

# Assessment of the Export Potential of Canadian Hardy Fruit Pear Trees to Nepal

Jordan Elshof

## **PART 1: PRODUCT INFORMATION:**

### **Brief Introduction to Pear Trees**

Pears (from the *Pyrus* genus) exist in several different species in the form of trees or shrubs (Wada et al., 2015). Certain species of pear are grown for ornamental purposes, while others are grown for the delicious

fruit that is produced by them, known as the pear fruit (Culley and Hardiman, 2009). Pear fruit (like the one seen in Figure 1)

contains a good source of dietary fiber, and pears also contain antioxidants, minerals such as potassium, manganese, iron, copper and magnesium, and vitamins such as vitamin C and

vitamin B6 (USDA,



**Figure 1:** An Average Looking Pear Fruit  
Source: (Hardy Fruit Tree Nursery, 2015)

2016). Pears are known as the least allergenic fruit, and consuming pears has been known to possibly aid in protection from certain types of cancer, as well as being used to help treat diseases such as colitis (Linseisen et al., 2007; Magee et al., 2005). Like other forms of trees, pear trees also have environmental benefits (Evans, 2016). Fallen tree leaves can help to reduce soil moisture loss, and decaying leaves can enrich surrounding soil with nutrients. Trees can improve air quality by removing harmful gasses from the air and replacing them with oxygen, and the fact that they remove greenhouse gasses from the air helps to fight climate change.

Another benefit is that trees can help to prevent or reduce soil erosion, a problem that is prominent in some parts of the world, with one of these countries being Nepal (Evans, 2016; Shrestha, 1997).

#### Description of Company and the Pear Fruit in Mind

Hardy Fruit Tree Nursery is a small-time nursery/business located in Sainte-Julienne, Quebec (Hardy Fruit Tree Nursery, 2015). Run by a small group of regular staff and a group of



rotating volunteers/interns each year, this nursery propagates, grows, and sells fruit trees/saplings such as apple, plum, cherry, and pear trees, with multiple varieties of each. All trees grown at this nursery are grown outside rather than in a greenhouse, allowing them to be more prepared for real

life when planted in their final locations. Though not certified organic, all plants at this nursery are only given compost and manure, and are not exposed to the use of any chemical fertilizers, herbicides, or fungicides. On top of this, these plants are propagated to be disease resistant, less prone to insect damage, great tasting, and to have good storage properties. Some varieties of pear trees grown here are also self-fertile which is very handy, though some require the use of another plant for cross-pollination. Along with some of the other fruit trees grown at Hardy Fruit Tree Nursery, the pear trees here are all grafted trees (Hardy Fruit Tree Nursery, 2015).

The significant thing about this nursery and its trees is that the trees are propagated to withstand very cold temperatures, such as those experienced in the northern parts of provinces in Canada (Hardy Fruit Tree Nursery, 2015). The nursery has more than 10 different varieties of

pears, and trees of each variety have been able to withstand temperatures as cold as  $-47^{\circ}\text{C}$ , also being able to live in hardiness zones as low as zone 4 ( $-34.4^{\circ}\text{C}$  to  $-28.9^{\circ}\text{C}$ ), with some varieties even being able to survive in zone 1 areas ( $-51.1^{\circ}\text{C}$  to  $-45.6^{\circ}\text{C}$ ) (Hardy Fruit Tree Nursery, 2015). Considering that the average January summit temperature of Mount Everest is  $-36^{\circ}\text{C}$ , these pear cultivars could be planted in any part of Nepal that has arable land and the right type of soil (Heinrichs, 2010). Since the different varieties of trees grown here have different growing characteristics and different ideal growing conditions, the locations that these trees can be shipped to and grown at becomes less limited (Hardy Fruit Tree Nursery, 2015).

Whiffletree Farm and Nursery, located in Elora, Ontario, also produces hardy fruit trees, though most of their cultivars can only withstand level 4 or 5 hardiness zones, and their trees sell for around the same price (\$34.95 - \$39.95 for a 4-6 foot tree) (Whiffletree Farm and Nursery, 2016). Mr. V's, located in Boyle, Alberta, produces a couple of varieties of zone 3 hardy fruit pear trees, though their trees are around double the price, starting at \$71.70 for a 6-foot tree (Mr. V's Field and Forest, 2016).

