

Gaia Green Glacial Rock Fertilizer as an Export from Canada to Nepal

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AGR 1110 Section 103

December 1, 2015

Abstract

Exporting a Canadian fertilizer, Gaia Green Glacial Rock Dust will have many benefits for the Nepalese people. The weak soil structure will be rejuvenated by the high mineral content in the fertilizer. This will begin the slow process of rebuilding the topsoil (humus) and will promote crop growth. This results in crops yielding more food each season, feeding the hungry Nepal families. Exporting Gaia Green from Canada will grow a Canadian company, creating more jobs without causing competition for work in Nepal. Further research should be done to find a way in which Nepalese people can harvest their own fertilizers using the rocks native to them and the machinery necessary to do that. Doing this would be the most efficient way at providing them with cheaper fertilizer in more abundant amounts, while opening a new market and jobs for the people.

Part I:

Fertilizer is an important component of farming crops, with the growing popularity of modern agriculture, fertilizer consumption in Nepal has been increasing over the years (Shrestha, 2010).

Fertilizers provide soil with necessary nutrients that they lack.

Soils naturally contain many nutrients like nitrogen, phosphorous, calcium, and potassium. These nutrients allow plants to grow. When soil nutrients are missing or in short supply, plants suffer from nutrient deficiency and stop growing. When the nutrient level is too low, the plant cannot function properly and produce the food necessary to feed the worlds' population (Soil Science Society of America 2015).

In the article written by Balter (2013), he discusses that fertilizer has been used by farmers since approximately 8000 years ago, in the form of manure. Manure was spread over agriculture fields in order to provide the soil with nutrients from the dung; manure is still a fertilizing technique used in current time. Soil requires approximately 16 elements to be productive and healthy as described by McKenzie (1998) in an article about essential plant nutrients. Below is a table displaying the 16 elements. Macronutrients are describing elements that are required in large amounts while micronutrients are required in small amounts.

Table 1: Essential Plant Nutrients

Supplied from air and water	Supplied from soil and fertilizer sources	
	Macronutrients	Micronutrients
Carbon (C)	Nitrogen (N)	Zinc (Z)
Hydrogen (H)	Phosphorous (P)	Copper (Cu)
Oxygen (O)	Potassium (K)	Iron (Fe)
	Sulphur (S)	Maganese (M)
	Calcium (Ca)	Boron (B)
	Magnesium (Mg)	Chlorine (Cl)
		Molybdenum (Mo)
		Cobalt (Co)

Figure 1: (Table from McKenzie 1998)

Soil is often tested in order to see the elements which it lacks in order to find the most useful fertilizer, since fertilizers contain a unique combination of elements tailored to the specific needs of soil.

Gaia Green Glacial Rock Dust is a natural mineral product, produced over many thousands of years by piedmont glacial action as described by their website.

Piedmont glaciers are traveling glaciers which moved north to south during the last ice age. As the glacier traveled it picked up different types of rock containing a full range of natural minerals and trace elements. At the end of the ice age the glacier receded leaving

behind deposits of “glacial moraine”. These deposits are mined, dried, and screened for agricultural and horticultural re-mineralization (Gaia Green Organic, 2015).

All nutrients, with an exception of nitrogen, are derived from naturally occurring rocks and minerals (Straaten, 2006). This means that rock is an excellent source for the replenishment of soil minerals, as it contains almost all of the necessary minerals and is extremely assessable. This particular fertilizer guarantees the presence of calcium, magnesium, cobalt, iron and sodium (Gaia Green Organic, 2015). Replenishing minerals has many benefits for the soil as described by Gaia Green (2015), adding fertilizer aids with: soil structure, moisture holding properties, nutrient availability and bacterial action. When the correct balance is achieved, organic matter is turned into humus and the soil becomes a favourable environment for a host of beneficial molds, fungi, bacteria and earthworms (Gaia Green Organics, 2015). All of those qualities are important as they essentially cut production cost down for the people of Nepal. Increasing the soils ability to retain more water mean that less irrigation is needed, this helps to save money since more reliance can be put on rain water as a source of water intake for crops. Gaia Green Glacial Rock Dust lasts in the soil for an entire season, as it leaches out the nutrients slowly and overtime. This prevents the plant from burning, which occurs sometimes due to intense chemicals interrupting the pants natural rhythm. The product application is extremely simple and requires a shovel or a tool to churn the product into the soil. Gaia Green Organic (2015) states that up to 10 kg (22 lbs.) per 10m². (100 sq. ft.) gently dug into the soil surface up to once a year.

