

Evaluating Canadian Agrifood Products for Export to Nepal; The Agriculex BCS-2

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About Nepal

Nepal is a small country landlocked in between India and China. It features three major regions. The region to the north is known as the mountainous region. This region is home the Himalayan Mountains. Eight of the world's fourteen mountains with a peak above 8000m are found in this region of Nepal (Nepal Tourism Board. (2012)). Much of the terrain is rocky and cold. The middle region is known as the hilly region. The southern region is known as the Terai region or the plains region. The total land area of Nepal is 147,181 sq km. 3,830 sq km of which is water (Nepal Tourism Board. (2012)).

Buddhists and Hindus make up the majority of Nepal's population (Nepal Tourism Board. (2012)). As a result the entire country is very religious. Much of the culture is based on these religions. Many religious festivals take place each year. The Hindus believe that the cow is sacred so many Nepalese do not eat beef. Most rural Nepalese are very traditional, while the urban areas can be more modern. Nepal was ruled as a monarchy for centuries. Nepal only recently became a democratic country.

Agriculture in Nepal

Much of the agriculture found in Nepal is located in the plains region. Most of the Nepalese farmers are subsistence farmers. Most own one or two hectares of land (Personal Communication, Raja Khanal, Oct 3, 2014). They also grow a variety of crops. Farmers in the Terai region grow sugarcane, tobacco, corn, mustard, rice, lentils, and wheat. Farmers in the hilly region grow crops such as wheat, barley, buckwheat, millet, and soybean. Wheat, soybean, peas, sesame, and brassica crops are grown in the mountainous region (Government of Nepal. (2014)). Each crop grown has a purpose. Grains are used as a high energy food. Mustard is used as an

Evaluating Canadian Agrifood Products for Export to Nepal; The Agriculex BCS-2 oilseed, producing oil for cooking. Any surplus crop is sold as a cash crop so the family has money to purchase things they cannot grow.

The government of Nepal has recognized some areas that could improve the quality of life for Nepalese farmers. The Department of Agriculture is very involved in research to help farmers. Their main goal is to increase yields while maintaining environmental sustainability and food safety (Government of Nepal. (2014)). The department recognizes that the population is growing very quickly and production must increase to meet demand. They also recognize that environmental conservation is essential to ensure an abundant food supply for future generations. There are several methods the department is using to help farmers maintain the balance between sustainability and increased production. They have started by suggesting areas where crops are most suited. They are also involved in producing varieties that will increase yields. Educating farmers about as well as providing equipment for sustainable irrigation is another goal.

To produce more food the government has expressed a desire to produce local seed. By working with farmers the government hopes to breed higher yielding varieties. Locally produced varieties are a great way to increase food production without using more inputs. This will also make the farmer more profitable. Seed that has been grown locally will produce more than seed that is better suited to a different geographical region (The US Government's Global Hunger And Food Security Initiative. (2013)). Due to a lack of seed handling infrastructure in Nepal locally produced seed will be of better quality. Quality seed is usually certified. Certified seed meets requirements such as germination tests. It must also be handled and stored in a manner that does not reduce the germination of the seed. The seed will be stored and only transported a small distance to reach the farmer. Growing certified locally produced seed will allow farmers to produce more than they could by saving seed for the following cropping season (The US

Evaluating Canadian Agrifood Products for Export to Nepal; The Agriculex BCS-2 Government's Global Hunger And Food Security Initiative. (2013)). Planting seed saved from the previous year is a cheaper way to grow crops, but these seeds often contain diseases. They also are usually stored in a manner that can cause poor germination. When all the factors are considered it is advantageous for a farmer to grow locally produced seed that has been certified as opposed to saving their own seed.

Much of the corn grown around the world is a hybrid. This hybrid corn offers higher yields as compared to open pollinated corn (Cummins, J. H., Mae-Wan. (2014)). Hybrid corn is produced by crossing two inbred parents to produce a uniform offspring (Cummins, J. H., Mae-Wan. (2014)). This offspring is what is sold to the farmer for planting. Hybrid corn is healthier and higher yielding than open pollinated corn (George Harrison Shull. (1946)). The largest drawback of planting hybrid corn is that the seeds produced by the hybrid plant are genetically different therefore saving seed for next year will minimize all the benefits of planting hybrid corn. To fully reap the benefits of hybrid corn farmers must purchase new seed each year (George Harrison Shull. (1946)). If farmers are going to plant hybrid seed corn in Nepal, local seed companies need to be set up to grow the seed and sell it to the farmers. Hybrid corn seed is available from companies around the world, but if Nepalese seed companies were able to work with government researchers to produce hybrid seed corn in Nepal, the money could stay within the Nepalese economy (The US Government's Global Hunger And Food Security Initiative. (2013)). This would greatly benefit all Nepalese people because small businesses are important to a growing economy (Major L. Clark, III and Radwan N. (2010)).

