

THE JUICE FOR NEPAL



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The focus of this paper is to outline the possible benefits and disadvantages of the potential export of a hay preservative by Nuhn Forage Inc. called “The Juice”. The product descriptions and benefits are portrayed in two sections which are in a well explained analysis of the hay preservative itself and how it will bring Nepal into a better economic state. Nepal is a nation that depends majorly on the agriculture sector of their economy, which includes hay. This paper heavily focuses on how this product can better Nepal in more ways than just agriculturally, which is exactly what The Juice was made to do. It will compare the product to other alternatives that do the same work, outline the potential benefits to the exporting country and how it positively affects Canada’s economically, and the pros and cons that the product may encounter as it is traded internationally. The Juice is a product that has become the most well-known hay preserver in Canada, and hopefully will continue its success in other countries in need.

Part I: Product Information

Product/ technology description

The possible product for shipping is called The Juice manufactured by Nuhn Forage Inc. and it is a hay preserver which is applied before it is baled or bunched up for storage. In this hay preserver, the two main components that allow this product to be effective are buffered propionic acid and citric acid (Nuhn, n.d.). Propionic acid is can be used as a hay preservative to prevent mould when baling hay. Where mould occurs in hay, a decrease in value of the nutrients occurs and when the quality of the hay is decreased and produces toxins that can be harmful to the animal’s health. With mould grow, spontaneous combustion can occur, where the hay will decompose and possibly start on fire (Bagg, 2004). With Nuhn Forage being a market leader in agriculture preservatives and in the 2000’s, The Juice became Canada’s leading hay preservative (Nuhn, n.d.). In Canada, there are a total of 134 products that are registered hay preservers,

which Nuhn Forages product The Juice, is the most purchased and applied in Canada. All the other products contain roughly the same ingredients and will do about the same thing as this product, Nuhn Forage has been around for over 100 years and is widely trusted. When applying the product, The Juice, farmers would generally use about 10 lbs of hay preservative for 1 ton of hay. Depending on the bale size and moisture. When researching the price for Nuhn Forages The Juice, there was no exact cost for unit of the preservative, rather when talking to the owner on the phone, the price was registered at about \$30 an acre.

Where/ how the product is processed?

Application Rates Large Square Bales		
Hay Moisture	Stem Moisture	Dew Moisture Only
Under 22%	6 lbs/ton	3 lbs/ton
23% - 26%	10 lbs/ton	8 lbs/ton
27% - 30%	DO NOT BALE	16 lbs/ton
Small Square and Round Bales		
Hay Moisture	Stem Moisture	Dew Moisture Only
Under 22%	4 lbs/ton	2 lbs/ton
23% - 26%	8 lbs/ton	6 lbs/ton
27% - 30%	16 lbs/ton	12 lbs/ton

Not recommended on any hay above 30% moisture.

http://harvesttec.com/wp-content/uploads/2015/11/4582_cropsaver_brochure.pdf

Nuhn Industries Ltd. Is located north of Stratford Ontario, where the hay preserver “The Juice” is manufactured. The components added into Nuhn Industries hay preserver are buffered propionic acid, which is modernized from previous propionic acids and is made to be non-corrosive. Citric acid is added to keep the hays freshness and colour. Lastly, a dispersing agent is

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added into “The Juice” which spreads around the whole bale and ensures equal application and quantity. This product is already pre-mixed and ready to apply, where no water needs to be added. The product is packed into 200kg barrels or 1000kg totes that are easy for shipping (Canadian, 2009).

Costs of production

Since the production of “The Juice” is produced in Canada, the most inexpensive way to get this produce to Nepal or other nations is to manufacture the product in Canada and ship it to the countries in need. The cost without shipping would be approximately \$10 per ton of hay that it is applied to (Canadian, 2009).

To apply the product, it is easiest to attach an applicator to the back of a baler. The issue with this is most of the farmers in Nepal are not fortunate enough to have a tractor or a baler. But as time goes on, more and more farmers in Nepal are getting tractors and updated equipment. The applicator that can be attached to a baler would cost approximately \$1000 dollars for the applicator and the set up (Canadian, 2009). The applicators come in three different sizes, 100 gallons, 55 gallons, and 25 gallons (Nuhn, n.d.). With Nepal having an average farm size of about 0.96 hectares (237.22 acres), it would be most beneficial if the farmers purchased the 25-gallon tank (Sharma, n.d.). With the set-up of the tank a list of add-ons are included. It includes flat surface mounting brackets, a tank mounted pump, an universal 2 nozzle assembly for many applicators, a manual pressure regulator application control, a pump unit with standard power cord, manual on-off switch and in-line gauge, and priming and self-filling capabilities (Nuhn, n.d.). For the farmers that do not have tractors or balers that an attachment would be simply added onto the machine, a hand spreader would also work. These farmers that are not working with as much land, it would be easy to apply to the hay before it is stored and used for the year.

