WaSH Market Analysis

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Philanthropy Advisory Fellowship Project
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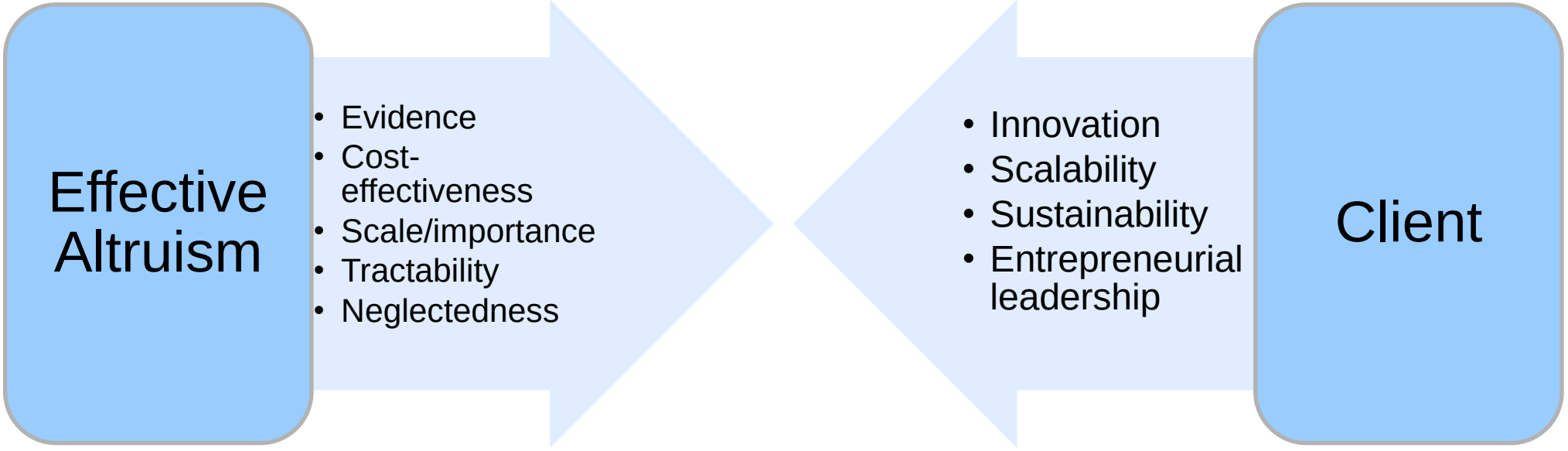
Outline

- Approach
- WaSH Overview
- Water
- Sanitation
- Hygiene

Two Approaches



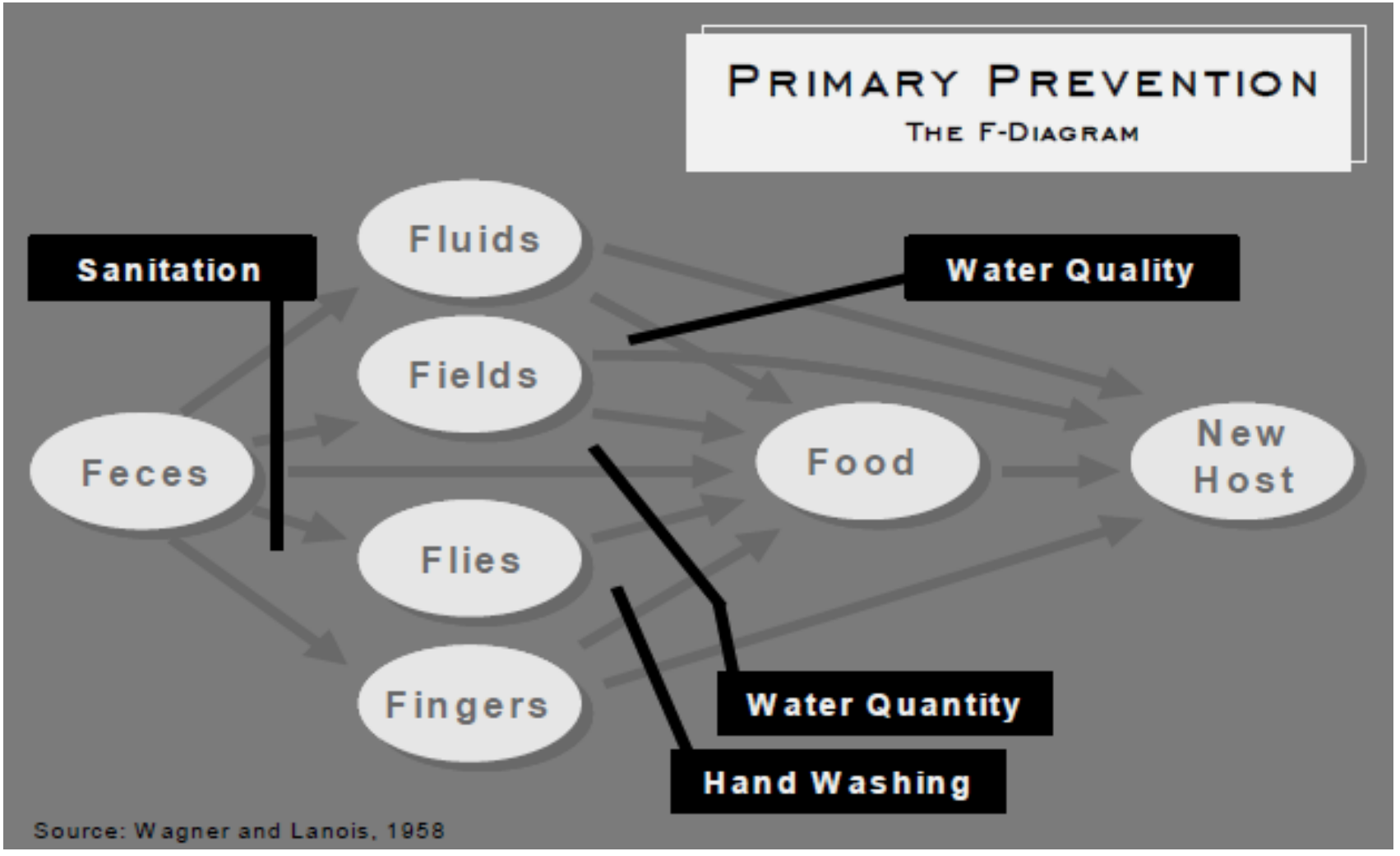
Considerations:

