

**The Jaylor A50 Total Mixed Ration Mini Mixer Targeted
for Bilateral Trade with Nepalese Dairy Farmers**

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Product Description:

When it comes to milk production, total mixed ration (or TMR) feed is considered the most significant factor for increasing yield in the past 10 years (Jaylor, 2014). TMR allows animal feeds to be mixed consistently, by discouraging the grouping/clumping of different types of feed, so that it is consumed by animals (mainly dairy and beef cattle) at a balanced ratio. In order to produce TMR feed, a TMR feed mixer is required. Specifically for this project, the “Jaylor A50 Self-Propelled Mini Mixer” was chosen because of its many potential benefits to livestock and dairy farmers around the world – including those in Nepal. The Mini Mixer is a niche product, with a target market of Nepalese dairy farmers. With this type of bilateral trade, whether it is the exporting country of Canada, or the importing country of Nepal, there are many promising advantages to consider for both nations.

Figure 1. The Jaylor A50 Total Mixer Ration Mini Mixer (below) is an effective piece of feeding machinery which boasts many features that make it suitable for use on dairy farms (Jaylor, 2014).



Image Retrieved from: <http://farmfutures.com/story-28-new-farm-products-waiting-28-94391>

This 1300lb feed mixer features a small 50ft³ polyethylene drum with a galvanized steel frame (see figure 1). Its freestanding, vertical auger can easily mix together different forages, grains, and other supplements for TMR feed by spinning at 39-41 revolutions per minute. Its three-wheeled, hydrostatic, all-wheel drive system is easily manipulatable, allowing the mixer to move around tight corners. Furthermore, the Mini Mixer has a highly operational manual door so that feed may exit smoothly from the mixer into the desired feeding area. Additionally, a DG STAD 02 Digital Scale is attached, allowing ease of the correct weight of feed to be monitored and added to each batch of feed, specific to the number of cows that are to be fed (Jaylor, 2014).

Similarly, there are other Canadian companies that manufacture and distribute feed equipment internationally. One such product is the 210VS Vertical Single Screw Stationary Mixer

Figure 2. Comparison of the various features and dimensions of the Jaylor Self-Propelled Mini Mixer, and the Luck//Now 210 Vertical Screw Mixer, which are similar feed equipment manufactured in Canada.

Company Brand (Location)	<u>Jaylor (Orton, Ontario)</u> [†]	<u>Luck//Now (Lucknow, ON)</u> [‡]
Product Model	A50 Self-Propelled Mini-Mixer	210 Vertical Screw Mixer
Mixing Capacity (ft ³)	50	210
Auger System	vertical single screw	vertical single screw
Weight	1300lbs	5150lbs
Height	1.75m	2.24m
Width	1.17m	2.03m
Length	2.39m	3.00m
Knives	13 flat + 1 angling	6
Drum Thickness	10.9mm	6.35mm
Drum Material	Polyethylene	Steel
Door Width	45.7cm	61.0cm
Door Height	55.9cm	-
Standard Tires	16x6.50-8 4PR (3)	-
Frame	Galvanized Steel	-
Standard Engine/Motor	16 Horse Power Varguard	-
Starting System	Electric	Electric
Other Details	Self-Propelled	Stationary
Price	\$11,300 CDN	\$45,295 CDN

[†] column info retrieved from <http://www.jaylor.com/english/mixers/a50.htm>

[‡] column info retrieved from http://www.lucknowproducts.com/sites/default/files/single2015_0.pdf

