

## **Export of Canadian Cattle Oilers for Nepalese**

**Emily Duenk**

### **Part I – Information on Cattle Oilers**

#### Cattle Oilers Overview

Cattle oilers are able to reduce pests that can irritate cattle and carry disease. Cattle oilers allow farmers to have an option to control pests with minimum stress on cattle and little to no work for the farmer themselves; this helps to keep cattle pest-free. Supplying the people of Nepal with cattle oilers would allow them to have an option to control pests all year long; this would help keep cattle healthy and the cattle industry in Nepal growing. Nepalese can benefit from cattle oilers because they can help stop the spread of diseases, like pink eye, spread by fleas, flies, and lice (Campbell, 1994). This will help improve herd health and expansion of the cattle industry.

#### Description of Product

Lewis Cattle Oilers is a Canadian company based out of Oak Lake, Manitoba, that manufactures and distributes cattle oilers and other cattle management products (Lewis Cattle Oilers, 2003). Lewis Cattle Oilers have dealers in Western Canada and Ontario as well as three dealers throughout the United States. The oiler works by inciting the cattle with their need to scratch. The cattle rub up against the chain covered cotton wick, which releases topical insecticide that kills insects. The system has low maintenance cost compared to other forms of pest control and virtually no stress on cattle due to the self-

treatment system. The added salt block holder and mineral feeder would be beneficial in ensuring cattle are also receiving needed vitamins and minerals.

The single upright cattle oiler is essentially maintenance free and the best option for Nepalese farmers due to its size and features. Compared to the double-upright oiler and the quad oiler, the single oiler has one cotton wick and one drape oiler, which is best suited for the herd size in Nepal, and unlike the quad oiler it still contains the mineral feeder feature. The alleyway oiler is also unrealistic because of its use in controlled watering and feeding stations and barn entrances that are less common than pasture systems in Nepal.

The single upright oiler (as seen in figure 1) has many features including, auto wick tightner, cotton wick, 8-chain harness, extended arms, lifter loop, suspended mineral feeder, salt block holder, diaphragm pump, and an auto drape oiler. The aerodynamic design of the suspended mineral feeder causes the feeder to rotate in order to face away from the wind and keep mineral dry (Lewis Cattle Oilers, 2003). Lewis Cattle Oilers are a good option because cost per animal is low due to the self-treatment system. The oilers also provide optimal yearlong treatment as the insecticide remains at full strength all year long unlike other products, such as ear tags that lose their potency (Lewis Cattle Oilers, 2003). The residue left behind helps to kill pests as new ones hatch on the hide and is persistent because even after rainfall more insecticide is added to the hide again as cattle continue to scratch (Lewis Cattle Oilers, 2003). Preventative care is the easiest way to stop the spread of disease and is cheaper than the cost of curing already sick cattle. The Ontario dealer for Lewis Cattle Oilers is Darrell Wiebe, who can be contacted at 1-800-

665-0458 for further inquiries about the product and its benefits to cattle (Lewis Cattle Oilers, 2003).



Figure 1. Single Upright Lewis Cattle Oiler (Lewis Cattle Oilers, 2003)

### Benefits to Cattle Health

Cattle oilers protect against many different types of parasites, having a great positive impact on cattle health. Lewis Cattle Oilers provide yearlong protection against many parasites including, face flies, horn flies, stable flies, lice, and mosquitoes (Lewis Cattle Oilers, 2003). Parasites cause a loss in profits as weight gains and animal health decrease. Studies show a direct correlation between face fly populations and Pink eye cases, as well as when horn fly counts reach 250 per head the loss in weight gain is greater than 23% (Lewis Cattle Oilers, 2003). Bites from flies are also painful and can cause significant irritation to cattle and other animals. It has been proven that stable flies can cause significant economic losses, rates of gain can be reduced by as much as half a pound and milk production can decrease as much as 40% (Lewis Cattle Oilers, 2003). To

a Nepalese farmer who only milks a few cows, 40% loss of milk production is a significant loss to the farmer's profits and food source.

