Goat semen export to Nepal from Canada

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Part 1- Product Info:

Nepal is one of the poorest and least developed countries in the world (The World Factbook, 2014). Farming is a very big industry for the Nepalese, but since most of their agriculture is based on subsistence farming little of their food or animals are sold to provide money for their family (Nepal-Agriculture, 2014). Goat farming in specific in Nepal is based on poor quality goats with low productivity that are adapted to the environment (FAO, 2010). The export of goat semen to Nepal from Canada would greatly help goat farmers in Nepal. This is because they would be able to improve the genetics in their goats to get higher productivity and quicker growth so that they can move away from subsistence farming and be able to sell their goats for increased profits. Increasing the genetics of goats in Nepal would add higher value to their goats so that the Nepalese farmers will be able to get better prices for their goats when selling them at the market. This would ultimately increase the income that Nepalese goat farmers are able to make in a year and help them to attain better living conditions.

Product Technology:

In order to artificially inseminate goats, the semen needs to be collected from a male goat (buck) and then transferred into the reproductive tract of a female goat (doe) (Smith J., 2009). When artificially inseminating goats it is important to breed the doe two or three times at twelve hour intervals in order to increase the chances of a healthy sperm contacting a healthy ovum and successfully fertilizing the doe (Smith J., 2009). There are three methods of storage of semen: frozen, liquid or in a fridge (Haenlein at al., 2014). Frozen semen first needs to be diluted with Ortho Semen Diluter (19:1 ratio) or plain milk (19:1 ratio), then slowly cooled to liquid

nitrogen temperature of -196^{o}C (Haenlein at al., 2014). Liquid semen can be stored at 37^{o}C but needs to be used within three hours of collection (Haenlein at al., 2014). The semen can also be stored in a closed collection tube placed in water in the fridge, however, this can only be for 24-48 hours (Haenlein at al., 2014).

Canadian Company:

Goat semen will be purchased from OC Flock Management in Bowden Alberta, which is founded and run by two veterinarians, Lynn Tait and Ileana Wenger (OC Flock Management n.d.). They provide semen from six different breeds of bucks along with complete genetic information and pedigrees for each buck. This provides the person buying semen with information on the sire and dam of the buck in which they are purchasing the semen from, as well as pictures of the buck. OC Flock is approved by CIFA (Canadian Food Inspection Agency) for quarantine and semen and embryo production (OC Flock Management n.d.). For More information on OC Flock Management, they can be contacted by phone at: 1-403-357-8652 or fax at: 1-403-224-2431. They can also be contacted on their email at: ileana@ocflock.com or lynn@ocflock.com. Their website will be listed in the reference list below.

Canadian Benefits:

Benefits to Canada would be that shipping goat semen to Nepal would increase the demand for goat semen and genetics in Canada, and therefore bring profits to Canadian companies and farmers. Also, if genetics are successfully increased in Nepal it has the potential to provide more jobs for people in the goat industry, as well as possible business expansions. OC Flock provides training for

semen processing, artificial insemination and embryo transfer for goats (OC Flock Management n.d.). The courses take place at their main facility in Bowden Alberta, but training programs can be provided in other areas as well. These programs are priced differently based on where the will be taking place so there is no set price (OC Flock Management n.d.). If theses training programs are successful and in high demand in Nepal, it could result in OC Flock needing to hire more staff to be able to go to Nepal to train Nepalese farmers. Thus resulting in more jobs for Canadians, and increasing the profits made by OC Flock. Canada's trade with Nepal is fairly minimal, so exporting goat semen will increase the trade between the countries (Government of Canada, 2014). This could help build good relations between the countries, as well as possibly open up new trade possibilities with neighbouring countries to Nepal which are having similar agricultural issues. In the 2012-2013 year Canadian exports to Nepal totalled $7.1 million and Canadian imports from Nepal totalled $11.7 million (Government of Canada, 2014). Imports from Nepal are primarily clothing, and some exports to Nepal include: machinery, paper, vegetables as well as other items (Government of Canada, 2014). Increasing trade with Nepal will contribute to Canada's economy, and possibly provide more and new trade opportunities with Nepal.

Part 2- Export Potential to Nepal:

Nepal is a landlocked country located in southern Asia between India and China (The World Factbook, 2014). Nepal is based on three different geographical regions, the hills, Himalayan, and the terai (Naturally Nepal, 2012). Each

experience different climatic conditions. The terai region has a moderate temperature change of 7°C to 37°C in the winter and summer months respectively, however, the hills and Himalayan regions can reach temperatures of well below zero (Naturally Nepal, 2012). Nepal has a total land area of 147,181 square kilometers, with 16% arable and 11,680 square kilometers irrigated (The World Factbook, 2014). Nepal's economy is very poor and many of its citizens live in poverty. Out of a population of 30,986,975, 46% are unemployed and one quarter live below the poverty line. The main contributor to Nepal's economy is agriculture, with 75% involved in the agriculture sector. Activity in the agriculture industry is mainly processing products such as pulses, sugarcane, tobacco and grain. They also have a large potential to produce hydropower from the numerous Himalayan rivers (The World Factbook, 2014).

