

The Opportunity to Export Hop Rhizomes from Canada to Nepal

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Product Information

Hop farming is an essential aspect of the beer brewing industry thus making the growing of hop plants an extremely profitable business. The shipping of hop rhizomes to be planted is a more efficient process than the selling and planting of a fully grown plant due to the large size of hop vines and also as it will allow for the roots to adjust to the surrounding soil.

Though farming of rhizomes can be extremely successful the initial cost and purchase of rhizomes would be unfeasible for Nepalese citizens (Morgan, 2015). Initial cost and upkeep of the farm is extremely expensive making it unmanaged with the average Nepalese citizen's income thus resulting in rhizomes being an unrealistic export idea to Nepal (Sirrinc, Lizotte, Brown, 2014). Though majority of citizens would be unable to afford a hop farming business some of the wealthy citizens or already existing hop farms may be able to purchase a few Canadian grown Hops for home brewing or the start of a small business.

Cascade hop plants are widely known for the unique taste that beers obtain with the use of the plant. Cascades provide beer with a combination of spicy, citrus, and floral taste therefore appealing to almost every consumer's taste buds (YCHHOPS, N/D). The cascade hop was originally bred in Oregon by the United States Department of Agriculture (U.S.D.A) (Hops of Pelham Inc, N/D). Due to being under experimentation cascade hops were not released for public sales by the U.S.D.A until 1972 therefore giving the department of agriculture over 15 years to perfect the product (YCHHOPS, N/D). This extensive time period to work on the plant allowed for the U.S.D.A to create one of the most popular hops on the market.

i) *Nutritional/Brewing Value*

Table 1: Provides the brewing value of a Cascade Hop Cone

Nutrient Makeup	Percentage/Amount
Alpha Acid	5.5-9%

Beta Acid	6-7.5%
Co-humulone	30-35%
Total Oil	0.8-2.5mL/100g
B-Pinene	0.5-0.8% of total oil
Myrcene	45-65% of total oil
Linalool	0.3-0.6% of total oil
Caryophyllene	5-9% of total oil
Farnesene	6-9% of total oil
Humulene	14-20% of total oil
Geraniol	0.2% of total oil

(YCHHOPS,N/D)

ii) *Cascade Hops in Ale Production*

Cascade hop plants are most commonly used for the production of different types of ale (Beer Legends, N/D). Ale is known as a malt beverage that is considered to be more bitter than other



beers and contains a higher alcohol percentage (Dictionary, N/D).

Cascade hops being used in ale production will provide the drink with a different colour than Nepal's commonly drunk lagers

(Karki, 2014). Ales such as the ones made with cascade hops are darker than the normal lagers and pose a reddish amber or gold colour (Beer store, N/D). The main difference other than colour between that of an ale and lager is that ale is produced by top yeast fermentation while lagers are produced by bottom yeast fermentation (Beer store, N/D). This means that yeast used in ale production works better at a temperature of 10-20 degrees Celsius whereas yeast used in lagers are suitable between temperatures of 7-15 degrees Celsius (Beer advocate, N/D).

iii) *Important Facts about Hop plants*

Cascade hop plants reach full maturity during the middle of the growing season. Once the hops have reached the maturity level cascade hops will produce a low to moderate yield of approximately 1600-2000kg/hectare (Beer Legends, N/D). Once picked Cascade hop plants do not have a long self-life, only maintaining 48-52% of alpha acid content if stored at a temperature of 20 degrees Celsius for six months (Beer Legends, N/D). Therefore farmers must insure that a contract is made with a brewery so that already picked cones will not spoil if not sold and used before the six-month period has passed. Cascade hops are also fairly susceptible to diseases and pest so proper procedures must be followed to insure that crops are not lost. (Beer Legends, N/D). While purchasing hop rhizomes farmers should insure that only female rhizomes are purchased and planted as only female plants produce cones which is the part of the plant that is used within the brewing business. If male hop plants are in the same area as the female plants germination will occur resulting in the cones to produce seeds. Seeded cones are undesirable to breweries therefore resulting in farmers losing profit as the plants will not be purchased (Rouge Farms, 2013).

iv) Cultivation:

Hop plants enter the growing season in the early spring therefore the plant should be planted after the last frost of the season. Planting of the rhizomes usually occurs in the month of March (Morgan, 2015). In order to have the best results for plant growth the rhizomes should be planted in holes that are approximately 2 feet in diameter and replenished with a large amount of compost placed on top of the soil (Oran, 2011). The compost will enrich the soil therefore providing the rhizomes with more nutrients to help them grow. Each rhizome will have individual plantation needs as some will need to be planted horizontally and others will need to be planted vertically depending on the location of each of the buds (Oran,2011). Once the rhizomes are planted it is important for a system of bines of roughly 30-feet in height are available for the vines to grow around (Oran,2011). After the sprouting of the rhizomes begins the translucent plant will soon become green due to chlorophyll being produced with sunlight reaching the now sprouted plant (Oran, 2011). Sunlight is extremely important in the growing of almost all plants; therefore, in order to insure that the hops get optimal sunlight it is important to choose the healthiest vine and wrap it in a clockwise position around the twine which was

previously set up (Rogue Farms,2013). The training of each plant with twine will allow for the hops to receive optimal sunlight as the growth will be in the direction of the sun. The twine wires will also provide structural support of the large vines (Rogue Farms,2013). As the season continues on it is important that the plants receive a sufficient amount of watering each day and the soil remains damp (Oran, 2011). As the plants continue to mature and grow farmers must also take precautions to lower the chances of pest and diseases affecting the crops.

v) *Secondary Cost:*

In order to successfully run a hop farm, it is important that enough money is saved for fertilizers, pest control, and products to train the plants growth. A study performed by Michigan State university estimated that the initial cost of a 5 acre hop farm in the United States is around \$13,668 USD (Sirriner et al., 2014). This price is not including the cost of labour, labour included cost to run a 5 acre hop farm results in the owners spending a total of approximately \$68,340 USD (Sirriner et al., 2014). As years pass the cost of up keeping the facility will increase as each plant will require more than one string of twine to hold the vine up therefore adding to the yearly maintenance costs. The study also showed that after a five year growing period farmers made a revue of around \$5,495 USD per acre of farm (Sirriner et al., 2014). If the initial and yearly cost of hop farming can be easily afforded, a large amount of profit can be made each year depending on the size of the crop yield.

Figure 2: Cost per acre and cost per 5 acres of hop farm in Michigan
(2014, Michigan State University)

Expense	Cost per acre	Cost-per-acre notes	Cost per 5-acre yard
Land preparation			
Discing	\$26	\$26/acre	\$130
Hop yard establishment			
Post holes – digging	313	2.5 hrs @ \$125/hr (145 hp tractor)	1,565
Post holes – placement	750	6 hrs @ \$125/hr	3,750
Field poles	2,120	53 @ \$40/pole	10,600

a			
	1,350	27 @ \$50/pole	6,750
End poles			
Earth anchors	689	53 per acre @ \$13 each	3,445
Wire	1,000	Galvanized 7-strand (\$800) + #9 (\$200)	5,000
Miscellaneous hardware and supplies	500	Staples, hammer, Crosby clips, etc.	2,500
Labor – installing poles	480	4 workers @ 12 hrs each @ \$10/hr	2,400
Management	240	12 hrs @ \$20/hr	1,200
Hop plants	4,000	\$4/plant, 1,000 plants per acre (when planted on a 14' x 3.5' grid)	20,000
Labor – planting	700	70 hrs @ \$10/hr	3,500
b			
	1,500	Includes installation	7,500
Irrigation			
Irrigation well		Variable	
Total initial costs	13,668		68,340

vi) *Transportation:*

Transportation of the hop rhizomes is an extremely important part of the exporting process. In order to insure the rhizomes can successfully make the journey from Canada to Nepal trustworthy shipping companies must be used throughout the process. The rhizomes first must get picked up in Fenwick Ontario and travel to Toronto Pearson International Airport. AES Trucking and Delivering Company will transport the rhizomes from Fenwick to Toronto insuring that each plant will successfully make it to the airport and be able to continue on the long journey to Nepal. Once arrived at the airport the plants will then be loaded onto one of Priority Air Cargos planes and depart from Toronto to Tribhuvan International Airport in Nepal. Once the rhizomes have arrived in Nepal farmers will have the option to pick up the amount of plants order to lower the total shipping cost or companies such as Shangri-La Freight may be used to insure that the rhizomes arrive to each farm. Due to such a large number of rhizomes being needed to successfully start a hop farm shipping cost will be lowered as there will be a large quantity of rhizomes being shipped at once. Even with lower shipping prices it is still unlikely that farmers will be able to afford the cost to get the plants from Canada to the farms in Nepal.

Canada and Nepal

i) History of Trade

Since 1965 Canada and Nepal have had a bilateral trade relation, this agreement has benefitted both countries' economies for more than forty years (Government of Canada, 2014). Between the years of 2012-2013 Canada exported a total of 7.1 million dollars of product mostly consisting of machineries, vegetables, and optical instruments to Nepal (Government of Canada, 2014). Nepal exported a total of 11.7 million dollars to Canada in products such as textile garments and apparels. This well-developed trade argument reached a range of 15 million to 23 million dollars per annum between 2008-2013 (Government of Canada, 2014). Since the start of the trade agreement in 1965 Canada has invested 470 million Canadian dollars to help both large and small programs to further develop the country of Nepal (Government of Canada,2014). The last forty years have benefitted both countries' and allowed for Canada to become known for its fair trade and agreements with developing countries.

