

Saving Lives Through LifeStraw

A difference can be made by supplying Lifestraws to people who live with compromised water in areas of natural disasters.

Tag Words: LifeStraw; Water; Dirty Water; Natural Disasters; Waterborne Diseases; Diarrhea

Authors: Luri Lee, Danbee Park, Bryan Lui with Julie M. Fagan, Ph.D.

Summary

On sites of natural disasters many people suffer from unsafe and dirty water. Because of the lack of access to freshwater, they have to face waterborne diseases that kill about 6,000 people everyday. We want to make a difference by providing inexpensive water filters, Lifestraws, to people in natural disasters so that they can have more access to clean water.

The Issue: Dirty Water

Two out of three parts of our world are covered by water. 97.5% of the total water in the world is saltwater which leaves only 2.5% of freshwater. Among freshwater, 70% is in the form of ice and snow covered in mountainous regions, and 30% is groundwater. Therefore, the total usable freshwater supply for ecosystems and humans is only less than 1% of all freshwater resources. In approximately thirty years, the world's population is believed to rise to about eight billion people, while the amount of fresh water will still remain constant.

However, the issue is not that there is not enough freshwater. On top of lacking freshwater, another problem is very large unequal amount of access to freshwater. For example, the Congo has more fresh water resources (291, 000 cubic meters per capita) than the United States (9,000 cubic meters per capita). But even with the Congo's large fresh water source, only 17% of the rural inhabitants have access, compared to the 77% of the city and town dwellers that have access. In general, experts can agree to two main problems regarding the availability of fresh water. The first problem is that there is a dramatic virtual simultaneous extraction from ground aquifers, and the second problem is that there has been an extreme exponential increase in population (especially in third world countries).

Water is a fundamental need for every human as air is critically essential. However, abundant people on our planet do not have this fundamental need satisfied. The most obvious examples can be seen on the continents of Africa and Asia especially. One can even look at countries that are considered better off than others, such as India, and discover scarcity of safe clean drinkable water, especially in rural areas.

In addition to the fundamental need of water, three out of four diseases in third world nations can be attributed to drinking unclean water. A total of 2.8 billion people from 31 countries experience chronic water problems. Every day, 6,000 people die from ingesting dirty water. This equates to 2,102,400 people per year. In 2006, the study showed that 1.8 million people died from waterborne diseases each year while about 1.1 billion people lack safe drinking water. Diarrheal diseases cause 90% of all deaths of children under five years old in developing countries. These people do not have access to 13.2 gallons of clean water which is the daily requirement for sanitation, bathing and cooking needs for assuring survival. The average person in the world uses only 2.6 gallons of water every day for their drinking, washing and cooking. One in six people worldwide do not have access to safe freshwater. It is estimated that 1.8 million people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under stress conditions by 2025.

Community Service Project

Our main goal for the Lifestraw project is to reduce the suffering people from ingesting dirty water throughout their daily lives in areas of natural disasters. The plan of the project is purchasing Lifestraws through Water Project, Inc., and sending them to areas in need of safe, clean, and drinkable water. As a start, we plan to make bulk purchases for Nakapiripirit District. We are writing a proposal to the Red Cross, The Ananda Marga Universal Relief Team, the

International Relief Friendship Foundation, the National Emergency Response Team, and The Salvation Army, and the Adventist Community Services for help, and other forms of assistance.

The goal of the Lifestraw Company is to respond to critics by providing cheaper water filters and removing the complete spectrum of microbiological contamination, including parasites like *Giardia lamblia*. LifeStraws are portable water filters designed by the Swiss-based company Vestergaard-Frandsen for people in areas of natural disaster. There are two types of LifeStraws.

The LifeStraw Personal is a form of the LifeStraw technology that is designed for the individual use. In addition to the personal uses, it is designed for drinking water outside of the home in the outdoor environment. LifeStraw Personal filters at least 700 liters of water which is enough for one person for one year.

The LifeStraw Family is a form of the LifeStraw technology that can be used by multiple individuals (for example, a family of multiple individuals utilizes a single LifeStraw Family). The LifeStraw Family should be used for drinking water in an indoor environment such as the inside of homes. In addition, the LifeStraw family has shown even higher effectiveness in filtering viruses, parasites, and other types of harmful organisms; it can also be utilized through turbidity for water. LifeStraw Family filters at least 18,000 liters of water, providing clean water for a family for more than two years. Of the two types of Life Straws, the LifeStraw Personal has been praised for its effective and instant method of bacteria removal. According to the test results, LifeStraw removes 99.9999% of waterborne bacteria, 99.99% of viruses, and 99.99% of parasites.