Health and Nutrition Values

The only ingredients in “The Juice” are buffered propionic acid, citric acid, and dispersing agent that allows the whole bale to be enhanced (Canadian, 2009). For the most part, the health benefits come from the post application of The Juice. After applying the juice to the bale, the nutrients in the bale are trapped in and will be stored for some time. When adding this preservative, the formula promotes an increase in production of lactic acids which are proven to amplify the nutritional values of hay when introduced (Canadian, 2009). The consumption of primed hay is much healthier and is easier for the livestock to consume and digest. The hay

naturally produces about 3.5 kilograms of protein per metric ton of hay and about 50.3 mega calories (50 300 000 calories) per metric ton of hay (Canadian, 2009).

Benefits to Canada

With the purchase of Nuhn Forage's product The Juice, many possible opportunities open for not only the people of Nepal, but the Canada economy. Many people will be employed for the shipping process of this product to Nepal, where it is a product that could be sold in huge quantities. The main benefit that Canada will get is the company of Nuhn forage, where they will sell their products overseas and will cash in from all the products sold. Another benefit to Canada would be a research portion on the product. By Nepalese farmers using this product, it would allow for Nuhn Forage to experiment how their product works in different climates around the world. This would allow the product to expand internationally, and be used by farmers across the globe to boost hay production and quality. Along with this, not only would the Nuhn Forage company be able to see where



<http://www.nationsencyclopedia.com/economies/Asia-and-the-Pacific/Nepal-AGRICULTURE.html>

their product works in different climates, but it would also allow them to see where it didn't work. This would lead to the company being able to alter their product to work efficiently in different climates, expanding productivity and allowing crops to thrive globally. Also, not only would this research what climates it works best on, but also what soil types and hay breeds the product thrives with, again allowing the company to produce products to work anywhere they would like to deal with.

Part II: Export Potential to Nepal

About Nepal

Nepal is a landlocked nation in South Asia between India and China. This country is on the base of the Himalayas, which is the tallest mountain in the world, Mount Everest. Nepal is made up of three different regions, the Plains, the Mid-hills, and the Mountain region. Nepal's farmable land is only about 17% and only 15% is pasteurized (Trade, 2016). This is a problem because agriculture is involved in over 80% of Nepal's population, which constitutes about 41% of their GDP (Nations, 2016). Nepal has a large population comparing to their land size. They have about 31 million people in a country that is only 147 181 squared kilometers, which would have a population density of about 210 people per squared kilometer (Lintner, 2016). Comparing to Canada's population of about 36 million people and an area of 9 071 595 kilometers squared, which is a population density of about 4 people per squared kilometer.

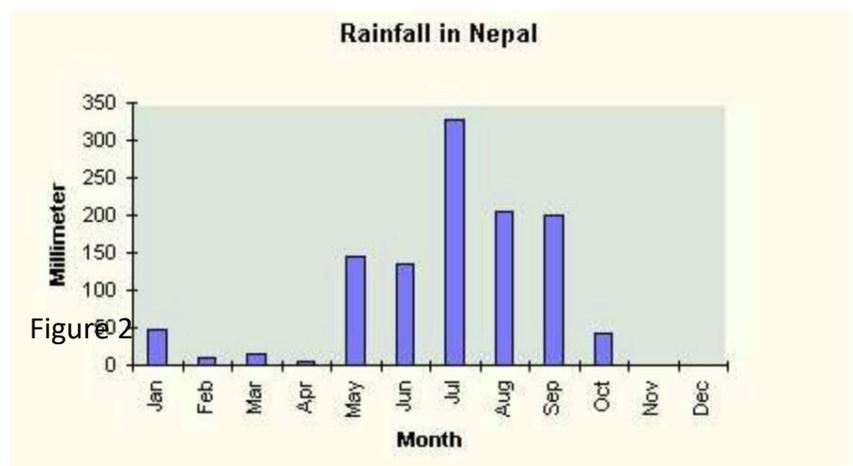
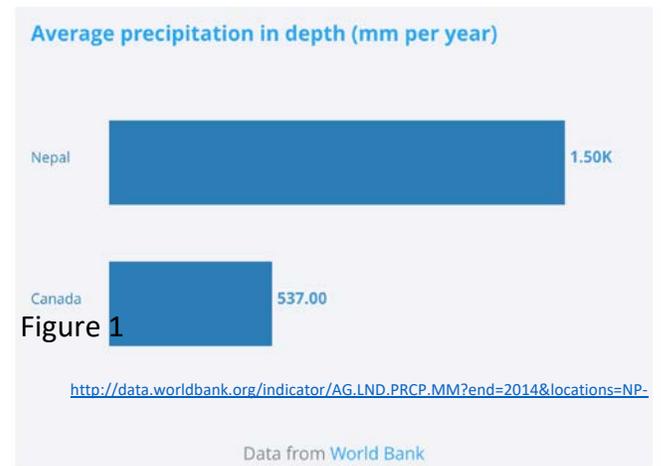
Benefits to the Importing Nation