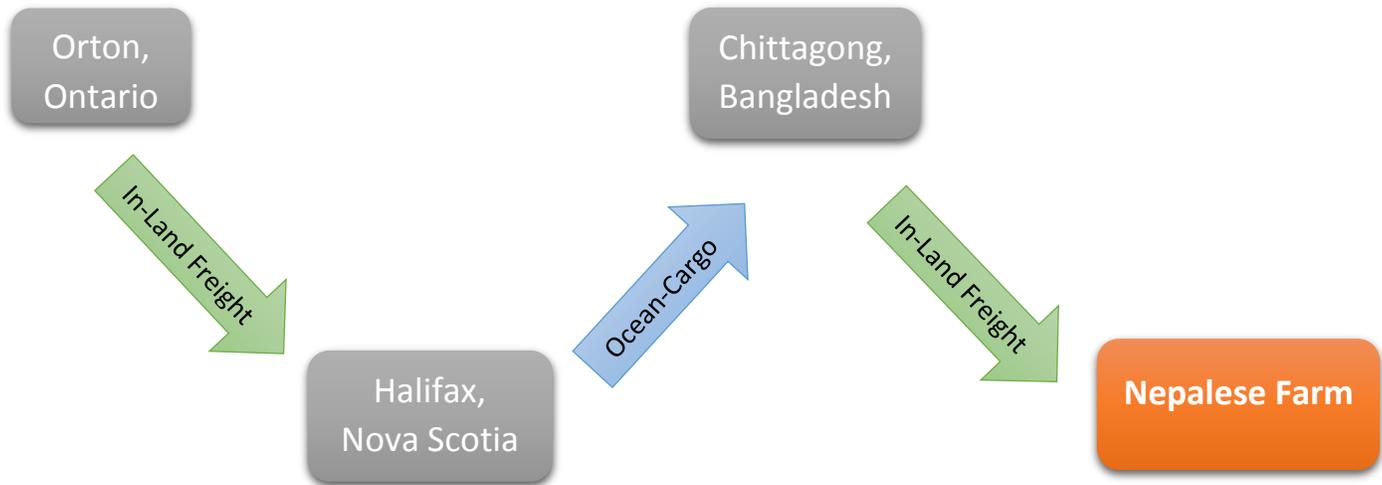
which is manufactured by Helm Welding Limited (Luck//now, 2014). Ultimately, this product performs the same technique to produce a TMR feed, however, it is a much larger machine, that does not have a self-propelling mechanism, that costs over four times as much - not including freight to Nepal (see figure 2) (Luck//now, 2014).

The average herd size in Nepal is just 4 lactating cattle and/or buffalo per farm (Sharma et al., n.d.). Not only may this product cost more to ship to Nepal (due to its larger weight and size), it also does not seem as beneficial to the relatively small dairy farms in Nepal since the 210VS mixer is rather large for the required amounts of feed for Nepalese herds. Contrarily, the Jaylor A50 Mini-Mixer is specifically designed for small herd and group sizes, such as those in Nepal (Jaylor, 2014).

Benefits to Canada:

Jaylor is a successful corporation based out of Orton, Ontario, which manufactures and distributes feed equipment throughout North America and 42 countries world-wide (Jaylor, 2014). Having its production and dealership facilities in Ontario, this relatively large corporation is a direct employer of about 60 Canadians, whether it be through production, sales, customer service, accounting, advertisement, or nutrition services. Jaylor sources the steel used to produce their equipment from Nucor, the largest steel producer in the United States (Tamminga, pers. Comm., 2014). Unfortunately, expansions and development of Nucor may not necessarily result in any benefit to Canada. However, if there was increased sales of this type of product to a market of Nepalese dairy farmers, this may result in more Canadian jobs, not only for corporations such as Jaylor, but also for transportation companies that deliver the product by freight and/or cargo overseas to Bangladesh (see figure 3). A1 Freight Forwarding, which is headquartered in Toronto, Ontario is one such company that ships directly from Halifax, Nova Scotia to Bangladesh (FF, 2014).

Figure 3. The possible route that the Mini -Mixer could take from production in Orton, Ontario to the target market, a Nepalese farm (FF, 2014).