- Client's focus on an exceptional leader is a key consideration beyond available evidence
- Innovative, disruptive solutions will, almost by definition, have less evidence
- Sustainable WaSH interventions will look different than most heavily-researched WaSH interventions
- Organization should be putting effort into evaluation/research and refining approach based on evidence
- Focus may be on generating "practice-based evidence" rather than pursuing "evidence-based practice"

WaSH Overview

Water	• Because water is an incredibly encompassing potential intervention space, for the purposes of this report, the focus will be on safe drinking water. According to the World Health Organization, the global target for drinking water was met five years ahead of schedule in 2015. However, sub-Saharan Africa, despite showing incremental improvement, still remains a problem area, as only about half of the population have access to safe drinking water. There, the urban-rural disparity in the availability of safe drinking water sources is the highest in the world.
Sanitation	• Sanitation is one of the most off-track Millennium Development Goals (MDG) globally, partly because building sanitation facilities require a significant amount of capital investment and partly because of stigma and privacy issues. • While most sanitation infrastructure building requires support from governments and international organizations, non-profit organizations also play an important role in driving innovation in the sanitation space, ranging from adopting new technology to build low-cost sanitation facilities to providing education, financing, and waste management tools to improve sanitation outcomes.
Hygiene	• Lack of handwashing is a major cause of preventable disease and death in many low- and middle-income countries. The problem is made particularly challenging since improved handwashing requires behavior change that starts at the community level as well as consistent access to clean water. Menstrual hygiene is another major unmet hygiene need across the world.

Disease Prevention through WaSH



Major Players & Initiatives

- UNICEF
  - 100 countries; $470 million annual budget
- UN Water Supply & Sanitation Collaborative Council
  - $250 million global sanitation fund
- USAID Wash Plus Project
  - FHI 360, CARE, Winrock
- World Bank
  - Water & Sanitation Program
- Bill and Melinda Gates Foundation
- Global Public-Private Partnership for Handwashing
  - World Bank, Unilever, Proctor & Gamble, USAID, others
- And many others

Summary of Recommendations

Water	• Although there are many intervention types when it comes to disinfecting drinking water, not all of them are suitable for low-income, rural, or nomadic populations. One intervention that translates well to these populations is SODIS. • We want to avoid water conservation interventions such as eco-friendly shower technology and leak monitors, because for-profit organizations are already in this space and it is more of a priority to provide safe drinking water to those who lack proper sources • One example of a good SODIS organization is PotaVida, which has a two-fold mission to provide SODIS technology and to track its effectiveness and usage through cloud data.
Sanitation	• Among the many approaches through which non-profit organizations can improve sanitation outcomes, building low-cost sanitation facilities attracts the most amount of innovation and is sometimes under-funded. In addition, there is scientific research comparing the cost-effectiveness of different sanitation facilities, making evidence-based funding possible. • One example is Toilets for People, an early stage organization aiming to build low-cost, composting toilets in developing countries. TFP's business model is scalable and the organization is currently under-funded, preventing it from reaching its full potential. • This research also identifies other promising organizations which focus on education, financing, and waste management, although many of which are well-established and have received significant funding.
Hygiene	• The handwashing space is highly saturated by large aid organizations and private sector partners. Sustainable and scalable integrated behavioral change interventions initiated by entrepreneurs are rare. • There are dozens of innovative menstrual hygiene management (MHM) organizations but there is a gap in organizations that have taken their interventions to scale. • There is an opportunity to have an impact by identifying early stage MHM organizations that have the potential for scale.

Water – Overview

The Challenge

- Diarrhea kills as estimated 1.8 million people each year, and accounts for 17% of the deaths of children under 5 years of age in developing countries
- Over 90% of the world's population now has access to improved sources of drinking water, but sub-Saharan Africa still lags behind.
- There is also a huge urban-rural disparity – 8/10 people are still without improved drinking water sources in rural areas.
- In 2015, 663 million people still lack improved drinking water sources.
- The lack of safe drinking water affects other issues such as adequate nutrition, gender equality, education, and poverty.
- Challenges of solving this problem:
    - Striking a balance between water conservation and water filtration
        - Many organizations, especially Western focused ones, focus more heavily on conservation – This is not as well suited for regions such as sub-Saharan Africa
    - Infrastructural change is high cost and non-transferrable
    - Safe drinking water interventions that are household-based is not transferrable enough to the nomadic populations in sub-Saharan Africa
    - Many water interventions require community training

Current Trends and Opportunities

- Traditionally, water interventions have been mainly infrastructural
- WHO and UNICEF as well as other organizations are seeking interventions that can deliver safe drinking water at a low cost
- Among the candidates are conventional source and household-based water treatment interventions
- Household-based chlorination is the most cost-effective water quality intervention, followed by solar disinfection (SODIS)
    - In 1991, the Swiss Federal Institute for Environmental Science and Technology began to investigate and implement SODIS as a household water treatment option to prevent diarrhea in developing countries – They have continued to be a key player in this space
    - Studies have shown that SODIS is best implemented through promotion and dissemination by partner institutions based in the project area – The opportunities for non-profit organizations to step in are abundant
- Transferrable water filtration technologies such as the Lifesaver bottle have been tested and distributed during natural disaster
    - Lifesaver has partnered with two stockists: Oxfam and UK Aid – These are potential partners or resources
- While many interventions are proven to improve water quality, the evidence is mixed in terms of realization outcomes such as diarrhea reduction, likely due to other confounding variables. We were unable to identify an organization that has been successful in addressing such factors. However, this remains an opportunity.

Water – Potential Solutions

Solar Disinfection ("SODIS")

Function

- Users fill up plastic bottles with low-turbidity water, shake them to oxygenate, and place bottles on a roof or rack for 6 hours to 2 days (depending on weather)
- This process inactivates disease-causing organisms

Implementation

- Over 5 million people in 50 developing countries use SODIS
- SODIS is best promoted and disseminated by partner institutions based in the project area
    - Important partners are community-based organizations, well-established NGOs working on community development projects, institutional organizations, and government programs
    - SODIS promotion in a new area usually begins with a pilot project of one year that reaches 2000-4000 families. In the second year, the project expands into the field of advocacy to scale-up the project.