One of the major downfalls of Nepal's agriculture system is that there is not enough land for them to produce enough crop for their country. Where livestock is the most important aspect of the Nepalese farming industry, and the most important cash resource for rural families in Nepal (Misri, 2016). The quantities on hay in Nepal every year are always insignificant, and is always rationed from year to year. With this rationing of food for the livestock, the animals are undernourished and do not have enough for full potential of growth.

The main benefits that will affect Nepal, would be how efficient the product is and how it adds great value to the crops. With this applicant, the amount of protein and energy that are added to the product are worth the price of The Juice alone. But, the problem for some farmers is

the hay becomes too wet to harvest and they must wait for it to dry to store it. To wait a few extra days just so the hay can dry is crucial and can decrease the value of the hay by a tremendous amount. According to studies, when hay is rained on before it can be stored, it can lose up to 30% of its nutrients and value (Canadian, 2009). Which 30% of hay's value can add up quickly, if you are looking at an average field in Nepal that produces approximately 10 tones of hay per hectare (4.05 ton per acre), in a 50-acre field that's a value loss of about the price of 60 tons of hay (Canadian, 2009). Depending on how much hay is sold for, the value of 60 tones can add up to about \$5000-6000, which can be a huge hit in Nepal. When it only cost about \$1000 to apply to a 50-acre field this could be a huge benefit.

Another huge benefit that would help Nepal out, is being able to get their hay inside and dry before it is rained on or the moisture collects. Nepal is in a very wet region compared to North America, where the use of this product would be very helpful when harvesting their hay. As you can see in figure 1, Nepal gets almost 3 times as much precipitation as Canada. During harvest season (May-October), Nepal experiences the most precipitation (figure 2). Due to this, it makes it very difficult for farmers in this region to efficiently harvest their hay and store it dry



because their harvest season is within the time of year that the country receives the most precipitation. Having this relationship, farmers have very few good quality hay harvesting days to produce hay that is of good quality, and is of course dry. Compared to Canada, our season where we receive the most rain is within the months of March to May, mostly due to warmer weather after a winter of continuous snowfall, where more precipitation occurs leading to more rainfall. On top of this, Canadas hay harvest season is closely related to Nepal’s, where we can harvest hay from May to October. This means that Canadian farmers can harvest hay for a total of 5 months of drier weather compared to Nepal, which can have an enormous impact on how much hay is harvested in both places, and more importantly, the quality of the hay. This again stresses how this product would dramatically boost the quality of the hay in Nepal, leading to an economic increase for the Nepalese farmers. With the addition of the increased protein and energy that The Juice adds, the quality also increases.

By filling in the chart (figure 3) we can see the savings that occur even if there is no nutrient damage to the crop.

Shipping and Handling Costs

The shipping of Nuhn Forages product, The Juice would take several steps to reach its goal of improving hay farmers in Nepal. First off, the product would be sent to Toronto airport by Fed Ex. It would cost \$72.50 per package to ship to Toronto from Stratford, which is equal to \$725. Next the product would be sent on a plane to Nepal’s

Increased Protein	+3.5 kg/mt
Increased Energy	+50.3 Mcal/mt
Total Added Value (\$/mt)*	\$6.93
Cost of Prime-Hay**	\$1.75
Prime-Hay Return (\$/mt)	\$5.18
Multiply by the number of tonnes of silage you make annually	X _____
Annual Savings with Prime-Hay	= \$ _____
** 0.5 kg Prime_hay/mt haylage @ \$3.50/kg	

Figure 3

http://www.canadianhayandsilage.com/?page=silage_inoculants2

capital city, Kathmandu. The estimated cargo shipping costs would be about \$7720 to send 10 containers of 200 kilograms.