### Competitive Global Producers

Pear trees can be grown in many places around the world due to their regular growing conditions and the fact that many countries have ideal growing climates for different varieties of these trees. If pear trees in general were being looked at, Canada would have many potential competitors in the exportation of pear trees to Nepal, as pear fruit can be grown naturally in six of the seven continents on Earth (FAOSTAT, 2013). However, since many countries in the world do not get as cold as Canada or at least have fairly warm regions alongside their colder regions, not many other countries produce pear trees that are close to as hardy as the ones that are produced in Canada, and if other countries do, it is not advertised as heavily. Although there are

not really any nurseries in other parts of the world heavily focused on selling hardy fruit, there are a few nurseries in the United States that have pear varieties that could hold up fairly well in colder climates, therefore making these nurseries potential competitors when considering hardy pear fruit.

The Nursery at Ty Ty, located in Ty Ty, Georgia, sells a variety of pear trees known as Kieffer Pear trees that can withstand climates in hardiness zones as low as level 4 ( $-34.4^{\circ}\text{C}$  to  $-31.7^{\circ}\text{C}$ ). These pear trees start for as low as \$8.75 USD (\$11.81 CAN) for a 3-4 foot tree, increasing in cost as size increases (The Nursery at Ty Ty, 2016). This price is a fair bit lower than the prices of Canadian hardy fruit trees, making this nursery's pear trees a potential competitor for export.

Chestnut Hill Nursery and Orchards, located in Gainesville, Florida, is another American nursery that sells pear trees that could potentially be competitive with the ones grown in Canada (Chestnut Hill Nursery and Orchards, 2016). This nursery sells a variety of pear known as the Pineapple Pear, and the trees of this pear can withstand climates in zone 5 areas ( $-28.9^{\circ}\text{C}$  to  $-26.1^{\circ}\text{C}$ ). These trees start at a price of \$19.95 USD (\$26.93 CAN), which means that these trees are also cheaper than those produced in Canada, and could be potentially competitive in the exportation of hardy pear trees to Nepal as well (Chestnut Hill Nursery and Orchards, 2016). Table 1 lists all of the nurseries found that sell at least one variety of a relatively hardy pear tree.

**Table 1: Information of nurseries that sell hardy pear trees**

<b>Name of Producer</b>	<b>Location of Producer</b>	<b>Starting Price of Desired Pear Tree (CAN)</b>	<b>Starting Price of Desired Pear Tree (Nepalese Rupees)</b>	<b>Contact Information</b>	<b>Reference</b>
Hardy Fruit Tree Nursery	Saint-Julienne, QC	\$35	2863.79	Phone: 514-418-4109	(Hardy Fruit Tree Nursery 2015)
Whiffletre e Farm and Nursery	Elora, ON	\$34.95	2859.70	Phone: (519) 669-1349	(Whiffletre e Farm and Nursery, 2016)
Mr. V's Field and Forest	Boyle, AB	\$71.70	5866.69	Phone: (780) 689-2944 Fax: (780) 689-2945 E-mail: shop@mrvs.net	(Mr . V's Field and Forest, 2016)
The Nursery at Ty Ty	Ty Ty, GA	\$11.81	966.33	Phone: 1-888-758-2252 E-mail: customerservice@tytyga.ca	(The Nursery at Ty Ty, 2016)
Chestnut Hill Nursery and Orchards	Gainesville , FL	\$26.93	2203.48	Phone: 386-462-2820 Toll-free: 1-800-669-2067 Fax: 386-462-4330 E-mail: chestnuthillnursery@gmail.com	(Chestnut Hill Nursery and Orchards, 2016)

### Cost and Issues

Unfortunately, the nursery that provides these pear trees does not sell any seeds or scions themselves, but they do sell the saplings in the form of bare-rooted trees, ranging in price from \$35-\$45 CAN depending on the size of the bare rooted pear tree (Hardy Fruit Tree Nursery 2015). Another unfortunate issue that arises with pear trees sold at Hardy Fruit is that they are all grown in the same time frames, and only go dormant twice a year – in April or October. These

are the only times that pear trees can be purchased, which means that there are only short time frames that these plants can be exported to Nepal. Along with being a bit of an investment itself, the pear trees grown at Hardy Fruit Tree Nursery are also a bit of a time investment, as a majority of the varieties grown here take about seven years to bear fruit, while some of the quicker varieties are able to bear fruit after around five years (Hardy Fruit Tree Nursery, 2015).

