

Canadian Agrifood Exports Project  
The Production Minor™ Spray Dryer

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This report is written to evaluate the idea of exporting the Production Minor™ Spray Dryer, a small scale milk dehydrator, from Canada to Nepal. Many different aspects must be considered when deciding if a product should be considered a potential export. In this report, many critical aspects are included that are to be bared in mind when considering the Production Minor™ Spray Dryer as a potential export. The four parts to this report discuss different, yet interrelated, critical topics as to whether the spray dryer could be a sufficient product to export to Nepal, in the current time period, or if the spray dryer is a futuristic export that could benefit Nepal's agricultural industry in future years. Part 1 of this report includes, but is not limited to: specifics about the company supplying the dehydrator, the details of the Production Minor™ Spray Dryer, the Canadian supplier, and the transportation plan. Part 2 provides an elementary description of Nepal. Part 3 outlines and analyzes the possible benefits or drawbacks to the importing and exporting nation. Part 4 concludes the report with future recommendations and a summary. It is important to note, whether or not the Production Minor™ Spray Dryer is a logical export to Nepal or whether it is not ideal, this report discusses a possible future opportunity for exporters from Canada and also highlights the potentiality to bring new ideas to Nepal or larger developing countries.

## **Part 1: Introduction to the product**

### **(i) Information about GEA**

The Production Minor™ Spray Dryer is produced by Gesellschaft für Entstaubungsanlagen (GEA) which is one of the leaders in technology for the food processing industry (GEA, 2015). GEA originated in Düsseldorf, Germany; however, has many distributors across the world (GEA, 2015). The group employs over 18,000 people as of June, 15, 2015 (GEA, 2015). The employee rate increased by 2.8 % between 2013 and 2014 and is expected to

continue to rise (GEA, 2015). GEA employees 2,068 people across Canada and the United States, as of 2014 (GEA, 2015). It is not indicated or circulated how many people are employed solely in Canada. A distribution of employees worldwide is shown in Figure 1.



**Figure 1. World distribution of employees (GEA, 2015).**

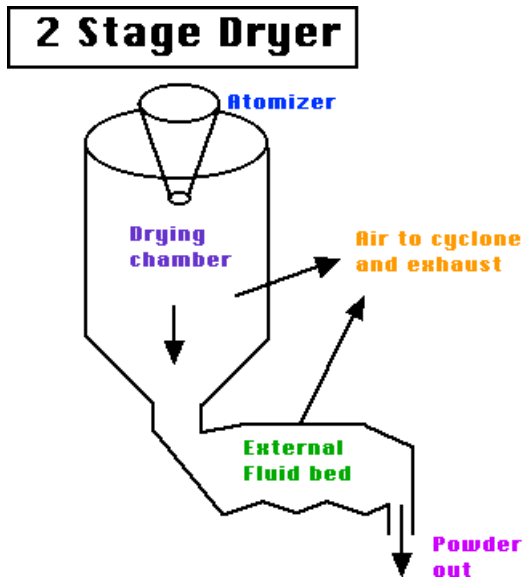
It is specified that there is a total of four GEA distributors in Canada (GEA, 2015). The closest distributor to Guelph, ON is located in Burlington, ON (GEA, 2015). The closest distributor to the west coast is located in Richmond, British Columbia (GEA, 2015). This location would be the ideal distributor when exporting to Nepal as it would require less transportation when

<b>Table 1: Contact information for two GEA distributors in Canada (GEA, 2015).</b>	
GEA Canada Burlington	GEA Canada Richmond
5045 South Service Road, Suite 201 L7L 5Y7 Burlington Canada Telephone: 289 288 5500 Fax: 1 289 288 5501	150-2551 Viking Way V6V 1N4 Richmond Canada Telephone: 604 278 4118 Fax: 1 604 278 4847

shipping. The contact information to these two distributors are stated as follows in Table 1.

