Under Five Nutrition in Bolivia and Brazil: A Comparative Study

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Executive Summary

Proper nutrition in the earliest stages of life is crucial for proper development and long term health. Yet despite current efforts, malnutrition continues to affect millions of children worldwide under the age of five. Malnutrition is experienced differently depending on circumstance, including factors such as: wealth, location (urban or rural setting), diet, mother's education level and work status, maternal nutrition, sanitation and breastfeeding practices. This paper explores the prevalence of these issues in Bolivia and Brazil and analyzes major government efforts to combat malnutrition in children under the age of five.

In Bolivia, there is a low life expectancy and high mortality rate. Most of the population lives under the poverty line and great income disparities exist between the richest and poorest members of society. Those living in rural areas are most impacted by such differences as they have reduced access to nutritious foods, vaccinations, and adequate sanitation. Children are aversely affected by the lack of exclusive breastfeeding (54% under six months of age) and low levels of maternal education. Desnutrición Cero is the government's newest initiative to address these issues, but because the program is just beginning to be implemented it is difficult to analyze. It aims to educate care givers on proper care practices, strengthen institutional capacity, and promotes the consumption of the complementary food "Nutribebé." More time must elapse before the program's success can be evaluated in depth.

Brazil's population is mainly urban-based and suffers from inequality in terms of access to resources. Poverty and malnutrition are prevalent in cities and rural areas; both are affected by issues with food security, sanitation and vaccination status for children under five. Children are aversely impacted by low levels of exclusive breastfeeding and are introduced to complementary foods at very early ages. Fome Zero is the government's largest initiative to

address these issues and centers around socioeconomic issues in general as a means of improving nutrition. This program focuses on the population as a whole rather than children under the age of five specifically. Its income transfer programs create questions about future sustainability.

Comparison between these countries and programs is difficult. Brazil has a lower incidence of infant mortality, but because the population is so large this affects a greater number of children. Similarly, Bolivia has a greater percentage of children who are exclusively breastfed up to six months of age, but the number of children this affects is smaller because of the population size. Both nations are making positive strides towards eliminating malnutrition for children under the age of five.

Issue/Problem statement:

Despite the fact that the world is more than capable of producing enough food to feed its entire population, millions of people die annually due to malnutrition, starvation, and the diseases associated with these two conditions. Citizens of developing and poor nations shoulder the majority of this burden as they often lack access to the essential resources that will allow their citizens to lead productive and healthy lives. Children in particular, especially those under five years of age, are greatly impacted by inadequate nutrition; when they begin their lives without sufficient nutritional reserves, the likelihood of their becoming healthy adults dramatically decreases. This paper will exam two developing countries in South America—Bolivia and Brazil—in order to assess the current nutritional status of children under five in these nations, how malnutrition occurs, and what steps each respective government is taking to rectify the situation. In addition it will analyze why these interventions have or have not worked, as

well as offer some suggestions on what can be done to improve programs and the nutritional status of children under five in each country in the future.

Literature Review:

Nutrition plays a crucial role in all of our lives and allows us to perform everyday tasks we might otherwise take for granted. Proper nutrition is "essential for survival, physical growth, mental development, performance, productivity, health and well-being across the entire life-span: from the earliest stages of fetal development… on into adulthood."[1] Children, especially those under the age of five, are just beginning to create the foundation of nutritional reserves they will utilize throughout their lifetimes; it is crucial during these years that they receive adequate amounts of nutrients that will make it possible for them to develop into capable adults. However, "nutrition's importance as a foundation for healthy development is often underestimated. Poor nutrition leads to ill-health and ill-health contributes to further deterioration of nutritional status."[2] The continuation of this cycle of malnourishment and disease often leads to unfortunate results. Though proper nutrition is internationally recognized as one of the basic rights of a child, malnutrition has and continues to be responsible for 60% of the 10.9 million deaths annually among children under five.[3] This means that proper nutrition has the potential to prevent millions of deaths worldwide every year. Currently, however,

> Over 50 million children under the age of five are wasted, and in low-income countries one in every three children suffers from stunted growth. Indeed, many children never reach this age. The effects of poor nutrition and stunting continue throughout life,

[1] "Nutrition," *The World Health Organization,* http://www.who.int/child_adolescent_health/topics/prevention_care/child/nutrition/en
[2] "Complementary Feeding: Report of the Global Consultation," p.iii, *The World Health Organization* http://www.who.int/nutrition/publications/Complementary_Feeding.pdf
[3] "Global Strategy for Infant and Young Child Feeding," *The World Health Organization,* 2003, http://www.who.int/nutrition/publications/gs_infant_feeding_text_eng.pdf

> contributing to poor school performance, reduced productivity, and impaired intellectual and social development.[4]

Despite existing efforts, poor nutrition continues to affect many children and keeps them from ever reaching their full potential. Poor nutrition at the beginning of one's life can have negative consequences for years to come.

Malnutrition occurs due to a variety of factors, making its existence difficult to contribute to one lone cause. According to information from Demographic and Health Surveys (DHS), these include location of the home (urban or rural setting), sanitation conditions, and vaccination status.[5] For example, homes located in an urban setting may enjoy not only "improved accessibility to food (in and out of season)" but also greater access to health care due to the larger concentration of people living in these areas.[6] A wider variety of accessible nutritional options mean children are more likely not only to receive food in general, but their chances of achieving a healthy diet that "provides enough of each essential nutrient" is increased.[7] Similarly, socioeconomic factors play a role in nutrition in terms of access to improved sanitation facilities. Children living in homes with unimproved sanitation facilities are at a greater risk of being undernourished since these conditions are conducive to an increased risk of diarrheal disease.[8] The implications are severe since diarrheal disease and undernutrition are directly correlated, and diarrhea rates in most countries are "higher among children who are stunted, wasted, or underweight."[9] Prevention of disease through vaccination can also help reduce the risk of undernutrition; this is significant as undernutrition "reduces the body's

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[4] "Complementary Feeding: Report of the Global Consultation," p.iii.
[5] Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha. "Nutritional Status of Children: Results from the Demographic and Health Surveys 1994-2001, *Demographic and Health Surveys,* 2005, http://www.measuredhs.com/pubs/pdf/CR10/CR10.pdf
[6] *Ibid.,* 29.
[7] "Smart Nutrition 101," 2008, http://riley.nal.usda.gov
[8] Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha. p.43.
[9] *Ibid.,* 96.

resistance to infections and adversely affects the immune system."[10] An increased ability to fight disease, especially in the presences of undernutrition, will decrease the overall mortality rate of children under five.

