

Export Idea: Lime based bedding for cattle

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PART 1: PRODUCT INFORMATION

Significance of Bedding

Dairy as well as beef farmers that use barns to sheltering their animals have had constant struggle with choosing correct bedding that will keeps their cows as healthy and happy as physically possible, but it has to be affordable (Teigen & Moser 2009). Using improper bedding or the mismanagement of bedding can lead to leg lesions, decreased cattle hygiene, increased bacterial counts/ Somatic cell count, and have a negative impact on the cow's overall performance (Fulwider et al. 2007). With the precise choice in bedding for the environment and

accessibility it is possible increase these potential flaws that other beddings have while staying on a budget.

Lime Based Bedding for Cattle

The anaerobic based bedding mixed with the dolomitic hydrated lime Type S will create a clean, healthy, and safe environment for the cattle to lay and rest. If this product is managed correctly it will reduce the amount of lameness, reduce SCC as well as it will increase total production from the cattle industry.

Adding limestone to anaerobic bedding increases the pH which creates an environment that cannot sustain bacterial growth (Russell et al. 2002). For the most effective results 2 pounds of lime is added to the back 1/3 of the stall ever 24 hours if not added continuously, after the 24-hour period the pH will have returned to it’s original state and after 48 hours the bacteria levels become comparable to what they were before the additive (Russell et al. 2002). Limestone is primarily inorganic and lacks the carbon and nitrogen bacteria need for growth in organic material, therefore the limestone acts like an alkaline conditioner that doesn’t allow the growth of bacteria (Clanton et la. 2005), the limestone also decreases gram-negative bacterial and streptococci growth which causes about 50% of mastitis cases (Rahman et al. 2010). The importance of using limestone with anaerobic bedding is that tests showed that only hydrated lime significantly reduced the bacterial counts in anaerobic bedding (Russell et al. 2002)

	Production cost \$	Sipping costs \$	Total \$
Anaerobic Bedding (CND)	2.63 \$ per stall or 11.54\$ a tone	3400\$ for 5 metric tones	3457.7\$ per 5 metric tons
Limestone additive (CND)	22\$/50-pound bag	680\$ for 1 metric shipped	1560\$ peer 1 metric ton

	880\$ 1 metric ton skid		
Lime based Bedding for 5 metric tons of anaerobic bedding and 1 ton of dehydrated lime	991.54\$ \$	4080%	5017.7\$

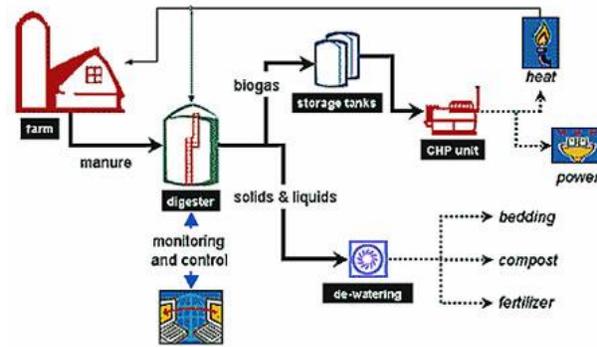
Anaerobic Digestion

Anaerobic digestion is a process where organic materials is broken down by micro-organism, this process is all done with the absence of oxygen (Debruyne & Hilbrun 2016). This process produces biogas (which is a mixture of methane and carbon dioxide), when animal by-product is used to feed the digesters, a by-product of this is digestate (anaerobic bedding). As more anaerobic digesters are created

using animal bioproduct to feed them there becomes the potential to have anaerobic bedding marketed on a larger and more affordable scale to the current consumer (Debruyne & Hilbrun 2016). With approximately 728 KT being produced a year in Canada (Maple Reinders 2013), and with an estimate that this product could become marketable after an increase of production of digestate. Currently many more digesters are in development, therefore there becomes an opening to export this product cheaply before it hits the Canadian markets.

Canadas highest producing anaerobic digester for producing solid digestate is located just outside of Toronto and handles about 83,000 tons of separated organic solids annually, out of this 83000 tons about 30% is made into digestate which is sold for fertilizer (Gorrie 2015)

Anaerobic Digester Facility



<http://completemixdigester.com/ad-facility.jpg>

Anaerobic bedding benefits

Anaerobic bedding was the best chose for bedding for exporting to Nepal due to its extremely low price of production as well as it's organic properties, sense it is treated manure it has very high nutrient values making it also benefit to Nepal's cattle industry as well as having the potential of helping crop production after its been used.