Gaia Green Organics is a Canadian company originating in Grand Forks British Columbia. It currently has six distributors: Plant-Prod Quebec, Direct Solutions across Canada,

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Concentrates Inc Pacific North West, Peaceful Valley Farm Supply California and Western United States, Halifax Seed Co. Inc Nova Scotia and Sparetime Supply Northern California.

Piedmont glaciers (the source of Gaia Greens minerals) are glaciers that occur when steep valley glaciers flow onto relatively flat plains where they spread out into fan or bulb shapes (lobes) (The Geography Site, 2006). The image below displays the typical shape of the glacier.



Figure 2: (from National Snow & Ice Data Center, 2015)

Gaia Green Organic takes the glacial rock and breaks it down, and creates their mixture of minerals. The typical process of breaking down rock involves the following, described by How Products are Made

One method of granulation involves putting the solid materials into a rotating drum which has an inclined axis. As the drum rotates, pieces of the solid fertilizer take on small spherical shapes. They are passed through a screen that separates out adequately sized particles. A coating dust is then applied to the particles, keeping each one discrete and inhibiting moisture retention. Finally, the particles are dried completing the granulation process. (How Products are Made, 2006). The following images help to show the process.

Rock Granulating Process

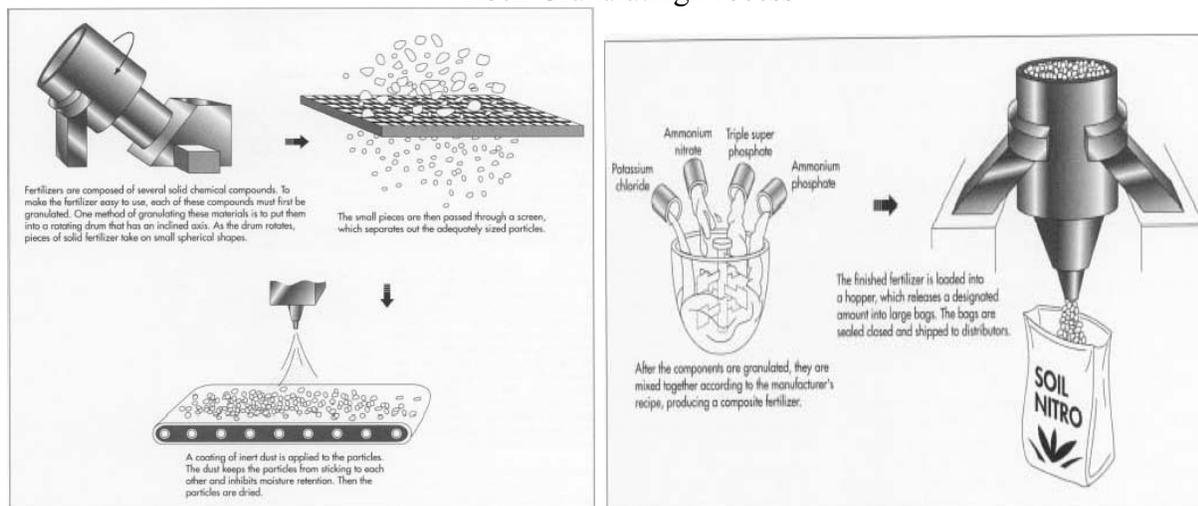


Figure 3: (from How Products are Made, 2006) Figure 4: (from How Products are Made, 2006)

Gaia Green Glacial Rock Dust is an all year production since it is not a crop grown outside and has essentially no factors that would affect its production in the winter. The labour to produce this product would require workers to manage the machinery that break down the glacial rock and workers to package the product. The product poses no threat to human health. Gaia Green is made from natural minerals and does not cause harm to humans, if the product gets in your eye gently rinse with water.

