Deliverables for Practicum Clients:

1. **Indian Institute of Emergency Medical Services (IIEMS)**
   Kottayam, India

2. **LV Prasad Eye Institute (LVPEI)**
   Hyderabad, India

3. **Reap Benefit**
   Bangalore, India

4. **Water and Sanitation Program, World Bank**
   Washington, D.C.
International Development Program Practicum 2013 – 2014

Deliverables for Indian Institute of Emergency Medical Services (IIEMS)

Kottayam, India

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Terms of Reference with Indian Institute of Emergency Medical Services

Purpose: The SAIS IDEV team will build a business development toolkit to guide IIEMS’ future work. The toolkit will enable IIEMS to leverage its organizational strengths and refine plans for expansion into the nascent disaster response sector.

Project Description: The toolkit will include, but is not limited to, the following:

IIEMS Brand: Reengineer the IIEMS to establish the organization as a pioneer in the field of emergency medical services. Communicate IIEMS’ core mission, functions, priorities, partners, clients, and capacity.

Stakeholder Mapping: Situate IIEMS’ activities within the broader disaster response field in India. Identify and evaluate current actors in the disaster response space and examine the relationships between state and national-level stakeholders. Identify opportunities to leverage existing partnerships (e.g. training staff from abroad).

Financing and Partnerships: Create a working database of existing and potential donors and partners in the area of emergency response to be populated by the SAIS team and IIEMS staff.

While several of the toolkit elements will be tailored to the disaster response sector, they will serve as templates for future business development efforts in general. In an effort to best meet the needs of IIEMS, the specifics of this plan are flexible.

Deliverables: See Appendices 1 and 2.

Action Items:

Become familiar with the day-to-day operations of IIEMS, focusing on IIEMS’ approach to training and capacity building. Specific activities may include:

- Observe IIEMS trainings in EMS and Community Outreach
- Review materials on previous large-scale trainings
- Speak with IIEMS staff about IIEMS program

Meet with IIEMS stakeholders to identify how IIEMS can increase its presence in the sector of disaster response training. Specific groups may include:

- Government officials, including KSDMA and NDMA representatives
- IIEMS trainees and partners
**Timeline:** All of the action items detailed above will be completed by the end of the in-country period. The SAIS IIEMS team will also complete the PowerPoint presentation and the IIEMS overall one-pager during the same period. Other deadlines are outlined in the appendices.

**Team and Advisor:** The SAIS IDEV team is Allison Carragher, Caitlin Hamill, Lauren Keevill, and Kabir Sethi. Specific roles for each member will be assigned as necessary as the project progresses. Dr. Dan Hanfling, an emergency room doctor with extensive experience working in disaster preparedness in India, will advise the SAIS IDEV team. The team will also work closely with Dr. Tanvi Nagpal to fulfill the academic requirements associated with the practicum, the details of which have been discussed in previous documents.
Appendix 1: Table of Deliverables*

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Purpose</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-pagers</td>
<td>Provide a quick overview of IIEMS’ work (overall and disaster-specific) to interested parties.</td>
<td>A one-page document that can be read in a few minutes and provide the reader with basic information on IIEMS.</td>
</tr>
<tr>
<td>PowerPoint Presentation</td>
<td>Serve as a flexible platform for IIEMS’ presentations to potential partners and donors, both public and private. The presentation will acquaint potential partners with IIEMS by detailing its expertise, past work experience, and plans for the future in various sectors.</td>
<td>Two potential approaches: one overarching slide deck that can be edited to suit the needs of a given audience, or individual slide decks for each of IIEMS’ core competencies.</td>
</tr>
<tr>
<td>Stakeholder Map</td>
<td>Inform business development efforts in the disaster response sector.</td>
<td>A one-page map of key actors in the disaster response space.</td>
</tr>
<tr>
<td>Partnerships and Financing Database</td>
<td>An internal database that allows IIEMS staff to target and track organizations it has engaged with.</td>
<td>Database will include contact and background information for key organizations and donors in the field of EMS and disaster response capacity building.</td>
</tr>
</tbody>
</table>

*The practicum team will hand in all deliverables, in hard copy form, along with a work-log and public relations materials

Appendix 2: Deliverables Plan*

<table>
<thead>
<tr>
<th></th>
<th>EMS Training</th>
<th>Community Outreach</th>
<th>Ambulance Service</th>
<th>Disaster Response</th>
<th>IIEMS Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-pager [3/1]</td>
<td></td>
<td></td>
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<td>✓</td>
</tr>
<tr>
<td>PowerPoint Presentation [3/1]</td>
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<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Stakeholder Map [4/9]</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Financing Database [4/9]</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Bracketed dates are the deadlines for submitting drafts of each product to IIEMS Advisor Dr. Dan Hanfling
**Action Plan for IIEMS**

**Introduction and Overview**

Even though the direct engagement between the SAIS practicum team and IIEMS ends in May 2014, we hope that our work will continue to help IIEMS into the future. In order to help IIEMS gain a foothold in the disaster risk reduction, response, and resilience sector, the SAIS team has completed the following deliverables:

- Donor engagement guide
- Financing Database
- Stakeholder Map
- One-pagers
  - Overall IIEMS
  - IIEMS DRR experience and capacity
- PowerPoint presentations
  - Overall IIEMS
  - IIEMS DRR experience and capacity
- Digital media presence recommendations

This document should serve as (i) a manual for using the above deliverables to best serve IIEMS’ ongoing needs and (ii) a guide for future operational and strategic planning. Figure 1 below illustrates how the practicum deliverables fit into IIEMS’ strategic planning.

<table>
<thead>
<tr>
<th>Partnerships</th>
<th>Short term (&lt;6 months)</th>
<th>Medium to long term (&gt;6 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donor engagement guide</td>
<td>FCRA approval, 501c(3) status</td>
<td>Implement a comprehensive management information system</td>
</tr>
<tr>
<td>SAIS Financing Database</td>
<td>Develop and collect financial and performance metrics</td>
<td></td>
</tr>
<tr>
<td>SAIS Stakeholder Map</td>
<td>Adopt a systematic business development process</td>
<td>Integrated strategic planning process covering:</td>
</tr>
<tr>
<td>SAIS one-pagers and PowerPoints</td>
<td></td>
<td>- Intra-IIEMS synergy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Internal capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- External opportunities</td>
</tr>
<tr>
<td>SAIS Digital Engagement Presence</td>
<td>Build a robust network of DRR Partners</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 1: Overview of Action Plan*
The three areas identified as key to building IIEMS’ presence in the disaster space, namely Partnerships, Expansion, and Brand, feed into medium- and long-term objective for the organization.

**Foundations**

The SAIS practicum team has developed a number of products that should be used as a foundation to achieve short-, medium-, and long-term objectives.

- **Donor guidelines** cover engagements with bilateral and multilateral sources of funding for IIEMS. The documents provided by SAIS should be used by IIEMS to develop proposals, expressions of interest, and other channels of interaction with major donors.

- The **financing database** identifies and profiles important potential collaborators, distinguishing between *Funding Opportunities* and *Potential Partners*. Funding opportunities refer to organizations that are likely to finance the kind of work that IIEMS is hoping to do in the DRR space. Potential Partners are organizations that are leaders in their respective fields, and should be connected with even if they are unable to provide funding. The profiles of organizations covered includes information about the organization’s mission, size, budget, and specific activities in India. When building relationships with potential partners and funders, we hope that this information will help guide IIEMS’ engagement strategy and approach. IIEMS should expand on this project as it encounters new organizations that are deemed to be relevant.

- We have created a **stakeholder map** that should serve as a living document that (i) maps the DRR space in India and (ii) positions IIEMS within this landscape. As IIEMS interacts with other organizations, we hope that the stakeholder map will continue to evolve.

- A collection of **one-pagers and PowerPoint presentations**, covering IIEMS in general and IIEMS’ role in DRR in particular, was developed as part of an effort to standardize and professionalize IIEMS’ approach to potential partners. These documents also help create a singular image that IIEMS projects, and are therefore important for the organization’s brand.

- After analyzing IIEMS’ online presence, we identified **recommendations for an enhanced digital media presence**, which is intended to help IIEMS manage its online brand. Recommendations cover the IIEMS website, Facebook presence, a LinkedIn profile, and other areas.

**Short-term**

Over the next six months, the products developed by the SAIS practicum team should help IIEMS develop its brand, expand into new or underdeveloped segments of the DRR space, and identify and connect with important partners. In addition, the foundations from above should be used to build IIEMS’ organizational capacity more broadly. The steps outlined
below are not limited to the DRR space and are intended to support the growth of IIEMS as a whole.

- In order to maximize its ability to engage with potential funding sources, IIEMS should seek to register with the Foreign Contributions Regulations Act (FCRA) in India and acquire 501(c)3 status in the United States. Several potential donors are limited in their ability to disburse funds, e.g. Give2Asia can only engage with FCRA compliant organizations. In the medium-term IIEMS should look to position itself to receive funding from multiple sources. It may be worthwhile to engage a lawyer to provide advice on these and other regulatory and compliance related matters.
- Increasingly, donors are keen to look at financial statements and performance metrics before providing funding to organizations. IIEMS should conduct financial audits and develop and track key performance indicators, such as the number of individuals being trained, the satisfaction of trainees with IIEMS’ services, government officials being educated about DRR, etc. These metrics are also a valuable tool for internal planning.
- IIEMS’ strategic approach in the DRR space is different than its emergency response training model. In order to access funds in DRR, where competitive bidding rather than end-user fees are the primary source of funds, IIEMS should develop a systematic business-development process. While there are several approaches to business development, a common strategy is for organizational leadership to meet on a biweekly basis to discuss opportunities, and for a more junior staff member to be looking at key donor databases and online forums on a daily basis to identify projects of potential interest.
- Using the foundations described above, IIEMS should seek to consolidate its position in DRR and build a robust network of DRR partners. IIEMS should be seen as a key strategic partner by other organizations, including knowledge creators, donors, and implementing institutions.

Medium- and long-term

Looking beyond the next six months, we hope that the SAIS project will help IIEMS position itself to better contribute to and benefit from the growing DRR space. While the steps outlined below are aspirational and not immediately executable, they should nonetheless be kept in mind as IIEMS continues to grow.

