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Canadian Agri-food Export Project-AGR1110
Exporting Walipini Greenhouse infrastructure and construction book to Nepal.
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Part I: Introduction and Analyses of the Canadian export product

This report is to evaluate a Canadian export product to Nepal and analyze the benefits. The overall achievement that we are trying to assess is too potentially benefit Nepal via the export product being sent there, while creating Canadian jobs at the home front. Canada has a population of roughly 34 million people, which 327,000 people were primarily employed in agriculture, accounting for 1.8% of the labour force; while Nepal has a population of 28 million people and the agriculture sector employs >70% of the population (Statistics Canada, 2011; Central Bureau Statistics, 2011; Course link AGR guest lecture Dr. Tejendra Chapagain).

A product that can be exported to Nepal that can create the chance to benefit both Canadian and Nepalese residents, is the low-cost greenhouse known as “Walipini.” A Walipini greenhouse consists of a rectangular hole in the ground 6’ to 8’ deep covered by UV protected plastic sheeting (BAFI, 2002). The name ‘Walipini’ comes from an Amaraya Indian language meaning “place of warmth” (BAFI, 2002). The Walipini utilizes nature’s resources to provide a warm, stable, well-lit environment for year-round vegetable production (BAFI, 2002). Direct or non-electric utilization of geothermal energy refers to the immediate use of the heat energy rather than to its conversion to some other form such as electrical energy (Lund, 2006). Therefore utilizing the sun, and the intake of the heat in soil walls of the Walipini greenhouse, is what keeps the temperature high enough to produce while the external outside weather is cold (BAFI, 2002). A corporate company does not currently create the Walipini greenhouse, although this can still benefit Canada, because all the parts that need to be purchased can be obtained through Canadian companies (Reference). The inputs that are needed to build

this greenhouse are: UV plastic film, PVC Pipes, tool kit, door, and door jamb, water barrel, topsoil and fertilizer. The needed parts and inputs can be found at these stores; *OMNI structures, Rona Canada, Home Depot, TCO Agromart ltd, Pykes Farm Kingston* (OMNI, 2015;Rona 2015;IPEX, 2015, TCO Agromart group, 2015; Pykes Farm Kingston, 2015). In the Appendix labelled *Table 1: Canadian retail locations selling the required parts to build the Walipini Greenhouse, while including the comparisons of the Canadian dollar to the Nepalese rupee*. All tables and figures referenced in this report can be found in the Appendix ensuing this report.

The lowest costs of these products are: Greenhouse UV protected poly- film with 4 year guarantee is \$40.00 for 10lbs in bulk (OMNI, 2015). The PVC pipe used to span the roof, will cost \$7.27 /pipe (Home Depot Canada, 2015). The tool kit consist of: Hammers, shovels, picks, saws, wheelbarrows, crowbar, forms for rammed earth compaction, 100' and 25' measuring tapes (BAFI, 2002). The cost of all items listed above for one kit would be \$172.19 (Rona, 2015). The inputs that are needed to increase growth and create a healthy environment for the products grown in the greenhouse are topsoil and fertilizer. A 25 kg bag of nitrogen fertilizer will cost \$18.00 (TCO Agromart, 2015). Topsoil will cost \$5.00 a bag and \$42/cubic foot (Pykes Farm Kingston, 2015). The costs of a door and water barrel will be dependent on finding used products, this will impact the overall cost and therefore it is an unknown variable, because one will not know the cost of these used products. Therefore the overall cost will not include these products at the moment. There currently is no corporate company that build and sell pre-built Walipini greenhouses; therefore this fluctuates cost and labour costs. Therefore we are left with unknowns and will use the overall cost of the tool kit from *Rona in appendix*

Table 4. The reason we will use Rona as the exporting company is because it is the most inexpensive as seen in appendix labeled *Table 2*, it also is the most stable cost (doesn't fluctuate or contain unknowns).

