Conner Stevens,
Eric Counsel,
Bennett Dierckman,
Ahijin Kim,
Enguunee Byambadorj

Research

Eric Counsel
Group Project Resource Summary
April 9th, 2014

The scarcity of water in Sudan is a result of multiple factors. The first being the Sudanese government's conflicting interests and lack of cooperation has left the country lacking a solution for all of the drought ridden people. If they two opposing parties could work together, a solution could be found, but until then, the people of Sudan are going to remain thirsty. The second problem is that of Egypt and the Nile. Egypt has rights to control the Nile, the closest fresh-water resource for Sudanese people. Since Egypt has control over the Nile and Egyptians are just as thirsty as the Sudanese people, Egyptians basically have primary access to the Nile's water. Also, the water of the Nile is not very clean, which poses a problem in that the water the Sudanese people do receive is not very good water at all.

Work Cited

Shelby, Jan. Hoffmann, Clemmens. *Beyond scarcity: Rethinking water, climate change and conflict in the Sudans.* Elsevier Ltd, 2014. Print.

Bennett Dierckman
Summary of page from "Land, livleyhoods and identities: Inter community conflicts in East Africa"

In the section of the reading titled, "Current access to land and natural resources", begins by stating that which groups will get access to rescources is often dependant on the current regimes, state practice and customary framework. As the author tries to describe the complexity of the situation, the reader begins to develop an idea of exactly how allocation of resources in sudan take place. As the section continues to unveil information, it becomes more and more noticable, that the author is having trouble describing how the allocation of resources works, and it leaves us to conclude that this is because there is not a structured, "offical" fair method of allocating resources in sudan. This relates to our groups problem in

that these poor methods of allocating resources, mainly, water, result in the loss of thousands of lives.

Works Cited

Korir, Sing. King, Laura. *Land, Livleyhoods and identities: Inter community conflicts in East Africa.* Minority Rights Group International, 2011. 10. Print.

Bacteriological quality of drinking water in Nyala, South Darfur, Sudan
http://kg6ek7cq2b.search.serialssolutions.com/?ID=pmid:20480392&genre=article&atitle=Bacteriological%20quality%20of%20drinking%20water%20in%20Nyala,%20South%20Darfur,%20Sudan.&title=Environmental%20Monitoring%20And%20Assessment&issn=15732959&isbn=&volume=175&issue=1-4&date=20110401&aulast=Abdelrahman%20AA&spage=37&pages=37-43&sid=EBSCO:MEDLINE:20480392

Developing countries are likely to have problems associated with drinking water. According to WHO in 2003, unsafe water have been ranked as one of the top 3 risk factors of 20 leading risk factors for health burden in developing countries, including Sudan. This article provides a study of bacterial contamination condition of drinking water in Nyla city, South Darfur, Sudan. Between August 2008 and September, 240 water samples were collected from all kinds of water reservoirs in Nyala. Samples were collected from reservoirs like boreholes, dug wells, water points, hand pumps, and etc.

As a result, out of 240 water samples, 46.4% were examined to be contaminated. Only 25.4% of the water samples were suitable for drinking water. The three bacteria that were found the most were coliform, faecal coliform, and faecal enterococci. The three bacteria were all above the permissible limits for drinking water. There were 46.4% coliform, 45.2%faecal coliform, and 25.4% faecal enterococci in 1,600 U/100 ml water.

Sudan's Infrastructure: A Continental Perspective

Page 22-26
SUMMARY:
Around 15 percent of Sudan’s population can access utility water and 85 percent of the population don’t have access to clean water. In the year of 1993, 60 percent of the population had access to utility water but there has been a steep decline in access rates down to 35 percent in the 2000s(Ranganathan and Briceño-Garmendia). The cause of the decline in water access is mainly due to the lack of maintenance. Also, there is almost no access to piped water, the only form of utility water that the population have access to are stand posts. Therefore, by building a water purifying irrigation system in Sudan it will provide access of safe and clean water to the population.

Works Cited

Ranganathan, Rupa, and Cecilia M. Briceño-Garmendia. *Sudan's Infrastructure: A Continental Perspective*. N.p.: n.p., n.d. Sept. 2011. Web. 9 Apr. 2014. <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-5815>.