Some of the main indicators of under-five malnutrition, however, can be closely linked with maternal health and well-being. Many health professionals and scholars alike believe that although "there is no magic technological bullet to solve the problem of undernutrition… long-term investments in the role of women… through education, economic, social, and political empowerment—will be the only way to deliver sustainable improvements in maternal and child nutrition."[11] As women tend to be primary caregivers, issues regarding their welfare should also be addressed in order to improve children's nutrition. Several important factors that affect a child's nutrition include mother's work status and education level, maternal malnutrition, breastfeeding and complementary feeding. For example, according to DHS,

> For most countries, undernutrition is higher among children of working mothers than children whose mothers are not working. This may be due to high poverty rates…which are reflected in women's need to work and its relationship to children's nutritional status. However, if poverty is the major influencing factor, it may also affect the quality of alternative child care that a working mother is able to access.[12]

These results may be surprising as one may tend to associate a woman's non-employment with undernutrition since that would suggest a lack of income. However, the DHS study shows that women often go to work out of necessity because their families are impoverished; since poverty is one of the "underlying determinants" of undernutrition, it should come as no surprise that maternal work status is therefore a viable indicator of child malnutrition.[13] Similarly, it also

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[10] *Ibid.,* 78.
[11] Horton, Richard "Maternal and Child Undernutrition: an Urgent Opportunity," *The Lancet* 371 (2008), 15 Mar. 2008, http://www.thelancet.com/journals/lancet/article/PIIS0140673607618698/fulltext.
[12]Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha*,* 35.
[13] Butta, Ahmed, Black, Cousens, Dewey, Giugliani, Haider, Kirkwood, Morris, Sachdey, Shekar, "What Works? Interventions for Maternal and Child Undernutrition and Survival," *The Lancet* 371 (2008), http://www.thelancet.com/journals/lancet/article/PIIS0140673607616936/fulltext.

makes sense that women would not be able to access high quality childcare if their financial resources are low. Yet regardless of whether or not a mother is working, her education level plays an important role in the nutritional well-being of her children. In most areas of the world there is "an inverse relationship between the mother's education and child undernutrition… the higher the level of education, the lower the prevalences [*sic*] of childhood stunting and underweight."[14] Women who receive a greater amount of higher-quality education—whether formal or informal—are "more capable of providing quality care for their own children," and develop behaviors that have a positive impact on health.[15] Because they are better equipped to care for themselves, they can in turn pass on the benefits of their knowledge to their children.

Maternal malnutrition is one of the areas that can have the greatest overall impact on a child's health as it begins to affect a baby during the first stages of its life. According to DHS, indicators of undernutrition in children "are higher for children whose mothers are undernourished."[16] If women have a poor or insufficient diet during their pregnancy, they face an increased risk of delivering low birth weight and "small-for-gestational-age" babies, as well as an increased risk of infant mortality.[17] This is important since birth weight helps to determine overall child health and nutrition, and low birth weight babies "face higher risks of illness and death."[18] If a mother is better nourished during pregnancy, so too will her baby be better nourished during her pregnancy as well as after he or she is born. Micronutrient supplementation with substances such as vitamin A, iodine, iron and zinc can help reduce many risk factors to

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[14] Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha, 32.
[15] Veneman, Ann M "Education is Key to Reducing Child Mortality: The Link Between Maternal Health and Education," *UN Chronicle* XLIV (2007),p.2, http://www.who.int/pmnch/topics/mdgs/2008unchronicle_aveneman.pdf.
[16] Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha, 101.
[17] Butta, Ahmed, Black, Cousens, Dewey, Giugliani, Haider, Kirkwood, Morris, Sachdey, Shekar, *The Lancet*.
[18] Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha, 62.

both mother and child, including anemia, pre-eclampsia, severe or persistent diarrhea and dysentery, lower respiratory infections, mortality and more.[19]

After a baby is born, proper breast feeding, and later subsequent complementary feeding and supplementation are crucial in ensuring that children receive the nutrition they need in order to prevent disease, stunting, and wasting. The World Health Organization recommends that infants be exclusively breastfed for the first six months since breast milk is "an unequalled way of providing ideal food for… healthy growth and development," containing "all the energy and nutrients that the infant needs for the first months of life."[20] Not only this, but "exclusive breastfeeding reduces infant mortality due to common childhood diseases such as diarrhoea [*sic*] or pneumonia, and helps for a quicker recovery during illness."[21] In total, breastfeeding "annually prevents an estimated 6 million infant deaths from infectious disease alone."[22] However, despite its benefits, many children in developing nations are not exclusively breastfed during the first six months. This can occur due to complex emergencies, children living in circumstances where they are separated from their mothers, the risk of mother to child transmission of HIV, low birth weight, and infants who are malnourished.[23] Many women more commonly face other difficulties when trying to breastfeed their children that may deter them from doing so, including sore nipples, plugged ducts and breast infection, or low milk supply.[24] USAID recommends that children in developing countries be breastfed for up to two years as this practice "would prevent many… of the estimated 9 million infant deaths that occur… each

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[19] Butta, Ahmed, Black, Cousens, Dewey, Giugliani, Haider, Kirkwood, Morris, Sachdey, Shekar, *The Lancet*.
[20] "Exclusive Breastfeeding," *The World Health Organization*, http://www.who.int/nutrition/topics/exclusive_breastfeeding/en/index.html.
[21] *Ibid.*
[22] "Breastfeeding Support and Promotion Programs," USAID: Maternal and Child Health, 2005, http://www.usaid.gov/our_work/global_health/mch/ch/techareas/breastfeed_brief.html.
[23] "Feeding in Exceptionally Difficult Circumstances," *The World Health Organization,* http://www.who.int/nutrition/topics/feeding_difficulty/en/index.html.
[24] "Coping with Breastfeeding Challenges," *U.S. Department of Health and Human Services,* http://www.womenshealth.gov/Breastfeeding/index.cfm?page=229.

year," but without adequate counseling for women who face breastfeeding complications this recommendation may never become a reality.[25] Nonetheless, some breastfeeding is better than none at all. Children who are not breastfed appropriately "have repeated infections, grow less well, and are almost six times more likely to die by the age of one month than children who receive at least some breast milk."[26] Therefore many believe it to be absolutely crucial that children are breastfed within the first months of their lives.

Once a child is past six months of age they should receive complementary feeding in order to ensure they receive proper nutrition. This means a new diet composed of both breast milk and solid foods. It is during this period of time that "breast milk alone is no longer sufficient to meet all nutritional requirements" for infants and young children, which places them at "an increased risk of malnutrition."[27] This is particularly troublesome given that "infants and young children… [have] high nutritional requirements" that must be met in order to achieve proper growth and development.[28] Proper complementary feeding can help to reduce childhood malnutrition by introducing foods into a child's diet that provide "sufficient energy, protein, and micronutrients to meet a growing child's nutritional needs" and which are given "consistent with a child's signals of appetite."[29] Studies have shown that "educational interventions" such as feeding counseling for caregivers on nutrient intake given in combination with food supplements can have a positive impact in reducing child mortality and malnutrition.[30] By focusing nutritional interventions on mothers' health and education, children's well-being will also improve in turn.