Scalability

- Virtually zero-cost technology, but faces marketing constraints
- Since 2001, local NGOs in 28 countries have disseminated SODIS through training of trainers, educating at the grassroots level, providing technical assistance to partner organizations, lobbying key players, and establishing information networks
- The experiences gained have shown that SODIS is best promoted and disseminated by local institutions with experience in community health education
- A long-term training approach and repeated contact with the community is needed to create awareness on the importance of treating drinking water and to establish corresponding changes in behavior

Transferrable Technologies

- For profit companies have traditionally been the main promoters of transferrable technologies projects given their capital-intensive, commercial nature.
- Transferrable technologies are an alternative to public or household water interventions, especially for the rural / nomadic population
- However, there are opportunities for nonprofit organizations to enter this intervention space as stockists or distributors of technologies such as:
    - **Lifesaver bottles:** Portable water filter capable of delivering up to 6,000 liters of clean water for individual use; has been distributed commercially and is a military favorite; has been distributed during natural disasters
    - **WaterisLife Filter Straw:** Portable water purifier, which can be used in any water source to provide clean water
    - **WaterisLife Bucket filter systems:** Easy to use (does not require community training) hollow fiber membrane filtration system
    - **Drinkable book:** Book containing silver or copper ion infused paper that works to kill dangerous microbes; printed with instructions in local languages (does not require community training)

Water – Evidence

Insufficient evidence for source treatment success in low-income settings

- While source treatment has been proven effective in high income, developed nations, it comes at a higher cost due to infrastructure maintenance.
    - According to Kremer and Zwane (2006), infrastructure maintenance has been a problem for developing nations.
    - Miguel and Gugerty (forthcoming) report that in Western Kenya, normal half of wells dug in 1980s have fallen into disrepair by 2000.
    - A UNICEF survey estimates that 20-70% of handpumps in Sub-Saharan Africa are not functioning.
- Because of its fixed nature and high cost, this intervention might not be the best option, especially since water can still be contaminated upon transport or storage.

Household based interventions proven to be effective alternatives to source treatment solutions

- In remote and low income areas, these lower cost interventions can improve water both at the source or at some other point in the distribution cycle (with cost per DALY averted in Africa region):
    - Chemical treatment, most commonly with chlorine - most cost effective ($53)
    - Pathogen removal, such as filtration, absorption or sedimentation – higher cost, but largest health impact ($142)
    - Heat or UV disinfection, such as boiling or sun exposure - second most cost effective ($61)
    - Protection from recontamination, through, for example, piped distribution and safe storage

Why SODIS?

- Due to its relative cost effectiveness, proven effectiveness, and recent surge in innovation and technology, SODIS is an attractive intervention to pursue.
- According to SODIS has proved effective in the lab and in the field.
    - According to the CDC, SODIS has been proven to inactivate the viruses, bacteria, and protozoa that cause diarrheal diseases.
    - Field data also shows reductions of these organisms in water from developing countries treated with SODIS.
- In low-income settings SODIS-type interventions have been shown to reduce diarrhea by one third.
    - This is less effective as water filtration (at half), but again, SODIS has a lower implementation cost.
- In order to yield consistent, long-term results, SODIS must be implemented through a repeated and ingrained training system.
    - Past experiences show that local organization partners and community training lead to effective usage.
    - Data on usage and effectiveness in these communities or populations would be helpful here.

Sources:
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http://www.givewell.org/international/technical/programs/water-quality
http://www.who.int/water_sanitation_health/economic/prevent_diarrhoea.pdf
http://www.cochrane.org/CD004794/INFECTN_interventions-improve-water-quality-and-prevent-diarrhoea
http://www.cdc.gov/safewater/solardisinfection.html

Top Recommendation: PotaVida

Key Facts

- **Headquarters**: Seattle, WA
- **Inception**: 2011
- **Website:** http://www.potavida.com
- **Co-Founders**: Charlie Matlack, Tyler Davis, Jackie Linnes
  - The team won the 2011 University of Washington business plan competition for a $10 solar water disinfection measurement device with a 5 year life cycle. Matlack has a Ph.D. in electrical engineering, Davis has a public policy background and several years of fieldwork experience in developing countries, and Linnes has a Ph.D. in bioengineering.
- **Advisory Board**:
  - PotaVida's advisers include a CMO for a publically traded company, a consulting executive, and a CFO of a venture capital firm.
- **Financials**:
  - PotaVida does not publicly disclose its financial information.
  - However, the team has earned upwards of $200,000 in design competition design money.

Solution

- PotaVida's business is two-fold, consisting of a Smart Solar Purifier and usage history data tracking.
- PotaVida's Smart Solar Purifier provides a turnkey solution that integrates data-driven program evaluation with cost effective household water purification.
  - Only 5% of water purifiers distributed in emergencies are used correctly.
  - The Smart Solar Purifier consists of a 10 liter hydration bag with an electronic dosage indicator that shows when the water is safe to drink and records usage data.
  - The Smart Solar Purifier automatically collects its own usage data, which can be easily transmitted to a cell phone and then to a cloud-based database.
- Since founding, PotaVida has created a ample status report of the purified water usage in Jacmel, Haiti.

Impact

- **Impact**: PotaVida captures and aggregates usage data for grant makers and donors.
- **Progress to Date**:
  - May 2016 – First production Smart Solar Purifiers available in time for PotaVida's relief program in Haiti with World Concern
  - November 2015 – PotaVida selected by the Washington Global Health Alliance for a $150,000 grant to test the Smart Solar Purifier

Why Recommended?

- Passionate, talented, and diverse founding team and knowledgeable advisory board
- Award winning concept with potential to provide industry changing data
- Innovative, tech-based approach for a variety of uses including cost effective household water purification in all types of communities and emergency relief
- Good size and stage for growth investment

Potential Partner Organizations

WaterisLife
Water Filtration

- **Headquarters**: Los Angeles, CA
- **Inception**: 2011
- **Website:** http://waterislife.com/
- **Solution**: WaterisLife provides temporary, life-saving water filtration straws or other devices like the drinkable book for the immediate need. The organization also focuses on developing community-driven initiatives.
- **Differentiation**:
  - **Transferrable technologies** such as the straws and water book suitable for households, schools, and orphanages in rural areas.
  - **Creation of community-driven and community-engaged programs** fostering the cooperation of nonprofit partners, local governments, and community organizations.
- **Result**:
  - The model has built a powerful local and global network, which provides opportunities for others to get involved through fundraising and field project implementation. The drinkable book costs pennies to produce, and can offer potable water for up to four years.