- As performance metrics described above begin to be collected, they should feed into a comprehensive management information system that tracks IIEMS’ operations, keeps track of financials, and ensures that progress toward goals is being made. A management information system, while initially time-consuming and expensive to set up, is likely to lead to large cost- and time-savings in the long-term.
- To effectively manage its expansion, IIEMS should consider developing an integrated strategic planning process which takes into account both internal and
external opportunities. An annual strategic retreat that brings together senior leadership to take stock of the work done in the past year and to look ahead to the future should cover the following key areas:

- **Intra-IIEMS synergy:** identify and develop ways in which different IIEMS units can work with and benefit from each other. For example, leveraging reputation and expertise in emergency response training to partner with hospitals in disaster-prone areas.
- **Internal capacity:** over time, IIEMS staff will become increasingly competent and acquire new skills. These should be incorporated into IIEMS’ plans.
- **External opportunities:** Just as IIEMS has identified DRR as an important growth opportunity, it is important to take advantage of future prospects, both within extant spaces such as DRR and emergency response and in thus far unexplored sectors. In addition, a strategic plan should evaluate IIEMS’ position in each of the sectors where it works.
WHO WE ARE
The Indian Institute of Emergency Medical Services (IIEMS) is an India-based non-profit organization that saves lives by providing world-class training and consulting on Emergency Medicine, Emergency Medical Services, Trauma Care Services, and Disaster Response. Our mission is to build capacity in emergency medicine and disaster response in India, enhance the quality of emergency care, and raise public awareness. We were founded in 1993 in Kerala, India, with an executive office in Pennsylvania, USA, and have Regional Training Centers across India.

WHAT WE DO

Capacity Building: Emergency medicine and trauma care are distressingly underdeveloped in India, with too many emergency room doctors lacking fundamental life support skills. We provide a range of consulting services and trainings to build India’s capacity to respond to emergencies. Our extensive network of certified trainers offer basic courses for civilians, postgraduate courses in emergency medicine, and advanced training programs for medical professionals. Our courses are certified by leading organizations including the American Heart Association, All India Institute, and the Australasian Registration of Emergency Medical Technicians. Over the past decade, we have conducted over 700 courses across India, training more than 52,000 healthcare providers.

IIEMS also seeks to build resilience to disasters by tailoring our expert training portfolio to meet the unique challenges of disaster situations. India’s geography, climate, and infrastructure make it one of the most disaster prone countries in the world. IIEMS offers basic and advanced courses in disaster life support, as well as a comprehensive course on hazardous material incidents. These courses equip first responders, administrative officials, and community members with the information and skills necessary to effectively respond to a disaster. Furthermore, IIEMS provides government consultation and facilitates large-scale disaster management exercises that challenge medical professionals and community members to demonstrate competency in realistic scenarios. To date, IIEMS has participated in exercises in three states, involving more than 5,000 participants.

Community Programs: India has the highest number of road fatalities in the world, and 30 percent of accident victims die before reaching a hospital. When an accident strikes, action by community members already on the scene can keep a victim alive until medical professionals arrive. IIEMS partners with community groups such as schools, churches, panchayats, taxi/auto drivers, fire and police departments, rotary clubs, and residents associations to provide practical skills in First Aid, CPR, patient stabilization, and early trauma care. To date, we have trained around 50,000 community members in numerous states in India. The vast majority of these trainings are provided free of charge.

IIEMS also owns and operates an ICU ambulance service in the city of Kottayam. Our nine vehicles and qualified Emergency Medical Technicians deliver fast, quality care regardless of the victim’s ability to pay. Our ambulances also offer non-emergency services such as inter-facility patient transfers. IIEMS community programs that educate citizens on emergency medicine and ambulances are an essential component of India’s fledgling emergency medical system.
IIEMS AND DISASTER RISK REDUCTION

WHO WE ARE
The Indian Institute of Emergency Medical Services (IIEMS) is an India-based non-profit organization that saves lives by providing world-class training and consulting on Emergency Medicine, Emergency Medical Services, Trauma Care Services, and Disaster Response. Our mission is to build capacity in emergency medicine and disaster response in India, enhance the quality of emergency care, and raise public awareness. We were founded in 1993 in Kerala, India, with an executive office in Pennsylvania, USA, and have Regional Training Centers across India.

THE NEED
India’s geography, climate, and infrastructure make it one of the most disaster prone countries in the world. More than 75 percent of the country’s coastline is vulnerable to cyclones and tsunamis, nearly 60 percent of land is earthquake-prone, and some 40 million hectares are at risk from floods and river erosion. While initiatives led by the Indian government and other organizations have made some impact in responding to disasters, risk reduction efforts remain nascent. Emergency medical services (EMS) are either absent or unequipped for large, unexpected events. Medical institutions are unfamiliar with triage for natural or technological disasters.

THE RESPONSE
Recognizing the complexity of these risks, India recently prioritized disaster risk reduction (DRR). Since the creation of the National Disaster Management Authority (NDMA) in 2005, IIEMS has made a valuable contribution to this emerging field. IIEMS continues to advocate for a strong EMS system to complement nationwide DRR efforts by leveraging our expertise in emergency medicine training. IIEMS has contributed to three state-organized emergency management exercises involving more than 5,000 participants. Starting as a participant in Chennai (CEMEx 2011), IIEMS assumed additional responsibility as lead trainer in Guwahati (GEMEx 2012), and most recently served as a lead trainer and evaluation consultant in Delhi (DEMEx 2012), assessing the efficacy of the entire exercise.

IIEMS regularly offers basic and advanced courses in disaster life support certified by the National Disaster Life Support Foundation. We are the only certified agency in India providing Advanced HAZMAT Life Support course, developed by the University of Arizona’s Department of Emergency Medicine. These courses equip first responders, administrative officials, and community members with the information and skills necessary to effectively respond to a disaster.

In addition to our work building DRR capacity, IIEMS provides a range of courses certified by leading organizations including the American Heart Association, International Trauma Life Support, Advanced Trauma Life Support, Advanced Trauma Care for Nurses, All India Institute of Medical Sciences, and the Australasian Registry of Emergency Medical Technicians. Over the past decade, we have conducted over 700 courses across India, training more than 52,000 healthcare providers. We also provide community-based practical skills courses in First Aid, CPR, patient stabilization, and early trauma care. To date, we have trained around 50,000 community members in numerous states in India. The vast majority of these trainings are provided free of charge.
Donor Engagement Guide

Introduction
There are more opportunities than ever to affect positive change in the world, but navigating the complex donor community can be difficult. Fledging organizations looking for funding often seek partnerships with well-known and respected donors, such as bilateral organizations (USAID, DFID, or AusAID) and prominent NGOs (The Gates Foundation, The Red Cross), believing that they manage the bulk of funding. The high profiles enjoyed by these organizations come at a cost: they are often unable to devote administrative and programmatic attention to the day-to-day implementation of their projects. As such, this responsibility is often delegated to a trusted “prime contractor,” who is then charged with issuing grants and contracts to small, local organizations.

In the short-term, we recommend that IIEMS pursue a “downstream” funding and partnership strategy that targets these implementing partners, smaller donors, and lesser-known grant making institutions. This approach seems to be the best fit considering IIEMS’s size, local knowledge, and experience. It is also more appropriate for an organization trying to break into a relatively new sector. For any organization, “following the money” downstream can be a tricky exercise. However, by developing a strong understanding of where money is flowing into a sector, who is managing the funding, and how projects are being implemented, IIEMS can determine where it can add the most value. The following resources should help IIEMS undertake this challenge by finding its niche in the Disaster Risk Reduction space, building a robust network of partners, and identifying funding opportunities.

Resources

Stakeholder Map
Our stakeholder map includes information on dozens of organizations and actors in the disaster risk reduction field. The map is a living document that can be updated as IIEMS builds its network. This document aims to illuminate the relationships among actors by dividing organizations into three categories: knowledge creators, implementers, and donors.

- **Knowledge creators**—Institutions and individuals contributing research to the field of DRR;
- **Implementers**—Local and international organizations conducting disaster training and capacity building activities in India; and
- **Donors**—These include bilateral, multilateral and private sources of funding for DRR activities. The most promising donors are profiled in more detail in the financing and partnerships database.
Financing and Partnerships Database
In our financing database, we present more detailed profiles of what we have determined are the most promising donors and potential partners for IIEMS in the DRR sector. Each profile includes background information on the size and mission of the organization, details on some of its activities and programming in India, and any specific opportunities that we have identified that may be of interest to IIEMS. These profiles are by no means exhaustive, but have been designed to give IIEMS the information necessary to engage effectively with these organizations.

**Funding Opportunities:**
- Gates Foundation
- Give2Asia
- The World Bank
- USAID (including PEER partners)

**Potential Partnerships:**
- AmeriCares
- Ananda Marga Universal Relief Team
- International Federation of the Red Cross
- Oxfam India
- World Vision

**General Eligibility**
Through researching funding and partnership opportunities, we have identified three key areas where IIEMS can focus internally in order to become a more attractive partner and funding recipient. These priorities are drawn from the requirements of potential donors and partners, including those listed in Requests for Proposals as well as insights obtained through conversations with donors.

1. **Confirm that IIEMS is legally eligible and approved to receive funding.**
   Before IIEMS can apply for funding, it must ensure that it is eligible. This may include obtaining approval to receive foreign funding under the Foreign Contribution Regulation Act (FCRA), applying for 501(c)3 tax-exempt status in the United States, and registering with specific organizations.

2. **Build capacity around budgeting and accounting to ensure clean, transparent financials.**
   The top concern of donors and potential partners is financial, and grant recipients need to be able to account for all funds received. Building IIEMS’s capacity in this area may include systems to prepare and track expenditures and revenue, staff training, and enhanced transparency. The ultimate goal should be to complete regular, professional financial audits.

3. **Develop and implement performance metrics to demonstrate impact.**
   The other key concern of potential donors and partners is assurance that organizations are achieving specific program goals. Metrics that demonstrate the impact that IIEMS has on individuals and communities must be identified, carefully tracked, and reported.

