# **Envision |** Issue Statement Paper

## Group Name
Sustainable Hygiene Program (SHYP)

## Authors

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## Issue and Topic
Improving Hygiene, Preventing the Spread of Infectious Diseases, and Stabilizing the Economies of Developing Nations in Sub-Saharan Africa

## Background and Proposal
In 2012, the global population suffered an estimated 871,000 deaths due to water contamination, inadequate sanitation, and poor hygiene ("Mortality Due to…"). Over one-third (34.1%) of these fatalities resulted from insufficient hand-washing alone. In 2014, it was estimated that 81% of the global population lacked proper hand hygiene resources, making them vulnerable to preventable infections and possible death (Prüss- Ustün). While this is a worldwide burden, low-income countries suffer from these easily preventable diseases most, specifically those in Africa ("Mortality Due to…").

Of the nearly one million water, sanitation, and hygiene (WASH) related deaths in 2012, 45% of the fatalities occurred in Africa, where only 13% of the global population lives ("Mortality Due to…"). Each hour, 115 people in Africa die due to a lack of hand-washing materials – mere soap and water. In 2015, the Ebola Virus Prevention Department at the Mayo Clinic stated that, "As with other infectious diseases, one of the most important measures is frequent hand-washing. Use…..alcohol-based hand rubs containing at least 60% alcohol when soap and water are not available." Additionally, with the outbreak of Ebola in 2014, which devastated West Africa and its surrounding regions, the World Health Organization (WHO) stated that, "Alcohol-based hand rubs should be made available at every point of care (at the entrance and within isolation rooms/areas) and are at the standard of care" ("Hygiene…"). Yet, WHO reports that even 35% of hospitals and health care clinics in 54 developing countries lacked the

basic resources needed for staff and patients to wash their hands (WHO, United Nations' Children's Fund).

In these most vulnerable countries, economic and job instability further threaten lives. In Sierra Leone, Guinea, and Liberia, largely poor countries whose economies are based on agriculture, lack of money and infrastructure prevents the adequate storage and transport of fruit crops including oranges and mangos. Often, these fruits become spoiled by heat before they can be sold, resulting in large losses for those in the farming industry who cannot profit off their harvest ("Tropical Fruits"). Yet, these "wasted" fruits hold incredible power, which would be harnessed by the "Sustainable Hygiene Program."

The Sustainable Hygiene Program (SHYP) proposes a plan to convert these otherwise wasted fruits into ethanol to be used for sanitation in low-income regions of Africa. By fermenting and distilling these spoiled fruits into ethanol and bottling that sanitizing agent as 60% alcohol-based hand-rubs, nations can reduce the horrific rates of death due to infectious diseases and diarrhea, improve sanitation in medical and domestic environments, and stimulate economies of impoverished areas throughout the world. SHYP aims to build the necessary transport and manufacturing systems in these low-income communities to bring fruit from farm to factory, and sanitizers from factory to consumer. The process to efficiently convert fruits into ethanol was determined in 2009 by Dr. Wayne Fish and his team at the USDA. From a single acre of unsalable melons, Dr. Fish and his colleagues were able to produce 87 liters of ethanol (Fish). This process can easily be modified to use the mangoes, oranges, and other fruits spoiled in the African sun to create sanitation supplies for low-income communities. In fact, since these tropical fruits are higher in sugar content than the melons("Tropical Fruits") tested by Dr. Fish, the implementation of this distillation process would yield increased volumes of ethanol. No individual in this modern world should become ill or die from a preventable disease due to an inability to wash their hands; the Sustainable Hygiene Program would eliminate this global threat.

## Partners

For decades, there has been no shortage of organizations that want to help low-income, African communities. However, with still 70% of the continent suffering from lack of sanitation, clean water, and proper hygiene (Africare), it is evident that there is a desperate need for a sustainable and financially responsible project such as SHYP. By partnering with the current organizations working to ameliorate this suffering, the Sustainable Hygiene Program can be accomplished. Such organizations include Africare, a leader in improvement of African lives and responsible for educating nearly 66,000 people about sanitation and health practices through its Water, Sanitation, and Hygiene (WASH) program (Africare). Likewise, the Water and Sanitation Trust Fund (WSTF) and the Human Values in Water, Sanitation and Hygiene Education Program (HVWSHE), are top nonprofits seeking innovative ideas to ameliorate the difficulties in lives of those suffering from sub-standard hygiene. By partnering with the WSTF, HVWSHE, and Africare, as well as with the governments of African countries, the

financial support, community intelligence, and legal permission needed to employ the Sustainable Hygiene Program in Africa would be acquired, saving the lives of millions for generations to come.