In 2011, the gross domestic product of Canada was \$1.7 trillion, while Canada's imports and exports of goods and services was approximately \$1.1 trillion or 63.3% of the economical trade share (FATDC, 2012). This translates to \$3 billion every day, or about \$31,600 for every person in Canada every year. Trade in such substantial quantities improves the quality of life in Canada more than just by creating jobs though. It means that larger companies can be made, with greater efficiencies, which converts into lower prices for international consumers and consumers here in Canada as well. Growing companies as a result of greater international trade have broader client bases, allowing them to be more stable and reliable employers when softer market conditions arise. Higher wages may also be paid by more successful businesses. In particular, larger, more efficient, and more profitable companies, support governments as they may receive greater funding through taxation. Increased tax funding may allow Canada to further develop healthcare, education, infrastructure, etc. thus improving the quality of life of the Canadian public (FATDC, 2012).

Moreover, with increased trade between Nations, trading relationships between Canada and Nepal may consequently strengthen, allowing greater trade between the countries and likely greater benefits to both national economies in the future. From 2008-2013, bilateral trade between Canada and Nepal ranged from \$15 million CDN to \$23 million CDN per year (GOC, 2013). Canadian exports to Nepal totaled \$7.1 million while Canadian imports from Nepal totaled \$11 million from 2012-2013 (GOC, 2013). Clearly, Canada is importing more than it is exporting to Nepal in terms of dollar amount. Exporting products such as the Mini Mixer may prove beneficial in order to bridge this gap.

Consequences to Canada:

While this may be true, there are some outstanding consequences of increased shipping to Nepal or other locations around the world. For instance, some environmental impacts from freight transportation include air and water pollution, as well as exposure of diesel particulate matter and noise to nearby community and marine life (Matsuoka et al., 2011). This can lead to sleep difficulty, anxiety, cardiovascular, respiratory, and other health problems, for people living near ports, but also workers for freight companies. Therefore, increased trade between Nepal and Canada will likely have negative effects on the health of both Nepalese and Canadians, not to mention the environmental costs due to potential contamination from hazardous spills, and the contribution to global warming from carbon dioxide emissions and other pollutants. Without getting into too much detail, rising global temperatures, rising sea levels, and more sporadic weather are just a few of the many consequences of global warming. Ironically, these conditions directly affect transportation and freight, as they often depend on favourable weather conditions for successful delivery. Additionally, carrying heavy equipment on roads also means more money may need to be used toward repairing roads, among other infrastructural projects (Matsuoka et al., 2011).

Price and Contact Info:

The Mini-Mixer costs ~\$10,000 CDN, while shipping a container of 4 mixer units to Bangladesh and subsequent in-land freight to Nepal, would be ~\$4000 CDN and ~\$1200 CDN, respectively (Tamminga, pers. comm., 2014). This brings the total costs of manufacturing and delivery from Ontario to Nepal to ~\$45,200 for 4 units or ~\$11,300 CDN each (Tamminga, pers. comm., 2014).

Any questions or inquiries about the Jaylor A50 Self-Propelled Mini-Mixer can be directed to Ken Tamminga, marketing coordinator for Jaylor, through e-mail (ktamminga@jaylor.com), to Jaylor's sales department e-mail (sales@jaylor.com) or through phone at 1-519-787-9353 or 1-800-809-8224 (toll free). If interested in the Luck//now 210 Vertical Screw Mixer that was mentioned (see figure 2), their phone number is 519-529-7627 or 519-529-7000 and their email is inquiry@lucknowproducts.com.

About Nepal:

Lying between the Southern slopes of the Himalayan mountain range, the land-locked country of Nepal is situated (Pariyar, 1999). Currently, the leader of Nepal is president Ram Baran Yadav and the capital city is Kathmandu. The country borders India from the West, South and East, and the People's Republic of China from the North. A population of about 28 million people lives amongst a land area of 147,000km². Despite being a relatively small country, Nepal has varying altitudes and climates, which can be divided into three distinct topographic zones: the Terai plains, the mid-hills, and the mountains. In fact, 78% of the total land mass in Nepal is comprised of hills or mountains, leaving just 22% of the total land mass for flatter plains. In particular, the majority of agricultural activity occurs in the mid-hill region of Nepal (Pariyar, 1999).

When considering the entire country, agriculture provides employment opportunities for 66% of the total population while contributing to 39% of the GDP (DOA, 2014). Because of the major influence agriculture has on the GDP, the growth and development of the sector is vital for the national economy (DOA, 2014).