Exporting from these various Canadian companies will increase economical growth and create job opportunities in Canada. Since there are many companies that are needed in order to create this product, I will strictly focus on Rona because it is largest company and would benefit Canada the most. Rona consists of over 500 stores, with 13 large distribution centres across Canada employing approximately 28,000 people. (Rona-history, 2015). Ergo this company does give opportunity to many Canadians to be employed and provides a source of income.

This product although seeming ideal in theory and in analyses so far, there is many steps and factors involving the exportation to Nepal and the Nepalese farmers. Initially there is a need from the Canadian company and it entails having a business number from Canada revenue agency, also the product being exported must contain an accurate description (Canadian Border Service Agency, 2015). Also what needs to be taken into consideration is international competition and online sales. One company in particular that comes to mind is Alibaba; this is a company out of china, and operates leading online and mobile marketplaces in retail and wholesale trade (Alibaba, 2015). As seen in *Table 5* in the appendix, this company can be viewed as serious competition, due to low costs in comparison with Rona. What could be taken into consideration is the diverse costs and that they may fluctuate as people bid and or trade for certain products (Alibaba, 2015).

Ultimately using the online retails will not benefit Canada, because those sales will not supply to the Canadian economy.

Part II: The Potential of the Exportation Product in Helping Nepal and how it Benefits Nepalese Farmers.

Nepal is located in in South Asia, landlocked between China and India. As mentioned before, Nepal has a population of 28 million people and the agriculture sector employs >70% of the population. This reiterates that Nepal is essentially built on agriculture.

Nepalese farmers would benefit the most from this product, because a major concern, especially in the mountain regions, is soil degradation and the length of the crop season (Reference). The Walipini greenhouses can benefit the high altitude levels (>2500 masl.) in the mountain region (Course link AGR guest lecture Dr. Tejendra Chapagain; BAFI 2002).

Farming receipts represents around 3/5th of the nation's GDP and 70% of the aggregate fare profit. It is geologically differing, in area and rise with three fundamental districts running east west the nation over: terai locale, slope locale and mountain district. These areas are to a great degree unmistakable by method for arable area accessible for horticulture and development (Central Intelligence Agency, 2015). By building this low-cost greenhouse the soil will not be affected by soil degradation and the greenhouse will allow an all year crop season (BAFI, 2002), therefore increasing total yields and income for the Nepalese farmers.

The main yields in Nepal are: Maize, paddy, wheat and millet, however most by far of Nepalese nationals are subsistence farmers (Joshi, 2011).

Subsistence agriculture means that a farmer only grows enough food to provide and produce strictly in order to nourish the family. This is the ample practice of agriculture generally with 80% subsistence farming, with roughly 2 hectares of property being used for agriculture (Swaminathan, 2004). Relating this to Nepal, many farmers have small amounts of land to meet the nutritional needs for their families (Neupane 2001).

In all farming-based practices, the quality of the soil is the main part for crop success. If soil conditions are poor, it will be reflected in low crop produces and poor quality (Masto, 2007). Agriculture is vital in Nepal and improvements are needed, soil degradation is becoming more and more of an issue and leading to different growth yields of crop products, and this leads to illness in Nepalese children, due to malnutrition (Farquharson, 1976). The Walipini greenhouse is capable of preventing soil degradation from impacting growth yields (BAFI, 2002). Soil degradation is essentially a worldwide issue that is categorized into two categories. 1) Soil degradation is caused by removal of macronutrients (figure 1 in appendix) by erosion caused by water or wind (Oldeman, 1994). 2) Soil degradation is caused by physical removal or by pesticides (Oldeman, 1994). Soil degradation by erosion is major issue in Nepal, because reduction of soil quality leads to decrease in crop yields (Lal, 2001). This is a challenge because the mountain regions, specifically the administrative zone known as Sagarmatha where the Walipini greenhouse would be considered a valuable niche product, have small crop seasons (Schroeder, 1985).