Fertilizer is a well known product and is not considered a niche product. Everyone can benefit from fertilizers whether they are farmers or home owners with house plants or gardens. Fertilizers are in demand all over the world by all types of people, making a large market for the product. The following chart briefly shows how the worlds fertilizer consumption has increased, the consumption is measured in million tons.

World Fertilizer Consumption Calendar Year Basis			
<i>Mt nutrients</i>	2010	2011(e)	2015(f)
Nitrogen <i>N</i>	102.6	105.2	112.4
Phosphorus <i>P₂O₅</i>	39.9	41.4	44.9
Potassium <i>K₂O</i>	27.2	28.7	32.6
Total	169.7	175.3	189.9

Source: Heffer, IFA, May 2011

Figure 5: (from Buxbaum, 2015)

Canada would gain many benefits from exporting this product, as it would grow a Canadian company. Gaia Green Organics currently has retailers in Canada and in some locations in the united states, exporting to Nepal would open up a whole new market. In growing the business, more job opportunities would become available for Canadians, not only through the growth of Gaia Green Organics but also through the transportation of the product. Canada would also become a contributor to helping the Nepalese farmers.

The production of a fertilizer from rock is a sustainable manufacturing endeavor for Canada. With rock being such an easily assessable product and having so much of it on earth there essentially would never be a shortage of rock fertilizer. Since there is thousands and thousands of types of rocks, there are many variations of minerals that could be used for fertilizers, meaning that Gaia Green could continue creating more fertilizers to target different soil types. Fertilizer as talked about above, is so highly demanded by the world that there would always be a large market for it. Especially natural organic fertilizers such as Gaia Green Organic because it contains nothing but ground rock and minerals, causing no environmental issues.

There are hundreds of fertilizers in the world to choose from and Nepal could easily choose a different fertilizer than Gaia Green Organic. The four factors that made me choose this

particular fertilizer over any other was: 1)it is a Canadian formula and business, 2)it is made solely from ground up rock which means it is easy to produce and easily accessible, 3)it is organic and would not contribute to anymore environmental issues in Nepal since there are no harsh chemical involved and finally, 4)it directly says in the product description it is geared toward the regrowth of topsoil, a major issue in Nepal.

Part II:

Nepal is located between China and India; it holds approximately 28 million people. It has three different geological regions: mountain, terai and hills, mountain and hills being popular for the production of fruit, vegetables and livestock where as terai produces small grains (Tejendra, 2015). Nepal faces many challenges with food production due to it's environment and high poverty rate. Due to the geography and slope of the land their soil has severally degraded and left poor earth to grow from. The following shows examples of how the severe degradation began. Intensifying rain storms can cause soil erosion and nutrient leaching from terrace edges, while extended drought can cause soil crusting which leads to erosion upon the first heavy rains. (SakNepal 2015). One of the other major factors affecting Nepal's agriculture production is the high poverty level. Tejendra (2015) explains that the majority of farmers in Nepal are 25% below the poverty line, this means that necessities like seeds, fertilizers, feed, tools and equipment are too expensive for the common farmer to afford.

To export Gaia Green Glacial Rock Dust, a company called A1 Freight Forwarding will be used. This freight company will ship the boxes of fertilizer across seas to Nepal. The further distance will be done by vehicle in Nepal. The storage of the product is very simple; no precautions need to be taken as long as the fertilizer does not soak in water. This means that the fertilizer does not require any special refrigeration or storing necessities' during the

transportation. It is also good because Nepalese people do not have to worry about the freshness or the longevity of the product. They also do not need to invest money to house the fertilizer in any way.

The Gaia Green Fertilizer comes in three sizes: 2 kg, 10kg and 22kg. Ranging in price from approximately 10-30 dollars depending on the retailer. The cost of shipment depends on many variables such as weight of material, which depends on how much the Nepalese people demand the product, and the dimensions of the box. The cost of freighting the product can be estimated at around 130 dollars for a 60 lbs shipment. The fact that transportation is expensive and is an added cost, the price of the product would have to be raised in order to help break even or make a profit from exporting. I find the product to be on the expensive side for the Nepalese people. The average Nepalese family is of a lower class and has a lower paying job. An example of a low income job includes a housekeeper, who earns approximately 100 rupees a day, 100 rupees being equal to 1.15 American dollars (Dave, 2012). If the smallest size of the fertilizer was selling for 15 dollars, that would mean 13 days of work is necessary to pay for it. This is not ideal since the average Nepalese family has 6 kids, it would be difficult for families to spend that significant amount of money on a new product they don't trust or know much about. They would be more likely to continue relying on manure, compost and leaves as a way to fertilize their land.

