exportation of Tasvax 8 could also increase profitability for Merck Animal Health and Kane Veterinary Supplies.

Table 1: Canada to Nepal

Product trade (2014) 21 HS Sections Canada - Nepal		
Section	Exports	Imports
01 Animal & Prod.	\$	\$10
02 Veg. Prod.	\$5,943,455	\$204,285
03 Fats, Oils & Waxes Prod.	\$	\$4,173
04 Food Prod.	\$49,140	\$116,269
05 Mineral Prod.	\$	\$2,692
06 Chemical Prod.	\$5,411	\$89,196
07 Plastics, Rubber Prod.	\$80,334	\$21,216
08 Leather, Fur Prod.	\$582	\$199,498
09 Wood Prod.	\$997	\$9,680
10 Paper Prod.	\$	\$146,793

(Statistics Canada, 2014)

Benefits for Merck Animal Health

With an increase of exportation for Tasvax 8, the demand for production of the vaccine could increase creating more job opportunities for MSD/Schering- Plough, New Zealand. Although this would not directly benefit Canada, MSD/Schering-Plough Animal Health is a global operation that would like to see a return on investment, increased profitability, growth into new markets and expansion of logistics. The roles that MSD/Schering-Plough and Merck Animal Health would be able to develop and grow throughout the company would include sales and

marketing, manufacturing, quality, supply chain, finance, and administrative functions. (MSD/Schering-Plough, 2014).

Benefits for Kane Veterinary Supplies and Other Partners

Kane Veterinary Supplies is the current distributor of animal health products across Canada (Kane Veterinary Supplies, 2015). Exporting Tasvax 8 could benefit Kane Veterinary Supplies through an increase in a demand for employees in supply chain, sales and administration. Tasvax 8 would be required to be transported throughout Canada on specialized refrigerated trucks increasing business for those companies. There would also be an increase with airline transportation to fly the vaccine to Nepal.

Since Tasvax 8 is not manufactured in Canada it will not have a direct benefit because it does not use Canadian products or ingredients. The indirect benefits for Canada are abundant through a greater demand for employees for two companies, increased demand for transportation companies and distribution. The increase of jobs for Canadians would benefit the Canadian economy immensely.

Canada's Market Opportunity with Nepal

Tasvax 8 could be helpful in the prevention of diseases in a country such as Nepal. There are 698 veterinarians in Nepal that have limited accessibility to reach livestock due to lack of roads enabling them to administer a proper vaccination which may result in unhealthy livestock (IRIN, 2013). Establishing a market for this product may be difficult due to the lack of resources in Nepal. A large portion of farmers are unaware of diseases that are effecting cattle, goats and sheep. With the lack of veterinary personnel, many farmers in Nepal will not seek out veterinary

assistance to assess the factors involving a cattle or goats death (Thornton, 2010). Since 70% of households in Nepal own some form of livestock, whether it be cattle, buffalo, sheep and/or goats, importing Tasvax 8 to Nepal would be a benefit to the mass majority of the livestock population (FAO, 2005).

PART II: EXPORT POTENTIAL TO NEPAL

The Country: Nepal

Nepal is a landlocked multiethnic, multilingual, multireligious country that is neighbored by India and China in south-central Asia (Government of Nepal, 2015). Nepal has a population of approximately 27.8 million (Trading Economics, 2014). 86% of the population in Nepal practice Hindu beliefs (Government of Nepal, 2015). Nepal is divided into three separate ecological zones: mountain, hill and terai regions, the greatest density of ruminants in Nepal is located in the hills region (Pariyar, 2006). Nepalese currency is referred to as a Nepalese Rupee, \$1.00 Canadian is equivalent to 79.11 Nepalese rupees (World's Currency Authority, n.d.).

In Nepal livestock are essential for the production of milk, meat, egg, wool, and labor (Joshi, 1992). Livestock is mainly used for labor such as cultivation, fertilization and transportation for crop growth (Joshi, 1992). Livestock is considered to be an important agricultural sub-sector in Nepal resulting in 32% of agricultural Gross Domestic Product (GDP) in 2011 of the numerous ways livestock are used in Nepal they serve as a cash income for the farmers as well (Joshi, 1992). Over 2 million households own cattle in Nepal (Joshi, 1992) based upon the large number of the Nepal population that owns cattle suggests the vaccine Tasvax 8 would be beneficial to a large community of Nepal.

