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Niger, Factor 9: Water & Sanitation

Resolving Water and Sanitation Access in Niger

Water is often taken for granted in the United States. Most Americans have ready access to a plentiful supply of clean water for drinking and cooking, washing clothes and dishes, showering, and flushing the toilet. However, people living in impoverished countries around the world lack adequate access to safe water and improved sanitation facilities, putting them at high risk for waterborne diseases and diminished food security. Global initiatives to reduce poverty have resulted in significant improvements in some countries. Programs funded by international organizations have resulted in increased access to piped water, installation of boreholes, and construction of latrines. However, underfunding has been an obstacle to progress, particularly in rural areas and in the sanitation sector. Increased funding for infrastructure, involvement of local communities, education, and training are key strategies for resolving water and sanitation access and improving food security. These initiatives are particularly relevant for poverty-stricken countries in sub-Saharan Africa. Niger, a large landlocked country located in the sub-Saharan region of western Africa, is one of the poorest countries in the world. The population of Niger exceeds 16 million people, and more than 60% of Nigeriens live below the poverty line (CIA). Approximately 18% of Nigeriens reside in urban areas, leading to an economy dominated by agriculture and livestock grazing. Agriculture accounts for 35.2% of Niger's gross domestic product (GDP), whereas industries represent only 14.2% of the GDP. Uranium mining is Niger's main industry and is the source of the country's most important export item. Sporadic rainfall, severe droughts, and locust or grasshopper infestations are regularly occurring threats to the country's food security. Based on country rankings for the 2013 Global Hunger Index (GHI) score, Niger is ranked 60 out of 78 countries, faring worse than most neighboring countries including Nigeria, Mali, and Benin (von Grebmer et al.). Approximately 40% of children under the age of 5 years are underweight and almost 17% are acutely malnourished. Life expectancy in Niger is approximately 54 years and 50% of the population is less than 15 years of age. Women in Niger give birth to an average of 7.57 children, leading to an estimated population growth rate that is one of the highest in the world. Nigeriens have limited access to health care and trained medical professionals. Health expenditures account for only 5.3% of Niger's GDP, as compared to approximately 11-18% in developed countries such as the United States, Canada, France, and Germany. Women have a high maternal death rate of 590 deaths/100,000 live births. The infant mortality rate is also quite high (88 deaths/1,000 live births) and diarrheal disease contributes to an under age 5 mortality rate of 13.6% (CIA). Poor sanitation and hygiene account for over 20% of deaths in Niger (USAID). Nigeriens have a very high risk of major infectious diseases that are transmitted by contact with contaminated food and water. Although access to safe drinking water is improving, particularly in urban areas, sanitation services are generally poor throughout the country.

A typical subsistence farm family in Niger is composed of a father, a mother, and several children. A typical rural family would generally pasture some animals and grow much of their own food. Their diet would primarily consist of cereals such as millet and sorghum, cowpeas, some vegetables, and occasional meat. However, the food supply is unreliable in this harsh environment, so the children are highly likely to be underweight and possibly acutely malnourished. The lack of essential nutrients frequently leads to illness, stunted growth, impaired cognitive development, and possible death. Most rural families in Niger do not have access to a safe source of water or improved sanitation facilities. Because the risk of food or waterborne diseases is very high, the children in a typical rural family are at increased risk for premature death due to complications arising from diarrhea. Diarrhea is often undertreated because the family's utilization of healthcare is limited by inadequate access to medical facilities, a shortage of trained medical professionals, and possibly cultural beliefs (WHO). Children in a rural family typically go to school for

only 5 years, resulting in an average literacy rate of 28.7%. Females are particularly disadvantaged, with a literacy rate of only 15% (CIA).

A typical Nigerien farm is small and, depending on location, families would be raising crops, livestock, or both. Families living in the sub-Saharan area of south-central Niger are purely pastoralists, only raising livestock such as cattle, sheep, and goats. As the terrain gives way to rolling plains and savannahs farther south, the climate becomes semi-arid and crops are introduced to a farm family's livelihood. These agropastoralist families engage in both agriculture and grazing to varying degrees. In the very far south of Niger, the typical rural family would be raising crops and very few livestock, due to the higher amount of rainfall in this area. The major crops grown in Niger are cowpeas, millet, sorghum, and rice (CIA). Traditional agricultural practices in Niger lack diversification, which has contributed to poor soil quality and soil erosion in some areas. As one would expect in a poverty-stricken country like Niger, agricultural practices are devoid of modern technology and machinery, and access to high yielding seeds and a reliable water source is very limited (Geesing and Djibo).