It is important to begin pest control before fly and pest season begins, because Lewis Cattle Oilers can be used year round these precaution steps can be taken easily. Pests in the summer also increase the risk of foot rot and drowning, as cattle often seek out ponds and other water sources to stand in in order to help avoid bites from pests (Lewis Cattle Oilers, 2003). Foot rot in cattle and goats is an on-going issue in Nepal; vaccinations are the best solution to manage foot rot in Nepal, however not all farmers have proper management systems in place to do so, which is why preventive care is so important (Ghimire, Egerton, & Dhungyel, 1996). Pests have a major effect on cattle; implications are that total energy balance is altered when an animal is exposed to ectoparasite infestations, thereby resulting in decreased productivity (Byford, Craig, & Crosby, 1992). Oilers are one of the most effective ways to combat parasites in cattle.

#### Lewis Cattle Oilers Use in Canada

Cattle oilers are a popular product in Canada due to their effectiveness, minimal stress for animal and producer, and low maintenance. In Canada oilers are used to prevent different types of flies, and tapeworms as well as diseases like Mange or Pink eye in cattle (Alberta Agriculture and Forestry, 2016). Types of oilers commonly used include brush oilers, walkway oilers, rope oilers, as well as the Lewis style oilers. Protecting cattle against flies results in economic gain for Canadian farmers, as gains and milk production increase when cattle are healthy and parasite free (Lewis, 2009). Oilers are often placed near water sources and in walk ways where cattle frequent in order to ensure

use of the oiler and better manage pest control (Lewis, 2009). Oilers are one of many herd management techniques Canadians use to continue the Canadian standard of ensuring happy and healthy cattle.

### Comparing Oil Types

Homestead Organics is a Canadian company based out of Morrisburg, Ontario that has a natural insecticide product called Eco-scent. Eco-scent contains castor oil, and essential oils of orange, eucalyptus, citronella, lemongrass and coconut oil (Homestead Organics, 2015). Eco-scent is both oil and water-soluble, this product can be mixed with water, mineral oil, or diesel fuel and be used to fill the oilers (Homestead Organics, 2015). The benefits to this product are that it is safe, effective, cost-effective, and readily available. Eco-scent requires a 1-part eco-scent to 9-parts water dilution (Homestead Organics, 2015). Eco-scent costs \$139.00 for one four-liter jug (Homestead Organics, 2015). Tom Manley of Homestead Organics can be contacted at 613-543-0480 for further information on the product (Homestead Organics, 2015).

Malathion 50 is a water-based insecticide often mixed with diesel fuel and used in cattle oilers across Canada. Malathion 50 costs \$86.75 for one four-liter jug (Wesley Veterinary Clinic, 2016). 1 liter of Malathion 50% is to be mixed with 24L of diesel fuel (Khan, 2002). Malathion 50 is an effective pesticide but due to its chemical make-up it poses various health risks (Bonner, Coble, Blair, Freeman, Hoppin, Sandler, & Alavanja, 2007).

One single-upright cattle oiler holds 81L of fluid. Length of time it takes to empty the tank is dependent on the number of cattle using the oiler and the time of year. If it is

peak season for pests, the cattle will have the need to scratch more often, depleting oil levels faster. Table one shows a comparative table of price to fill the oiler using each product. The cost of diesel fuel was determined by using the price of diesel in Nepal today using the currency of the Canadian Dollar, which was found to be 0.9 cents/L (Global Petro Prices, 2016).

Table 1. A Comparison of Oil Product Costs

<b>Product- Eco-scent</b>	Diluent -Water	Total
Volume 2 jugs x 4L =8L	1:9 8x9 = 72L	80L
Price 2 x \$139.00 =\$278.00	-	\$278.00
<b>Product- Malathion 50</b>	Diluent- Diesel Fuel	Total
Volume 3L	1:24 24x3= 72L	75L
Price \$65.06	0.9 cents/L \$64.80	\$129.86

Malathion 50 would be a cheaper insecticide to use, but Eco-scent would be safer for the farmer, cattle, and environment. Malathion is also produced in Mumbai, India by Kalyani industries, for these reasons Eco-scent is the recommended product to use in oilers in Nepal (Kalyani Industries, 2016).