Table 2: Ruminant Numbers by Ecological Zones

Eco-zones	Cattle	Buffaloes	Sheep	Goats
Mountain	867 700 (12.46)	347 270 (8.79)	357 829 (43.42)	968 375 (13.87)
Hills	3 285 375 (47.16)	2 077 822 (52.57)	364 333 (44.21)	3 466 271 (49.66)
Terai	2 813 361 (40.38)	1 527 561 (38.65)	102 025 (12.38)	2 545 229 (36.47)
Total	6 966 436 (100)	3 952 653 (100)	824 187 (100)	6 979 875 (100)

(Pariyar, 2006) - Country Pasture/Forage Resources Profiles

Cost Efficiencies - Small and Large Farms

There are small to very large farms in Nepal that are measured by the number of head of cattle, sheep or goats (FAO, 2010). Tasvax 8 could be relatively inexpensive for Nepalese farmers. To ensure as many farmers as possible receive the vaccine for their herds, the farmers in Nepal with lower incomes could consider the option to share a larger bottle of Tasvax 8 (Maltsoglou, Tangiguhi, 2004). The farmers with larger herds and greater income could buy various sizes of the vaccine depending on the size of their herd (Maltsoglou, Tangiguhi, 2004).

To get an idea of pricing for Tasvax 8 in Canada Kane Veterinary Supplies provided a 2015 pricing for the 50mL bottle at \$10.25 CDN up to \$71.25 CDN for the 500mL bottle. (Kane Veterinary Supplies). This is a retail price without the cost of transportation.

Table 3: Sizes of Herds in Relation to Size of Farm

Factors (one of the following)		Small farms	Medium farms	Large farms
1. Cultivated area	without irrigated land, fruit trees or plantation	< 10 ha	10 – 50 ha	≥ 50 ha
	with irrigated land, fruit trees or plantation	< 5 ha	5 – 10 ha	≥ 10 ha
2. Number of head of cattle		< 10 head	10 – 50 head	≥ 50 head
3. Number of head of sheep, goats and pigs		< 50 head	50 – 500 head	≥ 500 head
4. Number of fowls		< 5000 head	5000 – 20 000 head	≥ 20 000 head

(FAO, 2010. *Characteristics of small farmers in asia and the pacific*)

Transportation and Distribution

The export of Tasvax 8 to Nepal requires various stages of handling before arriving in Kathmandu, Nepal. Tasvax 8 is manufactured in Upper Hutt, New Zealand which will then be shipped to Merck Animal Health for distribution to Kane Veterinary Supplies who would handle the exportation to Nepal. It is recommended that Tasvax 8 is kept between 2-8°C and refrigeration must be available at all time (Merck Animal Health, 2015).

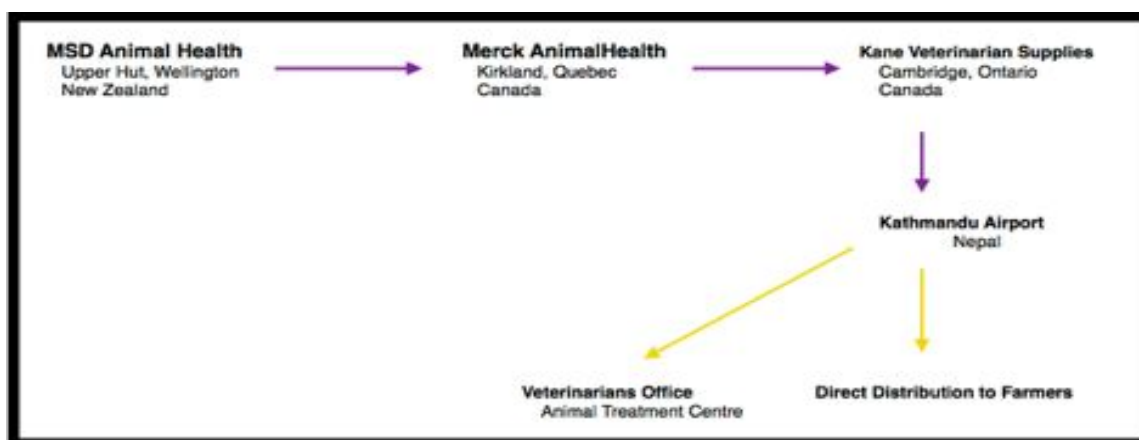


Figure 1: This figure demonstrates the handling involved and the transportation of Tasvax 8. (B. Lacasse, 2015)

