

The Opportunity To Export Cauliflower Seeds From Canada To Nepal

Intro to Agri-food Systems - AGR1110  
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Cauliflower seeds are an excellent product for Canada to produce and export to Nepal. Canadians would benefit by the increased seed business, which would provide increased employment and financial return, while Nepal would benefit by growing the cauliflower seeds to produce a nutritional food source as well as a cash crop to sell. Now, more than ever, after the devastating earthquake in Nepal in April 2015 there is a window of opportunity for Canada and Nepal to further develop their trade relationship. A critical analysis of potential benefits and limitations to both countries is required to determine if this export/import business could be a feasible option.

### **Part 1: Product Information**

Cauliflower seeds are small, easily packaged, and inexpensive to transport, which makes them an optimal product to deliver overseas (Cornell, 2015). When planted these seeds grow into cauliflower; species *Brassica oleracea*, family Brassicaceae. Brassica seed production involves four main steps, which includes pollination, seed production, harvesting in pods and drying (Cornell, 2015).

#### **i) Cauliflower Seed Production**

Firstly, Brassica species require insect pollinators (Cornell, 2015). Due to the fact that varieties of the same species (e.g. cauliflower, cabbage, broccoli) will cross-pollinate with each other, cauliflower seed producers must ensure isolation distances of at least one half to one mile between these different varieties (Rashid and Singh, 2000). The cross-pollination occurs naturally by insects. Secondly, most Brassica plants are biennials (taking two seasons to produce

seed) and require a cold temperature in order to flower. Cauliflower plants are dug up after the first year and over-wintered with the roots buried in sawdust or sand. The heads are trimmed before planting for seed the second year (Rashid and Singh, 2000). There are some Asian varieties that are an annual and can flower and produce seeds the same year. Thirdly, seed pods are harvested when they are fully mature (Rashid and Singh, 2000). This is when the pods start to dry and turn brown. It is best not to allow the seed pods to dry completely in the field or there is the risk of them shattering. Therefore, mature plants are harvested and allowed to dry completely in mesh bags or on tarps. Lastly, Brassica pods need to be threshed. This can be done using a belt thresher or by hand. The smaller chaff can be separated using screens, an air column or winnowing (Rashid and Singh, 2000).

In order to obtain high quality seeds and higher yields selection of the right variety of seed, best possible agronomic management, seed source, seed treatment, nutrition of the seed crops, disease and insect control, cross pollination and the appropriate harvesting and storage of seeds is of the utmost importance (Rashid and Singh 2000). These valuable seeds can then be packaged and become ready for sale (Rashid and Singh, 2000).



**Figure 1: Cauliflower Seeds** (<http://www.indiamart.com/tejaswi-seeds/vegetable-seeds.html>)

- ii) Cauliflower Seed Producers and Distributors In Canada

There are a large number of small vegetable seed producers and distributors from the east to west coasts of Canada (Seeds Of Diversity, 2015). One of the larger companies is called Stokes Seeds Limited in Thorold Ontario (296 Collier Road South, L2V 5B5) and is a well-respected company that would benefit from exporting seeds to Nepal (Stoke Seeds Limited, 2015). The company was established in 1928, employs 175 people, and is one of the largest distributors of garden seeds in North America, with sales between \$10 and \$25 million (Industry Canada, 2015). Cauliflower seeds are one of their specialties and they distribute 19 different varieties many of which are hybrids (Stoke Seeds Limited, 2015). This company has experience exporting seeds to various areas in the United States, but does not appear to export to other countries (Stoke Seeds Limited, 2015). Selling seeds to Nepal would be a new market for this company.