### Benefits to Canada

Benefits of the export of cattle oilers to Canada include a strengthened Canadian economy as well as stronger relationships with foreign countries. Exporting goods from Canada helps to increase the GDP of the country in many ways. Exports help to create

jobs within the country by allowing growth to Canadian companies. Exports directly benefit Canadians by creating jobs, and indirectly by helping create jobs that support the product, in this cause indirect benefits would be to Canadian shipping companies and primary sector jobs that extract steel alloys to make Lewis Cattle Oilers (Global Affairs Canada, 2013). Direct benefits would be to the sales staff, manufactures, and owners of the products at Lewis Cattle Oilers and Homestead Organics. These companies would have an increase in sales, however only a few units of each product would likely be sold due to the high costs of the products and the sharing of few products between many Nepalese farmers. As Canadian relationships between Nepal and other developing countries grows, and if the export of oilers is successful, other locations in Nepal and other countries will be interested in exports which would create a positive feedback loop. This would result in more exports and greater benefits for Canada.

#### Market Opportunity and Inputs

The cattle oilers would be a good cattle management system for communities in Nepal who have a high population of cattle or oxen. This way the farmers could share the oilers and oil, which would decrease the cost per farmer. However, the communities would need to be properly set up to have many farmers cattle together in one pasture or all have access to a common area where the cattle could use the oiler and mineral feeder. This is due to cattle needing constant access to the oiler in order for most efficient function and greatest potential benefits to cattle.

Inputs for the product include oil and parts. The cotton wick will wear out over time and need to be replaced, but with the small amount of cattle the Nepalese farmers

have this should not be an issue for many years. From experience, Lewis Cattle Oilers rarely break or need parts to be replaced. Oil however, needs to be added once levels are depleted. This creates maintenance costs to the farmer, but preventative care is cheaper than the cost of treatment and decreases in profits due to parasites would be virtually non-existent. Frequency of filling the oilers is dependent on the number of cattle using the oiler, but it is estimated that the oiler would need to be refilled every 1-2 years. Other inputs include minerals for the added mineral feeder and salt blocks for the added salt block holder. These costs are profited in the form of healthy cattle.

#### Issues with the Product in Nepal

One of the issues with Cattle oilers in Nepal that is not an issue in Canada is movement of the oilers. Typically in Canada a loader tractor would be required for movement, but by adding dolly wheels the oiler can be moved with a truck (Lewis Cattle Oilers, 2003). Depending on the area in Nepal some farmers or communities may have access to a vehicle, or a team of oxen that can transport the oiler to a community pasture with use of dolly wheels.

Another issue with the product in Nepal is the cost of the oilers themselves. One new single upright Lewis Cattle Oiler will cost around \$3000 (Lewis Cattle Oilers, 2003). This converts to \$242883.17 in the Nepalese Rupee. When 25.2% of people in Nepal live below the poverty line, this cost is simply unrealistic without the help of government agencies in the form of grants or loan opportunities (CIA, 2016). The product would be used most cost effectively if placed in a communal pasture or other areas where many farmers' cattle can all use and benefit from the oilers.

## **Part II Export Potential to Nepal**

### **Introduction to Nepal**

Nepal is located in Southern Asia, land locked between India and China. The population of Nepal is 31 million people (BBC News, 2016). Nepal is divided into three agro-ecological regions, Terai, Hills, and Mountains, as seen in figure 2. The Terai is a lowland region along the southern part of the country; this is Nepal's most agriculturally rich area and is where you can find abundant grain farming (World Atlas, 2016). Within the Hills region there is great diversity of land use due to topography, climate, population, and geological formation. In general, the steep slopes and dry parts of the region are left as forest, grassland or rough/pasture land, while the areas with gentle slopes and reliable rainfall are extensively cultivated, slopes up to 30% are traditionally formed into innumerable terraces for growing crops (Shrestha, n.d). The Hill region is where livestock husbandry, forestry and arable cropping are practiced together (Shrestha, n.d). In the mountain regions, crops and animal agriculture are produced (Tulachan, 2001). A breakdown of agriculture by region in Nepal can be seen in table 2.

Table 5:7  
Average annual livestock contribution to household economies by eco-region (NRs)

Ecological Region	Crops	Livestock	Agriculture Total
Mountain	3549 (52.7)	3190 (47.3)	6739 (100)
Hill	4495 (64.3)	2495 (35.7)	6990 (100)
Terai	8224 (80.0)	2057 (20.0)	10281 (100)
All Nepal	6007 (71.7)	2371 (28.3)	8378 (100)

Figures in parentheses indicate per cent of total  
Source: Shrestha N.P. and Sherchand, L. (1988)

Table 2. (Tulachan, 2001).