WATERisLIFE

Kenya Water for Health Organisation
SODIS

- **Headquarters**: Kenya
- **Inception**: 1976
- **Website**: http://www.kwaho.org/
- **Solution**: KWAHO is a national NGO that aids in SODIS implementation and other water and sanitation efforts in disadvantaged communities in Kenya.
- **Differentiation**:
  - KWAHO promotes the **participation of women**. The support consists of the encouragement of traditional women group activities and the **conferment of skills** required for these activities to develop in the most sustainable manner.
- **Result**:
  - KWAHO has partnered with local governments and community leaders to create an enabling environment for women groups to become to future operators of the water supply systems, especially through SODIS.

KWAHO

Lifesaver
Water Filtration

- **Headquarters**: UK
- **Inception**: 2007
- **Website:** http://www.iconlifesaver.eu/
- **Solution**: Lifesaver technologies, most notably the Lifesaver water bottle, filter out harmful viruses, bacteria, and heavy metals. The bottle has been used for drinking water as well as cleaning wounds.
- **Differentiation**:
  - Lifesaver technologies have been tried, tested, and proven in the toughest **outdoor, military, and aid environments**. The organization has partnered with several governments and humanitarian stockists to distribute their technologies.
- **Result**:
  - Lifesaver technologies have been used in several natural disasters since 2007.
  - The Lifesaver bottle has been used by several militaries since 2008.
  - In 2014, Lifesaver cubes were airdropped into Iraq to provide civilians with a supply of emergency drinking water.

LIFESAVER®

Sanitation – Overview

The Challenge

- Sanitation is one of the most off-track Millennium Development Goals (MDG) globally. 68% of the world's population has access to improved sanitation, but 70% of the Sub-Saharan Africa population and 53% of South Asia still lack access. The world missed the MDG target for sanitation by almost 700 million people.
- Sanitation lies at the root of many other development challenges, as poor sanitation impacts **public health, education, and the environment**.
- Lack of sanitation also holds back **economic growth**. Poor sanitation costs billions to some countries, amounting to the equivalent of 6.3% of GDP in Bangladesh, 6.4% of GDP in India, 7.2% of GDP in Cambodia, 2.4% of GDP in Niger, and 3.9% of GDP in Pakistan annually.
- Constructing toilets and managing waste are **capital-intensive**
  - Such projects require investments from governments or international organizations.
  - Effectiveness of investments varies (e.g., programs that used all or most of their budget on building toilets without using any resources to change people's behavior have failed.)
- **Stigma and privacy issues** make sanitation a challenging area to raise funding, engage end-users, and change behavior
  - Not a "sexy" topic for funders. Few people in developed countries feel a compelling connection to the issue, and it is ill suited to external PR & branding efforts (e.g., CSR)
  - Difficult for NGOs to engage people, encourage discussion, change behavior/norm
  - Jobs related to sanitation (e.g., collectors) are highly stigmatized, undesirable

Current Efforts

- Studies have been conducted to identify **most cost-effective sanitation facilities** (e.g., biogas units and Urine-diverting Dry Toilet).
- Trend toward **turning waste into productive uses** via anaerobic digestion* (i.e., decomposition):
  - Produces methane, which can be burned as cooking fuel or converted to electricity via a fuel cell (expensive) or generator (less so)
  - As waste is processed in biodigester, it is sanitized by the high-methane environment
  - After gas production, the liquid that remains is a safe, high-quality organic fertilizer
  - Works best in naturally hot/humid areas
- A type of behavioral intervention known as "**Community-Led Total Sanitation" (CLTS)** has shown promise through a combination of education and social pressure(shame, embarrassment, status).
- Major players have begun advocating for and funding sanitation more intentionally
  - **The World Bank Water and Sanitation Program** is a collective effort between the WB and UNDP to work with governments to identify cost-effective technologies and models for providing safe water and sanitation to the world's poor.
  - The **UNICEF** works in more than 100 countries around the world to improve water supplies and sanitation facilities in schools and communities, and to promote safe hygiene practices.
  - **BMGF**'s WASH portfolio focuses on five main areas: (1) transformative technology, (2) urban sanitation markets, (3) building demand for sanitation, (4) policy and advocacy, and (5) monitoring and evaluation.

Sanitation – Potential Solutions

Basic Sanitation

- Basic sanitation is improved sanitation (e.g., facilities that ensure hygienic separation of human excreta from human contact). Basic sanitation options in rural areas include the following, which have been tested by the World Bank Water and Sanitation Program:
  - **Private pit latrines**: When properly built and maintained, private pit latrines can decrease the spread of disease by reducing the amount of human feces in the environment from open defecation.
  - **UDDT (Urine-diverting Dry Toilet)**: UDDT is a type of dry toilet that operates without water and has a divider so that the user, with little effort, can divert the urine away from the feces. The separately collected urine and the dried feces can be used as fertilizer in crop production.
  - **Biogas**: A 3-in-1 biogas unit is a structure integrated with a latrine where human and animal excreta, kitchen waste, agricultural waste are disposed of through a fermentation process and biogas is produced for household use.

Community-Led Total Sanitation ("CLTS")

- Traditional approaches to improving sanitation, which are aimed at building facilities, have not resulted in significant and sustained sanitation coverage. New community based approaches leverage behavioral interventions for sanitation promotion and are showing considerable promise in some countries.
- CLTS focuses on:
  - Stressing the elimination of open defecation in communities;
  - Encouraging communities to carry out an analysis of existing defecation patterns and threats, and to use local resources to build low-cost household latrines and ultimately eliminate the practice of open defecation.
- Today CLTS is in more than 50 countries in Asia, Africa, Latin America, the Pacific and the Middle East, and governments are increasingly taking the lead in scaling up CLTS. At least 16 national governments have also adopted CLTS as national policy.

