Nepal Final Essay: Exporting Edamame Beans from Canada to Nepal for Human Consumption

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Introduction

A potential export idea from Canada to Nepal is edamame beans for human consumption. This export is intended to provide benefits to both countries. In order to promote this idea, research had to be constructed to determine if Canadian edamame beans could be a potential export to Nepal. By investigating specific needs of Nepal and characteristics of edamame beans produced in Canada, it will be determined whether edamame beans are an adequate export idea.

Part I

Product Information

Edamame beans belong to the legume family and their species name is known as *Glycine max (L.) Merrill* (Kelly & Sanchez, 2005). Edamame is essentially a vegetable soybean, versus a traditional soybean, which is dry and harvested and processed to be broken down for animal feed or oils (MacKellar, MacKellar Farms Interview, 2014). Edamame beans include the entire pod and are harvested as a vegetable (MacKellar, MacKellar Farms Interview, 2014). They are distinct from the regular grain soybeans in many ways such as: having large seeds with a mild or neutral taste and age of bean when harvested (Tiroesele, Hunt, Wright, & Foster, 2013). They tend to have a distinctive combination of sweetness, sourness, and bitterness (Tiroesele, Hunt, Wright, & Foster, 2013). Sucrose contributes to sweetness, while saponin, isoflavonoids, and l-arginine adds bitterness (Tiroesele, Hunt, Wright, & Foster, 2013). Edamame beans also have low oil and are relatively high in protein content (Tiroesele, Hunt, Wright, & Foster, 2013). They are a popular snack or vegetable side dish consumed mainly in Japan and China but has made their way to North America (MacKellar Farms, 2015a).

Edamame beans are similar to regular soybeans but are planted in intervals throughout May and June with the harvesting season following soon after in August (Shurtleff & Aoyagi, 2004). Today's edamame beans are 24-36 inches in height shown in Figure 1, bearing typically 100-150 pods per plant (Shurtleff & Aoyagi, 2004). The seeds grow in pods containing usually 2-3 seeds per pod (Shurtleff & Aoyagi, 2004). The plant has trifoliate leaves. The leaves, pods, and stems are typically covered with soft brown hairs.

Figure 1. Growing Edamame

Retrieved from: http://www.omafra.gov.on.ca/CropOp/en/spec_veg/pea_bean/edam.html

The roots bear nodules, which extract nitrogen from the air and fix it in the soil, where it stimulates the growth of the edamame beans (Shurtleff & Aoyagi, 2004). Jacob MacKellar, an Ontario edamame farmer, explains that an everyday process of growing edamame consists of watching the plants closely for irrigation needs or any pests or diseases (MacKellar, OAFT Game Changers in Agriculture, 2013). The edamame is harvested in August before it starts to harden and then within 6-8 hours the bean is boiled, sorted, and frozen (Cattel, 2015). The freezing

process is called "Individually Quick Frozen" (IQF) which means to freeze each shell or pod separately from all the others (Cattel, 2015). This process takes place to maximize its tender flavor and preserve its freshness (Cattel, 2015). Below in Figure 2 shows a farmer using an Oxbo Green Bean Harvester to harvest the edamame beans (Oxbo International Corporation, 2014). There is only approximately two ideal days that edamame can be harvested (MacKellar, OAFT Game Changers in Agriculture, 2013). At this time the pod is at its peak and the highest yield can be obtained (MacKellar, OAFT Game Changers in Agriculture, 2013). It is just before the plant is about to dry out.

Figure 2. Oxbo Green Bean Harvester

Fig 2. Retrieved from: http://www.oxbocorp.com/Products/FreshMarketVegetables/GreenBeanHarvesters/2475.aspx

Figure 3. Edamame Facts

Nutrition Facts

Serving Size 0.5 cup

Amount Per Serving	
Calories 120	
	% Daily Values*
Total Fat 2.5g	**4%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Polyunsaturated Fat 1.5g	
Monounsaturated Fat 0.5g	
Cholesterol 0mg	**0%**
Sodium 15mg	**1%**
Total Carbohydrate 13g	**4%**
Dietary Fiber 0g	**0%**
Sugars 0g	
Protein 11g	**22%**

