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Section 102 Friday 2:30-5:20

AGR1110

Tuesday December 1, 2015

Canada to Nepal: California Mastitis Testing Kits

Introduction:

In Nepal, the Nepalese's agriculture is based on the interdependence of crops, livestock, and forest resources. Ruminants such as cows, buffalo, oxen, yaks, sheep and goats are normally found up in the hill and mountain regions of Nepal and produce 28% of the agricultural GDP for milk, meat and hide products (Joshi, 1992). The livestock listed above are some of the main resources of protein for the Nepalese through their milk and milk products in Nepal. This resource is a big contributor to cash income for some Nepalese families (Joshi, 1992). Meaning if family's bovines or ruminants contract a source of mastitis (an infection that causes inflammation to the mammary glands within the udder that can be contagious within a herd (Mastitis in Beef Cows, 2015)), it can cause loss of income to some families. Research was conducted in Nepal in 1992, where they tested for sub-clinical mastitis in 19 cows and 40 buffalo. 31.57% of the cows and 40.00% of the buffalo were infected with subclinical mastitis (Tiwari, Joshi & Singh, 2011). With numbers this high, in comparison to Canada, the best way to solve this problem is sending California Mastitis Testing kits to Nepal for their bovine and other ruminants (shown in figure 1).



Figure 1: What the California Mastitis Kit would look like (Homesteader Suppliers, 2015)

What is a California Mastitis Testing Kit?

California Mastitis Testing kits that would allow Nepalese farmers to test for both clinical and sub-clinical mastitis in a way that is quick and easy. The kit comes with 4 supplies; a manual full of instructions on how to do the test and read the final reading of the somatic cell count, an 16 ounce bottle of reagent containing bromocresol purple (sodium salt), sodium hydroxide and sodium linear alkylbenzene (Immucell, 2015) which helps to that detects increased somatic cell count, an 8 ounce applicator bottle to dilute the reagent (instructions on diluting the reagent would be on the bottle) and a paddle with 4 quarters which allows the farmer to test the four different teats on the cow all at once (Ormond Veterinary Supply Ltd, 2015). When mixing approximately a teaspoon of milk with a teaspoon of diluted reagent mixed together in the paddle. There are some precautions to take when doing the test though. The reagent is considered an irritant to the eyes, mouth, skin and respiratory (Immucell, 2015). Some ways to prevent exposure to eyes, mouth, skin and respiratory is by always wearing gloves to cover the skin on your hands, wear goggles if worried the product will get in contact with the eyes, and if feeling light headed, to make sure to get fresh air and breathe until feeling better again. In figure 2, it states what might happen and what to do when in contact with the reagent.

• Section 4 – First Aid Guidelines

Oral Exposure: If swallowed, rinse mouth with water. Call a physician.

Inhalation Exposure: Remove to fresh air.

Dermal Exposure: May cause slight irritation with brief contact and more severe irritation with prolonged contact.

Eye Exposure: Irritation with pain. If contact occurs, flush eyes with copious amounts of water for a minimum of 15 minutes. Separate eyelids to assure adequate flushing.

Figure 2: Safety Guides if in contact with the mastitis reagent (Immucell, 2015)

Table 1: California Mastitis Test scores: correlation of CMT score with somatic cell count
(McFadden, 2011)

CMT Score	Somatic Cell Range			Gelling
None	0	to	200 000	None
Trace	200 000	to	400 000	Very Mild
1	400 000	to	1 200 000	Mild
2	1 200 000	to	5 000 000	Moderate
3	Over 5 000 000			Heavy, almost solidifies



Figure 3: As shown in the figure to the left, the more gel the more mastitis has been found within the milk (UPEI, 2015).

