

**Canadian Chickpeas for Human Consumption as a  
Potential Export Idea to Nepal**

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**Sarah Storey**

# **Canadian Chickpeas for Human Consumption as a Potential Export Idea to Nepal**

A potential export idea from Canada to Nepal are Canadian chickpeas for human consumption. This export idea is intended to provide benefits to both countries while being reasonable and rational. In order to promote this idea, research had to be constructed in order to determine if Canadian chickpeas could be a potential export to Nepal. By investigating specific traits of the chickpea legume, the characteristics of Nepal and the benefits to both countries, a conclusion may be drawn to determine whether chickpeas are an adequate export idea.

## **PART ONE - About Chickpeas**

The chickpea species is a grain legume and is known as *Cicer Arietinum L.* (Upadhyaya et al., 2006). Figure 1 is a picture of a chickpea plant. It is a herbaceous annual (Gaur et al., 2010). Herbaceous annuals are plants that only live and bloom for one year (Love, Noble, Parkinson, & Bell, 2009). At the end of the growing season they die and must be replanted in order to be regrown the following season (Love, Noble, Parkinson, & Bell, 2009). The chickpea plant has a height ranging from around 30 to 70 cm and possesses a tap root system which is very deep and strong (Gaur et al., 2010). Trichomes, which are delicate hairs densely cover the surface of the plant shoot completely (Gaur et al., 2010). These trichomes are able to produce exceedingly acidic substances which contain malic, oxalic and citric acids that aid in protecting the plant against insect-pests (Gaur et al., 2010).

## Figure 1.



Retrieved from <http://pulse.ab.ca/producers/varieties-management/chickpeas/chickpeas-overview/>

Two popular cultivars of chickpeas in Canada are known as kabuli and desi chickpeas. The right picture in Figure 2 are Kabuli chickpeas. Kabuli chickpeas are large and reveal the shape of an owl or rams head (Gaur et al., 2010). They have a very thin, smooth surfaced seed coat surrounding them (Upadhyaya et al., 2006). They are generally white or beige coloured (Gaur et al., 2010). The kabuli type has white flowers and lacks anthocyanin pigmentation on their stem (Gaur et al., 2010). They have a higher level of sucrose but a lower level of fiber compared to the desi chickpea (Gaur et al., 2010).

In contrast, desi chickpeas are angular shaped, have a rough surface and a thick seed coat surrounding them (Upadhyaya et al., 2006). The left picture in Figure 2 are desi chickpeas. They

possess various shades of colours including brown, yellow, green and black (Gaur et al., 2010). Typically, desi chickpeas have pink flowers and reveal a various degree of anthocyanin pigmentation on their stem (Gaur et al., 2010). However, not all desi types have pink flowers and show this pigmentation (Gaur et al., 2010). Some have white flowers and show no degree of anthocyanin pigmentation on their stem (Gaur et al., 2010). This desi type of seed accounts for 80-85% of the chickpea area (Gaur et al., 2010). Though, kabuli chickpeas, which are larger and weigh more have a 60% increase in price compared to the desi type (Upadhyaya et al., 2006).

**Figure 2.**



Retrieved from [http://www.icrisat.org/tropicallegumesII/pdfs/ChickpeaManual\\_full.pdf](http://www.icrisat.org/tropicallegumesII/pdfs/ChickpeaManual_full.pdf)

Chickpeas are a cold season legume and can be grown in a variety of environments and cropping systems (“International,” 2009). The chickpea is heat-tolerant and relatively drought-tolerant (“International,” 2009). The crop “...thrives under good moisture conditions with daytime temperatures between 21°C and 29°C and night temperatures near 20°C” (McVicar et al., 2007). It takes chickpeas a range from 80 to 180 days to mature (“International,” 2009). This is such a wide timeframe range because specific factors including genotype, growing conditions and environments affect the rate at which the chickpea crop matures (“International,” 2009). The

growing conditions for chickpeas require 110 to 120 frost-free days, relatively high temperatures throughout the day and night time, loamy and medium soil textures, high soil moisture, fair drainage and low salinity, and a soil pH of 7.0 to 8.0 (“Growing,” 2014).

The chickpea is rich in quality protein and can be digested without difficulty (Upadhyaya et al., 2006). In addition to the chickpea having a high protein content of about 20-22%, it is also rich in fiber, minerals such as phosphorus, calcium, magnesium, iron and zinc, and it is rich in  $\beta$ -carotene as well (Gaur et al., 2010). It is able to provide consumers with a primary source of dietary protein, essential amino acids, carbohydrates, minerals, and both Vitamin A and C (Pande et al., 2005).