Vitamin A 8% • Vitamin C 10%

Iron 10%

*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2400mg	2400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Fig 3. Retrieved from: http://www.onlinelabels.com/label-generator-tools/Nutrition-Label-Generator.aspx and http://mackellarfarms.ca/faq/

Nutritional Information

Figure 3 shown above describes the health benefits of a ½ cup of shelled edamame; the same health benefits correspond to 1 1/8 cup of in the pod edamame (MacKellar Farms, 2015a). Edamame in the pod contains the pod that matured as the edamame plant grew as well as seeds inside (MacKellar Farms, 2015b). The pods are mainly consumed as an appetizer or snack (MacKellar Farms, 2015b). They can be cooked in a variety of different ways. Shelled edamame are just the seeds that have been removed from their pod (MacKellar Farms, 2015b). They have numerous applications like tossing a handful into a salad or adding a healthy helping into a stir-fry to add flavor (MacKellar Farms, 2015b).

Market Opportunity

The market opportunity of edamame beans are in the wealthier areas of Nepal. This includes the capital of Nepal, Kathmandu, and surrounding areas. Kathmandu is full of ancient monuments and is facing a rapid population expansion (Thapa, Murayama, & Ale, 2008). The city comprises of two densely populated urban centers, "Kathmandu Metropolitan City" and "Lalitpur Sub-Metropolitan City" (Thapa, Murayama, & Ale, 2008). The city extends over 65 square kilometers of area with three nearby municipalities within the valley, Kirtipur, Madhyapur Thimi and Bhaktapur (Thapa, Murayama, & Ale, 2008). With this increase in urbanization of Kathmandu and surrounding areas it provides an excellent area for edamame to be marketed.

Company Invloved

The Canadian company involved in this export idea is MacKellar Farms. MacKellar Farms started as a traditional cash crop farm of soybeans, corn, and wheat with a focus on seed production (MacKellar, OAFT Game Changers in Agriculture, 2013). MacKellar Farms is

Canada's first local grower of edamame (MacKellar Farms, 2015a). They offer non-GMO edamame and are well known in many grocery stores across Canada as well as other countries for their edamame (MacKellar Farms, 2015a). MacKellar Farms is a family run operation, based out of Alvinston, Ontario where they cultivate about 3,000 acres, 300 of it being edamame (MacKellar, OAFT Game Changers in Agriculture, 2013). Jacob MacKellar, shown in Figure 4 below is a third generation farmer of MacKellar Farms with an entrepreneurial drive and a passion for growing food (Cattel, 2015). Just a few years ago Jacob brought the idea to his family to start growing edamame beans. Unlike other Canadian crops there are no government publications or research on how to grow edamame in Canada; and no crop insurance to protect against severe weather and other damaging events which could wipe out the year's harvest (Cattel, 2015). Jacob saw the opportunity and jumped at the idea to provide local edamame for consumers in North America and around the world (MacKellar, OAFT Game Changers in Agriculture, 2013).

Figure 4. Jacob MacKellar Showing off His Edamame Beans

Retrived from: http://www.localizeyourfood.com/blog/2015/03/05/mackellar-farms-pioneering-

Benefits to Canada

Exporting edamame beans as a product from Canada could potentially increase the demand of edamame bean production in Canada. Therefore, depending on the growth of the market it may have the potential to create more jobs in the processing, packaging, and transportation of vegetables industry. With an increase in demand it could cause more farmers from Canada to be involved in growing and harvesting edamame beans. It will also benefit MacKellar farms because they will be making a profit off of the edamame beans that they export to Nepal. Not only will the edamame provide a profit, but it will also play a notable role in improving soil fertility by fixing the atmospheric nitrogen (Shurtleff & Aoyagi, 2004). This is beneficial to MacKellar Farms by improving the fertility of the soil for the crops in the following years.