A rural family's barriers to improving agricultural and pastoral productivity include drought and food crises. During a food crisis, there is a dramatic reduction in agricultural and pastoral production. Families lose livestock as well as crops, and many become indebted. Subsistence farming is a difficult way to make a living. Most years, a typical farm family produces only enough food to survive. Sometimes, in a good year, they have some surplus to sell, but much of the time they go hungry. Rural women and children are particularly vulnerable to poverty and starvation.

Women and girls in a typical rural family spend a large portion of each day fetching water. They often have to walk miles to the nearest public water point. Water points in rural areas are often unimproved sources such as unprotected dug wells, unprotected springs, or surface water. Open wells and other unprotected water sources are usually shared with livestock and large populations, so the water often harbors bacteria and other disease-causing pathogens. In many cases the water must be drawn up by hand – a backbreaking and time-consuming task. Finally, the women of the family must carry the heavy water containers back to their home. After all this work, both the quantity and quality of water may be insufficient to safely meet the family's needs. Ultimately, the family's productivity is hindered by the significant time and energy spent fetching water every day.

The Millennium Development Goals (MDG) are a global initiative to reduce extreme poverty. Increasing sustainable access to safe drinking water and basic sanitation is paramount to ensuring environmental sustainability as outlined in MDG Goal 7. Specifically, Target 7.C is to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation. The MDG Report 2013 indicates that access to improved drinking water sources and sanitation facilities has improved for the overall population of sub-Saharan Africa since 1990. However in Niger, access to clean drinking water has improved by only 13% and access to improved sanitation has increased by a mere 4% (UN). Additionally, the population of Niger has almost doubled since 1990, leading to a much higher number of people who need water and sanitation access in order for Niger to achieve its 2015 MDG's (USAID). According to the Joint Monitoring Programme for Water Supply and Sanitation, ten times more people (1,248,000 people per year) in Niger need access to improved sanitation and four times more Nigeriens (855,000 people per year) need access to improved drinking water (WHO/UNICEF). There is a distinct disparity between the urban and rural population in Niger when it comes to meeting the MDG targets related to improved water and sanitation. From 1990 to 2011, the proportion of Niger's urban population with improved drinking water sources increased from 57% to 100%, while the rural population achieved only an 8% increase from 31% to 39%. This disparity reflects adequate funding for the urban water supply subsector, while the rural water supply subsector has continued to be seriously underfunded. Similarly, access to improved sanitation facilities has lagged in the rural subsector, increasing only slightly from 2% in 1990 to 4% in 2011, as compared to an increase from 19% to 34% in the urban

population. Inadequate funding has resulted in much slower progress for sanitation in general. Data from 2011 to 2013 indicates that sub-Saharan Africa is unlikely to meet the MDG target goals for drinking water and sanitation (UN). Poor access to basic sanitation is a particularly serious health concern because rural Nigeriens resort to unsanitary practices, such as open defecation and open disposal of solid waste and wastewater. This leads to a high rate of fecal contamination of food and water, which results in transmission of life threatening diseases. Infants and young children are particularly vulnerable. According to the Child Health Epidemiology Reference Group (CHERG) of the Department of International Health, diarrhea was the third leading cause of global child mortality in 2010, accounting for 11% of deaths. Child mortality was particularly high in sub-Saharan Africa (Liu et al.). Diarrhea-related illnesses are a major contributor to the already rampant malnutrition epidemic in Niger, and mortality rates are higher in malnourished children with diarrhea (WHO).