A number of the cauliflower seeds sold by Stokes Canada Limited are hybrids (Stokes Seeds Ltd., 2015). The production of hybrid seeds is also very important. A hybrid is created when two different species of cauliflower or other types of Brassica are cross-pollinated. The hybrids are bred to improve the characteristics of the resulting plant (Stokes Seeds Limited, 2015). This can be used to increase yields, have better curd quality, grow at different climates, have a higher nutritional value and improved disease and drought resistance. Hybrid seeds tend to be higher in cost, therefore, may have a more limited application for developing countries like Nepal (Sharma, 2001). Many of the cauliflower varieties, whether hybrid or not, grow well under cooler conditions, which would be ideal for certain geographical areas in Nepal (Sharma, 2001).

Having Stokes Seeds Limited export cauliflower seeds to Nepal would allow for increased cauliflower seed production and distribution, provide a greater number of Canadian

jobs, increase sales and profits for their company and ability to aid the Nepalese people after the April 2015 earthquake, a proud humanitarian act. Two limitations for this to happen were discovered upon further research. The cauliflower seeds are produced in the United States for Stokes Seeds Limited, and then distributed by the company in Thorold (Sara, personal communication, November 5, 2015). Secondly, it was indicated that the distribution rights for these seeds were only for North America (Sara, personal communication, November 5, 2015). These are two constraints which would need addressing if Stoke Seeds Limited pursues the export of cauliflower seeds to Nepal.

Seeds International is another company that sells cauliflower seeds (Alibaba, 2015). The Alibaba website has only one cauliflower variety (Heirloom, a non-hybrid variety), which also is produced in the United States. The seeds are packaged in poly bags and 30 of these bags are placed in a larger foil bag for long term storage, this holds 1,500 seeds. This company was established in 1999, employs 5 to 10 people and has approximately \$1 million (CAN) in sales. It appears as well to only be a distributor of vegetable seeds. They do though distribute seeds in North America and to South America, Eastern Europe and Southeast Asia (Alibaba, 2015). This company appears to have export experience and would be able to meet the distribution needs required to send seeds to Nepal.

### iii) Seed Transportation

The seeds are a dry product and therefore easier to transport. Shipping involves the seeds being placed in a container, transported by rail or truck to Vancouver and then onto a boat to either Calcutta or Haldia India (International Finance Corporation, 2015). It would cost \$800 (CAN) to transport a forty-foot shipping container by rail or truck to Vancouver (Transport

Canada, 2010). This forty-foot shipping container costs approximately \$800 (CAN) to ship across the Pacific to India (Transport Canada, 2010). The product would then be transported either by rail or truck to Nepal. Importing cauliflower seeds into Nepal requires an import permit and a phytosanitary certificate (International Finance Corporation, 2015). The phytosanitary certificate is issued in Canada prior to shipment (CFIA, 2015). The transportation cost for Canada is feasible when one considers the potential financial return from cauliflower seed sales.

iv) Competition

Canada would be competing with other major seed producers from China, India, United States and Japan (Agriquest, 2015). Companies based in India and China would be our greatest competitors by having low cost labour (e.g. India's average daily rate for unskilled labour is \$7.10 (CAN) per day) and being countries that border onto Nepal (India Labour Department, 2015). Recent data indicates that India, Thailand, China, Japan and Korea are the major countries that import vegetable seeds into Nepal (GON, 2011). This data is displayed in Table 1.

Table 1. Import of Vegetable Seeds Into Nepal 2008/9 and 2009/10 (GON, 2011)

Importing Countries	2008/09			2009/10		
	Imports (kg)	Imports (NPR.)	Avg. Cost (NPR./Kg)	Imports (kg)	Imports (NPR.)	Avg. Cost (NPR./Kg)
India	327,096	30,878,821	94.4	292,577	24,329,653	83.1
Thailand	29,013	18,024,236	621.2	8,757	9,865,939	1,126.60
China P. R.	15,032	4,763,312	316.9	4,321	1,021,426	236.4
Italy	10,775	2,266,194	210.3	-	-	-
Japan	9,615	52,236,637	5,432.80	4,252	29,736,695	6,993.60
Korea R	5,144	15,861,967	3,083.60	8,227	3,933,870	478.2
Others	1,559	3,726,193	2,390.10	1,803	9,343,273	5,182.10
<b>Total</b>	<b>407,784</b>	<b>127,871,077</b>	<b>-</b>	<b>319,937</b>	<b>78,230,856</b>	<b>-</b>

This competitive disadvantage could possibly be offset if Stoke Seeds Limited would be able to receive government grants to aid in expanding, perhaps producing in Ontario and developing marketing tools and export capabilities. The Canadian Government gives grants through Export Development Canada (Export Development Canada, 2015). Using a small business grant tool possible funding of \$3,179,000 was calculated (Small Business Grants Canada 2015).

