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Bolivia, Factor 19

Bolivia: Infrastructure Development to Improve Market Accessibility and Reduce Inequity

With a maximum height above sea level of 6,542 meters and a location in the center of South America, the Plurinational State of Bolivia enjoys a geographically exalted position on its continent, starkly contrasting with its economic position as the most impoverished nation in South America (“Bolivia”). With 51.3% of its population below the poverty line of \$2 per day, Bolivia is not only the most impoverished nation on its continent, but also is one of the most impoverished in the world, ranking among many of the much-more publicized, impoverished sub-Saharan African nations. What causes Bolivia to pass unknown to the general American public as a poor nation, while some better-off nations receive much more publicity? The answer lies in Bolivia’s reason for poverty. Most impoverished countries have easy-to-blame causes of poverty: war, corruption, or a plethora of natural disasters. However, Bolivia has few of such ailments, with no major wars since the late 19th century, only an average amount of corruption, and no major disasters other than small yearly floods and droughts. Bolivia is impoverished because of its poor infrastructure quality, which limits farmers’ ability to access the markets needed to sell their crops and their ability to purchase equipment, fertilizers, better seeds, or other advantages that would enable them to grow crops more efficiently.

Bolivia’s first national census since 2001 took place in 2012 and the data collected has yet to be published to the general public. This unfortunately limits the supply of adequate and up-to-date data on family characteristics in specific regions. However, according to older data, the average immediate family size in the areas where subsistence farming is practiced was five and likely is of a similar value today. Among the typical five person immediate family, there was a father, a mother, and three children (*Censo 2001*). Often, older generations may also reside in the same dwelling, as well as assorted cousins, uncles, and aunts, especially among the indigenous households, but additional household members cannot be considered part of the immediate families.

The diet of a typical subsistence agriculture family in Bolivia consists almost solely of the plants that they can grow, with little supplement from other sources. Although several types of cash crop are grown in Bolivia by the larger farmers, including cocoa and soybeans, Bolivian subsistence farmers generally only grow crops for their own consumption, mainly starches such as potatoes, corn, rice, or quinoa. To supplement these, many types of fruits and vegetables are also grown:

The principal vegetable crops ...[include] kidney beans, green beans, chick peas, green peas, lettuce, cabbage, tomatoes, carrots, onions, garlic, and chili peppers. Also common ...[are] alfalfa, rye, cassava, and sweet potatoes. Some of the most popular fruits ...[are] oranges, limes, grapes, apples, quince, papayas, peaches, plums, cherries, figs, avocados, pineapples, strawberries, bananas, and plantains. (Hanratty)

Although a typical smallholding family would not grow all of the aforementioned crops, such a family will grow at least some of those crops almost exclusively for its own consumption. The poorest families may not have the resources to grow some of the fancier crops, like the fruits, and instead may focus more on growing potatoes, quinoa and some vegetables. In general, meat, in the form of llamas, goats, or, in rare cases, beef, is seldom consumed due to the high food cost to raise the animals and the little sustenance gained from their consumption. Such an unbalanced and incomplete diet among the impoverished can cause severe malnutrition, especially in conjunction with the high caloric intake required to sustain a body working in the fields.

Bolivian children, regardless of class or gender, are very likely to be enrolled in mandatory schooling from ages 6 to 13 (“Bolivia”). Seven years of schooling can hardly be considered adequate, but for most students of impoverished families, those seven years are all that they will receive. Especially due to a lack of transportation among the impoverished and the positioning of schools closer to urban areas, among subsistence farm family children, “each additional kilometer between the home and the closest school reduces the probability of being enrolled in school by 1.3 percentage points” (Human Development Department 30). In addition, even if the impoverished students are enrolled in school for the mandatory seven years “household survey data reveal that on any given day, close to 40 percent of them are not attending” (Human Development Department 28). Finally, “the level of education is significantly lower in rural areas than in urban areas, which can partly be explained by the fact that rural teachers are twice as likely as urban teachers to lack full training,” so even if children of subsistence families do receive education, their education is substandard in a nation of where the normal education is substandard when compared to the rest of the world (Morgan 51).

In rural Bolivian areas, the access to health care can be as limited as 1,377 people per hospital bed, and this is further exacerbated by the lack of adequate infrastructure to allow ease of access from the farms to the hospitals (*Censo 2001*). In addition, the quality of healthcare that a rural family can receive at their nearest hospital can be much more rudimentary when compared to the care that an urban family may receive.