Bennett Dierckman
4/11/14
Making the Most of Scarcity : Accountability for Better Water Management Results in the Middle East and North Africa
This article talks about the source of the water scarcity in East Africa. It talks about the future of water scarcity in Africa, and notes that by 2050, “percapita water availability will fall by half”. A rather pessimistic article, this author fears for the future of Africa’s ever diminishing water supply.
Bucknall, Julia. *Making the Most of Scarcity: Accountability for Better Water Management Results In the Middle East and North Africa.* Washington, D.C.: World Bank, 2006.

Conner Stevens
The Borderlands of South Sudan

In May, 2011, Abyei, a district between Sudan and Southern Sudan was invaded by the Sudan Armed Forces. This invasion led many of the residents within Abyei to flee to Agok, a region in Southern Sudan. Abyei was promised a referendum in 1972, but the referendum never took place. This as well as other conflicts led to much tension in the area, making the area extremely dangerous and the people discontent. This tension leads to very low safety in Southern Sudan and the border of Sudan and Southern Sudan, making it extremely difficult for the people of this area to walk through and back every day for water. Because it is dangerous for the people to go through this area and get their water, many of the people never receive the clean water, and just end up going without or drinking the dirty water, causing sickness and in some cases, death.

http://en.wikipedia.org/wiki/Water_supply_in_South_Sudan

"Water supply in South Sudan." *Water supply in South Sudan*. Wikipedia, 13 Feb 2014. Web. 11 Apr 2014. <http://en.wikipedia.org/wiki/Water_supply_in_South_Sudan>.

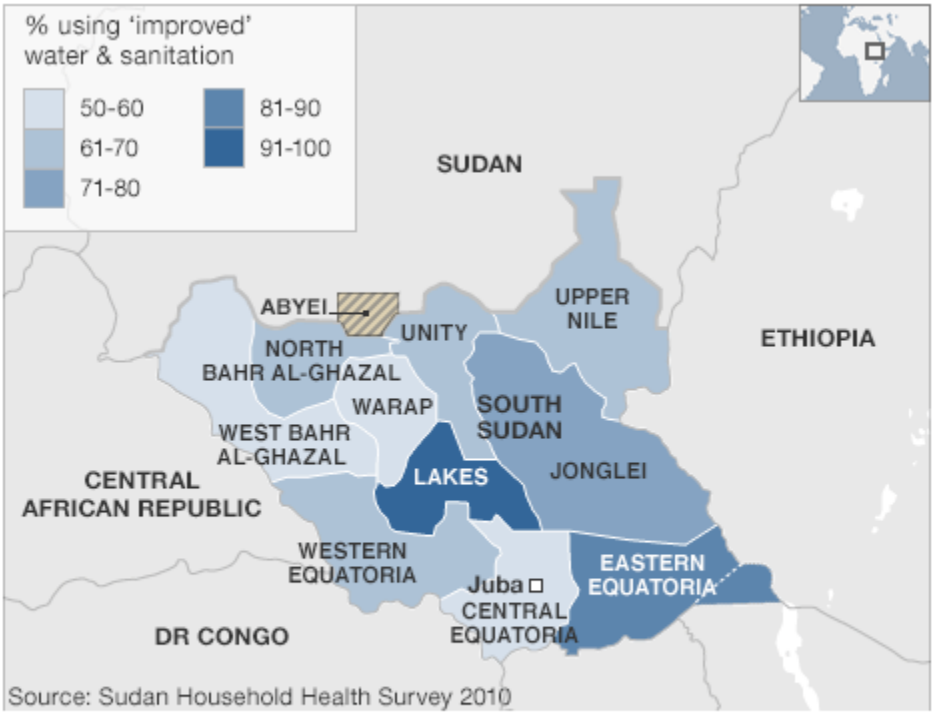
Southern Sudan rainfall is highly seasonal. During the rainy season, between March to May and July to October, Sudan have water supply for people and livestock. However, during the dry season, all rivers except the Nile River dries up. This cause people to suffer from shortage of water. Rivers like Bahr el Ghazal River and Sobat River are the ones that disappear during the dry season. The main river in the South Sudan is the White Nile, which starts from southern part of Uganda to northern Sudan.

About 50% to 60% of the population has access to improved water source like a hand pump. Improved water source are sources like protected well, standpipe, or a handpump that can be accessed within 1km. However, even the people who have access to improved water source are not receiving safe water. Moreover, they are not able to receive water for the throughout the year. The improved water source dries up during the dry season.