Nepal has a per capita GDP of just 694 USD and is considered a developing country (Sitaula, n.d.). 80% of Nepal's population resides in rural areas, 30% of the population lives under the poverty line, and still yet, 45% of the people cannot read or write. Physical facilities are lacking in these rural areas, as adequate infrastructure to these isolated and dispersed communities remains a significant challenge for the Government of Nepal (Sitaula, n.d.).

Target Market:

According to a study published in Thailand, the demand for milk in Nepal has risen and, in order to meet this demand, greater efficiencies are needed on the farm (Yoshiaki et al., 2013). For many successful and efficient dairy farms in Canada, TMR mixers are exploited and may contribute to the average production of 30 liters of milk per day (DFO, 2012). However, in Nepal, a daily average in Nepal of 2 litres or more is produced by only 2 million cattle, despite a grand total of 13 million cattle and buffalo (Nirmal, 2013). By marketing a TMR mixer such as the Jaylor A50 Self-Propelled Mini Mixer to Nepal, a TMR diet for dairy herds may be possible. Consequently, If TMR feed was made available to Nepalese dairy farmers, perhaps their milk production may also increase. This all sounds fine in theory, but there are many obstacles that must be overcome, not only in order for this product to reach Nepalese dairy farms, but for the product to be suitable once it is delivered.

Obstacles:

First of all, the average herd size in Nepal is about 4 cows and/or buffalo per farm (Sharma et al., n.d.). The average production of cattle and buffalo is about 6 litres per day, the price of milk is about 25 rupees per litre, and roughly 90 Nepalese rupees are the equivalent of \$1 CDN. Even if dairy farmers were paid in full for their milk, it would take the average Nepalese farmer 4.65 years to pay for a Jaylor TMR Mini Mixer (see figure 4). Moreover, this does not take into consideration that many farmers rely on their milk for their own consumption, that there are “milk holidays” where milk does not get picked up from the farm, or even that farmers have things to pay for other than a TMR mixer throughout the year such as other farm products, food, children’s schooling, etc. (Sharma et al., n.d.). Clearly, purchasing a TMR mixer may be a substantial amount of money for the average dairy farmer.

Figure 4. The average Nepalese dairy farmer would require 4.65 years of production to pay for a Jaylor A50 TMR mini mixer as the calculations show below.

Average # of cattle/buffalo	4	
Average Production per day	6 litres/day	6L/d x 4 animals = 24 litres/day
Average Price of Milk	25 rupees/L	25rupees/L x 24litres/day = 600 rupees/day
Conversion to \$CDN	\$1/90 rupees	\$1/90 rupees x 600rupees/day = \$6.67/day
Days to afford mixer	\$11,300/(\$6.67/day)	= 1,694 days
Years to afford mixer	1,694 days/ (365days/year)	= 4.65 years

Determined from info retrieved from: http://lib.icimod.org/record/21368/files/c_attachment_79_555.pdf

Despite this, because the mini mixer is self-propelled, perhaps it can be shared between groups of dairy farmers (or even other livestock owners), whereby splitting the cost of the mixer may be a more practical option. Additionally, this may be a more suitable product for Nepalese dairy farmers that have above average herd sizes of 20 or more cattle/buffalo. More milk produced in a day may result in more income that can be used for feeding equipment like the Mini Mixer. Either way, the potential increase in production may be worth the investment of a TMR mixer.

With respect to transporting the product to farmers or in order for farmers to share mixers, flat, well-maintained roads and farmland may allow ease of transporting the Mini Mixer. Considering that 78% of Nepal is covered in hills or mountains and that 43% of roads are earthen, transportation may prove rather difficult (Pariyar, 1999). Not only this, but the fact that many farmers may be illiterate, all the while sales representatives in Canada are unlikely to speak the language of the Nepalese farmers, simply communicating between parties may be challenging for sales, maintenance, etc.