Quality seed must be carefully harvested and shelled. Extreme care must be taken to ensure that the seed coat is not damaged. Once the seed is shelled and cleaned, it must be stored properly to ensure it is disease free. If the seed coat is damaged the seed may not germinate when planted.

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Planting seed that has not been handled poorly and doesn't germinate eliminates the benefits of planting hybrid seed. For farmers to be able to take full advantage of the benefits of hybrid seed it must be harvested and stored correctly. Seed companies need very specialized equipment to handle seed. The Agriculex BCS-2 Bulk Corn Sheller could be used to shell corn to be used for seed.

Producing certified seed is not the only way the BCS-2 would help Nepalese farmers. The machine is also useful to the researcher. By using this machine corn breeders can shell small batches of seed, while preventing cross contamination. The efficiency allows researchers to dedicate their time to making better genetic selections. This will result in them being able to produce better hybrid much quicker than before. Research by the University of Minnesota suggests that genetic selection resulted in better varieties. These varieties were a very significant part of the 4280kg/ha corn yield increase observed between the 1930's and the 1980's (Cardwell, V. B. (1982)). If Nepalese researchers was able to produce new varieties the corn yield in Nepal could increase. The increased yield would result in wealthier farmers.

About the BCS-2

Founded in 1986, Agriculex is a small company based in Guelph Ontario. They design and manufacture equipment for small scale seed production and research. Their equipment is designed to use common parts, making repairs easy. They also use Canadian materials where ever possible (Personal Communication, Agriculex, Oct 1, 2014). Alongside the BCS-2 they also manufacture Seed cleaners, sorters, and counters (Agriculex. (2011)). They also manufacture a small thrasher for small grain crops. No other Canadian companies were found that manufacture

Evaluating Canadian Agrifood Products for Export to Nepal; The Agriculex BCS-2 anything similar. This means that Agriculex has an advantage over foreign made equipment in Canada.

The BCS-2 was designed to quickly and effectively shell seed corn without damaging the kernels. It features two rotating cylinders at precise angles. The rotation of the shafts produces two actions. The first action is the ears of corn are moved through the machine. The second action is, while the ears are moving through the machine they are gently struck with rubber paddles (Agriculex. (2011)). It is this action that gently removes the kernels from the cob. The kernels then fall down onto a screen that separates them from the chaff. The husk and cob are the sent out the rear of the machine. The cleaned kernels are then collected in a bag or hopper. It features 3 HP, 240V electric motor (Agriculex. (2011)).The machine can be used to shell small batches of corn for research purposes, or it can be used to shell bulk batches of seed. The machine has a capacity of 120 ears per hour when shelling continually (Agriculex. (2011)). It is easy to clean which reduces contamination from previous batches. The rubber paddles are designed to gently remove the kernels to maintain the seed coat, increasing germination. It is made out of powder coated metal to provide a durable, long lasting finish that prevents rusting (Personal Communication, Agriculex, Oct 1, 2014). The machine is quick, efficient, and effective. The BCS-2 retails for \$28,620USD (Agriculex. (2011)).



Figure 1. The BCS-2 (Retrieved from <http://www.agriculex.guelph.org/bcs-2.html>)

Shipping Costs

To get the BCS-2 to Nepal it would need to be trucked to the Canadian port of Montreal. From Montreal it would travel by ship out the St Lawrence River and then around the southern tip of Africa. It would arrive at the Indian port of Calcutta. It would then need to be transported by truck to Nepal. Shipping costs are quite high because the machine is quite large. When crated for transportation it measures 86" long, 53" wide and 72" high. It weighs in at 1800lbs. The machine is not a full container load. It is also important to consider other associated fees. Import duties, taxes, and insurance also add to the cost of shipping. These additional costs were hard to calculate due to the complexity of international trade. The base shipping cost was calculated to be \$1800-\$3000USD (World Freight Rates. (2013)). To confirm shipping costs another quote was acquired (Figure 2.). It was unclear what duties and/or taxes would be required to import this

Evaluating Canadian Agrifood Products for Export to Nepal; The Agriculex BCS-2 product into Nepal. Shipping by sea was the best way to ship. Shipping this unit by air would very cost prohibitive due to its size.

PARTICULARS	VALUE	RATE	AMOUNT
Freight	5.38 CBM	\$221.00	\$1,188.98
Bill of Lading	5.38 CBM		\$50.00
Bunker Surcharge (Fuel)	5.38 CBM	\$10.00	\$53.80
Handling Fees	5.38 CBM	\$45.00	\$242.10
GRI Charges	5.38 CBM	\$15.00	\$80.70
Pickup Charges (51 - 100 Miles)			\$225.00
Customs Brokerage Fee			\$0.00
Delivery Charges (101 - 300 Miles)			\$0.00
Filing Fee			\$15.00
Shipper's Export Declaration (Over \$2,500.00)	\$28,000.00		\$50.00
Less: Online Allowance	5.38 CBM	\$5.00	\$26.90
Total			US \$1,878.68

Figure 2. Shipping costs

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Canada has had peaceful relations with Nepal since 1965. Trading relations with Nepal are in good standings. In 2012-2013 Canada exported \$7.1 million worth of goods to Nepal. Major exports included machinery, paper, vegetables, and appliances (World Trade Organization. (2014)). It should not be a problem to export this product into Nepal but, the exact tariffs are not known as they depend on Nepal's Customs department's categorization of the machine.