Export Potential to Nepal

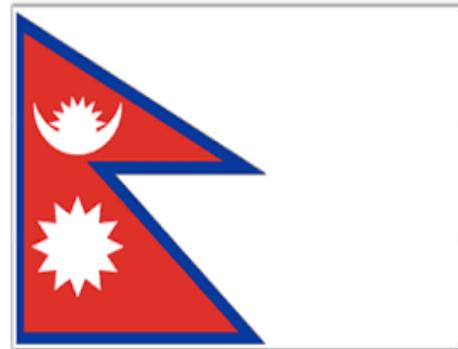


Figure 3: Nepal's National Flag

i) About Nepal

Nepal is a small country located in southern Asia between India and China (Pradyumna, Matinuzzaman, Proud, and rose, 2016). Nepal is most commonly known for being the home of the world's tallest Mountain Mount Everest. Though Nepal has a large tourist industry the country has always been classified as developing. In more recent years Nepal has faced a major setback after experiencing an earthquake of a magnitude of 7.8 resulting in the loss of over 9,000 lives and extensive damage to settlements (Rafferty, 2016). The earthquake has had lasting effects on the country due to the inability to fix all of the damage that was caused by the earthquake. Businesses in all sectors of the agricultural industry have experienced a decline in profit as structures, and tools have been damaged due to the earthquake. Even after the natural disaster Nepal's tourist industry is still thriving which allows for many companies to sell to a wealthier cliental and in turn restart the businesses that were lost (Wearn, 2016).

ii) What Area is Most Suitable for Hop Farming?

Nepal has a landmass of 147 181 km² with 28.7% of it being used for different agricultural purposes (Karan, Zuberi, Proud, and Rose, 2016) (World Bank, 2015). Nepal's agricultural regions can be broken down into three sub regions known as the Himalayas, hill region, and the terai. The cascade rhizomes would be best suited to grow in the hill region as it is the most fertile region within Nepal therefore allowing for the hop plants to have the ideal area for optimal growth (Sherestha, N/D). The rhizomes should be planted in this region

during early spring to allow for the roots to take full hold of the soil. An excess amount of water must be provided to each hop plant during the growing season as Nepal receives more than 80% of the rainfall during the moonshine season which starts towards the end of June therefore not allowing for the plants to receive enough water to stay healthy and grow during months prior to this (World Travel Guide, N/D). The growing and production of hop plants in Nepal is more than possible but it must be insured that plants are receiving a sufficient amount of water during drier seasons in order to continue growth.

iii) *Nepal's Beer Industry*

Majority of beer sold within Kathmandu (Nepal's made up of lager only allowing for 1% of the beer sold to be types of brews (Karki, 2014). This large majority of lager beer being sold and produced within Nepal allows for a new beer

market to be formed. Approximately 92.3% of Nepalese citizens drink lager therefore allowing for the selling of a new product/brew to be appealing to already large beer drinking cliental (Laurence, 2015). Due to majority of beer consumed in Nepal being lagers cascade hops provide companies and famers with a new opportunity to expand the brand by selling a new and "exotic" type of beer. The production of ale with Canadian grown hops will bring forth a new affordable alcoholic beverage to those in Nepal. The new market will result in cascade hops to be widely desired by brewers that are trying to increase company sales as the plants will provide an exciting and intriguing new taste of beer.

iv) *Benefits to Nepal*

By exporting hop rhizomes to Nepal a larger number of hop farms can be started throughout the country therefore allowing for the already booming beer industry to experience a drastic increase in production and sales. Hop farms require a large area of land to be profitable therefore requiring for a large amount of manual labour to successfully run the operation. With the increase in sales the economy will also experience an increase. This increases will result in more Nepalese citizens finding employment or receiving a job with an increased salary. A large

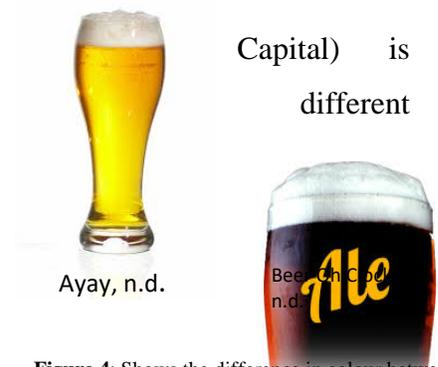


Figure 4: Shows the difference in colour between a lager and Ale. Lager is pictured on the left and ale is pictured on the right.

Capital) is different

number of citizens within Nepal live on an income of \$14 USD per month making it extremely hard to afford basic necessities (International Fund for Agriculture Development, N/A). With the beer industry experiencing an increase with the new cascade hop plants a demand for workers will be extremely high therefore allowing for individuals to acquire a working position thus increasing their financial status.

