2015

Spanish River Carbonatite Export to Nepal

KYRA KECKES

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Export to Nepal

Spanish River Carbonatite

Intro

The world is full of chemicals to remedy the earth and correct the nutrients we take to feed the world (Preece and Read, 2005) Spanish River Carbonatite (SRC) is an soil conditioner and agromineral fertilizer that can increase yield and productivity in Nepal (Jones, 2015). It comes directly from the earth and provides a sustainable solution to improving agriculture in Nepal and developing countries.

Part I – Product Info

Product/technology description

Spanish River Carbonatite (SRC) is an agromineral mined in Sudbury ON, Canada from an igneous deposit that is a fertilizer and soil amendment to increase plant growth and soil pH (Slack, 2012). SRC is an agromineral fertilizer that is composed of approximately 50% calcium carbonate, 25% Biotite, 12% apatite and 13% trace and rare earth elements (Slack, 2012). The label below is the typical geochemistry found in the Spanish River Carbonatite deposit. The trace elements in SRC are manganese, zinc, copper, cobalt, molybdenum and boron and are essential micro nutrients for plants for the pH and Eh values, cation exchange capacity, organic matter, oxides and hydroxides and microorganisms within the soil (Kabata- Pendias, 2010). The macro nutrients in SRC are important to the function of plants, calcium (Ca) in needed for the formation of the cells and constitution of chromosomes within the plant, with a Ca deficiency the apical meristem breaks down and stunts grow of the plant and the leaves curl in. Biotite is a form of potassium and vermiculite both play important role in soil condition. Potassium (K) activates the uses of many enzymes and stomatal activity, controlling the plants intake of water and without K the plants may have a reduced dry weight (Preece and Read, 2005). A natural form of vermiculite is mica found in biotite, it helps hold water in the soil, 3 liters (3-4gal/ft3) of vermiculite will hold up to 1 litre of water, making the plants (Preece and Read, 2005).

Fertilizer Label

Soluble Analysis 0.30 - 0.04 - 0.20

Guaranteed Minimum Analysis

Total Nitrogen..... 0.30%

Available Phosphoric Acid (P2O5)... 0.04%

Total Phosphoric Acid (P2O5)..... 2.00%

Soluble Potash (K2O)..... 0.20%

Total Potash..... 0.70%

Calcium (Ca).....,..... 20.00%

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Magnesium (Mg)..... 1.00%

Neutralizing Value

(%CaCO3 equivalence)..... 81.00%

Fineness:

Passes 10 mesh Tyler screen..... 97.08%

Passes 60 mesh Tyler screen.....62.15%

Mining and processing of SRC

Agricultural Mineral Prospectors Inc. started mining in Sudbury Ontario Canada in a deposit of carbonatite in 1994. Boreal Agrominerals a company formed in 2012 and John Slacks the CEO, has the mining lease for the Spanish River site. They have a contractor that excavates and screens the carbonatite, with distributors through out the Canada and the US (Franczyk, 2014)

Machinery required and cost

Boreal as a company requires very little machinery as they outsource excavation, trucking and bagging of SRC. The product most farms in Ontario receive is straight from the quarry, the only process it goes through is screening (Franczyk, 2014).

Inputs required

Although is can be put on the fields without the need any thing else, SRC needs nitrogen or to be mixed in too green manure to achieve full potential as shown in Jones (2015) research. There is the potential that s-compost and mycorrhizal fungi would provide similar results in combinations with SRC.

Benefits to Canada (e.g. Canadian farmers)

