

Abby Ollendieck
Union High School
La Porte City, IA
Bolivia--Factor 6: Sustainable Agriculture

Bolivia: “A Little Rough Around The Edges”

The travel websites describe Bolivia in these terms—“superlative in its natural beauty, rugged, vexing, complex, a little nerve-racking, and a little rough around the edges”. It is certainly one of South America’s most diverse and complex nations. A tragic political past and rather harsh and variable climate has taken its toll on the land and its people. Hidden in the shadow of all its populous and prosperous neighbors, poverty-stricken Bolivia was once part of the mighty ancient Inca Empire. It has a tragic past marred by a defeat at the hands of the Spanish who reduced the predominantly indigenous Indian population to slaves. While under their control, a stratified society formed that continues to this day. Although indigenous Indians make up 2/3 of the population, the lighter skinned Europeans in the country remain as the wealthy elitist group. (“Geography”) A large percentage of families in Bolivia only have enough to barely scrape by, and nearly 50% of the population lives below the poverty line. Many of these are indigenous farming families who have limited education, limited funds, little access to outdated technology, and little knowledge about progressive farming techniques. Bolivia needs to make changes quickly if it is to keep from falling further behind and if it is to be able to feed itself. It is certainly “a little rough around the edges”, but there are solutions to help it smooth out those edges and make Bolivia food secure. (“Introducing Bolivia”)

Bolivia faces huge problems concerning sustainable agriculture. Unsustainable crop and livestock farming techniques, including slash and burn clearing methods have denuded the landscape and depleted the soil of its fertility. To begin with, only 2-3% of Bolivia’s land mass is arable land suitable for farming and permanent crops. These conditions make it extremely difficult for farmers to establish a sustainable cropping system and satisfactory yields. Outdated and harmful methods along with poor land use has led to decreases of yield, more hungry families, and more poverty. Many farmers continue to rely on farming methods handed down to them from generations before them. Without proper training, farmers will not be able to utilize progressive farming techniques such as soil conservation, crop rotations, nutrient management, and effective pest control—all of which can increase their production, profit, and do it sustainably.

As the population increases, available arable land decreases. Even in the Altiplano area, two-thirds of land lies fallow every year. The land that is currently being farmed has to be used as efficiently as possible. The fertile region east of Santa Cruz de la Sierra is considered the “promised land” of Bolivian agriculture. Lowland rice and sugar is mostly grown here. To the northeast are the tropical forests where Indians practice slash-and-burn agriculture. This damaging tactic has to be controlled. This is when a forest or vegetation is cut down, and then what remains is burned to make room for farmland. The area is then converted from forest to farmland. It creates a reliable farmland for a couple years but eventually exhausts the land’s nutrients and farmers are unable to grow anything productively on the land. The farmers then move on to repeat the process on another area of the forest. Eventually, they must return to their original land where they are unable to produce any sustainable crop. The process is very inefficient and also causes mass deforestation. When using the slash-and-burn method, the thin topsoil is depleted of its nutrients and potentially washed away by the rain. Over the years, every harvest depletes more and more of the land’s soil and nutrients.

Deforestation and desertification are growing problems for farmers living in rural Bolivia. Agricultural expansion and cattle ranching along with intensive farming has resulted in rampant deforestation. Brazil nuts are an important crop for many Bolivian farmers. In fact, Bolivia is the world’s largest producer of

Brazil nuts, but they are now threatened. Because of the tree's unique reproductive system they must be grown in natural forests. When the trees around them are removed, they stop producing nuts. ("New Agriculturist")

About 40 percent of Bolivia's population are engaged in agriculture and almost all of the families that live in Bolivia's rural areas are farmers. ("New Agriculturalist") Many of these families live in poverty, making only \$150 per month. This is not nearly enough for an average family to survive since the average cost of living is nearly \$500 per month. The percentage of children that suffer from malnutrition is 26.8%. ("Central Intelligence Agency") Most families eat whatever they can grow themselves. This means they are consuming mostly carbohydrates and not enough proteins often leading to stunted growth. Their homes are made from cheap materials; often small brick buildings with roofing tiles and dirt floors. They have only the most basic necessities.

