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The Impact of Malnutrition on Food Insecurity in Mali

The West African nation of Mali, ranked 178th out of 182 countries on the United Nations Development Programme's Human Development Index in 2009, is one of the world's poorest countries. Poverty in Mali is a combination of monetary poverty caused by lack of income, poverty of living conditions caused by lack of access to proper health care and clean water, and the poverty of potential caused by uneven distribution of resources (IFAD). Poor water conditions have led to an increase in malnutrition in the country's population over the last decade. Malnutrition is caused by an excess or lack of protein, energy, and vitamins, and is associated with frequent infections and diseases. Disease and an inadequate water supply and sanitation are linked to poverty. All forms of malnutrition increase the chances of disease and early death. People who are malnourished are unable to utilize the food they eat because they absorb too many or too few calories, or have diarrhea or other illnesses which prevent nutrient absorption. Malnutrition affects people of all ages but is most common in groups without access to proper sanitation or health education. Eliminating malnutrition involves adequate health care, a healthy environment, and sustaining the quality and quantity of food (WFP). In Mali, malnutrition is caused by inadequate access to clean water and the lack of calories in diets. The coupling of poverty with malnutrition contributes to an increased burden of disease, stunted development, and a reduced ability to work (WHO). Of Mali's rural population, more than 77% is below the poverty line. Climate change has had a negative impact on crop production, reducing a source of income and food for Malian families. This limited food supply is further hindered by a lack of access to potable water supplies. In the village of Konodimini, five small water pumps served a village of 3,500 for several years before new pumps were introduced by the help of USAID. The old pumps continually broke, and even when functioning they did not produce enough clean water to support the village or its food sources. During periods of water scarcity, broken pumps were a source of tension between villagers. This issue has been experienced in several villages throughout Mali (USAID). To increase food security, the Government of Mali must address the problem of malnutrition and lack of nutritional education among its farming population.

The typical Malian farm family inhabits the Sahelian and Sahelo-Saharan regions of Mali. The rural inhabitants of this area practice dryland subsistence farming, growing a variety of crops such as cotton, rice, corn, millet, peanuts, and vegetables during the rainy season between June and November. Herds of cattle and goats are maintained as another source of income. Family size is around six members, who live in round huts built of dried stalks which can be easily erected. During the wet season the family remains close to ponds and other water sources, while during the cold season between November and February the household camps on the edge of a village. The young men take the herds in search of grazing during the dry period, leaving the rest of the family with the weaker animals to buy or barter for water. The maximum dietary intake by the family members occurs just after harvest, when there are enough calories to meet their bodies' needs. The number of calories is almost halved, from 14,700 to 7,840, between December and June (FAO). The school life expectancy is eight years for males and 5 years for females, assuming enrollment in school at all. Of the total population of Mali, it was estimated in 2003 that 46.4% of individuals fifteen or older could read and write. Health care for the typical Malian farming family is similarly limited. There is a high risk of obtaining an infectious disease, whether it be food or waterborne, vectorborne, resulting from contact with water, or respiratory related. The most common diseases that are faced include diarrhea, hepatitis A, typhoid fever,

malaria, schistosomiasis, and meningococcal meningitis. The life expectancy as estimated in 2010 for the total population is 51.78 years. With 80% of the population engaged in farming and fishing and only 3.76% of the land arable, there is an uneven distribution of resources. Environmental issues of soil erosion, desertification, and inadequate supplies of potable water contribute to the difficulties experienced by Malian farm families (CIA). A lack of rainfall over the past two seasons has also contributed to a decrease in crop production and an increase in food insecurity. Education and access to more resources can alleviate the strain placed on Malian farmers by providing a source of improved techniques and an opportunity to increase profits and amount of food available for their families.