The LifeStraw's purposes were to avoid having any movable segments and to function as a completely sealed technology while not requiring any electricity because of the difficulty in seeking electricity in areas of natural disaster. Therefore, the force needed to filter the water is sucking which is the most basic of forces that the human body can perform. The sucking force is a force that even babies are able to perform as it is the natural reflex with which human beings are born.

LifeStraws has a technology called PuroTech Disinfecting Resin which is a type of substance that kills organisms on contact. In addition, it has textile pre-filters which can take out substances as small as 15 microns. Active carbon prevents organisms such as parasites from being ingested. In more detail, the LifeStraw Personal is a plastic tube 31 cm long and 3 cm in diameter, and it costs approximately five dollars (in our situation, by purchasing one-thousand units in bulk, the individual price of each life straw would be exactly \$5.50 with no shipping costs included). When water is sucked through the straw, it first passes through a mesh of 100-micrometer spaces, then through a mesh of 15-micrometer spaces. Many large contaminants are thus filtered out, as well as the many groups of bacteria. Water then goes through a chamber with iodine-coated beads that kill remaining bacteria. The largest contaminants will be filtered out by the pre-filter, and the least strong bacteria will be completely killed by the iodine that is located in the LifeStraw. Then it will all pass through an empty chamber, and finally pass through active carbon which removes the iodide taste and medium-sized bacteria. The entire process is powered by suction just like drinking with a straw. The Vestergaard-Frandsen laboratories' readings have shown a log. 7 to log 8 of destroying the parasites, and this reading can be compared to the tap

water in many developed nations, such as the United States.

Upon receiving the LifeStraw for the first time, it is advised to spit out the first two forty milliliters due to not enough large amount of black carbon that may come out. This can be compared to many types of Brita filters which can have many small black carbon substances floating around after being bought straight from the store. Also, the use of the LifeStraw for the first time can be difficult because of a natural brake of the water which has been purposefully installed into the LifeStraws. Hence, the water would be best sucked out when coming out at a rate of 100 mm to 150 mm every 60 seconds in order to get the fullest potential out by killing of the parasite organisms. This natural break is important because it assists in destroying parasitic organisms which can be detrimental to the human health.

The LifeStraws are produced and manufactured in Asia. Vestergaard-Frandsen does not ship life straws to the United States due to a lack of approval by the Environmental Protection Agency; the organization does not seek for EPA approval because there is no demand for lifeStraws in the United States. Hence, Vestergaard-Frandsen thinks going through rigorous and expensive testing is unnecessary. Because there is no production or manufacturing of LifeStraws in the United States, we cannot purchase and send them on our own. The LifeStraws will be sent through the Lifestraw Company. It is important to work through the closest branch, Swiss-based Vestergaard-Frandsen in Florida, in order to purchase the LifeStraws.

Our group believes that education is an important part of a successful distribution campaign. The individuals in the community need to be educated on how waterborne diseases are transmitted, and how Lifestraw can be used correctly and appropriately in order to avoid and prevent these waterborne diseases. Many of these people do not even know that there is clean water available, they are not aware of their water conditions. To find out more about the education part, we called Casey W. Spigle, a representative of Vestergaard-Frandsen. He said that there are people who distribute and educate people on how to use the Lifestraws in various areas of natural disasters that utilize LifeStraws. Unfortunately, Vestergaard-Frandsen does not educate about waterborne diseases. Through Lifestraw, these people will at least learn to differentiate between clean and dirty water and to drink safer water.

LifeStraw can be especially important for people who are suffering from two main health conditions. One type of health condition is Human Immunodeficiency Virus (HIV) because people with HIV have weakened immune systems, and they are much more susceptible to getting waterborne illnesses and other infectious diseases. The other type of health condition is Diarrhea. Diarrhea is one of the top causes of death children who suffer from Human Immunodeficiency Virus. In the African nation of Uganda, a study showed that the use of safe drinking water had diminished the number of diarrheal illnesses by 36%.