Once in the paddle, you keep mixing the solution in a circular motion for approximately 20 seconds (Ruegg, 2005). Shown in figure 3, these are some of the outcomes that could occur. The more gel that is formed in the paddle, the more the somatic cell count (Ruegg, 2005). Looking above at table 1, shows how you would rate the amount of somatic cell count in the milk. With these rates farmers can see if the test is positive or negative, and if it is positive, it would show how severe the case of subclinical mastitis is and then later find a treatment for the certain case of subclinical mastitis. This product is easy, fast, reliable and cost effective (Immucell, 2014). It's easy because anyone can do the test without special recommendations or

veterinary assistance, it's fast because it only takes a total of 5 minutes to full know the somatic cell count in the milk given. It's reliable since it shows good testing in most of the test and that the environment does not affect the reaction of the milk and diluted reagent (Immucell, 2014). And finally it's cost effective because it is a cheaper product that gives many test, (approximately 350 test per kit (Drugs.com, 2015)) (Immucell, 2014).

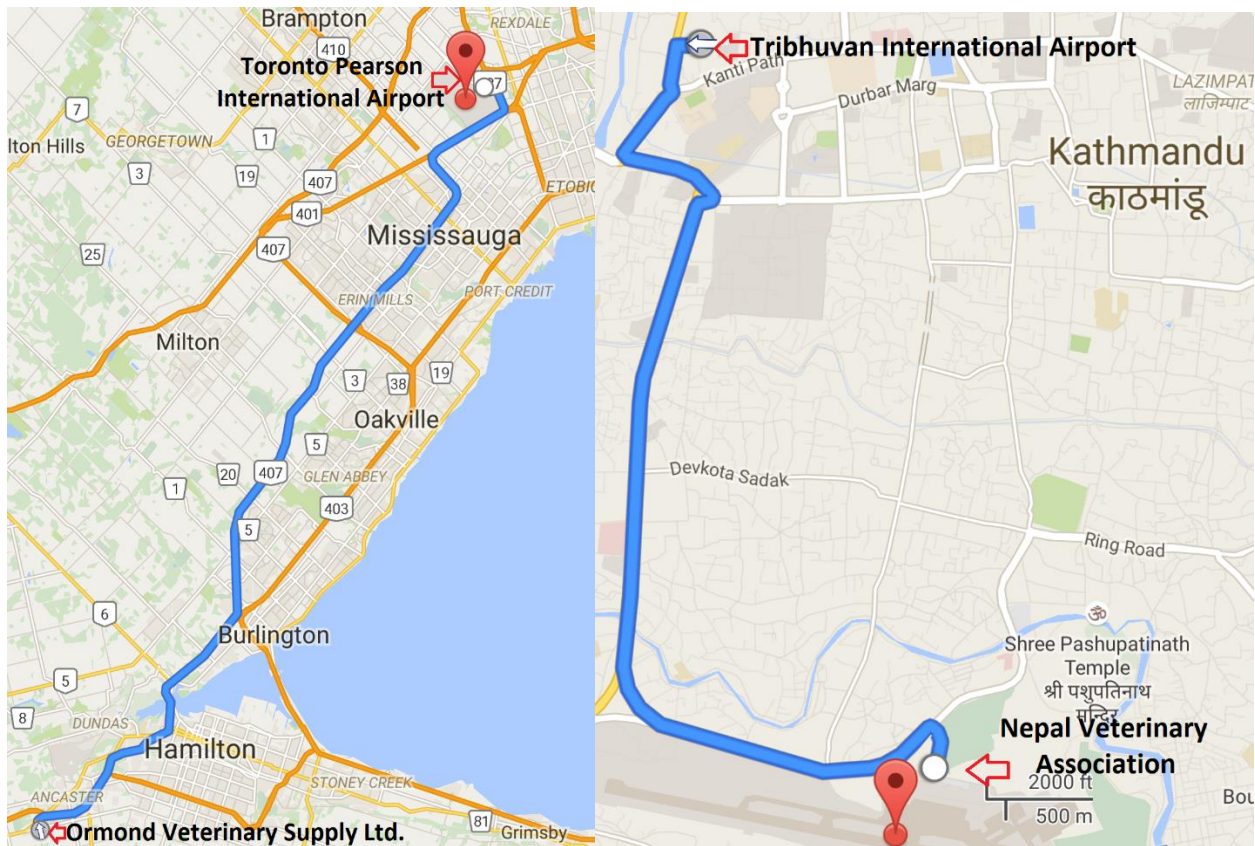


Figure 4 (left) and 5 (right): Images of the route the trucks would take the supply of CMT kits
(¹Google, 2015) (²Google, 2015)