Opportunities for Nonprofit Organizations

- Governments and international organizations have traditionally been the main promoters of sanitation projects given their capital-intensive,, infrastructure-heavy nature.
- However, there are opportunities for nonprofit organizations to address certain aspects of the problem:
  - **Sanitation facilities:** leveraging new technology to develop improved toilets that households and communities can purchase at a low cost.
  - **Education and support:** for example, ZanaAfrica supports adolescent girls in Kenya to stay in school by delivering reproductive health education and sanitary pads.
  - **Waste management:** collecting and reusing waste to produce organic fertilizer and biogas (e.g., SafiSana).
  - **Financing:** providing microfinancing to households for the construction of improved sanitation facilities (e.g., FINISH Society).
  - **Holistic approach to build and maintain a sanitation ecosystem:** for example, Sanergy builds sanitation facilities, collects the waste, and converts the waste into fertilizer and renewable energy.

Sanitation – Evidence

Biogas and UDDT proved to be effective sanitation solutions

- In rural areas of many developing countries, some basic forms of sanitation (e.g., shared toilets or private pit latrines) already exist. The World Bank Water and Sanitation Program conducted household surveys with control groups and leveraged World Bank's data to estimate the **cost effectiveness** of various options to improve sanitation outcomes (e.g., UDDT, biogas).
- Depending on what existing infrastructure a rural area has, different sanitation solutions proved to be more cost effective. For example:
  - Building **biogas** units improves sanitation outcomes most effectively ($230 per DALY averted) in rural areas where shared toilets are currently used.
  - Building **UDDT** improves sanitation outcomes most effectively ($325 per DALY averted) in rural areas where private pit latrines are used.
  - **Pit latrines, biogas units, and UDDT** are all more cost effective than **water flushing toilets**, which have high construction costs and require a large amount of water.

TABLE A: RURAL AREA EFFICIENCY MEASURES FOR MAIN GROUPINGS OF SANITATION INTERVENTIONS, COMPARING DIFFERENT POINTS ON THE SANITATION LADDER (QIUBEI RURAL SITE)

Efficiency measures	Moving from shared toilet to			Moving from pit latrine to		
	Pit latrine	EcoSan UDDT	Biogas	EcoSan UDDT	Biogas	Septic tank + STF
COST-BENEFIT MEASURES						
Benefits per US$ input	3.8	4.5	7.3	4.5	5.0	2.1
Internal rate of return (%)	>100%	>100%	>100%	>100%	>100%	40%
Payback period (years)	1.2	<1.0	<1.0	<1.0	1.6	3.9
Net present value ($)	164	270	339	270	315	142
COST-EFFECTIVENESS MEASURES						
Cost per DALY averted ($)	na	325	230	325	335	557
Cost per case averted ($)	na	3.1	2.2	3.1	3.2	5.3
Cost per death averted ($)	na	5,840	4,139	5,840	6,026	10,010

Note: na: not calculated due to improved pit latrine assumed to have the same health impact as improved shared latrine.
STF - septage treatment facility.

Mixed results from CLTS

- While CLTS has been especially successful in India, Cambodia, Zambia and other countries, one study estimates that only 39% of villages can achieve and maintain open defecation-free status.
- The success or failure of community-led approaches may relate to its cultural suitability and to the degree to which it address supply-side constraints to sanitation adoption.

Limited evidence for alternative approaches

- There has been limited scientific research on the effectiveness of alternative sanitation solutions.
- However, some non-profit organizations adopt variations of basic sanitation solutions such as biogas and UDDT, the effectiveness of which can be derived from existing research. Other organizations provide supplemental solutions to improve the sanitation ecosystem by providing education, financing, and waste management, the effectiveness of which can be evaluated case by case.

Source: Economic Assessment of Sanitation Interventions in Yunnan Province, People's Republic of China, 2012, World Bank Water and Sanitation Program

Sanitation - Recommendations

U.S. organizations

Organization	Headquarters	Description	Funders/Partners
Toilets for People [Sanitation Facilities]	New York, NY	• Building affordable composting toilets in Peru, Mexico, Haiti, and Senegal • Technology proved to be cost-effective by WB	• Columbia University Venture Competition Winner • Crowd funding

International organizations

Organization	Headquarters	Description	Funders/Partners
Samagra [Sanitation Facilities]	India	• Providing superior designed toilets and encourage behavior change via community workshops and door to door surveys.	• Acumen • BMGF • Ashoka etc.
Safi Sana [Waste Management]	Ghana	• Collecting toilet and organic waste from slums in Accra, Ghana, to produce organic fertilizer and biogas.	• African Development Bank • African Water Facility • Ghana-Netherlands WASH Program etc.
FINISH Society [Total Sanitation]	India	• Aiming for sanitation for all in India by improving quality and safety of sanitation services, reducing the price of these services, and ensuring proper disposal of the waste produced.	• WASTE • SNS REAAL • United Nations University

Top Recommendation: Toilets For People

Key Facts

- **Headquaters**: New York, NY
- **Website**: http://toiletsforpeople.com/
- **Inception**: 2012
- **Founder**: Jason Kass
  - Before founding Toilets for People, Jason had worked for 15 years as an environmental engineer, Jason has worked at large engineering and consulting firms (Louis Berger Group), city agencies (NYC's Department of Design and Construction) and small, specialized firms (EnTech Engineering). Jason's desire to use his engineering skills to help the world's poor get access to water and sanitation led him to work with Rotary International & Engineers Without Borders where he was VP of the NYC chapter.
- **Advisory Board**:
  - Toilets for People's advisory board consists of 4 professionals with experience in business development, healthcare, industrial design, and fabrication.
- **Financials**:
  - Toilets for People does not publicly disclose its financial information.
  - However, its five projects so far have an aggregate budget of slightly over $30,000, indicating that the organization is fairly early-stage in its life cycle.

Solution

- TFP designs and builds affordable **composting, biogas toilets** for people living in developing countries. Its customers are low- and middle-income families and charity organizations that serve poor communities where flush toilets and pit latrines fail.
- TFP's goal is to provide toilets that bring privacy, safety, comfort, cleanliness and dignity to **400,000 people** in the next five years.
- Specifically, TFP has designed the **CRAPPER toilet** (Compact, Rotating, Aerobic, Pollution Prevention, Excreta Reducer), which an affordable, waterless composting toilet.