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[25] "Breastfeeding Support and Promotion Programs," USAID.
[26] "Complementary Feeding: Report of the Global Consultation," p iii.
[27] *Ibid.,* pg.1.
[28] http://www.who.int/quantifying_ehimpacts/publicaitons/MalnutritionEBD12.pdf.
[29] "Complementary Feeding: Report of the Global Consultation," pg. 1-2.
[30] *Ibid.*

Lastly, poor diet in and of itself is another factor that contributes to malnutrition in children under five. Poor diet often results from a lack of "access to adequate… foods… necessary for improving infant and young child feeding" since diets "based solely on unmodified, locally available ingredients, are often inadequate to meet recommended energy and nutrient needs."[31] Achieving dietary diversity can often depend on previously mentioned socioeconomic factors such as the income and location of a household. Children living in rural and/or poor areas may be disadvantaged in terms of access to nutritious and nutrient diverse foods when compared to the "the better-off" who suffer less from malnutrition.[32] Therefore, improving children's diets may also involve improving the economic status.

Background:

Malnutrition is an issue that affects children living in both Bolivia and Brazil. However, the problem manifests itself differently within each population. In order to account for these differences and gain a sense of why malnutrition occurs, one must first examine demographics and statistics from each country.

Bolivia is a nation of approximately nine million people.[33] Of these nine million, 60% are under the age of twenty five and only seven percent over the age of 65.[34] This implies that the country is very young in general and supports an increasing population; children are being born at a higher rate than the elderly are dying. In fact, as the Pan American Health Organization states, Bolivia's population has "tripled in size" during the past fifty years.[35] However this

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[31] *Ibid.,* pg.4.
[32] Poel, Hosseinpoor, Speybroeck, Ourti, Vega, "Socioeconomic Inequality in Malnutrition in Developing Countries," *World Health Organization*, Vol. 86 No. 4 (Apr. 2008), http://www.who.int/bulletin/volumes/86/4/07-044800/en/.
[33] "Bolivia," *World Health Organization,* http://www.who.int/countries/bol/en/.
[34] "Bolivia: Country Cooperation Strategy at a Glance," *The World Health Organization*, http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_bol_en.pdf.
[35] "Bolivia," *Pan American Health Organization*, http://www.paho.org/English/DD/AIS/cp_068.htm.

demographic distribution may also be partly due to the fact that the current average life expectancy at birth in Bolivia is 63 for males and 67 for females; therefore, this percentage may be small because some adults do not ever reach the age of 65.[36] Similarly, couples may be having more children because the likelihood of childhood survival is low. Because life expectancy "reflects the health of a country's people…the quality of care they receive when they are sick," and generally tends to increase with greater income, one can infer that Bolivia is a nation facing both health and economic difficulties.[37]

While Bolivia as a whole can be considered among Latin America's poorest nations, it is important to note that not all Bolivians experience poverty to the same degree. One of the most striking features about the country's demographic is the gap or disparity between the richer and poorer populations. Estimates from the World Health Organization indicate that in 2003 although the average per capita income was around US$ 900, "the income of the wealthiest 20% of the population is 13 times higher than that of the poorest 20%."[38] While most Bolivians may not be considered 'wealthy' by U.S. standards given their per capita income, this statistic demonstrates much about the distribution of this wealth. Almost two-thirds (62.7%) of the population lives under the national poverty line, and of this two thirds about 35% live in extreme poverty.[39] Similarly, this number coincides with the 2001 census indicating that around 64% of the population "did not bring in enough income to meet its basic needs."[40] It is statistics such as these that emphasize Bolivia's economic status, or lack thereof, on the whole.

Of those considered among the poor, the most marginalized tend to be the indigenous and rural populations. In many cases these two groups are one in the same. Indigenous people make

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[36] "Bolivia," *World Health Organization,* http://www.who.int/countries/bol/en/.
[37] "Life Expectancy," *The World Bank*, http://www.worldbank.org/depweb/english/modules/social/life/print.html.
[38] "Bolivia: Country Cooperation Strategy at a Glance," *World Health Organization*.
[39] *Ibid.,* 1 and "Bolivia," *World Health Organization.*
[40] "Bolivia: Country Cooperation Strategy at a Glance," *World Health Organization*.

up roughly two-thirds of the population, which is significant since more than 60% to 70% of indigenous people "live in rural areas and account for between 45% and 50% of the rural poor."[41] Many rural areas tend to be extremely mountainous, meaning they are difficult to access; here, poverty rates "are extremely high, approaching 100 percent" in many cases.[42] However, though the standard of living may be somewhat higher in Bolivia's cities, this does not mean that cities are without poverty. As people from rural areas migrate to cities in hopes of improving their welfare their poverty travels with them; they do not immediately change their economic status merely by changing location.[43] Migration is not a new trend in Bolivia as the rural population "decreased from 65% to 35% of the national population" between 1950 and 2000.[44] Though poverty usually tends to be lower in cities in comparison to rural areas, the migration of rural poverty could become an even larger issue in the future if this trend increases throughout the 21st century.

Children's well-being and nutritional status are highly affected by all of these circumstances and more. Overall, Bolivia has a high infant mortality rate of 65 per 1000 live births, with 7,000 of the 255,000 infants born each year dying in their first month of life and another 7,000 dying within their first year.[45] Of those between the ages of six months and five years that do survive, almost fifty-one percent are malnourished.[46] Consequently, improving nutrition for children under five is of great concern to the future of the nation.

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[41] "Strategy for Indigenous Development," *The Inter-American Development Bank*, February 2006, pg. 5, http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=691275.
[42] "Poverty Within Countries," *CIESIN*, pg.20, http://sedac.ciesin.columbia.edu/povmap/downloads/maps/atlas/chp4.pdf.
[43] "Country Cooperation Strategy at a Glance: Bolivia," *World Health Organization.*
[44] "Bolivia," *World Health Organization.*
[45] "Bolivia," *World Health Organization,* and "Bolivia: Challenges for Children," *Save the Children*, 2008, http://www.savethechildren.org/countries/latin-america-caribbean/bolivia/challenges-for-children.html.
[46] "Bolivia: Challenges for Children," *Save the Children*.

Beginning with pregnancy, maternal health can play a large part in determining the health of a child. As one can imagine women living in rural areas of Bolivia receive less prenatal treatment than those living in urban areas, and the treatment they do receive is of a lesser quality; those women who obtain adequate prenatal care are "concentrated in the upper wealth quintiles" of society.[47] Without proper prenatal care, it is less likely that mothers are receiving complementary foods and vitamins that will ensure they deliver a healthy baby. Consequently many children are born underweight and are more prone to disease. Likewise, because many rural births take place in the home, this makes children less likely to see a doctor or receive proper vaccinations.[48] According to the Pan American Health Organization, hundreds of cases of diseases like measles, mumps, rubella, diphtheria and pertussis could have been prevented between 1998 and 2000 alone if proper immunization of children under five occurred around the nation.[49] Vaccinations are especially important for those who are undernourished as they can help bolster the immune system and help resist infection, thereby reducing infant mortality due to malnutrition.

