



# Wells Bring Hope Curriculum Guide



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## Introduction

Water is necessary for life and one of the most fundamental resources to human well-being. It is a basic human right, which is owed to everyone on the planet. Unfortunately, many communities around the world are faced with hardships related to not just a lack of water but a lack of safe, clean water. These include: high infant mortality, debilitating diseases, chronic poor health, a lack of education (particularly for young girls), and limited economic well-being.

Fortunately, there are significant strides being made in the area of safe water provision. Wells Bring Hope strives to spread knowledge and increase awareness of these issues—both the struggles and the improvements being made.

This packet is designed to explore the global water crisis and its effects on human development, with an emphasis being placed on the West African country of Niger, the poorest country in the world. It will begin with a brief introduction to the global water crisis, Niger, and WBH's approach to improving access to clean water. The statistics and other information presented here can be used in various lesson plans and adapted for varying grade levels and subject areas.

The packet will also include basic lessons that can act as examples for lesson plan development. They are divided by topic and will vary in complexity and subject area. The goal of these sample lessons is not to provide teachers with an exhaustive database of water/Niger related lesson plans, but rather to spark some ideas that can be further explored and developed. Additionally, lessons can be modified to meet the learning objectives of different subject areas and academic years.

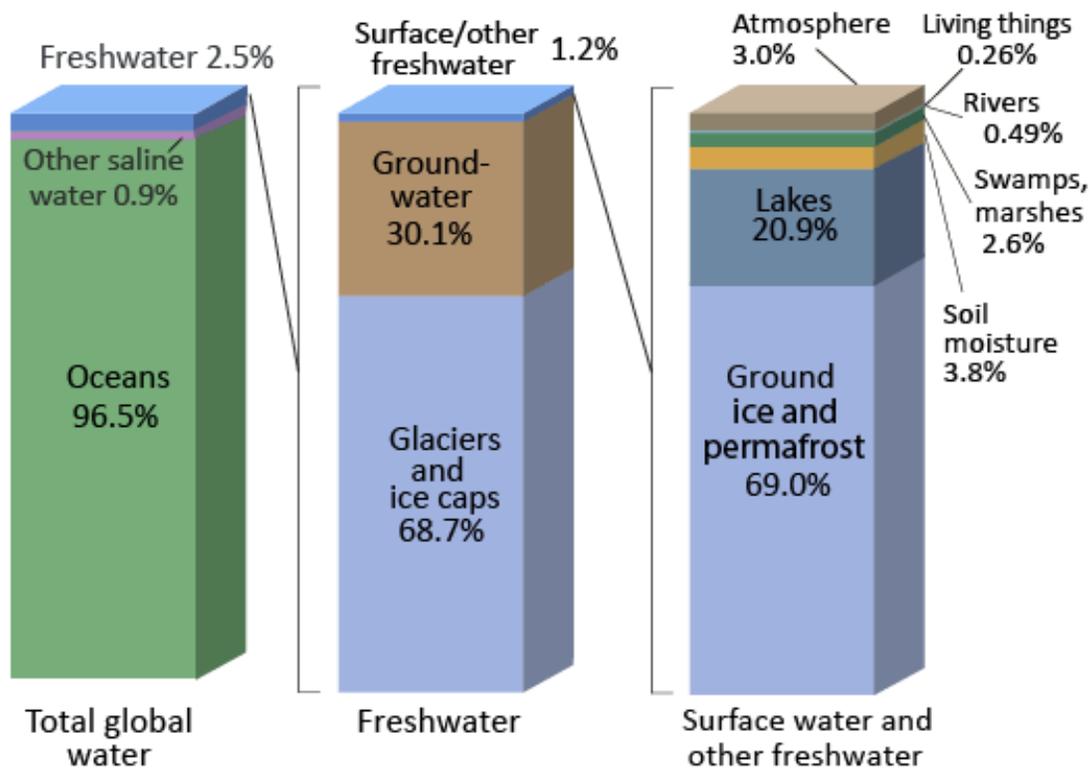
We hope that you find this packet beneficial, and thank you for partnering with us to educate the next generation of change-makers.