Why Recommended

- **Proven Effectiveness**: TFP's composting, biogas technology has been proven to be cost-effective by the World Bank.
- **Low Cost**: TFP has lowered the cost of the CRAPPER from $1,500 to $200 by utilizing inexpensive locally sourced materials.
- **Scalability**: TFP's model to employ local labor and purchase local materials to build the CRAPPER toilets, and to train local NGOs for ongoing maintenance is scalable.

Impact

- **Progress to Date**: TFP has successfully carried out projects in Peru, Mexico, Haiti, and Senegal with limited financial resources by employing local labor and purchasing local materials.
  - **Peru**: Installation of 22 Crapper composting toilets, Wizzers, Tinklers, and hand washing stations across two locations.
  - **Mexico**: Installation of 5 Crapper composting toilets, Wizzers, Tinklers and hand washing stations at 5 residential dwellings.
  - **Haiti**: Installation of 4 Crapper composting toilets, Wizzers, Tinklers and hand washing stations at a kindergarden with 100 students.
  - **Senegal**: Provided 1 Crapper composting toilet, Wizzer, Tinkler and hand washing station to local construction team to be replicated. After TfP departed, 7 Crappers were built and installed in a local school.

TOILETS FOR PEOPLE

Additional Recommendations: International Organizations

Samagra Sanitation
Sanitation Facilities

- **Headquaters**: India
- **Website**: http://www.samagra.co/
- **Inception**: 2011
- **Solution**: Samagra Sanitation is the first for-profit social enterprise in India that is dedicated to providing access to clean, safe, and reliable community toilet facilities for the urban poor.
- **Differentiation**:
  - **Seamless bundling of other value-added services** along with the toilet block: a rewards program for users, access to mobile phone re-charge and TV subscription services, and financial services.
  - **Creation of a community center and a "one stop shop" for slum residents**.
- **Result**:
  - The model has proven its ability **to attract and retain users to the toilet facility, promote hygienic behavior, and still achieve profitability**. Samagra's facilities and associated services also create a hub of commerce within otherwise marginalized slum communities and the potential for large-scale job creation for their residents.

Samagra
EMPOWERING TRANSFORMATIONS

Safi Sana
Waste Management

- **Headquaters**: Ghana
- **Website**: http://www.safisana.org/en/
- **Inception**: 2010
- **Solution**: Safi Sana collects toilet and organic **waste** from slums in Accra, Ghana, to produce **organic fertilizer and biogas**. The biogas is subsequently used to produce electricity. Part of the organic fertilizer will be used to grow seedlings.
- **Differentiation**:
  - Expertise in **waste collection and conversion**
  - Sales of end-products (i.e. electricity, bio fertilizer, seedlings) enables Safi Sana to operational cost and achieve **financial sustainability and scalability**.
- **Result**:
  - Safi Sana has built its first **factory** where waste collected from local slums are processed into biogas and organic fertilizers.
  - Safi Sana has also established a number of **communal service blocks**, providing improved sanitation facility and drinking water to l

safisana

FINISH Society
Total Sanitation

- **Headquaters**: India
- **Website**: http://finishsociety.org/
- **Inception**: 2010
- **Solution**: FINISH aims for sanitation for all in India by improving quality and safety of sanitation services, reducing the price of these services, and ensuring proper disposal of the waste produced.
- **Differentiation**:
  - FINISH connects all **stakeholders** by (1) promoting behavioral change among **end users** and households, (2) supporting **businesses** to build safe and affordable toilets, (3) encouraging **financial institutions** to provide credit and micro-insurance for households and entrepreneurs, and (4) partnering with **governments** to create an enabling environment.
- **Result**:
  - The program aspires to deliver improved sanitation systems for 500,000 households in various Indian states.

Financial Inclusion Improves Sanitation & Health

Hygiene – Overview

The Challenge

Handwashing

- Poor hygiene is a risk factor for many diseases, including diarrhea, which causes 590,000 worldwide deaths annually and is the fifth leading cause of death among children.
- Good hand-washing practices can help prevent diarrhea as well as diseases like pneumonia, trachoma, scabies, skin and eye infections, cholera, dysentery, and avian flu.
- Overall, it is estimated that inadequate hand hygiene leads to 297,000 deaths every year.
- Barriers to good hand hygiene include lack of clean water and soap, lack of knowledge, and lack of motivation for behavior change.