A portion of the cauliflower seeds are produced in Nepal. When there is no distribution chain, seeds are traded between farmers (GON, 2011). The seed distribution network is discussed in more detail in Part II of this paper.

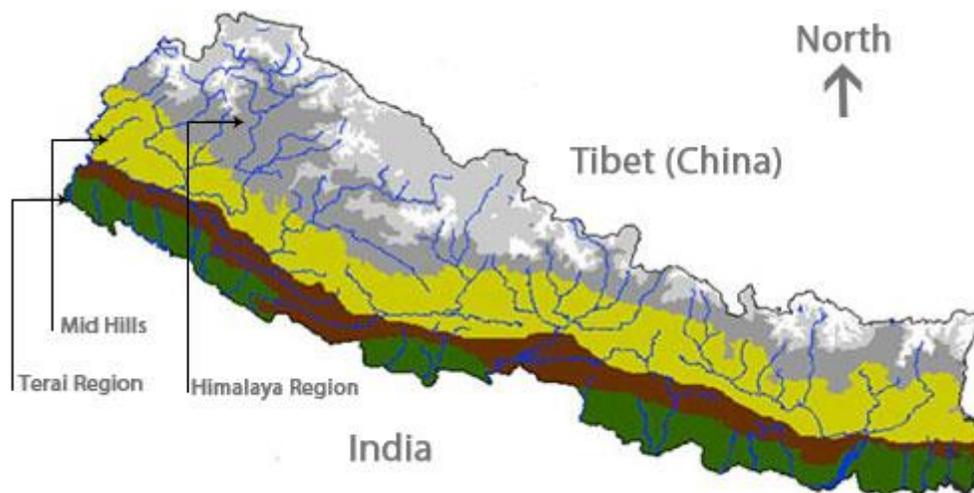
## **Part 2- Critical Analysis Of Potential Benefits To Nepal**

### **i) Facts About Nepal**

At this point it is important to understand some facts about the country of Nepal to better analyse the possibility of exporting cauliflower seeds from Canada. Nepal is a country that is situated between China and India (CIA, 2015). The country is approximately 1/5 the size of Ontario. It has a population of close to 30 million people (CIA, 2105). One quarter of the population are living below the poverty line (World Bank, 2015). Most of the farming is looked after by the women and children where it is subsistence farming (Sharma, 2001). This is where the food produced is consumed by the family and if there is any left over it goes to cash crops. This is slowly changing and a steadily growing trend is for vegetables such as cauliflower to be used as a cash crop, to increase family income (Kathmandu Post, 2015). The devastating earthquake in 2015 destroyed fields and stored crops, damaged seed availability, reduced irrigation and created lack of access to fertilizers which all threatened agricultural production (FAO, 2015). The estimated affects of the earthquake was a reduction of the projected Gross

Domestic Product (GDP) by 1.5% (Asian Development Bank, 2015). GDP is a total of all of the goods and services produced within a country (Conference Board of Canada, 2015). According to the World Bank (2015) the Nepal GDP for 2014 was \$19.64 billion (US). Now, more than ever Nepal needs help from Canada. This is motivation to create a new export product such as cauliflower seeds to help the Nepalese people.

Aspects of the climate and geography of Nepal most definitely favour the growing of cauliflower (MEDEP/MOI, 2010). The three Nepal geographical regions are the Himalayas comprised of mountains, Mid Hills and Terai regions (CIA, 2015).