**Capacity Building**
Progress in these three areas will take time, effort, and investment. We have also identified a number of resources, most of which are free, that can help IIEMS expand its capacity in these areas and increase its attractiveness as a potential partner. These resources include online toolkits, training programs, and organizations that are designed to support NGOs looking to expand or enter new lines of business. Increasing IIEMS’s knowledge base through formal and informal methods will increase the organization’s visibility and credibility, ultimately enabling IIEMS to compete in the DRR space successfully.
Websites

Idealist (www理想list.org): This well-respected internet hub has a wealth of resources. Organizations can post opportunities online, connect with similar organizations, and find out about events going on around the globe.

IIEMS could use Idealist to: recruit interns and staff, promote its work, and connect with the Indian Diaspora.

Devex (www.devex.com): Tailored to suit the needs of international-development professionals, this internet clearinghouse is similar to Idealist. Its focus on improving information sharing between development organizations sets it apart: tools for business development, regular publications, and career advice are designed to build the capacity of Devex community members.

IIEMS could use Devex to: recruit team members, promote its work, and learn more about the DRR and international development space in India.

ReliefWeb (www.reliefweb.int): A United Nations website that provides information to humanitarian organizations. Contains news, job postings, and training opportunities.

IIEMS could use ReliefWeb to: develop a comprehensive understanding of international stakeholders and activities in DRR.

Civicus (www.civicus.org): An international alliance developed in the global south dedicated to strengthening civil society and building capacity. They offer user-friendly online toolkits for budgeting, strategic planning, monitoring and evaluation, writing a funding proposal, and other skills.

IIEMS could use Civicus toolkits to: build internal capacity in areas such as fundraising and systems.

Dasra (www.dasra.org): Mumbai-based organization seeking to build the capacity of local organizations to affect positive social change. Aims to bring together social entrepreneurs and philanthropists by equipping both with knowledge, access to funding opportunities, and people that makes their work more strategic.

IIEMS could work with Dasra to: build internal capacity that is tailored to India specifically, and engage with other local organizations.

Tips and Tricks for Working with USAID


2. Understand the different procurement tools used by USAID's Office of Foreign Disaster Assistance (OFDA) and the USAID Missions: http://www.usaid.gov/what-we-do/working-crisis-and-conflict/crisis-response/resources

3. Enroll in the Awards Results Tracking System (ART) online course.
   - ART is OFDA’s platform for partner organizations to submit award reporting and data. Organizations must take the ART online course to enroll in the Guidelines for Proposal Workshop, a workshop held three times per year. To enroll in the ART online course, email: ofdaworkshops@ofda.gov.


8. Build strong relationships with USAID, and their partners, through formal and informal meetings. This is especially important as some projects and RFPs may be designed for or tailored to specific organizations with which USAID already has a relationship. These relationships will also help IIEMS identify other potential partners.


**Continued Engagement with Government Actors**

Over the last two decades, the Government of India has reorganized its approach to disaster management and preparedness. Because both resources and the policy impetus for action come from government actors, it is key for DRR actors to understand where government agencies fit in the sector landscape, as illustrated below. This is a particular strength for IIEMS. IIEMS has built working relationships with government actors at all levels, and is well positioned to meet the training and capacity building needs of other agencies going forward.

![Government Roles Diagram](image)

_More information on the specific roles of government actors is available in the stakeholder map._
# AmeriCares

**AmeriCares India**  
Seagull House, 1st floor  
P.No. 6, Shivaji Colony  
Chakala, Andheri Kurla Road  
Andheri East, Mumbai 400099  
Phone: +91 (0) 22-6556-8098

## About

<table>
<thead>
<tr>
<th>Mission</th>
<th>The AmeriCares India Foundation is a public charitable trust that provides medical aid in India and neighboring countries, irrespective of race, creed or political persuasion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>AmeriCares, the parent organization to AmeriCares India, issued $3.9 million in direct funding in 2012.</td>
</tr>
<tr>
<td>Funding</td>
<td>AmeriCares raises the majority of its funding by soliciting cash, medicines, medical supplies, and other relief materials from Indian and multinational pharmaceutical manufacturers based in India</td>
</tr>
</tbody>
</table>

## Relevant Programs

**Description**  
As a disaster relief organization, AmeriCares India responds to major disasters. They also run disaster preparedness workshops for first responders, lay people, and healthcare professionals as well as disaster medical training programs for hospitals. Their activities are channeled through established partnerships with local governmental and NGOs.

**Activities in India**  
AmeriCares India Foundation has run disaster preparedness trainings in the following locations:
- Almora district, Uttarakhand  
- Thane, Maharashtra (Conducted at Thane’s Jupiter Hospital in conjunction with the NDMA)  
- Ahmedabad, Gujarat (in partnership with the New York Presbyterian Hospital/Columbia University Medical Center, Columbia University’s Mailman School of Public Health, and the Academy of Traumatology of India)  
- Mumbai, Maharashtra (Mumbai Emergency Management Exercise (MEMEx) conducted in 2008 with faculty from New York-Presbyterian and Harvard)  
- Tamil Nadu (Tsunami-affected areas through a grant to Project Concern International India)  
- Ahemadabad  
- Kolkata  
- Nagpur  
- It also plans to expand into several disaster affected states such as Bihar

*AmeriCares India is not active in Kerala state*

**Budget**  
Response to disasters in India have totaled more than $50 million since the organization started. Only a very small portion of funding goes towards disaster risk reduction and preparation.

**Resources**  
Activities are listed here: [http://www.americaresindia.org/whatwe/spotlight/disaster-preparedness/](http://www.americaresindia.org/whatwe/spotlight/disaster-preparedness/)
Ananda Marga Universal Relief Team (AMURT)

Global Headquarters
AMURT Bhawan
Ananda Nagar, Bagalata
Purulia District, West Bengal
Pin: 723213
Phone: +91 - 3254 - 260214 / 260270
Email: amurtcentral@amurt.net

About

Mission
AMURT was established in 1965 and is one of the few private international voluntary organizations founded in India. Its main objective is to help meet the needs of the affected population after disasters. It is active in 34 countries.

Size
AMURT employs less than 200 people.

Funding
AMURT does not publish the amount of its funding.

Relevant Programs

Description
AMURT seeks local solutions to DRR and poverty. Its field directors are based in the areas they serve.

Activities in India
AMURT works with local implementing partners on its projects. In India, these include:

- **Abha Seva Sadan**: The Abha Seva Sadan Multitherapy Charitable Health Centre (ASSMCH) was started to provide quality health care and health education. Its main features include holistic health care for the poor, grassroots work in villages and training local health care workers.

AMURT also has partnerships or receives funding from many of the largest donors, including:

- USAID
- KNH Kindernothilfe Germany
- CIDA (Canada)
- World Food Program
- UNICEF
- Norad (Norway)
- Catholic Relief Services
- GTZ (Germany)
- IFRC (Red Cross)
- Save the Children

Resources
More information is available at: [http://www.amurt.net](http://www.amurt.net)
**Organization**

<table>
<thead>
<tr>
<th>The Bill and Melinda Gates Foundation</th>
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<tbody>
<tr>
<td><strong>Grant Inquiries</strong></td>
</tr>
<tr>
<td>(206) 709-3140</td>
</tr>
<tr>
<td><a href="mailto:info@gatesfoundation.org">info@gatesfoundation.org</a></td>
</tr>
<tr>
<td><strong>India Office (Delhi)</strong></td>
</tr>
<tr>
<td>011-91-11-4713-8800</td>
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**About**

<table>
<thead>
<tr>
<th>Mission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided by the belief that every life has equal value, the Bill &amp; Melinda Gates Foundation works to help all people lead healthy, productive lives.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Endowment: $40.2 billion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grants ranging in size from a few tens of thousands to more than $20 million.</td>
</tr>
</tbody>
</table>

** Relevant Programs**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Their Global Development Division includes an Emergency Response team, focused on improving the speed and performance of partner organizations in the first critical hours of an emergency, and helping communities prepare for disasters and recover more quickly after an emergency. Most funding is disbursed to pre-vetted responding organizations as fast track funding to address high-impact disasters. Some funding also goes to “Slow Onset Emergencies”, which does not explicitly include traffic accidents but probably could.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities in India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launched a pilot project to strengthen the effectiveness of emergency responders by developing and disseminating effective approaches. Were also involved in the internal displacement of people in northeastern India.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Partners/Grant Recipients</th>
</tr>
</thead>
<tbody>
<tr>
<td>• World Vision, for emergency response to flood and landslide affected populations in Uttarakhand ($500,000)</td>
</tr>
<tr>
<td>• Tulane University's Disaster Resilience Leadership Program, to support programs in universities in disaster-prone regions of Africa and Asia ($5 million)</td>
</tr>
<tr>
<td>• CARE’s Emergency Capacity Building project, to improve emergency response at major humanitarian organizations ($5 million)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant opportunities are listed here: <a href="http://www.gatesfoundation.org/How-We-Work/General-Information/Grant-Opportunities">http://www.gatesfoundation.org/How-We-Work/General-Information/Grant-Opportunities</a></td>
</tr>
</tbody>
</table>

**Eligibility**

<table>
<thead>
<tr>
<th>Tax-Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>The majority of grants are awarded to U.S. 501(c)(3) tax-exempt organizations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most grants are made proactively, with Gates staff designing concepts that meet their strategic priorities and then reaching out directly to organizations in the field.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gates Foundation does not fund individuals, or make grants outside of its strategic priorities.</td>
</tr>
</tbody>
</table>

**Funding Opportunity**

**Potential Partnership**
# Organization

## Give2Asia

<table>
<thead>
<tr>
<th>Headquarters (USA)</th>
<th>Phone: 415.967.6300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email: <a href="mailto:info@give2asia.org">info@give2asia.org</a></td>
<td></td>
</tr>
</tbody>
</table>