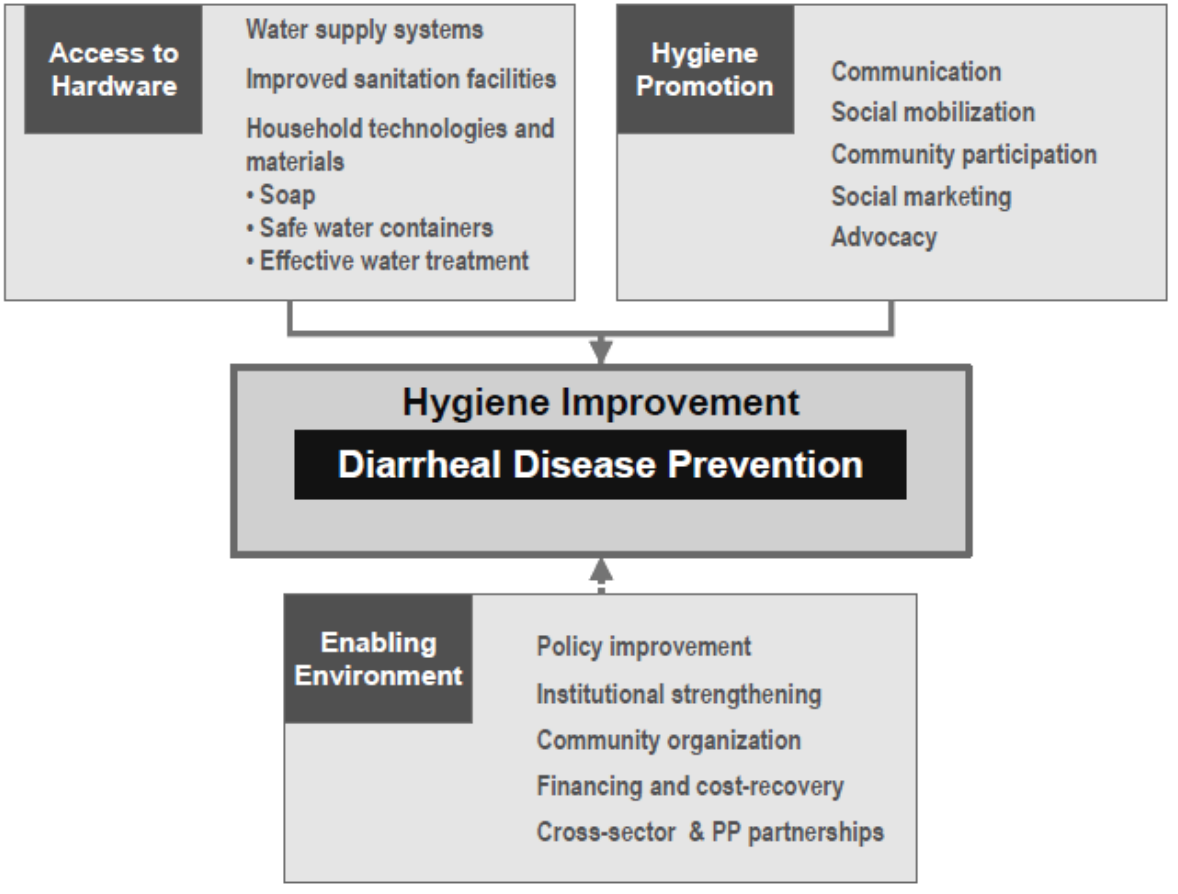
Menstrual Hygiene

- Menstrual hygiene for women and girls is a major health and social issue in many low- and middle-income countries where stigma and lack of information around menstrual hygiene lead to fear, shame, and social exclusion.
- Unhygienic practices around menstruation can also lead to poor health. In urban India, as many as 88 percent of girls use reusable cloth that are often washed without soap or clean water.
- Girls in many places believe that menstruation is a disease or curse or that it makes them dirty.
- Girls in many places lack knowledge of or access to menstrual hygiene products due to financial and cultural barriers.
- Menstruation is a common reason for missing school in many countries. Girls may feel shame from staining their clothes or from not having access to private sanitation facilities.

Hygiene – Potential Solutions

Handwashing Promotion

- Hygiene interventions include both the “hardware” (soap, facilities, water) and the “software” (health promotion, social marketing, community participation).
- Both the hardware and software have been found to be essential to effective handwashing promotion efforts.
- Many hygiene promotion efforts focus on schools and households through emphasizing the importance of handwashing after defecation and before handling food.
- Handwashing is also a major component of emergency response efforts.
- Clean water is an essential element to successful handwashing programs.
- Many government aid agencies and non-governmental organizations have large handwashing programs or include handwashing as part of other health initiatives.
- Innovative, sustainable solutions that can be developed and scaled by social entrepreneurs are rare.



From USAID Environmental Health Project, 2004

Hygiene – Potential Solutions

Menstrual Hygiene Management

- Menstrual hygiene management often involves a “hardware” and “software” component
- The hardware includes supplying girls with menstrual hygiene kits that can include items like pads, underwear, and soap.
- There is an ongoing debate in MHM regarding the use of reusable pads or menstrual cups, which are thought to be better for the environment and more sustainable, vs the use of disposable pads, which may be easier for to use and don’t require the availability of clean water.
- There are many projects that seek to provide facilities at schools for girls to cleanly dispose of used pads.
- Many social enterprises have developed new products that are meant to be both affordable and environmentally sustainable, and that include some type of entrepreneurial component to generate income for local women.

From https://transformationtextiles.ihubapp.org/stories/40620

Hygiene – Evidence

Handwashing

- There is strong evidence from multiple systematic reviews and meta-analyses that handwashing interventions are effective in increasing hygienic handwashing behavior and in reducing incidence of diarrhea, respiratory disease, malnutrition, and even school absenteeism.
    - One systematic review of multi-component handwashing intervention studies looked at various cluster-adjusted randomized controlled trials and found that, overall, these interventions can reduce diarrhea by approximately one-third.[1]
    - Handwashing interventions have also been found to be extremely cost-effective with an estimated cost per disability adjusted life year (DALY) averted of $3.35. This number compares very favorably to other standard public health interventions such as oral rehydration therapy, breastfeeding promotion, and HIV antiretroviral therapy which can all have costs per DALY averted of over $1000.[2]
- Hygiene promotion “software” added to existing “hardware” has been found to be far more cost effective than stand-alone infrastructure.[3]
- More effective:
    - Approaches that build on lessons of social marketing, emphasize research on interests, needs, and motivations of different people within communities. Recognize that messaging and drivers depend on audience and context. Reach target audiences using mass media and interpersonal communication with messages that respond to needs and preferences. Treat people as active customers rather than passive project beneficiaries.[4]
- Ineffective:
    - Top-down, technology-led solutions or campaigns that hinge primarily on health education messages.
- Some studies have suggested importance of focusing on intermediate outcomes of take-up and behavior-range before realizing changes in health.[5]

Menstrual Hygiene Management

- A recent systematic review found insufficient evidence to say that MHM interventions reduce school absenteeism and infections.[6]
- Some program evaluations and anecdotal evidence have shown that MHM interventions can reduce school absenteeism.[7]
- There is a gap in evidence for high quality randomized studies that include both hardware and software.

1. Ejemot-Nwadiaro, Regina I., et al. "Hand washing promotion for preventing diarrhoea." *Cochrane Database of Systematic Reviews* 9 (2015).
2. http://globalhandwashing.org/about-handwashing/why-handwashing/economic-impact/)
3. Varley, R. C., J. Tarvid, and D. N. Chao. "A reassessment of the cost-effectiveness of water and sanitation interventions in programmes for controlling childhood diarrhoea." *Bulletin of the World Health Organization*76.6 (1998): 617.
4. http://globalhandwashing.org/about-handwashing/faqs/#auto
5. Briceño, Bertha, Aidan Coville, and Sebastian Martinez. "Promoting handwashing and sanitation: evidence from a large-scale randomized trial in rural Tanzania." *World Bank Policy Research Working Paper* 7164 (2015).
6. Sumpter, Colin, and Belen Torondel. "A systematic review of the health and social effects of menstrual hygiene management." *PloS one* 8.4 (2013): e62004.
7. http://www.ircwash.org/sites/default/files/menstruation_health_book.pdf