Currently, the majority of Nepalese livestock are raised on pastureland, which accounts for about 12% of the country's total land (Pariyar, 1999). As a result of poor management, extremes in climate and constant grazing, these areas have been degraded substantially, and once productive grasslands are now wastelands. TMR feeds require the harvesting of forages such as grasses and corn, which may be difficult to grow in these areas, given the current circumstances. Plus, increased equipment and labour may be required in order to harvest feed sources and deliver it to livestock as opposed to allowing the animals to freely uptake their feed by roaming the pasturelands (Pariyar, 1999).

People who may be hurt by the sale of the Mini Mixer in Nepal may be the farm employees who would normally be hired to feed livestock, since there may be less work to do. Existing distributors in Asia who may already be selling farm machinery may find that they will have decreased sales and/or may have to lower the price of their products in order to be competitive.

Benefits to Nepalese Dairy Farmers:

First of all, the use of TMR feed has been shown to increase milk quality, yield, and animal health (Kolver et al., 1998). To illustrate, a study conducted in Pennsylvania, United States found that the performance of dairy cattle feeding on pasture varied greatly compared to when fed TMR.

The results show that when fed TMR feed, the cattle had increased dry matter (DM) intake (23.4 vs. 19.0 kg of DM), increased milk production (44.1 vs. 29.6kg/day), increased milk protein content (2.80% vs. 2.61%), live weight (597 vs. 562kg), and body condition score (2.5 vs. 2.0) (Kolver et al., 1998). Not to mention, TMR mixers greatly reduce feeding labour to achieve a mixed ration which may reduce labour costs of farm employees who would otherwise be working (Jaylor, 2014).

TMR feed is also effective at maintaining a constant pH level in the stomachs of cattle since the amounts and types of parts in the feed can be manipulated and sustained (Jaylor, 2014). Fluctuations in pH due to inconsistent feed may result in acute acidosis and laminitis (Beauchemin et al., n.d.). Acidosis inhibits feed intake, salivation, and the onset of rumination following meals, possibly causing anorexia, abdominal pain, rapid heart rate, abnormally fast breathing, lethargy, staggering, inactivity, diarrhea, and even death in cattle (Beauchemin et al., n.d.). Some studies show that fluctuations in pH may also cause lameness in cattle, characterized by inflammation of the connective tissue in the hoof, potentially causing deformed hoof shape, sole ulcers, and ridges on the hoof wall (see figure 5).

Figure 5. Fluctuations in pH of the stomach cause alterations of the blood composition which may result in inflammation to the laminae of the hoof, pain for the animal, and consequently a decline in milk production (Beauchemin et al., n.d.).