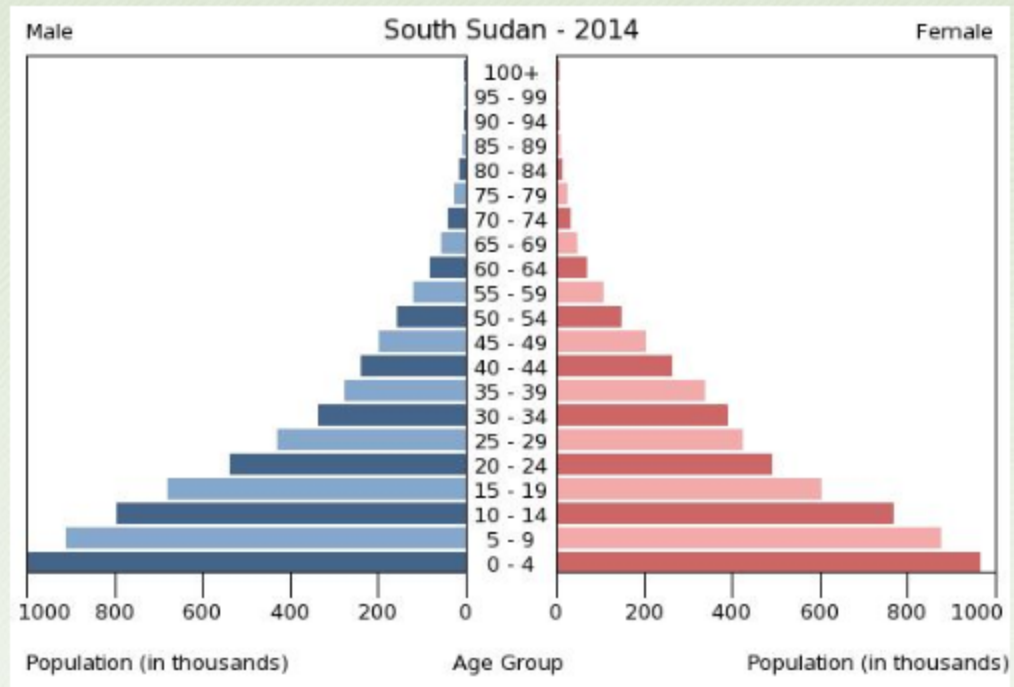
https://www.cia.gov/library/publications/the-world-factbook/geos/od.html

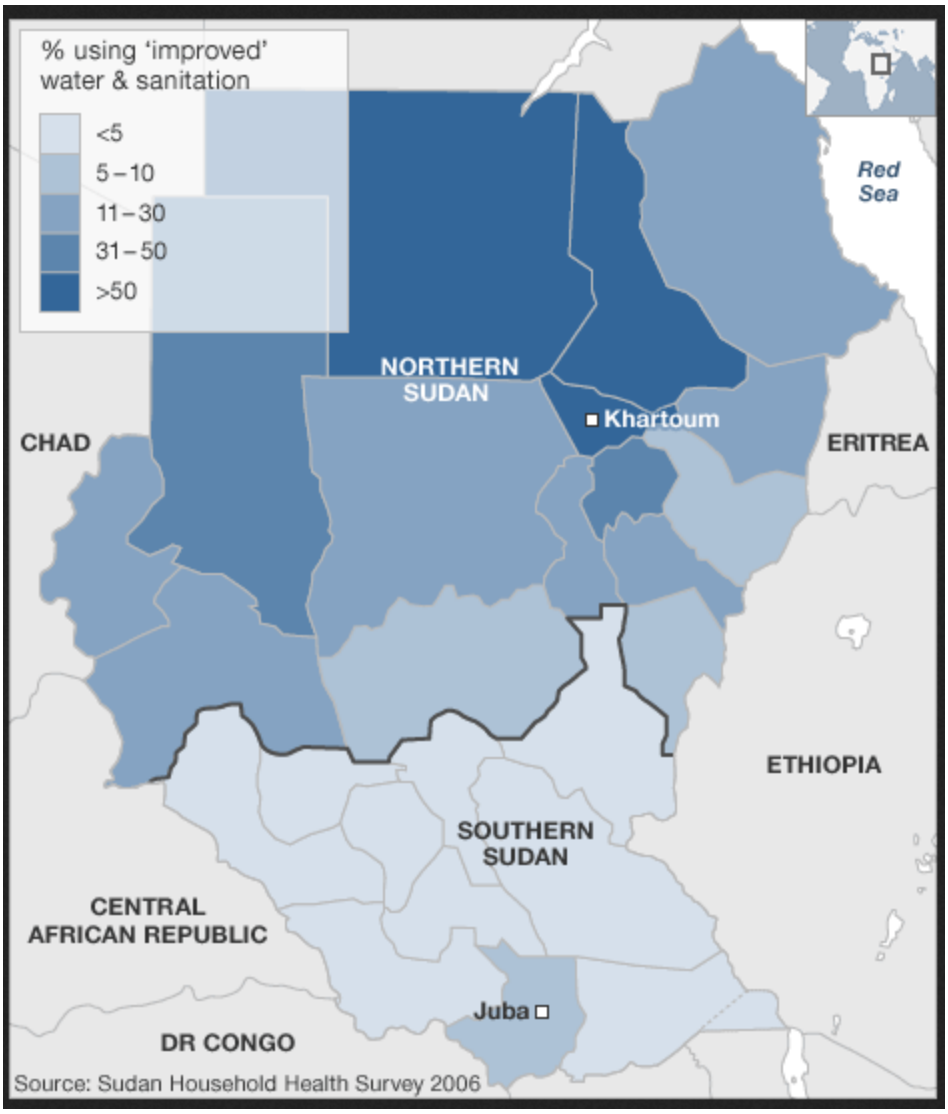
Drinking water sources are available only to 43.5% of the population according to the 2011 census from the CIA Factbook. In terms of access to sanitation facilities, urban areas have improved up to 15.8% of the population, rural areas are at 7.3%, which totals up to 8.9% of the whole population. Therefore, for the unimproved rates of sanitation facilities, it leaves 84.2% of the population for urban areas, 92.7% for rural areas, which totals to 91.1% of the population according to the 2011 census. As a result, the risks of food and waterborne diseases are high as well as for water contact diseases, respiratory diseases, and animal contact disease which include rabies.