Environmental Sustainability

The environmental sustainability of growing edamame beans in Canada is not very high. Canadian farmers have just discovered the cultivation of edamame beans only a few short years ago. Edamame beans are recommended to be grown in a field with high fertility and good drainage to obtain the best flavor and maximum yield (MacKellar, OAFT Game Changers in Agriculture, 2013). They require care and management throughout the growing season (MacKellar, OAFT Game Changers in Agriculture, 2013). Considering edamame is a relatively new crop in Ontario and Canada, there is no manual on what seeds to grow, how to plant, or harvest. This may affect farmers in Canada trying to produce edamame because they may not have the proper soil to grow edamame in, or the proper knowledge to produce it. Therefore, the

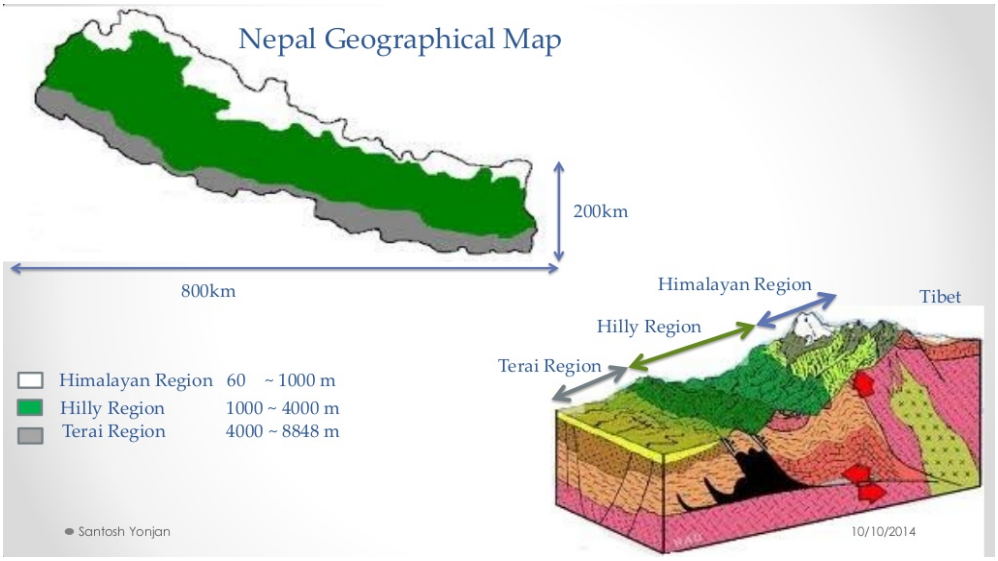
sustainability of edamame in Canada is a significantly smaller amount than any other commodity crops like soybeans, corn, and wheat, which have been growing in Canada for generations.

Part II

General Information About Nepal

Nepal is one of the most un-wealthy, non-developed, poverty-stricken countries with approximately one-quarter of the population under the poverty line (Gale, 2007). Nepal is landlocked between India and China with an area of about 140,800 square kilometers (Gale, 2007). Nepal is made up of three very different regions shown in Figure 5.

Figure 5. Geographical Map of Nepl



Retrieved from: http://www.slideshare.net/santoshyonjan/nepal-40113533

Southern Nepal is known as the Terai region. This region contains cultivable land and dense jungle (Gale, 2007). The Terai contains about one-third of Nepal's population and makes up about one-quarter of the total area (Gale, 2007). The climate in the Terai is subtropical and in the swamps and forests extremely humid (Gale, 2007). The average daily temperature fluctuates

between 7°C to 24°C during December/January and between 24°C to 41°C during June/July (Pariyar, 2002).

Northern Nepal is known as the Himalayas (Gale, 2007). The altitude in the Himalayas increases toward the north, with its highest peak at Mt. Everest standing amid other noble peaks (Gale, 2007). This subalpine zone is generally covered with snow during the long winter and extreme cold is experienced in the upper Himalayas (Gale, 2007). The average daily temperature fluctuates between 9°C to 10°C during June/July (Pariyar, 2002). The annual rainfall varies from 140 mm in the west to 900 mm in the east (Pariyar, 2002).

The third area is a high central region known as the Hills region. The Hills region is filled with fertile soil and a temperate climate (Gale, 2007). This region supports thriving agriculture (Gale, 2007). The capital of Nepal, Kathmandu, is located in the Hills region (Gale, 2007). It is also the most densely populated area of Nepal (Gale, 2007). The average daily temperature fluctuates between 2°C to 17°C during December/January and between 13°C to 27°C during June/July (Pariyar, 2002). The average rainfall varies from 1000 mm in the west to 2800 mm in the east (Pariyar, 2002).

