Export Idea: Canadian Cantaloupe Seed Variety

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Part I- Product information

Introducing Nepal

In Nepal, mountains, hills and terai make up the total proportion of crop and livestock production systems (Nepal-Agriculture N.d.). Mountains and hills make up 77% of the land in Nepal which is ideal for fruit, vegetable and livestock production (Nepal-Agriculture N.d.). Agro-ecological regions in Nepal with sub-tropical temperatures is ideal for fruit production (Nepal-Agriculture N.d.). In the Terai (south Nepal), summer temperatures exceed 37° C and can be higher in some areas (Nepal-Agriculture N.d.). Winter temperatures range from 7°C to 23°C (Nepal-Agriculture N.d.). In mountainous regions, hills and valleys, summers are temperate while winter temperatures can plummet under sub-zero (Paudel 2016). Nepal contains a wide diversity of landscape, altitude, topography and temperature which is why there is great potential for exchange with Canada (Paudel 2016). Canadian cantaloupe seed varieties would provide Nepal farmers with a diverse crop, grown in an ideal environment, while supporting Canadian economy and businesses.

Exchange product

Melons (ie. cantaloupe) are members of the *cucurbit* family, also known as muskmelons (University of Minnesota 2016). The ideal temperature for this crop is hot, sunny climates (15-20 degrees c) with well-drained soil (Nepal-Agriculture N.d.). South Nepal in the terai regions is an optimal growing location for the seeds because the growing season is almost year round. The seeds can be transplanted or directly seeded, this is done by hand usually. Optimal seed germination temperature is 70-90 degrees F (University of Minnesota 2016). Plastic tunnels are often used to protect the seedlings from cool air temperatures and insect pests (University of Minnesota 2016). Ideal growing environment includes well-drained sandy loam soils, with a pH between 6-6.5 (University of Minnesota 2016). Phosphorus is a common fertilizer for cantaloupes since it doesn't move easily through the soil (Crop Nutrition 2001). Importance of phosphorus use in growth of muskmelons is demonstrated in figure 4, shown in the appendix. Trials completed in China with melons have proven that phosphorus has potential to increase the fruits weight (Crop Nutrition 2001). Continuous watering and weed control is crucial to obtain a successful crop. Production stages of cantaloupe include preparation, growth and harvest. Nepal farmers receive seeds un-germinated, meaning the environment in which it's planted must be an appropriate temperature for seed germination, initiating plant growth. Cantaloupe seeds are planted on raised mounds in rows, maintaining moist soil during plant growth (wikiHow 2016). It's important to prevent direct contact with cantaloupe and soil to reduce rotting and spoilage (wikiHow 2016). Cantaloupe has a short growing season, 3-4 weeks, harvest is commonly done by hand when fruit is ripe (wikiHow 2016). Cantaloupe can be stored uncut for 5-6 days and about 4 days refrigerated when cut (wikiHow 2016). To maximize sweetness of crop, water is

minimized a week prior to harvest to allow the vines to concentrate sugar in the fruit (wikiHow 2016).

A good crop of cantaloupe would consist of yields around 1400 cases per hectare (Agriculture Victoria 2014). Potential diseases that may affect yield include fusarium and gummy stem blight (Paudel 2016). With proper tools and knowledge these can be easily prevented (Agriculture Victoria 2014). Small scale fruit crop farming in Nepal is relatively sustainable and doesn't require the use of machines usually. A subsistence farmer is likely to use a hand plow or animal assistance to prepare the land prior to planting. Cost of plow, animal care (feed, healthcare, etc.), fertilizer, and water usage are costs to consider. Majority of equipment is made by farmers but it can also be purchased. The average cost of a hand plow in Canada is about $70-80 or 5628- 6432 Nepalese Rupee (Kijiji 2016). Labour includes planting, maintaining and harvesting the crop. Greater human labour would decrease carbon emissions, benefitting the environment (Midmore *et al.* 2016). Lack of machinery makes this very time consuming and weather (climate, precipitation and temperature) has a large influence on how successful the crop will be. Seasonality is not a problem for cantaloupe production due to a consistently hot climate in South Nepal (Midmore *et al.* 2016).