## Disaster Preparedness

Matt Grager, Director, Disaster Preparedness Program
mgrager@give2asia.org

## About

<table>
<thead>
<tr>
<th>Mission</th>
<th>Give2Asia is a U.S.-based social enterprise that serves as a catalyst for philanthropic investment in Asia by advising donors, foundations, and individuals on grant opportunities and managing the grant making, project monitoring, and other responsibilities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Total Giving: $237 million (since 2001)</td>
</tr>
<tr>
<td>Funding</td>
<td>24% of its 2013 funding went to disaster; 9% of overall funding supported programs in India</td>
</tr>
</tbody>
</table>

## Relevant Programs

<table>
<thead>
<tr>
<th>Description</th>
<th>Give2Asia focuses on engaging local responders who understand the local context and needs, and balancing relief with long-term recovery. They responded to nearly 40 natural disasters in the Asia Pacific region during the past 10 years.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities in India</td>
<td>Give2Asia has partnered with the International Institute of Rural Reconstruction (IIRR) to connect U.S. donors with effective local disaster preparedness programs in 6 of the most vulnerable Asian countries, including India. This project is their first foray into funding DRR.</td>
</tr>
<tr>
<td>Budget</td>
<td>The NGO Disaster Preparedness Program is supported by a three-year $1.5 million grant from the Margaret A. Cargill Foundation.</td>
</tr>
<tr>
<td>Resources</td>
<td>NGOs wanting to stay up to date on opportunities for fundraising, training and networking—and to begin the process of reaching US donors—should contact the Director of the Disaster Preparedness Program directly.</td>
</tr>
</tbody>
</table>

## Eligibility

<table>
<thead>
<tr>
<th>Tax-Status</th>
<th>All grants recipients must have FCRA registration. More information on FCRA approval can be found here: <a href="http://www.ashanet.org/munich/fhra.html">http://www.ashanet.org/munich/fhra.html</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>In May 2014, Give2Asia plans to launch an open, online Request for Proposal (RFP) process to determine grant recipients for DRR projects for one year grants up to $25,000 or two year grants up to $50,000. Proposals will be evaluated on a rolling basis with the first round of grants awarded in September 2014. The RFP will request a project proposal or concept note and an organizational information questionnaire, which covers registration and eligibility, etc. All organizations that submit proposals will also be considered for other opportunities including to open fiscal sponsorship funds with Give2Asia, attending Community-Managed Disaster Risk Reduction Training with IIRR at its headquarters in the Philippines, and receiving support from Give2Asia's US-based donor network.</td>
</tr>
<tr>
<td>Exclusions</td>
<td>Give2Asia provides transparent reporting on every project, and seeks only local responders who can account for every dollar committed to the disaster effort.</td>
</tr>
</tbody>
</table>
Organization

Oxfam India

Head Office, Oxfam India
Shriram Bharatiya Kala Kendra
4th and 5th Floor
1, Copernicus Marg
New Delhi-110001
Phone: +91 (0) 11 4653 8000
Email: delhi@oxfamindia.org

About

Mission
The Oxfams are rights-based organizations that fight poverty and injustice by linking grassroots programming (through partner NGOs) to local, national and global advocacy and policy-making. Oxfam India is a fully independent Indian organization (with Indian staff and an Indian Board), and is a member of a global confederation of 17 Oxfams. Oxfam has been in India for 62 years, but Oxfam India was only established in 2008.

Size
Oxfam India works in partnership with over 130 grassroots NGOs.

Funding
Oxfam India’s total income in 2012-2013 was 58 crores. It is undertaking an aggressive fundraising strategy through which it aims to double in size over the next 5 years.

Relevant Programs

Description
Humanitarian Response and Disaster Risk Reduction is one of Oxfam India’s four priorities. It is working to build a wider institutional culture in India for disaster management community preparedness and disaster response. The organization has shifted the focus of its activities to the 7 poorest states in India: UP, Uttarakhand, Bihar, Jharkhand, Chattisgarh, Assam, and Orissa.

Activities in India
In 2012-2013, Oxfam India provided direct humanitarian assistance to over 100,000 people. This included:

- Launching a humanitarian response to Cyclone Phailin and the Assam floods, which was funded by the European Commission (ECHO).
- Responding when violence erupted in July 2012 in Assam
- In the past, Oxfam India also responded to the Uttarakhand floods, East India floods, 2011 Tsunami, Kurnool floods in 2009, Leh flooding, Cyclone Aila, and 2008 Bihar floods.

The DRR program is also working to establish relationships with organizations in the space including government bodies, local and international NGOs, and UNICEF to build capacity and contingency planning.

Resources
All India programming will be selected in line with Oxfam India’s new strategy, which is available here: http://www.oxfamindia.org/about-us/oxfam-india-strategy-summary

Funding Opportunity
Potential Partnership
# Organization

## The International Federation of Red Cross and Red Crescent (IFRC)

**Red Cross Society of India-Kerala State Branch**  
Red Cross Building, Red Cross Road, General Hospital Junction  
Thiruvananthapuram-695 037  
Phone: 09400328063

**Red Crescent Society of India**  
Regd.Off: 202, Embassy Center,  
Nariman Point Mumbai- 400 009.  
Phone: +91 22 2285 4708/09/10/11  
Email: info@redcrescentsocietyofindia.com

## About

<table>
<thead>
<tr>
<th>Mission</th>
<th>The American Red Cross prevents and alleviates human suffering in the face of emergencies by mobilizing the power of volunteers and the generosity of donors.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>In 2013, the American Red Cross spent $87.9 million on international programs.</td>
</tr>
<tr>
<td>Funding</td>
<td>Grants by the American Red Cross are generally made in support of specific disasters.</td>
</tr>
</tbody>
</table>

## Relevant Programs

<table>
<thead>
<tr>
<th>Description</th>
<th>The sharp increase in the number of natural disasters countrywide in recent years has prompted the IFRC to devote more attention to disaster preparedness activities.</th>
</tr>
</thead>
</table>
| Activities in India | • Active in disaster intervention including responses most recently to Cyclone Phailin (Odisha) and Uttarakhand floods.  
• The American Red Cross is providing supplemental funding to support the strategic regional risk reduction program, the Program for Enhancement of Emergency Response (PEER), which is partially funded by the U.S. Agency for International Development's Office of U.S. Foreign Disaster Assistance (USAID/OFDA) in partnership with the Asia Disaster Preparedness Center. This project aims to train approximately 5,000 first responders who will be in a position to support millions of vulnerable people living across the nine countries encompassed in this program.  
• Through the Gujarat Disaster Risk Reduction Project, the American Red Cross is working with the Indian Red Cross in two vulnerable communities in Gujarat to train specialized Task Forces, develop community disaster response teams, and coordinate with the government and other organizations. This project is expected to benefit 2,500 people.  
• The Indian Red Cross Society partners with the Guru Gobind Singh Indraprastha (GGSIP) University, Delhi, to offer a One Year Part Time Post Graduate Diploma Course in Disaster Preparedness and Rehabilitation. It also maintains a Central Training Institute in Bahadurgarh, Haryana, a Disaster Management Center at National Headquarters (Delhi), and vocational training centers and health clinics elsewhere in the country. |
| Budget       | 27% of the American Red Cross’ international expenditures go towards disaster preparedness.                                                      |
### Organization

**United States Agency for International Development**

**Headquarters (USA)**
1300 Pennsylvania Ave, NW
Washington, DC 20004

### About

| Mission | USAID works to end extreme global poverty and enable resilient, democratic societies to realize their potential. |
| Size | In FY2012, USAID spent $78.7M in India on all programming. USAID/OFDA spent approximately $27M throughout South Asia on DRR programming. |
| Funding | USAID is funded by the U.S. Congress through annual appropriation bills and other legislation. |

### Relevant Programs

| Description | USAID has supported the Program for the Enhancement of Emergency Response (PEER) since 1998, training more than 2,600 disaster response professionals. PEER promotes disaster preparedness by training national and regional cadres of professional emergency response instructors, and helping local, regional, and national disaster management authorities to organize and conduct standardized training for professional responders and local communities. PEER is active in ten countries, including India. The main implementer for PEER is the Asian Disaster Preparedness Center (ADPC). Under PEER, there are two main programs: Hospital Preparedness for Emergencies (HOPE) and Community Action for Disaster Response (CADRE). |
| Activities in India | PEER works closely with NDMA to implement its programming. PEER is entering the 4th phase of programming, known as PEER 4. The most recent solicitation includes the following objectives: Continue to Offer High Quality Courses, Strengthen & Enhance Engagement with Training Institutions, Leverage Existing Institutions and Networks while Seeking New Stakeholders to Extend and Institutionalize PEER in Targeted Countries. A targeted list of existing PEER partners in India is included on the following page. |
| Budget | In FY 2012, OFDA contributed $1M to the program. |

### Eligibility

| Exclusions | All applicants for PEER funding must be registered in the Central Contractor Registration (CCR) database. For registration go to: [https://www.sam.gov/portal/public/SAM/](https://www.sam.gov/). PEER funding is not granted to individuals. All applicants must also qualify as legally recognized organizational entities under national law. |

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**Funding Opportunity**

**Potential Partnership**
Program for Enhancement of Emergency Response (PEER): Existing USAID Partners

**USAID Prime Contractors and Partners:**
- American Red Cross
- Asian Disaster Preparedness Center (ADPC)
- National Society for Earthquake Technology (NSET) - Nepal

**Sub-Programs Managed by ADPC:**
- Community Action for Disaster Response (CADRE)
- Hospital Preparedness for Emergencies (HOPE)

**National Partners (according to ADPC website):**
- Nodal Agency – National Disaster Management Agency, Indian Ministry of Home Affairs
- CADRE – American Red Cross Indian Delegation
- HOPE – Ministry of Health and Family Welfare

**PEER Sub-Contractors:**
- National Industrial Security Academy (NISA), Hyderabad
- Indo-Tibetan Border Police (ITBP), Chandigarh
- B.S.F. Academy, Tekanpur
- Basic Training College, CRPF, Coimbatore

**Training Institutions for Medical First Responder (MFR) and Collapsed Structure Search and Rescue (CSSR) courses:**
- National Industrial Security Academy (NISA) at Hyderabad
- Indo-Tibetan Border Police (ITBP) at Chandigarh
### Organization