## (ii) Information about the Production Minor™ Spray Dryer

The Production Minor™ Spray Dryer is a small scale dairy spray dryer (GEA, 2015). This product can be exported to Nepal to provide the Nepalese dairy farmers with the option to dehydrate their milk into powdered form. The Production Minor™ Spray Dryer requires a space of 4.4 m x 2 m x 2.7 m (l x w x h) (GEA, 2015). This spray dryer works great for small volumes and is very efficient at sustaining internal temperature (GEA 2015). A spray dryer works when milk is sprayed on the hot cylinders (GEA, 2015). The milk then evaporates and the left over steam is sucked up out of the chamber by a fan. The powdered milk will be captured beneath the chamber (GEA, 2015). This method is displayed in Figure 2. Using a spray dryer is advantageous in contrast to freeze drying or other common types of drying (Tetra Pak, 2015). Freeze drying is more expensive and it is proven that consumers have a higher satisfactory level with powdered milk processed by using a spray dryer (Nickerson, Coulter, & Jenness, 1952). Additionally, a spray dryer is not only the cheapest option, but the process of production is much shorter; therefore, more product can be produced at a much lower cost (UofG, 2014).



**Figure 2. Diagram of spray drying process (UofG, 2014).**

(iii) Cost analysis of the product with a comparison to similar products

The cost of the Production Minor™ Spray Dryer is undeterminable. After speaking with Yves-Martial Girod, of GEA, it was indicated that multiple variables are required to purchase and install the system. At this time, with no knowledge of the building location in Nepal or the energy sources available at that location in Nepal, GEA is unable to give a quote. GEA was not willing to release information to a customer without serious intention to purchase the product. A rough estimate, without meeting professional quote requirements is approximately \$20,000 CDN (GEA, 2015). The inputs required to run the Production Minor™ Spray Dryer is variable. The variables are propane, electricity, or natural gas (GEA, 2015). The farmers of Nepal would be given this option.

There are similar products to the Production Minor™ Spray Dryer in Canada. Table 2 emphasizes the differences the two products have in contrast to the Production Minor™ Spray Dryer. These two machines are also manufactured by GEA and do not create a competition (GEA, 2015). The FSD Minor™ Spray Dryer is the smallest spray dryer available from GEA

(GEA, 2015). This machine is meant for lab purposes and creates a coarse powder (GEA, 2015). The dryer also has multiple stages and the capacity of water evaporation is significantly less, 0.5-6 kg/h rather than 5-30 kg/h (GEA, 2015). The Mobile Minor™ R&D Spray Dryer is also meant for lab purposes and the powder is produced in small volumes (GEA, 2015). The capacity of water evaporation is also significantly less, 0.5-6 kg/h rather than 5-30 kg/h (GEA, 2015).

<b>FSD Minor™ Spray Dryer</b>	<b>Mobile Minor™ R&amp;D Spray Dryer</b>
<ul style="list-style-type: none"> <li>-smallest spray dryer available from GEA</li> <li>-meant for lab purposes</li> <li>-creates a coarse powder</li> <li>-has multiple stages</li> <li>-the capacity of water evaporation is significantly less, 0.5-6 kg/h rather than 5-30 kg/h</li> </ul>	<ul style="list-style-type: none"> <li>-meant for lab purposes</li> <li>-powder is produced in small volumes</li> <li>-the capacity of water evaporation is significantly less, 0.5-6 kg/h rather than 5-30 kg/h</li> </ul>

Spray dryers from Canada do not create a competition; however, other nations, such as China and India, produce competitive products. See Table 2, for two similar products manufactured in China and India. The table shows the advantages and disadvantage of each product in relation to the Production Minor™ Spray Dryer.

<b>Nation</b>	<b>Company</b>	<b>Product and cost</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>China</b>	<b>Jiangyin Haixiang Machinery Co Ltd.</b>	-LPG-25 high speed centrifugal industrial lab milk spray dryer -\$15,000	-cheaper cost -cheaper shipping -cheaper overall cost	-doesn't produce as much milk per hour and will significantly reduce production -larger particle size -slightly larger size of machine
<b>India</b>	<b>Rishikesh Exports</b>	-Industrial spray dryer -unable to retrieve a reference	-double the production rate -cheaper shipping	-the cost is likely to be greater -older model
<b>Contact Information:</b>				

**Jiangyin Haixiang Machinery**

Contact Person: Mandy Van

Telephone: 86-510-66200163

Fax Number:86-510-66200168

[www.haixiangchina.com](http://www.haixiangchina.com)

Room 508 No. 139 Pujiang Road, Lingang New City, Jiangyin Jiangsu China

**Rishikesh Exports**

Contact Person: Mr. Prashant Lolage

Telephone: (91- 22) 25369069, 25407497

Fax: (91- 22) 25453189

[response@rishikeshexports.in](mailto:response@rishikeshexports.in)

10, 'Sital', Saraswati English School Road, Panchpakhadi, Thane (W) - 400 602, Maharashtra, India.