Major crops grown and consumed in Nepal include rice and wheat crops, shown in image 2 (Paudel 2016). Cantaloupe would be considered a niche product to Nepalese citizens since it's not as commonly found in their diet. Cantaloupe has many nutritional benefits which is crucial in Nepal due to prevalent malnourishment. It is an excellent source of vitamin C and A, contains high levels of potassium, good B vitamins (B1, B3, B6 and folate) and provides vitamin K, magnesium and fiber to consumers (Natural Society 2015). Cantaloupe doesn't contain cholesterol, benefitting people suffering from heart disorders and helps to combat bad effect of

heat in Nepal (Natural Society 2015). Typically, there is low consumption of fruit and fresh vegetables because it is highly dependent on seasonal availability. This contributes to nutritional disorders and deficiencies commonly seen in Nepal.

Production and growth of product would have both harmful and beneficial effects to our environment. The product requires a large amount of water to grow/ thrive, transportation of product would result in large carbon emissions and storage of final product requires proper storage facilities (Lamichhane *et al.* 2011). These factors have harmful impacts on the environment. The product requires greater human labour compared to machinery during production of the produce, decreasing carbon footprint. It acts as a good rotational crop resulting in improved soil quality and preservation of future crops (Lamichhane *et al.* 2011). Sustainable agriculture is when a product is produced using farming techniques that are eco-friendly, while considering consumer health, location and overall welfare of species involved (Foundation 2016). Cantaloupe is an environmentally sustainable product to grow but transportation and manufacturing in Canada would negatively impact overall sustainability of the product.

Canadian Export Company

Vesey is a company located in York, Prince Edward Island (PEI), Canada (Vesey 2016). Vesey specializes in seed variety, maximizing efficiency and effectiveness of seedlings. Mr. Vesey is the founder of the company, dating back to 1943 (Vesey 2016). With over 500 employees, Vesey is one of the largest agriculture companies in PEI (Vesey 2016). They are a large supporter of Farmers Helping Farmers, a nationally recognized organization that strives to help struggling farmers in Kenya (Vesey 2016). The aim is to use the expertise of people with agriculture backgrounds to assist Kenyan farmers in becoming more self-reliant in agriculture

food production. Exporting seed varieties to Nepal would benefit Canada's economy while providing jobs for Canadian citizens. Due to the size and shape of the product, it would be easy and efficient to transport seeds to Nepal. An example of seed shape and size is shown in image 1 in the appendix. Due to Nepal's subtropical temperatures it's an ideal crop to grow in this region. There would be a continuous flow of business from Nepal because cantaloupe crops would be able to grow year round.

Vesey is currently partnered with Canada Post Expedited Parcel Post to ship products to required location (Vesey 2016). The common form of transportation would include ground transport from the warehouse. A partnership with Aeron International Nepal (distributor, exporter, importer of seeds in Nepal) would help to distribute cantaloupe seedling upon its arrival in Nepal to local companies and farmers (Nepal Seed Suppliers N.d). Seeds must be stored at a temperature less than 60 degrees F to prevent premature germination of the seeds (University of Minnesota N.d.). Cantaloupe seeds are light weight and relatively easy to store, which is ideal for Nepal's terrain (hills, mountains). It is a relatively cheap product which is essential due to the poverty demonstrated in Nepal. It requires minimal assistance during growth and has a low morbidity and mortality rate since it's being grown in an appropriate environment.

Canadian cantaloupe seed variety would benefit the agriculture industry in Nepal by providing local businesses, farms and citizens with a subtropical crop that is environmentally sustainable with a small ecological impact.

Potential companies to contact and negotiate with would be Vesey, Aeron International Nepal and other recognized horticulture companies in Nepal including, National Biosolutions Nepal and Horticulture Farm (Nepal Seed Suppliers N.d.). Partnering with these established

companies would provide a direct pass into Nepal's agriculture industry while supporting Canadian exports and horticulture industry.

Contact information regarding Nepal and Canadian companies

Table 1: Contact information companies selling cantaloupe seeds for planting

Company	**Contact information**	**Reference**
Vesey Seeds	Location: PEI, Canada 1-800-363-7333 Email: Commercial Sales – Angus: angus@veseys.com Custom Seed Packaging – Gary: gary@veseys.com	Vesey (2016)
Aeron International Nepal	Location: Nepal + 977-01-4242630 Email: info@aeronint.com aeronherbs@gmail.com	Aeron International (2016)

The companies are both in the business of exporting seeds, this would be beneficial when starting up the export to Nepal. It was difficult contacting the companies to determine cost of bulk exports and their interest in the export.