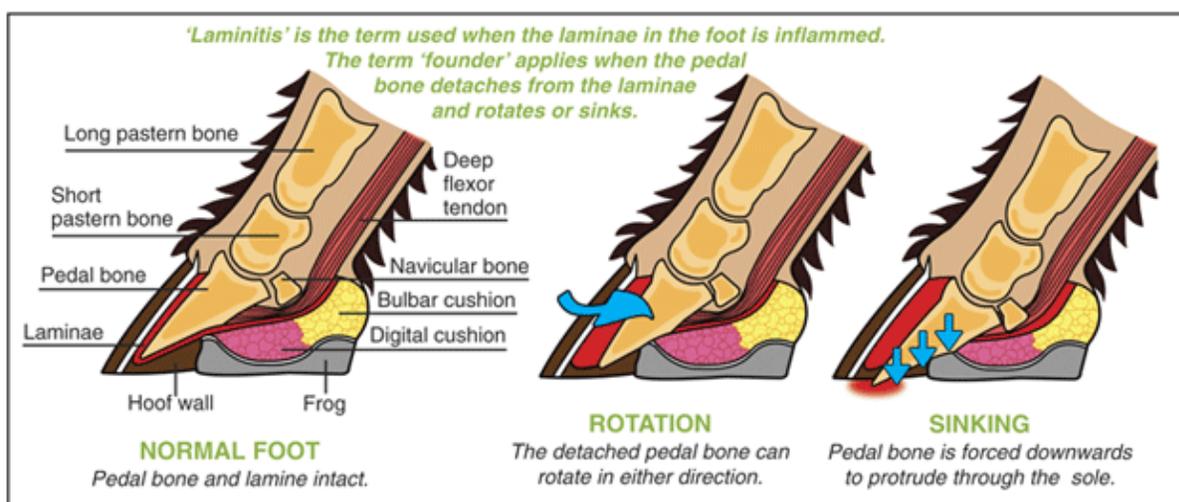


Photo Retrieved from: <http://www.horsewyse.com.au/founder.html>

If cattle develop acidosis or laminitis, they may have reduced mobility and reduced appetite, may not eat as much feed, and therefore may not produce as much milk. Treating an acidosis or laminitis patient – or even losing an animal – also costs dairy farmers. Hence, from both an animal welfare and economical standpoint, the TMR Mini Mixer is an effective piece of equipment to limit cases of laminitis and acidosis, by providing a feed that may allow for more stable pH levels in the ruminant stomach (Beauchemin et al., n.d.). Furthermore, increases in body weight and condition on animals is an indication of greater amounts of carcass weight, which may translate into more income for farmers if they sell their animals for meat (Kolver et al., 1998).

Ultimately, by being able to earn more money, farmers may be able to expand their business by purchasing more farmland, cows, etc. Meanwhile, the farmers may be able support themselves and their family by affording food, education, and other possessions which attribute to a greater quality of life.

Other Benefits to Nepal:

Besides directly benefitting dairy farmers, the sale of TMR mini mixers may increase business for freight companies in Nepal as they transport the product to the farmers. The Mini Mixer operates on gasoline, and so through use of the machine, it will benefit gas companies such as the Nepal Oil Corporation who employ around 600 employees throughout the country (NOC, 2014). Repairs and other trade services on farm equipment such as the Mini Mixer may open business opportunities for mechanics and sales companies. Consequently, more successful businesses may earn greater taxation for the Government of Nepal, benefitting the country through funding for infrastructure, education, healthcare, social programs, etc.

Furthermore, a higher efficiency and production of raw milk may allow milk prices to fall for Nepalese consumers which may also give milk processors a greater chance at being successful

in producing and selling products, such as butter, yoghurt, and cheese. The per capita consumption of energy, protein, and fats from livestock products in Nepal is very low at just 159 cal/day, 25.3g/day, and 2.7g/day respectively (Pariyar, 1999). Through better milk and carcass quality of dairy and other livestock animals, Nepalese people may have greater availability to more nutritious foods (Kolver et al., 1998). As a result, less poverty may be experienced throughout the country.

Universities and other research facilities may be able to make use of the TMR Mini Mixer as well. The product will allow consistent feed for livestock who must have a controlled diet throughout the process of certain studies. In conducting successful and insightful experiments of their own, the Nepalese may be able to use new information to continue to improve agricultural practices, not only in dairy farming, but other livestock commodities as well. Evidently, there are an abundance of potential benefits that the Mini Mixer may have to offer for Nepal.

Similar Products Manufactured in Asia:

Likewise in Asia, there are many companies who manufacture and distribute livestock feeding equipment. Many of these products originate from China which may be shipped from the Qingdao port in China, to Bangladesh (Alibaba, 2014). Three such company brands are Tianhui, Raphael, and Jade Cattle. Upon further research there were no other TMR mixers with a capacity under 2m³ and so, it is difficult to compare these products since they are all larger feeding systems than the Mini Mixer, all with capacities of 3m³ or above, as opposed to just 1.4m³ for the Mini Mixer. The sizes and prices are listed with other details (see figure 6) (Alibaba, 2014). One note is that the prices of these products do not contain the price for actual shipping to Bangladesh or inland freight to Nepal. Still, many of the products found were either stationary or had to be pulled by a tractor or similar equipment, whereas the Jaylor Mini Mixer is self-propelled.

Figure 6. Comparison of speculations of several TMR mixers manufactured in China.