Breakdown of Transportation

MSD/Schering-Plough the manufacturing plant would ship Tasvax 8 by airplane to Canada for distribution. When the vaccine arrives in Canada, a Canadian trucking company with specialized refrigerated would deliver Tasvax 8 to Merck Animal Health in Kirkland, Quebec. From Merck Animal Health a trucking company with specialized refrigeration would deliver to Kane Veterinary Supplies in Cambridge, Ontario. Kane Veterinary Supplies would be responsible for the exportation of Tasvax 8 to Nepal. Tasvax 8 would ship from Cambridge to Toronto Pearson Airport before arriving Kathmandu, Nepal.

Tasvax 8 in Nepal

Tasvax 8 could be distributed amongst Nepal's farmers by various veterinary clinics. Nepalese farmers would have the ability to reach the clinic closest to them, such as the Kathmandu Animal Treatment Centre (The KAT Centre, 2015). The highest density of ruminants are located in the hill region of Nepal, for Tasvax 8 to be provided to the greatest population of farmers. Kathmandu would be a suitable distribution location as it is located in the hill region of Nepal (FAO, 2006).

Transportation Options - Styrofoam Bins

A way to ensure Tasvax 8 remains between 2-8°C while shipping there are specialized styrofoam bins with freezer blocks made of an artificial gel which can remain frozen for 72 hours

(Coopers Animal Health, 2011).

This could be used as alternative



for transportation or storage as some

(Coopers Animal Health, 2011)

farmers do not have accessibility to fridges on their farms. FedEx also provides an option of medium extended duration units that allows 96 hours of cooling time for international shipments, with an additional cost of \$117.00 CDN ensuring the package remains between 2-8°C (FedEx, 2015).

Tasvax 8 in Nepal

Importing to Nepal requires a pre-shipment quality inspection certificate for import of pharmaceuticals and industrial chemicals (SME Toolkit, n.d.). Tasvax 8 is considered to be a non-hazardous waste, causing no environmental concerns for when disposing of the needle, syringe or vaccine package (Merck Animal Health, 2015). To dispose of the needles properly, it is recommended that the needles are placed in some form of container to ensure the administrator would not get injured by the needle when disposing of needles (Merck Animal Health, 2015).

Tasvax 8 is included in the list of products authorized for Canadian Export, through the issuance of a Veterinary Biologics license or Veterinary Biologics Import Permit (Canadian Food Inspection Agency, 2014).

Price Analysis of Exporting Tasvax 8

As mentioned previously the information provided by Kane Veterinary Supplies, the 2015 prices indicated for the 50mL bottle is \$10.25 CDN but, can range to \$71.25 CDN for the 500mL bottle of Tasvax 8 (Kane Veterinary Supplies, 2015). As needles and syringes are needed for the application of this vaccine, Nepalese farmers can buy disposable syringes and needles of the proper gauge from a local veterinary clinic. Kane Veterinary Supplies provided details of cost in Canada for disposable needles and syringes for a box of 100 with a variety of needles sizes for \$13.55 CDN (Kane Veterinary Supplies, 2015)

Table 4: Cost of Tasvax 8 in Various Sizes

Tasvax 8	
Cost (Canadian Dollar)	Bottle Size (mL)
\$10.25	50
\$17.65	100
\$37.95	250
\$71.25	500

Kane Veterinary Supplies , 2015 - Table (B.Lacasse, 2015).

The transportation cost of Tasvax 8 would be included in the sale of the vaccine to Nepal, but the airline would be an additional cost from Toronto to Kathmandu. The cost of airline shipment from Toronto, Ontario to Kathmandu, Nepal is \$503.00 CDN for 26 - 100mL vaccines (FedEx, 2015).