The first few months of a child's life are crucial in terms of receiving the proper nutrition necessary for healthy development. In most contexts, this involves exclusive breastfeeding for the first six months of life. Though breastfeeding continues to be practiced in Bolivia,

> Exclusive breastfeeding… is only received by 70 percent of those under two months of age and by 56 percent of children from two to three months of age. After that, breastfeeding is only recorded in 17 percent of children that are six months old. In children under six months of age, exclusive breastfeeding is received by only 54 percent.[50]

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[47] *Translation from* "Encuesta Nacional de Demografía y Salud 2003" (Demografic and Health Survey), Chapter 9 p.158, "Mortalidad Infantil, En la Niñez, Adulta y Materna", http://www.measuredhs.com/pubs/pdf/FR159/08Chapter08.pdf.
[48] *Ibid.*
[49] "Bolivia," *Pan American Health Organization*, http://www.paho.org/English/DD/AIS/cp_068.htm.
[50] *Translation from* "Encuesta Nacional de Demografía y Salud 2003" (Demographic and Health Survey), Chapter 10, pg. 198-201.

These numbers are highly troubling considering the importance of breast milk for newborns. Not only can breastfeeding reduce infant mortality and fortify the immune system, but research has shown that it can help promote children's intellectual and motor development.[51] With just over half of infants under six months being exclusively breastfed, Bolivia's children are at a high risk for being malnourished. Because children are not fed only breast milk this means they are introduced to complimentary foods at an earlier age.[52] However, these foods cannot provide the nutrition needed for infants during this stage of their lives, and children may thus become malnourished.

From six to eighteen months of age the incidence of malnutrition tends to rise as complementary foods are introduced since they tend to be of poorer nutritional quality than breast milk.[53] Though no recent data exists on food consumption for the population in general, let alone children under five, "studies… indicate a low energy intake" that tends to vary depending on location (urban versus rural).[54] Children in rural areas tend to live with higher levels of poverty and are "between 1.5 and 3.7 times more likely to be underweight than [those] living in urban area[s]" because they lack access to the same resources.[55] This is not to say that the urban areas are without poverty or malnutrition; children living in cities are also affected. However, the ratio of rural to urban mortality in children under five is 1.5; likewise, the probability of stunting in children under five is 2 times greater in rural areas than urban.[56] Both populations are affected but to a different degree.

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[51]León-Cava, Natalia and Chessa Lutter, Jay Ross, Luann Martin, "Quantifying the Benefits of Breastfeeding: A Summary of the Evidence," *Pan American Health Organization* 2002, pg.3, http://www.linkagesproject.org/media/publications/Technical%20Reports/BOB.pdf.
[52] "Encuesta Nacional de Demografía y Salud 2003" (Demografic and Health Survey).
[53] "Complementary Feeding: Report of the Global Consultation," pg. 1.
[54] *Translation from* "Perfiles de Nutrición por País: Bolivia" (Nutritional Profiles by Country: Bolivia), *Agriculture and Consumer Protection Department*, http://www.fao.org/ag/agn/nutrition/bol-s.stm.
[55] "Child Malnutrition in Latin America and the Caribbean," *ECLAC,* April 2006, http://www.eclac.org/dds/noticias/desafios/4/24384/Desafios_Nro2_ing.pdf.
[56] "Bolivia," *World Health Organization.*

One the whole, studies in Bolivia have shown that

> Child mortality is higher in the rural area than the urban area (96 of 1000 vs. 59 of 1000). The difference in this indicator is greater than that of infant mortality, since it is known that mortality after the first year of life is more closely associated with prevailing socioeconomic and environmental conditions, which are much lower in rural areas.[57]

Such conditions can affect the quality of food received by children, the sanitation facilities available to them in the home, and the education of caregivers. All of these can lead to nutrition-related problems such as anemia, iodine deficiency, diarrhea and chronic malnutrition. Children in Bolivia whose mothers attain some degree of education and literacy are more likely to be able to prevent their children from becoming chronically malnourished than those who are illiterate.[58] In 1999, only "72% of the population had access to potable water services… and 61% had access to sanitation and… disposal services."[59] This can lead to both illness and infectious disease, which "alter the absorption and utilization of food" by the body and make it difficult for children to obtain nutrients from the foods they eat.[60] Though these percentages may have improved in the last few years they have not yet reached total population coverage.

In contrast with Bolivia, Brazil is the largest country in South America and boasts a population of approximately 186 million people.[61] Of these 186 million, "young people… account for 28.3 percent of the population and senior citizens… 8 percent."[62] As a result the majority of adults both young and middle-aged fall between these two categories; though the age distribution is not completely level, this means that the birth rate is declining throughout the

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[57] *Translation from* "Encuesta Nacional de Demografía y Salud 2003" (Demographic and Health Survey), Chapter 9, pg. 138.
[58] "Bolivia," *Pan American Health Organization*, http://www.paho.org/English/DD/AIS/cp_068.htm.
[59] *Ibid.*
[60] *Translation from* "Programa de 'Desnutrición Cero': Niñas y niños bien nutridos, un compromiso de todos" ('Malnutrition Zero' Program: well-nourished girls and boys, a commitment to all), Bolivian Ministry of Health and Sports, La Paz, June 2007.
[61] "Brazil," *World Health Organization,* http://www.who.int/countries/bra/en/.
[62] Hudson, Rex A, "*Brazil: A Country Study,*" Washington: GPO for the Library of Congress, 1997, http://countrystudies.us/brazil/.

nation. According to the World Health Organization the average life expectancy for males is 68 years and the average life expectancy for females in 75 years.[63] This is an increase in total average life expectancy from years past; as people begin to live longer, there is less need to have more children in order to 'replace' those that have died.

Because Brazil is such a large nation, there are discrepancies in the development of its many regions. On the whole, around 81% of the total population lives in urban areas located in the northeast and southeast, which encompasses cities such as Sao Paulo, Rio de Janiero, Salvador and Belo Horizonte.[64] Almost half of the nation is made up of the Amazon, an area considered to be the "largest extension of hot and humid rainforest in the world."[65] Subsequently, little development has occurred here and those that occupy this territory tend to be indigenous peoples. Other rural areas in the southern and center-west regions are mostly concentrated in agriculture and are home to some of the country's poorest and most marginalized populations.[66] As was the case with Bolivia, people living in poorer and often rural areas tend to have less access to the resources necessary for promoting healthy nutrition. Improvements being made in children's health care, food security, nutrition, basic sanitation, and vaccinations within Brazil have not "benefited the population in a uniform manner" as they tend to reach those with more wealth and status in society.[67] Consequently, the socioeconomic status of a population has much to do with the well-being of its children.