The Canadian company involved in this export idea is Ilta Grain Incorporation. Ilta Grain Incorporation is a buyer, processor, and exporter of Canadian pulses. They handle desi chickpeas, kabuli chickpeas, edible green peas, edible yellow peas, lentils, red lentils, and other lentils as well as other pulses. Their head office is located in Surrey, British Columbia. Ilta Grain Incorporation owns and operates four processing plants in the production area in Saskatchewan. They currently export whole red lentils and yellow and green whole peas to Nepal. These lentils and yellow and green whole peas are all produced in Saskatchewan. They buy their products from local producers who grow and harvest the lentils and peas that they export to Nepal. The machinery that they use to grow, raise and process these products is typical planting and harvesting equipment that is seen in Southern Ontario to produce corn, wheat and beans (G. Donkersgoed, personal communication, November 12, 2014). Figure 3 represents a picture of the company logo.

**Figure 3.**



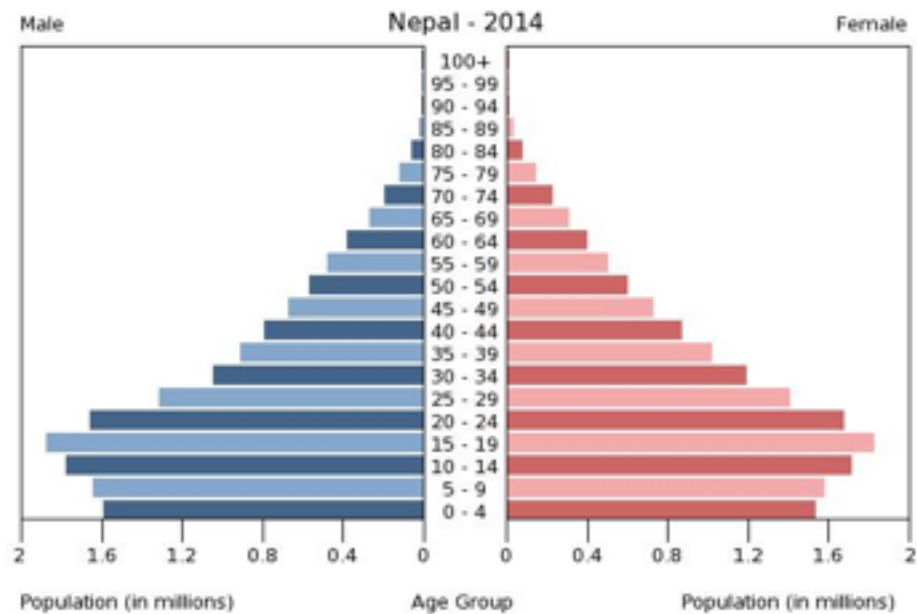
Retrieved from <http://www.iltagrains.com>

The export of Canadian chickpeas to Nepal would benefit Canada by employing more people and improving their export stats. It will also benefit Ilta Grain because they will be making a profit off of the chickpeas that they export to Nepal. Not only is the chickpea equipped with nutritional value, but it also plays a notable role in improving the soil fertility. It is capable of improving the soil fertility by fixing the atmospheric nitrogen (Gaur et al., 2010). It fixes 40kg N/ha in the soil and is also capable of reducing fertilizer costs in subsequent cereal crops (Pande et al., 2005). Plenty of organic matter is added to improve the health and fertility of the soil as well (Gaur et al., 2010). This is beneficial to Ilta Grain Incorporation by decreasing fertilizer costs and improving the fertility of the soil.

## PART TWO - About Nepal

Nepal is one of the most un-wealthy, non-developed poverty-stricken countries with approximately one-quarter of the population surviving below the poverty line. The 30, 986, 975 populated landlocked country is located in South Central Asia between China and India. The nationality of Nepal is known as Nepali. Approximately 31.6% of the total population is within 0-14 years old and 35.7% of the total population is within 25-54 years old. Figure 4 is a population pyramid of Nepal that represents the population with respect to age. The median age in Nepal is approximately 22.9 years. The birthrate is 21.07 births/1,000 population, the death rate is 6.62 deaths/1,000 population, and the infant mortality rate is 40.43 deaths/1,000 births (“Central,” 2014).