Nepal differs in many significant aspects compared to Canada. The most evident differences are the language, religion, and the currency (Central Intelligence Agency, 2015). The most common language in Nepal is known as Nepali, which accounts for about 44.6% of the population (Central Intelligence Agency, 2015). The most predominant religion in Nepal is Hindu in regards to about 81.3% of the population (Central Intelligence Agency, 2015). Most Hindus do not consume beef, eggs, or chicken (Nursing Management, 2005). With this in mind, the majority of the Nepalese population does not consume meat. Nepal could truly benefit from the high protein and healthy fat offered from the edamame bean. The currency in Nepal is known

as a Nepalese Rupee (Currency Encyclopedia, 2015). One Canadian dollar is equivalent to approximately 79.78 NPR (Exchange Rates, 2015).

Transportation Logistics

Transporting edamame beans from MacKellar Farms to Nepal is a long process but doable. The packaged edamame beans are stored in large cardboard totes weighing approx. 1,000 lbs each. About 1100 bags are in each cardboard tote. One tote placed on a pallet from MacKellar Farms should be loaded on to a reefer truck to bring to the airport. A reefer truck is equipped with cooling abilities where the shipment is kept. This allows the edamame to stay frozen while being shipped. When the pallet arrives at the Toronto Pearson airport it should be loaded onto a temperature-controlled plane along with many other vegetables and flown to the Tribhuvan International Airport of Nepal. This is where small temperature controlled trucks will distribute the edamame pallet to Bhat-Bhateni Supermarket in Kathmandu, Nepal. The main office is located in Kathmandu, but the supermarket has over 10 different locations (Bhat-Bhateni Supermarket & Department Store, 2014). This allows the main location to distribute the frozen edamame beans across all locations. The Bhat-Bhateni Supermarket offers a full range of 120,000 products from almost 1000 international suppliers with more than 40,000 customers a day (Bhat-Bhateni Supermarket & Department Store, 2014). The main Supermarket is also located only a short 12 minutes from the Tribhuvan International Airport. The edamame beans must remain frozen until they are about to be eaten. After the bag has been opened the edamame will only last about 3 days.

Refrigeration Issues Post-Harvest

Edamame is boiled and frozen within 6-8 hours of harvest and must be kept frozen until it is about to be eaten. The only issue with keeping the edamame frozen until market is when it

reaches Nepal. After the beans are unloaded off the plane, they would need to stay frozen in a temperature-controlled truck until it reaches the Bhat-Bhateni Supermarket. With Nepal lacking reefer trucks, this may be an issue.

Cost Analysis

The cost analysis of edamame beans varies. MacKellar Farms sells both in the pod and shelled edamame beans for $4.79 CAN per 400g in Canadian grocery stores. Therefore each pallet containing approximately 1100 bags would cost $5,269 Canadian and 419,8812 NPR. An independent quote from A1 Freight Forwarding estimates a shipping cost of CAD $1750.80 for one pallet containing about 1100 bags of frozen edamame to be shipped by air from Toronto Pearson Airport to the Tribhuvan International Airport of Nepal (A1 Freight Forwarding, 2015). Although, the A1 Quote was unable to include a reefer plane until further communication is obtained. Transporting edamame beans from MacKellar Farms to the Bhat-Bhateni Supermarket could range between $2000 CAN and $5000 CAN, depending on the shipping companies. Therefore, one bag of edamame beans could vary depending on shipping total. With this in consideration, the edamame beans for human consumption are geared more towards the wealthier people of Nepal to be considered affordable. This still may seem very expensive for the wealthy Nepalese families, but with the edamame beans strong nutritional value, the purchase would be worth it.