<table>
<thead>
<tr>
<th><strong>The World Bank</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Headquarters (USA)</strong></td>
</tr>
<tr>
<td>1818 H Street, NW</td>
</tr>
<tr>
<td>Washington, DC 20433</td>
</tr>
</tbody>
</table>

### About

<table>
<thead>
<tr>
<th><strong>Mission</strong></th>
<th>End extreme poverty within a generation and boost shared prosperity.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>Since 1995, the International Development Association (IDA) has provided interest-free credits totaling US$19.4 billion to India. During this time, the IBRD has extended loans of US$23.6 billion to the country. Between 2000 and 2011, IDA committed US$14.5 billion to India through 57 projects. Consistent with IDA's poverty focus, over three-quarters of the lending has gone to rural development (39%), health and nutrition (16%), and education (21%).</td>
</tr>
<tr>
<td><strong>Funding</strong></td>
<td>There are two main funding mechanisms: the International Bank for Reconstruction and Development (IBRD), which provides market-rate loans and advice to middle-income and credit-worthy countries; and the International Development Association (IDA), which offers concessional loans (called “credits”) and grants to the poorest countries. India is considered a “blend country”, which means it is eligible for both types of funding. In addition, countries can use the Crisis Response Window or the Immediate Response Mechanism to access IDA funding in a crisis.</td>
</tr>
</tbody>
</table>

### Relevant Programs

| **Description** | According to the World Bank’s Country Partnership Strategy, which will guide engagement through 2017, the World Bank Group will focus on three key areas: integration, rural-urban transformation, and inclusion. Common themes running across these areas will be improved governance, environmental sustainability, private sector, and gender equality. Going forward, the Government of India has requested the World Bank’s engagement in some of its large transformative projects including a program to support the cleaning and conservation of the Ganga River, a phased approach in the flood-prone state of Bihar, and collaborate with the GoI on strategic initiatives such as the National Livelihoods Program. |
| **Activities in India** | - In January 2011, the World Bank agreed to support the first phase of the Government of India’s National Cyclone Risk Mitigation Project (I) (NCRMP-I), to be implemented by the NDMA. The Adaptable Program Loan is for $255M, and the project will originate in Orissa and Andhra Pradesh, expected to expand to other states in the second and third phases.  |
|                    | - In November 2013, the Government of India and the World Bank signed a $236 million credit agreement to help increase the resilience of coastal communities to a range of hazards by enhancing mitigation measures along coastal Tamil Nadu and Puducherry. |

### Eligibility

| **Exclusions** | The World Bank does not partner directly with local organizations. It exclusively funds national governments, which are then responsible for channeling funding through local institutions. |

---

**Funding Opportunity**  
**Potential Partnership**
## Organization

<table>
<thead>
<tr>
<th>World Vision</th>
<th>World Vision India - National Office</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16,VOC Main Road, Kodambakkam,</td>
</tr>
<tr>
<td></td>
<td>Chennai - 600 024</td>
</tr>
<tr>
<td></td>
<td>Phone : +91 44 42287070</td>
</tr>
</tbody>
</table>

## About

<table>
<thead>
<tr>
<th>Mission</th>
<th>World Vision is a Christian humanitarian organization dedicated to working with children, families, and their communities worldwide to reach their full potential by tackling the causes of poverty and injustice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Total Budget: $982 million (in 2013)</td>
</tr>
<tr>
<td>Funding</td>
<td>World Vision raises the majority of its funding through private cash contributions.</td>
</tr>
</tbody>
</table>

## Relevant Programs

<table>
<thead>
<tr>
<th>Description</th>
<th>World Vision adopts a “first-in, last-out” approach to disaster, first responding with life-saving emergency aid, and then staying for the long term to help families recover and rebuild.</th>
</tr>
</thead>
</table>
| Activities in India | • Nagpur: Funded a project to train 50 village development committees in forming disaster preparedness plans.  
• Arunodaya: Helped 77 community organizations develop disaster preparedness and trained them in disaster mitigation  
• Shanthidatha: Helped 33 villages develop or update their disaster preparedness plans  
• Premadhar: Facilitated training for 60 community volunteers on disaster preparedness  
• Himalaya: Trained 210 community members to develop disaster preparedness plans and formed seven emergency response teams |
| Budget       | Response to disasters in India totaled a combined budget of around 3 Crore Rupees in 2013                                                                                                             |
| Resources    | Activities are listed here: [http://www.worldvision.org/our-impact](http://www.worldvision.org/our-impact)                                                                                          |
Recommendations For an Enhanced Digital Media Presence

Managing your online presence to further the IIEMS brand

An online presence is an essential extension of the IIEMS brand. The IIEMS website is likely to be the first impression potential partners and donors receive of IIEMS, and customers of all types will communicate their satisfaction—or discontent—with IIEMS services through social networks. In fact, in interviews with IIEMS trainees, the Johns Hopkins SAIS team discovered that most students taking an IIEMS course were referred by word of mouth. As word of mouth shifts increasingly to social media, IIEMS may be able to attract new clients and business by enhancing its online presence through these recommendations.

Website

While the majority of students attending IIEMS courses were referred by word of mouth, many visited the website to find out specifics. Other students discovered IIEMS online while searching specifically for licensed trainings, such as those recognized by the Australasian Registry of Emergency Medical Technicians (AREMT). IIEMS’s current website could be improved in the following ways:

- Update language to match new one-pagers and branding guidance.
- Use pictures and photographs from actual IIEMS events.
- Introduce a searchable course list (E.g., drop-down menu) and more user-friendly interface for the course calendar.
- Utilize the calendar to show outside engagements and programming, such as conferences or community outreach activities.
- Verify all partnerships and remove any logos that do not represent current relationships.
- Establish website update schedule and identify responsible staff member to keep information current.
- Consider posting videos and other media that reflect IIEMS’ work, such as disaster response drills.

Facebook

By 2015, India is expected to have more Facebook users than any other country in the world. IIEMS currently maintains a Facebook page with 1,505 likes. The following recommendations would allow IIEMS to reach more potential partners and customers:

- Standardize language used on the Facebook page with the website and branding guidance.
- Create a Facebook group for IIEMS trainees to join, connect in, and discuss their experiences. Use this platform to advertise new courses, or offer incentives for referring friends.
- Provide links to IIEMS website, page for trainees, and LinkedIn page.
- Reduce general EMT postings in favor of more IIEMS and India-specific content.
- Advertise conferences and events where IIEMS staff are travelling or speaking on behalf of the organization.

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LinkedIn
India is the second-largest market for this professionally-oriented social network. However, the IIEMS presence is limited, with some 40 people listing IIEMS in their profiles. IIEMS could better utilize this growing online platform by undertaking the following:

- Create a profile for Dr. George Abraham, which can be managed by his son or another staff member, that includes information on Dr. Abraham’s founding vision for IIEMS as well as where Dr. Abraham will be travelling or speaking on behalf of the organization.
- Launch an IIEMS company page on LinkedIn. Standardize the language with the branding guidance.
- Make an IIEMS group for trainers, and a separate group for past trainees.
- Assign a single staff member responsible for updating the LinkedIn pages and content.

Other
- Add social media buttons to all staff email signatures, and ensure that they link to IIEMS-specific pages.
- Offer a brief social-media training course for all staff, and require those staff that will manage the IIEMS online presence to attend. The training should cover topics such as the mechanics of using social networks, but also the best practices for doing so.

--

International Development Program
Practicum 2013 – 2014

Deliverables for
LV Prasad Eye Institute
(LVPEI)

Hyderabad, India
Barriers to Compliance in Post-Cataract Surgery Patients in India

Authored By: Hilary Kinka, Gabriele Liotta, Chimdi Onwudiegwu, Tingting Juni Zhu

This study took place in January 2014 in the state of Andhra Pradesh, in India. The study was conducted by LV Prasad Eye Institute, in conjunction with the Johns Hopkins University School of Advanced International Studies.

May 2014
ACKNOWLEDGEMENTS

Several individuals were integral to our Practicum experience, and we would like to express our deep appreciation for all of their assistance. Thank you to Dr. Gullapalli N Rao and Dr. Rohit Khanna at the LV Prasad Eye Institute for generously hosting our team, and to Dr. Giridhar Pyda and Jyothi Korani for their guidance during our field study in Paloncha and Kothagudem.

We are particularly grateful to Dr. Krishna Tanuku and Santosh Srivinas at the Indian School of Management, for allowing our team stay on their beautiful campus for the duration of our visit in Hyderabad.

We would also like to thank Dr. Deborah Brautigam, Director of the International Development Program, whose vision it was to start the Practicum program at SAIS, and Cinnamon Dornsife for both establishing a relationship between SAIS and LVPEI and helping to secure the grant that made our trip to India possible. Special thanks should be given to Dr. Tanvi Nagpal for her hard work and leadership in directing the Practicum program, and to Dr. Josh Michaud, our advisor, for his enthusiastic support and valuable feedback and advice.
I. Introduction

Despite the increased availability of eye surgery, cataracts are the leading cause of blindness in the world today. They account for about 16 million cases of blindness worldwide.\(^1\) Twenty percent (6.7 million) of the 28 million blind people globally, are in India.\(^2\) It is estimated that cataracts are responsible for 81 percent of severe vision loss and blindness among this 6.7 million.\(^3\)

Between 4000 and 6000 cataract operations per million people are performed each year in developed countries. Given such high surgery rates, it is unusual for cataract cases to advance to the point of blindness. In developing countries such as India, however, this is not the case. India increased its absolute number of cataract operations from approximately 1.2 million surgeries annually in the 1980s, to 3.9 million per year in 2003.\(^4\) In India, the prevalence of cataracts is close to 7 million cases at any point in time, and the incidence of new cases annually is 6.15 million.\(^5\) Indian doctors currently perform nearly 6 million cataract surgeries per year, which is not enough to fully meet the need. Fortunately, it is possible to provide good quality cataract surgery at a reasonable cost and distance from the target population, and bridge this gap. As a provider of high quality medical care free of charge to about 60 percent of its clients, LV Prasad Eye Institute (LVPEI) has a groundbreaking model to tackle this challenge.