These spray dryers previously analyzed provide a better option for the Nepalese. The LPG-25 high speed centrifugal industrial lab milk spray dryer from China is averaged at a cost around \$15,000 CDN (Alibaba, 2015). The advantages of purchasing this product instead of the Production Minor™ Spray Dryer are: it is cheaper, would require cheaper shipping and therefore a cheaper overall cost (Alibaba, 2015). However, there are disadvantages. The machine would not produce as much powder per hour and would significantly reduce production (Alibaba, 2015). Also, the machine is slightly larger than the Production Minor™ Spray Dryer and would produce larger particle size (Alibaba, 2015). The Industrial spray dryer, produced from Rishikesh Exports, would double the production rate and the shipping would also be cheaper (Alibaba, 2015). However, the machine is an older model and the overall cost is likely to be greater compared to the Production Minor™ Spray Dryer (Alibaba, 2015). After analyzing and comparing these spray dryers, the LPG-25 high speed centrifugal industrial lab milk spray dryer from China is a good option. This product is cheaper and is also manufactured much closer to Nepal, in contrast to the Production Minor™ Spray Dryer. This results in a cheaper overall cost.

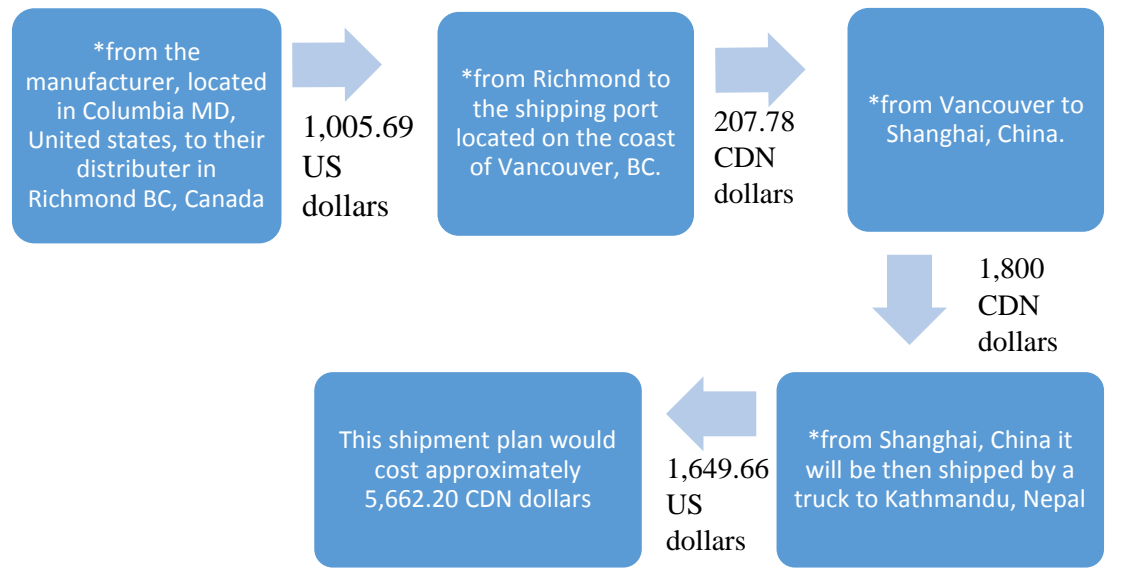
Additionally, in a situation where the machine needs repairing, Jiangyin Haixiang Machinery Co Ltd. is located much closer to China than GEA. This will decrease future maintenance costs.

