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West Africa, Factor 2

West Africa: Recognizing and Managing Water Scarcity to More Effectively Irrigate and Conserve

Water is the basis of life, is a main ingredient in the composition of living things, and is needed to sustain the life of these organisms. As we need water, the things that we consume also need water. When battling world hunger in other nations with struggling economies, it is very necessary to take into account any lack of water not only for personal use of drinking or sanitation, but also for irrigation to increase, or even make possible, the production of crops to be used for personal consumption as well as helping the needy that are all too common in these areas.

Water availability in West Africa is expected to drop significantly before 2025. According to www.unep.org, water availability in Niger is expected to drop from nearly 6,000 cubic meters to 2,000 cubic meters. With the current poor management of water that is currently occurring in West Africa, the coming scarcity is a rather frightening issue.

In West Africa, Subsistence farmers make up the majority of the rural population. A typical subsistence farming family grows crops to feed itself, and other crops like cotton to sell on the market. When it comes to the crops that are used personally, the families usually grow both corn and beans. Due to recent floods, the corn hasn't been coming through very well, so the beans are being more heavily relied on. To battle drought, the farmers have passed down traditions to help the crops grow. One main problem is that the farmers can't produce enough food to feed their families, especially in these days of drought. Also, cotton prices are down due to American companies growing large amounts of cotton and selling it overseas. The African families simply cannot compete with that as they produce all of their cotton using manual labor. The African farm families have no good source of income, and can't grow enough crops. The average woman of Niger gives birth to eight children over the course her life. Having eight children makes for a large family to feed. In many cases, small children die due to sickness or malnutrition, so it's difficult to get a very good average of family size. But whether the majority of the family lives and is starving or dies, the situation is still tragic.

Healthcare is nearly unheard of to rural farmers. When you can't afford to feed your family, it is plain to see that people aren't going to spend money on healthcare that could go to food. When it comes down to it, these families cannot produce enough food for themselves because of drought and lack of technology, and they can't compete on the cotton market because of lack of technology and an increase in foreign competition. The Africans cannot research better technology because they are too poor to allow such specialization. So the Africans poverty is what stops them from being able to research and improve their techniques, and their lack of technology is what instills their poverty.

If water were to be handled more efficiently, a good portion of these issues could be sorted through and overcome. With the recent lack of water, it becomes vital to do make all of the water that you have go exactly where you want it to go, distributing it as needed for sanitation, irrigation, and wells.

The lack of water effects agriculture in West Africa in many ways. For West Africa to produce enough food to sustain itself, the farmers need access to water. The lack of water in West Africa doesn't allow the farmers to have the water necessary to grow enough crops to take care of themselves, and as the farmers don't have enough water to grow enough crops for themselves, the entire region suffers.

The average subsistence farm family is in this tough position. If the water could be made more available, they could grow more, so increasing the availability of the water that there is, is the main objective. Though the droughts have been severe, the water currently in West Africa could be used more wisely. Currently, the lack of water leaves a good portion of West Africa threatened by desertification. With the drought drying the farmland along with poor irrigation practices, desertification is very possible. The only way that we could really influence desertification is by improving our irrigation systems. The situation is severe, but it can be fixed.

In this situation, the rural poor are put at a huge disadvantage. They have to do whatever the larger, more developed nations tell them to and hope that it works when it comes to fixing the problem of water scarcity. At this point, they are so reliant on foreign aid that their own problem only tends to get better if other nations can sacrifice the time and money to help them out. This is a desperate state, and they need to be gotten back onto their feet to be able to take care of future problems on their own.

We are at a place with this problem where we can turn things around if we put a focus on it now. All of the issues that I have mentioned so far can be taken care of, but if we choose to ignore them certain threats like desertification will not go away and the situation will only worsen. So far, the desertification isn't as terrible as it could get, but if the drought continues to be an issue and nothing is done to bring water in to cropland, it will become one.

In West Africa, there are two levels of water scarcity. One level is called economic water scarcity. Economic water scarcity occurs when there is enough water to go around, but there is not enough infrastructure to transport the water to where it can be used. Economic water scarcity covers a large amount of Africa, including most of West Africa. This is the main problem that must be faced to improve the issues with water scarcity. However, the second of these two levels cannot be overlooked.

The other level that exists in West Africa, though not as commonly as economic water scarcity, is physical water scarcity. Physical water scarcity is defined by looking at the demand for water as compared to the amount of water that there is to fill that demand. Deserts don't necessarily have physical water scarcity because though they don't have much water, they also don't have much of a demand for water.

About 95% of Africa relies on rain systems for growing crops, so focusing on bettering this system is vital for combating water scarcity. To improve rain fed systems, a few things can be done. First off, supplemental irrigation is vital. Supplemental irrigation is the process of bringing in water by irrigation systems to help grow crops, but allowing the rainwater to do most of the work. In this, the irrigation is only used in case it fails to rain enough to give the crops the water that they need. In West Africa, it is not uncommon for a lack of rain to ruin crops. If supplemental irrigation is used properly, the rain that does fall can be used to its maximum potential, and any extra water required can still be gotten to the fields.