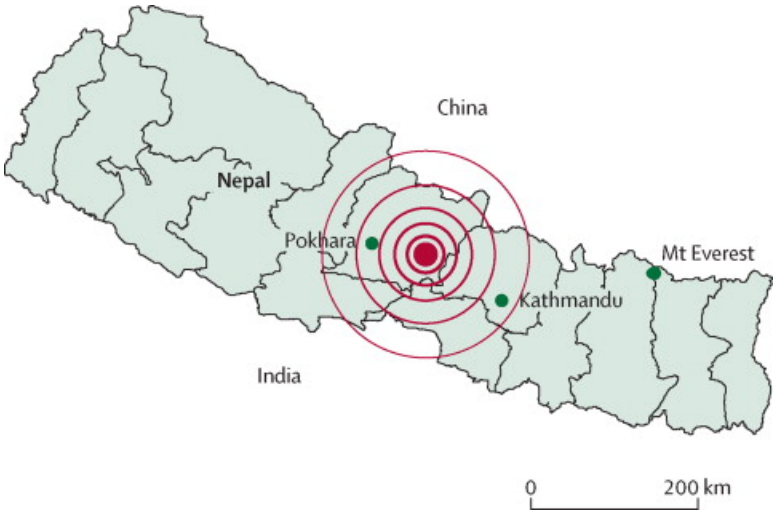
Benefits to Nepal

The April 25th, 2015 earthquake in Nepal caused a mass devastation, killing and injuring thousands of people, as well as an enormous amount of agricultural land destroyed (Sharma, 2015). Figure 5 shown below shows where the 7.8 magnitude earthquake struck causing a widespread devastation (Sharma, 2015)

Figure 5. Map of Nepal Showing Earthquake's Epicenter

Retrieved from

http://www.sciencedirect.com.subzero.lib.uoguelph.ca/science/article/pii/S0140673615609138



The disaster triggered an avalanche on Mt. Everest, which left more than 7400 people dead, and more than 14,000 injured (Sharma, 2015). In the 14 most affected districts, out of 75, hospitals collapsed, roads and markets that provided food to remote areas were demolished, and agricultural assets, on which food supplies depend, were destroyed (Webb, West, & O'Hara, 2015). About 50% of households lost their stored grain and seed, and 20% of cattle were killed (Webb, West, & O'Hara, 2015). As noted, a large amount of agriculture was destroyed. Additionally, edamame beans shelled or in a pod, include a healthy helping of fibre, protein, vitamins and minerals (MacKellar Farms, 2015b). This is a main reason why the finished product of edamame would be an excellent export to Nepal. Considering Nepal's recent loss in a large part of their growing land from a massive earthquake, fresh vegetables are in high demand. Edamame could simply help the struggling families by providing a fresh vegetable snack to keep their families healthy.

Global and Regional Competition

Canada is not a large producer of edamame beans because they have just started to be cultivated in Canada in the past few years. With edamame beans being a more popular cultivation in China it is hard for Canada to compete. The shipping rates from China to Nepal versus Canada to Nepal would be significantly less.

Companies/Buyers Involved

Contact	Contact Information	Role
MacKellar Farms	Jacob MacKellar Location: Alvinston, ON Email: info@mackellarfarms.ca	Edamame grower
Reefer Trucking Company Onatrio	Vary across Ontario	Transport of edamame packages from farm to Toronto Pearson Airport
Reefer Air Plane Company	Departs from Toronto Pearson Airport	Transportation of frozen edamame to the Tribjuvan International Airport of Nepal
Reefer Trucking Company Nepal	Varies across Nepal	Transports frozen edamame from the Tribhivan International Airport of Nepal to the Bhat-Bhateni Supermarket
Bhat-Bhateni Supermarket	Head Office Ms. Nabina Moktan Mobile: 977-1-4419181, 4413825 Email: customer@bbsm.com.np	Distributor of edamame beans. There are ten listed Supermarkets in Nepal.

Conclusion

Overall, the idea of exporting edamame beans for human consumption from Canada to Nepal has several benefits to both countries. However, there are also many limitations including cost, and refrigeration that exist with this export idea. Canada is not a large producer of edamame beans. Therefore the exports are limited because of limited production. China also has cheaper shipping costs. For that reason, it is cheaper for Nepal to buy edamame beans from China than it is for them to buy edamame beans from Canada. In conclusion, the potential export idea of Canadian edamame beans to Nepal has more limitations than benefits. Considering that, Canada is known to have a better tasting edamame.

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