Part II- Export potential to Nepal

Transportation of product from Canada to Nepal

Cantaloupe seeds are very small and light weight, making them an easy product to transport in large quantities. One pound of cantaloupe seed contains anywhere from 10 000 to 20 000 individual seeds depending on their size (Vesey 2016). Vesey Seeds sells a 40lb bag for approximately $250 dollars (Vesey 2016):

1 Canadian dollar is equal to 80.41 Nepalese Rupee

250 Canadian dollar × 80.41 Nepalese Rupee= 20,102

Depending on the farming system an acre requires approximately 10lbs of seed (Vesey 2016). It's essential that the seeds are stored in a cool, humid environment to prevent premature germination of seeds. This must be considered when transporting and storing product and proper transportation containers must be used to prevent spoilage of product. When seeds are properly stored they can last up to approximately 6 years (Vesey 2016). Since the seeds are not heavy or large, they could be transported by ship or airplane to Calcutta in India. From there the seeds could be transported by trucks to Katmandu in Nepal. Aeron International Nepal has appropriate transportation tools to transport the seeds to the appropriate market once seeds arrive in Nepal (Aeron International 2016). Product would most likely be commonly found in tourist dense locations since it's a niche product. The price of shipping would exceed the cost of the actual seeds, making it difficult for majority of Nepalese farmers to afford. The price of transport will be a constraining factor during export exchange. Since price might be too high for individual Nepalese farmers, it would be beneficial for larger companies or groups of farmers to purchase bulk amounts of seeds to share. Cantaloupe seeds are available in a variety of weighted bags. Depending on the scale of farming would determine the quantity of seeds a farmer would wish to purchase.

Storage Post harvest

Cantaloupe seeds have a relatively short growing season compared to average horticulture crops. Storage life and refrigeration of the product would be a large problem in a Country like Nepal. Image 3, shown in the appendix, demonstrates the proportion of energy use in Nepal. Nepalese farmers would not have the same usage of energy being located in rural areas in Nepal. This would make it very difficult to refrigerate harvested cantaloupe. It generally has a

very short shelf life even with proper storage techniques. Product must be sold quickly in order to maximize profit. Transportation would be required to move the product to market and this must be done quickly but carefully to prevent bruising of fruit. Cantaloupe is a relatively large and heavy fruit, making transportation of product challenging and expensive. Fruit would likely be taken to a local market and/or consumed amongst the community. Due to niche status of product it would be commonly found in the tourist industry or consumed as a "treat" in communities.

Cost analysis and potential benefits

In order to profit off the product it must be grown in an area close to market. Due to expense and limited opportunity for storage, tourist industry should be targeted when product is produced on a large scale. Cantaloupe has many benefits! Nepalese citizens receive nutritional value from cantaloupe consumed. This is crucial due to the prevalent malnourishment seen in Nepal. It also has potential for large economic return if the correct industry is targeted. Cantaloupe is a fantastic crop that would utilize Nepal's natural climate and provide many environmental benefits (talked more about under subtitle "exchange product").

Trade, permits, Canada-Nepal relations

Trade is organized primarily through India (Government of Canada, 2013). Both Nepal and Canada have benefitted from bilateral agreements since 1965 (Government of Canada, 2013). Import permits are required for the import of seeds to Nepal, according to the "Plant Protection Act 1972 and the Plant Protection Rules 1975" (SME Toolkit Nepal, 2014). There is a cost associated with requesting plant quarantine, 10 Nepalese Rupees (SME Toolkit Nepal,

2014). A phytosanitary certification, plant quarantine and more regulations around importation is required for imports into Nepal. Further information can be found on the website of SME Nepal (2014).

Exported seeds from Canada are inspected by the Canadian Inspection Agency for labelling and quality standards (Canadian Food Inspection Agency, 2015a). Choosing suitable seed varieties for Nepal would require a Multiplication Agreement to ensure inspection and certification (Canadian Food Inspection Agency, 2015a).