**Figure 4.**

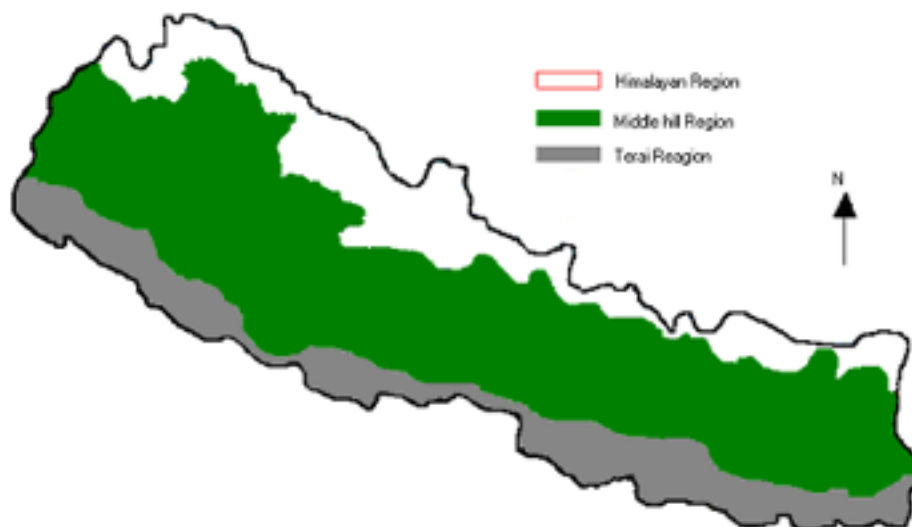


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The climate in Nepal varies depending on the location. Northern Nepal experiences cool summers and severe winters and Southern Nepal experiences subtropical summers and mild winters (“Central,” 2014). There are four seasons present in Nepal just as there are in Canada. Their winter season ranges from December to February, spring ranges from February to June, summer ranges from June to September and fall ranges from September to November (R. Khanal, personal communication, October 17, 2014). In some regions in Nepal the lowest temperature in the winter is around 15°C and in the summer temperatures can reach above 40°C (R. Khanal, personal communication, October 17, 2014).

There are three terrains in Nepal known as the Himalayan Region in the North, the Central Hill Region between the North and the South, and the Terai Region located in the South (“Central,” 2014). Figure 5 represents the three different regions in Nepal.

**Figure 5.**



Retrieved from <http://pridenepal.wordpress.com/geography/>



The “Himalayas is a group of mountainous regions located in South Asia - Pakistan, India, Bhutan, Tibet, and Nepal” (“Himalayas,” 2009). They have an elevation exceeding 2000 meters and have a cool dry climate with average daily temperatures varying between 9°C - 10°C in June and July (Pariyar, 1998). The Himalayas are a valuable estate of Nepal and possess some of the tallest mountains compared to any other region on the planet (“Himalayas,” 2009). In fact, the highest mountain in the world is located in Nepal reaching approximately 29035 meters tall (“Himalayas,” 2009). This mountain is known as Mount Everest.

The central region of Nepal is known as the Hill Region. This region is a broad section of land that possesses an elevation ranging from around 300 - 2000 meters (Pariyar, 1998). In December and January the daily temperature varies between 2°C - 17°C and in June and July the temperature varies between 13°C - 27°C (Pariyar, 1998).

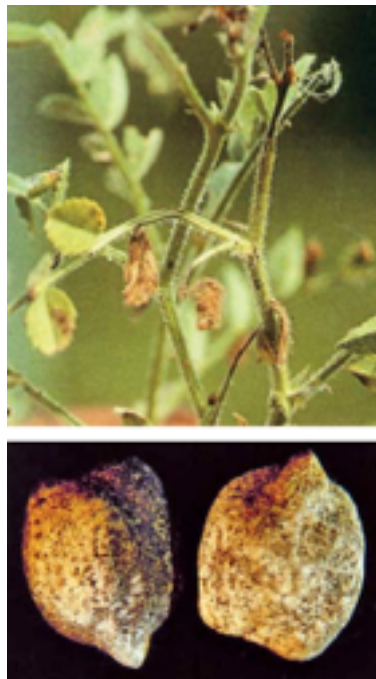
The Terai Region located in the South of Nepal is a flat plain. This region extends from the East of Nepal to the West with an elevation from 60 - 300 meters. The Terai Region has a tropical and sub-tropical climate. In December and January the average daily temperature varies from 7°C - 24°C and in June and July the temperature varies from 24°C - 41°C (Pariyar, 1998).

