

**AGR 1110 – Independent Study**  
**Promoting Canadian Agrifood Exports**

**F2015 Target Nation: Nepal**

**Final Paper**

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**Introduction to Nepal**

Nepal is a landlocked country located in southern Asia, between China and India (World Fact Book, 2015). Its landmass is just over 147000 km<sup>2</sup> and the population is 27.8 million (World Fact Book, 2015). Nepal is home to Mount Everest, and the capital city is Kathmandu (World Fact Book, 2015). The country is made up of three regions, the flat tarai region in the south, the central hill region, and the mountainous north (World Fact Book, 2015) (See the Image section for a map of Nepal showing elevated areas). The median age in Nepal is 23, making the average Nepalese person of reproductive age (World Fact Book, 2015). Nearly 30% of children under age 5 are underweight and therefore malnourished (World Fact Book, 2015).

**Part 1 – Product Information – benefits to Canada**

**Product Description**

The proposed product is biofortified salt for food processing and home use to reduce micronutrient deficiency in Nepalese children, women of reproductive age, and pregnant women. Salt has been chosen because it is one of few regularly purchased in impoverished areas (Zimmermann *et al.*, 2004). The

product will be produced by Compass Minerals, which is based in Canada, the United States and the United Kingdom.

### **Description of Production Process**

Continuous mining at the Goderich, Ontario mine removes salt with a machine that shears salt away from the rock face using steel cutting picks (How We Do It, 2015). Compass Minerals' mines are from 500 to 1800 feet below ground (How We Do It, 2015). The fortified salt is made by first washing the salt, then a nutrient solution is added, next the salt is mechanically dried, and finally the salt is packaged into large bags (How We Do It, 2015).

### **Machinery required and cost**

The required machinery includes the mining machine, a mechanical evaporator, and the packaging machinery (How We Do It, 2015). There would be no new cost for this since Compass Minerals already has the mining, processing, and packaging equipment.

### **Inputs required**

Required inputs include the raw salt, the micronutrient solutions, and the packaging materials. There would also be the energy used to operate all of the machines. Additionally, there would be the human labour input.

### **Health and Nutritional Information**

The aim of this product is to create a more rounded and beneficial fortified salt for impoverished areas of Nepal. Therefore, a range of micronutrients would be added including iron, iodine, and vitamin A, which have already been tested in Nepal (Dreyfuss *et al.*, 2000). Additional nutrients would include selenium,

copper, zinc, and vitamins B, D, E, and K (Chandyo *et al.*, 2009; Schulze *et al.*, 2014).

### **Evaluate market opportunity**

There is currently no other product like this on the market, which poses an incredible opportunity that would benefit Nepal, and other developing countries.

### **Benefits to Canada**

The chosen company is Compass Minerals. They were chosen because they already produce fortified culinary salt, and export worldwide. Compass Minerals also has other biofortified salts for livestock, therefore they could easily add other nutrients to salt for human consumption. Using Compass Minerals would benefit the Canadian economy by creating jobs for both product development, and product production (Salt and mineral solutions..., 2015).

### **Environmental sustainability in manufacturing in Canada**

Compass Minerals has a commitment to corporate responsibility (Corporate Responsibility, 2015). They promote transparency in their operation (Corporate Responsibility, 2015). They protect their workers' and the community's health and safety (Corporate Responsibility, 2015). Compass Minerals is committed to making decisions that are sustainable in the long-term (Corporate Responsibility, 2015). They also practice and promote responsible use of minerals (Corporate Responsibility, 2015). For instance, salt is extracted in sections, leaving large pillars of salt for structural support of the mine area (How We Do It, 2015). They work to improve the communities surrounding their mines and factories (Corporate Responsibility, 2015). Compass Minerals values, implements and

encourages innovation to make their processes more efficient and their activities more sustainable (Corporate Responsibility, 2015). They also value all of their employees by sharing profit with employees as well as shareholders (Corporate Responsibility, 2015).