Adequate data specifically describing the average subsistence farm sizes in Bolivia is hard to find, but data for several neighboring countries is available. For example, in Chile, smallholding families have “an average farm size of 17 hectares” whereas, in Brazil, farm sizes of about 18 hectares “belong to the subsistence group” (Berdegú 17; Berdegú 15). As Brazil’s farming climate is most similar to Bolivia’s lowland farming climate and as Chile’s farming climate is most similar to Bolivia’s highland farming climate, assuming that Bolivian smallholder land acreages are equal to the average of those in Brazil and Chile yields that the average subsistence agricultural farm in Bolivia is likely around 16 hectares, the size of 33 American football fields.

As mentioned before, the crops grown by an average subsistence agriculture farm family mainly consist of assorted starches like potatoes or quinoa along with some vegetables like peas or beans (Hanratty). Because it is seldom economically feasible for smallholders to grow all of the crops necessary for a balanced diet, a small portion of their land may be set aside specifically to grow cash crops or crops for sale in local markets. The smallholders are then, in theory, able to sell the crops for money with which to purchase the necessary food to complete their diets or purchase foods if bad weather and misfortune destroy their crops. However, in practice, poor market access can reduce the efficacy of such a method.

In general, the farm practices used by the average subsistence agriculture farm families are the typical techniques used worldwide among farmers lacking modern technology. Terracing is typically employed in the highland areas near the Andes Mountains to capitalize on the rare water resources available and animal-drawn plows are used throughout Bolivia instead of complex, expensive machinery. In the past, “Bolivia's use of tractors, 0.2 per 1,000 hectares, was ... the lowest in the Western Hemisphere,” and little has changed since then (Hanratty). Similarly, Bolivian farmers primarily use natural fertilizers, as they are unable to afford the more effective and more costly alternatives (Hanratty).

The major barriers to improving agricultural productivity among the subsistence farmers are the lack of technology, the lack of infrastructure, the fickle weather conditions in Bolivia, and the lack of credit that would allow farmers to purchase the supplies that they could use to alleviate their lack of technology or infrastructure. In addition, “the combined lack of infrastructure and technology made farmers vulnerable to almost yearly droughts and floods,” which, coupled with their inability to get credit, further prevents

them from improving their infrastructure or technology, in an unfortunate, yearly cycle of continual poverty (Hanratty).

Poor access to food markets and inadequate nutrition go hand-in-hand with the inability to improve agricultural productivity. Without the infrastructure allowing them to bring their crops to market, Bolivian subsistence farmers are unable to sell the crops from which they to gain money for purchasing food when weather issues destroy or limit the crops they grew for their own consumption. Without such money, they can only sometimes buy the backup food supply needed for adequate nutrition during times of flooding or drought, and they can hardly ever purchase the technology that would improve their access to markets, provide them greater crop yields, or make them more resistant to losing their crops during sudden droughts or floods in the first place.

Specifically, the lack of infrastructure connecting subsistence farms to markets most prevents their escaping poverty. A lack of infrastructure directly affects subsistence families' access to adequate nutrition or to earn sufficient income to purchase food and indirectly affects their ability to produce enough food. During times of bad weather in Bolivia, the crops of subsistence farmers are often ruined, and, if lucky, the farmers are able to consume purchased food in the meantime and at least maintain a survivable, if not good diet. However, subsistence farmers are hampered in their efforts to purchase such back-up food by a lack of infrastructure. Even if the farmers are lucky enough to have generated an excess of a certain foodstuff that they can hope to sell, "not having necessary road infrastructure severely limits the rural areas and makes farming extremely expensive. The transportation costs are much higher than they would be if there were roads available for use. This issue lowers the amount of money that farmers are able to get by selling their products" (Morgan 53). With only a tenuous ability to sell their crops and only slight monetary gains from such crop selling, the high transportation costs cause the farmers to have an even lesser ability to purchase back-up food. This limited ability to purchase food for the times when the farmers are likely to face destruction of their normal food supply causes poor access to adequate nutrition during such times of harsh weather. Similarly, the lack of infrastructure indirectly prevents the Bolivian smallholders from being able to produce enough food by limiting their ability to purchase agricultural technology that would raise their crop yields. Barely able sell food and bring other food home, the Bolivian smallholders can hardly be considered able to purchase better farm equipment or seeds and bring it from the source to their farms. Many of the factors that keep Bolivian smallholders impoverished are dependent upon the single issue of lack of infrastructure.