As a start, our group feels very passionate to send the Lifestraws to a district in the nation of Uganda, on the continent of Africa. The reason is the district's large population yet with lack of large access to clean and safe drinkable water. The 2002 national census estimated the population of the district at 153,862, with an annual population growth rate of 2%. With that, it is estimated that in 2009, the population of Nakapiripirit District is about 176,741. It has been estimated that in the year 2009, the population will be 176,700. Nakapiripirit District is in

northeastern Uganda, Africa. Similar to other Ugandan districts, the Nakapiripirit District follows the tradition of being named after its 'chief town' Nakapiripirit. The district of Nakapiripirit is famous in Karamoja for consisting of the central food basket, as a result of its evenly scattered rainfall and fertile lands. And these characteristics are reminiscent of the neighboring districts of Kapchorwa and Mbale.

There is a lack of education in the district even though there has been a rise in the number of schools in the district. They lack knowledge on the appropriate ways of cleaning and other facts about sanitation; hence they ingest un-sanitized water from rivers. In addition, the people of the district make holes in the ground to collect rainwater for all the uses.

Hence, we would like to send one-thousand units of Life Straw to the northeastern Uganda Nakapiripirit District, straight from Vestergaard-Frandsen factories located in Asia. The reasoning would be because we would save money and time by directly shipping from the Vestergaard-Frandsen factories. Casey W. Spigle, representative of Vestergaard-Frandsen, has stated that shipping address is not required to send Life Straws because Vestergaard-Frandsen already has associates in the nation of Uganda. Those associates will not only receive and appropriately distribute the Life Straws to the district of Nakapiripirit but also fully educate the people so that they can utilize the Life Straws to its fullest potential.

The minimum purchase of LifeStraws personal is 1,000 units. This puts the price of each individual straw costing \$5.50. The shipping price varies depending on the location and the methods of shipping at the time of approval according to market value. Casey W. Spigle, representative of Vestergaard-Frandsen, informed our group that it would not be plausible to accurately give a shipping price due to the constant changes in market value of labor, modes of transportation, and shipping. If we were to ship 1000 units of LifeStraws, air flight would be our best solution, and it would cost about \$785. Shipping transit time would only be 4-5 days. The total cost would be \$6,285.

For more information regarding Vestergaard-Frandsen's life straw, here is an excerpt from a CNN documentary on the Life Straw, <http://www.youtube.com/watch?v=wRG8pIDAANA>. In addition, here is a demonstration on effectiveness of the lifeStraws, <http://www.youtube.com/watch?v=ycEnu9p1GPE>.

References

UN Water: <http://www.unwater.org>

The World Bank: <http://web.worldbank.org>

WaterAid: <http://www.wateraid.org/>

Wikipedia: <http://en.wikipedia.org/wiki/LifeStraw>

District Information Portal: <http://www.nakapiripirit.go.ug/index.htm>

Vestergaard-frandsen: <http://www.vestergaard-frandsen.com/index.htm>

LifeStraw: <http://www.lifestraw.org.uk>

AIDS, malaria eclipse the biggest child-killers:

http://news.yahoo.com/s/ap/20091119/ap_on_re_as/as_world_s_children_forgotten_killers

December 9, 2009

To: Whom It May Concern

As students at Rutgers University, we believe that we need to take part in helping developing countries have better access to safer water to drink. 3 out of 4 diseases in third world nations are attributed to drinking unclean water. Every day, 6,000 people die from ingesting dirty water. In 2006, studies show that 1.8 million people died from waterborne diseases while about 1.1 billion people lack safe drinking water. We have attached our proposal about water usage problems and the deaths in third world countries along with a power point presentation. We believe that we could lend a hand by sending out Lifestraws to the countries in need of clean, safe and drinkable water in order to help save lives.

Thank you for taking your time in considering our proposal. If you have any questions regarding any of the information attached, please contact us at Fagan@rci.rutgers.edu.

Sincerely,
Danbee Park
Bryan Lui
Luri Lee

Proposal for a helping hand to send out Lifestraws to developing countries

Many people in developing countries may have water, but it is very unsafe and dirty, leading to highly preventable mortality. We want to make a difference by providing inexpensive water filters, Lifestraws, to people in developing countries so that they have access to clean water.