This product in order to get into the hands of Nepalese farmers, will be exported from Canada to Nepal by an international carrier company whose headquarters are located in Toronto, Ontario (A1 Freight Forwarding, 2015). This company is called A1

Freight Forwarding. As seen in the appendix there are two quotes generated by A1 freight forwarding, labelled *figure 3*, and *figure 4*, these quotes relate to Air Freight and Water freight. The Air Freight would fly out of Toronto to Kathmandu, Nepal. The cost to send 10 Rona tool kits via flight would be \$ 2245.92 CAD and 179,118.07 NPR. The Water freight would go from Toronto, Ontario to New Delhi, India. This is because Nepal is a landlocked country between China and India. The cost to do this would be 1,284.77 CAD and 102,463.81 NPR. This also needs to take into consideration of travel from New Delhi to Kathmandu. This is an unknown but it would add additional cost due to gas intake and time to drive to Kathmandu due to locations of these cities. This can also lead to a carbon footprint, which is the mass of cumulated Carbon dioxide emissions (Hertwich, 2009).

Part III: Summary and Suggestions

This product if exported demonstrates that it can help both countries; Canada and Nepal through critical and analytical analyses provided. Exporting this product from Canada can create an uptake in retail sales and employment for Canadian citizens, while creating and helping with international trades between Canada and Nepal. This product is considered a niche product aiding Nepalese farmers, although a high labour product, is considered low cost and will ultimately help with crop season length within the mountain regions and increase overall crop yields. The citizens of Nepal will be able to purchase out of season crops and possibly grow more crops that will intern benefit them with profit. This export product will also be applicable to other countries that are currently developing and are in need of this tool relating to agriculture, to aid with subsistence farming and crop seasons.

Some suggestions to help with this product reaching the Nepalese farmers would be public support from the government and or organizations that are trying to benefit Nepal, Financial aid will also benefit farmers who are in need of these agricultural aids due to the fact it will help with making these tools more available, being able to travel and reach these destinations where they are available. Ultimately with some unknowns with this product, with more research and financial and emotional support, I believe this product will benefit developing countries, with increase crop season, increase crop yields, and lastly an increase in profit for the Nepalese farmers.

Appendix:

Table 1: Canadian retail locations selling the required parts to build the Walipini Greenhouse, while including the comparisons of the Canadian dollar to the Nepalese rupee.

Retailer and product	Store with location	Price in Canadian dollars	Price in Nepalese Rupees
OMNI Structures (UV. Protected Poly-film)	Ontario (St. Catherine's)	\$40.00	3206.78
Home Depot (PVC pipes)	Ontario, Québec, British Columbia, Alberta, Nova Scotia, Saskatchewan, PEI, Manitoba, New Brunswick, Newfoundland and Labrador	\$7.27	582.83
Rona (ToolKit)	Ontario, Québec, British Columbia, Alberta, Nova Scotia, Saskatchewan, PEI, Manitoba, New Brunswick, Newfoundland and Labrador	\$172.19	13804.37
TCO Agromart ltd. (Fertilizer)	Ontario (Napanee, Tamworth)	\$18.00	1443.05
Pykes Farm (Soil)	Ontario (Kingston)	\$5.00	400.85

Table 2: Canadian retailers selling comparative tool kits, with Canadian and Nepalese price conversions.

Canadian Retail	Canadian dollars	Nepal rupees
Rona	172.19	~13804.37
Home Depot	252.39	~20222.78

Essential Elements for Plant Growth	
Macronutrients	Micronutrients
Carbon (C)	Iron (Fe)
Hydrogen (H)	Manganese (Mn)
Oxygen (O)	Boron (B)
Nitrogen (N)	Molybdenum (Mo)
Phosphorus (P)	Copper (Cu)
Potassium (K)	Zinc (Zn)
Calcium (Ca)	Chlorine (Cl)
Magnesium (Mg)	Nickel (Ni)
Sulfur (S)	Cobalt (Co)
	Sodium (S)
	Silicon (Si)

Figure 1: The essential nutrients for productive plant growth

<https://www.boundless.com/biology/textbooks/boundless-biology-textbook/soil-and-plant-nutrition-31/nutritional-requirements-of-plants-186/essential-nutrients-for-plants-711-11935/>



Figure 2: Nepal's 14 administrative zone divisions: Mahakali, Narayani, Bagmati, Janakpur, Sagarmatha, Koshi, Mechi Seti, Bheri, Karnali, Rapti, Lumbini, Dhawalagiri, Gandaki. <http://www.allinnepal.com/index.php?opn=GeneralInfo&Chp=NepalMap>

Table 3: Summarized cost of the *Rona Tool kit* at the quantity specified, exclusively.