Manufacturing Location and Pricing in Canada

The California Mastitis Testing (CMT) kits are manufactured by Ormond Veterinary Supply Anesthetic Supplies Limited (Coll. M., personal communication, December 1, 2015) and

distributed by Ormond Veterinary Supply Incorporated (Ormond Veterinary Supply Ltd, 2015). This companies are associated together in Ancaster, Ontario which is approximately an hour truck ride to Toronto Pearson International Airport in Mississauga, Ontario (figure 4). When talking to Mike Coll from Ormond Veterinary Supply Incorporated, he stated the cost of the California Mastitis Testing kits are sold for 35 dollars to veterinarians here in Canada (Coll. M., personal communication, October 19, 2015). This price will change once the product is exported to the Nepal Veterinary Association in Kathmandu, Nepal because of the cost of shipping as shown in table 2.

Table 2: Shipping Cost from Canada to Nepal

LOCATATION	TRANSPORTATION NEEDED	COST OF TRANSPORTATION (\$)	TOTAL COST OF PRODUCT SHIPMENT (\$)
Ancaster, ON Ormond Veterinary Supply Ltd.	None	\$ 0.00	\$ 0.00
Toronto, ON Toronto Pearson International Airport	Truck (FedEx)	Approximately \$ 120.00	\$ 120.00
Kathmandu, ON Tribhuvan International Airport	Airplane (A1 Freight Forwarding)	Approximately \$ 745.00	\$ 865.00
Kathmandu, ON Nepal Veterinary Association	Truck	Approximately \$ 120.00	\$ 985.00

(²A1 Freight Forwarding, 2015), (¹FedEx, 2015)

Transportation

The easiest way to transport this product would be by air. Before it is flown to Nepal, the product needs to be trucked from the Ormond Veterinary Supply Inc. in Ancaster, Ontario, to Mississauga, Ontario (shown in figure 4). The transportation cost shown above would be approximately 120 Canadian dollars to truck the packages (¹FedEx, 2015). The most costly trip would be the flight from Toronto Pearson International Airport in Mississauga, Ontario to Tribhuvan International Airport in Kathmandu, Nepal. For the first trial, approximately 50 kits would be flown over to Nepal to sell to the farmers. To send a boxes that are 50 cm³ with around 8 kits within one box, it would be cost approximately 745 Canadian dollars to fly 8 boxes full of kits (¹A1 Freight Forwarding, 2015). Documents like the commercial invoices, certificate of origin and the shipper’s export declaration would be needed to quicken the process of shipping. Some other documents could be need depending on the contents in the kits (²FedEx, 2015). Once the product is in Kathmandu, Nepal, they would be trucked from the Tribhuvan International Airport to the Nepal Veterinary Association which is also located in Kathmandu, Nepal (shown in figure 5). Since trucking the packages could take around an hour trip from the airport to the Nepal Veterinary Association location (²Google, 2015), it could cost approximately the same as the cost of trucking the packages from Ancaster, Ontario to Mississauga, Ontario (shown in table 2).