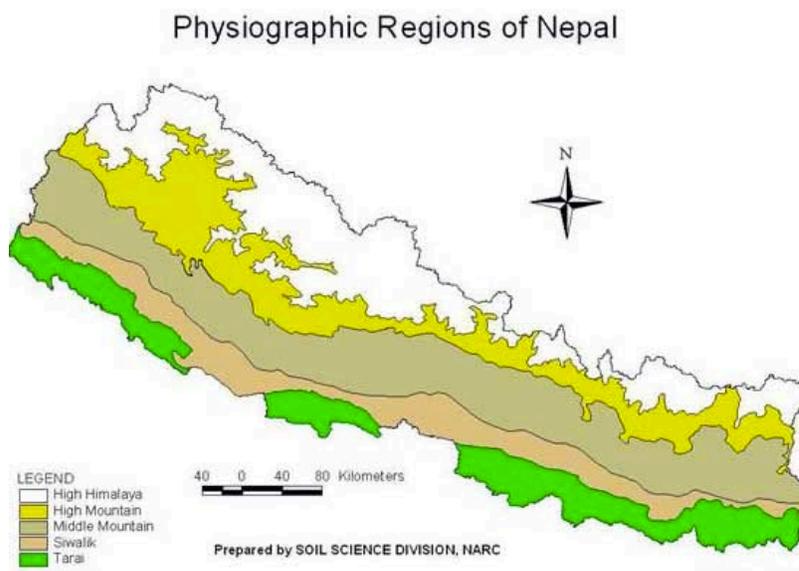


Figure 2- Agro-ecological regions of Nepal. (La Historia con Mapa, 2015)

### Cattle Industry in Nepal

Livestock is an important asset to agriculture in Nepal. The livestock population in relation to arable land in Nepal is relatively high compared to other countries in Asia (Tulachan, 2001). Estimated populations of livestock in Nepal are, 6.2 million cattle, 3.1 million buffalo, 5.4 million goats, and 0.9 million sheep (Tulachan, 2001). Large ruminants in Nepal are a source of manure fertilizer, a protein source, a source of farm power, and have economic value (Abington, 1992). Despite an abundant ruminant population, Nepal still imports livestock, mostly from neighboring countries; this suggests that individual productivity per livestock unit in Nepal is relatively low (Abington, 1992). Different regions of Nepal are home to different breeds of cattle, predominate in the hills of Eastern Nepal are a crossbreed between Siri and Zebu cattle, known as Kachha Siri (Abington, 1992).

Nepalese farmers use primarily three different types of cattle management systems, the transhumance system, sedentary system, and stall-fed system. The

transhumance system is often practiced in the high mountainous areas and involves the migration of cattle from one place to another throughout the year as cattle forage on available resources (Abington, 1992). Sedentary management systems include cattle making daily grazing journeys away from the village but returning to the village in the evening (Abington, 1992). The stall-feeding system is most alike to the average Canadian cattle farm where animals are fed by producers and allowed to graze in pastures.

Low economic gain from cattle systems stem from poor feed quality as well as high levels of disease in cattle. In Nepal major diseases effecting cattle include, rinderpest, haemorrhagic septicaemia, foot and mouth disease, and helminth parasitic diseases (Abington, 1992). Unhealthy cattle results in major economic loss to the producer, especially when herd sizes are small. Estimated economic loss due to disease in ruminants in Nepal is outlined in table 3. Incidences of parasitic diseases are found to vary with altitude as well as the type of herd management system (Abington, 1992). Mosquitoes or other feeding flies that transmit parasites to new hosts can spread helminth parasites (O'Donoghue, 2010). Cattle oilers can help stop the spread of parasitic diseases in Nepal, and overall improve herd health and profits from raising livestock.

Table 3. (Abington, 1992).

