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Guatemala, Factor 11: Malnutrition & Factor 20: Farm to Market

Guatemala: Giving rural families access to a larger variety of food and goods

Guatemala is ranked as one of the nations on Earth with the greatest inequality (GINI. Web). One reason for the great disparity among the population is an uneven allocation of resources. Due to the vast majority of the wealth and land being held by the 0.1%, this gap seems impossible to close (Alisha. Web). One way to fix this inequality among the population is to open up new markets, via increased transportation, and by improving the irrigation methods used in rural Guatemala.

1. Background

Guatemala is the most populous country in Central America. It has a population of 16 million which is nearly double the population of the second most populous country, Honduras (CIA. Web). Guatemala has been hit as hard as Mexico and Brazil by the current population crisis with only a fraction of the land of those two nations. The average size of a rural Guatemalan family consists of eight members, split between parents, grandparents, and children. Additionally, the average family lives on less than US\$5 per day, with over 50% below \$2 in rural areas (the international poverty threshold) (Alisha. Web). Among the Guatemalan population, about 40% are indigenous Mayans (CIA. Web). Another major problem for these families is lack of education. Nearly one quarter of Guatemala's population is illiterate, with this number spiking to 60% for the indigenous peoples (CIA. Web). According to USAID, on average, Guatemalans only go to school for four years and only 30% of children continue past sixth grade.

In addition to the income inequality, land ownership is greatly unbalanced, with a mere 2.5% of farms representing 65% of agricultural land (Immink and Alarcón. Web). Approximately 40% of the economically active rural population does not own any land (Dietzen). Those that do own land typically use it to grow the staple crops of corn, beans, and sorghum. The vast majority of rural Guatemalans are agricultural workers on large farms, who live in villages where they also tend to their own plots at home to supplement their income with their own corn, beans, and other vegetable staples (Dietzen). The average Guatemalan family eats a largely vegetarian diet consisting of corn and beans supplemented with tomatoes, chilies, fruit, and, occasionally, wild game. Rice, introduced by the Spanish, has also become a staple food (Dietzen). In addition, only 54% of rural Guatemalans have healthcare, and those who do are often unable to access it because of a lack of transportation (Pan-American. Web).

Most rural farms lack irrigation and are sown by hand, with the workers hoeing, weeding, and harvesting in a non-mechanized fashion (Dietzen). This is, obviously, very inefficient when compared to the mechanized farming methods used in many first-world nations. While farming is generally labor intensive, rural farmers tend their own small personal plots (Ibid). Most families use the income they make on the farms for bartering and trading within their villages or communities (Ibid). Lack of transportation prohibits rural families from accessing larger markets for their extra crops. With extra transportation, rural Guatemalans would be able to reach

domestic and international markets in order to sell their crops to Guatemalan citizens as well as export their crops in order to make a usable profit (Ibid). These factors combine to cause a severe lack of non-local foods and goods. Lastly, many rural Guatemalans receive little protein, calcium, and other minerals due to their mostly vegetarian diet (Adoption. Web). Even though increasing their agricultural productivity could be helpful to get more income into homes, the large inequality gap makes it difficult to bring these new methods into common use in the rural areas. In addition, many rural Guatemalans will reject these new methods, even if they are clearly superior, because their strong traditions keep them using the same, usually outdated, methods of their ancestors (Dietzen).

2. Challenges

Rural Guatemalans generally live hand-to-mouth, spending only on their immediate needs with no savings to increase their future prospects (Alisha. Web). Nonetheless, the majority of families are able to get what they absolutely need (Dietzen). While these families generally do have sufficient shelter, they often have limited clothing and are unable to get healthcare in case of an unexpected incident. Despite all these glaring issues, government involvement is rare. A lack of a decent national financial aid system often leaves these families fending for themselves (Social. Web). This does not seem like it will change anytime soon due to only 10-15% of rural children leaving their family's farms, and a large fraction of them returning upon failing to find work in the city (Dietzen). Without political lobbying from these suffering families, the Guatemalan government has no propellant to work towards fixing these problems in the near future.

3. Current situation

In recent years, the inequality problem in Guatemala has become more and more substantial - to the point of Guatemala having a Gini coefficient of 52.4, the sixth highest in the world (GINI. Web). Even though income inequality has been increasingly talked about worldwide, it is not expected that the United Nations will persuade governments like those nations similar to Guatemala to do anything meaningful about it. Without access to markets and limited savings potential, rural Guatemalans are trapped in a slow, downward spiral while the top few thousandths of the population are getting exponentially richer, increasing the income inequality experienced in Guatemala to seemingly, infinite proportions.