The present status of farm-to-market infrastructure in Bolivia is very poor. In American popular culture, the Bolivian roads have been immortalized in reality television as death roads, and although such an assessment is not necessarily accurate, it still demonstrates the rudimentary quality of Bolivia's roads. As of 2009, "Bolivia's road network ...[had] a total length of 60,792 km of which about 4,314 km are paved. The remaining roads are either gravel or dirt roads" (Sánchez 13). With only 7 percent of its roads paved, and those roads mostly in the urban areas, Bolivia clearly has a young and under-developed road network, with the roads connecting subsistence farmers to their markets usually rudimentary and prone to impassability in times of flooding. In general, especially in the Andes mountains areas, the risks of traveling on such roads cause a high transportation cost for the poorest farmers, who, possessing no vehicles of their own, must hire truckers to carry their produce to the market and sell it for them, reducing the amount of monetary return the farmers can receive for their excess crops.

The environment is not being degraded due to a lack of good transportation infrastructure in Bolivia, and in fact, increased road production might actually adversely affect the environment in Bolivia, although most would probably say that the benefits of road improvement absolutely outweigh any environmental issues. The rural poor and developing countries are particularly affected by a lack of infrastructure, because rural countries are where such lack exists, and the rural poor areas are the areas where such lack

is most evident, with roads being the best in the cities and becoming progressively worse farther from the cities.

The trends for transportation infrastructure in Bolivia are improving, with the total road length increasing from about 41,000 km in 1988 to about 61,000 km in 2009 and percentage of paved roads to unpaved roads increasing from about 3 percent to about 7 percent from 1988 to 2009 (Hanratty; Sánchez 13). Because of these changes, the conditions for Bolivian smallholders are improving, with a greater ability among the subsistence farmers to sell their excess crops at market and gain money to purchase a back-up food supply and agricultural technology. However, such a slight increase can hardly be considered adequate for 31 years, and more is needed, if the impoverished of Bolivia are to increase in quality of life.

Should the transportation infrastructure in Bolivia improve, subsistence farm families will be able to earn more money from their excess crops, as transportation costs would decrease, to purchase more back-up food in the event of crop failure due to harsh weather, and to purchase better agricultural equipment and products, such as fertilizers, better seeds, and tractors, to increase their productivity. Such benefits would directly lead to poverty reduction as the families would be able to have a constant food supply, even in times of drought or flood, and may be able to purchase foods that can complete their diets and prevent malnutrition. In addition, increased free time due to improved agricultural efficiency may result from better equipment, allowing the children of subsistence agriculture families to attend school longer and become more educated.

In the decades, ahead, improved transportation infrastructure in Bolivia will simply be made more urgent by factors such as urbanization, climate change, and population growth. Such factors will make it even more important that the Bolivian subsistence farmers are able to access markets for their goods, as the listed factors will make the current living conditions of the Bolivians harder, with shorter growing seasons and a greater focus of governmental funding and aid on the growing cities.

To address the dearth of transportation infrastructure in Bolivia, funding will be required to construct safer, larger, and more dispersed roads that connect rural farmers to their markets in a manner that is less affected by weather patterns. Because the Bolivian government is already lacking funding for promised projects, such funding will need to come from other countries or organizations. A project that has already worked to complete a similar task on a local level is the Cash for Work program sponsored by the world food program. Under this program, farmers were given food coupons in exchange for work around their communities, sometimes for planting orchards to supplement their diets, other times in exchange for work building sandbag walls to prevent their fields from being flooded by heavy rains (Loza). Scaling up this project to give money to farmers in exchange for road building would allow for an improved transportation network between the subsistence farms and their markets, while also supplying the farmers with coupons to allow them to have more balanced diets and avoid malnutrition.

The community's role in such a program would be to direct farmers to areas where road construction is required and work directly with the worldwide organizations that are providing the funding, to prevent misuse of funds and corruption that can result from too many middlemen. The Bolivian government's role in such a program would be to stay far away from it and prevent corruption or interference. The worldwide organizations' roles would be to raise funding from wealthy countries and distribute it to the communities effectively, without corruption. Rural farm families should play the integral part of both supplying the workers and supplying the local knowledge of where and how such roads should be constructed for the benefit of the entire communities.

In summary, the main cause of the widespread poverty in Bolivia is likely poor infrastructure. Lack of transportation infrastructure makes it difficult for farmers to get goods to market and for young people to

get to schools. A good way for international organizations to assist would be to contribute resources directly to communities to develop transportation infrastructure, such as roads.

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