

## **Haskap Berries Export to Nepal**

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### **Introduction:**

Nepal struggles with growing enough food to feed its population. With poor infrastructure and the inability to afford many expensive technologies, the Nepalese are stuck in a cycle of poverty and subsistence farming. The objective of this paper is to find a product or service from Canada that could benefit Nepal's agri-food industry while providing new opportunities to Canadian companies. The product discussed in this paper is *Lonicera caerulea*, commonly known as Haskap or blue-berried honeysuckle. This plant is a shrub that produces a berry as its fruit. Key characteristics of this plant are that it is durable and productive. The Haskap plant can help impoverished Nepalese farmers by giving them a high yielding crop that is very durable and hardy in cold conditions and tolerates different soil conditions and acidity. These plants are a long-time investment that will provide income for decades without high maintenance or expenses.

### **Nepal:**

Nepal is a small South-Asian country located just north of India, and just south of China. The country is classified as a developing country. The people there are extremely poor, with a GDP per capita of 670\$, compared to 50001\$ for Canada (Nepal GDP, 2015)(Canada GDP, 2015). Over 66% of the workforce in Nepal is employed in agriculture (Welcome). The majority of farms are extremely small scale with an average size of 2 acres (Sharma, 2000). A food deficit exists in Nepal, meaning they are producing less food then they need. This makes them rely considerably on India for their food supplies.

Nepal is geographically divided into 3 regions, the Terai region, Hill region, and Mountain region. The Terai is the plain region with large pieces of land, high temperatures and is mostly mechanized (Smith 2009). Rice, tropical fruits, and other warm weather crops are grown in this region. The hill region has a more temperate climate, and is mostly used for terrace farming and livestock (Smith 2009). The terrace farming is mostly used for temperate crops

maize, millets, and potatoes (Smith 2009). The Himalayan region is at very high altitudes and can only be used for nomadic livestock production (Smith 2009).

**Haskap Background:**

Haskap is a plant that has only recently begun to be mass produced in Canada. Developed by the University of Saskatchewan Fruit Breeding Program and led in development by Dr. Bob Bors, the plant was bred by crossing a more winter resistant variety of Haskap from Northern Russia with a tastier variety from Northern Japan. Haskap is native to North-East Asia and Europe (Bors Blue). Haskap plants are shrubs that are grown Canada wide, mainly in British Columbia, Alberta, Saskatchewan and Eastern Canada. Haskap shrubs are also grown in Northern Japan and Russia (Bors Growing). The plants yield blueish purple berries shaped like a cylinder. The taste is described as a “raspberry/blueberry flavour with a special zing” (Bors Growing). First coming to into mass production in 2007, Haskap is an up and coming crop in Canadian Agriculture.



<http://haskap.ca/>

Table 1 shows the different traits of varieties of Haskap berries, released by the University of Saskatchewan’s Fruit Program (U of Sk, 2007).

Table 1: U of S Releases

Variety	Berry Size	Shape	Flavour	Bush Size	Read more
Tundra	1.49 grams		sweet/tart	average	<a href="#">Here</a>

<b>Borealis</b>	1.62 grams		sweet/tangy	average	<a href="#">Here</a>
<b>Indigo Treat</b>	1.41 grams		Sweet	average	<a href="#">Here</a>
<b>Indigo Gem</b>	1.30 grams		sweet/tangy	average	<a href="#">Here</a>
<b>Indigo Yum</b>	1.29 grams		tangy/sweet	average	<a href="#">Here</a>
<b>Honeybee</b>	1.9 grams		Tart	large	<a href="#">Here</a>
<b>Aurora</b>	2.17 grams		Sweet	large	<a href="#">Here</a>

## **Benefits to Nepal**

### **Plant durability:**

Haskap plants are very cold resistance. The plants remain undamaged down to -48°C, and blossoms are resistance until -8°C(Bors Growing). This is ideal for the hill region where the cold temperatures may be a limiting factor for other crops. Irrigation is not critical after 3 years because of the deep root systems.

### **Growing the plants:**

Plants are grown in a plug, meaning a plastic tray with a small Haskap plant in it, until about one year old (Hascap Central). This is how multiple propagators grow the plants across Canada. In Nepal, they would be transferred from the tray into the soil on the terraces in the hill region in Nepal. Grown 1 metre apart in rows, cover crops could be grown in between. Soils in the hill region are generally slightly acidic, in which Haskap can grow suitably as they can grow in a pH range of 5-8 (Bors, Blue). The Haskap shrubs on the terraces should be grown 1 metre apart in rows as well. Haskap is pollinated by bees and other insects (Bors Pollinator, 2009). Haskap plants are self incompatible, so a second compatible Haskap variety is needed. One pollinizer is needed for every five fruit bearing plants (U of Sk, 2007).