4. Guatemalans' need for access to markets and high-quality protein sources

Guatemalans typically grow more crops than they need for consumption on their personal plots. However, because they cannot get to markets to sell these extra crops, they end up going to waste and spoiling during the following winter. Since all of the villages produce virtually the same crops, these cannot be bartered to other villages. By giving rural Guatemalans a way to use their extra crops for income, such as easier to access markets, they would be able to purchase meat and seafood to supplement their low-protein diets (which are caused by the inability to support livestock in the rural areas). These markets, in cities such as Flores and Coban, have the ability to greatly help these rural Guatemalans, if they were accessible through increased transportation. In addition, this would help slow down or even stop the inequality that is spiraling out of control, with Guatemala's Gini coefficient predicted to become higher than 60 by 2040. Finally, with the money they obtain from these markets, rural Guatemalans can pay for their children to get a better education. With this education, children would have a better ability to advance economically.

5. Aftermath of a lack of access to markets and high-quality protein sources

If access to markets continues to be unobtainable for rural Guatemalans, the protein deficiency they experience could cause many unfixable problems. One very noticeable effect is within the mothers of rural Guatemalan children. A lack of protein in an expectant mother's diet can lead to a number of health problems in both the mother and the developing baby. A protein deficient diet during pregnancy can make the expectant mother feel weak or light-headed and make it difficult to manage day-to-day tasks without feeling tired or fatigued. For the developing baby, the effects of a lack of protein in the diet include poor muscle and joint development, poor bone development, muscle or bone deformities, miscarriage, brain damage and a high risk of birth defects (Stuart). These often contribute to the 2.4% infant mortality rate, which increases in rural areas (CIA. Web). Considering how rare it is for rural Guatemalans to leave their farms, let alone succeed, imagine how much more this would be reduced by the rural children having birth defects which urban and suburban Guatemalan children do not have. This would just continue the seemingly uncontrollable spiral of inequality already spoken about.

6. Solutions

There are a number of possible solutions to improving rural Guatemalans' access to markets in larger cities, especially those (relatively) close to rural areas, such as Flores, Coban, and Chichicastenango. This would allow them to obtain a wider variety of food and nutrients. These markets would allow the rural Guatemalans to sell their crops to other Guatemalan citizens and to larger groups aiming to export those crops. With the ability to actually sell their crops, these rural Guatemalans would be able to make a usable profit to supplement their diets with more protein and to live more comfortably by being able to afford other benefits, such as healthcare and education for their children. However, gaining access to these is a challenge that cannot be overcome by the rural families without outside assistance. One prominent solution is to simply build more and better roads and give rural Guatemalans access to transportation. However, providing roads and transportation is not easy to implement. There currently is no funding for this, and the Guatemalan government will not build these roads without an international push. It is imperative that funding is provided, and used accordingly, to enable rural Guatemalans to get to these markets easily and consistently.

Another solution is implementing better irrigation and thus increasing crop yield and profit. This extra income will allow the rural families to buy the variety of foods and goods they are missing, resulting in a more balanced diet due to being able to afford healthier and more expensive food. In addition, they could use some of this additional money to occasionally visit the other markets and sell some more of their extra crops as well.

7. Increased transportation

By building better and additional roads between the rural villages and the markets the villagers need to access, rural Guatemalans will be able to sell their excess crops and to purchase other amenities such as more protein-rich meat. In addition, the extra money they make at these markets can be used to give their children a better education. The only major road in Guatemala to enter the north of the country is Highway 13, but it does not reach much of the far north, including El Tigre, Lacandon, and El Mirador-Dos Lagos-Rio Azul National Parks, all of which (and their surrounding areas) are parts of the country dealing with the issues already

highlighted. Much of Western Guatemala is also relatively isolated. The Sierra del Lacandon mountains, Laguna Lachua National Park, and the areas in between also only have Highway 13 and a small portion of Highway 5 in their nearby vicinities. Unfortunately, the Guatemalan government will not provide the funding to construct additional and better roads (Guatemala Reviews. Web) leading to these particular areas, so wealthier Guatemalans, foreign aid charities, and international donors will need to contribute money for the building of the roads and providing vehicles to be used on them.