**Figure 2: Topographical Map Of Nepal.** (<http://www.greatholidaysnepal.com/nepalfacts.htm>)

The mountain regions have small areas that can grow vegetables (Sharma, 2001). The Mid Hills are less densely populated and are cut by a series of valleys, often terraced for extensive localized agriculture. The topography of the hill zone results in different microclimates that can be suited to specific crops, cauliflower being one of these (MEDEP/MOI, 2010). It is a cool weather crop that requires 58 to 100 days of cool temperatures to grow from seed to maturity (Sharma, 2001). Many areas of Nepal have cool growing seasons (Sharma, 2001). The Terai

Plains, which are warmer, is a fertile land where the majority of agricultural activity occurs.

Overall 29% of land in Nepal is used for agriculture (World Bank, 2015). Agriculture accounts for 60% of the GDP and represents 75% of Nepal's exports.

## ii) Cauliflower Nutrition

There is no question that Nepal would benefit from cauliflower seeds as an imported food source from Canada if the financial and production aspects are worked out. Cauliflower is a very nutritious food. One hundred grams of whole cauliflower contains 3 grams of fibre, 4 grams of protein, 77% of the daily value of vitamin C and 20% of the daily value of vitamin K (Health Canada, 2012). Other coloured cauliflower varieties contain even higher levels of vitamins and minerals (Health Canada, 2012).



**Figure 3: Coloured Cauliflower Hybrids** (<http://www.stokeseeds.com/category.aspx?CategoryID=50>)

This highly nutritious vegetable would help improve the overall health of the Nepalese people, in particular the women and children whose nutritional status is extremely poor (FAO, 2010). In Nepal, food shortages are often due to seasonality which contributes to ongoing malnutrition (FAO, 2010). This is yet another reason cauliflower seeds are such an interesting export idea

since they grow in the cooler temperatures when other vegetables and fruit are less available (FAO, 2010).

### iii) Crop Diversification In Nepal

The Nepal Department of Agriculture has a 20 year strategy to use crop diversification to decrease poverty by 35% and increase the rate of growth of agriculture GDP by 5% from the existing 3% (Sharma, 2001). This is intended to help the growth of the economy and would help increase the number of jobs in Nepal. Cauliflower is a vegetable that could fit well into this plan. Small farms have seen excellent profits from this vegetable as a cash crop (Kathmandu Post 2015). Hill farmers can make a net profit of 169,150 rupees (\$2120 CAN) per hectare of cauliflower when grown in the hill regions and the Tarai farmers can make \$262,992 rupees (\$3,300 CAN) per hectare. Crops such as maize are giving lower returns to the hill farmers, subsequently these farmers are gradually shifting to vegetable crops (Kathmandu Post 2015). Imports of high quality Canadian seeds would help ensure cauliflower grows well in Nepal's geographical zones and helps to maintain high yields.

### iv) History Of Seed Distribution In Nepal

A short history of seed production and distribution in Nepal allows Canada to realize a new export market. Based on 2008/2009 vegetable producing records, Nepal has shown low productivity (GON, 2011). Nepal has shown a productivity rate of 12.2 metric tons per hectare compared to other countries with a productivity rate of 30 metric tonnes per hectare. One of the reasons for low productivity is an inadequate supply of high yielding seeds and in particular hybrid seeds. Canadian cauliflower seeds could help this situation.

Nepal produces some of its own cauliflower seeds. The commercialization of vegetable seeds in Nepal started in 1974 (radish seeds) (GON, 2011). The major vegetable seeds produced in Nepal include cauliflower as well as radish, onion, mustard, cabbage, carrots, bean squash and Swiss chard. Vegetable seed production has been concentrated into four different areas of Nepal that have suitable climates. Indeed vegetable seed production in Nepal has continued to grow with a steady climb from 1974 to 2009 (GON, 2011), which is shown in Table 2.