There are other pluses to supplemental irrigation. Using irrigation for only what is completely necessary is a good idea because though it uses irrigation, it doesn't overuse irrigation. Overusing irrigation results in depleting groundwater. As rainwater is the most natural way to farm, it is a good idea to stick to it as a main method of watering crops.

There are multiple problems that tie into the larger problem of water scarcity. Climate change is one of these issues. No one is sure what is causing the climate change in Africa, but the result of drought has been devastating small farm families. One theory of what is causing this drought is the amount of land we are using for livestock grazing and farming. The suggestion here is that we are not giving the land time to recover, and are somehow depleting groundwater supplies. Another theory is that human methods have nothing to do with it, but rather that the earth is on a natural cycle of climate change. On this natural

cycle, the temperatures of the ocean surface become cooler. As the ocean surfaces cool, the summer rains become less productive. Also, as plants extract moisture from the soil, the soil loses its moisture, which depletes the amount of groundwater for the water cycle. This in turn makes it rain less.

As it rains less, it becomes more difficult to grow crops and livestock. The crops and livestock that the subsistence farmers do grow will wear on the groundwater in the soil even more. It's a vicious cycle, but supplemental irrigation could help here. In using supplemental irrigation, the farmers could gradually increase the amount of groundwater in the soil. Doing so would increase the quality of the soil, allowing more crops to thrive, and livestock could be grazed in more areas.

Biotechnology is also an option in West African agriculture. According to www.ctahr.hawaii.edu, biotechnology is the application of using scientific techniques to modify and improve plants, animals and microorganisms to enhance their value. There are a few ways that biotechnology could help produce more crops and battle water scarcity. The first is that it can be used to increase crop productivity. Biotechnology can be used to insert genes from plants that are naturally drought resistant into crops to make them drought resistant as well. In these times of frequent drought, it becomes necessary to find ways to help crops survive. This method could also be used with supplemental irrigation, as it would make crops that require less water and would therefore take less groundwater from the soil. Taking less groundwater from the soil would be helpful because any extra water could be fed into the water cycle.

Biotechnology can also be an alternative to using pesticides. Using biotechnology over pesticides can be beneficial to the environment because pesticides get into the ground and leach valuable groundwater. So crops that are altered using biotechnology not only save groundwater, but also can be used in place of pesticides to save groundwater.

Aid to West Africa is necessary to get any of these options to work. The Red Cross has recently called for \$1 million in aid for Niger in their drought. The United States government's relief program USAID has also been active. USAID programs in West Africa have a focus of increasing agricultural growth and food security, and to do so USAID is working on strengthening African institutions. USAID states that West Africa has "a rich natural resource base, weak institutions, poor management, political instability and some of the world's highest levels of corruption consistently undermine efforts to put the region's resources to work for the good of it's people". USAID combats these issues by providing Africa with aid in the areas of their management and institutions so that they can strengthen the area as a whole and compete in world trade.

If the USAID programs are successful, West Africa will be able to overcome troubles concerning water scarcity, as they will be able to put the money that they make on trade into further combating the issue. Nonetheless, there is still a ways to go on foreign aid before the nations of West Africa will be ready for such a program.

I believe that in order to battle water scarcity in West Africa, other nations in more prosperous areas of the world need to give aid. It is the only way to get things going because as long as large portions of the West African population are starving, the money to work on bioengineering, building supplemental irrigation systems, and building an institution for affectively using the various tools that they have simply isn't there. Other nations need to build a plan together on how to fix the current situation in West Africa to combat the issues pertaining to water scarcity such as drought and climate change, and then follow through with that plan. It can be done, but it is going to take cooperation. The amount of people starving in West Africa due to a lack of water for crops is far too many, and it is up to the other nations of the world to do the right thing and help them improve their methods of using and conserving water.

Works Cited

-- United Nations Environment Programme (UNEP) - Home Page --. Web. 29 Sept. 2010.
<<http://www.unep.org/>>.

Andersson, By Hilary. "BBC NEWS | Africa | Niger Children Starving to Death." BBC News - Home. Web. 29 Sept. 2010. <<http://news.bbc.co.uk/2/hi/africa/4695355.stm>>.

"USAID Africa: West Africa." U.S. Agency for International Development. Web. 29 Sept. 2010.
<http://www.usaid.gov/locations/sub-saharan_africa/countries/warp/>.

"Water for Food Water for Life." Web. 29 Sept. 2010.
Welcome to College of Tropical Agriculture and Human Resources, University of Hawai'i. Web. 29 Sept. 2010. <<http://www.ctahr.hawaii.edu/site/>>.