However, poverty is rampant in Brazil's cities as well. Though the gross national income per capita reached $8230 USD in 2005, according to the World Bank "one-fifth of Brazil's…

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[63] Brazil," *World Health Organization,* http://www.who.int/countries/bra/en
[64] "Background Note: Brazil," *U.S. Department of State*, http://www.state.gov/r/pa/ei/bgn/35640.htm. and "Inequality and Economic Development in Brazil," *The World Bank*, http://wbln0018.worldbank.org/LAC/.
[65] "Irrigation in Brazil," *FAO Regional Office for Latin America and the Caribbean* 1998-2002*,* http://www.fao.org/Regional/LAmerica/paises/h2o/brazil.htm.
[66] *Ibid.*
[67] "The State of Brazil's Children: The Right to Survival and Development," *The United Nations Children's Fund (UNICEF)* 2006, pg. 11, http://www.unicef.org/sitan/images/Brazil_SitAn_2006.pdf.

people account for only a 2.2 percent share of national income. Brazil is second only to South Africa in a world ranking of income inequality."[68] Because most of the country's population is concentrated in cities, it is plausible to assume that this kind of poverty has a strong presence in surrounding slums or 'favelas.' Many of the most marginalized people live in these areas, and children growing up in these conditions have "low educational levels… limited access to water and sanitation services… [and] are the most vulnerable to hunger and malnutrition."[69] This places them at a great disadvantage in comparison with their wealthy counterparts.

Children's well-being and nutritional status are highly affected by all of these factors. Though Brazil's infant mortality rate has declined in recent years, it still remains around 26.6 per 1000 live births—this implies that "each year, nationwide, almost 100,000 children die prior to completing one year of life."[70] Of those that do survive past their first birthday, they face a 33 in 1000 chance of dying before the age of five.[71] Though infant and child mortality are affected by factors other than nutrition, nutrition has a large role to play in prolonging and improving the quality of children's lives.

Raising healthy children often begins with improving the health of mothers. One of the principal objectives of care during the prenatal period is to monitor the woman's health and reduce risks that contribute to both maternal and infant mortality. According to Brazil's Demographic and Health Survey, children whose mothers receive "more than four prenatal consultations have a 60% greater chance of survival than those whose mothers never see a doctor or see a doctor less than three times."[72] Wealthier women who tend to live in urban areas are

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[68] Brazil," *World Health Organization,* http://www.who.int/countries/bra/en/, and "Country Brief: Brazil," *The World Bank,* www.worldbank.org.
[69] "Child Malnutrition in Latin America and the Caribbean," *ECLAC*.
[70] The State of Brazil's Children: The Right to Survival and Development," *The United Nations Children's Fund (UNICEF* 2006*)*, pg. 9.
[71] "Brazil," *World Health Organization.*
[72] *Translation from* "Saúde da Mulher e Da Criança" (Women's and Children's Health), *Demographic and Health Surveys,* pg 104, Chapter 8, http://www.measuredhs.com/pubs/pdf/FR77/08Capitulo8.pdf.

more likely to see doctors as they may have greater access and resources; poorer, rural women and their babies are at a disadvantage in comparison and may not receive needed information on proper nutrition or advice on providing care for their newborns. This is reflected in the fact that childhood and infant mortality in rural areas is "practically double that of urban areas."[73] Consequently, although Brazil's infant mortality rate has been declining over the past few decades, "a major portion of such deaths occur in the first month of life, thus emphasizing the importance of factors linked to pregnancy, delivery, and postpartum."[74] Of children that do survive beyond this first month, perinatal causes "accounted for 48.5% of all under-5 deaths in Brazil" in recent years. Therefore it is crucial for child survival that mothers receive adequate nutrition and attention during this stage.[75]

Similarly, it is crucial that children are properly vaccinated against disease. In this regard, Brazil appears to have decent coverage for children under five since there are surveillances systems in place. However, neonatal tetanus, diphtheria and hepatitis B remain an issue for this age group.[76] Vaccinations help support the immune system, prevent illness and thus allow children to absorb essential nutrients from the foods they consume. Though the percent of those suffering from malnutrition and acute malnutrition—5.7% and 2.3% respectively—may seem small, this is still a significant number of children given the size of the total population.[77] Lack of proper vaccination in combination with poor nutrition places the lives of these children at risk.

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[73] *Ibid.,* 97.
[74] The State of Brazil's Children: The Right to Survival and Development," *The United Nations Children's Fund (UNICEF)*, pg. 12.
[75] *Ibid.*
[76] "Brazil," *Pan American Health Organization,* http://www.paho.org/English/DD/AIS/cp_076.htm.
[77] *Ibid.*

Proper nutrition in the first months of life is essential for ensuring healthy development. Although it is recommended that children be exclusively breastfed for the first six months, breastfeeding in Brazil

> Decreases very rapidly before children reach six months of age, and studies suggest that only around 60% of those less than 2 months of age are exclusively breast fed… Before entering their seventh month of life, 13% of children are exclusively breastfed while another 51% are also breastfed though they receive other foods.[78]

A large percentage of children are being introduced to complementary foods at very early ages, placing them at greater risk of being malnourished. Children who are not breastfed appropriately "have repeated infections, grow less well, and are almost six times more likely to die by the age of one month" than children who are properly breastfed.[79]

As in Bolivia, after six months of age the incidence of malnutrition in Brazil tends to rise as complementary foods are introduced. While detailed statistics regarding diet and complementary feeding patterns are difficult to locate, discrepancies do exist between nutrition in children under five depending on whether they live in urban or rural areas. In total, the prevalence of malnutrition "was higher in rural areas with 9% of underweight compared to urban areas where there were only 5% of underweight children."[80] According to the World Health Organization, the ratio of rural to urban mortality in children under five is 1.6; similarly, the probability of stunting in children under five is 2.4 times greater in rural areas than urban.[81] It is interesting to note that "main food items, which provide most of the dietary energy supply, are similar from one region to another," meaning that the inconsistency between the urban and rural settings is really an issue of access.[82] Yet because much of the population lives in urban areas,

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[78] *Translation from* "Saúde da Mulher e Da Criança" (Women's and Children's Health), *Demographic and Health Surveys,* pg 127.
[79] "Complementary Feeding: Report of the Global Consultation," *The World Health Organization,* pg. 1.
[80] "Nutritional Profiles by Country: Brazil," *Agriculture and Consumer Protection Department*, http://www.fao.org/ag/AGN/nutrition/bra-e.stm.
[81] "Brazil," *World Health Organization*.
[82] *Ibid.*

malnutrition exists there as well. Children living in the slums of large cities, for example, are particularly susceptible to malnutrition.[83] Nonetheless, malnutrition tends to be more pronounced in rural areas when compared to urban settings.

Undernutrition during this stage of life is also affected by other socioeconomic factors. For instance, a mother's level of education plays a large role in the nutritional well-being of her children. The United Nations Children's Fund notes that "the more years of schooling the mother has, the greater the chances of her preventing the death of a child in its first five years of life" as she will be able to better care for both herself and her child.[84] On average, children and infants of Brazilian women who received between 9-11 years of schooling had a mortality rate that was three time less than those whose mothers had never attended school.[85] At the same time, lack of basic sanitation and potable water sources "increases the risk of contracting infectious illnesses… [and leads] to…malnutrition."[86] Approximately 10% of Brazilians do not have access to an improved water source; when taking into account that the total population amounts to 186 million citizens, this percentage becomes extremely significant.[87] All of this can contribute to nutrition-related problems such as iron deficiency, anemia and acute diarrheal disease that are still prevalent in the country today.