Type	Qty	Dimensions	Weight
Other	10	60 x 60 x 104 cm	200 kg

AIR FREIGHT RATE	3.60 \$ CAD / KG ALL IN
ACTUAL WEIGHT	2000.00 KG
VOLUME WEIGHT	624.00 KG
CHARGEABLE WEIGHT	2000.00 KG
AIR FREIGHT	7200.00
TERMINAL & SCREENING FEE	445.00
PROCESSING FEE	75.00
SURCHARGES	0.00
PICKUP CHARGES	0.00
TOTAL:	7720.00 \$ CAD

<http://www.a1freightforwarding.com/quote/booking.php?quoteID=225349&CargoType=Commercial%20cargo>

Once the product has made it to Nepal, it would then be shipped to many different types of machinery companies, such as Agro Engineering Works (P) Ltd., Nepal, Baba Krishi Aaujar Udhog, Nepal, Nepal Yantra Shala Energy, Nepal and many more. These companies are all machinery based companies which would supply the product and the applicators. These 10 barrels of The Juice, would supply about 441 pounds of hay. This is equivalent to about 110 acres of hay, which could support up to 45 farmers in Nepal. If there would be rain damage to every hay crop in Nepal (unrealistic), and they lost a total of 30% of their nutrient value, then the total loss of production in Nepal would equal up to 330 acres of hay. To put this into perspective, 330 acres of hay in Nepal is equivalent to about \$80 000 worth of value. Although it is not realistic for all the hay to lose nutrient value, it is a good example to see that the possible

potential for this product and how much effect it can have. Considering Nepal having a high amount of precipitation, it is possible that they would have a problem of nutrient loss more than other nations. Also, not to forget the potential chance of the hay bales catching on fire when they are compacted with moisture, this additive prevents a possible tragedy. Hay bales over time will decompose if they are not treated properly, and if they have moisture inside of the bale, they will combust and eventually catch flame.

Considering it is difficult to tell how much exactly how much this product would save over a year, an estimate is necessary. The average hay nutrient loss in Canada is about 5%, where Canada has upgraded equipment and correct techniques in storing hay. Bearing in mind Nepal is a relatively wet region, a fair average would be approximately 8% Nepal's nutrients in hay are lost over the time it is harvested and stored. In an average hay farm in Nepal that is about 2.37 acres, a loss of 8% of a farms nutrient value would have a huge effect against the farmers. They would lose about 0.8 of a ton of hay, which would be equal to about \$800 in value. It would cost the farmer approximately \$30 an acre to apply, therefore they would only spend about \$71 to save a potential \$800. Adding the costs of the shipping and the costs of applying the product are some barriers and would be difficult to find the exact cost. With an average of 45 farmers using this product at about \$8500 to ship it over, they would only need to pay about \$190 on shipping. Adding this together, it would cost about \$260 to pay for their whole farm to be protected. Without the cost of applying the product, which in the big picture is a one-time purchase and could be paid off quickly.

Other competitors/ Is this Product Reasonable?

As of right now, there are not a lot of tractors and balers that would harvest the crop. Therefore, hay preservatives are not common and research on whether they have been introduced could not be found. This being said, there is no real competition in Nepal for hay preservatives which is excellent for Nuhn Forages product The Juice, where if it could find its way to Nepal and if applied properly, the benefits would be outstanding. If Nepalese farmers were to purchase Nuhn Forages product right now, it would not have much use to them. Where the product costs and shipping are extremely high for this undeveloped nation. To make this product more reasonable, they should allow the Nepalese people to produce their own product of The Juice, where it would save them the time and the costs it would take to ship the product over to the farmers. As of right now, the technology is not there.

In conclusion, this paper has presented the idea of hay preservatives from Nuhn Forage, called The Juice. Included is a thorough explanation of how this potential product would benefit the exporting nation comparing to how it would benefit Nepal or other receiving nations. With the trade of this product, more research could be done to improve the yields of the people in developing countries. With trade between Canada and Nepal, the possibilities of sustainable agriculture to rise above world hunger and poverty are greater than previous years with no trade at all. This product will have an extremely positive impact on Nepalese farmers and the nation but also to Canada in many ways. New products like The Juice are being created every year to increase agriculture around the world and to boost the way of life for international people outside of the first world. Countries such as Nepal are lucky to have such great support from countries like Canada, and this support will continue until the maximum level agriculture, including hay is sustained.

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