Anaerobic bedding is a soft clean alternative to the current sand, sawdust and straw pack currently being used in Nepal. If a cow is in comfortable stall or laying area it will spend 60% of their day laying and resting, the benefit to this is this time is then lead to the cow producing milk as well as fighting off any potential illnesses it may have,

Anaerobic bedding is also surpassed the conventional bedding in major categories such as cow comfort, leg lesions, expenses, cow hygiene. But the bedding lacks in is bacterial count, this is due to the anaerobic bedding being so nutrient rich it creates a bacterial problem.

Cow Comfort- is gauged by a cow's behaviour and diseases. Cows with low comfort more prone to lameness, neck injury's, mastitis, milk fever, ketosis, and worse overall performance (Anderson 2001).

Leg lesions- is directly related to somatic cell count, deaths, lameness, and culling rates (Fulwider et al. 2007).

Cow Hygiene- The importance of cow hygiene is that it has been observed that the cleaner and increased hygiene of a cow also lowers the average somatic cell count (Warld et al. 2002).

Expenses-The cost associated with the bedding is increased but, with the decreased costs from of leg injury's, mastitis incidents and increased production from the extra cow comfort (Fulwider et al. 2007), make it a more affordable product.

Exporting

The company involved in producing the anaerobic bedding is Disco Road Organics Processing Facility in Toronto they are currently Canada's largest producer of anaerobic bedding. The cost to produce one ton of anaerobic bedding is about 11.7 \$ per ton (Ket et al. 1976).

For this product to be exported to Nepal it would have to be transported by ship from Toronto to Nepal, the bedding would be shipped to Delhi, India then driven by truck to Nepal, this process would cost roughly 4500\$ CND to ship 5 tones of this product (NVOCC 2016)

In order to correctly store this product it will be within a dry sheltered area, if the area is not dry the bedding could become contaminated therefore defeating the need for this product.

Dolomitic Hydrated Lime Type S Additive



GRAYMONT

<http://www.graymont.com/en>

Limestone is a naturally occurring mineral which has huge deposits all over the world. For this product to be useful in the conditions that is needed it must be refined into the dolomitic hydrated lime type s. The Canadian company GrayMont does the mining and refining needed for this product. GrayMont is a global leader for the supply of limestone and limestone related products (Graymont limited 2016). This company has recently made some markets in the Asian-Pacific regions (Graymont limited 2016), this would make the product significantly cheaper in production and distribution, making it more affordable for the Nepalese people but it would then become indirectly beneficial to Canada sense only the Canadian compony that owns GrayMont would be making any profits.



<https://en.wikipedia.org/wiki/Asia-Pacific#/media/File:Asia-Pacific.png>

Exporting

The company that would be responsible for producing the dolomitic hydrated limestone type s is currently is GrayMont who is currently exporting their limestone into Pacific-Asia, but they do not go into Nepal meaning that trucking would need to be involved to get the lime to the distribution site.

The Dolomitic hydrated lime type s would have to be stored inside in a dry environment, this could anywhere from a shed to a shipping crate, but the lime must be kept dry. If the limestone comes into contact with high amounts of moisture it undergoes the same reaction as it would on the cows laying area making it an ineffective product within 24 hours.

How Exporting will benefit Canada

Canada is currently pushing into be a greener country from renewable resources, and have recently invested huge amounts of money into anaerobic digesters for their production of biogas as well as the electricity that the digester produces (Lane 2012). There is current grants from the provincial and federal government up to 70% (Lane 2012), as more if these digesters are built it will create an increased amount of anaerobic bedding produced which will decrease the current cost of 11.47 \$ per ton

As well sense these digesters are mainly on farms it gives farmers a source of income to help increase their growth Currently the Canadian government has grants out as well as fixed prices in order to encourage the development of new anaerobic digesters, many of these are being put up at dairy and swine barns. There are grants that are willing to pay up to 60% of the is paying 0.145\$/Kwh which is about 20% lower then what the Canadian public is paying

Part 2: Exporting to Nepal

How Importing Will help Nepal

Currently in Nepal mastitis is the most common diseases for adult lactating cows with an estimated 68.3% of cows having a Somatic cell infection (Khanal & Pandit 2013). With 99% (Blomquistk 2015) of mastitis being from environmental bacteria. It costs roughly 144\$ (CND) or per clinical case of mastitis, roughly 70% of that cost is coming from the drop in-milk production, while over 20% is coming from the treats and from veterinarian expenses (Khanal & Pandit 2013).