## Global Water Crisis Statistics

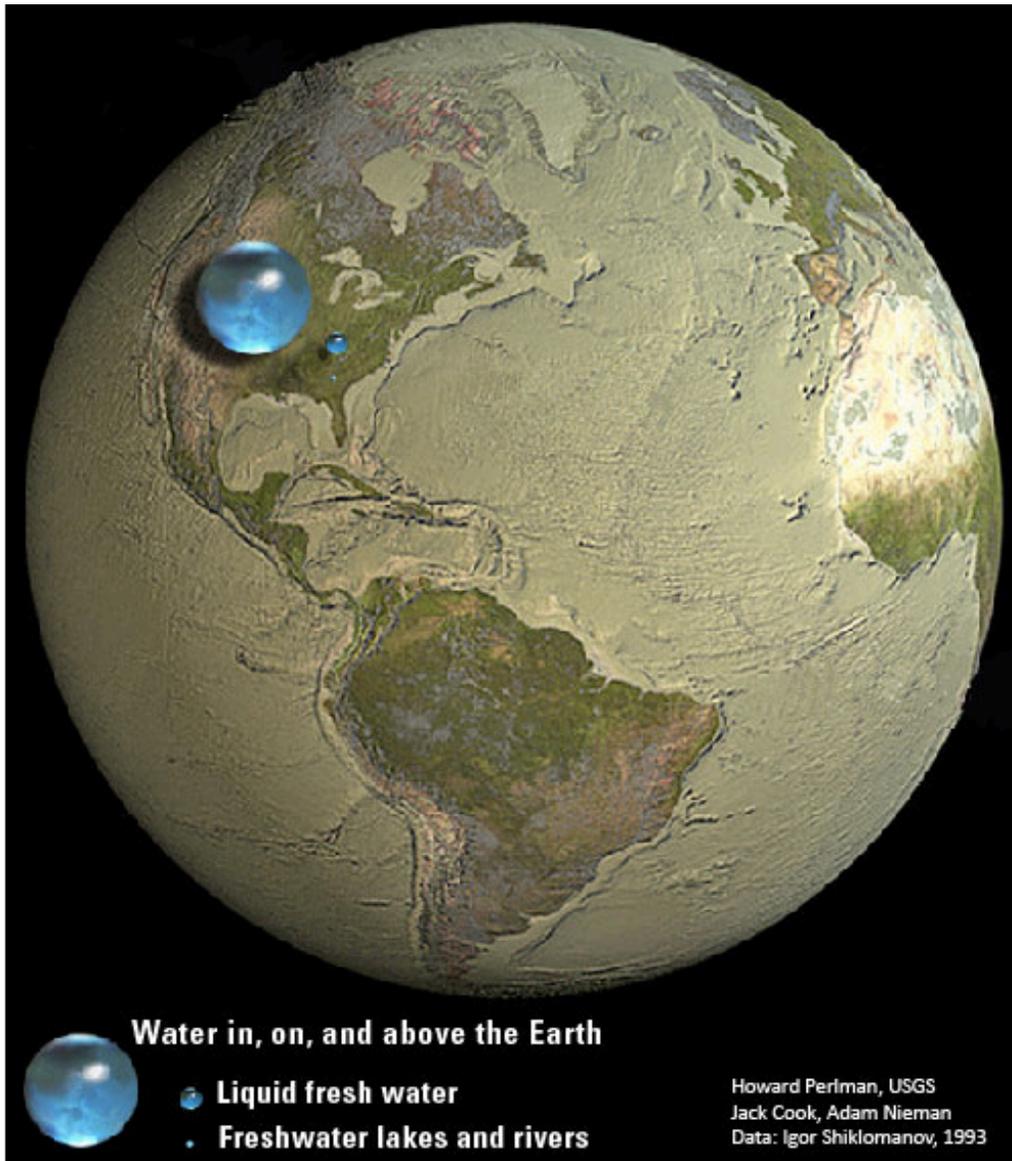
### Freshwater:

- Of the earth's water only about 2.5% is freshwater ([http://www.globalchange.umich.edu/globalchange2/current/lectures/freshwater\\_supply/freshwater.html](http://www.globalchange.umich.edu/globalchange2/current/lectures/freshwater_supply/freshwater.html))
- Almost 70% of the world's freshwater is frozen in icecaps ([http://www.globalchange.umich.edu/globalchange2/current/lectures/freshwater\\_supply/freshwater.html](http://www.globalchange.umich.edu/globalchange2/current/lectures/freshwater_supply/freshwater.html)).
- Groundwater accounts for 30% of the world's freshwater supply (<http://water.usgs.gov/edu/earthwherewater.html>).
- By 2030, 3.9 billion people, half of the world's population, will be living under "severe water stress." ([OECD Environmental Outlook to 2030: http://www.oecd.org/env/indicatorsmodellingoutlooks/oecdenvironmentaloutlook\\_o2030.htm](http://www.oecd.org/env/indicatorsmodellingoutlooks/oecdenvironmentaloutlook_o2030.htm))