It should also be noted that pear fruit is a bit trickier to harvest compared to other fruits, which may be puzzling to someone who has never taken fruit from a pear tree before (Hardy Fruit Tree Nursery, 2015). In order to get the best tasting fruit, pears must be taken off early and left to ripen off of the tree as they develop a more unpleasant mealy texture when left to ripen on the tree. General signs that pears are ready to be harvested are when the skin begins to change colour and they are still relatively hard. From here the pears can either be kept in room temperature conditions until they fully ripen a few days later, or kept in a colder place to preserve them for longer (Hardy Fruit Tree Nursery, 2015).

### Benefits to Canada

The exportation of hardy fruit pear trees to Nepal could potentially help to create more jobs in Canada, as more nurseries could expand to also propagate hardy fruit trees. This could also help to expand and create more jobs at Hardy Fruit Tree Nursery itself, and if the Nepalese people are interested, the nursery could also export some of the other types of hardy fruit trees that it also currently propagates, such as apple, plum, and cherry trees. People of Nepal may also really enjoy the taste or other characteristics of these fruits or fruit trees, so if these fruit trees are greatly admired, pear scions that can be grafted onto Nepal's native pear trees could potentially be exported to help make Nepal's own trees stronger or more desirable. If more and more items

get exported to Nepal, more workers will be required to ship these items, which would therefore benefit Canadian shipping companies as well (Canada's State of Trade, 2013).

Overall, the idea of exporting goods in general can help boost Canada's economy and overall level of income, create new jobs which would therefore decrease unemployment rate, and in this case, it could potentially help to strengthen bonds between Canada and Nepal, which could potentially lead to exports of different items in the future (Canada's State of Trade, 2013).

## **PART II: EXPORT POTENTIAL TO NEPAL**

### **Brief Introduction to Nepal**

Nepal is a developing southern Asian country, located between China and India (CIA, 2016). Nepal is a fairly densely populated country, being only 147 181 km<sup>2</sup> in area, but having a population of approximately 29 033 914 as of July 2016. Although it is the birthplace of Buddha, only about 9% of Nepalese people are Buddhist, with the majority, approximately 81%, being Hindu (CIA, 2016). Nepal is a very poor country, with a 2014 GDP per capita of approximately \$691.70 USD (UNdata, 2016). Food for survival is relied on heavily in Nepal, with more than 70% of the population being employed in agriculture, and about 29% of the country's GDP coming from agriculture (CIA, 2016).

Nepal consists of three main agro-ecological regions (Pariyar, 2008). The sub-tropical Terai region of Nepal is where Nepal's most advanced agriculture occurs, and most of the food grown here consists of tropical fruits and fresh vegetables. The Hills region of Nepal is more central in location and elevation than the rest of Nepal, with terracing being a common practice here. This region is suitable for growing fruits such as mangos and papayas, as well as crops such as rice, maize, and millet. Nepal's capital city, Kathmandu, is also located in this region. The last agro-ecological region of Nepal is the Mountain region, being the highest in elevation,



as well as containing half of Mount Everest, as the other half is owned by China. Areas in the Mountain region are much more remote, and it is much tougher to grow crops up here as temperatures are much lower and growing seasons are short. Subsistence farming and nomadic farming are common in this region, and the main grown crops consist of buckwheat, potato, and barley (Pariyar, 2008).

### Fruit Farming Industry in Nepal

Pears are mostly grown in the Middle Mountains regions of Nepal, with not as much pear production coming from the High Mountains regions (FAO, 2005). If Hardy Pear trees were to be exported, they could likely help boost the production of pears in the High Mountains regions. As far as fruit crops go, deciduous fruits are the most important in Nepal, with many different deciduous fruits growing all over the different regions. Over the course of 1996 and 1997, 81 640 metric tons of deciduous fruit were produced in Nepal, with 27 339 of those metric tons coming from pear fruit. Pear fruit is also the second most produced deciduous fruit in Nepal, right after apples. Production of the top deciduous fruits in Nepal can be seen in Table 2. There are two native varieties of pears grown in Nepal, along with a few Japanese and European varieties that were once introduced to Nepal. There are over 250 000 nurseries in Nepal, with over 50 000 nurseries producing pear fruit, and there is a demand for more nurseries to meet the growth of Nepal's population (FAO, 2005).