## Challenges, Solutions, and Schedule for Implementation

The biggest challenge to SHYP is the funding and construction of the factories needed to convert damaged fruits into ethanol, and to bottle and distribute the alcohol sanitizers to impoverished communities. In order to reduce these logistical burdens, the local citizens of these poor areas should be employed to construct, run, and maintain each of the factories, as well as distribute the 60% alcohol sanitizers to their local communities. Doing so will eliminate the need to import and house workers from other nations and will result in the self-sufficiency of the factories. By creating new manufacturing jobs and training locals to maintain the facility, these destitute poor will be able to earn a stable wage. In order to further make these factories self-sustaining, these factories will be powered by solar panels, which will efficiently create electricity under the strong, African sun. In order to supplement this solar energy, a portion of the fruit-based ethanol can be used as a biofuel, just as corn-based ethanol is the primary source of biofuel in America. Consequently, the factories will be sustainable, will preserve the environment, and will stabilize the economies of surrounding communities by providing jobs for local citizens.

By collaborating with the aforementioned governmental, international, and non-profit partners, it would be feasible to gather the funding and design the plans for the construction of this eco-friendly, life-saving project in sub-Saharan Africa by 2020. Thus, it is estimated that this Sustainable Hygiene Program (SHYP) would be able to be up and running in those most needy countries like Sierra Leone, Guinea, and Liberia by 2025.

## Critical Impact

As described above, the implementation of the Sustainable Hygiene Program throughout Africa would yield three major results: the prevention of nearly 300,000 deaths per year due to a lack of soap and water for hand-washing, the ability of farmers in these agriculture-based countries to profit from their abundant amounts of spoiled fruits, and the creation of thousands of jobs in low-income communities.

Please, help support this initiative to improve health, hygiene, and economics in developing nations. It is critical that these deprived men, women, and children be provided with the most basic tools to have a healthy and hygienic life. Please support and establish the Sustainable Hygiene Program and ask that your fellow world leaders do the same. Millions of the world's most vulnerable lives can easily be saved, one SHYP at a time. Thank you for your time and consideration.

## Research Sources

"Africa, Decade, Water for Life, 2015, UN-Water, United Nations, MDG, Water, Sanitation, Financing, Gender, IWRM, Human Right, Transboundary, Cities, Quality, Food Security." United Nations. United Nations, 16 May 2016. Web. 20 January 2017.

Africare. “Water, Sanitation, & Hygiene.” Africare. Africare, 2017. Web. 20 January 2017. <https://www.africare.org/africares-approach/water-sanitation-hygiene/>.

Fish, Wayne W. “Watermelon Juice: A Promising Feedstock Supplement, Diluent, and Nitrogen Supplement for Ethanol Biofuel Production.” Biotechnology for Biofuels. USDA-ARS Agricultural Research Laboratory, 2009. Web. 20 January 2017. <https://biotechnologyforbiofuels.biomedcentral.com/articles/10.1186/1754-6834-2-18>.

“Hygiene Drive to Combat Ebola in Sierra Leone.” BeaVan Charities. BeaVan Charities, Inc, 2015. Web. 20 January 2017.

“Mortality Due to Unsafe Water, Unsafe Sanitation, and Lack of Hygiene.” World Health Organization. World Health Statistics: 2016. Web. 20 January 2017. <http://www.who.int/gho/publications/world_health_statistics/2016/whs2016_AnnexA_MortalityWaterSanitation.pdf>.

Prüss- Ustün A, Bartram J, Clasen T, Colford JM, Cumming O, Curtis V, et al. “Burden of disease from inadequate water, sanitation and hygiene in low- and middle- income settings: a retrospective analysis of data from 145 countries.” US National Library of Medicine, Nation Institutes of Health. Trop Med Int Health, 2014 Web. 20 January 2017. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4255749/#b17>.

“Tropical Fruits – Africa’s Real Diamonds are Not Hidden in the Ground; They’re Hanging in the Trees!” Smallstarter. Smallstarter Africa, 2015. Web. 20 January 2017. <http://www.smallstarter.com/browse-ideas/how-to-start-a-fruit-farming-and-export-business-in-africa/>.

WHO, United Nations’ Children’s Fund. “Water, Sanitation, and Hygiene in Health Care Facilities .” World Health Organization. World Health Organization. 2015. Web. 20 January 2017. <http://www.who.int/water_sanitation_health/publications/wash-health-care-facilities/en/>.