## Where is Earth's Water?



Source: <http://water.usgs.gov/edu/earthwherewater.html>



### All Earth's water, liquid fresh water, and water in lakes and rivers

Spheres showing:

- (1) All water (sphere over western U.S., 860 miles in diameter)
- (2) Fresh liquid water in the ground, lakes, swamps, and rivers (sphere over Kentucky, 169.5 miles in diameter), and
- (3) Fresh-water lakes and rivers (sphere over Georgia, 34.9 miles in diameter).

Credit: [Howard Perlman](#), USGS; globe illustration by [Jack Cook](#), Woods Hole Oceanographic Institution (©); [Adam Nieman](#).

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Source: <http://water.usgs.gov/edu/earthwherewater.html>

#### Threats to freshwater:

- Variable rain patterns
- Climate change
- Increasing human demand
- Pollution
- Economic development (i.e. industrialization)

#### Access to clean drinking water and adequate sanitation:

- The Millennium Development Goals aim to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015 (<http://www.un.org/millenniumgoals/> ).
- In 2008, over 2.6 billion people did not use improved sanitation facilities, while nearly 900 million people did not use drinking-water from an improved source (UN Water GLASS 2010 Report: [http://www.unwater.org/downloads/UN-Water\\_GLAAS\\_2010\\_Report.pdf](http://www.unwater.org/downloads/UN-Water_GLAAS_2010_Report.pdf) ).
- Large urban and rural disparities exist in both sanitation and drinking-water; for example, less than half of the rural population used improved sanitation facilities in 2008, compared with 76% of the urban population (UN Water GLASS 2010 Report: [http://www.unwater.org/downloads/UNWater\\_GLAAS\\_2010\\_Report.pdf](http://www.unwater.org/downloads/UNWater_GLAAS_2010_Report.pdf)).
- More people have a mobile phone than a toilet. ([The World in 2011 ICT Facts and Figures](http://www.itu.int/ITU-T/ict/facts/2011/material/ICTFactsFigures2011.pdf): <http://www.itu.int/ITU-T/ict/facts/2011/material/ICTFactsFigures2011.pdf>.)

#### Water-related illnesses:

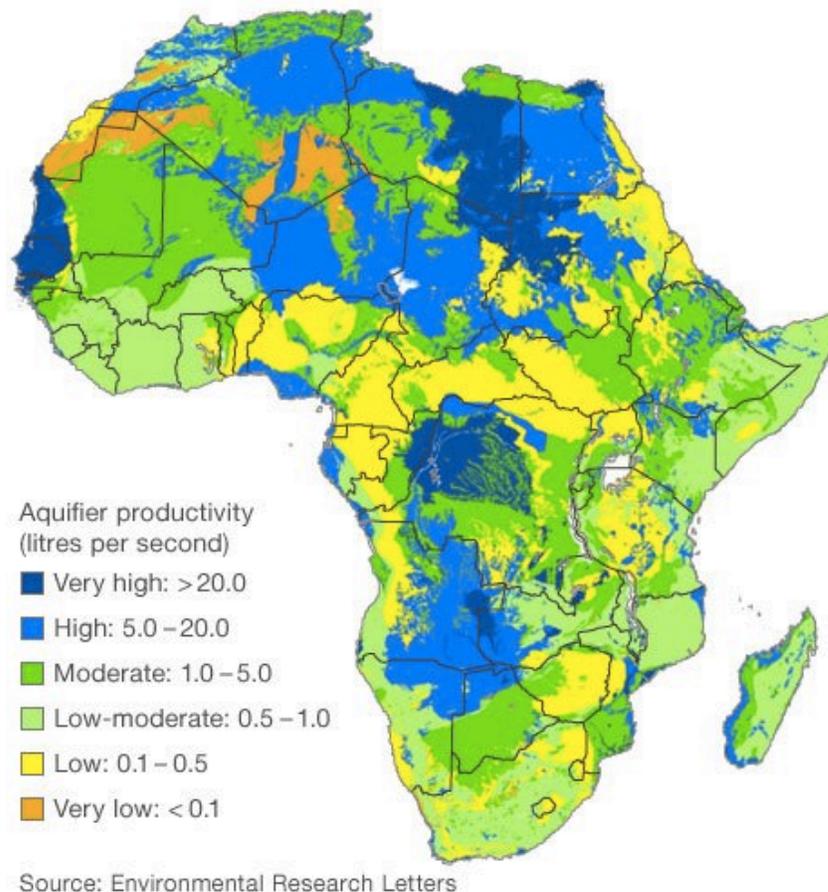
- Unsafe water kills 1.4 million people a year; 90% of them are children.
- A baby dies from unsafe water every 15 seconds.
- 80% of all childhood disease in the developing world is linked to unsafe water and poor sanitation and hygiene.