## **Part 2 – Export Potential to Nepal – needs and benefits to Nepal**

### **Transportation logistics**

There are several options for transportation. The product could be shipped in bulk from Canada to India and package it individually Nepal. The product could also be packaged in small packages for retail in Canada before shipping. The product would be sent by cargo ship from Goderich, Ontario, and travel by truck once it reaches India.

### **Storage**

The product will be shipped, stored, and sold in plastic bags to keep moisture out. Plastic bags were chosen over other materials like cardboard or plastic containers since they are compact and lightweight. They also protect from water and are readily available in different sizes.

### **Cost analysis to achieve profitability and price point**

Based on similar products available in Canada, the fortified salt would retail for approximately CDN \$1-2 per kilogram in Nepal (Search Results for 'salt'..., 2015). However, this is based on iodized salt, the cost of other micronutrients may increase the retail price. There is not true comparable product currently available. The low price point of the product means that the poor will be able to afford it and benefit from it. Substituting the fortified salt for their regular salt is

something that they can manage and are probably more likely to do since it is not an additional product to buy.

### **Benefits to Nepalese Women of Reproductive Age, Pregnant Women, and Preadolescent Children**

The Nepalese diet consists mainly of cereals (Chandyo *et al.*, 2009). This diet is high in phytate, which inhibit absorption of zinc, especially when there is a high phytate to zinc ratio. 50% of daily zinc intake is from rice, however it also contains 68% of phytate daily intake in Nepal (Chandyo *et al.*, 2009). Zinc is essential for basic cell function as well as preventing many pregnancy complications. It is common for Nepalese women to have micronutrient deficiencies, including zinc (Chandyo *et al.*, 2009).

Iron deficiency and associated anemia, and vitamin A deficiency are just some of the other common micronutrient deficiencies in Nepal that contribute to health problems and disease susceptibility among all age groups (Dreyfuss *et al.*, 2000).

Fortifying salt with vitamin A, iron, and iodine has been studied a number of times, however there are micronutrients that are essential to child development that would be beneficial in a fortified salt (Schulze *et al.*, 2014). These include D, E, K, and B vitamins, as well as selenium and copper. The micronutrients listed above contribute to bone health, immunity, thyroid function, and many other functions essential for health and development (Schulze *et al.*, 2014).

### **List of companies and contact information**

Compass Minerals

Corporate Office

913-344-9200

Overland Park, KS

Compass Minerals – Sifto Canada

Ontario Consumer and Industrial Division

1-800-387-8580

### **Sales/marketing strategy to sell in Nepal**

The bulk bags of salt would be sold to grocery stores and other retailers. The salt would then either be put into smaller bags for purchase, or the customer would buy the desired amount from a bulk container. In both cases the salt would be sold by weight.

The salt may also be sold to food processors to use in the manufacturing of food products. This would be beneficial to the food processor because they could market their product as being fortified or enriched. By adding nutritional value, they are also adding economic value since people will pay more for a better product.

### **Note future studies required to evaluate viability**

There are a number of studies that need to be performed to confirm viability of this product. First, the preferred form of salt (coarse, fine, colour, etc.) of the Nepalese people needs to be determined. It would be beneficial to also determine the preferred packaging. Next, the chemical makeup of the salt needs to be tested. The combination of micronutrients needs to be assessed for stability, as well as interactions preventing adequate absorption of the nutrients.

The ratio of nutrients is also important, as is the affect of adding the nutrients on the colour and taste of the salt. It will need to be tested by the Nepalese to determine if a change to the colour or taste of the salt will affect their willingness to purchase it. Another option that should be tested is to produce a salt with a high concentration of the desired nutrients and mix it with unfortified salt in Nepal. However, this raises the issue of non-uniform dosing of the individual nutrients.

### **Summary and Recommendations**

In summary, it has been shown that there is a need for a product like this fortified salt. It would increase the health and overall quality of life of the Nepalese and other similar people. It is recommended that the suggested studies be done to further evaluate the viability of this product and to work with the Nepalese to fine tune the product to something they would purchase.

Image



Map of Nepal showing high and low areas (Map of Nepal 2011, 2015)

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