The MDG targets for access to safe water and improved sanitation facilities are estimated from data obtained from household surveys and national censuses. Access to safe drinking water is measured by the proportion of the population using an improved drinking water source such as piped water, public tap, protected wells and springs, rainwater collection, and bottled water. Access does not take into account the quality of the drinking water or the time spent obtaining water from improved sources. Access to improved sanitation facilities is defined by the percentage of the population with access to facilities that hygienically separate human excreta from human contact (UN). Increasing access to safe drinking water and improved sanitation facilities would profoundly impact quality of life and human dignity for the typical rural Nigerien family. Females in the family would spend much less time and energy searching for and bringing home water and worrying if the water is safe. The family's daily lives would be greatly improved if appropriate sanitation facilities were widely accessible. Infants and young children would have a much lower risk of diarrhea, malnutrition, and premature death. Productivity of the entire family would increase, leading to improvement in the amount and quality of food they could produce, and potentially adding to their family income. Since the economy of Niger is so dependent on agriculture, it is imperative to improve the productivity of the family farm in order to advance the economy and reduce poverty. The World Bank estimates that inadequate sanitation costs countries between 1% and 2.5% of their GDP, and Niger loses US$148 million per year due to this. Economic losses in this study were largely attributed to premature deaths in infants and children under 5 years of age due to diarrhea-related diseases caused by poor water, sanitation, and hygiene. Also cited were productivity and time losses associated with poor sanitation and open defecation practices (WSP).

Various obstacles impede efforts to improve the safe water and sanitation sectors in Niger. Niger is a large landlocked country, primarily composed of desert, with one of the fastest population growth rates in the world. It is also one of the poorest countries in the world and has suffered from political instability in recent years. The climate in Niger is quite volatile; sporadic rainfall and severe droughts are ever-present threats, but flooding also occurs. Poverty-stricken Nigeriens are especially threatened by climate changes that result in acute hunger emergencies and an inability to make meaningful long-term progress in overcoming poverty. Finally, it can be challenging to overcome socially accepted norms such as open defecation.

Widespread access to safe water and basic sanitation would greatly improve food security in Niger. Successful solutions must address inadequate funding, incorporate innovative and sustainable approaches to providing safe water, and promote community-led programs for hygiene and sanitation. It is important for the Nigerien government to make safe water and sanitation a high priority, in order for the Nigerien people to feel motivated and trusting of the reforms that need to be made. In the past, the Nigerien people have been exploited by foreigners, and are at times not trusting of changes brought into their communities. Leaders from rural communities should advocate for their people's water and sanitation needs, and help build working relationships and trust. Women in rural families have an important role because they are the ones most affected by the lack of safe water and sanitation on a daily basis. They

know how much time and effort it takes to fetch water and to help family members find a discrete place to use the toilet, so they are much more adamant about improvements being made.

Adequate funding has been a major obstacle to meeting the MDG targets related to water and sanitation. Public development aid provides the vast majority of funding for the water supply and sanitation sector in Niger. The government of Niger needs to allocate more funding for water and sanitation and secure additional resources from donors and investors. Additionally, the Ministry of Water needs to provide clear coordination and oversight of the various government entities that have responsibility for the water and sanitation sector so governmental bureaucracy does not hinder progress.

Efforts to improve access to safe drinking water have largely focused on construction and repair of boreholes and cemented wells that tap into the abundant underground waters of the Illumeden Aquifer System. The number of water points has greatly increased in recent years, and UNICEF and multilateral funding partners including the World Bank and the African Development Bank Group (AfDB) continue to provide funding for drilling wells and for purchasing and maintaining pumps in Niger. However, some experts warn that the rate of water extraction from the Illumeden exceeds the capacity of the aquifer system to become recharged with water (IRIN). Boreholes and cemented wells are a practical and fairly well established means of providing safe drinking water for families in Niger, particularly in regions without a reliable source of surface water. However, in regions with access to surface water, a strategy that can convert contaminated surface water to clean, safe water would take pressure off the aquifer and improve overall sustainability.

An innovative approach for increasing access to safe water in Niger is the Slingshot™ water purification system. The Slingshot uses a vapor compression distillation process to transform any type of non-potable water into clean drinking water. The Slingshot is about the size of a dormitory refrigerator and can make approximately 800 liters of safe water per day – enough to meet the daily drinking water needs of about 300 people. The Slingshot only requires about one kilowatt of electricity to operate, which is less than that of a household hair dryer. Since electricity is not readily available in many remote areas, the Slingshot could be powered by a Stirling engine (Nasr). The Slingshot is easy to operate and is designed to require minimal maintenance and repair, as should be the case for any proposed solution for water and sanitation problems in Niger. People at the local level must be taught how to use the new equipment, as well as how to repair and maintain it, whether it is a new type of well or pump, a latrine, or new technology such as a Slingshot unit powered by a Stirling engine. Sustainability is more likely when members of the community know how to build and/or maintain facilities and equipment. In order to remove the burden of transporting water great distances, it would be best to position the Slingshot in communities with ready access to surface water. A Slingshot unit could be placed at the hub of each community, which many times is a school or community center. School children are central to the success of the project because they will learn the importance of using safe water for drinking and cooking, and can take this knowledge home to be shared with their families. Children could also share the task of transporting water between home and school to meet their families' needs and relieve some of the burden currently falling on women and girls.