Brand (location)	Tianhui (Shandong, China) ^a	Raphael (Henan, China) ^b	Jade Cattle (Shangdong, China) ^c
Model	TH-320	RL-TMR5	9JSG-5
Price	US \$10,280 – 12,300	US \$15,000-\$25,000	US \$7,800-\$18,700
Port	Qingdao, China	-	-
Capacity	3m ³	5m ³	5m ³
weight	860kg	3000kg	-
voltage	110v	-	220v
Details	Self-Propelled	stationary or pulled	stationary
Revolutions/min	-	18	-

a – column info retrieved from: http://www.alibaba.com/product-detail/3m3-TMR-cattle-feed-mixer_60067967932.html

b – column info retrieved from: http://www.alibaba.com/product-detail/TMR-poultry-feed-mixer-grinder_1749462783.html

c – column info retrieved from: http://www.alibaba.com/product-detail/horizontal-TMR-mixer-higher-efficiency-for_1549944686.html

In order to export out of Canada, the Mini Mixer would require a bill of lading, a commercial invoice, and a packing list (YRC, 2014). Other documentation that may be required is a NAFTA Certificate of Origin and/or a Transportation and Exportation (T&E) Customs Bond (YRC, 2014). Documentation that is required to export out of China was not found. Whether the product comes from North America or Nepal, the equipment may be challenging to sell directly to Nepalese dairy farmers. Instead, to market and sell this product, Jaylor could possibly sell to established equipment dealers in Nepal like Ugurtar, Baltz Equipment or Bharat Agro Equipment, among others (AED, n.d.) After all, because of its small size, the Mini Mixer makes a unique product for Nepalese dairy farmers with competitive pricing when compared to products manufactured in other parts of the world, such as China.

Recommendations:

To manufacturers and/or distributors of feeding equipment, it may be useful to communicate with trade officials and/or translators in other countries – like Nepal – to ease the process of foreign trade due to language gaps and technicalities. Similarly, it may also prove

beneficial to establish a dealership in another country where products can be shipped, stored, and displayed for potential buyers in other countries. This may improve sales since enquirers may have the opportunity to see first-hand what the machinery can do or even through demos of the equipment before actually purchasing them. Particularly, mechanics, feed specialists, and sales representatives may be hired out of this office/dealership where they may visit farms in order to repair equipment, offer animal nutrition advice, or to advertise their product. For Jaylor, if the Mini Mixer turns out to be a successful product, exporting other company products may be a possibility to expand business as well.

In addition, the Nepalese may consider improved education to livestock producers, so as to improve the quality and production of their soils to support the growth of forages like grass and corn. Secondly, farmers may purchase forage seed and plant it in their fields so that they may produce a feed source for their cattle. Without these forages, a TMR feed mixer is essentially useless. Thirdly, trade individuals may travel to rural areas and ask dairy farmers what types of products may improve their feeding systems, and how much they may be willing to spend on such equipment. This may assist equipment dealers to develop appropriate equipment specific to the agriculture systems of Nepal.

Unknowns and Future Studies:

A few unknowns for this export idea include the cost of import/export duties of a product such as the Jaylor Mini Mixer, the availability of gasoline as a fuel source, and if a system broke down in Nepal, the cost to repair and personnel who may fix it. Further research may help determine these unknowns.

Studying the effects that TMR mixers may have for the buffalo and cross breeds of cattle in Nepal may be different than the results obtained from the Holstein cattle in North America.

Particularly, the types of feed that yield the highest production should be tested, since the Nepalese buffalo may have adapted better to different plant species in Nepal than the typical corn or alfalfa diet in North America. Consequently, TMR mixers may be altered according to the types of feed that are to be mixed together. For instance, the number of knives, the angle of the knives, the spinning mechanism, and the revolutions per minute may all be considered in developing the most suitable TMR mixer for Nepalese dairy farmers.

Ultimately, it requires an ambitious and perseverant group of people, along with some funding, in order to strive towards the success of a project such as this. The Jaylor A50 Self-Propelled Mini Mixer is an impressive, new piece of feeding machinery which may have the potential to change people's lives not only in North America, but in countries such as Nepal and beyond.

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