Canadian Benefits

Export of this product would have many positive impacts on the Canadian economy. Agriculex is a small company. Studies show that small businesses are the key to increasing economic activity (Major L. Clark, III and Radwan N. (2010)). By opening up the export market in Nepal, Agriculex will expand and possibly hire another employee. The increased production could also impact Agriculex's suppliers, many of which are Canadian. These suppliers would also see an increase in sales. This may seem like a small impact on the economy, but by exporting to Nepal, Agriculex may gain international recognition for its quality equipment for the agricultural researcher. This could result in increased sales for Agriculex, as well as establishing Canada as a world supplier of agricultural research equipment.

Not all of the impacts from exporting this machine are positive. Exporting equipment that would help Canadian farmers could place Canada at a disadvantage. These machines are used for research. If they were sold and used in Canada they could benefit Canadian farmers. Canadian farmers have benefited greatly from the results of the efforts of Canadian researchers. If Canadian farmers are unable to keep up with the rest of the world their crops will not be worth as much in the global market. It is essential for the Canadian economy that Canadian farmers

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maintain their competitive advantage. This negative impact, although quite small should still be noted.

Nepalese Market

This machine would be purchased by Nepalese seed companies and corn breeders. It would be impractical for each farmer to own such a large machine. The cost is the factor that will limit sales. There may only be a demand for a few of these machines. Financial grants provided by the Nepalese government or a foreign agricultural organization would increase the market in Nepal. Certified seed costs the farmers more, so financial incentives to help farmers buy seed may also be required (Witcombe, J. R., Devkota, K. P., & Joshi, K. D. (2010)). Once farmers have planted the certified seeds for a few years they will be able to afford to buy their own seed. Education is also an important factor in the use of certified seed. Nepalese farmers need to be taught how certified seed will increase their yields and as a result increase their standard of life. They will be able to produce more food on their land or have some surplus corn to sell at the market. This surplus will be used to buy good they could not afford prior to the use of certified seed. Convincing Nepalese farmers to use the certified seed will prove to be difficult because Nepalese people are very traditional. Once the farmers are informed of the benefits of certified seed and are able to witness them on their own farm, they will continue to plant certified seed. As more farmers get on board with the program Nepal will produce more corn as a country (Witcombe, J. R., Devkota, K. P., & Joshi, K. D. (2010)). This increase in economic activity will help Nepal emerge as a developing nation and allow it to thrive for future generations.

Competitive Products

There are other methods of shelling corn. Shelling by hand is by far the most common way in Nepal. This method is very labor intensive and can lead to contamination. It is also very slow. It is used because Nepal has an abundance of labor and not a lot of money to purchase a corn sheller. Basant Products in India also manufactures a corn sheller. It is lower in cost than the BCS-2. The sheller is powered by a tractor, which could be a problem, because many areas of Nepal do not have heavy machinery (Basant Products (India). (n.d). Corn sheller). The sheller is also harder on the kernels. It was designed to shell corn for food or animal feed (Basant Products (India). (n.d). Corn sheller). This will result in a damaged seed. By using these damaged seeds farmers are giving up all the benefits of a mechanical corn sheller.

Although the BCS-2 provides benefits to both Canada and Nepal there are things that could have a greater effect on Nepalese agriculture. Nepalese farmers need information that will help them grow their crops more efficiently. The sheller made by Basant Products would be a cheaper alternative, but it requires a tractor. It also will damage the seed coat making the corn only useful as food or animal feed. Hand shelling is cheap. The largest downfall of hand shelling is the labor. Often kids are required to stay home and help shell corn. If shelling was done mechanically the children may have the opportunity to attend school.

Conclusions

Establishing a certified seed production system in Nepal will require significant financial investment as well as educational investments. Educating farmers will take both time and money. Constructing the required infrastructure also requires significant financial investments. Nepal as a country may not be ready for the investment required to make this work. The next step in

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investigating the value of the BCS-2 corn sheller in Nepal would be to contact the existing seed
companies in Nepal.

For Canadian exporters looking to provide goods to help Nepalese farmers a small scale, low
cost, hand cranked corn sheller would provide farmers with an affordable way to shell their corn
for food. The hand operated sheller should be well built, easily repairable, and most importantly,
low cost. Nepalese farmers do not have much money to invest in machinery. The hand operated
sheller could be owned by several farmers that work together. The BCS-2 is simply too large for
Nepalese farmers. By providing small scale products for Nepalese farmers Canadian companies
could help an emerging nation continue to grow. There are products currently produced by
Canadian companies that would benefit Nepal more than the BCS-2.

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