Programs:

Previously cited evidence in this paper allows for the conclusion that the nutritional status of children under five must be improved in both Bolivia and Brazil. This section will analyze one major effort of each respective government being carried out in order to correct malnutrition.

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[83] "Saúde da Mulher e Da Criança" (Women's and Children's Health), *Demographic and Health Surveys.*
[84] The State of Brazil's Children: The Right to Survival and Development," *The United Nations Children's Fund (UNICEF)*, pg. 16.
[85] *Translation from* "Saúde da Mulher e Da Criança" (Women's and Children's Health), *Demographic and Health Surveys,* pg 130.
[86] "Child Malnutrition in Latin America and the Caribbean," *ECLAC*.
[87] "Brazil at a Glance," *The World Bank*, http://devdata.worldbank.org/AAG/bra_aag.pdf.

Bolivia: "Desnutrición Cero" (Zero Malnutrition)

Recognizing the critical state of nutrition in children under five, the Bolivian government and the Ministry of Health and Sports have put forth "Desnutrición Cero" as part of the National Development and Health Development Plans for 2006-2010. This is a social program that will attempt to mobilize the entire nation around the goal of eliminating malnutrition, focusing its energy on targeting those municipalities that are "most vulnerable to food insecurity, in which populations that have been historically excluded… live" in order to promote equality.[88] Its central goal is to strengthen the ability of families, communities, the health system and municipalities to improve the feeding and care of children under five and women who are pregnant or breastfeeding. It denounces the nation's current rates of both malnutrition and chronic malnutrition, and recognizes that both persists as a result of

> social, economic, political, and cultural exclusion of those segments of the population that live in conditions of poverty, without basic health services, potable water, access to health, education and in situations of food insecurity; in this way… it is a reflection of the economic inequality and sociopolitical crises plaguing our planet.[89]

Confronting this issue will require an intervention that is "intersectoral, massive, coordinated, sustained over time and in which the organized community can greatly participate."[90] The Health Sector will be charged with initiating a series of intersectoral and community-oriented processes geared not only towards preventing malnutrition, but also towards assuring that children receive the best care possible in both health establishments and in the home. This means "promoting the best food and care practices… [and] the early detection and treatment of malnutrition and prevalent diseases."[91] Mobilizing and coordinating government ministries and

[88] *Translation from* "Programa de 'Desnutrición Cero': Niñas y niños bien nutridos, un compromiso de todos" ('Malnutrition Zero' Program: well-nourished girls and boys, a commitment to all), Bolivian Ministry of Health and Sports.
[89] *Ibid.*
[90] *Ibid.*
[91] *Ibid.*

departments with the municipal governments of civil society will help to optimize the use of resources and allow for intervention not only in "detection, treatment and rehabilitation… but also in factors that contribute to the problem."[92]

Through this program, the Ministry of Health and Sports hopes to achieve three main results by the year 2010:

1. Having improved feeding and care practices for children less than five years of age.
2. Promoting the consumption of the complementary food "Nutribebé" for children between 6 and 23 months, and other complementary foods for pregnant women that are undernourished such as the supplementation and consumption of foods fortified with micronutrients.
3. Having strengthened institutional capacity to address nutrition and prevalent illnesses for children less than five years of age.

Implementing this program will involve: printing and distributing the document outlining Desnutrición Cero around the country; coordinating, planning, follow-up and evaluation of multi-sectoral actions geared towards achieving the goals of the program; diffusing the integrated mobilization strategy, communication and social marketing of the program as part of the Integrated Health Strategy; coordination with scientific and academic institutions.[93] The project will initially be put into practice in 52 municipalities, 40 of which are deemed to have an extremely heightened vulnerability to food insecurity and 12 of which are thought to have only a heightened vulnerability. The main initiative will be implemented under the responsibility of the National Council on Food and Nutrition (CONAN), headed by the President, and shaped by nine ministries including the Ministry of Education and Culture, the Ministry of Development Planning, the Ministry of Rural Development, the Ministry of Justice and Representatives of Civil Society. It will be centrally coordinated at the sectoral level by technical teams in the Health Services Unit, and its implementation at the state-level will be the responsibility of a

[92] *Ibid.*
[93] *Ibid.*

technical team and shaped by individuals from Nutrition, Planning, Health Services, and more. At the municipal level, operational activities will be the responsibility of "Gerente de Red" (a technical team), and health personnel in conjunction with local health directors, social organizations, and the community in general.

Similarly, the program will create a new Unit on Integral Nutrition whose technical team will "lead actions to promote and prevent malnutrition," including a network to promote "breastfeeding and sufficient and adequate complementary feeding for all children between 6 and 23 months and for pregnant women who are underweight, the consumption of fortified foods by all, and health and safe feeding practices for children in general."[94] They will monitor and promote supplementation with micronutrients, giving technical assistance to those that are part of the network in order to help them to detect and manage malnutrition. At the same time they will constitute a space of "exchange and coordination" with traditional medicine, as with other actors in civil society that help the goals of Desnutrición Cero.[95]

Brazil: "Fome Zero" (Zero Hunger)

The Fome Zero initiative began in 2003 and is based on the principal idea that every citizen has the right to adequate food. President Luiz Inácio Lula da Silva announced that fighting hunger was an "absolute priority" for his administration, saying that his "life's mission would be accomplished if, at the end of his term of office, each Brazilian had access to three meals a day."[96] Because the poorest members of society tend to be those with the least access to such resources, the program defines its target population "through the use of an available income based poverty line (monetary income *minus* fixed rental payments… plus value of food self-

[94] *Ibid.*
[95] *Ibid.*
[96] *Translation from* "Fome Zero," 2006, http://www.fomezero.gov.br/o-que-e.

reliance)" in hopes reaching those most in need, thereby eliminating hunger, assuring food security, and creating inclusiveness .[97] This means a coordinated effort on the part of several government ministries that are directly linked to Fome Zero, making it possible to ensure greater access to food, expand the production and consumption of healthy foods, generate jobs and income, improve the quality of education and health conditions, and create access to water supply.[98] These include the ministries such as the Ministry of Health, Ministry of Education, Ministry of Agriculture, Ministry of Science and Technology, and the Ministry of Social Development. The principles of the program are based on "the intersection of state actions in three spheres of government: development of joint actions between the State and civil society; transcending economic, social, gender, and racial inequalities; and the link between budget management and emergency measures."[99]

In order to achieve its goals, Fome Zero is divided into four separate branches that contain various social programs. The first, "Access to Food," involves reducing social inequality through income transfers for food and food stamps, education, and basic necessities for poor families in the "Bolsa Famila" or Family Grant program. This program "covers 3.8 million households and receives the largest chunk of Fome Zero resources."[100] Some of the programs that fall under this category include the distribution of vitamin A, the creation of a food and nutrition monitoring system, initiatives for promoting nutrition in infants and women who are pregnant or breastfeeding, school feeding programs, and the creation of food banks.[101] The second branch involves Generation of Income through promoting professional training as well as developing community producer groups and micro credit programs. The third branch is