(iv) Plan for transportation

GEA can ship one Production Minor™ Spray Dryer from their manufacturer, located in Columbia MD, United states, to their distributor in Richmond BC, Canada. UPS would charge 1,005.69 US dollars for shipping the product within 7 business days (Freight Centre, 2015). GEA would then ship the spray dryer from Richmond to the shipping port located on the coast of Vancouver, BC. This stage would cost 207.78 CDN dollars using Day and Ross transportation (Freight Centre, 2015). The product would be shipped in one business day. The average shipping cost from Vancouver to Shanghai, China for this size of a product would cost 1,800 CDN dollars (Freight Centre, 2015). When the product arrives in Shanghai, China it will then be shipped by a truck to Kathmandu, Nepal (Freight Centre, 2015). UPS would charge 1,649.66 US dollars for and 8 day business shipment (Freight Centre, 2015). This shipment plan would cost approximately 5,662.20 CDN dollars without import duties and taxes as they are unknown variables that may have additional costs. See Figure 3 for a summary of the transportation plan.



**Figure 3. Summary of transportation plan.**



## **Part 2: Introduction to Nepal**

### **(i) Information about Nepal**

Nepal is a small country, approximately 147, 000 km<sup>2</sup>, located between China and India (CIA, 2015). As of 2014 Nepal had a population of just over 28 million people (World Bank, 2013). With this number expected to continue to rise; Nepal's agricultural industry needs to become more structured to support a growing population. 90% of the population is involved in the countries agricultural industry (FAO, 2008).

Nepal is divided into three agroecology regions. The three regions of Nepal create different farming challenges due to different elevation levels, climate, forestry and the quality of agricultural land (FAO, 2008). The terai region is known for its grain production. The hill and mountainous region is known for its fruits, vegetables, and livestock (FAO, 2008).



**Figure 4. Agro-ecology regions of Nepal (FAO, 2008).**

Mid-hill and Terai region have existing cattle milk production and the mountain region currently produces Chauri milk (FAO, 2008). In Nepal dairy livestock is milked by hand as farmers tend to have smaller herds (Singh & Pundir, 2002). The dairy infrastructure is lacking and farmers have a difficult time transporting their milk to the market (Singh & Pundir, 2002). This creates an obstacle for dairy farmers to produce maximum yields (Singh & Pundir, 2002). These obstacles make things very difficult for the Nepalese as milk provides the people of Nepal with many nutrients. Milk and other livestock products are also a significant income for the Nepalese families (FAO, 2008). In the hills and mountainous region this income encompasses for an average of 20% of the farmers' total income (FAO, 2008). The total income can be increased if farmers can increase their milk yields. Right now, milk production in Nepal is inefficient (Joshi, n. d). Nepalese farmers are not able to market all their milk that they could be capable of selling to other local Nepalese people (Joshi, n. d). In Nepal, there is only a market for milk in the morning; therefore, an abundance of milk that is produced in the afternoon creates a loss of profit for the farmer (Joshi, n. d). The incapability to transport and store milk effectively is one of the problems for Nepal's dairy industry (Joshi, n.d).

### **Part 3: Benefits and disadvantages to the importing and exporting nation**

#### **(i) Benefits to Canada**

Exporting the Production Minor™ Spray Dryer results in no direct benefits to Canada; however, indirect benefits include sales personal and Canadian shipping companies. The material used to manufacture the machine is not identified; therefore, this variable could not be indicated as a benefit to Canada. Employees from GEA work in Canada at the four different distributors; therefore, Canadian jobs are made available from the production of the Production Minor™ Spray Dryer and other similar spray dryers. This increases revenue for Canada and helps the economy. Additionally, exporting the Production Minor™ Spray Dryer introduces bi-lateral trade between Canada and Nepal.