Table 2: Compatibility between different varieties of Haskap (U of Sk, 2007)

	<b>Tundra</b>	<b>Borealis</b>	<b>Indigo Series</b>	<b>Aurora</b>	<b>Honeybee</b>	<b>Berry Blue</b>	<b>Blue Belle</b>	<b>Cinderella</b>
<b>Tundra</b>	no	no	no	yes	yes	yes	no	yes
<b>Borealis</b>	no	no	no	yes	yes	yes	no	yes
<b>Indigo Series</b>	no	no	no	yes	yes	yes	no	yes
<b>Aurora</b>	yes	yes	yes	no	yes	yes	yes	yes
<b>Honeybee</b>	yes	yes	yes	yes	no	yes	yes	yes
<b>Berry Blue</b>	yes	yes	yes	yes	yes	no	yes	yes
<b>Blue Belle</b>	no	no	no	yes	yes	yes	no	yes
<b>Cinderella</b>	yes	yes	yes	yes	yes	yes	yes	no

The shrubs do not bear much fruit for 2 years, but after 5 years the plants can produce from 5-7 kilos of fruit per plant per year(Bors Growing). Haskap bushes grow from 1.5-2 metres in height. Their lifespan is about 30 years so over time it should be a good investment over

time(Bors Growing). Haskap is an early fruiting plant which would provide income to Nepalese farmers early in the season (Bors Growing).

### **Organic opportunities and low maintenance:**

Haskap plants are low maintenance because they are early blooming plants meaning less time to be subject to disease and other issues. They don't need much, if any, fertilizer. The main disease harming Haskap plants is powdery mildew, which is a fungus. However, the University of Saskatchewan has developed varieties that are extremely tolerant to the fungus reducing the need for fungicide (Bors Growing). Haskap also survives in soggy oxygen-deprived soils, needing very little or no fertilizer, and easily surviving the monsoon season (O'Connor, 2015). One of the biggest pests for Haskap berries in Canada is birds. They become a big problem after a few years when there is a substantial amount of berries (Bors Growing). Farmers in Canada use bird nets, which have a cost of about 1000\$ an acre, but the Nepalese could find a more economical way to either produce their own nets, or use a different way to repel them (Haskap Cost). Japan does not experience the same problem with birds, perhaps Nepal also being an Asian country as well would be as lucky. Other animals may also feed on the berries, so a fence or other physical barriers to keep out wild animals would be beneficial (Bors Growing).

### **Export Potential**

There are multiple propagators of Haskap shrubs in Canada. Haskap Central Sales Ltd., ships internationally to Europe (Haskap Central). They may be open to shipping to Asia as well. They are based out of Saskatchewan and have been in existence since Haskap were mass produced in Canada in 2007 (Haskap Central). Haskap plants could be exported from Canada to Nepal by flying them in. Haskap plants in the plug stage of growth can't be without water or sunlight for an extended period of time so the most realistic way of shipping plants to Nepal would be by air. A1 Freight Forwarding ships directly from Canada to Nepal by plane. Using A1 Freight Forwarding's website, the cost for 1 pallet that weighing 1000 lbs would cost 2350.00\$ from Regina to Kathmandu, the capital of Nepal (Freight Shipping). From there the plants would be distributed by a local company, one option being Biotech Association of Nepal for Research and Development. The Nepalese farmer would then have to look after getting the plants from the distributor.

### **Nepalese Markets**

Haskap is a very marketable plant. The berries can be eaten as fresh fruit, made into wine, jam, put into granola bars, yogurt, and syrups (Bors Blue). Very few of the Nepalese would be able to afford the processed products, but the jams, wines and syrups could easily be sold to tourists, at hotels and at local markets. In addition Nepal could work on propagating Haskap themselves, and exporting to other Asian countries making it a cash crop. However that would not benefit Canada if Nepal became self sufficient, although it would be great for Nepal to bring in money from other richer countries in Asia.

The main way Haskap would realistically be consumed in Nepal would be as the fresh berry. The fruit comes in mid June in Canada, and the shrubs produce berries until early September (Bors Growing). The berries would have to be picked off the bush by hand and put into containers. The berries would then have to be refrigerated. This may be a problem for farmers in the hill region because many of the rural communities have no power. The market for Haskap berries is also probably in the cities, as they are not a traditional part of the Nepalese diet, they may have to be exposed to a large amount of people before they are sold. The price per pound in Canada is 4.40\$, but could be brought down in Nepal because of cheaper labour, and lack of machinery. Haskap berries would most likely be a niche product for the wealthy in Nepal, as it will be probably too expensive for local people in the poor rural communities, compared to other fruits already established.