8. Better Irrigation Methods

By improving the way villagers irrigate their fields, rural families can get much more out of the semi-hospitable soil in which they plant. "GEPIC - modeling wheat yield and crop productivity with high resolution on a global scale", is an article published in *Agricultural Systems* in 2007 by Junguo Liu, Jimmy R. Williams, Alexander J.B. Zehnder, and Hong Yang, which outlined a new method for efficient irrigation. It described how using the aptly named GEPIC model -an easy-to-implement method of irrigating many crops at once, particularly in less than ideal soil such as that of the Guatemalan villages where these rural families live - can increase crop production exponentially. The GEPIC model is an irrigation system that alters the concentrations of water in different consistencies and layers of soil to allow optimal crop growth in environments that could not previously support heavy irrigation. This method has been proven through multiple experiments in many settings and has been performed in multiple soils of different qualities to prove its near-universality. By using the GEPIC model in rural Guatemalan villages, rural Guatemalans would be able to pay their own way to markets through the transportation methods described above. The GEPIC model is a very good long-term solution to the issues proposed in this paper, but implementing it along with immediate better access to markets will allow the families to begin to remedy their solutions quickly while also creating a long-term plan towards sustaining themselves over time.

I have devised an irrigation system based on the GEPIC model in order to remedy these issues. This system consists of three or more pipes laid parallel to each other at increasing depths underneath the soil, until the deepest one reaches the aquifers underneath the mountainous Guatemalan terrain. By using another series of perpendicular smaller pipes to connect these main pipes and using filters to ensure the water is clean, effective irrigation can be provided to the crops in this rugged terrain. Although there is not much water in the soil at the top in these mountainous regions, there is plenty deep underground, which is why I propose using this or a similar system to provide increased irrigation to rural Guatemalan crops.

9. What Can Be Done

Although it would be ideal for the Guatemalan government to fund these solutions, they are currently focused on other expenditures, mostly building up the infrastructure of Guatemala's cities (Guatemala Reviews). The government does have departments dedicated to helping with issues like the ones highlighted so far, including the Ministry of Agriculture, Livestock, and Food (MAGA) and the Ministry of Environment and Natural Resources (MARN). However, both are severely underfunded and are unable to do much to aid in the problems rural Guatemalans are facing. In addition, MAGA has been using its limited funding to build up commercial agriculture in Guatemala, as opposed to aiding the rural farmers. This leaves the funding up to charities, individual donors, and Guatemalan citizens. In particular, these irrigation

and transportation systems would need to be funded and implemented by international organizations and charities. The irrigation system I proposed is expensive, but the benefits it provides would more than make up for the cost.

Some agricultural and poverty reduction projects and programs have already been started in Guatemala and are working to combat the issues focused on in this paper. These include, but are not limited to, TeleFood Projects through the FAO (Food and Agriculture Organization of the United Nations), the MDG Fund, Freedom from Hunger, and the International Food Policy Research Institute. Although all of these organizations have made significant strides in the right direction, there is still much more to be done. With the help of these organizations and others, the money can be raised to implement these irrigation and transportation systems, but it will not be easy and many donations and volunteers will be needed.

The MDG Fund in particular, which is based on the United Nations' 8 Millennium Development Goals, has worked extensively in Guatemala over the past decade and a half. One of its programs, Alliances to improve the situation of Children, Food security and Nutrition, from December 3rd, 2009 until the same date in 2012 (Guatemala: Alliances. Web). In its efforts to improve food security and nutrition in Guatemala, the program raised almost USD \$7.5M (Ibid). The program succeeded in implementing superior nutrition and improving food security in many parts of Guatemala and also established a Food Security Municipal Committee in Totonicapán to develop initiatives to reduce chronic malnutrition (Ibid). Overall, this program was a success, but there is still much more to be done, especially in the more rural and isolated areas of Guatemala.

10. Conclusion

Even though most rural Guatemalan families do not have access to a wide variety of foods and goods, it is a responsibility of rich nations to assist poorer nations in improving their health and opportunities for their citizens. Multiple charities, such as the ones mentioned above, have already begun working towards solving the issues plaguing these families. These charities, however, cannot solve the issues alone. They need donations of time, money, and energy in order to succeed in their mission. While it may seem that the problems faced by the poor in many countries of the world are insurmountable, it is necessary for those of us in developed countries to contribute. One person donating just a few dollars can be enough to get a family access to markets and better agricultural methods.

The problems of income inequality and the factors hindering improved lives is not purely Guatemalan. Although extremely prominent in Guatemala, due to it being the most populous Central American nation, Latin America has consistently been the most unequal region of the world (GINI. Web). The issues brought up in this paper affect all nations in that region. Building transportation networks in Guatemala and other Latin American nations can remedy these problems quickly and efficiently, as can providing more efficient agricultural processes and enabling rural Latino families to increase their income. In the twenty-first century, income inequality has been shown to have severe negative consequences for individuals, families, and nations, so it is imperative that we act now. By allowing these Guatemalan, and other Latino, families to live with greater access to what they need and reducing the income barriers they face, the world can become a more equal and better place.

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