Because of Bolivia's various climates, a variety of crops can be grown. Near the capitol, La Paz, average annual temperatures vary from 43.5F to 51.8F while in Southern Bolivia temperatures can reach 104F. Agriculture takes place primarily in the high Altiplano plains and Andean Valley regions near La Paz. The growing season, depending on temperature conditions, is usually from October to March. Some of the major crops are potatoes, corn, rice, soybeans, tomatoes, nuts, and fruits. Farmers in Bolivia also raise cattle, llamas, sheep, and alpacas. ("Central Intelligence Agency")

Over 60% of farmers in Bolivia live in the Altiplano region, where farming is extremely difficult. The high, dry and cold land is difficult to farm since the region has the least fertile soil as well as the least amount of rainfall in the country. Their crops are susceptible to frost, irregular rainfall and soil erosion. They use outdated farming methods, such as the use of foot plows. Many farmers utilize the practice of terraced fields but their crops are still vulnerable to soil erosion. Most have small plots of potatoes, corn and beans, only producing enough to keep their family fed. They frequently raise livestock such as hardy sheep, llamas and alpacas which provide them with food in case of a bad harvest. Unfortunately, the animals also contribute to soil infertility and erosion because of over-grazing. Farmers also have limited livestock training, technical and management information, and veterinary services which leads to extremely low livestock yields and reproductive performance due to poor management. ("New Agriculturist")

The children of Bolivia are encouraged to start attending school when they are six. Unfortunately attendance is much lower for rural children than urban children. Children in rural areas attend school for half as long as children in urban areas. This is because families in rural areas need their children at home to work in the fields. Bolivia has now become the first nation to legalize child labor starting at age 10. Many poor families in Bolivia have no other choice than for their kids to work. The country says there is no alternative in a society where half of the population is poor. Right now, it is estimated that nearly 1 million children work regularly, which accounts for nearly 15% of the total work force. One in three children do not attend school. The problem with this is that once these children are older and have their own farms, they will not be educated enough to read and apply progressive agricultural techniques and update current farming practices. ("Education in Bolivia") Public Education in Bolivia is of very poor quality. Many children in rural areas do not finish primary school or even learn to read or write due to lack of accessible education opportunities. Jo Becker, the children's rights advocacy director at New York-based Human Rights, said, "Bolivia is out of step with the rest of the world. Child Labor may be seen as a short-term solution to economic hardship, but is actually a cause of poverty. ("Central Intelligence Agency")

Bolivia needs to find solutions to the serious problems facing its rural agricultural population. One very basic solution would be to improve the educational system to alleviate the problems rural families face. Children need to have a higher quality education to help them out of the cycle of poverty. All need to be

able to read and write well enough so they are able to use the information that is available to them. The introduction of Agricultural Education classes starting at the primary level would help both farmers and children. They would be able to learn about the most efficient methods of farming and also stay up to date with modern ideas. Children would also start learning at a young age how to properly care for the land to prevent further damage and to manage livestock which could add needed protein to their diets. Ideas learned in classes would allow the farmers to immediately make the changes and start turning around their productivity, maybe even to the point of profitability in the marketplace.

Another way for farmers to increase yields and productivity would be to introduce comprehensive educational programs, similar to the Cooperative Extension programs in the U.S. through its land-grant universities, in the main agricultural regions of Bolivia. Farmers would have experts on hand near their area that would help them make choices and answer questions they have about the new techniques and ideas being introduced. Another idea is to establish youth organizations such as FFA and 4-H in the school. Children would be able to work together as a team to learn about new ways to use agriculture to benefit themselves and their families. These organizations would teach children how to sustainably raise livestock, practice leadership skills, and socialize.

Another problem that needs a solution is farmland condition caused by massive soil erosion due to over-grazing by their animals and improper farming practices. There are many basic ways for farmers to prevent this. Crop rotation is one of the best ways to improve soil quality and conserve nutrients. This practice is done by growing diverse crops in either sequence, in association, or after each other to benefit one or both crops. Certain plants like legumes use soil and nutrients their own unique way and crop rotation uses that as an advantage. If a certain plant uses excess amounts of a particular nutrient, the other plant would help restore the nutrient by not continuously using it or by helping replenish it.

Another method for the farmers to use is cover crops. Cover crops occupy the land between growing cycles. This helps reduce soil erosion, suppresses weeds, and builds organic matter. Land left bare is more susceptible to unwanted weed growth, and desirable fibrous rooted plants help hold the soil in place so water cannot come through the area and wash the soil away. The cover crops like legumes can even help certain crops when its growing cycle begins by providing it with additional nutrients.