Current water issue:

As mentioned in the cover letter, the total usable freshwater supply for ecosystems and humans is less than 1 percent of all freshwater resources. However, this is not the main issue. The main issue is that there is a very large unequal amount of access to freshwater. This leads to two main problems. The first problem is that there is a dramatic virtual simultaneous extraction from ground aquifers, and the second problem is that there has been an extreme exponential increase in population (especially in third world countries).

Water is a fundamental need of every human, in much the same way that air is critically needed by humans. However, most of the people on our planet do not have this fundamental need satisfied. The most obvious examples can be seen on the continents of Africa and Asia especially. In areas of rural society, they lack safe clean drinkable water. 3 out of 4 diseases in third world nations can be attributed to drinking unclean water. Third world nations also lack knowledge and education in how to prepare and even differentiate between clean water and dirty water. 31 countries, consisting of a total of 2.8 billion people experience chronic water problems. Every day, 6,000 people die from ingesting dirty water. This equates to 2,102,400 people per year. In 2006, studies show that 1.8 million people died from waterborne diseases each year

while about 1.1 billion people lack safe drinking water. Diarrheal diseases cause ninety percent of all deaths of children under 5 years old in developing countries. These people do not have access to 13.2 gallons of clean water which is a daily requirement for sanitation, bathing, and cooking needs, as well as for assuring survival. The average person in developing countries uses 2.6 gallons of water every day for their drinking, washing, and cooking. One in six people worldwide do not have access to safe freshwater. It is estimated that 1,800 million people will be living in countries or regions with absolute water scarcity, and two-thirds of the world population could be under stress conditions by 2025.

Our Proposal:

Our proposal is to ask you to help us send out Lifestraws to developing countries where clean water is needed. Since we cannot send out clean water every day, we were considering that Lifestraws be sent out. We understand that your goal is to build wells for the developing countries, but you might also want to consider these Lifestraws.

Lifestraws are portable water filters designed by the Swiss-based company Vestergaard-Frandsen for people in developing countries. There are two types, Lifestraw Personal which filters at least 700 liters of water, enough for one person for one year and Lifestraw Family which filters at least 18,000 liters of water, providing clean water for a family for more than two years.

The goal of the Lifestraw Company is to respond to critics by providing cheaper water filters and removing the complete spectrum of microbiological contamination, including parasites like *Giardia lamblia*. Of the two types of Life Straws, the Lifestraw personal has been praised for its effective and instant method of bacterial removal. According to test results, Lifestraw removes 99.9999% of waterborne bacteria, 99.99% of viruses and parasites.

Lifestraw is designed for drinking water outside of the home in the outdoor environment. Its purposes were to avoid having any movable segments and to function as a completely sealed technology, needing no spare parts, while not requiring any electricity, because of the difficulty one would usually experience in seeking electricity in third world countries. Hence, the force needed to filter the water would be from the most basic of forces that the human body can perform, which would be sucking. We recommend these Lifestraws to developing countries because they are relatively very inexpensive and very effective.

Life Straws has a technology called PuroTech Disinfecting Resin which is a type of substance that kills organisms on contact. In addition it has textile pre-filters within the LifeStraw which can take out substances which are as small as fifteen microns. Active carbon prevents organisms such as parasites from being ingested. In more detail, the LifeStraw Personal is a plastic tube 31 centimeters long and 30 millimeters in diameter, and costs approximately five dollars (However, in our situation, by purchasing one-thousand units in bulk, the individual price of each life straw would be exactly \$5.50 with no shipping costs included). When water is sucked through the straw, it first passes through a mesh of 100-micrometer spaces, then through a mesh of 15-micrometer spaces. By doing such an action, many of the large contaminants are thus filtered out, as well as the many groups of bacteria. Water then goes through a chamber with iodine-coated beads that kill remaining bacteria. The largest contaminants will be filtered out by the pre-filter, and the least strong bacteria will be completely killed by the iodine that is located in the LifeStraw. Then it will all pass through an empty chamber, and finally pass through active carbon which removes the iodide taste and medium-sized bacteria. The entire process is powered by suction just like a

drinking straw. The Vestergaard-Frandsen laboratories readings have shown that a log. 7 to log 8 of destroying the parasites, and this reading can be compared to the tap water in many developing nations, such as the United States.