### **Health Benefits**

Haskap berries are extremely healthy and would be useful for counteracting the malnutrition of the Nepalese. The Nepalese diet in the hills and Himalayan regions are particularly poor. Haskap berries are very high in Vitamin C, providing 60% in two-thirds of a cup, and 6% of potassium in the same amount of fruit (Health Benefits, 2013).

Table 3: Vitamins and Mineral Content of Various Fruits (Haskap Berry, 2015).

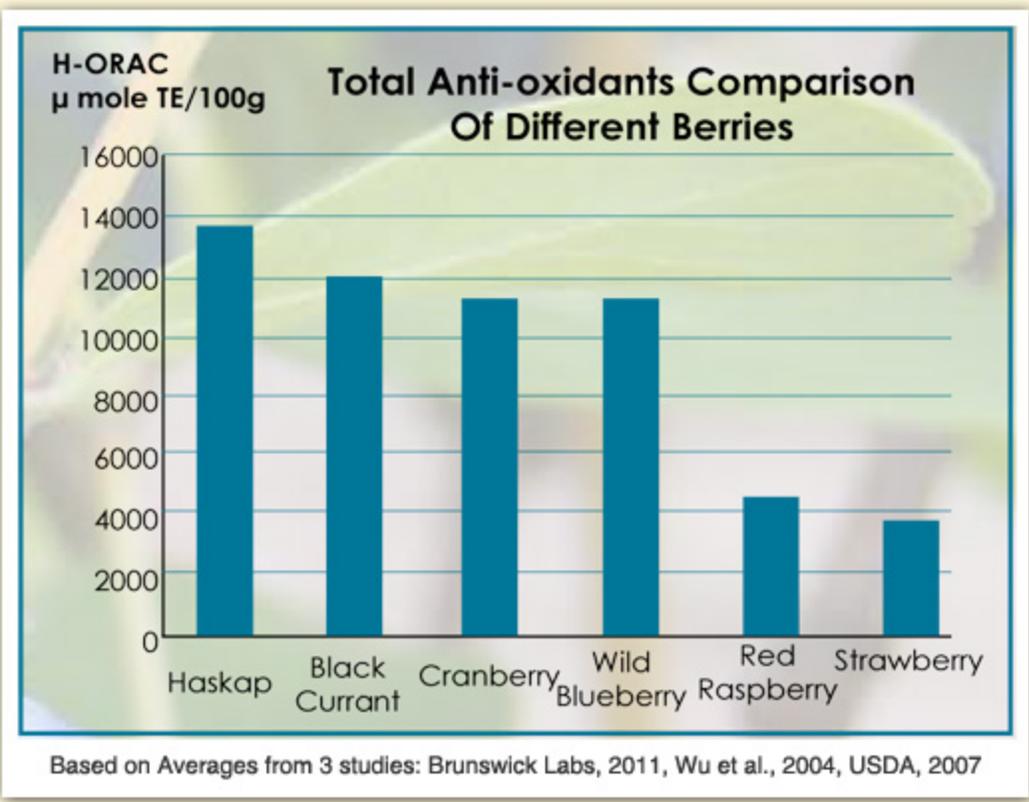
### Fruit Comparison Table (per 100g )

Fruit	Potassium mg	Calcium mg	Phosphorus mg	Iron mg	Vitamin A ug	Vitamin C mg	Vitamin E mg	Energy kcal
Haskap	190	38	25	0.6	130	44	1.1	53
Pomegranate	236	10	36	0.6	0	10	0.6	n/a
Blueberry	70	8	9	0.2	55	9	1.7	49
Orange	130	17	12	0.1	60	35	0.4	39
Grape	130	6	13	0.2	15	4	0.3	56
Apple	110	3	8	0.1	11	3	0.2	50

Five revised standard tables of Food composition in Japan (Resources Council of Science and Technology Edition)

Haskap berries also provide lots of antioxidants (Health Benefits, 2013). Antioxidants are a vital component of human diet because they are thought to help prevent chronic diseases later in life.

Table 4: Levels of Antioxidants in Haskap Compared to Other Common Fruits (Health Benefits, 2013).



With the Nepalese average age being so low, antioxidants from Haskap berries could help the population live longer and hopefully allow the Nepalese have to spend less money on healthcare, which would benefit the entire population.