#### Social cost of low water quality and water scarcity:

- Every year, 443 million school days are lost to water-related illness.
- 80% of diseases in developing countries are associated with a lack of clean water. At least 5,000 children die every day of diarrhea alone.

#### Benefits to investing in water:

- Every \$1 invested in improved water supply and sanitation yields gains of \$4-\$12. (Reference: Hutton, [Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage](http://www.who.int/water_sanitation_health/publications/2012/global_costs/en/):[http://www.who.int/water\\_sanitation\\_health/publications/2012/global\\_costs/en/](http://www.who.int/water_sanitation_health/publications/2012/global_costs/en/)).
- Achieving universal access to safe water and sanitation would save 2.5 million lives every year (WHO, Global Burden of Disease 2004 Update, Geneva:[http://www.who.int/healthinfo/global\\_burden\\_disease/GBD\\_report\\_2004\\_update\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004_update_full.pdf)).



## **Statistics about Africa**

### Groundwater in Africa:

- Groundwater is a major source of drinking water in Africa and is expected to have an increasing role in irrigation in the future (<http://iopscience.iop.org/1748-9326/7/2/024009/article>).
- Note that very few areas above have a “very high” level of productivity.
- Underground aquifers in Africa offer varying amounts of clean water, depending on the location.
- Not all groundwater resources are available for extraction, however, scientists estimate that the total groundwater storage in Africa is 0.66 million km<sup>3</sup> (0.36–1.75 million km<sup>3</sup>).

\*There are several relevant maps and charts at:

<http://iopscience.iop.org/1748-9326/7/2/024009/article>.

### Social cost of water scarcity:

- Over 40 billion work hours are lost each year in Africa to the need to fetch drinking water. (WHO, 2004)
- Lack of water, sanitation and hygiene (known as WASH) costs Sub-Saharan African countries more in lost GDP than the entire continent gets in development aid. (Using a % estimate from [UNDP: Human Development Report, 2006](http://hdr.undp.org/sites/default/files/reports/267/hdr06-complete.pdf): <http://hdr.undp.org/sites/default/files/reports/267/hdr06-complete.pdf>)
- An American taking a five-minute shower uses more water than the rural African uses for an entire day. (United Nations Development Programme.)

Human Development Report 2006:

<http://hdr.undp.org/sites/default/files/reports/267/hdr06-complete.pdf>).

- The average weight of water women in Africa carry on their heads is 50 pounds, the same as the average airport checked luggage allowance (United Nations Development Programme).

## **Statistics about Niger**

### Groundwater in Niger:

- Niger, the country where Wells Bring Hope works, ranks 8<sup>th</sup> in terms of having the largest supply of water underground.

### Climate and Environment:

- Desert plains and sand dunes, most prevalent in the northern regions
- Very dry and one of the hottest countries in the world
- Tropical in the southern most part of the country
- Landlocked
- 11.79% of the land is arable
- As in most countries, the majority of freshwater is used for irrigation (67% of total used)
- Total freshwater withdrawn is 0.98 cu km/yr
- Environmental threats include severe droughts, coming more frequently, flooding, overgrazing, deforestation, and desertification

### Economic status:

- According to the 2013 U.N. Development Index, Niger is the poorest country in the world, ranking #186 (tied with Democratic Republic of the Congo for last place)
- Economy centers on subsistence crops, livestock and some of the world's largest uranium deposits in the north, proceeds of which go to the government (<https://www.cia.gov/library/publications/the-world-factbook/geos/ng.html>).
- GDP per capita = \$800 in 2013.
- 44% earn less than \$1.25 per day.
- Nearly half of the government's budget is derived from foreign donor resources.