To start off with our project, our group feels very passionate about sending the purchase of Lifestraws to a district in the nation of Uganda, on the continent of Africa. The reason is that this district's large population yet lack of large access to clean and safe drinkable water. Nakapiripirit District is a district in northeastern Uganda, Africa. Similar to other Ugandan districts the Nakapiripirit District follows the tradition of being named after its 'chief town' [Nakapiripirit](#). The district of Nakapiripirit is famous in Karamoja for consisting of the central food basket, as a result of its evenly scattered rainfall, generally speaking, and in addition to its fertile land. And these characteristics are reminiscent of the neighboring districts of Kapchorwa and Mbale. There is a lack of education in the district, even though there has been a rise in the number of schools developed in the district. They lack knowledge on the appropriate ways of cleaning, and other facts about sanitation; hence they ingest un-sanitized water from rivers. In addition, the people of the district make holes in the ground to collect water from the rain, for a number of uses such as drinking, cooking and washing.

The 2002 national census estimated the population of the district at 153,862, with an annual population growth rate of 2%. With that, it is estimated that in 2009, the population of Nakapiripirit District is about 176,741. It has been estimated that in the year 2009, the population will be 176,700.

Hence, we would like to send one-thousand units of Life Straw to the northeastern Uganda Nakapiripirit District, straight from Vestergaard-Frandsen factories located in Asia. The reasoning would be because we would save money, and time by directly shipping from the Vestergaard-Frandsen factories. Casey W. Spigle, representative of Vestergaard-Frandsen, has stated that shipping address need not be required by people who wish to send Life Straws to their appropriate destination because Vestergaard-Frandsen has associates in the nation of Uganda who will not only receive and appropriately distribute the Life Straws to the district of Nakapiripirit but the Vestergaard-Frandsen associates will also fully educate the people of this district so that they can utilize the Life Straws to its fullest potential.

As you know, access to clean water is very important for every individual. Wells may be useful to many places, but some places don't allow the condition to have wells. Wells can be more expensive and may take a longer time to build. Many volunteers would be needed to build one and to actually make progress of the well building. If you would just take a consideration of the Lifestraws as part of your Water project, we thought it might be some help to saving some lives. For more information regarding Vestergaard-Frandsen's life straw here is an excerpt from a CNN documentary on the Life Straw, <http://www.youtube.com/watch?v=wRG8pIDAANA>. In addition, here is a demonstration of how effective the Vestergaard-Frandsen life straw can be. <http://www.youtube.com/watch?v=ycEnu9p1GPE>.

References

UN Water: <http://www.unwater.org>

The World Bank: <http://web.worldbank.org>

WaterAid: <http://www.wateraid.org/>

Wikipedia: <http://en.wikipedia.org/wiki/LifeStraw>

District Information Portal: <http://www.nakapiripirit.go.ug/index.htm>

Vestergaard-frandsen: <http://www.vestergaard-frandsen.com/index.htm>

LifeStraw: <http://www.lifestraw.org.uk>

AIDS, malaria eclipse the biggest child-killers:

http://news.yahoo.com/s/ap/20091119/ap_on_re_as/as_world_s_children_forgotten_killers

Editorials

To: New Jersey Magazine
research@njmonthly.com
PO Box 920
Morristown, NJ 07963

Editorial: How to save one person with \$5/year
By. DanBee Park
Rutgers University

What is the most concern to you? Money? Jobs? Beauty? While you are thinking about things that comfort your living, there are people who have to worry about their daily surviving. Many people in third world countries have to walk hours to get water which is not even clean enough to survive without diseases and share water with animals. Clean water requirement for living is about 12 gallons per day but average American uses about 100 gallons per day. How about people in developing countries? They live with only 2.5 gallons. About 6,000 people die from water problems everyday. Have you imagined drinking water out of a puddle? We are privileged to have clean water.

What can we, as privileged people, do? There is a way to save people who are dying from water borne diseases! Let me introduce you spectacular equipment called "Lifestraw." It is a personal straw with layers of filter that can filter out 99 % bacteria and 98 % viruses. People can safely drink water out of rivers, puddles, or any other unclean water sources. The straw lasts one year and costs only \$5. Let me do my calculation. Five dollars/year is less than 1.5 cents/day. So, the question is: how can you help? "Lifestraw" is made in UK, but it can not be exported to America yet. So, people can not purchase or donate directly because EPA has not approved LifeStraws. However, people can donate through rotary club in Florida. Amazing equipment is invented. "Lifestraw" can save abundant people, and it costs so little! Why don't we start helping out today?