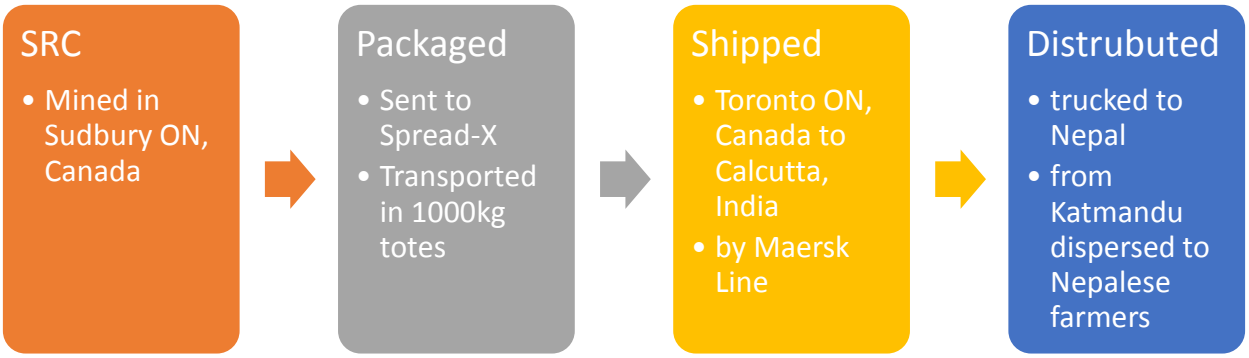
Carbonite in this form and a high reactive form has relatively little research compared to chemical fertilizers and opening the market to Nepal creates new possibilities for studies on the long term effects of SRC on soils and plant yield. While more extensive research and marketing Spanish River Carbonatite is a certified organic product by OMRI and has the potential to be sold to large scale farmers looking for organic alternative to tradition fertilizers.

Environmental sustainability in growing/manufacturing in Canada

SRC promotes sustainable agriculture and help protect the environment as it is having a low solubility in water therefore when it enters the watershed through farm runoff it will not increase phosphate levels and encourage algae plums (MSDS, 2012., Martin, 2010)

Part II – Export potential to Nepal

Transportation logistics



Boreal Agrominerals will mine SRC and package into 1000kg, 20kg or 4.5kg for the company Spread-X to sell. Spread-X is located near Ottawa and about 460km from the port of Toronto costing approximately 75$ for the tote the fertilizer comes in and the km's to deliver the produce (Spread-X, 2015). There is the possibility to buy smaller amounts but to be economical this cost projection will ship in 1000kg totes. The fertilizer will then be shipped by Maersk Line in 40ft shipping containers. The rates for shipping from North America to India are $630USD for the SBF price, extra charges that are unknown are terminal handling charges of loading and unloading, document charges and extra BAS charges as the amount of fertilizer and weight determine extra charges (Maersk Line, 2015). The fertilizer will be shipped to Calcutta port, India and where imports must go through to get to Nepal and taken by train to Katmandu where it can be distributed to communities or farmers that ordered the fertilizer (Maersk Line World Factbook)

A company in Nepal already selling fertilizers could be potential importer of SRC and could group along with other fertilizers and goods already coming from Canada but the costs are unknown at the moment as demand of the product will be the main factor in transportation costs

If the company in Boreal Agrominerals or Spread-X sells directly to the farmers in Nepal, there will have to be a website or brochure available to Nepalese farmer they are willing to use.

Cost analysis

The table below shows the prices for sustainable fertilizers and soil amendments like SRC. The cost of buying directly from Spread-X is $120.00/1000kg, $34.95/20kg and $17.99/4.5kg bag.

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Traditional agricultural limestone is haft the price of SRC but does not have phosphorus, potassium or micronutrients. The micronutrients listed at the bottom are essential to good productivity of soils but very expensive when sold separately (Spread-X, 2015., Kabaya-Pendias, 2010).

SPREAD-X
Your Soil Management Experts
Naturally Sourced Products for Sustainable Agriculture

DRY Fertilizers & SOIL AMENDMENTS		**Format**	**Price**	**other format**	
Calphos	20P - 20Ca	50lb	$18.39		
Certified Dolomitic Lime	28Ca – 16Mg	1000kg	$34.00		
Corn gluten meal (not organic)	9-0-0	9.1kg	$19.00		
Organic extruded soybean meal	7-2-1 48% protein	25kg	$42.95		
Organic Flax meal	6-1-1	25kg	$33.95		
Earth Alive – Soil Activator	BioStimulant	25kg	$329.95	$39.95/4kg	
Greensand	20 K	50lb	$32.95		
Gypsum	17Ca - 22S	50lb	$12.20		
Limestone Calcitic	34Ca	1000kg	$65.00	$13.50/25kg	15.00/MT bulk
Limestone Dolomitic	22Ca – 11Mg	1000kg	$65.00	$18.50/25kg	20.00/MT bulk
Magnesium oxide	55MgO	25kg	$41.00		
Magnesium Sulfate/Powder	9.8Mg - 12S	60lb	$39.00		
Spanish River Carbonatite	0.1-3.2-1.5 19 Ca	1000kg	$120.00	$34.95/20kg	$17.99/4.5kg
Sulphate of Potash	50S - 17P	1000kg	$1,300.00		
Sulphur	S90%	1000kg	$918.00		
Sul-Po-Mag (K-Mag)	22K - 11Mg - 22S	1000kg	$1,100.00		
Wollastonite	5.12Mg, 19.8Ca,1.88K	1000kg	$100.00		