[97] "Projeto Fome Zero: Report of the Joint FAO/IDB/WB/Transition Team Working Group."
[98] *Translation from* "Fome Zero," 2006.
[99] *Ibid.*
[100] "Perspectives in Health," *Pan American Health Organization,* http://www.paho.org/English/DD/Pin/perspectives20.htm
[101] *Translation from* "Fome Zero," 2006, http://www.fomezero.gov.br/o-que-e.

designated for Strengthening Family Agriculture through creating national programs and making agricultural insurance available. One of its main goals is developing territories located on the periphery of the country not only to generate income and food security in these areas, but to "socioeconomically emancipate" families there that live under the poverty line.[102] The final branch of Fome Zero deals with social programs that will promote citizen education and mobilization, public-private partnerships, and capacity building for public servants.[103] Greater citizen involvement will lead not only to innovative solutions, but solutions that are also more effective and sustainable than those that could be created at the government-level.[104] In addition to all of these programs, the government has planned emergency efforts to provide "basic food baskets" for citizens affected by "floods or natural disasters, as well as landless and rural workers and indigenous and isolated communities" as well.[105]

The Fome Zero program recognizes that hunger and poverty are experienced differently in each region of the nation. Consequently, different "flexible institutional arrangements which ensure that actions respond to local conditions and demands, as expressed by the target population themselves" must be created to achieve the maximum benefit for the largest number of people.[106] Strengthening the link between local and national government as well as municipalities and civil society will help the project to become sustainable and well accepted throughout the country.

Analysis:

Both programs are practical in their efforts as they target the poorest populations that are most affected by malnutrition and hunger. Though each entails a government-led, nation-wide

[102] *Ibid.*.
[103] *Ibid.*
[104] *Ibid.*
[105] "Perspectives in Health," *Pan American Health Organization.*
[106] "Projeto Fome Zero: Report of the Joint FAO/IDB/WB/Transition Team Working Group."

effort, Bolivia's program is focused specifically on proper feeding and care for children under the age of five; Brazil's program focuses on malnutrition within marginalized groups in the larger society by supplementing income and ensuring food security. This is because each nation's experience with malnutrition has manifested itself differently. In terms of childhood and infant mortality, while Bolivia is a smaller nation it faces higher rates than Brazil because it is not yet as economically developed. Bolivia also has a larger rural population that is more difficult to access versus the 81% of the Brazilian population that lives in the nation's cities. Nonetheless, the rates of malnutrition and mortality among Brazilian children are still alarming despite their small percentage values given that the population is so large. This makes it difficult to say which nation is 'better' or 'worse' off in terms of the problems they face in confronting malnutrition.

Desnutrición Cero is a relatively new program that was initiated by the Bolivian government in June 2007. Because the program is so young it is difficult to evaluate its successes or shortcomings as these efforts take time to produce results and create change. Even so, this program has the potential to drastically improve the lives of millions of Bolivian mothers and children in the next few years. Community involvement is essential in the program's success as it allows individuals to be directly involved in the process. Improved knowledge about proper child care, breastfeeding and complementary feeding can be passed down from one generation to the next; with adequate national support and monitoring to ensure that such practices are being followed, this increases the potential sustainability of the program. Similarly, the proposed strengthening of institutional capacity to deal with these issues is essential to the programs sustainability as well. This means not only creating monitoring programs and training members of government on such matters, but also ensuring that hospitals have trained personnel

who are capable of dealing with malnourished children and providing accurate information to their families. Such investment on the municipal level throughout the nation will help to produce better results and conditions in the future.

Yet regardless of the program's strong points there appear to be several potential stumbling blocks that could impede its progress. First, one of the main strategies for generating support and awareness is through the use of marketing and information distribution. However many of the poorest people in Bolivia lack high levels of education, which increases the likelihood that they are illiterate and will not be able to utilize these resources. Though the program outline also mentions 'social marketing' as another technique that would be used to promote Desnutrición Cero, it does not elaborate what this would entail and how it would reach out to the poor. Similarly, the program promotes the use of a complementary food called Nutribebé but fails to mention where funding for this supplement would come from and how it would be distributed. This is especially important since poor and rural families might be disinclined to buy it if the price was especially high and they had to travel a long distance to obtain it. These logistical matters must be worked out in the near future to guarantee the program's success.

In contrast, Brazil's Fome Zero focuses on families as a whole rather than a specific age group of citizens. This program has enjoyed success and achieved inclusiveness given the extensive number of initiatives and social policies that fall under its guidelines. However, the breadth of this approach makes it appear as if the government assumes that the benefits of Fome Zero will trickle down through the family and affect all members equally. This may not always be the case as there appears to be little written about the actual use of additional income from the cash transfers. For example, if the money is being put towards purchasing additional food, are

boys and girls given enough to eat or is one sex favored over another in this distribution? Do those working within the monitoring system have the power or ability to ensure equal distribution? This is important to consider when determining whether or not Fome Zero is effective in combating malnutrition.

Like Bolivia's Desnutrición Cero, Fome Zero seeks to mobilize the nation around the common objective of eliminating hunger. Recognizing that different regions of the country may have different needs that must be met in order to meet this goal is definitely a positive step. Rather than prescribing a set program, Fome Zero sets main objectives and encourages citizens to become involved in finding ways to achieve them in order to promote sustainability. Yet the sustainability of the program has come under criticism as income transfers are one of its main components. Income transfers are a short-term solution for a long-term problem, and their benefits usually tend to disappear when the transfers end.[107] Fome Zero hopes to increase the standard of living for vulnerable populations through creating jobs and opportunities, but seems to lack a definitive mechanism that would prevent families from becoming dependent on transfers in the future. There seems to be little incentive to not become dependent as the project does not provide a designated time frame after which the payments will cease. Since transfers are a major component of Fome Zero, the government must address this issue and find a sustainable solution.

Conclusions/Recommendations:

Both Fome Zero and Desnutrición Zero have many positive approaches towards combating hunger and malnutrition. In each case, more community outreach and monitoring are needed to ensure that programs are utilized to their full potential. With Desnutrición Zero, the

[107] "Projeto Fome Zero: Report of the Joint FAO/IDB/WB/Transition Team Working Group,"

program could be enhanced through on-the-ground training within communities on breastfeeding and childcare for those that are unable to read about the program in print form. While this may be costly it would help in terms of outreach to those populations who need it most. Likewise the Bolivian government could set up Nutribebé distribution centers within rural and urban communities that would be in charge of delivering the supplement to homes on a regular weekly schedule. This would also serve as another form of monitoring the progress of complementary feeding around the nation.