Malnutrition impacts the Malian farming family because it increases the chances of disease and early death, which reduces the individuals' ability to work. The disease has led to an increase in the number of wasting children under the age of five years from 12.7 % in 1996 to 15.3% in 2006. The number of children experiencing stunting has decreased since 1996, but the number of underweight children increased 4.1% in a ten year period. Women of all Body Mass Indexes (BMI) have experienced an increase of malnutrition cases in the same ten year period between 1996 and 2006. Women with a BMI that equals or exceeds 25 kg/ m² did not represent many cases of malnutrition in 1995-1996, but make up 17.6% of cases in 2006 (WHO). Malnutrition as before mentioned is associated with a water supply of poor quality and inaccessibility to health care. With the current environmental conditions and the lack of potable water, farmers do not have enough water for their families or crops. The decline in the health of the family allowed by these factors is paralleled by the decline in crop production. Without vital nutrients provided by water, both people and plant begin to wither. Thus afflicted by disease and unable to produce crops, Malian farmers lose their source of income. The end of the growing season further strains the family's ability to survive with the shortage of available food, water, and income.

The current extent of this situation is apparent by the calls for assistance by the Government and people of Mali. In May 2010, it was estimated that 258,000 people most at risk received emergency aid from the government, the World Food Programme, and various humanitarian partners (WFP). Mali is a major recipient of foreign aid by major organizations such as the World Food Bank, the African Development Bank, and Arab Funds. Programs funded by the European Union, the United States, France, Canada, the Netherlands, and Germany provide further assistance the country needs to fulfill basic goals. The government of Mali and the Millennium Challenge Corporation signed a compact in 2006 to provide funds equivalent to U.S. \$460 million to develop agro-business and other programs (Bureau of African Affairs). Environmental degradation and climate change add to the challenges faced by the foreign-dependent country. Mali is naturally divided into the cultivated Sudanese zone of the south, the semiarid Sahelian zone in the center, and the arid Saharan zone in the north. In 2005 it was estimated that only 0.03% of land was devoted to permanent crops, while 96.21% was used for purposes other than agricultural development. Limited farming land is impacted by deforestation, soil erosion, desertification, and an inadequate supply of clean water. Erratic rainfall does not provide the constant source of water necessary for crop production and sustenance of life. Unsafe water is one of the leading causes of malnutrition, so the depleted source of potable water has led to increased illness among the population of Mali.

Trends for malnutrition have worsened as time has passed. Increased cases of wasting and low birth weights over the last ten years indicate that the issue of malnutrition has continued to impact the lives of Malians. Action Against Hunger reported that malnutrition in children below the age of five in Ansongo on the Niger River increased from 15.9% in 2009 to 18.5% in 2010 (UNHCR). Trends are measured by the rising number of cases of wasting, stunting, and underweight children. As food insecurity and environmental degradation increases, the Malian

farm family is faced with an increased opportunity to fall prey to malnutrition. A lack of clean water presents the opportunity to contract illnesses like diarrhea that can lead to malnutrition, and decreases the number of crops that can be maintained by the family. Without crops to provide an income or a source of nutrients, debt and hunger creep up on the family. Illness further decreases the ability of the farmer to work, which amplifies food and financial insecurity. The cycle can continue until the farmer and his family die of disease and starvation.

Alleviating or eradicating malnutrition would improve conditions for the Malian farm family. The absence of malnutrition would ensure the farmer's health and continued ability to produce what crops he could, depending on the environmental situation. Since malnutrition is linked with poverty and poor water quality, the lack of malnutrition cases would indicate an improvement in living conditions and food security. Mali's economy would benefit from the more stable base in agriculture operations provided by the absence of disease. Crop production hindered by the health of the farmer would no longer be a concern, and farm families could better address any debt obtained during the period of low crop production.

Changes in climate and water scarcity will have the largest impact on Mali's rural farming population. If the environment continues to degrade, food insecurity and poverty will continue to increase. Continued water scarcity will lower future crop production and raise the number of cases of disease among the population. However, if farming techniques are adapted to available water and land resources, increased food insecurity in Mali can be slowed or stopped altogether. If a positive change in food security and water availability occurs, the health of the Malian farm family will be protected and it will be able to continue working. If there is a sudden growth in population unaccompanied by a growth in food security, there will be an increase in the numbers of malnourished or underweight individuals in Mali. To combat these issues, it is important to call on the abilities of the rural farmers. By addressing their concerns, 80% of Mali's economic work force will be stabilized. Providing increased nutritional education and improved farming techniques will help eliminate malnutrition and food insecurity among Malian farm families. Improvements at the base of Mali's economy can limit the country's need to look outside for financial aid.