Nepal is in great need of fertilizer, since they currently do not have the means of creating their own, they import it from other countries. Farmers in Nepal face an acute lack of fertilizers that could aggravate food insecurity (Humanitarian news and analysis, 2010). The lack of fertilizers only makes growing their food there more difficult, adding stress to the food shortage they already have. Humanitarian news and analysis (2010) describes how there has been cutbacks in Nepal, causing Nepalese farmers access to even less fertilizer than in previous years.

Exporting fertilizer to Nepal allows people to access it if they have no other way to, or if this is the cheaper option for them. The option of being able to buy their own fertilizer means they could grow more prosperous crops. The added nutrients should help to yield more; this means there would be more food for family's and animals to eat and hopefully, some crop leftover to sell and make a small profit from.

The product Gaia Green Glacial Rock Dust was chosen specifically to help with the environmental conditions in Nepal. The product advertises that it aids in the reproduction of topsoil. The top layer of soil called the humus is the organic layer of soil, made up mostly of leaf litter and humus (decomposed organic matter) (Enchanted Learning, 2014).

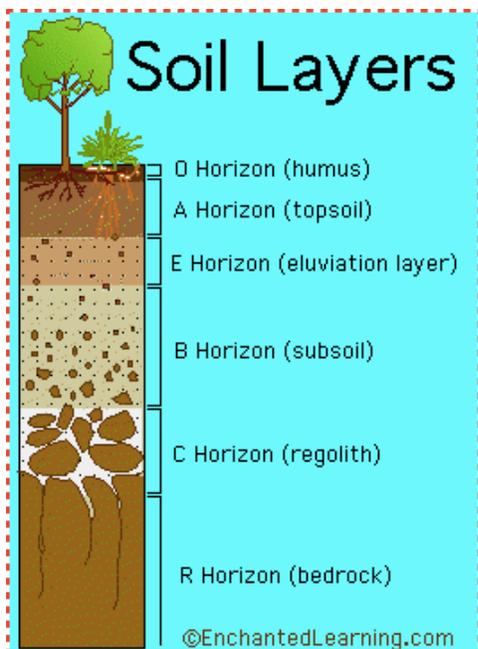


Figure 6: (from Enchanted Learning, 2014)

The minerals in the fertilizer will help to replace the minerals the soil in Nepal greatly lacks. With continual use, the fertilizer will help to replace the nutrients long term. But in the short term it will slowly leach out nutrients to crops to better their growth. Although this is not going

to solve Nepal's soil degradation issue, it is a start that will begin to help in a small way. The following paragraph from an article on farming with rocks and minerals describes this.

There are two aspects of agrogeology: the role of parent material on soil development and soil productivity, and the beneficial application of geological materials to enhance the productivity of agricultural crops and contribute to better management of horticultural and forestry systems (see book *Rocks for Crops*, van Straaten 2002). It must be emphasized that an agrogeological intervention is a small, albeit important resource-based intervention among many others that contribute to more regenerative and more sustainable land management. These interventions have to be part of an overall strategy to enhance sustainable soil use, enhance sustainable land use, and ultimately, enhance sustainable livelihoods. (Straaten, 2006).

After transporting my product to Nepal I plan to target grocery stores in the main cities Kathmandu, Pokhara, Patan and Biratnagar. An example of a grocery store would be the Bhat Bhateni supermarket found in Khatmandu. I need to first bring my product to the supermarkets because I need Nepalese people to become aware of the fertilizer. When people begin to use it, learn and talk about it, they can order it through the internet or through the grocery store.

Luckily this product should not cause any negative competition for the Nepalese people, since they do not produce fertilizers in Nepal. Commercial fertilizers are imported from other countries as stated earlier in this paper.

Resources

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