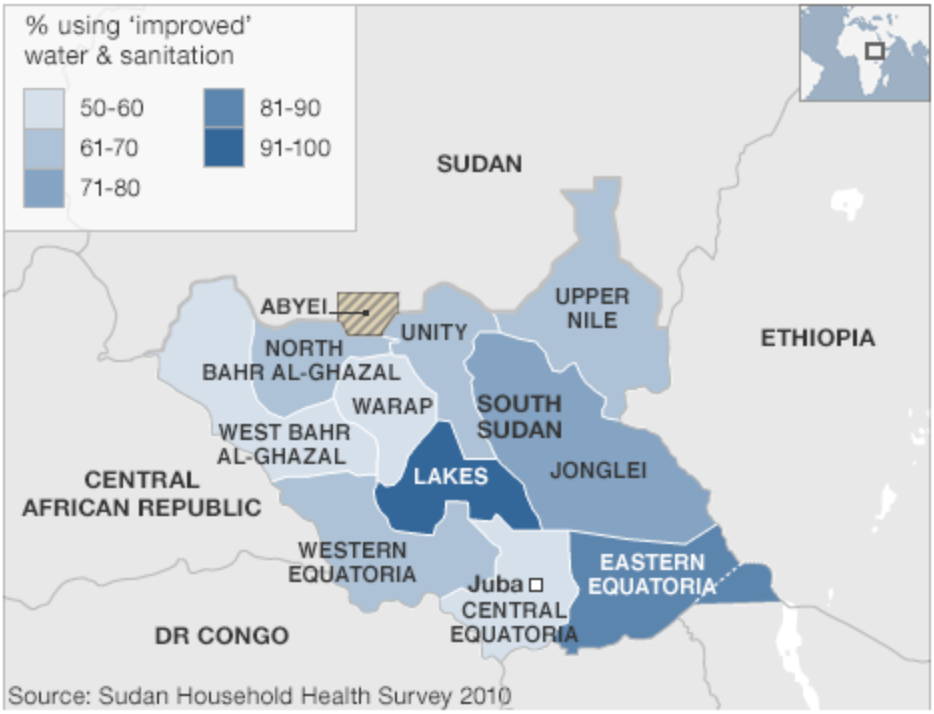
The age structure of South Sudan include individuals within the ages of 0-14 years to make up around 45.8% of the population which puts the main population at high risk for getting infected with various food and waterborne diseases. As for the other portions of the population, individuals within the ages of 15-24 makeup 19.9% of the population, 25-54 makeup 29.1% and 55-64 year olds makeup 2.1% of the total population.



After gaining independence in 2011, South Sudan is the world's newest country - and one of its poorest. Figures from 2010 show some 69% of households now have access to clean water - up from 48% in 2006. However, just 2% of households have water on the premises.