Micro nutrients:			
Boron Granular	15%	0.5kg	$1.45
Cobalt Sulphate	22% C 20% S	50lb	$1,123.50
Manganese sulphate	26-28Mn	50lb	$39.00
Copper sulphate	35%	25kg	$192.50
Ferous sulphate	pH reducer	25kg	$30.00
Zinc oxide	72%	50lb	$187.00
zinc sulphate	35%	50lb	$80.00

Table from Spread X Spring prices 2015

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Transportation + product cost

	Cost $
1000kg of SRC	$120
Shipping	$630 (+unknowns)
Land Transport	$75
Total	Approx. $825

The approximate cost of Spanish River Carbonite to Nepal is $825 with the acknowledgment of unknown factors in price of shipping and transport.

According to a report done by the FAO the average annual house hold income for rural families in Nepal is 30 980 Nepalese rupees which equal approximately $311 USD (Maltsoglou and Taniguchi, 2004., WFB, 2014) Therefore SRC may not suite a household in rural Nepal but a community that could buy into a cooperative with multiple villages. As shown above the cost of SRC is high for individuals without subsidies and government aid. It has been over 30 years since an in-depth look at the use and economics of fertilizers in Nepal and the government when looking at the 70% employment in agriculture should subside or incentives the largest industry in Nepal. (Joshy and Deo, 1976) Over 60% of the population lives in the hill and mountain regions that use only 25% of the imported fertilizers in Nepal (Maltsoglou and Taniguchi, 2004., Sherchan and Karki, 2007) Government involvement in the distribution of fertilizer in the hill and mountain region could greatly increase the production.

In the future Boreal Agrominerals is looking to sell a 1kg bag for under $10, this may be the perfect size to export the Nepalese farms as it would be affordable (Fanczyk, 2014).There is the potential for lowering costs through buying directly from the quarry in Sudbury as growers in Ontario can buy it for $55 a tonne when buying in bulk (Franczyk, 2014) A company from Nepal or a NGO could provide the packaging or containers needed to ship loose SRC to Nepal and package it in country creating job possibilities in the Nepal.

Needs of the importing nation

Nepal is split up into three different ecological regions the terai, mountain and hills. It is evident in Nepal that agriculture in the hill and mountain region is be greatly affected by soil degradation through erosion. This is an issue found across Asia as both China and India report loses of nutrients due to erosion (Tiwari et al., 2009) Nepal is found in-between these countries and face the same issue of land degradation due to slope steepness, overgrazing, deforestation and intensive agriculture. These issues result from a growing population demanding an intensification of land used for agriculture along with the natural causes, intensive rain showers and landslides destroying man-made terraces used for cultivating crops (Shrestha et al., 2003). The nutrients lost from erosion need to be returned to the soil through chemical fertilizers or agro-organic fertilizers as they are vital to productivity of crops. Organic fertilizers like Spanish river carbonatite are already being tested in Asia and found to produce almost 121% higher than untreated crops (Adhikary et al., 2012).