**Table 2: Area, Production and Productivity of Deciduous Fruit in Nepal (1997)**

<b>Fruit</b>	<b>Total Area (ha)</b>	<b>Productive Area (ha)</b>	<b>Production (Mt)</b>	<b>Yield (Mt/ha)</b>
Apple	4652	3006	28595	9.51
Pear	3049	2381	27339	11.48
Peach	2143	1765	12819	7.26
Plum	1441	1179	8294	7.03
Apricot	97	63	431	6.84
Persimmon	71	45	328	7.29
Total	11392	8439	77806	

Source: Taken directly from 8. DECIDUOUS FRUIT PRODUCTION IN NEPAL. (FAO, 2005).

The quality of the trees in Nepal are not the greatest due to the proper growing practices of trees not being strictly followed throughout the years (FAO, 2005). On top of this, soil fertility of the hills and mountain regions where these fruits are grown is slightly low. Pests are also another problem that effects the growth of pear fruit in Nepal, with a few pests such as bag worms, defoliating beetles, and pear psylla all reducing pear fruit yields. Due to these factors, the trees need fertilizer to help improve growth, but due to the price of fertilizer, manure and compost is often used instead (FAO, 2005). The fact that the hardy fruit pear trees grown at Hardy Fruit Tree Nursery are propagated to be disease resistant may give them a better chance of survival compared to the more native trees of Nepal.

Some farmers in Nepal do intercropping with their fruit trees, as long as there is adequate space between trees to do so (FAO, 2005). Some inter-crops include potatoes, maize, and mustard. When Nepalese farmers harvest their deciduous fruits, it is done entirely by hand, with the fruits being placed in 30 kg baskets to be shipped to the closest markets. No grading is really done in Nepal besides throwing out the extremely bad fruits, so the quality of fruits sold at the market is not always the greatest. Since a lot of fruit is grown in the Hills and Mountains regions, a lot of it is therefore grown in fairly remote areas that lack vehicle-accessible roads, local

markets, or processing and storage facilities. Farmers from these areas must transport their baskets by mules or porters to the closest market, and this transportation can take multiple days sometimes, leading to some of the fruit going bad, or having to sell fruit for cheaper due to closer expiry dates. Some farmers in the Mountain areas have found a way to store apples for up to seven months, and it is possible that this method could work for pear fruit as well (FAO, 2005).

Due to the difficulties of getting deciduous fruits to more heavily populated areas in time, Nepal relies heavily on imports from other countries such as India, while exporting very little amounts of food (FAO, 2005). Commercial fruit farming is not a traditional thing in Nepal, but the demand for fruit in Nepal is continuing to increase as Nepalese people are becoming more educated and are starting to realize the importance of having a well balanced diet. Fruit farming in Nepal has a lot of potential to grow as an industry, but in order for the outcome of this industry to be more fruitful, an increase in the amount of research and other funding towards fruit farming needs to occur in Nepal, as well as the construction of more roads to make the transportation of fruit to market easier (FAO, 2005).

### Potential Customers

Fruit farmers and nursery workers all over Nepal could benefit greatly from the importation of these hardy fruit pear trees, as these trees are propagated for their overall quality (Hardy Fruit Tree Nursery, 2015), and there are many fruit trees in Nepal that could be much better in quality (FAO, 2005). The fact that new varieties would be introduced into Nepal can also be seen as a selling point for fruit farmers here, as some varieties are very suitable for certain conditions, and they could bring about different things that native pear trees cannot, such as certain desired genetics (Hardy Fruit Tree Nursery, 2015). Apart from fruit tree farmers, these trees could also be sold to people in villages or cities as a nice piece for a backyard or park area.