Male
South Sudan - 2014
Female
100+
95 - 99
90 - 94
85 - 89
80 - 84
75 - 79
70 - 74
65 - 69
60 - 64
55 - 59
50 - 54
45 - 49
40 - 44
35 - 39
30 - 34
25 - 29
20 - 24
15 - 19
10 - 14
5 - 9
0 - 4
1000 800 600 400 200 0
0 200 400 600 800 1000
Population (in thousands)
Age Group
Population (in thousands)


% using 'improved' water & sanitation
<5
5–10
11–30
31–50
>50
Red Sea
NORTHERN SUDAN
Khartoum
CHAD
ERITREA
ETHIOPIA
SOUTHERN SUDAN
CENTRAL AFRICAN REPUBLIC
Juba
DR CONGO
Source: Sudan Household Health Survey 2006



After gaining independence in 2011, South Sudan is the world's newest country - and one of its poorest. Figures from 2010 show some 69% of households now have access to clean water - up from 48% in 2006. However, just 2% of households have water on the premises.

Research Summary

In Sudan, as well as Southern Sudan, there are many separate problems currently contributing to difficulty accessing clean drinking water. Geographically, Sudan is already a place where water is naturally scarce. The little bit of water that they do have is mostly contaminated with harmful bacteria. In 2008, studies were done of 240 various water samples from reservoirs in Nyala, a city in Sudan. The results were that almost 50% were contaminated and that only 25% were suitable for drinking and these are considered better than average numbers. Currently, only around 15% of the Sudanese population has access to water. On the border of Sudan and South Sudan, there has been an underlying cloud of political tension since the 1970's. These political tensions erupted with violence in 2011, causing many of the citizens of Sudan to flee, and cross the border into South Sudan. Currently, the citizens of the conflicting regions find it difficult to obtain clean drinking water not only because of bacteria in the sources, but also because of fighting regimens that make the areas unsafe, and the sources increasingly difficult to access. Furthermore, the political parties left in charge of these regions have been unsuccessful in finding a successful solution for quite some time, prolonging the problem. Another issue in the region lies within in the Nile River, one of the closest and largest fresh water resources to Sudan. The Egyptian government is in full control over the access to the water of the Nile River, only allowing Egyptian citizens to have access to it. The problem further develops with the bacteria content of the water from the Nile River. Even if the Sudanese and South Sudanese people were able to access this water, the integrity of the water is rather questionable as well. Individually, these problems are not nearly as problematic to the Sudanese and South Sudanese people as a combination of them all, however, the synthesis of the problems is the reality for most, the result of which being a near impossibility of easy access to a long-term clean water source.

Interview Questions about South Sudan water Crisis

- How much water would you say you drink every day, and how easy is it to access it?

- Are you aware of the political happenings in Sudan that are causing the areas in the south to be extremely volatile?

- Are you aware that due to the geographical layout, and dangerous and volatile citizens that live in the area, it is very difficult for the people living in the villages of south Sudan to get clean water every day?

- What thoughts do you have about the water crisis in south Sudan?

- Many of the people who live in the villages of south Sudan must walk miles every day to get clean drinking water. The water that is closest to them is not pure and causes most of those who drink it to become sick, or even die. Can you think of a long-term solution to this problem that involves technology?

Interview Questions about South Sudan water Crisis

Conner Stevens

- How much water would you say you drink every day, and how easy is it to access it?

  -I would say that I drink about one to two gallons of water a day.

- Are you aware of the political happenings in Sudan that are causing the areas in the south to be extremely volatile?

  -Before researching this issue, I was completely unaware of the volatile political happenings in Sudan and South Sudan.

- Are you aware that due to the geographical layout, and dangerous and volatile citizens that live in the area, it is very difficult for the people living in the villages of south Sudan to get clean water every day?

  -Prior to research on the issue, I had absolutely no knowledge of the difficult terrain and dangerous people in the region of Abyei that make it difficult for the population to access clean water.

- What thoughts do you have about the water crisis in south Sudan?

  -I believe that a solution should be continuously worked towards in an effort to aid the people in these regions. I believe that the water crisis is a tragedy.

- Many of the people who live in the villages of south Sudan must walk miles every day to get clean drinking water. The water that is closest to them is not pure and causes most of those who drink it to become sick, or even die. Can you think of a long-term solution to this problem that involves technology?