There is a zero rated item benefit, meaning Revenue Canada does not require GST/HST on large quantities of vegetable and fruit seeds (Revenue Canada, 2016). This has potential to decrease cost of exporting the seeds, making it more affordable for Nepal and Canadian companies.

Canadian government or international loan/grant programs to startup projects include Market Development Stream (SMEs). SME focuses on developing and expanding new markets internationally and domestically (AgriMarketing Program 2016). Support is provided by allowing startup company to discover market priorities and increase chances of global success. Grant amount is up to $50K/year for a maximum of 50% of eligible costs (AgriMarketing Program 2016). Applications are accepted on a continuous basis but the projects must be completed by March 31, 2018 (AgriMarketing Program 2016).

Trial run

In order to determine whether exporting cantaloupe seed varieties to Nepal will benefit both parties involved, a trial run should be proposed. Before a large investment is made, small scale shipments could be made to Nepal to determine if there is potential for the product. Market,

yield, cost, storage etc. should be analyzed to figure out how successful the idea will be. Small scale shipments would determine whether it would be a good idea to invest further in cantaloupe seed exports. Nepalese farmers should target niche markets, including the tourist industry to determine how successful and the level of demand there would be. Marketing strategies could include providing tourists with an opportunity to explore Nepal's agriculture, providing them with a hands on, interactive experience. Tourists could receive farm tours, receiving an educational experience while providing local farmers with additional income.

Regional/ global competition

China accounts for 52% of the world's melon production and is growing 16.7 million tonnes annually (The Earth of India 2012). India has approximately 10 commercial varieties of muskmelons and it is a growing industry (The Earth of India 2012). Nepal is located between China and India so there is great opportunity for competition. Due to location, it would be cheaper for Nepal to import cantaloupe seed varieties from India compared to Canada. This greatly decrease the cost of transportation. Additionally, due to the higher demand of cantaloupe in China and India it would be more likely to grow muskmelons there instead of Nepal. Since climate is similar in China/India and Nepal there would be no issues with growing the cantaloupe.

Conclusion

Cantaloupe seed variety could benefit larger companies or big groups of farmers since they would purchase higher amounts of seeds, sharing the value. Since cantaloupe is a niche product in Nepal, specific industries must be targeted to profit off the crop. The product is

sustainable benefiting both the environment and human health. There is potential for trade with Nepal but it should be done on a small scale at first to ensure there is a large enough market. If market could be established, it would benefit both economies while providing a consistent, high yielding product. Product's light weight makes it easy to transport initially but there are concerns for transportation after harvest since the fruit is delicate, large and has a short shelf life. Canadian cantaloupe seed varieties would provide Nepal famers with a diverse crop, grown in an ideal environment, while supporting Canadian economy and businesses. Due to large transportation costs compared to value of product, it's not likely that this is a good investment for both Canada and Nepal. In conclusion, having China and India located so close, it makes more sense that trade would be done with them instead of Canada.