To open the trade of Tasvax 8 between Canada and Nepal, a small shipment would be shipped over to ensure the product is useful in Nepal. The first shipment would be able to vaccinate 250 cattle and 100 goats or sheep. This would include 26 - 100mL bottles of Tasvax 8 at a cost of \$458.89 CDN + the cost of the medium extended duration unit of \$117.00 CDN + airline shipment of \$503.00 CDN (FedEx, 2015) for an approximate total of \$1078.89 CDN.

Grants to Aid Nepal

By June 2015 Nepal's imports reached \$83987.30M NPR. To aid in the cost of importing Tasvax 8 vaccine, "Business Opportunities: Develop Humanitarian Aid Markets" grant aids in the beginning financial stages of trading business (Trading Economics, 2015). This grant provides \$150 Million CDN in funding for humanitarian aid projects including export opportunities for Canadian companies (Government of Canada, 2015).

Why Tasvax 8 for Nepal?

Currently there are not any other vaccines manufactured in Canada to fight against *Clostridium chauveoi*, *haemolyticum*, and *perfringens* type B, C and D (Merck Animal Health, 2015). Covexin 8 is the same vaccine as Tasvax 8, except it is manufactured in the United States opposed to New Zealand (Merck Animal Health US, 2015). Tasvax 8 is sold at various vet companies throughout Canada, which also could have the potential for exporting to third world countries such as Nepal for healthier livestock. Kane Veterinary Supplies demonstrated the best option for exporting Tasvax 8 to Nepal since this company is the distributor across Canada of Tasvax 8 and the company has the means already set up for distribution (Kane Veterinary Supplies, 2015).

Recommendations

The literacy rate in Nepal is 63.9%, the remaining population which includes some of the farmers are illiterate (Central Intelligence Agency, 2015). An alternative means of communication on how the vaccine works would have to be provided for the farmers. A way to ensure Nepalese farmers are properly vaccinating their livestock a small picture book would be recommended to be sent with the vaccine to demonstrate how to vaccinate cattle, sheep and goats (Raizada, 2015).

Reflection of Exporting Tasvax 8

The vaccine Tasvax 8 would provide several benefits to Nepalese farmers and veterinarians. In addition to increasing the life expectancy of their livestock Tasvax 8 would ultimately benefit the farmers investments by having a higher profitability from livestock and livestock by-products (Nepal, 2005). The Nepalese farmers would rely less on importing livestock from India due to loss of livestock in previous years allowing the farmers to focus on raising their own healthy livestock offspring (IRIN, 2013).

To further improve the export potential the transportation could be reworked to have less intermediate steps between various partnerships within Canada. An alternative could be MSD/Schering-Plough Animal health directly dealing with Kane Veterinary Supplies. This could result in export efficiencies including reducing costs and time by not including Merck Animal Health in the distribution process. Contrary to what was previously assumed, an identical vaccine to Tasvax 8 is manufactured closer to Canada than New Zealand, called Covexin 8 from the United States Merck Animal Health location (Merck Animal Health, 2015).

Conclusion

Tasvax 8 would be beneficial in Nepal and could be used by every farmer and veterinarian. The benefits to the farmers who vaccinate their livestock would include having healthier herds, relying less on India for new livestock, and a possible increase in income enabling them to provide more to their families (IRIN, 2013). With having livestock vaccinated this would allow veterinarians to concentrate on other pressing animal health concerns.

Smaller farmers could share one bottle and use disposable needles to vaccinate their herds to avoid the need for storage of the vaccine as well to cut down on the cost for an individual farmer. The larger farms with a greater income, could have the option to buy Tasvax 8 in larger quantities to be able to vaccinate their entire herd also using disposable needles from various local veterinarian clinics. Having the readily supply of Tasvax 8 could be an opportunity for veterinarians to aid in fight against the clostridium chauveoi, haemoliticum, and perfringens type B, C and D (Merck Animal Health, 2015).

There would also be benefits for the Canadian companies to grow their businesses and develop new opportunities. With the export of Tasvax 8 and the development of the vaccine it may provide new export opportunities and build relations with other countries looking for a cost effective way to vaccinate their livestock. Tasvax 8 would not only benefit Canada's economy and business relations with Nepal, but it would be helping Nepal with one of their greatest treasures and source of income, their livestock.

Further Inquires

For additional information the following contacts are available to answer any further questions that were not addressed within this report.

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