**: Estimated loss due to disease (in million Rupees).**

<b>Diseases</b>	<b>1980</b>	<b>1985</b>	<b>1990</b>	<b>1995</b>
<b>FMD</b>	<b>110</b>	<b>123</b>	<b>134</b>	<b>145</b>
<b>Liverfluke</b>	<b>85</b>	<b>92</b>	<b>106</b>	<b>111</b>
<b>H.S.</b>	<b>18</b>	<b>20</b>	<b>21</b>	<b>24</b>
<b>Rabies</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>5</b>
<b>Brucellosis</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>4</b>
<b>Others</b>	<b>20</b>	<b>22</b>	<b>25</b>	<b>28</b>
<b>Total:</b>	<b>240</b>	<b>265</b>	<b>294</b>	<b>317</b>

## Benefits to Nepal

Nepalese can benefit from cattle oilers because they can help stop the spread of diseases caused by fleas, flies, and lice (Campbell, 1994). This will help improve herd health and expansion of the cattle industry. Healthy cattle are more likely to thrive and produce a healthy calf, which will allow for growth of herd sizes. Animal agriculture has many positive affects for Nepalese, but its been proven that lack of preventive care resulting in animal disease hinders the growth of these affects (Redding, Chetri, Lamichhane, Chay, Aldinger, and Ferguson, 2012). Preventative care in the form of cattle oilers will allow for improvements to the livelihoods of farmers by increasing economic gain from higher daily gains and milk production, healthy calves, and minimal labour required, allowing farmers to spend time improving other areas of their farm.

The addition of mineral feeders and salt block holders to the oilers can also reap added benefits to livestock herds in Nepal. These features would ensure livestock are able to acquire the nutrients they need for optimal production that is not always readably available from feed sources. In order to improve productivity of cattle in Nepal improving feed quality and removing seasonal feed deficiencies are essential (Abington, 1992). Mineral feeders are important assets to be able to overcome both these obstacles and improve herd management and health. Livestock husbandry is a critical asset to many impoverished people in developing nations, and often allows for opportunities out of poverty (Randolph, Schelling, Grace, Nicholson, Leroy, Cole, Ruel, 2014). Improving livestock herds with the use of cattle oilers can benefit the people of Nepal by creating economic opportunities.

## Transportation

Transportation of the products to Nepal in the most economically way possible would be a challenge for this project. Oilers and oil would need to be shipped from central Canada, specifically Manitoba and Ontario, to the west coast via rail car by the Canadian National Railway. The products would then be loaded into shipping containers and shipped across the Pacific Ocean to the Bay of Bengal. Specifically, the products would be shipped into the Haldia Port on the west coast of India, in the West Bengal region (Maps of India, 2015). Trucking company Katari Transport Private Limited would ship products to farmers and communities in Nepal. Estimated logistics of transportation costs can be seen in Table 4.

Table 4. Estimated Shipping Costs

Shipping Route and Method	Estimated Price
Manitoba to Vancouver via Rail	\$5,871.00 (CN Rail, 2016).
Vancouver to India via Boat	\$3,010.00 (MoverDB, 2016).
India to Nepal via Truck	\$1,200 (India Post, 2016)
	Total Cost - \$10,081

The estimated total price of shipping cattle oilers to Nepal from Canada is \$10,081.00 Canadian dollars. This price causes the shipment of oilers to Nepal to be unrealistic, as Nepalese farmers cannot afford the costs associated with shipping this large of a product to Nepal.

### Purchasers of the Product

The Lewis Cattle Oilers would be used by a group of Nepalese farmers; therefore groups of Nepalese farmers would be purchasing the cattle oilers and oil. Farmer organizations in Nepal, such as Nepal Agriculture Federation could also purchase or contribute to the price of the oilers. The Project for Agriculture Commercialization and Trade (PACT) is a project created by the Government of Nepal, overall the projects goal is to improve the competitiveness of small farmers and agribusinesses in districts of Nepal. They achieve this goal by aiding farmers to access profitable markets with the use of technology and information, creating partnerships, and reducing obstacles to the farmer in the agricultural industry (Project for Agriculture Commercialization and Trade, n.d.). The Ontario dealer for Lewis Cattle Oilers is Darrell Wiebe, who can be contacted at 1-800-665-0458 for information and Tom Manley of Homestead Organics can be contacted at 613-543-0480. These men can be put in contact with Dr. Prasad Sharma, who is the project director of the Government of Nepal, Project for Agriculture Commercialization and Trade (PACT), this project can help bring together farmers and communities with cattle oilers to increase herd health. They can also be put in in contact with Mr. Ganesh Kumar who is president of the Nepal Agricultural Federation and can be reached by phone at 985-108-4226.