Benefits of SRC to Farmers

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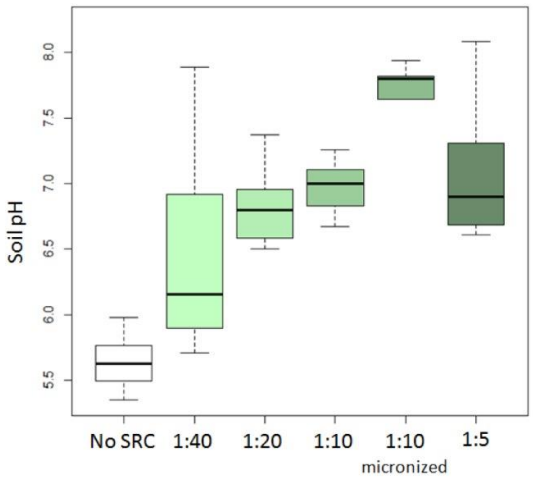
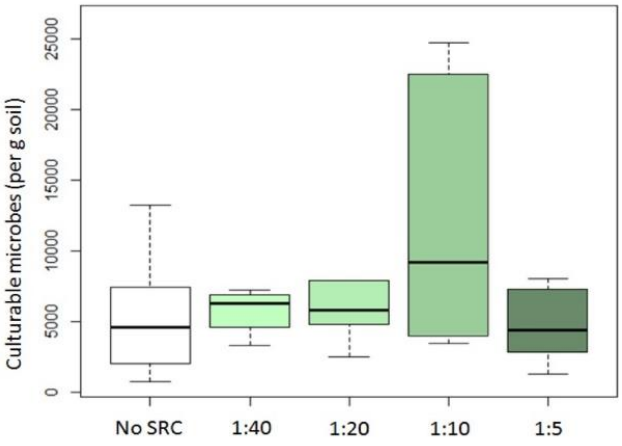
A study done by Wilfrid Laurier University of the affects of Spanish River Carbonatite on soil when apply in conjunction with a chemical nitrogen solution compared to plants given full macro and micro nutrient fertilizer solution resulted in an overall benefit to the soil and yield. The study proves with a concentration of 1:10 SRC helps maintain ideal soil PH and microbial community. It is beneficial to farmers in Nepal and across the world to increase yield and seed size

Graph from Jones 2015



Liming and buffering affect on soils

Spanish river Carbonatite is a soil amendment that is beneficial for the acidic soil found in Nepal because it increases the pH in the soil and decreases the impact of aluminum solubility that can cause phosphorus deficiency. (Schreier et al.,1995., Jones, 2012). Acidic soils with a lack of phosphorous is a major constraint to agriculture in developing countries (Bationo et al., 2012) Jones (2015) research on SRC effects on soil pH levels shown in the graph on the left, found SRC improved pH levels in the soil and maintained it for the duration of the plant growth, whereas the chemical fertilizer made the soil 0.5 pH units more acidic. SRC would be a long term improvement of the soils in Nepal and reduce the acidification from continuous use of chemical NPK fertilizers and improve naturally acidic soils to maximise crop production and benefit Nepalese farmers (Subehia et al., 2005).



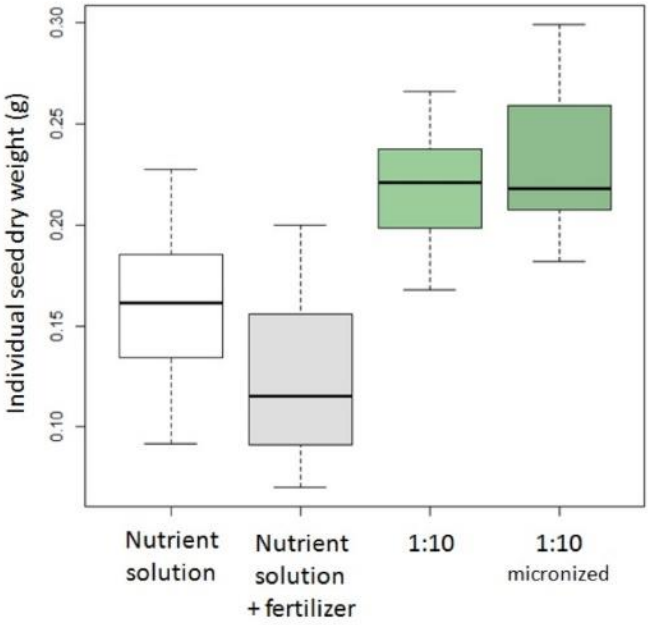
Soil Microbes

The soil microbes are vital to the use of nutrients for the plant as they can provide an almost continuous source of nutrients through breaking down organic matter within the soil (Preece and Read, 2005) The graph to the right show the ratio of 1:10 SRC doubles the amount of microbes in the soil and therefore help the plants use the nutrients already found within the soil.