Community leaders in Niger should secure funding or loans from the Nigerien government, non-governmental organizations, and development banks to purchase a Slingshot unit and Stirling engine for their community. The Stirling engine could be powered by a solar panel or methane from decomposing animal dung. Solar panels could be obtained by partnering with an energy company such as NRG Energy. The feasibility of bringing the Slingshot to remote communities in Niger is greatly facilitated by a partnership between DEKA Research and Development Corporation (the developer of the Slingshot) and Coca-Cola. They intend to install and operate 1,500 Slingshot units in various countries around the globe by the end of 2015. DEKA R&D and Coca-Cola are collaborating with other partners, including NRG

Energy, to place the Slingshot in solar-powered, community-based kiosks called EKOCENTERS. The goal is to install and operate 150 EKOCENTERS across 20 countries by the end of 2015 (Coca-Cola).

Communities that participate in Community-Led Total Sanitation (CLTS) and School-Led Total Sanitation (SLTS) programs are showing significant improvements in neighboring Nigeria and Mali. In Niger, these programs need to be expanded into all rural communities. These programs are implemented at the local level and focus on behavioral changes to create open defecation-free (ODF) communities. Representatives from UNICEF and Plan work with communities to help them understand the danger of open defecation and to develop an action plan for their community. People in the community can build latrines from local materials and help each other to ensure that every family has access to a covered latrine and water, soap, or ash for handwashing. Children practice safe sanitation and hand washing at school and then bring the message home to help educate their families and their community. CLTS/SLTS is a low-cost, workable solution that empowers Nigeriens at the local level and gives them a sense of ownership and pride in their community (Degen/Marinovich). To ensure sustainability, each community should form a core group that will support and advocate for the project over time so the community maintains its ODF status. Schools should devote classroom time to sanitation and hygiene on a regular basis to bolster awareness and promote appropriate behavior.

Niger faces many challenges in its pursuit to meet the Millennium Development Goals by 2015. Currently, Niger is not on track to meet the goals related to safe drinking water (particularly in rural areas) and improved sanitation. Niger is an exceedingly poor country with a high population growth rate and a low literacy rate, particularly in women. Poverty and food security issues have resulted in high rates of underweight and malnourished people. Infant and under age 5 mortality rates are high, with many deaths caused by diarrhea-related illnesses. Poor sanitation and use of contaminated water for drinking and cooking lead to transmission of food and waterborne diseases that are associated with diarrhea. Illnesses are frequently undertreated because families often do not utilize or do not have access to health care. Inadequate sanitation has a considerable impact on Niger's economy, largely due to premature deaths in infants and young children, as well as productivity and time losses associated with poor sanitation and open defecation practices. The time and energy currently expended in water-fetching and sanitation-related activities could be diverted to more productive pursuits that could positively impact family income and the economy. The typical farm family is engaged in subsistence agriculture and/or livestock-rearing. Traditional agriculture practices lack diversification and have resulted in poor soil and soil erosion in many regions. Niger is dominated by a desert climate where rain is sporadic and droughts are common. In such a harsh environment, food security issues are widespread and Nigeriens have struggled to survive during times of food crises. Widespread access to safe drinking water and improved sanitation facilities would have a profound impact on the quality of life of the Nigerien people. The Slingshot is a feasible and innovative approach for providing safe water in Niger, while expansion of community-led sanitation efforts will result in the eventual elimination of open defecation. The Nigerien government must resolve to secure additional funding and resources for water and sanitation, and provide the necessary oversight to ensure more rapid and substantial progress. Finally, implementation at the local level, with active involvement of people from the community, offers the best chance for success and sustainability in Niger's quest to meet its MDG targets.

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