Nepal differs in many significant aspects compared to Canada. The most evident differences are the language, the religion, and the currency. The most common language in Nepal is known as Nepali (“Central,” 2014). This language accounts for approximately 44.6% of the population (“Central,” 2014). The most predominant religion in Nepal is Hindu (R. Khanal, personal communication, October 17, 2014). Since Hinduism is the leading religion in Nepal, very few Nepalese consume meat (R. Khanal, personal communication, October 17, 2014). The currency in Nepal is known as a Nepalese Rupee (R. Khanal, personal communication, October

17, 2014). One Canadian dollar is equivalent to approximately 54.6 Rupees. To put this in perspective, one carton of milk in Nepal is approximately 25 Rupees (R. Khanal, personal communication, October 17, 2014). This is equivalent to less than one Canadian dollar and reveals that the country of Nepal is not very wealthy.

The chickpea has been an essential pulse crop in Nepal. It is grown in the Terai Region, which is the principle agricultural district. The area under chickpea production has dropped significantly in previous years. In 1981 - 1982 the area under chickpea production was approximately 54,000 ha and in 1997 - 1998 dropped to 19,000 ha. Botrytis gray mold was responsible for this decline in chickpea production. In 1997 - 1998 the Botrytis gray mold epidemic terminated chickpea production from the country and destroyed a significant amount of seed for the following season (Pande et al., 2005). Figure 6 is an example of a chickpea plant with Botrytis gray mold.

**Figure 6.**



Retrieved from [http://www.icrisat.org/tropicallegumesII/pdfs/ChickpeaManual\\_full.pdf](http://www.icrisat.org/tropicallegumesII/pdfs/ChickpeaManual_full.pdf)

The peas and lentils that Ilta Grain Incorporation exports to Nepal are either delivered to the Incorporation plants by farmers or they are arranged to be picked up at the farm that they are buying from. Ilta Grain Incorporation then processes the peas and lentils in order to remove all foreign material. They process the products by using sieves, screens, gravity tables, and electric eyes. This procedure ensures that the chickpeas are fit for human consumption. Once the processing procedure is complete, the clean peas and lentils are transported to port from Ilta Grain's mills. They are transported in bulk rail hopper cars to Vancouver in packages of around 90 - 100 MT each. Figure 7 is a picture of a bulk rail hopper car. From Vancouver the peas and lentils are loaded onto ocean containers and shipped to Kolkata (Calcutta). Once the shipments reach Kolkata they are then transported by overland transit to Nepal (G. Donkersgoed, personal communication, November 12, 2014).

**Figure 7.**



Retrieved from <http://www.midlandmfg.com/products/pressure-differential-car>

The market prices that the peas and lentils are sold for vary. They are typically sold in US dollars per MT CIF Calcutta. CIF stands for Cost Insurance Freight Calcutta, which means that the delivery of the peas and lentils to Calcutta is funded by Ilta Grain Incorporation. The current value for peas is approximately \$500 per MT and \$835 per MT for lentils. In Nepal, there is a competitive private trade that imports, packages and distributes locally (G. Donkersgoed, personal communication, November 12, 2014).

Considering that Ilta Grain Incorporation already currently exports peas and lentils to Nepal, chickpeas could be a potential export. Ilta Grain also already handles chickpeas, which assures that they are familiar with the product. The chickpeas could potentially be bought the same way as the peas and lentils are and processed in a similar way in order to remove all foreign material to be fit for human consumption. They would also be exported a similar way by over ocean and overland transportation. The market cost of chickpeas and the production costs would be relatively similar to the expenses of peas and lentils.

For millions of people in developing countries, the chickpea is an important source of protein (Gaur et al., 2010). It is particularly an important source of protein in South Asia (Gaur et al., 2010). In Nepal, which is located in South Asia, the predominant religion is Hindu (R. Khanal, personal communication, October 17, 2014). Chickpeas would be very beneficial to Nepal since Hinduism is the leading religion. Due to Hinduism, very few Nepalese consume meat and most only ingest meat once a year (R. Khanal, personal communication, October 17, 2014). The chickpea can be a considerable substitute for meat due to the high protein content it contains. The chickpea legume is also able to provide the Nepalese population with a primary source of dietary protein, essential amino acids, carbohydrates, minerals, and both Vitamin A and

C as previously stated (Pande et al., 2005). Since the majority of the Nepalese population do not consume meat, chickpeas are a healthy substitute for meat and contain many nutritional benefits.

However, chickpeas are a long season crop (G. Donkersgoed, personal communication, November 12, 2014). This means that there is fall frost at risk (G. Donkersgoed, personal communication, November 12, 2014). They also do not like damp growing conditions and are susceptible to various plant diseases throughout the growing season (G. Donkersgoed, personal communication, November 12, 2014). Some diseases that they are susceptible to are fusarium wilt, collar rot, dry root rot, ascochyta blight, and botrytis grey mold (Gaur et al., 2010). Insect pests also need to be managed if applicable while growing the chickpea legume. Some insect pests of the chickpea include pod borer, termites, and cutworm (Gaur et al., 2010). Although there is management of diseases and insect pests, if they are not treated properly this could decrease yields of the chickpea legume, therefore decreasing profit. If both of these factors are decreased, the potential export of the chickpea legume from Canada to Nepal may not be as beneficial to Canada.