### Cost Breakdown

Haskap plants cost about 3 dollars per plant, if over 1000 plants are purchased (Berry Smart, 2016). Although this is expensive for the less wealthy Nepalese, it is a 30-year investment with high yields over time. About 1000 Haskap plants can be planted per acre (Haskap Cost). Income from Haskap berries in Canada is about 4.40\$ per pound, and after 5 years about 70,000.00\$ per 2 acres (Haskap Cost). Since the average farm in Nepal is about 2 acres, after a few years they can expect 70,000.00\$ gross income from Haskap berries. Expenses involved is 3.40\$ a plant to get started, the cost of the plug plant and the cost of shipping, however, being in the ground for 30 years it is an easy one time investment. Another huge problem is the 2,350.00\$ price of shipping for a 1000 lb pallet. One pallet should be able to carry around 6000 plants. 6000 plants multiplied by three dollars each is 18,000\$. Adding the shipping, this would put the price at about 20,350.00\$ for 1 pallet, about 3.40\$ per plant, and

support 6 acres of plants. Nepalese farmers would definitely not be able to afford this individually, but the communities, or groups of farmers could come together to split the cost. In the early stages of growth (first couple years), irrigation is needed (Bors Growing). Little expense is needed if there is a water source and the farmers shared the equipment, about 25\$ per acre on diesel if they have a pump. Few to no fertilizers are needed, and herbicides are not recommended (Bors Growing). This is a low-cost maintenance crop that has a good return on investment, despite the 2-year deficit getting started.

### **Employment Opportunities**

Haskap berries must be picked by hand and, for large scale farms, labourers may have to be hired to pick the berries (Bors Growing). A solution for farmers who cannot hire labourers is a U-pick system, where the customers pick for their own consumption and pay a discounted price compared to a market or store. A piece work system may also be suitable, the customers paying a certain amount of money for the amount of fruit picked. That way the farmer can determine the cost of labour per berry picked making sure there is always a profit for the farmer. If the farmers decide to propagate the shrubs, then there may be employees needed to propagate a large quantity of the Haskap plants.

### **Competition**

There is currently not much competition for Haskap berries because it is a very new and developing fruit that has not been perfected by other countries. Japan and Russia both produce Haskap berries but they are not in a position to be exporting. The reason for this is that Japanese and Russian Haskap, while older and has been grown for longer, is not as advanced as Canada's varieties in taste, durability, or yield (Bors, Growing). Canada is planning to export berries to Japan as it is right now, a projected 300M tons a year in 3 years, while today Japan produces about 100M tons of berries a year. Canada is at the advantage because it is able to produce the berries cheaper than Japan (Bors, Japan).

### **Benefits to Canada**

Exporting Haskap berries to Nepal has many benefits to Canada. The Haskap varieties mass produced in Canada were developed in Canada, so this is a good way to promote a

Canadian product abroad. With Canada already exporting to Japan, and then Nepal, at best, Haskap could become a staple in the Asian diet and at worst, it could be a niche product in Asia eaten by tourists. Canadian propagators would be making more profits, thus creating new jobs and bringing in foreign money, raising our GDP. The royalties from the patents of the Canadian varieties will give money back to the University of Saskatchewan's Fruit Breeding Program. This will help Canada develop new crops furthering the countries position as a leading nation in agricultural technology.

## **Conclusion**

All in all Haskap has a lot of potential to be exported from Canada to Nepal. The reasons for this is that with the durability and long lasting traits of Haskap shrubs, they are suitable for the conditions of high altitude and cold temperatures, providing farmers with a low maintenance, high yielding crop. Based on one study by LaHave Orchards and Haskap Central, farmers in Canada can make 70,000\$ or more on a two acre farm. In Nepal, farmers should not expect the same yield and not expect to have the same market demand for the berries, but there are no studies found showing how the plants will be affected by different altitudes, and monsoon season. Problems arising in Haskap for export to Nepal is the price point. Needing to buy in bulk to get the best cost per plant, it would be hard to find enough farmers to combine to spend over 20,000\$ on a plant that they have not seen succeed. At about \$3.40 per plant after the cost of shipping, it would be hard to accumulate enough money to get a significant amount of plants to support a family. Another problem is that Haskap shrubs do not produce very much fruit until 2 years in the ground. For poor farmers barely getting by and such a small average size of farm, they could not afford to go two years without income, and no room for other crops because the average farm is about 2 acres. Another problem is the need of an order for over 1000 plants to get the \$3.40 dollar a plant price point, meaning at least a \$20000.00 order, without shipping. Nepalese farmers would have to take loan, split the orders up between farms, or pay a higher individual price per plant and have smaller orders. Once the farmers get the berries, they need to be refrigerated, but most of the people in rural Nepal do not have access to electricity meaning no modern refrigeration. Haskap could be a great crop for Nepal, but there are many logistical problems to get the crops to the farmers there set up and making money, it may not be worth it.

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