Once transported into Nepal, these trees could even be planted in pots at first and sold at retail stores similar to the way that saplings can be bought at Canadian stores such as Canadian Tire. Bhat-Bhateni (office number 977-1-5261877, E-mail [info@bhatbhatenionline.com](mailto:info@bhatbhatenionline.com)) is the biggest supermarket and department store chain in Nepal, with several stores located throughout the country, so this chain could be a potential seller of these pear trees, with pear trees being sold at each store location (BBSM, 2016).

### Transportation Logistics

For orders of more than \$500, Hardy Fruit Tree Nursery will ship their trees throughout Quebec for free, therefore saving costs when shipping in bulk (Hardy Fruit Tree Nursery, 2015). It is possible to ship these trees from Montreal to Kathmandu via air freight through the company A1 Freight Forwarding (A1 Freight Forwarding, 2016). From the pear trees grown at Hardy Fruit Tree Nursery, it is likely that their 1-2 foot trees would be the ones desired for shipment, as they are the cheapest (\$35 CAN) and smallest, therefore also being the cheapest to ship (Hardy Fruit Tree Nursery, 2015). If 100 bare-rooted pear trees in between the heights of 1-2 feet were to be shipped, they could likely fit into a box that's 4 feet by 4 feet by 4 feet. Figure 2 shows a picture of the approximate size of 100 bare-rooted pear trees, which are small enough altogether to be able to fit into somebody's arms (Hardy Fruit Tree Nursery, 2015). Assuming 100 of these trees with the soil comes out to around 25kg in weight, A1 Freight Forwarding can ship 100 of these in a box for roughly \$1297.98 CAN (A1 Freight Forwarding, 2016). This would mean that shipping for one tree would cost \$12.98, and the total cost for one of these trees would be \$47.98 CAN (\$35.53 USD) (A1 Freight Forwarding, 2016). However, there are a few unknowns to this shipment cost that may increase the total price of one shipped tree. For one, it is recommended that these trees are kept in cool environments when they are not planted (Hardy Fruit Tree

Nursery, 2015), so the cost to ship them under certain conditions may cost extra. Also, once the trees get shipped to Kathmandu, it will likely cost more money to ship them around Nepal from there, with a possible increase in price for express shipment so that these trees can get planted as soon as possible.

#### Trade and Subsidy Barriers, and

#### Documentation Required

Shipping trees from Canada to Nepal is not as simple as placing them on a plane, however. Living plants can carry invasive or unwanted species into new environments, which can be detrimental to the native organisms of that ecosystem (NPB, 2014). Due to this, most plants are regulated and must meet certain criteria in order to cross

borders (Canada Post, 2016). Since this transportation involves the shipment of living pear trees, certain documentation is required when exporting and importing these trees (Canada Post, 2016; NEFFA, 2016). To export these trees from Canada, an *Export Declaration Form B13A* is required, and an export permit is also likely to be required as most trees are included on Canada's *Export Control List* (Justice Laws Website, 2016). To be able to import these plants



**Figure 2:** The approximate size of 100 bare-rooted trees:  
Source: (Hardy Fruit Tree Nursery, 2015)

into Nepal, there is a list of things that are required, which includes: a Nepal custom import declaration form, a letter of authority for clearing agents to act on behalf of the importer, an air way bill, a Performa Invoice, a packing list, a Certificate of Insurance Policy, a Foreign Exchange Declaration Form of Nepal Rastra Bank, a certified copy of L/C, a Company Registration Certificate, a VAT/PAN registration certificate, permission from the Plant Quarantine Section of Department of Agriculture for import of plants and plant products including fruit leaves & seeds, and an import license if applicable (NEFFA, 2016). Soil importation into Nepal is also heavily controlled, and is only allowed in for the sake of keeping these transported plants alive, so soil amount must be kept to a minimum when shipping these plants (NEFFA, 2016). Also, there is duty tax of 6.5% or 10% on all trees or shrubs that produce edible fruit (Government of Nepal, 2012). The amount of duty tax charged depends on the intended use of the plants, but nonetheless this would increase the cost of these pear trees even further (Government of Nepal, 2012). Further research in this sector would need to be conducted if this export idea were ever to be launched.