Beef cattle

The consumption of beef is prohibited in Nepal but the Nepalese still rely on their cattle as an energy source, currently there are about 7 million cattle in Nepal and those that are not lactating are used as an energy source for Nepal, with most of there lost energy coming from working of cattle, if their cattle become sick or injured the Nepalese instantly start to lose money, sense they have to pay for antibiotics as well as the animal temporarily becomes unable to work the land, this causes a decrease in the amount of field work able to be done leading to the potential loss in yields.

If a beef cow becomes infected with mastitis in effects their conception rate, and can reduce the weight of the animal by up to 12.5 % (Blomquistk 2015), after a heard has mastitis it makes it more difficult to mange sense it can then easily be transported from cow to cow via flies.

Environmental mastitis cases in the Nepalese beef industry will continue to have a lasting negative economically consequent until this prevent disease is correct managed. With 99% of mastitis cases in beef cattle being caused by environmental mastitis (Blomquistk 2015)

Dairy cattle

From 2014-2015 dairy cows produce just over 300,000 tons of milk per year (Sharma & Banskota n.d) of this milk it leads to about 8% of the AGDP for Nepal (Khanal & Pandit 2013).

This production leads to an average of about 48 l per person per year in Nepal (Sharma &

Banskota n.d). Currently the Nepalese population is growing at a rate of 2.9% and milk productions at 2.4% (Pradhan 2005), this gap is expected to continue to increase until some radical measures are put in place to increase production.

Dairy production results in 12 million MT of milk per year (Hayashi 2005) and with approximately 10% of the



[1http://www.adsa.org/portals/0/SiteContent/docs/GSD/Nepal%204.jpg](http://www.adsa.org/portals/0/SiteContent/docs/GSD/Nepal%204.jpg)

value of milk being lost from low productions due to diseases and illnesses (Khanal & Pandit 2013). If the lime based bedding is implemented it could result in a decrease in bacterial related diseases such mastitis, lameness and reduce the amount of injuries a cow gets

With the average farmer only owning between 3-4 lactating cows (Sharma & Banskota n.d) their isn't much room for production increase but there is the possibly to reduce the amount that the famer is going to spend on vet bills do to the animal being in contact with less diseases this product is affordable at low costs if a community of farmers come together and buy this product in bulk and share as needed.

Distribution in Nepal

For this product to become a affordable the anaerobic bedding for the Nepalese their would have to become a distributor of the bedding, potential town or a group of large farmers could afford to share this product, then sell off small amount to those who cannot afforded to purchase in bulk. The dehydrated lime can be purchased per bag, if these bags are stored in a dry area they will not go bad making it an affordable product.

Environmental impact

After the lime based bedding has been used in the cattle industry and cleaned out it could be spread out on fields as a high nutrient fertilizer as well as adding nutrients sense the product is basically deracialized manure which us then absorbed in the soils as nutrients. Currently limestone is used in controlling the pH in fields when the soil becomes to acidic. Many factors effect soil acidity such as salt content and carboned dioxide (Thomas 1996)

Why this product will not work

Competition

Anaerobic bedding is a very useful and effective product to be used in the cattle industry but the main problem for is how expensive it is to ship due to the need of large quantities of needed to be effective. With the increased price from shipping it would be more beneficial to use an alternate type of bedding such as sand or straw pack

Using dolomitic hydrated lime is probably the most effective way to decrease the amount of bacteria in cow stalls but the problem is that between fairly high costs of production and costs of exportation the Nepalese could just use crushed limestone and a less effective results at a fraction of the price.

Still Unknown

Anaerobic digester plants are currently in a uprising because of the push for renewable resources with this the production of digestate solids will also increase which should decrease the price of purchasing and should create new distributors. This may cause the price to decrease as well as a better product to be produced.

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