Table 3: Cost of final product in Nepal after shipping

(The Money Converter, 2015)

	Cost of CMT kits (\$)	Cost of Transportation (\$)	Cost of Transportation per package (\$)	Minimal Total Cost of CMT kits (\$)	Total Cost of CMT kits (NPR)

COST	\$ 35.00	≈ \$ 985.00	\$ 19.70	≈ \$ 57.70	≈ 4,609.09 Nepalese rupee
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Promoting the California Mastitis Testing Kits

A way to promote the California Mastitis Testing kits in Nepal is through the veterinarians and the agricultural cooperatives in the local communities. Giving the kits to the Nepal Veterinary Association, they could start by handing out a couple of the test to veterinarians in all the regions of Nepal, but mainly the hill and mountain regions (since they are more dependent on livestock). If the farmers have a problem with one of their bovine and calls the veterinarian, the vet could tell them about the product if they believe the bovine has some form of mastitis. If there is a possibility that the farmer wants to get the product, the veterinarian could inform the farmers how to use the CMT kits. Some farmers would not be easily convinced to buy this product. Since some farmers cannot afford veterinarians to come check on their animals, sometimes the agricultural cooperatives help by getting resources the farmers might possibly need. The agricultural cooperatives are to help the people agricultural societies create plentiful food production and be able to use this food production for household income (With Agriculture, 2013). The cooperatives want the Nepalese farmers to be successful in their businesses so they normally will do house calls at a lower rate than a house call from a veterinarian (Humanitarian News and Analysis, 2013). This could more persuade farmers to buy the CMT kits since it is a cheaper to talk to someone about the product, meaning less money to use from their income if they were to make a purchase. A second way to promote this product would be to give the farmers the idea of sharing a kit between a few farms in the community, this would be a cheaper option and could get the word out quicker between farmers within the

society. To make a good profit from this product, many people would have to buy the kits. One problem would be that the kits can last a very long time (can be used 350 time per kit (Drugs.com, 2015)). So if more farmers shared the product, and they did regular testing every month, the quicker the product is used meaning there would be more a demand for the product. The next steps would be to figure out if sending more kits would be good or just reagent solution. Also after getting this product on the market, a way to help the farmers get a treatment plan for their bovine. Once they have both the kits and the treatment, they can fully watch and prevent the spread of mastitis between herds.

Table 4: Total annual household income by subdivisions (1996-1997)

(Maltsoglou & Taniguchi, 2004)

Final Cost in Nepal

After all the shipping cost is added to the initial cost of the product from Canada, the approximation of the CMT kits would cost around 57.70 Canadian dollars which can be converted to 4,609.09 Nepalese rupee. Evident in table 4, different regions and living situations can change the average household of a Nepalese farmer, therefore this product could be expensive to some Nepalese farmers depending on their household income. So the best opinion would be to start selling the product to groups of farmers then slowly and gradually sell them to

Region	Mean (NRs)	Standard Deviation (NRs)	Median (NRs)	Frequency
Area Location				
Urban	114 113	179 983	72 400	696
Rural	30 980	36 766	22 070	2 632
Region				
Mountains	26 564	31 588	18 810	409
Rural Hills	32 526	40 131	23 270	1 082
Rural Terai	30 107	34 359	21 504	1 094
Other Urban	96 386	203 882	58 125	417
Kathmandu	128 142	127 422	95 660	326
Livestock Ownership				
Livestock	35 093	46 543	23 368	2 565
No Livestock	92 989	171 259	54 500	763
Gender of Household Head				
Male	49 162	95 151	26 978	2 878
Female	43 273	92 157	19 647	450
Household Head Can Read and Write				
Yes	74 688	140 240	42 876	1 324
No	29 671	42 216	19 450	2 023
Total	48 366	94 760	25 943	3 328

separate farmers once the knowledge of the product is in more of a demand to the public