#### **(ii) Benefits to Nepal and market plan**

All the Nepalese people would benefit from the Production Minor™ Spray Dryer and would be able to participate in the new market for powdered milk. This includes local families, the young and the old, tourists, and especially dairy farmers. Powder milk would not only provide a good nutrient source but would allow farms to work at their full capacity. Currently in Nepal some quantities of milk are being wasted due to the lack of proper storing (Sheere, 2008). Additionally, per 100g, powdered milk would provide the Nepalese with more nutrients than whole milk would (Tremblay, 2015) and there is hardly any change in taste between the two types of milk (Tetra Pak, 2015). The nutritional value of powdered milk will be extremely advantageous to pregnant women and their young children. In order to make the equipment and production affordable, the local Nepalese dairy farmers should form a co-op. This co-op should be located in Mid-hill and Terai region due to the existing cattle milk production or in the mountain region due to the Chauri milk production (FAO, 2008). Having the Production

Minor™ Spray Dryer in an ideal central location will increase productivity and revenue for the farmers and local Nepalese. Local Nepalese could work at the co-op processing milk. In turn, the Production Minor™ Spray Dryer would increase Nepal's economic situation.

**Table 4. Nutritional differences between powdered milk and 3.25% whole milk per 100g (Tremblay, 2015).**

Component	Powdered milk		100g 3.25% whole milk	
	Amount per 100g	% Daily value	Amount per 100g	% Daily value
Calories	496		42	
Total Fat	27 g	41 %	1 g	1 %
Saturated Fat	17 g	85 %	0.6 g	3%
Sodium	371 mg	15 %	44 mg	1%
Total Carbohydrate	38 g	12 %	5 g	1%
Protein	26 g	52%	3.4 g	6 %
Vitamin A	934 IU	18%	47 IU	0 %
Calcium	912 mg	91 %	125 mg	12 %

(iii) Drawbacks of exporting the Production Minor™ Spray Dryer to Nepal from Canada

Although the benefits to Nepal seem ideal, there is, however, a few drawbacks to exporting this product to Nepal. There is currently dairy operations set up in Nepal that include spray drying technologies; however, the Nepalese farmers, themselves, do not own the equipment (Sheere, 2008). Below, in table 5, a few current dairy companies from Nepal are listed. Another disadvantage to purchasing the spray dryer from Canada is that dairy spray drying equipment can be purchased closer and cheaper to Nepal, such as from China or India (Alibaba, 2015). This would not only reduce the cost of the machine and shipping fees but also maintenance fees that may be required in the future.

**Table 5. Three dairy operations currently in Nepal.**

Dairy operation	Contact information
Dairy Development Corporation (DDC, 2015)	Lainchour, Kathmandu Nepal Telephone: 977 441 1397 Fax:4417215 info@dairydev.com.np
Kathmandu Dairy (P) Ltd. (Nepal Home Page, 2015)	Kathmandu Telephone: 977 424 4155

	ktmdairy@ecomail.com.np
Sitaram Gokul Milks Ltd. (Kedia, 2013).	Contact Person : Mr. Hira Lal Kedia/ Mr. Tara Chand Kedia Alkhiya Road Birgunj, Nepal Telephone: 977 522092 Fax: 977-51-522086 kedia@atcnet.com.np, sugar@mail.com.np

#### **Part 4: Conclusion**

##### **(i) Summary and future recommendations**

Due to the current status of Nepal's dairy industry the Production Minor™ Spray Dryer may not be an ideal export at this time. A spray dryer, similar to the Production Minor™ Spray Dryer, would however also increase yields of milk and be advantageous for many Nepalese. A smaller spray dryer, which would be less costly, from Canada would also be much more efficient. If a product following that description is invented or found in Canada it would definitely have a greater potential to increase bi-lateral trade between Nepal and Canada. At this time, it would be advantageous for the Nepal's dairy industry to seek towards China or India for a spray dryer that is less costly and more convenient for importing. However, there are future studies that are required to further evaluate the export potential of the Production Minor™ Spray Dryer. One consideration is to establish how much powdered milk can be produced per day. This information will help determine the profit that one farmer in Nepal could generate per day, which would enable calculations to be made to determine how profitable the co-op will be.

Canadian government or international loan/grants would also be beneficial to help get the project started. After taking all these important variables into consideration a final decision can be made as to whether the Production Minor™ Spray Dryer would be a possible export for the Nepal dairy farmers. It is important to note that this report can be useful for Canadian exporters considering exporting to any developing country. Developing countries, such as countries in South Asia and Africa, with 2 billion people may demonstrate greater benefits from the Production Minor™ Spray Dryer.

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