While LVPEI provides cataract surgery to people who would otherwise not be able to afford it, preventing thousands of cases of severe vision loss and blindness each year, their success rate will be further improved if patients increase compliance to follow-up care. Compliance constitutes three post-surgery visits: the first is one day after surgery, the second is a week after surgery, and the third is one month after surgery. LV Prasad is looking to reduce the number of patients who do not fully comply with recommendations for follow-up care, with a target of 95 percent compliance overall. Non-compliance can reduce the effectiveness of surgery and result in further complications. The objective of this study is to analyze the barriers to compliance in follow-up care post cataract surgery, and to identify strategies to increase compliance, which will in turn reduce the likelihood of blindness.

II. Literature Review

Several studies evaluating the barriers to uptake of cataract services were identified and analyzed alongside this study to gain insight from past research and outcomes, both in India and other countries.

---

Mismatch between Utilization and Demand for Services

Utilization of services may not occur automatically even when demand is present and supply guaranteed. In a study in rural Kenya, Reshef\textsuperscript{6} found that only 70 percent of individuals agreed upon intra-capsular cataract extraction when offered free of charge. In Nepal, even when offered free transportation to receive surgery without charge, utilization rates were below 60 percent. When looking into barriers, Finger\textsuperscript{7} suggests differentiating between predisposing characteristics, such as a low socioeconomic status or rural residence, which may not be barriers themselves, but rather markers for other barriers related to enabling resources. For example, women have limited access to financial resources and may not be able to pay for transportation to the Secondary Center. Likewise, a person who is unaware of his or her eye condition, potential treatments, and services offered, is unlikely to take advantage of eye care. The promotion of health literacy can help to reduce this barrier. Rather than focusing on predisposing characteristics, which might be beyond the reach of any intervention, the focus should be on enabling resources and educating people about the need for eye care. To target need, Finger suggests the use of successfully treated patients as motivators, coupled with increased outreach screenings.

Fear of Negative Post-Operative Outcomes

Gupta and Murthy\textsuperscript{8} point to the use of social marketing as a valid tool to increase awareness and acceptability of cataract surgery services. In their study conducted in rural India, Fletcher et alia\textsuperscript{9} find that many individuals listed poor post-operative outcomes of intracapsular cataract extraction surgery in friends and relatives as their primary reason for not getting surgery. In the same study, Fletcher finds that fear of treatment, specifically fear of damage to the eyes, was the most cited reason for not seeking help, or for not following up on surgery recommendations. Given these results, although intracapsular surgery is no longer the norm, patient counseling and education at the consultation stage is highlighted as a potential area for greater investment. Furthermore, Finger et alia\textsuperscript{10} identified regular outreach, and cataract surgery in one eye as the main predictors of acceptance of cataract surgery. In this context, poor outcomes had a significant impact on the patient decision-making process.

Costs

Fletcher also noted that the opportunity cost of time spent at the clinic for visits and surgery—measured in loss of income from work, or in lost time for household responsibilities—was a major barrier to compliance. Fletcher posits that reducing appointment durations, requiring fewer follow-up visits, enabling shorter hospital stays, and locating services at shorter distances from patient residence will increase compliance rates.

\textsuperscript{7} Robert P. Finger, David G. Kupitz, Frank G. Holz. 2012. Regular provision of outreach increases acceptance of cataract surgery in South India. PLOS Medicine, Volume 7 Issue 2.
\textsuperscript{10} Robert P. Finger, David G. Kupitz, Frank G. Holz. 2012. Regular provision of outreach increases acceptance of cataract surgery in South India. PLOS Medicine, Volume 7 Issue 2.
In a survey conducted in Pakistan by Jadoon et al, 76 percent of respondents identify financial cost as their primary barrier to compliance. Similarly, Rabiu finds monetary barriers to be the predominant obstacle to uptake of cataract surgery in a rural community of northern Nigeria. Other barriers, such as a lack of knowledge of eye disease or fear of surgery, were also cited, demonstrating the need for health education, especially considering the high levels of illiteracy among individuals with operable cataract in their sample.

**Gender Barriers**

Direct and indirect costs are major barriers, particularly for women, who have to negotiate household support before undertaking surgery; each visit translates into a cost for the household as a whole. This negotiation process can be complex, especially as the households increase in size. In their study, Finger et al found that families who received repeated offers or recommendations for surgery from outreach campaigns ultimately accepted the services. This highlights the importance of solicitation in influencing familial support in the negotiation process. Susan Lewallen and Paul Courtright suggest taking into consideration gender specificities when analyzing cataract surgery issues, as blindness and visual impairment are more prevalent in women. As such, outreach campaigns are particularly critical in impacting decisions to first get cataract surgery, and then to comply with recommended post-surgical visits. Their study finds that females receive cataract surgery at a lesser rate than males, and that the “perceived value of cataract surgery is often gender-dependent.” Poor rural women who do not have independent control over finances are at a disadvantage when faced with hospital transportation costs or lost work time for both the patient and accompanying relative or neighbor.

In Africa, widowed and divorced women were found to be more likely to undergo surgery than married ones, with chances increasing in the presence of a sibling who can assist in the process. This result reflected the shift toward greater control of financial resources for women after parting with a significant other. In a study on willingness to pay for cataract surgery in Kathmandu valley, Shrestha et al found that while cost is generally the main barrier to surgery and follow-up, allocation of resources still poses a problem between income and non-income earning household members.

### III. Methodology

This study was conducted in January 2014 and the data collected over a four-day period in the Khammam district of Andhra Pradesh, India. The total population in the district is 2,565,412, and it has 42 mandals. The sample size included 108 people from two of these mandals—Paloncha and Kothagudem, which are bordering mandals.

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The LV Prasad model is set up as a pyramid. At the lowest level are the Vision Guardians who conduct door-to-door surveys and are the main tool for community involvement. The second level are the Vision Centers or Primary Centers, they serve the primary health needs of the community. The Primary Centers serve a cluster of villages with a target of 50,000 people. The third level are the Secondary Centers, about ten Primary Centers are linked to the Secondary Centers. These Secondary Centers serve a population of about 500,000, provide ophthalmological care and offer surgical care for cataract. These Secondary Centers are linked to the Tertiary Centers, the fourth level of the pyramid. The Tertiary Centers provide a comprehensive range of eye services as well as training and each serve five million people. At the highest level of the pyramid is the Center of Excellence, which does service delivery for complex diseases, conducts training of trainers of subspecialties and engages in extensive research and development.

The study was conducted at the Secondary level of the LV Prasad model, at the Nava Bharat Center, which is located in Paloncha. The sample size was selected arbitrarily and included 50 compliant and 50 non-compliant subjects and a combination of convenience and quota sampling was used in data collection. One potential drawback of the study, the sampling method used may have introduced bias to the study, as it was not fully randomized. Eight additional surveys were conducted with compliant subjects to mitigate bias; 55 surveys were conducted in Paloncha and 53 in Kothagudem. The sample size was further divided to include 50 patients from Paloncha and 50 patients from Kothagudem, of which 25 were compliant and 25 were non-compliant in each mandal. Patients were randomly selected from LVPEI’s medical records; however, final interviewees were chosen based on availability at the time of the team’s visit.

A standardized questionnaire was administered to the sample population via interviews. It contained five sections—visual function, demographics, facilities and services, post-surgery follow-up care (non-compliant subjects), and post-surgery follow-up care (compliant subjects). The questionnaire was developed in English but administered by LVPEI staff in Telugu, the local language. Informed consent was obtained from subjects prior to conducting the interviews. Ethical approval was obtained from the Institutional Review Board for the study in December 2013.

The study has the potential to be scaled to other areas of Andhra Pradesh, and so the analytical framework must be standardized in order to compare across all samples. Quantitative data was analyzed using STATA and the analysis focused on contributing factors to non-compliance. Statistical significance of 10, 5, and 1 percent were used. Multivariate probit regressions were carried out to determine influence on compliance. Descriptive analysis was performed in excel using graphs and bar charts.

IV. Analysis & Results

Descriptive Statistics & Results

Questions on socio-economic status indicate that the average age of respondents is 60.4 years; no subject under the age of 18 was included in the study. There were 60 females and 48 males in the study, with an average household income of 9,906 Rupees (a little over $162 USD, as of April 2014). Non-paying patients represent 62 percent of the sample. The average distance of patient residence from the Secondary Center was 13.1 kilometers. In the overall sample, 67 percent were unschooled; 82 percent of non-compliant subjects and 53 percent of compliant subjects received no schooling.
**Table 1: Basic Characteristics of Respondents**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total Sample (N=108)</th>
<th>Compliant Patients (N=58)</th>
<th>Non-Compliant Patients (N=50)</th>
<th>Male (N=48)</th>
<th>Female (N=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. Age</td>
<td>60.4</td>
<td>58.4</td>
<td>61.6</td>
<td>61.1</td>
<td>58.9</td>
</tr>
<tr>
<td>Avg. Household Income (INR)</td>
<td>9,906</td>
<td>11,267</td>
<td>8,228</td>
<td>10,253</td>
<td>9,636</td>
</tr>
<tr>
<td>% of Non-paying Patients</td>
<td>62%</td>
<td>53%</td>
<td>72%</td>
<td>60%</td>
<td>63%</td>
</tr>
<tr>
<td>% Unschooled</td>
<td>67%</td>
<td>53%</td>
<td>82%</td>
<td>52%</td>
<td>78%</td>
</tr>
<tr>
<td>Avg. Distance to SC (km)</td>
<td>13.1</td>
<td>11.7</td>
<td>14.8</td>
<td>13.5</td>
<td>12.8</td>
</tr>
</tbody>
</table>

The study shows that the top barrier to post-surgical compliance is the third and final visit. The critical nature of the third visit is that patients are fitted for glasses during this appointment, and failure to attend may increase the risk of blindness. Of those interviewed, 29 of 50 non-compliant subjects (n=50, 58 percent) responded that they visited the hospital twice post-surgery but did not consider the third visit necessary. When respondents were asked to rank the top three barriers they face, other than thinking the third visit was not necessary as the biggest barrier, the second largest barrier to compliance is that patients were not informed by doctors of the need to return for the third visit. Travel costs also inhibit compliance. Gender plays a role in barriers to compliance as well: when females do not have anyone to accompany them to the secondary center, this reduces compliance. Men, on the other hand, are more likely than women to say they did not understand that the need to return for the third follow-up visit, and most commonly only attended two appointments post-surgery.