Benefits for Nepal and Canada

With this product going to Nepal, it would benefit more the Nepalese but it will benefit the Canadians also. From the Canadian stand point, the benefits would be more jobs and boosting the economy with more exports. First this would create more jobs within Canada because of the increase of demand of the product means more jobs to make the product, while also creating jobs to truck the product within Ontario. Also sending this product to Nepal will benefit the Canadian economy because of exporting products would bring money still to Canada while making deals within Nepal. The California mastitis testing kits benefit Nepal by creating small jobs and creating more opportunities for the Nepalese. First it would create small jobs for transporting the product in Nepal to get it to the Nepal Veterinary Association or any other veterinary clinics. While this products helps create jobs, it creates better life benefits for farmers and their families, which includes health and income. Leaving the bovine or ruminant with mastitis means there would be a decrease of milk production for the farmer with percentages as high as 10 to 12% (Natzke, 1981). With the CMT kits, the health of the bovine or ruminant would increase if it is being tested since the farmer will be able to test and treat the mastitis which would lower the percentage of mastitis in the bovine or ruminant. As stated in the beginning, the main source of protein from Nepal is from milk and milk products (Joshi, 1992). In conclusion to health, a healthy bovine or ruminant with plentiful milk means more milk to give to the family for nutrition. Having more milk produced also benefits the family's income. If more milk or milk products is being produced then needed for the family to get there fill, they could sell the extra milk or milk products into small markets for money, bringing the farmers more household income for their family. More money and better health makes for a better, developing community.

Global Competition

One downfall to this product is that there are cheaper and more efficient ways to get California Mastitis Testing kits to Nepal. This can be compared in two ways, shipping cost and cost of the product. There is a company called DeLaval which has companies all over the world that can supply the California Mastitis testing kits into Nepal. The closest country to Nepal that does provide the kits is China (DeLaval, 2013). With China being a neighbouring country, the cost of flying the product from Guangzhou, China (DeLaval, 2013) to Kathmandu, Nepal is approximately 48% cheaper than trucking and flying the product from Ancaster, Ontario. While this is beneficial, the product could be priced at the same range and the flying cost only decreases the price of the product by approximately 10 Canadian dollars (as shown in table 5). If the cost of the product was as low as the manufactured product from Immucell (Maine, United States of America), it would make a big difference for the Nepalese farmers (Immucell, 2014). The cost range of these kits are approximately 10-15 American dollars (Nasco, 2015), which is much cheaper than the Ormond Veterinary Supply California Mastitis Testing kits. The way to benefit the Nepalese the best is to have the low cost of the kits and the low cost of shipment so it is cheaper for the Nepalese to buy, and with a cheap, effective model, farmers might spread the word around more about the product within the community. Since both China and the United States have better deals of the California Mastitis testing kits, this would make them global competition to the export of California Mastitis Testing kits from Canada.



Figure 6: Immucell California Mastitis Test Kit (Immucell, 2014)