### Competitive Products

Currently there are no competitive producers of cattle oilers in nearby countries, like India and China that would decrease shipping costs and make cattle oilers in Nepal more cost efficient. However, there are other brands of cattle oilers manufactured in the

United States. Easy Way Cattle Oilers are an American company based out of Decorah Iowa (Easy Way Cattle Care, 2016). The Easy Way Cattle Oiler has many of the same features as the Lewis Cattle Oiler but has a less efficient design by placing the mineral feeder in the middle and not including aerodynamic features to keep mineral dry.

### Future Studies

Future studies and more information would need to be gathered in order to ensure the shipment of Canadian cattle oilers to Nepal is feasible. Numerous research studies have been done on the types of parasites and their affects on Canadian cattle, however little is known about parasites and their affect on cattle in Nepal. Nepal may have different insects and require different insecticides or perhaps none at all. The difference in breeds of cattle in Nepal may also have an affect on the usefulness of cattle oilers, as some Nepalese breeds may be resistant to certain parasites. Changes in altitude throughout Nepal may mean that oilers are useful in some areas but not in others as ecosystems change throughout the country.

More extensive research would also need to be done on the exact cost of shipment to Nepal. Estimates were done on the costs of shipments but depending on the number of oilers and different shipment companies, costs can vary.

### Conclusion

Cattle oilers can bring many positive benefits to Nepalese farmers. Healthier cows will allow for greater economic gain and improved livelihoods of farmers. However, this proposal is simply not feasible at this point in time due to high costs to Nepalese farmers

and farm organizations. The costs of oilers themselves, the cost to fill the oilers with a high quality product that has environmental benefits, and the costs of shipping are extremely high. The total cost for shipment of one oiler, the Lewis Cattle Oiler, and the cost to fill the oiler is \$13,359.00. Government grants or other programs between Canada and Nepal would need to be implemented in order for this product to work in Nepal.

## References

Abington, J. B. (1992). *Sustainable Livestock Production in the Mountain Agro-ecosystem of Nepal*, (pp. 47-55). N.p.: Food & Agriculture Org. Retrieved from [https://books.google.ca/books?id=5qwIPiLsbbkC&pg=PA61&lpg=PA61&dq=diseases+by+parasites+in+cattle+in+nepal&source=bl&ots=1tOKGeshP0&sig=L6fLYPIi\\_FUQeoDI5RIY6Pr3X0g&hl=en&sa=X&ved=0ahUKEwjEhaWDpq7QAhVK](https://books.google.ca/books?id=5qwIPiLsbbkC&pg=PA61&lpg=PA61&dq=diseases+by+parasites+in+cattle+in+nepal&source=bl&ots=1tOKGeshP0&sig=L6fLYPIi_FUQeoDI5RIY6Pr3X0g&hl=en&sa=X&ved=0ahUKEwjEhaWDpq7QAhVK)

Alberta Agriculture and Forestry. (2016). Diseases/Insects/ Pests: Livestock Parasites.

Retrieved November 28, 2016, from <https://www.agric.gov.ab.ca/app21/infopage?cat1=Diseases/Insects/Pests&cat2=Parasites>

BBC News. (2016, August 24). Nepal country profile. Retrieved November 15, 2016, from <http://www.bbc.com/news/world-south-asia-12511455>

Bonner, M. R., Coble, J., Blair, A., Freeman, L. E., Hoppin, J. A., Sandler, D. P., & Alavanja, M. C. (2007, May 17). Malathion Exposure and the Incidence of Cancer in the Agricultural Health Study [Abstract]. *American Journal of Epidemiology*, 166(9), 1023-1034. doi:10.1093/aje/kwm182

Byford, R. L., Craig, M. E., & Crosby, B. L. (1992). A review of ectoparasites and their effect on cattle production. [Abstract]. *Journal of Animal Science*, 70(2), 597. doi:10.2527/1992.702597x

CIA. (2016, November 03). The World Factbook: NEPAL. Retrieved November 15, 2016, from <https://www.cia.gov/library/publications/the-world-factbook/geos/np.html>