**Figure 1: Most Important Barriers to Post-Operative Compliance**

![Most Important Barriers to Post-Operative Compliance](image)

16 N=25, the question asked the respondents to rank their top three barriers; only half of the 50 non-compliers answered this question.
Based on a probit regression analysis, there were several variables with statistically significant associations with compliance. Certain characteristics are more likely to be observed in non-compliant patients. It is important to note that the analysis points to correlation only, not causation.

**Socio-economic Factors**

Socio-economic factors such as payment status, age, level of education, distance from the Secondary Center, and tribal group membership influence compliance levels. Satisfaction with the Secondary Center also impacts compliance—higher patient satisfaction leads to greater compliance.

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17 N=50, the question gave multiple options for barriers and non-compliers selected all that applied.
Table 2: Statistical Test of Association—Respondent Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Older individuals are less likely to comply than younger sample participants</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Education</td>
<td>Unschooled individuals were less likely to comply than formally schooled participants</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Distance from SC</td>
<td>Participants residing at a greater distance from the Secondary Center (SC) were less likely to comply</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Tribal Group</td>
<td>Members of tribal groups were less likely to comply</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Satisfaction with SC</td>
<td>Patients who are more satisfied with the SC are more likely to comply</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Payment Status</td>
<td>Non-paying patients are less likely to comply than paying patients</td>
<td>&lt;0.1</td>
</tr>
</tbody>
</table>

Why did you choose this hospital?

Hospital choice also has an impact on patient compliance. When patients feel that the hospital has a good reputation and is known for the quality of its services, the likelihood of compliance increases. The same is true when patients are referred to the hospital by local consultants, or Vision Guardians, who are “trained young people who, through door-to-door surveys and other informal means, keep an eye on the eye health of around 5000 people.” However, if a patient goes to the hospital based on a suggestion from neighbors or relatives, there is a lower likelihood of compliance. This may indicate a social learning effect: If the individuals who recommended the hospital to the patient are non-compliant, new patients are less likely to comply as well.

Table 3: Statistical Test of Association—Reasons for Choosing the Hospital

<table>
<thead>
<tr>
<th>Why did you choose this hospital?</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital is well-known for its services</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Referred by local consultants</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Neighbors or Relatives recommended the hospital</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

If your other eye is an operable cataract, why have you not gotten surgery?

Several factors were found to be jointly statistically significant in relation to reasons for patient unwillingness to have cataract surgery on their non-operated eye (with operable cataract) and patient

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compliance. When the patient feels he or she has adequate vision in one eye, no one to accompany him or her to the Secondary Center, other health priorities, or has had no gained vision in the first operated eye, there is a heightened likelihood of non-compliance. The reasons for which the patient does not want to have the other eye operated are similar to those inhibiting post-surgical follow-up.

Table 4: Statistical Test of Association—Reasons for Not Having Other Eye Operated

<table>
<thead>
<tr>
<th>If your other eye is an operable cataract, why have you not gotten surgery?</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate vision in other eye</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>No one to accompany to SC</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Other health priorities</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>No gained vision in the operated eye</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

V. Proposed Interventions

Proposed recommendations will focus on increasing the likelihood that post-cataract surgery patients will attend the third, and last, required appointment for follow-up. Of the 50 non-compliance respondents, all went for the first follow-up, 10 did not go for the second or third follow-up, and 40 did not go for only the third follow-up, which indicates that the last visit is the major reason for non-compliance. Based on the data analysis from Paloncha and Kothagudem surveys and our literature review, we have the following recommendations to reduce non-compliance post-cataract surgery in the two regions.

*Increase the presence of Vision Guardians in both the pre and post phases of cataract surgery to target identified non-compliant groups.*

In the pilot study, we found that initial encouragement from a Vision Guardian was correlated with an increased likelihood of attending all three post-surgery follow-up appointments (5 percent significance). Males, however, were less likely to understand why they needed to attend the third follow-up visit, individuals in the higher age bracket of our sample population were less likely to comply (5 percent significance), and formally educated participants were more likely to be compliant (1 percent significance). Increasing the presence of Vision Guardians, and specifically targeting these populations, may increase compliance rates of these populations, according to our analysis.

The study also determined that when relatives and neighbors are the primary source of information for undergoing cataract surgery, individuals who do get surgery are less likely to comply with postsurgical follow-up requirements (5 percent significance). An unexpected finding of the study, and characteristic we attribute to social learning, may be mitigated by a higher presence of Vision Guardians who are both encouraging patients to seek the necessary care, and providing them with accurate and complete information regarding surgical and follow-up procedures. Finger points out, in his research in India, that patients with successful surgical outcomes can be used to encourage others to participate as well—applied to this study,¹⁹ Vision Guardians may have been cataract patients themselves, and in this case will be more persuasive in encouraging full compliance among new patients.

patients. Finger also mentions the importance of increased outreach in general, which is the primary responsibility of Vision Guardians.20

Vision Guardians may also be useful in the post-cataract surgery phase, to check-up on patients, remind them of the importance of attending all three appointments using customized methods to target males, the elderly, and unschooled individuals. Vision Guardians have a regional presence, and so the same individual may visit a town to encourage cataract surgery, and visit again post-surgery to discuss the importance of scheduled follow-up. This encourages consistency, and helps to build a relationship of trust between the client and the Vision Guardians employed by LVPEI, which may increase compliance rates.

**Promote targeted behavior change campaigns to encourage post-surgery follow-up.**

Behavior change campaigns will be critical in increasing compliance rates and maintaining the excellent reputation of LVPEI. Interventions should target specific groups in the population that have been identified through data collection to have lower rates of compliance. Each group is less compliant for a different reason, and so strategies and tools will be based on the specific issues faced by these populations. Many community-based programs use this technique to transfer knowledge to populations, particularly for desired health-related changes. These targeted behavior change interventions may serve two purposes: to spread general awareness of best practices in eye care to prevent against blindness in current villages where LVPEI works, and to impart information to prospective clients, as well as patients on necessary care post cataract surgery. This type of knowledge transfer has proven most effective in the short-term, and thus may have a larger impact on post-cataract care than on preventative behaviors in the long-term.21 The pilot study showed that individuals who chose the Nava Bharat Secondary Center due to its reputation were more likely to be compliant (5 percent significance). Behavior change campaigns for patients will expose greater numbers of individuals to the services offered by LVPEI, and word-of-mouth praise will then help prospective, current, and former patients to follow recommendations from the eye care center.

The most frequently stated barrier to compliance identified in the pilot study is that patients attended two of the follow-up visits and, due to vision improvement, did not think the third visit was necessary. Behavior change campaigns must explain to patients that, even if they experience improvement in vision, the third visit to the Secondary Center to have glasses fitted is critical to the long-term success of the cataract surgery. Without glasses, vision can deteriorate over time again, neutralizing the effects of the surgery.

The second most frequently stated barrier to compliance is the information gap between patients and doctors. Many patients reported not knowing that they needed to go back for a third appointment post-surgery, and thus attended only two of the three required follow-up visits. Of this group, the majority were males. A behavioral change intervention specifically targeting males will help cataract patients understand the process prior to surgery, including the expectations for post-surgery follow-up, which may increase compliance rates.

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20 Ibid.

Unschooled populations will also need clear oral or picture messages to relay post-surgical recommendations, as most cannot read or write. Of the 50 non-compliant subjects, only 16 percent received formal schooling, so non-schooled patients would be an important group to target in awareness campaigns. Overall, our analysis shows that schooled populations are responding to existing methods, as they are generally more compliant (1 percent significance), however, additional methods such as reminders via mobile technology, posters, flyers, or pamphlets may be more appropriate for this audience. Another example would be to specifically develop communication materials for target tribal populations, who were found to be less compliant overall (1 percent significance), and who are also more likely to be unschooled.

Behavior change programming can also target hospital workers, including doctors and nurses. A prime reason for non-compliance was an information gap between doctors and patients, where patients claimed not to have been told of the necessity of returning for the third follow-up appointment. To ensure that doctors relay all of the necessary information to patients, checklists can be used, witnessed by nurses, to track the information conveyed to the patient, and to make sure all communications are accurate and complete. Doctors and nurses alike are very busy, and despite best intentions, may forget to give patients all the necessary information at times, and a checklist would reduce human error. After doctors or nurses have given instructions for post-surgical care, either the patient or an individual accompanying the patient can be asked to repeat back the requirements relayed to ensure understanding.

Fletcher’s study in rural India indicates that fear of negative post-operative outcomes, including damage to the eye, or lack of improvement in the operated eye, deters potential patients from seeking care. Interventions including full explanations of the process, statistics on success, and stories from individuals who had successful outcomes may reduce this fear, increasing both a willingness to get cataract surgery, and to comply with post-cataract surgical follow-up visits.

**Devise a transportation mechanism for those living far from the eye center.**

The pilot study showed that when interview subjects live farther from the Secondary Center they are less likely to be compliant (5 percent significance). Analysis of the data also identified travel costs as the third most frequently stated barrier to compliance. The development of a transportation system, particularly for those living farthest from the Secondary Center, will both remind patients of the need to follow-up for all three visits when they see the transportation arrive, and provide them with a viable means of transport. The cost structure of this intervention would need to be closely analyzed, as if patients are solely responsible for the cost of transportation, this may prove too expensive. A service subsidized by LVPEI, or free shuttle service would likely have the largest impact on increased compliance, however this would require an additional fixed investment from LVPEI.

Among non-compliant subjects who did not return for a third visit, 100 percent of those who mentioned that they had no one to accompany them to the center were women. Female patients without someone to accompany them to the center were also less likely to have required cataract surgery on their non-operated eye. This is of particular significance, and shows that pre-arranged transportation for women to the center for post-surgery follow-up may increase compliance rates.