### Population and health:

- There are 17,466,172 people in Niger
- Life expectancy in Niger is 54 years. (World Bank)
- About 50% of the population is 0-14 years old (<https://www.cia.gov/library/publications/the-world-factbook/geos/ng.html>).
- Niger has the highest birth rate in the world with an average of 6.89 children born per woman (<https://www.cia.gov/library/publications/the-world-factbook/geos/ng.html>).
- One in seven children in Niger dies before the age of five, often from a preventable case of diarrhea caused by unsafe water. ([State of the World's Mothers. Save the Children: 2012](#))
- One in seven children in Niger dies before the age of five, often from a preventable case of diarrhea caused by unsafe water.
- There are only an average of 0.02 physicians/1,000 people and 0.31 hospital beds/1,000 people

#### Status of Nigerien women:

- Niger has been rated the worst place in the world to be a mother based on maternal and child health indicators. ([State of the World's Mothers. Save the Children: 2012](#))
- 8 out of 10 Nigerien women will suffer the loss of a child in her lifetime. ([State of the World's Mothers. Save the Children: 2012](#))
- 85% of women in Niger are illiterate, compared to 43% of men.
- Many girls don't go to school because they need to help their mothers collect water
- Women and girls typically walk 4-6 miles a day to find water for their families.

#### Clean water and sanitation:

- 87% of rural Nigeriens lack access to adequate sanitation.
- Almost 60% of rural Nigeriens have no access to clean drinking water.
- 96% of rural populations and 67% of urban populations do not have access to improved sanitation facilities.
- 40% of the population of Niger has trachoma, a disease related to unsafe water and poor sanitation and hygiene, which if left untreated, can lead to blindness.
- Niger needs about 11,000 more wells, but the government can provide only 10% of these.

#### What it will take to achieve the Millennium Development Goals by 2015 (Set by USAID & the West Africa Water Initiative):

- \$76 million every year for water
- \$10 million every year for sanitation

#### **Statistics Related to the Solution that Wells Bring Hope Provides in Niger**

From its inception in 2008 to 2011, this is what has happened in areas where it has worked:

- Child mortality drops by 70% as the result of a combined program of safe water, sanitation, and improved nutrition.
- Access to a safe water source increased from 35% to 76%.
- The percentage of communities that had not experienced a water supply stoppage in the previous two weeks increased from 40% to 75%.
- The number of schools with hand-washing facilities increased by over 20%.
- Increased hand washing led to a 50% reduction in deaths from diarrhea and a 30-40% reduction in school absenteeism.

## **Maintenance and Sustainability Lesson:**

All of WBH's water projects are fully sustainable. Sustainability is the most critical issue related to the drilling of wells in Sub-Saharan Africa. Before a well is drilled, a committee is formed to administer the well. These committees are composed of both men and women in order to foster female empowerment and to ensure decisions are being made that will benefit the entire community regardless of gender.

In order to sustain the effectiveness of a well it must be properly taken care of. Many of the wells that are drilled around the world are only beneficial for a few years because community members were not educated on how to preserve the well. It is important that villagers are taught how to maintain the well and are required to set up a maintenance fund.

The result is a strong sense of ownership over the well. When a strong sense of ownership is established community members work hard to protect the well, which will ensure both the present and future generations will benefit from it.

### Potential Lesson Idea:

#### **1) Academic Level:** Elementary

**Goal:** Introduce students to the ideas of maintenance and sustainability by requiring them to take care of something on a regular basis.

- Explain to students what it means to **maintain**, or to take care of, something consistently.
- Explain to students what **sustainability**, or to make something last, means.
- Provide students with examples, and ask for their own examples.
- Give each student a small cup, a bean seed, and some dirt.
- Ask the students to plant the beans, and take care of them each day by putting them in the sunlight and watering them. This will show them that when something is taken care of it will last more than just one day.
- Compare taking care of a bean to taking care of a well that provides people with drinking water.

#### **2) Academic Level:** High School

**Goal:** Develop argument/debate skills, while also expanding student knowledge of sustainability.

- Discuss sustainability in class as it relate to the environment and economics.
- Break students into small groups, or if the class is small students can work alone.
- Divide students into two categories—those arguing that environmental sustainability should be given primary focus and those arguing that economic sustainability should be given primary focus.
- Ask students to research sustainability and debate their position.