Top Recommendation: Sustainable Health Enterprises

Key Facts

- **Headquarters**: New York, NY
- **Project Countries:** Rwanda
- **Inception**: 2011
- **Website: http://sheinnovates.com/**
- **Founder**: Elizabeth Scharpf
  - MBA/MPA from Harvard
  - Experience at Cambridge Pharma Consultancy, Clinton Foundation, and World Bank
  - Fulbright Scholar
- **Team**:
  - Board of Directors consists of founder and 5 professionals with experience in investment, health care, environmental health, and manufacturing
  - Executive Director is former CEO of a global biomedical engineering training firm
- **Partners**
  - UNICEF
  - Seventh Generation
  - MIT
  - Grand Challenges Canada
  - Segal Family Foundation
  - Forum for African Women
  - Kigali Institute of Science and Technology
  - North Carolina State University
- **Financials**:
  - Annual budget of $600 million

Solution

- SHE is currently working in Rwanda to help women jumpstart social businesses to manufacture and distribute affordable menstrual pads
- SHE provides banana farmers with equipment and training to process and sell to SHE the banana tree trunk fiber that would normally be thrown away
- SHE uses community factories to process the fiber so it can be made into disposable menstrual pads, known as go! pads, that can be sold at an affordable price to women and schools
- SHE also seeks to increase knowledge around menstruation with a health and hygiene education program in communities and schools

SHE
SUSTAINABLE HEALTH ENTERPRISES

Impact

- 6,000 girls received menstrual hygiene education in 2015
- 12 new jobs created at production site in 2015
- 9,000 packs of go! Pads were sold directly to girls, schools, and NGOs in 2015
- SHE has worked with 600 farmers who have received a 33% boost in income
- Goal is to further refine business model to scale for global impact

Why Recommended?

- Passionate, talented founder
- Proven concept with goal and plans to scale globally
- Innovative approach that addresses MHM needs with hardware and software
- Market-based model that creates jobs for local women likely to be sustainable
- Good size and stage for high-growth

Menstrual Hygiene - Additional Organizations to Consider

Ruby Cup

- **Headquarters**: Barcelona, Spain
- **Inception**: 2011
- **Website**: http://www.ruby-cup.com/
- **Solution**: Ruby Cup is a for-profit social enterprise that produces and sells a high quality menstrual cup, which represents a healthy, eco-friendly alternative to tampons and pads. They operate on a "Buy One, Give One" concept so for every cup they sell a cup is donated to a girl in Africa.
- **Differentiation**:
  - Ruby Cup is unique because of its reusable menstrual cup approach to MHM and its for-profit business model. Ruby Cup's was started with a social mission to provide a sustainable and healthy menstrual hygiene solution to women and girls worldwide,
- **Result**:
  - The company is at a relatively early stage as it has only donated about 800 cups in Africa. The promise of this organization is the potential of a sustainable solution to menstrual hygiene, but evidence for menstrual cups is currently scarce.

Jayaashree Industries

- **Headquarters**: India
- **Inception**: 2006
- **Website:** http://newinventions.in/
- **Solution**: The founder invented a low-cost machine that produces sanitary towels at an affordable price. The machines are sold to rural women who receive training to start a sanitary towel manufacturing and distribution business that provides them with income and increases access to menstrual hygiene products for women who would otherwise not have access.
- **Differentiation**:
  - This company has received international attention for its innovative approach to MHM. The model is likely to be sustainable as it enlists local entrepreneurs to increase the supply of affordable products.
- **Result**:
  - Over 1300 machines have been installed across 27 states in India and 7 other countries. It is unclear what the actual impact on access to MHM products may be.

JAYAASHREE INDUSTRIES
new inventions....for better living...

Pasand

- **Headquarters**: Cambridge, MA; India
- **Inception**: 2010
- **Website:** http://www.pasand.org/
- **Solution**: Pasand is a health education social enterprise that uses an innovative, interactive curriculum to education youth about personal health and wellness, including personal and menstrual hygiene.
- **Differentiation**:
  - Pasand has successfully piloted a model that charges schools and other organizations for its programs. 60% of its programs were paid for by beneficiaries in 2015. It has a goal of being 100% financially sustainable by 2019 through a combination of paid programs and menstrual products and clothing sales.
- **Result**:
  - Pasand has reached over 55 schools and 6800 individuals directly, and has trained 130 facilitators. Pasand's curriculum evaluation has shown significant increases in desired knowledge and behavior.

pasand
grow with confidence

Hand Hygiene - Additional Organizations to Consider

Dharma Life

- **Headquarters**: India
- **Inception**: 2009
- **Website**: http://www.dharma.net.in/
- **Solution**: Dharma life has created a value chain that enables rural individuals to earn a living by generating consumer awareness and selling social impact products, including soaps and other hygiene items.
- **Differentiation**:
  - The Dharma Life model is a market-based solution to providing education and products to rural Indians by using local entrepreneurs who receive training and access to financing.
- **Result**:
  - Dharma Life currently operates in over 4,300 villages in 8 states, with a potential rural population of 460 million. Dharma Life plans to expand across all states in India.

VOTO Mobile

- **Headquarters**: Ghana
- **Inception**: 2012
- **Website:** https://www.votomobile.org/
- **Solution**: VOTO Mobile is a Ghana-based social enterprise that allows organizations to share information and gather feedback through interactive SMS or voice calls. They are seeking to pilot a project in India that uses Interactive Voice Response to promote handwashing by inviting consumers of soaps and other hygiene products to call toll-free hotlines to engage with 'edu-tainment' and incentives that encourage them to practice good hygiene.
- **Differentiation**:
  - This is a unique approach that has yet to be piloted, but it is one of very few innovations seeking to use mobile technology to improve hygiene.
- **Result**:
  - VOTO mobile has not tested this concept but has been successful in other similar health-related project using mobile technology.

Clean the World

- **Headquarters**: Florida
- **Inception**: 2009
- **Website:** https://cleantheworld.org/
- **Solution**: Clean the World collects and recycles soap and hygiene products discarded by the hospitality industry. They distribute these recycled products around the world to prevent hygiene-related illnesses.
- **Differentiation**:
  - Clean the World has partnerships with the hospitality industry in places like Orlando and Hong Kong, and with NGOs to distribute soap in places that need it.
- **Result**:
  - Clean the World has distributed 22 million bars of soap in 96 countries. They are already quite big, but the approach represents an innovative hygiene solution that has proved scalable and sustainable.