### Benefits to Nepal

Since Nepal is a developing country and having enough food to stay full is a big concern, these pear trees, whether grown randomly around the country or farmed, could help to give the people of Nepal a bit more to eat. Another benefit of the pear trees is that they would be able to withstand the harsher climate of the high mountain regions of Nepal (Hardy Fruit Tree Nursery, 2015), which could benefit farmers and nomads, especially in harsher seasons with lower yields. A nice benefit is the fact that they do not need to be replanted every year, so the amount of fruit produced in a season is not as depended on, it is just a nice bonus.

As Nepal becomes more aware of the health benefits of consuming more fruits along with their heavily concentrated grain diets, the fruits from these Canadian exported pear trees could help to increase the health of many Nepalese people, as these fruits are of better quality than much of what is already grown in Nepal, and as mentioned earlier, pear fruit is a good source of essential vitamins and nutrients, making them a great choice for human consumption in the first place (USDA, 2016). Growing these hardy fruit pear trees from Canada could help to increase plant production and to decrease the amount of viral, bacterial, and fungal diseases seen in pear trees, as the Hardy Fruit pear trees are propagated to be disease resistant (Hardy Fruit Tree Nursery, 2015).

Growing these improved pear fruit varieties in Nepal could greatly benefit the fruit and pear tree farmers of Nepal, as the higher quality of fruit grown from these trees means that farmers will be able to produce greater yields of fruit. If the fruit of these pear varieties remain higher in quality than the other varieties of pear fruit by the time it reaches the market, it is possible then that farmers could sell their fruit for a higher cost due to its improved quality, therefore leading to a greater income for these fruit farmers (FAO, 2005).

### **RECOMMENDATIONS FOR EXPORT**

Considering the fact that one bare-rooted pear tree would cost \$35.53 USD at minimum, it would be difficult for the people of Nepal to purchase one of these trees since the GDP per capita in Nepal was \$691.70 USD in 2014 (UNdata, 2016). Assuming a Nepalese citizen makes this amount as an annual income, that would mean that he/she would make roughly \$1.90 a day, and would have to work approximately 16 days to be able to afford one of these trees. This is a lot of work to put in for a plant that only bears fruit for a couple of months each year, and since the chance that one of these trees will survive after being planted isn't guaranteed (Vogt et al.,

2015), this imposes a very questionable decision for Nepalese citizens to make when debating on purchasing one of these trees, with a lot at stake. If this export idea were to be launched, more research would have to be done on the actual chances of one of these pear trees surviving its trip to Nepal and its chances for being planted successfully, which would require researching things such as the best soil characteristics for a pear tree versus Nepal's soil characteristics, as well as how long and under what conditions can a pear tree survive when not being planted in the ground. It is possible that a whole village could come together to purchase one of these trees as a centerpiece/decoration of the village while sharing the fruit that it bears, and though this would still benefit Nepal in a simple little way, sales of trees wouldn't be high enough to really have much of an impact on benefits for Canada.

The main purpose of exporting these trees was to appeal to people from the colder mountain regions of Nepal, where regular pear trees might not fare as well (Pariyar, 2008). However, most of Nepal's poorest people live in these mountain regions, and many of them are subsistence or nomadic farmers (Pariyar, 2008). If it is already a struggle for the average Nepalese citizen to purchase one of these trees, it would be even more difficult for people such as subsistence farmers to purchase these trees when they don't make profit off of their crops and only grow enough food to support their families. Considering that some of these farmers live in remote areas as well, it would be difficult to ship trees up to some of these areas, and it would likely cost extra to ship them.

If this product was sold in seed or scion form rather than only as bear-rooted trees, it would be much more plausible price-wise, and could actually be considered as a potential export idea. Not only is it cheaper to purchase a seed, but many more seeds could be shipped to Nepal for the exact same price as what it costs to ship 100 1-2 foot trees. Due to this, a Nepalese farmer



could likely continue to plant seeds until one actually sprouts and grows, and they would probably still have spent less than the amount to purchase a 1-2 foot tree. For now, it would likely be more ideal if people from the Terai and Hills regions stuck with Nepalese grown pear trees or pear trees from close-by countries, while some other strategy should be determined to get more food or better plants to the mountain people of Nepal.

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