  -The only thing that I can think of would be some sort of irrigation system or an automated water transport system.

Interview Questions about South Sudan water Crisis

Bennett Dierckman

- How much water would you say you drink every day, and how easy is it to access it?

  About a Half a gallon, and I find it fairly easy to access.

- Are you aware of the political happenings in Sudan that are causing the areas in the south to be extremely volatile?

  Yes, I am aware that the political happenings in Sudan are responsible for the areas in the south to be extremely volatile.

- Are you aware that due to the geographical layout, and dangerous and volatile citizens that live in the area, it is very difficult for the people living in the villages of south Sudan to get clean water every day?

  Yes, I am aware

- What thoughts do you have about the water crisis in south Sudan?

- Many of the people who live in the villages of south Sudan must walk miles every day to get clean drinking water. The water that is closest to them is not pure and causes most of those who drink it to become sick, or even die. Can you think of a long-term solution to this problem that involves technology?

Works Cited

Bucknall, Julia. *Making the Most of Scarcity: Accountability for Better Water Management Results In the Middle East and North Africa.* Washington, D.C.: World Bank, 2006.

Korir, Sing. King, Laura. *Land, Livleyhoods and identities: Inter community conflicts in East Africa.* Minority Rights Group International, 2011. 10. Print.

Ranganathan, Rupa, and Cecilia M. Briceño-Garmendia. *Sudan's Infrastructure: A Continental Perspective*. N.p.: n.p., n.d. Sept. 2011. Web. 9 Apr. 2014. <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-5815>.

Shelby, Jan. Hoffmann, Clemmens. *Beyond scarcity: Rethinking water, climate change and conflict in the Sudans.* Elsevier Ltd, 2014. Print.

Vaughan, Christopher, Mareike Schomerus, and Lotje De Vries. *The Borderlands of South Sudan*. New York: Palgrave Macmillan, 2013. 46. Print.

Thoughts on The Sudanese/South Sudanese water crisis research

The crisis in Sudan and South Sudan with water is one that seems to continue to grow worse as time goes on. The people of the South Sudan are already struggling due to the fact that they are trying to sustain a newly formed government. On top of this, political issues and fighting with Sudan and the people living in South Sudan have been going on since 1970 (at the time the people of South Sudan were simply unhappy residents of Sudan, and not their own nation). The water structure in Sudan basically makes the residents of the north and east much more able to access clean water than those of the south. The water structure of South Sudan makes it easier for citizens in central South Sudan to access clean water, but harder, especially in the north, for those who are further out from the central regions of the Country. These issues put together place the people living in Abyei, an extremely volatile and conflicted region of South Sudan right on the border of Sudan and South Sudan, into the center of the storm so to speak. These citizens are already very far from a clean, accessible source, and now they also have to deal with South Sudan forces fighting with the SAF, or Sudan Armed Forces, and work around these unsafe groups to get clean water. The Nile River, the largest River on Earth, is actually not that far from these people. The Nile River is also under the control of the Egyptian government who rarely, if ever, allow anyone but the Egyptians in the region to have access to the River. Even if the people in this area could access the Nile River that still doesn't account for the impurity of the water in it, which makes it hardly sanitary for people to be drinking anyways. Now that they have to deal with that, they also have to consider that only 7.3% of the water in the rural districts of South Sudan is pure, and a 15.8% purity rating of the urban districts. So even if they can find water, the chances of it being pure enough to drink and not infect them with bacteria are about 8 in 100 as an average for the entire Country. Stack on top of that the fact that children are more susceptible to diseases, and a good 45.5% of the South Sudan population is between the ages of 0 and 14, and you're left with a seemingly desperate situation. If however,

there was an pipe system that could pump in pure water directly to these dry regions from a river like the Nile that does not dry up every dry season, that might change the situation up a bit. If that pump system could clean the water as it transports it, making it a purity rating safe for human consumption and free of waterborne bacteria that could change the situation. If this pump system was underground, making it out of the way of the warring groups in the region, safe from careless weapon firing, moving troops, as well as directly passing through rocky, mountainous, desert, or somewhat unpassable terrain, that too, could change the situation. And if this pumping system had monitors on each end of it, showing a live representation of the purity rating of the water being received, as well as an modifiable request system that allows each village to select more or less water depending on their specific needs as a whole, and remotely accessed pressurized valves that could change these needs at a push of a button, the problem as a whole, could drastically diminish. This is the solution that our group suggests for the Sudanese/South Sudanese water crisis.