The farming of the cascade hop plant will also allow for a new type of beer (ale) to be produced on a larger scale throughout Nepal. The production of a new product can be sold throughout the country and also exported. Many people world-wide enjoy trying new flavours or a different countries beer therefore by having a new product available Nepal can increase beer sales not only within the country but also on an international scale. Exporting Nepalese beer will drastically benefit the economy therefore resulting in a cyclical effect on the entire country of Nepal.

Canadian Exports

i) Benefits to Canada

By exporting Hop rhizomes to Nepal from Canada an increase in employment rates throughout the agricultural industry would be experienced. More jobs will be needed in order to provide proper care of both obtaining and shipping the rhizomes. Positions will need to be filled within the breeding, obtaining, and transportation of each plant therefore allowing for a wide variety of individuals to find work within different sectors of the agriculture industry. This increase in jobs and sales will result in economic development to occur therefore having a positive effect on Canada as a whole.

ii) Benefits to companies

Companies such as Hops of Pelham Inc will receive a large incline in sales as more rhizomes will be purchased in large quantities to export to Nepal. Hops of Pelham Inc sells rhizomes in bulks of 1000 therefore allowing for Nepalese farmers to purchase enough hop rhizomes to start a successful business. With each purchase of 1000 hop rhizomes costing 4000 dollars (4 dollars per rhizome) Nepalese farmers could place one order and share it among multiple farmers thus allowing for quality rhizomes to be purchased at a lower price. Due to the large variety of hop plants sold at Hops of Pelham inc if Nepalese hop farms chose to import a different kind of hop rhizome other than the cascade hop the same Canadian company may be used.

Table 2: Provided contact Information for Hops of Pelham Inc.

Company Name	Contact Information
Hops of Pelham Inc.	Location: 540 Canboro Rd. Fenwick Ontario Phone Number: 905-932-0300 Email: info@hopsofpelham.ca

iii) Permits Required

Importing the rhizomes to Nepal has many challenges due to the rhizomes being shipped in Canadian soil. Importing and exporting plants within soil is extremely difficult as soil can contain a wide variety of pest which can in turn affect other crops within a country (Canadian Food Inspection Agency, 2015). An import permit must be cleared before the rhizomes entire Nepal. Only the required amount of rhizomes may be shipped and once approved may entire the country in order to decrease the risks of invasive pests (Ministry of Primary Industries, 2011). Upon contacting Hops of Pelham Inc the company is aware of the need of permeants and is willing to provide a phytosanitary certificate to insure that the rhizomes may entire the country. This documentation insures that the plants have

been inspected for the pests and diseases that are not welcome within the country of Nepal therefore insuring that any unwanted pest do not enter the country.

iv) *Competition*

The beer industry world-wide is faced with a large amount of competition as vast majority of countries produce multiple different types and flavours of beer. Within the industry it is important to find a unique and tasty flavour that will intrigue the consumer therefore creating profit. The importing of a new hop plant such as the Cascade hop to Nepal will allow for a new flavour to be put on the market therefore allowing for beer buyers to be intrigued by the new brew.

While Canadian hops are well monitored and taken care of the rhizomes are extremely expensive. Due to China bordering Nepal transportation cost would be lower than those shipped from Canada therefore resulting in a majority of farmers choosing the product with the cheaper transportation cost. With the cost of transportation being much cheaper the cost of rhizomes from china are significantly lower as well. Some rhizomes are being sold for only 0.10¢ making a purchase of 1000 rhizomes only cost a farmer \$100 (Can) instead of \$4000 (Can) not including shipping (AliExpress, N/D). Due to the financial restrictions that many Nepalese face being able to get the plants at a lower cost would allow for more money to be put into the cost of running a facility and a larger number of rhizomes to be purchased for cheaper therefore making it more practical to purchase the rhizomes at a decreased cost.

Conclusion:

Overall the idea of exporting hop rhizomes may be impractical to citizens of Nepal as the costs of running a farm is extremely expensive. Running each farm not only will require a large amount of money to be put into the business each year but farmers can buy cheaper rhizomes from China and therefore allowing them to save approximately three thousand dollars or more.

Hop farming is a great way for a wealthier Nepalese citizen to find a new source of income. If an individual could afford the cost of running a successful hop farm many opportunities would arise for not only that individual but for the entire country. The production of a new form of hop plant would allow for a different flavour and new type of brew to be experienced by Nepalese citizens. While also introducing a new brew to citizens a market can be created to sell to tourist and also export the new beer outside of the country therefore allowing companies involved to make a large profit. If the industry continues to thrive not only would individuals in direct contact of the sales benefit but the entire economy would as well.

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