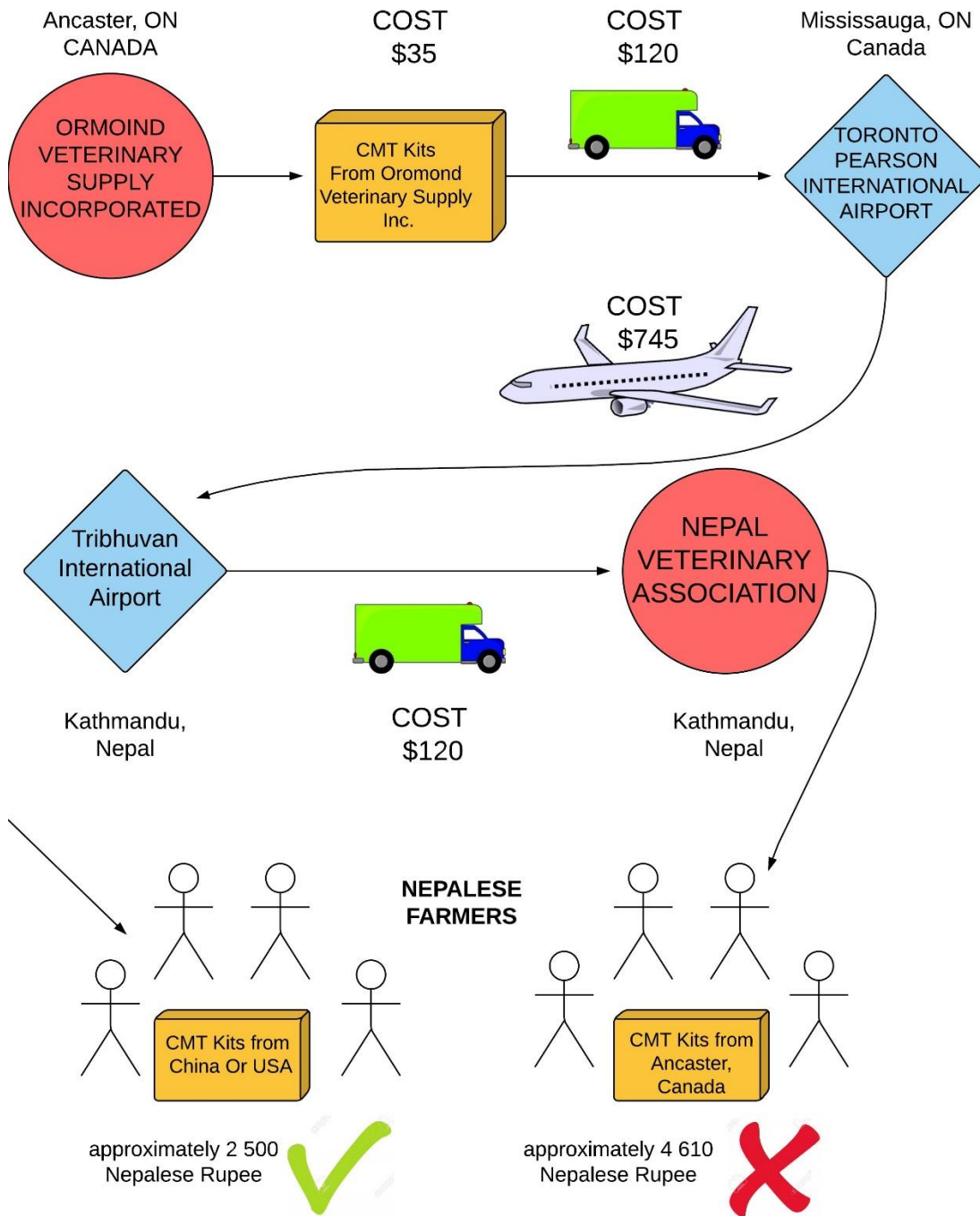
Table 5: Comparison of transporting from Canada vs. China

(²A1 Freight Forwarding, 2015), (¹FedEx, 2015), (³FedEx, 2015)

Exporting Country	Location of Dealer	Transportation need	Cost of Transportation (\$ Cdn)	Total Cost (\$ Cdn)	Cost of \$35 Packages after Shipping
Canada	Ancaster, Ontario	TRUCK	≈ \$120.00	≈ \$ 985.00	≈ \$ 57.70
		AIRPLANE	≈ \$ 745.00		
		TRUCK	≈ \$120.00		
China	Guangzhou, Guangdong	AIRPLANE	≈ \$ 510.00	≈ \$ 510.00	≈ \$ 46.70

Summary

Figure 7: Summary of the process of being California Mastitis Testing Kits to Nepal from Cannada



Conclusion

To conclude, the California Mastitis Testing kit is a great way to test for sub clinical and clinical mastitis in ruminants like cows, buffalo, sheep and goats. The test could help the farmers in the long run by decreasing the amount of mastitis within their community and always monitoring for mastitis to prevent the separate and treat herds. It is a cheap, easy, and reliable product that all farmers could benefit from in some way (Immucell, 2014). When looking at the summary from figure 7, with the cost being so high for the product and shipping from Canada, this product would not be the most ideal product to send over to Nepal. Since there could be better deals in different countries like China and the United States that could be more cost effective for the Nepalese, if there was competition, the farmers would go for their products before the Canadian products. Therefore this is a great product to go over to Nepal that could benefits the farmers and their families with more protein based food (Joshi, 1992) and more income towards their family for the future generation, but it should be supplied from another country that has a low cost product and has easy and cheap shipping charges to bring the supply over the Nepalese communities.

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