Seed Crop		Supply Share %		
Season	Crop	Domestic	Imported	
		Open Pollinated	Hybrid	Open Pollinated
Winter	Cabbage	2	65	33
	Carrot	20	0	80
	Cauliflower	56	22	22
	Coriander	11	8	82
	Onion	24	0	76
	Peas	79	0	21
	Spinach	35	9	56
Summer	Sponge Gourd	33	0	67
	Tomato	50	0	50
	Zucchini	25	50	25

Table 2: Share of Domestic and Imported Seed in the Nepalese Market for Selected Crops in (2003/04) (GON,2011)

The demand for vegetable seeds has grown rapidly with the greatest demand being for cauliflower by Nepalese households and the agro-processing industry. In 2009/2010 period the vegetable seed production grew to 2,010 metric tonnes (GON, 2011).

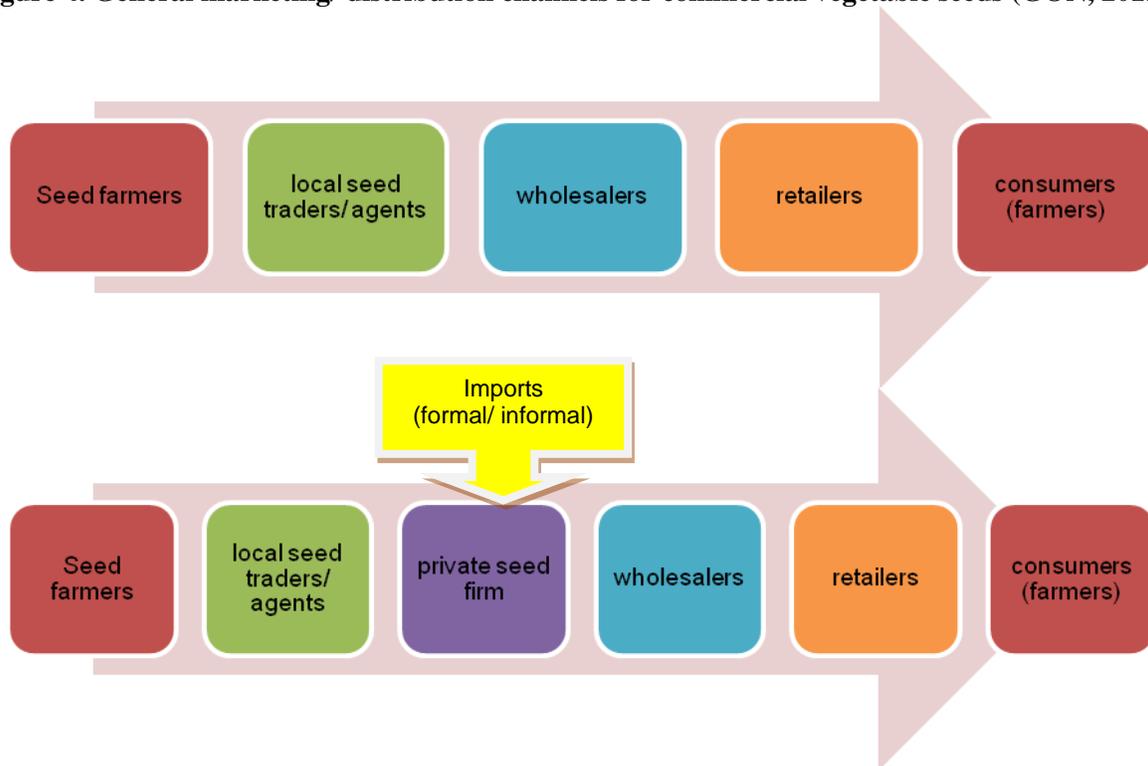
Based on land area the top five vegetables grown (cauliflower, cabbage, onion, radish and tomatoes) represents 50% of the total land area cultivated for these products (GON, 2011). Cauliflower is the highest being farmed on 32,500 hectares. Even though Nepal has its own

capabilities of producing cauliflower seeds, this country benefits greatly from importing cauliflower seeds as they are unable to produce enough of their own (GON, 2011).

v) Current Seed Production and Distribution In Nepal

The government in Nepal plays a major role in how the domestic seed market works. They were the first to start producing vegetable seeds and have government farms under the Vegetable Development Directorate (VDD) (GON, 2011). They initiated the production and supply of seeds. Seed producer's groups and farmers also prepare seeds them for commercial sale. The distribution chain is shown in Figure 4.