DanBee Park

Luri Lee

Surviving Under Poor Water Supply

It's hard to imagine living by drinking water directly from the rivers or drinking rain. Many Americans probably don't even know how grateful they are when they are drinking a clean glass of water. Essentially, we can live without modern technology but we can't live without clean water. Some people may say that they can't live without modern technology but have you ever thought about drinking contaminated water for the rest of your life?

Unfortunately, as we may all know, in many developing countries there are so many people out there that are actually using water from rain and rivers to cook, drink, wash, etc. Despite these poor conditions, many of these people have learned to live and continue to use the contaminated water. Not because they want to, but because it is all they have to survive. It's very depressing that these people are trying to survive on contaminated water.

Most of these people have no water source at all, that they have to go miles just to get contaminated water. Currently, 1 billion people in Africa and Asia have no clean drinking water. 6,000 people, mostly children, die each day as a result of diseases from contaminated, filthy drinking water.

Water, just like air, is a gift from God to all. Water covers 71 percent of the Earth's surface. But, why is it that in many places, only the rich have access to a clean water supply while the poor must struggle for it? Clean water is essential to life. Without water, life would cease to exist. As being one of the Americans with access to clean water, I wanted to start a group project with my fellow students that can do part in saving these people from drinking contaminated water. Being students at Rutgers University, we were planning to get support from Water Project, Inc. Our group has found a product that might actually help some people to clean water. It is called Life Straw. It's basically a filter that filters 99.99% of bacteria! Considering it's pretty cheap, we were considering donating these Life Straws to places where these are needed most. People like us, in the developed countries tend to waste precious, clean water. Many people don't know that we have to the power to make a difference so that everyone has access to clean water someday. It's possible that a billion people in the world will never have a clean drink of water. We can all help just by spreading the word or donating to these people. It's fairly simple.

New York Times
229 West 43rd Street
New York NY 10036
editorial@nytimes.com.
(212) 556-7652.

By Bryan Lui

Rise in Human Population as Amount of Drinkable Water Remains Constant

Imagine a life where we have to pay eight dollars for a bottle of dirty water. Although that may seem far fetched, many people in this world actually pay an equally heavy price for this fundamental need for water, and often times this water is not even sanitary. We would like to change that by introducing a new technology called LifeStraws to people in need of clean, safe and drinkable water.

In today's world, as our population grows exponentially, the amount of fresh water available on our planet remains constant. As time goes by, it will be more difficult to provide water to our increasing population. And as if it was not difficult enough, access to this small constant supply of fresh water is not distributed evenly. Take for example the country of Congo, which has 291, 000 cubic meters per capita of fresh water supply. Compared to the United States of America, which has 9,000 cubic meters per capita of fresh water supply, the people of Congo would clearly have more fresh water than the United States of America. However, only seventeen percent of the rural community of the nation of Congo actually has access to this large supply of fresh water. Where as seventy-seven percent of city and town dwellers of the Congo have access to their nation's fresh water supply. Hence, the biggest obstacle facing the need for clean drinkable water is not that our amount of fresh water on this planet remains constant. The biggest obstacle is that the access of this constant supply of fresh water is not equal in distribution.

We would like to make a difference by providing LifeStraws to people in need. Life Straws is a new and inexpensive breakthrough in technology that filters contaminated water into

safe drinkable water. It is thirty one centimeters long and thirty millimeters in diameter and would cost approximately five dollars individually. When water is sucked through the straw it first passes thru a mesh of 100-micrometer space, then through a mesh of 15-micrometer spaces. By going through this intricate sequence of filters it essentially filters out ninety-nine percent of bacteria and ninety-eight percent of viruses. The Life Straws can filter enough water to last the average person an entire year. Our group at Rutgers University would like to find an organization that would like to make such a significant yet inexpensive contribution in purchasing the lifeStraws for a community in need in the country of Uganda. It is important for us to improve the access of drinkable water in society, because having drinkable water is as critical as our fundamental need for air.