Contour farming is also a simple method farmers could use to prevent further damage to the land. Contour farming is the practice of tilling sloped land along lines of consistent elevation in order to conserve rainwater and to reduce soil losses from soil erosion. Farmers use furrows, crop rows, and wheel tracks across the slopes to act as reservoirs to catch and hold rainwater. This allows for increased infiltration and more evenly distributed water in the field. The practice of contour farming, especially if done in conjunction with terracing, helps reduce erosion and nutrient loss, saves time, and also helps to increase yields on uneven fields. ("Contour Farming (agriculture)")

Government organizations like the Bolivia Integrated Food Security (IFS) Project have been making a difference for malnourished people living in rural Bolivia. The project, funded by the USAID, addresses the many challenges contributing to malnutrition. The project works in the poorest rural areas of Bolivia and addresses the four pillars of food security: availability, access, use of food, and vulnerability. They merge the ideas of food security and national initiatives with environmental management. Because of organizations like the IFS Project, people in rural Bolivia are eating more nutritious meals and are more prepared to handle food security issues. ("Abt Associates | Food Security Project Improves Lives of Rural Bolivians.")

Although Bolivia has experienced some political turmoil in the recent years, it is possible that the election in 2006 of Juan Evo Morales Ayma, commonly called Evo, could make a positive difference in the lives of rural Bolivians. He grew up as a subsistence farmer and is considered an activist who has called for

poverty reduction and stands up for the rights of indigenous people all over Bolivia. Bolivia does possess rich natural gas reserves from which income could be used to finance efforts to improve the educational system and extend technical help to struggling farmers and their families.

By implementing immediate changes for underprivileged farmers and their families in rural areas, Bolivians can start to become more self-sufficient more quickly. They will be able to increase their productivity and their profits. Agriculture Education classes for families and Extension programs for farmers could be an effective solution to implement while other methods are being developed. Farmers will be quickly implementing solutions to help the land while working out ways to implement other solutions that will take longer to set up, such as cover crops, contour farming and crop rotation. Funding for educational programs that teach sustainable farming techniques, proper management of these programs,, and getting this assistance to the rural population people who really need it will go a long way towards helping Bolivia improve its food security. This will help smooth out those “rough edges”!

Works Cited

“Abt Associates | Food Security Project Improves Lives of Rural Bolivians.” *Abt Associates / Food Security Project Improves Lives of Rural Bolivians*. N.p., n.d. Web. 13 Mar. 2014.

<<http://www.abtassociates.com/noteworthy/2012/food-security-project-improves-lives-of-rural-boli.aspx>>

“Central Intelligence Agency.” Central Intelligence Agency, n.d. Web. 12 Mar. 2014.

<https://www.cia.gov/library/publications/the-world-factbook/geos/bl.html>

"Contour Farming (agriculture)." The Editors of Encyclopædia Britannica. *Encyclopedia Britannica Online*. Encyclopedia Britannica, n.d. Web. 13 Mar. 2014.

<<http://www.britannica.com/EBchecked/topic/135192/contour-farming>>

"Crop Rotation." *Why Is So Important?: Organic Gardening*. N.p., n.d. Web. 11 Mar. 2014.

<<http://www.organicgardening.com/learn-and-grow/crop-rotation>>

"Education in Bolivia." Wikipedia. 11 May 2006. 20 July 2006 <http://en.wikipedia.org/wiki/Education_in_Bolivia>.

"Geography." *Infoplease*. Infoplease, n.d. Web. 12 Mar. 2014.

<<http://www.infoplease.com/country/bolivia.html>>

"Introducing Bolivia." *Lonely Planet*. N.p., n.d. Web. 14 Mar. 2014. <http://www.lonelyplanet.com/bolivia>

"New Agriculturist." : *Country Profile*. N.p., n.d. Web. 12 Mar. 2014. <http://www.new-ag.info/en/country/profile.php?a=3155>

"Slash-and-burn" - Curiosity." *Curiosity*. N.p., n.d. Web. 12 Mar. 2014.

<http://curiosity.discovery.com/question/slash-burn-deforestation-particularly-harmful>