Appendix

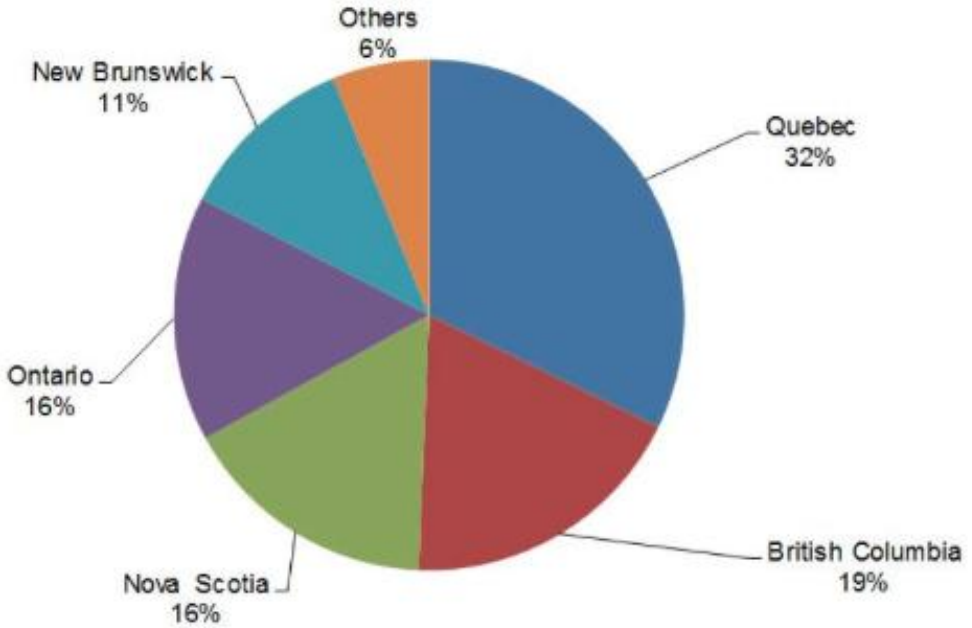
Image 1: Cantaloupe seeds

Image 2: Common yield in Nepal

	Crops	Area (ha)	Production (MT)	Yield (kg/ha)
1.	Paddy	1514210	3709770	2450
2.	Maize	802290	1345910	1678
3.	Millet	263950	291370	1104
4.	Wheat	640802	1086470	1695
5.	Barley	31843	31798	999
6.	Oilseeds	190429	119731	629
7.	Potato	118043	1091218	9244
8.	Sugar cane	53894	1971646	36584
9.	Pulses	308008	228840	743

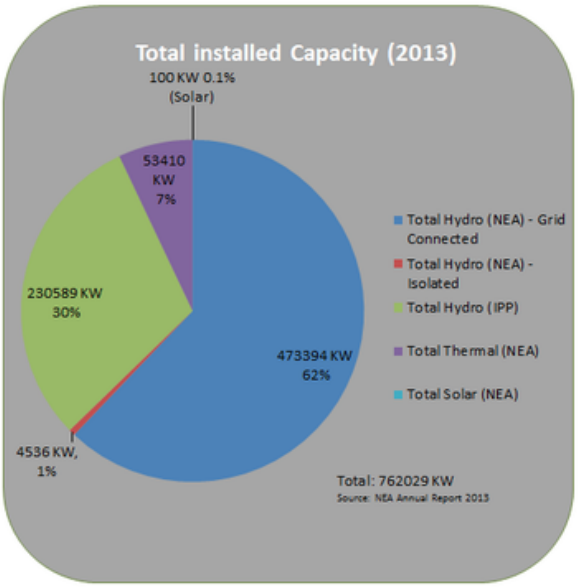
http://www.fao.org/docrep/003/x6906e/x6906e09.htm

Figure 3: Canadian fruit farm cultivated area by province



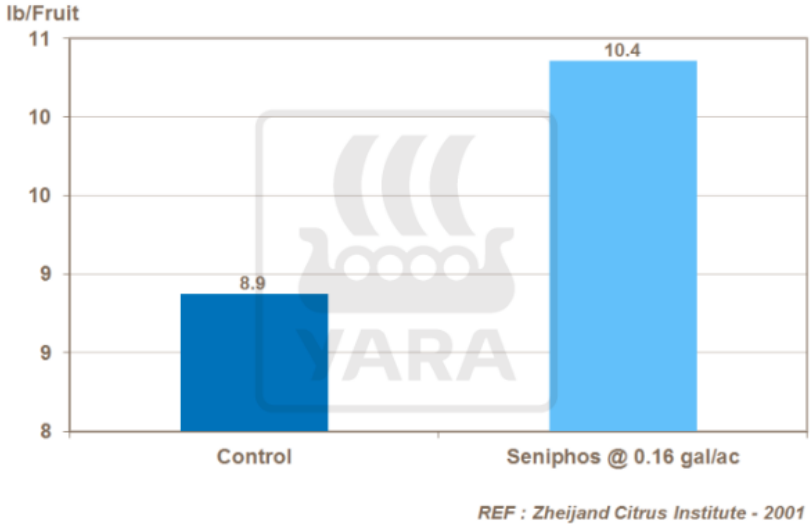
http://www.agr.gc.ca/eng/industry

Image 4: Nepal's Energy usage



https://energypedia.info/wiki/Nepal_Energy_Situation

Image 5: Role of phosphorus in melon production



http://www.yara.us/agriculture/crops/melon/key-facts/role-of-phosphate/

References

Aeron International - Site. (2016). Retrieved November 29, 2016, from http://www.aeronintl.com/