Marketing and Sales Strategy:

Before semen is sent to Nepal, sales representatives will be sent into the hills region where the goat population is 300,071 (Ghimire S., 1991). They will then inform the Nepalese goat farmers about artificial insemination and its many benefits and potentials it has. The number of Nepalese goat farmers wanting to purchase goat semen will be recorded so that the right number of semen straws are sent over and there will not be extra going to waste or too little for the farmers. Once the numbers of semen straws needed to be shipped to Nepal is known then the number of nitrogen tanks needed can also be calculated. The semen will be shipped directly from Calgary International Airport to Tribhuvan International Airport in Kathmandu. The cost of shipping one CT-3 dry tank to Nepal would be

approximately $230.43 - $254.69 Canadian dollars, and one CT-6 storage tank would cost approximately $280.72 - $310.27 Canadian dollars (World Freight Rates, 2013). Duties exporting goat semen into Nepal will be 10% (Department of Customs, 2012).

Storage and Associated Costs:

Since goat semen cannot be stored fresh for long periods of time it will need to be shipped and stored in a liquid nitrogen container (CT Cryogenics, 2012). Semen tanks can be ordered online from SemenTank.com and shipped to Canada. Two types of nitrogen tanks will be needed, one for shipping the semen and one for storing the semen while in Nepal. The shipping tank will be a CT-3 dry Shipper which can hold 470 0.25cc straws for 17 days. The storage tank will be a CT-6 which can hold 1788 0.25cc straws for 42 days (CT Cryogenics, 2012). The number of Nepalese goat farmers wanting to purchase goat semen will determine the number of straws and nitrogen tanks needed to be purchased. The semen costs approximately 15 Canadian dollars per 0.25cc straw, or 1318.21 Nepalese rupees (CT Cryogenics, 2012). However, there are occasionally clearance prices at OC Flock where semen can be purchased at discounted prices if ordering large quantities of straws, such as 50-100 straws for 10 Canadian dollars per straw (OC Flock Management n.d.). The nitrogen tanks cost 599 Canadian dollars for the CT-3 shipping tank and 349 Canadian dollars for the CT-6 storage tank (CT Cryogenics, 2012).

Cost Breakdown:

Product	Price	Shipping Price
Semen Straws	$15.00 per 0.25cc straw	Stored in shipping tank
CT-3 Tank	$599.00	$230.43 - $254.69
CT-6 Tank	$349.00	$280.72 - $310.27

Nepalese Benefits:

Benefits to Nepal would be that shipping goat semen to Nepal would increase the genetic quality in their goat herds more quickly because they would be able to breed more does in a day (Smith, 2009). Quality of goats is poor in Nepal and Nepalese farmers rely on local breeds of low productivity that are adapted to the environment (FAO, 2010). So high quality Canadian genetics could be combined with the low quality, but environmentally adapted breeds in Nepal. Nepalese farmers would also not have to keep bucks for breeding and could instead sell them for additional profits. Artificial insemination is very beneficial because it can increase genetics in goat herds without the risk of diseases (OC Flock Management n.d.). It can also increase milk production and growth speeds of goats, allowing the Nepalese farmer to make money quicker as well as more money. Not to mention goat semen is easier to market and sell in remote areas such as the hills region in Nepal rather than trying to sell live goats. Nepalese farmers will also be able to have semen for breeding from their top producing goats even after they have been sold if they collect semen from them before they are sold (OC Flock Management n.d.). This semen could then be used to breed another goat or goats in their flock for similar traits, thus ensuring that Nepalese goat farmers will always have a high quality of genetics

in their goats even if they do not have a breeding buck at all times. In Nepal goats are the second most popular source of meat next to buffalo, producing 53956 metric tons of meat in the 2011-2012 year (Kathmandu University n.d.). These numbers are also increasing as the goat industry in Nepal has an annual growth of 4% per year (Kathmandu University n.d.). The area of primary focus for increasing goat genetics in Nepal will be the hills region since that is where the largest goat population is (Ghimire S., 1991). However, it will not be limited to farmers in the hills region and all goat farmers will be able to purchase goat semen if they want to. Livestock production in the hills region provides approximately 20% of the annual household for those living in the hills from the sales of milk and meat (FAO, 2010). Not only would shipping goat semen to Nepal help the Canadian economy, but it would also help Nepal's economy. The livestock industry in Nepal contributes to about one third the agricultural GDP and four percent to national exports (FAO, 2010). Nepal has a very high population of people in in the agriculture sector at 75% (The World Factbook, 2014). So by taking advantage of an already large industry in Nepal, the export of goat semen could improve their goat genetics so that farmers owning smaller goat flocks could generate higher incomes for their families.

