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Bolivia: A Solution to Improve the Bolivian Dairy Industry

Bolivia is known for having some of the most magnificent places on earth from the Salar de Uyuni Salt Flats to the Andes Mountains. Tourists from all around the world travel to these beautiful destinations. Bolivia is not merely salt flats and mountains, although one-third of Bolivia's land borders the Andes Mountains. (Omondi, Sharon) "Bolivia has three distinct regions, Amazonian Lowlands (Yungas Valley), The Altiplano (Highlands), and The Llanos (Tropical Lowlands)" (Omondi, Sharon). Despite having varying topography, the county has two distinct seasons, the dry season (winter) and the rainy season (summer).

Previously, in Bolivia, there was much political unrest as a result of the October 2019 elections. From 2006-2019, Juan Evo Morales Ayma was the president of Bolivia. Morales' party was The Movement for Socialism. This party favored more radical reforms to capitalism. During the thirteen years Morales was in office; he presided during an economic boom, improved poverty rates, and social equality. This earned Morales high approval ratings. When the time came for the October 2019 elections, Morales and his right-wing opponent practically had a tie so a recount was called. Morales claimed that he won, but protestors came to the streets claiming he cheated. As a result of this unrest in the county, Morales was forced to flee. Jeanine Áñez Chávez, previously a Bolivian Senator (2014-2019), assumed the role of interim President of Bolivia in November of 2019 until elections were held in October of 2020 (Crabtree).

Currently, in Bolivia, Luis Arce is the President. Arce is a member of the Movement for Socialism political party. He assumed the position of President on November 8, 2020. Arce led the country's economy for over a decade under Evo Morales as the Minister of Finance. Arguably, many supporters of Arce hope he can provide Bolivia with another "miracle". In the 2000s, he was able to lift many out of poverty in one of South America's most impoverished nations (Reuters Editorial). During his time as Minister of Finance, he pushed for the nationalization of many sectors, in turn causing a commodities boom. This then "steered Bolivia to an average annual growth rate of 4.6%, which was one of the best in Latin America" (Reuters Editorial).

Just because Bolivians are hoping for a promising future with Arce as President does not mean they will have one just yet. Bolivia, like all countries, has been affected by the COVID-19 pandemic, in one way or another. Bolivia is one of the poorest countries in Latin America, and as a result, their health care systems are weak and many disparities are present. "Inequality, informality, and overlapping health disparities and pre-existing conditions of specific groups are systemic and persistent issues that amplified the impact of the pandemic and explain outcomes observed across the country" (Hummel et al.). At this point in time, during the COVID-19 pandemic, many vulnerable populations are experiencing more struggles than the wealthier populations. One vulnerable population would be those agricultural workers and migrant agricultural workers. Many cannot travel to work and others are unable to obtain the proper personal protective equipment (PPE) to work (Zimmerer et al.).

As of 2019, the population was a little over eleven and a half million people in Bolivia. Of those eleven million, about seventy percent of them live in urban areas like La Paz or Santa Cruz. The other thirty percent of those people live in rural areas. In addition, only about twenty-seven percent of Bolivian residents work in agriculture. An average rural farming family in Bolivia typically lives in extended family units. Rural families tend to have many children. These children are hardworking, well-disciplined, and share responsibilities. The oldest daughters in the families are called *mamitas* (little mamas). The girls learn domestic tasks and how to raise children. For the boys, when they turn eight years old, they begin working in the field with their fathers and learn to be self-sufficient around puberty (Bolivia-Culture Grams). Children tend to be considered grown around age sixteen or seventeen. That is when they get married and move into their own house. In urban areas, there are more nuclear family units. They tend to have one or two children. Fathers tend to take responsibility for earning money, but some wealthier families hire nursemaids so the women can accept administrative roles as well. Most rural and urban homes have electricity, but most rural homes do not have running water at all.

“Education in Bolivia appears to be lacking: one in every seven children in Bolivia does not complete primary school, and the majority of Bolivians never go on to secondary school. Over one million Bolivians over the age of 15 are illiterate” (Borgen Project). Four main factors have caused a lack of education in Bolivia. Most schools are taught in Spanish, but many children, especially in rural areas, cannot understand what is being taught. This is because some children grow up speaking *Quechua* and *Aymara* at home. As a result, students begin getting discouraged about learning a second language because of its difficulty and typically drop out. Furthermore, due to widespread poverty and education not being a priority, schools tend to be very run down with little to no classroom materials. Bolivian poverty affects the teachers as well. They often go on strike to protest for higher wages and other issues. Though, the primary reason for the rising illiteracy rate overall is poverty. Even in urban areas children only go to school for about nine years, and in rural areas, they only go to school for about four years. This is because they have to work to help support their families (Borgen Project).

About eleven million Bolivian citizens work in agriculture. Of those eleven million, in 2014, only thirteen thousand nine hundred of them are dairy farmers (Gapminder). In the United States, in 2014, there were about forty-five thousand dairy farms (The U.S. Dairy Industry…). Bolivian dairy farms tend to produce about three million pounds of milk per year. United States dairy farmers produce about two hundred billion pounds of milk per day (Fact-finding Bolivia). Subsequently, the average American dairy farmer can obtain about seventy-five thousand gallons of milk a day if cattle are milked twice a day (Changes in the Size…). Though, in Bolivia, there is a wide variety in the number of dairy cattle owned by farmers. Though, the typical farmer can own about five or ten dairy cows. This would give the average dairy farmer about one-hundred-five gallons of milk per day (About Dairy Cows). The vast difference in milk production rates between Bolivia and the United States is because of two fundamental reasons. The lack of modern milk production and the lack of quality veterinary care due to geographical location.