Canadian Food Inspection Agency (2015a). Seeds Export. Retrieved November 27, 2015, from http://www.inspection.gc.ca/plants/seeds/exports/eng/1299173811518/1299173935801

Canadian Food Inspection Agency (2015b). Multiplication of Seed Abroad. Retrieved November 27, 2015, from http://www.inspection.gc.ca/plants/seeds/exports/multiplication-of-seed-abroad/eng/1382971629670/1382971780221

Canada Revenue Agency. (2016). Retrieved November 29, 2016, from http://www.cra-arc.gc.ca/menu-eng.html

Foundation, G. C. (2016). Sustainable Agriculture - The Basics. Retrieved November 29, 2016, from http://www.sustainabletable.org/246/sustainable-agriculture-the-basics

Fisk, K. (n.d.). Rebuilding institutional legitimacy in post-conflict societies: A case study of Nepal. doi:10.14264/uql.2015.744

Government of Canada (2013). Canada-Nepal Relations. Retrieved October 15, 2015, from http://www.canadainternational.gc.ca/india-inde/bilateral_relations_bilaterales/canada_nepal.aspx?lang=eng

Horticulture Farm. (n.d.). Retrieved October 19, 2016, from https://companylist.org/Details/11571583/Nepal/Horticulture_Farm/

Lamichhane, J., Balestra, G., Mazzaglia, A., Kshetri, M., & Varvaro, L. (2011). An Overview On Bacterial Diseases Of The Most Important Agricultural Crops In Nepal. Acta Hortic. Acta Horticulturae, (917), 203-210. doi:10.17660/actahortic.2011.917.26

Melon growing. (2014). Retrieved November 29, 2016, from http://agriculture.vic.gov.au/agriculture/horticulture/fruit-and-nuts/melon-growing

Midmore, D., Bhattarai, S., Dhakal, D., & Bhattarai, T. (2016). Market-place and other organic wastes as nutrient sources for horticulture in Nepal. Acta Hortic. Acta Horticulturae, (1112), 343-348. doi:10.17660/actahortic.2016.1112.46

M. (2016). Grow Cantaloupe. Retrieved November 29, 2016, from http://www.wikihow.com/Grow-Cantaloupe

Nepal - Agriculture. (n.d.). Retrieved October 19, 2016, from http://www.nationsencyclopedia.com/economies/Asia-and-the-Pacific/Nepal-AGRICULTURE.html

Paudel, M. N. (2016). Consequences of Climate Change In Agriculture and Ways to Cope Up Its Effect In Nepal. Agronomy Journal of Nepal, 4, 25. doi:10.3126/ajn.v4i0.15514

Reddy, C. (1970). All About Muskmelon. Retrieved November 29, 2016, from http://theindianvegan.blogspot.ca/2012/11/all-about-muskmelon.html
Growing melons (cantaloupe, watermelon, honeydew) in Minnesota home gardens. (n.d.). Retrieved October 19, 2016, from http://www.extension.umn.edu/garden/yard-garden/fruit/growing-melons-in-minnesota-home-gardens/

SME Toolkit Nepal (n.d.). A Guide on Import Procedure and Documentation. Retrieved November 27, 2015, from http://nepal.smetoolkit.org/nepal/en/content/en/1676/A-Guide-on-Import-Procedure-and-Documentation#PSI

Udayanga, D., Castlebury, L. A., Rossman, A. Y., Chukeatirote, E., & Hyde, K. D. (2015). The Diaporthe sojae species complex: Phylogenetic re-assessment of pathogens associated with soybean, cucurbits and other field crops. Fungal Biology, 119(5), 383-407. doi:10.1016/j.funbio.2014.10.009

Veseys. (2016). Retrieved October 16, 2016, from http://veseys.com/ca/en/about/website/shipping

Www.business1.com, B. B. (n.d.). Seed Suppliers (Companies) in Nepal. Retrieved October 15, 2016, from http://www.seeds1.com/seed-suppliers/nepal.html

What is Cantaloupe Good For? 11 Reasons to Eat Cantaloupe. (2015). Retrieved November 29, 2016, from http://naturalsociety.com/what-is-cantaloupe-good-for-health/