## Millennium Development Goal Lesson:

Increased access to clean water is the foundation for achieving many of the following Millennium Development Goals. These goals work to improve human well-being around the world. Increased knowledge of these goals translates to increased awareness of the global community. It is our hope that expanded awareness and knowledge lead to a deeper desire to understand our neighbors from different cultures and countries. With understanding, empathy is developed, and communities rise to support one another.



Potential Lesson Idea:

**Academic Level:** Middle School or High School

**Goal:** Use the Millennium Development Goals to enhance research and presentation skills.

- Introduce the MDG's to students through videos on the MDG website (<http://www.un.org/millenniumgoals/>).
- Each day investigate a different topic in class through country and/or topic specific case studies.
- Divide students into groups, and assign them one of the MDGs to research.
- Students will develop an awareness campaign for the goal that is assigned to their group.

## **Female empowerment lessons:**

Wells Bring Hope focuses significant attention on the relationship between women and water. This is because women and girls as young as 7 years are responsible for collecting water. In Niger, they walk an average of 4-6 miles every day to find water, water that is often contaminated, causing death and disease. Women also take care of children who suffer from water-borne illnesses. They are also responsible for cooking food.

It is crucial to long-term economic development that women are educated, healthy, and involved in the decision-making processes governing everyday life in their village.

### Potential Lesson Ideas:

#### **1) Academic Level:** Elementary School

**Goal:** Imagine what it would be like if your family lived in Niger and had to cope with their situation.

- Talk about what it takes to walk each day to get water. What qualities do you have to have to be able to do that?
- Fill up a jerry can of water (or any container) and ask students to try to lift and carry it for a short distance.
- After doing that, describe to everyone (or write down, then read to others) what that felt like, how they would feel if they had to do that every day.
- How would you feel as a child, if your mother had to do this every day?
- How could you help her?
- How would you feel if your mother was able to work and earn money to help your family?

#### **2) Academic Level:** Middle School or High School

**Goal:** Develop an understanding of the relationship between water and women.

- Individually, Students will research the relationship between women and water in Niger. Some potential topics to explore are: the effect of poor sanitation on girls' education, and the amount of time women walk to get water every day and the effect this has on female education and employment.
- Break students into small groups to discuss what they learned.
- Ask students to share what they learned and how it connects to them.
- Have students respond to the following prompts:
  - If I were a young girl in rural Niger I would feel...
  - If I were a government working in Niger I would...in order to address the needs of women in my country.
  - If I were the director of a nonprofit, I would design a program that helps women by....

## **Clean water and sanitation lessons:**

As indicated in previous notes, clean water and adequate sanitation are significant threats to human well-being, particularly in the world's poorest countries such as Niger.

### Potential Lesson Idea:

#### **1) Academic Level:** Elementary School

**Goal:** Explain that clean water is a gift and that it should be conserved.

- Give students a cup of clean water and a cup of dirty water.
- Ask them which one they would drink.
- Explain that some people don't have clean water to drink.
- How would they feel if they had to drink that dirty water.
- Talk about the importance of protecting the freshwater that we do have.

#### **2) Academic Level:** High School

**Goal:** Familiarize students with the concerns of clean water and adequate sanitation.

- Have students read UNICEF's Progress on Sanitation and Drinking-Water ([http://www.unwater.org/downloads/JMP\\_report\\_2010.pdf](http://www.unwater.org/downloads/JMP_report_2010.pdf)) to familiarize them with the MDGs related to clean water and sanitation as well as the global need.
- Have students select a country to research.
- Ask them to research the percentages of people with access to clean drinking-water and adequate sanitation in both rural and urban communities and the government response to this need.
- Require students to create a solution to the water and sanitation needs of their particular country (look at Afripads for an example).

### **Microfinance Lesson:**

WBH has a microfinance program that works to equip women with the education and skills needed to start and sustain small businesses. Having missed out on years of education, many of the women in these villages do not even know how to count when they first join the program, so Wells Bring Hope begins by providing them with the basic skills necessary for micro-entrepreneurship.

The women form community-based savings groups with 20-25 members, meeting once a week, with someone there at the beginning to provide needed education and support. Once the savings group members have practiced lending and repaying their own money for one year, they are then eligible to apply for loans from local financial institutions. These loans enable them to grow their small businesses and contribute to the economic welfare of their families.

The women raise goats and chickens, and make peanut oil, millet cakes or soap. They feel pride and a sense of accomplishment while also contributing to the financial well-being of their families. Additionally, they become role models for their daughters, the future generation.