Canadian Retail and product	Export Quantity	Cost
Rona (\$172.19) Entire Tool kit	10	\$1721.90 138018.28 (Nepalese Rupee)

Table 4: Breakdown of Rona Tool kit costs per piece of equipment


Individual piece of equipment	Cost Canadian Dollars	Cost Nepalese Rupees
Hammer	\$10.79	864.43
Shovel	\$9.89	792.44
Saw	\$6.99	560.00
Pick-axe	\$37.99	3043.54
Wheelbarrow	\$67.99	5446.97
Forms for compaction	\$8.99	720.23
Measuring tapes	\$29.55	2376.76
Total	\$172.19	13804.37

Table 5: Breakdown of Tool kit costs per piece of equipment, on the website Alibaba.

Individual piece of equipment	Cost in American Dollars	Cost Nepalese Rupees
Hammer	\$3.10	247.64
Shovel	\$ 3.30	263.62
Saw	\$4.50	359.48
Pick-axe	\$2.50	199.71
Wheel barrow	\$20.00	1597.71
Forms for compaction	\$4.30	343.51
Measuring Tapes	\$2.30	183.74
Total	\$40.00	~4265.92



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QUOTE #154219

AIR FREIGHT	EMAIL ME THIS PRICE
FROM: Toronto (Our warehouse) TO: Kathmandu - Nepal (Airport)	Enter your email address <input type="text"/>
SHIPMENT TYPE: Commercial cargo	<input type="button" value="Send"/>


Type	Qty	Dimensions	Weight
Box	10	59 x 87 x 70 cm	25 lb

AIR FREIGHT RATE	3.35 \$ CAD / KG ALL IN
ACTUAL WEIGHT	113.25 KG
VOLUME WEIGHT	598.85 KG
CHARGEABLE WEIGHT	598.85 KG
AIR FREIGHT	2006.15
TERMINAL & SCREENING FEE	164.77
PROCESSING FEE	75.00
SURCHARGES	0.00
TOTAL:	2245.92 \$ CAD

Figure 3: Estimated A1 Freight Forwarding airfreight quote for 10 *Tool kits* from Toronto, Canada to Kathmandu, Nepal.



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OCEAN FREIGHT LCL (LESS THAN CONTAINER LOAD)
INTERNATIONAL SHIPPING BOXES, CRATES AND PALLETS

EMAIL ME THIS PRICE

FROM: Toronto CFS
TO: New Delhi - India CFS

SHIPMENT TYPE: Commercial cargo

Enter your email address

Send

Type	Qty	Dimensions	Weight
Box	10	59 x 87 x 70 cm	25 lb

RATE:	7 \$ USD PER CUBIC FOOT / MAX WEIGHT 1000 KG PER 1 CBM
Total volume	126.89 CUBIC FEET
Minimum charges	35.32 CUBIC FEET
OCEAN FREIGHT (126.89 CUBIC FEET)	888.23
OVERWEIGHT CHARGES	0.00
PROCESSING FEE	75.00
PRE-CARRIAGE FROM CFS TO PORT OF LOADING	0.00
EXPORT DECLARATION	0.00
SURCHARGES	0.00
TOTAL:	962.47 \$ USD

Figure 4: Estimated A1 Freight Forwarding Water freight quote for 10 Tool kits from Toronto, Canada to New Delhi, India.

*All Tool Kit prices and weights were taken from (Rona, 2015) (A1 Freight Forwarding- Airfreight Quote, 2015). (A1 Freight Forwarding- Ocean freight Quote, 2015).

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