Fome Zero could be improved by creating a system to monitor how money is spent from the income transfer programs. This would involve increasing the responsibility of local monitors that are already in place, or perhaps creating more monitors charged solely with assessing how income transfers are spent. Because the duration of income transfers is somewhat controversial, the government could also place a time limit on their length. By setting out a plan that will outline the amounts and time periods during which transfers will be received, this will help families plan out how they will use this money and when. This may also involve training individuals to work with poor families on making wise decisions with the money they are allotted. Such an initiative would hopefully decrease dependency on transfers over time, thus adding to the project's sustainability in helping people to plan for their futures.

References

"Background Note: Brazil," *U.S. Department of State*, http://www.state.gov/r/pa/ei/bgn/35640.htm.

"Bolivia: Challenges for Children," *Save the Children*, 2008, http://www.savethechildren.org/countries

"Bolivia: Country Cooperation Strategy at a Glance," *The World Health Organization*, http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_bol_en.pdf.

"Bolivia," *Pan American Health Organization*, http://www.paho.org/English/DD/AIS/cp_068.htm.

"Bolivia," *World Health Organization,* http://www.who.int/countries/bol/en/.

"Brazil at a Glance," *The World Bank*, http://devdata.worldbank.org/AAG/bra_aag.pdf

"Brazil," *Pan American Health Organization,* http://www.paho.org/English/DD/AIS/cp_076.htm.

"Brazil," *World Health Organization,* http://www.who.int/countries/bra/en/.

"Breastfeeding Support and Promotion Programs," USAID: Maternal and Child Health, 2005, http://www.usaid.gov/our_work/global_health/mch/ch/techareas/breastfeed_brief. html.

Butta, Ahmed, Black, Cousens, Dewey, Giugliani, Haider, Kirkwood, Morris, Sachdey, Shekar, "What Works? Interventions for Maternal and Child Undernutrition and Survival," *The Lancet* 371 (2008), http://www.thelancet.com/journals/lancet/article/PIIS0140673607616936/fulltext.

"Child Malnutrition in Latin America and the Caribbean," *ECLAC,* April 2006, http://www.eclac.org/dds/noticias/desafios/4/24384/Desafios_Nro2_ing.pdf.

"Complementary Feeding: Report of the Global Consultation," p.iii, *The World Health Organization* http://www.who.int/nutrition/publications/Complementary_Feeding.pdf

"Coping with Breastfeeding Challenges," *U.S. Department of Health and Human Services,* http://www.womenshealth.gov/Breastfeeding/index.cfm?page=229.

"Country Brief: Brazil," *The World Bank,* www.worldbank.org.

"Encuesta Nacional de Demografía y Salud 2003" (Demografic and Health Survey), "Mortalidad Infantil, En la Niñez, Adulta y Materna", http://www.measuredhs.com/pubs/pdf/FR159/08Chapter08.pdf.

"Exclusive Breastfeeding," *The World Health Organization*, http://www.who.int/nutrition/topics/exclusive_breastfeeding/en/index.html.

"Feeding in Exceptionally Difficult Circumstances," *The World Health Organization,* http://www.who.int/nutrition/topics/feeding_difficulty/en/index.html.

"Fome Zero," 2006, http://www.fomezero.gov.br/o-que-e.

Global Strategy for Infant and Young Child Feeding," *The World Health Organization,* 2003, http://www.who.int/nutrition/publications/gs_infant_feeding_text_eng.pdf

Horton, Richard "Maternal and Child Undernutrition: an Urgent Opportunity," *The Lancet* 371 (2008), 15 Mar. 2008, http://www.thelancet.com/journals/lancet/article/PIIS0140673607618698/fulltext.

http://www.who.int/quantifying_ehimpacts/publicaitons/MalnutritionEBD12.pdf.

Hudson, Rex A, "*Brazil: A Country Study,*" Washington: GPO for the Library of Congress, 1997, http://countrystudies.us/brazil/.

"Inequality and Economic Development in Brazil," *The World Bank*, http://wbln0018.worldbank.org/LAC/.

"Irrigation in Brazil," *FAO Regional Office for Latin America and the Caribbean* 1998- 2002, http://www.fao.org/Regional/LAmerica/paises/h2o/brazil.htm.

"Life Expectancy," *The World Bank*, http://www.worldbank.org/depweb/english/modules/social/life/print.html.

León-Cava, Natalia and Chessa Lutter, Jay Ross, Luann Martin, "Quantifying the Benefits of Breastfeeding: A Summary of the Evidence," *Pan American Health Organization* 2002, http://www.linkagesproject.org/media/publications/Technical%20Reports/BOB.pdf.

Mukuria, Altrena, Jeanne Cushing, and Jasbir Sangha. "Nutritional Status of Children: Results from the Demographic and Health Surveys 1994-2001, *Demographic and Health Surveys,* 2005, http://www.measuredhs.com/pubs/pdf/CR10/CR10.pdf

"Nutritional Profiles by Country: Brazil," *Agriculture and Consumer Protection Department*, http://www.fao.org/ag/AGN/nutrition/bra-e.stm.

"Nutrition," *The World Health Organization,* https://www.who.int/child/adolescent_health/topics/prevention_care/child/nutritio n/en.

"Perfiles de Nutrición por País: Bolivia" (Nutritional Profiles by Country: Bolivia), *Agriculture and Consumer Protection Department*, http://www.fao.org/ag/agn/nutrition/bol-s.stm.

"Perspectives in Health," *Pan American Health Organization,* http://www.paho.org/English/DD/Pin/perspectives20.htm

Poel, Hosseinpoor, Speybroeck, Ourti, Vega, "Socioeconomic Inequality in Malnutrition in Developing Countries," *World Health Organization*, Vol. 86 No. 4 (Apr. 2008), http://www.who.int/bulletin/volumes/86/4/07-044800/en/.

"Poverty Within Countries," *CIESIN*, http://sedac.ciesin.columbia.edu/povmap/downloads/maps/atlas/chp4.pdf.

"Programa de 'Desnutrición Cero': Niñas y niños bien nutridos, un compromiso de todos" ('Malnutrition Zero' Program: well-nourished girls and boys, a commitment to all), Bolivian Ministry of Health and Sports, La Paz, June 2007.

"Projeto Fome Zero: Report of the Joint FAO/IDB/WB/Transition Team Working Group."

"Saúde da Mulher e Da Criança" (Women's and Children's Health), *Demographic and Health Surveys,* pg 104, Chapter 8, http://www.measuredhs.com/pubs/pdf/FR77/08Capitulo8.pdf.

"Smart Nutrition 101," 2008, http://riley.nal.usda.gov

"The State of Brazil's Children: The Right to Survival and Development," *The United Nations Children's Fund (UNICEF)2006* , pg. 11, http://www.unicef.org/sitan/images/Brazil_SitAn_2006.pdf.

"Strategy for Indigenous Development," *The Inter-American Development Bank*, February 2006, http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=691275.

Veneman, Ann M "Education is Key to Reducing Child Mortality: The Link Between Maternal Health and Education," *UN Chronicle* XLIV (2007), http://www.who.int/pmnch/topics/mdgs/2008unchronicle_aveneman.pdf.