Canada has previously exported chickpeas to Nepal. However, they have recently ceased this export. The marketing year, which is August to July of 2010 - 2011 was the last time that Canada exported chickpeas to Nepal. This export was an overall 38 MT. Prior to this last export, Canada exported 124 MT in 2001 - 2002 and 271 MT in 2005 - 2006. This cease of Canadian chickpeas being exported to Nepal could be a issue of proximity and price/quality competitiveness (B. Clancey, personal communication, November 16, 2014).

Australia is a superior fit for exporting chickpeas to Nepal (G. Donkersgoed, personal communication, November 12, 2014). Nepal is one of the primary destinations for Australian

Chickpea exports as well as India, Bangladesh, Pakistan, United Arab Emirate, United Kingdom, Egypt, and Saudi Arabia (“Australian,” 2011). Figure 8 is a line graph that represents the thousands of tonnes of chickpeas that Australia exports and Figure 9 is a pie graph of Australia's primary export destinations for chickpeas. From November 2010 - October 2011, Australia exported approximately 3,953 tonnes of chickpeas to Nepal (“Australian,” 2011).

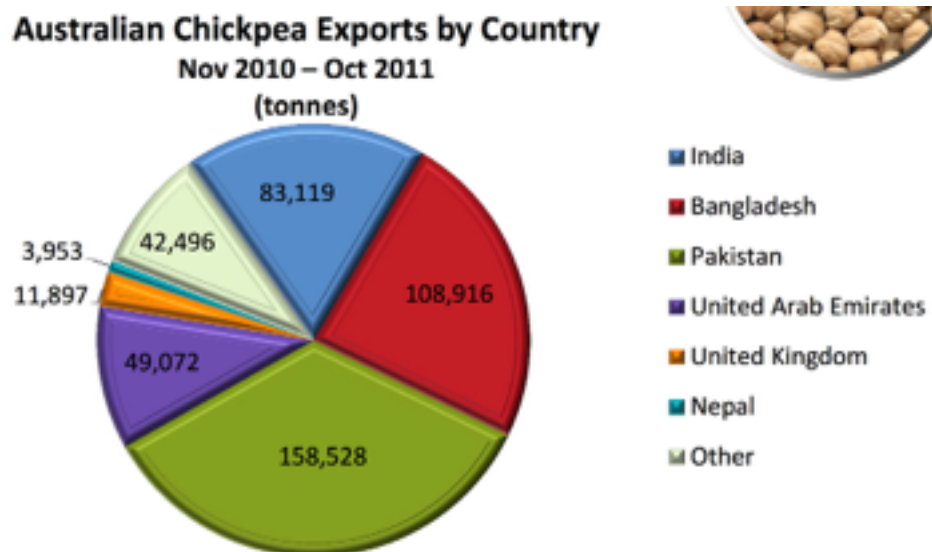
Canada is a residual producer and supplier of the desi type of chickpea. They can not compete with Australia’s exports of chickpeas to Nepal. Australia has a more suitable climate for growing and raising chickpeas as well as a cheaper freight cost to Nepal compared to Canada This means that it is less expensive for Nepal to buy chickpeas from Australia than it is from Canada (G. Donkersgoed, personal communication, November 12, 2014).

**Figure 8.**



Retrieved from [http://www.cicilsiptic.org/downloads/0\\_25319800\\_1357723130AustralianChickpeaExports.pdf](http://www.cicilsiptic.org/downloads/0_25319800_1357723130AustralianChickpeaExports.pdf)

## Figure 9.



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Overall, the idea of exporting the chickpea legume for human consumption from Canada to Nepal has several benefits to both countries. However, there are also many limitations that exist with this export idea. Canada does not have the optimal growing conditions for growing and raising chickpeas. They have stopped exporting chickpeas to Nepal due to these conditions. They have also ceased exporting chickpeas to Nepal due to cost. Australia has a better fitting climate for growing and raising chickpeas along with a cheaper freight cost. Therefore, it is cheaper for Nepal to buy chickpeas from Australia than it is for them to buy chickpeas from Canada. In conclusion, the potential export idea of Canadian chickpeas to Nepal has more limitations than benefits. Considering that Canada used to export chickpeas to Nepal, and does not anymore suggests that this potential idea will not beneficially pursue.

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