CN Rail. (2016, November 29). Price Proposal. Retrieved November 29, 2016, from

- [https://ecprod.cn.ca/velocity/POWCarloadFrontend/public/english/GetCarloadPrice?s\\_igid=CarloadPrice-feature-rght-getcarloadprice](https://ecprod.cn.ca/velocity/POWCarloadFrontend/public/english/GetCarloadPrice?s_igid=CarloadPrice-feature-rght-getcarloadprice)
- Easy Way Cattle Care. (2016). Easy Way Cattle Care Oilers. Retrieved November 29, 2016, from <http://www.easywaycattlecare.com/>
- Ghimire, S., Egerton, J., & Dhungyel, O. (1996, November). Characterisation of *Dichelobacter nodosus* isolated from footrot in sheep and goats in Nepal [Abstract]. *Small Ruminant Research*, 23(1), 59-67. doi:10.1016/s0921-4488(96)00892-9
- Global Affairs Canada. (2013, April 20). Canada's State of Trade: Trade and Investment. Retrieved November 28, 2016, from [http://www.international.gc.ca/economist-economiste/performance/state-point/state\\_2012\\_point/2012\\_7.aspx?lang=eng](http://www.international.gc.ca/economist-economiste/performance/state-point/state_2012_point/2012_7.aspx?lang=eng)
- Global Petro Prices. (2016, November 21). Nepal Diesel prices, liter. Retrieved November 27, 2016, from [http://www.globalpetrolprices.com/Nepal/diesel\\_prices/](http://www.globalpetrolprices.com/Nepal/diesel_prices/)
- India Post. (2016). Cost of Sending Parcel to Nepal from India. Retrieved November 29, 2016, from <https://www.findpincode.net/speedpost/cost-charges-send-parcel-nepal-india#calculator>
- Kalyani Industries. (2016). Malathion 50% EC. Retrieved November 28, 2016, from <http://www.kalyaniind.com/malathion-50-ec.html>
- Khan, B. A., Dr. (2002, February 28). Black Fly Control. Retrieved November 27, 2016, from [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex3321](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex3321)
- La Historia con Mapa. (2015). Nepal Land Use Map. Retrieved November 29, 2016,

from <http://www.lahistoriaconmapas.com/atlas/country-map10/nepal-land-use-map.htm>

Lewis, R. (2009, July 31). As few as 40 horn flies are considered an economic threshold for treatment, but untreated numbers can range into the thousands. Grainews. Retrieved November 28, 2016, from <http://www.grainews.ca/2009/07/31/as-few-as-40-horn-flies-are-considered-an-economic-threshold-for-treatment-but-untreated-numbers-can-range-into-the-thousands/>

Maps of India. (2015, January 27). Haldia Port. Retrieved November 29, 2016, from <http://www.mapsofindia.com/maps/sea-ports/haldia-port.html>

MoverDB. (2016). Overseas Cargo & Freight Costs From Canada. Retrieved November 29, 2016, from <http://moverdb.com/freight-costs-canada/>

O'Donoghue, P. (2010, July). PARA-SITE. Retrieved November 28, 2016, from <http://parasite.org.au/para-site/contents/helminth-intoduction.html>

Project for Agriculture Commercialization and Trade. (n.d.). Project for Agriculture Commercialization and Trade. Retrieved from [http://pact.gov.np/?option=cms&cms\\_id=373332303330&sid=373337333330](http://pact.gov.np/?option=cms&cms_id=373332303330&sid=373337333330)

Randolph, T. F., Schelling, E., Grace, D., Nicholson, C. F., Leroy, J. L., Cole, D. C, Ruel, M. (2014, December 8). Role of livestock in human nutrition and health for poverty reduction in developing countries [Abstract]. *Journal of Animal Science*, 85(11), 2788-2800. doi:10.2527/jas.2007-0467

Shrestha, R. K. (n.d.). Agroecosystem of the Mid-Hills. Retrieved November 27, 2016,

from <http://www.fao.org/docrep/004/t0706e/T0706E02.htm>

Tulachan, P. M., Dr. (2001). Mountain Agriculture in the Hindu Kush–  
Himalaya. *Mountain Research and Development*, 21(3), 260-267.  
doi:10.1659/0276-4741(2001)021[0260:maithk]2.0.co;2

Wesley Veterinary Clinic. (2016). Pharmaceuticals and Supplies. Retrieved November  
27, 2016, from <http://wellesleyvet.com/pharmaceuticals-and-supplies/>

World Atlas. (2016, July 12). Geography of Nepal, Landforms. Retrieved November 27,  
2016, from <http://www.worldatlas.com/webimage/countrys/asia/nepal/npland.htm>