To address malnutrition and improve food security in Mali, further water regulations should be made to improve the quality of available water. The Global Water Partnership and the Economic Community of West African States have been working with the Government of Mali to enact an Integrated Water Resource Management policy in the country. The IWRM plan is aimed at reducing poverty and increasing sustainable development in Mali and neighboring countries. Mali finalized its IWRM plan with the help of the GWP in 2008. The plan developed over a four year period and a number of donors were convened to obtain financial support and discuss its implementation phase. Donors agreed to pay for 85% of the costs while the Government provided funds for the remaining 15% (GWP). It was estimated that 56% of the population accessed improved drinking sources in 2008 (WHO).

Increased health care and nutritional education can prevent cases of disease when combined with improved water regulation. The World Health Organization has no data available on the number of trained nutritional professionals available per 100,000 people. There is no data available that stated if nutritional education is even part of medical curricula, or if degree training in nutrition exists. It is known that the Government of Mali spent only 11.8% of its total expenditure on health care in 2007 (WHO). Organizations such as World Vision provide invaluable information to fill the gap in health education and action. In a 12 day course, World Vision clinic workers instruct mothers on how to choose more nutritious and balanced foods for their children. Cooking classes allow the mothers to create a simple nutritious meal using seasonal ingredients (Douglass

and Bardwell). If the Government works with or invites more educational organizations to come to the country, Malians will understand the most effective ways to battle malnutrition and similar diseases.

Improved farming techniques will further combat food insecurity and malnutrition. USAID has worked with farmers to improve water use management, land use planning, and soil erosion along the Niger River. By amending soil with organic material, fertilizer use efficiency, soil water retention, and crop yields have increased. A number of communities in the valleys bordering the Niger River has stabilized or increased vegetation cover on its land, raising the carbon storage levels of the soil. USAID has also combated rising environmental degradation in Mali by lowering the demand for wood as fuel and implementing micro-irrigation technologies (USAID). The World Food Programme's Country Programme in Mali helps poor, hungry households cope with natural disasters and make improvements in their own development. The Programme supports basic education, rural development, and food security until 2012 (WFP). Continued cooperation with agencies like USAID and the World Food Programme will nurture a growing education of agriculture techniques that can benefit Mali's economy.

Food banks provide a final barrier to malnutrition and food insecurity. Action Against Hunger runs 17 feeding clinics throughout Mali to prevent cases of malnutrition. Cases of acute malnutrition with complications are recommended to regional centers (UNHCR). Food banks reduce the number of ongoing malnutrition cases and help limit the possibility of future cases.

By combating malnutrition and providing basic nutritional education, the Government of Mali can improve food security. Environmental degradation and the uneven distribution of resources in Mali have placed a strain on farmers who already struggle to feed their families. Low crop productions resulting from mediocre farming techniques and a lack of water have caused Malian farmers to fall into debt. The lack of potable water has also led to malnutrition, a potentially deadly disease. Malnutrition prevents farmers from being fully productive, which further impacts profits earned through agriculture practices. Over the last ten years, there has been an increasing number of reports detailing the large number of wasting, stunting, or underweight individuals. If the government hopes to increase food security and promote stability in the country's economy, it will address malnutrition among farmers of the Sahelian and Sahelo-Saharan regions. Through cooperation with various agencies, the Government of Mali can successfully combat malnutrition and food insecurity at the source. Organizations that the country has previously worked with should continue to provide aid until the Government can manage its own affairs. An education of improved farming techniques will ameliorate the quality of farmable land and raise crop production. Nutritional education will provide background knowledge of proper food preparation and a balanced diet. Improving water conditions will lower the number of cases of malnutrition that originated from water-borne diseases. Food banks will provide help for individuals in need to combat malnutrition and wasting diseases. International research agencies should continue to monitor levels of malnutrition in Mali to see if improvements are being made. If malnutrition continues to worsen, immediate action should be taken to prevent a further deterioration of health among Malians. The ultimate goal for the country is for malnutrition and food insecurity to no longer be a concern. Until this goal is obtained, outside sources of aid are vital in decreasing malnutrition among Mali's farmers. Food security in Mali will be positively impacted if the Government takes the necessary steps to address malnutrition.

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