Export Issues:

Possible issues of exporting goat semen to Nepal would be that Nepal has to have an official import protocol negotiated with the CIFA (OC Flock Management n.d.). Also frozen semen being exported out of Canada has to be processed by a CIFA certified quarantine facility that is specifically licensed for goats and sheep. Fortunately OC Flock is the only facility in western Canada that meets these requirements which allows them to export goat semen out of Canada (OC Flock

Management n.d.). Another potential issue will be that there are few roadways there. With only 10,844 km of roads, and 5,892 km of them are unpaved (The World Factbook, 2014). To make things even more difficult, over 60% of the roads are concentrated in the terai region of Nepal (The World Bank, 2013). Transportation costs in Nepal are also very high due to vehicle operating costs. However, there are 43 airports in Nepal, which are crucial to growth and trade in Nepal. As well as accessing villages in the hills and mountain regions that are inaccessible by roads (The World Bank, 2013). When bringing goat semen to farmers in the hills region in Nepal it may be necessary to reach many of them by plane. This will increase the cost of exporting semen, but is the only possible solution to accessing theses remote areas.

Co-ops and Business opportunities:

Since the cost of semen is 1318.21 rupees per straw many farmers may not have the means or funds to pay for one straw, let alone the two or three straws recommended for artificially inseminating goats. If farmers are not able to pay for the semen themselves, they could possibly purchase it together with neighbouring farmers and then breed and build up their stocks until they can purchase more semen themselves. The average farmer in the hills region makes 35,093 rupees per year (Maltsoglou & Taniguchi, 1996). So they could afford the three straws of semen recommended for artificial insemination worth 3954.63 rupees. However, the Nepalese farmers may have more important things to spend their money on such as food and clothing for their family. If farmers in Nepal choose to artificially inseminate their goats, most likely they will only inseminate one goat because it is quite a large expense. As a result it will be a slow process if they are only able to breed one goat per year, though it will mean that exporting goat semen to Nepal from Canada will be continued for many years rather than a onetime thing.

Additional costs would be the training for artificial insemination and purchasing an artificial insemination kit. Both of which do not have a set price, so costs will be different for each farmer based on location and their artificial insemination kit specifications (OC Flock Management n.d.). These costs could easily be split between multiple goat farmers in Nepal however so they would not be great expenses for each farmer. Multiple farmers could share the cost and take the training program together as well as purchase the artificial insemination kit together and share it amongst themselves. If not all goat farmers are able to take the artificial insemination training program, the ones that were able to could go around to farms in Nepal artificially inseminating goats for farmers. This could open up small businesses for some farmers and provide additional incomes for them by going around artificially inseminating goats for other farmers each year.

Profitability:

In order to make a profit exporting goat semen to Nepal, 101 straws of semen at 15 Canadian dollars each would need to be sold valuing 1515 Canadian dollars. Total costs including shipping and the CT-3 and CT-6 tanks would be 1512.96 Canadian dollars. Given the fact that goats should be bred three times for best chances of fertilization this would mean that approximately 34 goats would need to be bred to make a profit. Which is very doable since 75% of the population in Nepal is involved in agriculture (The World Factbook, 2014). This means that only 34 people would need to breed one goat each in order for exporting goat semen to Nepal to be profitable. Another option that could work equally as well is if two farmers bred one goat together and shared the costs. This would mean that 68 farmers would be needed to breed 34 goats, thus making it a profitable endeavour.

Global Competition:

Artificial insemination of goats is currently being used in India, which is right next to Nepal (ICAR, 2010). India could be a potential competitor to Canada for exporting goat semen to Nepal. 93.9% of Nepal's exports are to India, and 79.4% of their imports are from India (The World Factbook, 2014). As a result Nepal may rather import goat semen from India than from Canada. This could be because of many reasons, but the main reasons might be because they already trade with India often so it would make sense to continue trading with them. Another reason might be because the shipping costs would be less. There would be no need for shipping by air because of their close proximity to each other so the goat semen could be shipped by truck instead which costs less than by air. There are no websites on the internet providing information on the cost per straw of semen in India, so the comparison of product prices in Canada and India is difficult to determine. Though cost of semen could definitely play a factor in Nepalese farmer's decision to buy semen from Canada or Nepal. Canada however, is regarded in agriculture around the world for having low risks of disease, as well as the production of some of the best genetics available worldwide (OC Flock Management n.d.). Due to Canada's high quality of genetics the overall result over an extended period of time would be better. Though initial cost would be less if purchasing goat semen from India, the improvement in goat herds would be less and not as beneficial to Nepalese farmers.

In conclusion, shipping goat semen to Nepal will greatly benefit goat farmers by increasing the genetics in their goat herds. Breeding goats in Nepal with semen from Canadian goats would be able to improve the genetics in Nepalese goats to get higher productivity and quicker growth. Increasing the genetics of goats in Nepal would also add higher

value to their goats so that the Nepalese farmers will be able to get better prices for their goats when selling them at the market. Not only would exporting goat semen to Nepal benefit the Nepalese, but it would also benefit Canada. The trade between Nepal and Canada right now is fairly small (Government of Canada, 2014). So exporting semen to Nepal could possibly open up new trade opportunities with Nepal in the agriculture sector, as well as other neighbouring countries to Nepal. There is also the potential to increase jobs in Canada if the demand for exporting goat semen becomes high enough in demand. Overall, the export of goat semen to Nepal would benefit both Canada and Nepal, but most importantly help the Nepalese farmers to be able to provide for themselves and their families.

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