**Figure 4. General marketing/ distribution channels for commercial vegetable seeds (GON, 2011).**



Where the distribution channel does not exist, seeds are supplied from farmer to farmer. This farmer to farmer supply chain is limited and growing smaller with more commercial vegetable farming evolving (GON, 2011).

The Seed Entrepreneurs' Association of Nepal (SEAN) is the leading organization among seed entrepreneurs (GON, 2011). It has more than 175 members who try to improve seed production and marketing. The private seed firms also import seeds from other countries and these seeds are distributed through the same channels. Fifty percent of the domestic demands for vegetable seeds are met through imports, but for cauliflower this could be as high as eighty percent (GON, 2011).

Nepal has 1,300 seed traders that have been given permission by the Nepalese government to sell seeds abiding by the regulations of the country (GON, 2011). All of these agents are the source of vegetable seeds to the market. Most of these dealers also sell fertilizers, chemicals, seeds and equipment. They are mostly one person companies or family owned. There are only a small number of companies that are larger than this who would act as regional wholesalers or distributors (GON, 2011). One potential company in Nepal that could be a partner in importing cauliflower seeds is called Mega Agrotech Co. Pvt. Limited. The head office is in Kathmandu with one onsite office and farm fields scattered in different climate zones in Nepal. Its main farm site also produces honey, mushroom, vegetables, nursery plants, fruit and nuts. It also imports seeds and seedlings (Business Portals, 2015).

### Critical Summary And Recommendations

Overall the concept of exporting cauliflower seeds from Canada to Nepal has many benefits for both of the countries involved. As with any great idea there often are hurdles and

limitations to be investigated. Nepal produces a portion of its own cauliflower seed requirements at present, but there is still a large need for cauliflower seed imports. Nepal needs cauliflower seeds to consume as well as a cash crop but cannot make enough of their own. This is especially true after the 2015 earthquake. It would seem logical that the neighbouring countries of India and Asia would be the more likely exporters to Nepal because of their proximity and lower labour cost. Further analysis will demonstrate whether Canadian seeds can compete.

The following cost analysis shows potential sales upon which Canadian companies could capitalize. The number of seeds required will be either 300 or 1,000 seeds per hectare, depending on whether the seeds are used to grow plants for planting or placed directly in the ground (Agra Point, 2007). Stokes Seeds Limited has a range of prices for seeds from \$2.75 (CAN) to \$7.00 (CAN) (Stokes Seed Limited, 2015). Cauliflower farming in Nepal is estimated to be using 32,500 hectares (GON, 2011). Using this data the potential revenue would range between \$1,072,500 and \$9,100,000 for the whole cauliflower seed market. Further research and cost analysis would need to be done to see what portion of the total cauliflower market could be gained by a Canadian company.

Investigating the following points further would allow a more complete evaluation of this potential export product.

- 1) The potential of producing cauliflower seeds in Canada since most of the seeds distributed by Canadian suppliers have been grown in the United States. We need to determine where in Canada the climate could accommodate this crop best to assess cauliflower production feasibility.

- 2) Investigation of potential vertical integration, by either buying an existing US farm or starting one up to produce cauliflower seeds and determines whether available Canadian grants are able to be used.
- 3) Investigate the potential value of Canadian hybrids to increase seed quality and yields in Nepal.
- 4) A clearer understanding of the effects of the earthquake on cauliflower seed and vegetable production, to assess Nepal's current needs.
- 5) Determine the potential size of the cauliflower seed market that a Canadian supplier could actually obtain.

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