The current technology utilized on Bolivian dairy farms is milking the cattle by hand. “In 2013, ninety-seven percent of dairy farms used manual milking” (Fact-finding Bolivia). “In Santa Cruz and Cochabamba, there are about one-thousand mechanized farms each" (Fact-finding Bolivia). In addition, a few farms in Santa Cruz have climate control systems, but in the smaller rural villages, they do not have

access to any of this technology. In the United States, by 1944 there were six hundred and eighty-five thousand milking machines on four and a half million dairy farms with cows (Weimar, Blayney).

To get Bolivian dairy farmers to the amount of milk production that the United States has, milking machines would need to be utilized. In addition, farmers would also be able to own more cows because they could milk cows faster. Due to the current state of Bolivia's dairy industry, a single-stall milking machine unit would be the most practical and the most affordable. There are other types of automatic milking machines such as multiple stall units and automatic milking rotary (AMR). Though, both of these systems are newer and more expensive. Due to the fact that many Bolivians have never operated an automatic milking machine, they would need to be educated on the operation and maintenance of the machine. To combat this issue, AGRUCO could be utilized. This organization was established in "1985 as a part of a bilateral cooperation agreement between the governments of Bolivia and Switzerland" (Oliveira). AGRUCO is a center of excellence in participatory research, post-graduate training, and social interaction with indigenous communities and farmers. This program is housed at Universidad Mayor de San Simon, one of the largest public universities in the country (Oliveira). Most Bolivian farmers; notably the Altiplano or highland farmers will never be able to afford this technology on their own because of the low prices Bolivian farmers get paid for their milk. "PIL Andina controls eighty percent of Bolivia's dairy market" (Reuters Media). Dairy farmers are angry with PIL Andina because they are offering them less money for their raw milk and buying less of it. PIL Andina is buying less of their raw milk because international milk prices are so low (Fact-finding Bolivia). Ways to combat this issue would be to improve the competitiveness of facilities in Bolivia that buy and export milk. The United States achieved this by not allowing monopolies of one business in one industry. On July 2, 1890, the Sherman Anti-Trust Act was passed to do exactly that (Sherman Anti-trust Act). Considering everything, a way for Bolivia to boost its milk production is to become automated. The sole way for automated milk production in Bolivia to happen would be to take away monopolies and allow for more of a free-market system to be utilized so Bolivian farmers will make more money. In turn, allowing them to be able to afford better equipment.

Dairy farmers in Bolivia also struggle to keep their herds healthy and producing milk. This is because farmers, especially ones on the Altiplano or Highlands have very little to no access to quality veterinary care and proper nutrition. As a result, many herds can contract foot and mouth disease or parasites/worms. Foot and mouth disease is a highly contagious viral infection that affects cloven-hoofed animals (Foot and Mouth Disease-OIE…). They also do not produce the proper amount of milk because of inadequate nutrition. These issues can simply be overcome with education. A conventional form of agricultural education and outreach utilized in the United States is via extension from land grant universities. Such as North Carolina State University partnering with local extension agents in North Carolina communities. In Bolivia, there is the Global Forum for Rural Advisory Services (GFRAS). These services focus to enhance the quality of rural advisory services so that they can better serve rural farming families and rural producers. "Thus contributing to improved livelihoods in rural areas and the sustainable reduction of hunger and poverty. Rural advisory services help to empower farmers and better integrate them in systems of agricultural innovation" ("Sustainable Agriculture and Food Security • Inter-American Foundation"). Subsequently, veterinarians could go into rural areas of Bolivia and host workshops for area farmers in partnership with GFRAS. In these workshops, farmers could be educated on infection control, proper herd nutrition, common cattle diseases, treatment for them, and grazing land management. In addition, other

clinics could be held to train locals and inform them of some of the same skills that veterinary technicians and assistants have. By achieving this, animals could be diagnosed and even treated if more intense veterinary care was unneeded. This would equally give jobs to those who needed one helping raise them above the margin of poverty. In addition to infection control and education, pasture knowledge is also needed to prevent cattle from contracting worms. The best way to prevent cattle from ingesting and getting infected with worms is to rotate cattle every two-three weeks from pastures and to have a regular cattle worming schedule. When cattle are three-four months old, the worming process should begin. The calves should be wormed regularly every three-four months until they reach a year old. After they are a year old, it is recommended they are wormed once in the spring and once in the fall (Drovers). Deworming clinics could come to rural towns when the animals need to be wormed and farmers could be educated about grazing land management and herd health at these clinics as well.

Collectively, Bolivia is a country of many beautiful destinations. Under all of that beauty, however, remains a country struggling to get above the line of poverty. Bolivia's poverty has been caused by generations of illiteracy as a result of poor education, lack of modernization, and lack of free enterprises in the marketplace. Agriculture plays a significant role in helping Bolivian families get above the line of poverty. Even so, their dairy industry seems to be struggling to keep up with modern times. Bolivian dairy farmers experience a lack of modern equipment, little to no access to quality veterinary care, have no agro-business competition to increase milk profits, and a country struggling with the COVID-19 global pandemic does not create a steady environment for agro-businesses. Overall improving government systems to allow for more agro-businesses instead of monopolies would change Bolivia's current situation. Allowing for the social inclusion of small-scale farmers rather than supporting large companies could also help. As for quality veterinary care, clinics could be held to educate Bolivians to properly tend their livestock. All of these solutions are fairly easy and cost-effective ways to aid Bolivia in getting above the line of poverty all while improving its dairy industry. Ordinary citizens can also take a part in minimizing the margin of poverty in Bolivia. The simplest way for new ideas and technologies to be spread to Bolivia and other similar countries is through education and through advocating for causes you are passionate about.

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