Potential Lesson Idea:

**Academic Level:** Middle School

**Goal:** Demonstrate the impact of a small loan on an individual by creating a classroom-wide microfinance community.

- Create a small “store” that sells different goods. These goods can be goods essential for life (i.e. water, soap, food, school fees, seeds etc.) or small, fun, goods (i.e. candy, notebooks, accessories etc.). Price each good as seen fit. Note that this store can either be in operation till the end of the school year or for a set amount of time.
- Create a “bank” that will be able to distribute loans and keep track of interest.
- Brief the students on the new store and why it exists.
- Discuss the ideas of micro-finance and cooperative development with students.
- Create and distribute fake money to each student in the class.
- As students go through the allotted amount of time, they can choose to form cooperatives, create businesses, buy goods from the store or other student businesses, and take loans out from the bank.
- Periodically, hold discussions about student decisions. Ask students who still has money and what their decisions have been. Process the correlation between student decisions and the amount of monetary stability/success students are or aren't having.

## Resources

- **Freshwater in Africa**—[http://www.unep.org/dewa/africa/docs/en/aeo-2/chapters/aeo-2\\_ch04\\_FRESHWATER.pdf](http://www.unep.org/dewa/africa/docs/en/aeo-2/chapters/aeo-2_ch04_FRESHWATER.pdf).
- **Groundwater in Africa**— <http://iopscience.iop.org/1748-9326/7/2/024009/article>.
- **Millennium Development Goals**— <http://www.un.org/millenniumgoals/>.
- **Niger Country Profile (CIA World Factbook)**—  
<https://www.cia.gov/library/publications/the-world-factbook/geos/ng.html>.
- **Niger Profile (BBC)**— <http://www.bbc.com/news/world-africa-13943662>.
- **WHO/UNICEF Monitoring Report 2010**—  
[http://www.who.int/water\\_sanitation\\_health/monitoring/fast\\_facts/en/](http://www.who.int/water_sanitation_health/monitoring/fast_facts/en/).
- **State of the World’s Mothers 2012**—  
<http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/STATE-OF-THE-WORLDS-MOTHERS-REPORT-2012-FINAL.PDF>.
- **Progress on Sanitation and Drinking-Water (UNICEF )**—  
[http://www.unwater.org/downloads/JMP\\_report\\_2010.pdf](http://www.unwater.org/downloads/JMP_report_2010.pdf).
- **Niger Water and Sanitation Profile (USAID)**—  
<http://www.washplus.org/sites/default/files/niger.pdf>.
- **‘WASH’ strategy to improve access to safe water and sanitation in Niger (UNICEF )**— [http://www.unicef.org/wash/niger\\_35633.html](http://www.unicef.org/wash/niger_35633.html).
- **Lima’s burden: Access to water a daily struggle for women in Niger (UNICEF)** — [http://www.unicef.org/wash/niger\\_31847.html](http://www.unicef.org/wash/niger_31847.html).
- **In Niger, new sanitation programme is transforming lives through better hygiene (UNICEF)**— [http://www.unicef.org/wash/niger\\_57677.html/](http://www.unicef.org/wash/niger_57677.html/).
- **Niger Water Sector Project (World Bank)**—  
<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:23181693~menuPK:141310~pagePK:34370~piPK:34424~theSitePK:4607,00.html>.
- **Niger Water Profile (HELVETAS )**—  
[http://www.helvetas.org/projects\\_countries/countries/niger.cfm](http://www.helvetas.org/projects_countries/countries/niger.cfm).
- **Satellites Help Locate Water in Niger**—  
[http://www.esa.int/Our\\_Activities/Observing\\_the\\_Earth/Envisat/Satellites\\_help\\_locate\\_water\\_in\\_Niger](http://www.esa.int/Our_Activities/Observing_the_Earth/Envisat/Satellites_help_locate_water_in_Niger).

- **UN-Water Global Annual Assessment of Sanitation and Drinking-Water—**  
[http://www.who.int/water\\_sanitation\\_health/glaas/2008\\_pilot/glaas\\_2008\\_pilot\\_final\\_report.pdf](http://www.who.int/water_sanitation_health/glaas/2008_pilot/glaas_2008_pilot_final_report.pdf).
- **Running Dry: the humanitarian impact of the global water crisis—**  
<http://www.irinnews.org/indepthmain.aspx?InDepthId=13&ReportId=60537>.