Graph from Jones 2015

Increased dry weight & seed size

Graph from Jones, 2015



SRC out performs the chemical fertilizer in growth and yield giving the plant increased seed size and dry weight (Jones, 2015). This increase in yield and dry weight is highly beneficial to farmers as they will receive higher profits from their crops, the improved seed size will increase the size of the next year's crop. The graph to the left shows the improvement of dry seed weight with SCR in the green and with nutrient solution and chemical fertilizer, in the white and grey. The SCR shows almost a 10g difference in seed weight. The subsistence farmers in Nepal will then produce a higher quality seed for years to come as they mainly reuse seeds from previous years. Across the world 90% of crops in developing countries are planted with farm saved seeds (Fao (guei) 2010) This improvement in the seeds and soil with better yields and production for years to come.

Capacity building

Along with maintaining soil structure and improving yields there is a need to implement and teach sustainable faming practices. A program that can be implemented by a NGO or government organization to teach cropping and seed production in rural Nepal similar to practices enforced though case studies in other developing countries (Guei, 2010).

Application of SRC

The farmers in Nepal that will use SRC can use a variety of application process but the main two suggested methods of application are broadcasting and micro-dosing. Farmers who can afford large amounts of SRC a fertilizer spreader can use for broadcasting. That way the fertilizer is spread evenly over the field and can be done before planting or after as a top dressing (Preece and Read, 2005) The second method, micro-dosing is the application of a bottle cap of fertilizer placed directly where the seed was planted or around a growing plant. This method is suggested

for high results with smaller mounts of fertilizer (Fertilizer Micro-dosing, 2009) The suggested rate of application is 1:10 directly onto the soil or mixed into compost, that is out of the reach of most Nepalese farmers but in most test a 1:40 rate of application had similar effects to NPK solution while increasing the overall pH of the soil (Jones, 2015).

Contact info of Canadian companies

Boreal Agrominerals is the company in Canada that mines Spanish River Carbonatite. The company sells in wholesale to distributors throughout Canada and the United States. For more information go to: www.borealagrominerals.com

Spread-X is a Canadian company that sells fertilizers and soil amendments for sustainable and organic agriculture. For more information visit: www.spreadx.ca

Real world sales/marketing strategy to sell in Nepal

The issues in fertilizers distributed throughout Nepal in the past is the lack of information and transportation in the country. The lack of information and small literacy rate led to a distrust of fertilizers among poor farmers after the deregulation of fertilizer in Nepal (Sherchan and Karki, 2007) Transportation comes from a lack of money and infrastructure in Nepal, and there is the issue with importing totes of 1000kg. A company in Nepal or Boreal agromineral should market a 1kg bag that is under 10$ making SRC accessible and easy to transport (Fanc.

Future studies required to properly evaluate the export potential

In conclusion Spanish River Carbonatite holds great potential for soil amendment and to increase yields in Nepal to better fully evaluate the opportunity of exporting SRC further studies into the best application for SRC, soil conditions within Nepal, transportation costs, demand for organic fertilizers and potential subsides or government involvement.

There is no comprehensive soil map on Nepal and very little testing done within the country. Boreal Agrominerals suggest a soil test before the application of SRC, without testing the Nepalese farmers may not understand the long term affects or apply correct dosage.

SRC has very few independent research done on the effects and efficient application for different soils and continued research on removing the need for a nitrogen solution will further the application possibilities abroad (Jones, 2015).

There are too many unknown factors in the cost of transportation between Nepal and Canada to accurately give a price of the fertilizer in Nepal. A more comprehensive study on possible companies and demand within Nepal will help to elevate some cost and understand the full price. There is very little information on organic farms within Nepal, and organic produce gives added

value to commodities. This has the potential to increase income of larger scale farmers when exporting and marketing their produce as organic.

The cost of SRC is too expensive for most farmers in Nepal, there is potential for subsidies and government intervention that will help feed a growing industry both in Nepal and Canada. Future research is need for the best way to introduce and subside SRC to Nepal.

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