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Develop incentive structures for non-compliant patients.
The pilot study determined that paying subjects were more likely to be compliant than non-paying subjects (10 percent significance). An incentive structure for non-paying subjects may therefore increase compliance rates. One incentive already in place is a collaboration with TOMS through their One for One program, which gives one free pair of eye glasses to those in need in developing countries when a pair of glasses is purchased in a developed country. The collaborative approach allows subjects who would otherwise be unable to pay for glasses to receive a pair for free during the third follow-up visit. Non-paying patients may not be aware of this benefit, which could serve as the necessary push for them to attend the last required appointment.

Use mobile telephones to remind patients of the critical nature of the second and third follow-up appointments. Mobile technology use in healthcare is a growing trend globally. LVPEI can take advantage of widespread access to mobile phones in India by sending reminders for compliance visits to a cell phone number provided by the patient prior to surgery. A reminder regarding the purpose and critical nature of the third follow-up can also be relayed via text message through an automated system. The number one barrier to compliance listed by the subjects of the pilot study was that patients went for two post-operative follow-ups, and did not think the third was necessary; this text message would be a reminder of the importance of such a visit as well as a reminder regarding eyeglasses. The second most frequently stated barrier to compliance, based on this study, was the claim that doctors failed to inform the patient of the third required follow-up visit—the use of mobile technology to inform patients of this need, in the case that it was not clear during surgery, might increase patient compliance as well.
February 20, 2014

The Johns Hopkins University Paul H. Nitze School of Advanced International Studies

For use by: LV Prasad Eye Institute

Questionnaire & Data Collection Suggestions

Chimdindu Onwudiegwu, Gabriele Liotta, Hilary Kinka, and Tingting Juni Zhu
Suggested Updates to Barriers Questionnaire

1. **Relocate Socioeconomic Questions**
   - As questions relating to socioeconomic status are often sensitive, strategically placing them at the end of the questionnaire allows for patients to warm to the interviewer before responding, which may increase accuracy of data.

2. **Eliminate Biases in Questions**
   - To avoid the possibility of patients getting influenced by the word choice of the question in formulating a response, questions should be structured in formats such as “Why did you feel the need to attend all of the follow-up visits”.

3. **Clarify Definitions of Questions & Available Responses**
   - Options to questions should be framed in a precise and lucid manner e.g. what constitutes public vs. private vs. own transportation? Perhaps exact modes of transport should be included in this section (motorcycle, private car, taxi, etc.)

4. **Consider Renumbering Questionnaire**
   - Use sequential numbering system rather than starting over from 1 in each new section.

5. **Use Situational Questions to Improve Understanding of Patient Vision Status**
   - For individuals who feel that they do not need to attend additional follow-up appointments due to adequate vision, additional questions can be asked for clarification/a point of reference instead of relying solely on patients’ opinion.
     - Ask questions’ regarding facial recognition- do you have a problem recognizing the face of a person standing near you?
     - Differentiate between daytime and nighttime vision- can the patient see equally well at all times of day?

6. **Recategorize Questions Targeted to Only Compliant or Non-Compliant Subjects**
   - Both compliant and non-compliant subjects should be asked the last two questions of the questionnaire; currently questions are only asked of compliant patients.

7. **Readjust Satisfaction Scale**
   - The current scale used in the questionnaire to judge patient satisfaction- very satisfied, partially satisfied, indifferent, partially dissatisfied, very dissatisfied- does not include the options for “satisfied” or “dissatisfied”. These options should be added to expand the range of options.

8. **Set Ranges for Family Income**
   - Replacing the freeform response for family income with ranges in Rupees may result in more accurate responses and increase willingness to respond to the question.
     - E.g. < 1000; 1000-1999; 2000-2999; 3000-3999; 4000-4999; 5000-5999; 6000-6999; 7000-7999; 8000-8999; 9000-9999; > 10,000.
Suggested Improvements to Data Collection Methods & Fieldwork Operations

**Pre-Interview:**

1. **Ensure Collective Understanding of Interview Questions**
   - Interviewers should review the questionnaire in advance jointly, to make sure that there is a mutual understanding of the interpretation of each question listed to promote uniformity of patient responses
     - Discuss how the form will be filled out as well- check marks vs. specific dates for follow-up visits, or timing for ranking of top three barriers to compliance
     - To identify inconsistencies or questions regarding the survey, interviewers can conduct “mock” interviews on each other. This will help ensure that interviewers have the same understanding of question meanings, and that questions will be phrased in a similar manner when interviewing patients
     - Define all key terms on the questionnaire and create a written reference sheet for interviewers to bring to the field for reference
       - E.g. “Public transportation” vs. “private transportation” vs. “own transportation”- what specifically is included in each category?
       - E.g. Definition of “married” vs. “widowed”
       - E.g. Definition of “satisfied” vs. “partially satisfied” vs. “partially dissatisfied” vs. “dissatisfied”
     - Conduct pilot interviews in a different region to practice how the questionnaire should be asked, and encourage a consistent approach across all interviews

2. **Develop Payment Plan**
   - How will finances be handled, who will pay, and when will payments be made to hired personnel?

3. **Define Roles and Responsibilities of all Team Members**
   - Defining roles and responsibilities of each team member prior to arrival in the field will increase efficiency, reduce confusion, and facilitate team communication.
     - E.g. Who is the team leader? What is the role of investigator and driver?

4. **Standardize Sample Size Calculations**
   - Ideally, sample sizes should be calculated based on the proportion of compliant vs. non-compliant subjects per region. When time and money allow, minimum sample sizes can be calculated for each category and region based on the following formula:
Sample size \( N = \frac{(Z\alpha + Z\beta)^2 \times [p_1(1-p_1) + (p_2(1-p_2))]}{(p_1 - p_2)^2} \)

Where:
- \( n \) = the minimum sample size
- \( Z\alpha \) = standard normal deviation of \( \alpha \) at say 95% confidence level, (i.e. probability of making a type 1 error) = 1.96
- \( Z\beta \) = standard normal deviation of \( \beta \) at say 90% confidence level (i.e. probability of making a type 2 error) = 1.28
- \( p_1 - p_2 \) = the difference between the two groups: x% as an estimate of the compliance rate in the region and x% as an estimate of the non-compliance rate in the region

5. **Formulate Exclusion Criteria for Interviewees**
   - Create predetermined criteria for patients to be included or excluded from the interview process
     - Hearing impaired patients that cannot speak on their own behalf, or inebriated persons should not be interviewed, as the accuracy of responses is questionable
     - Questions regarding patient sight should not be answered by neighbors or family members, as they cannot precisely relay the patient’s vision status
**During Interview:**

6. **Record Interviews for Later Review**
   - Request patient consent to record interviews, as this will allow for interviewers to double-check information at a later date, or refer back to specific interviews, if needed

7. **Develop an Interview Plan by Region/Distance from Center**
   - To ensure that interviewees living at farther distances are reached, on day one of interviews, drive to the farthest site, and progressively work your way back through neighborhoods closer to the clinic or center

8. **Reduce Clustering of Data Points**
   - Interview only one individual per family to avoid clustering samples, as multiple entries from the same family will decrease the accuracy of results
   - Within the same village, the interviewers should attempt to interview subjects from various sections. An effective sample size will be compromised if there is a high concentration of samples from the same section of the same village, as their profiles are likely to be similar

9. **Focus on Details**
   - Check consistency of answers throughout survey
     - E.g. First page of survey shows “RE operated”, and later on in the survey it is indicated that both eyes were operated

10. **Create Environment Conducive to Accurate Interviewing**
    - Facilitate an interview environment that is conducive to providing accurate and thought-out responses, ensuring a degree of privacy
      - Avoid crowds of bystanders around the interviewer and interviewee
      - Assess whether or not the presence of relatives is influencing patient responses
        - Inflation or deflation of family income
        - Failure to give honest answers regarding reasons for which a family member could not accompany the patient to a follow-up appointment
        - Embarrassment in admitting a lack of sufficient funds to cover transportation to and from the secondary care center
Post-Interview:

11. **Review Questionnaires**
   - Check each questionnaire for completeness prior to leaving the household, and ask clarifying or follow-up questions if necessary

12. **Schedule End-of-Day Individual Interviewer Review**
   - Double check surveys for completeness and consistency in a quiet location after interviews, where there will be fewer distractions. If there are inconsistencies or missing values in the questionnaire mark them clearly, and refer to the recordings at a later time to clarify

13. **Schedule End-of-Day Group Debriefing**
   - All interviewers should debrief daily to discuss progress, harmonize interview procedures, share experiences, propose solutions to issues/obstacles, and promote good communication

14. **Conduct Independent Quality Control Checks**
   - To reduce human error, a certain percentage of the total surveys (e.g. 10%) should be reviewed by an independent third party to ensure accuracy; recordings can be compared to survey responses to complete this step

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**Top Three Priorities**

1. **Improve Communication**
   - Ensure Collective Understanding of Interview Questions
   - End of Day Group Debriefing

2. **Reduce Biases in Data**
   - Reduce Clustering of Data Points
   - Create Environment Conducive to Accurate Interviewing

3. **Conduct Independent Quality Control Checks**

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*Based on our observations, the SAIS team has identified these three priorities as those that will make the most immediate and substantial impacts on data collection and fieldwork operations.*
Use of Mobile Technology to Increase Compliance Rates
Overview of mHealth for compliance and implementation strategy for use by LV Prasad Eye Institute

Hilary Kinka, Gabriele Liotta, Chimdi Onwudiegwu, Tingting Juni Zhu

APRIL 2014
SCHOOL OF ADVANCED INTERNATIONAL STUDIES (SAIS), JOHNS HOPKINS UNIVERSITY, WASHINGTON DC, USA
LV PRASAD EYE INSTITUTE, HYDERABAD, INDIA
I. Overview of mHealth for Compliance

In health services delivery, mHealth, which is a component of eHealth, is growing in popularity due to its simplicity and cost-effectiveness in reaching a widespread portion of the population with limited effort on the part of the provider. International Telecommunications Union (ITU) data indicates that in 2010, 77 percent of inhabitants globally owned a mobile phone, and estimates predict that by the end of 2014, coverage will increase to 95 percent. Additionally, according to the GSM Association, 85 percent of the world has access to a wireless signal. Cell phones are pervasive, and a technology that should be exploited to improve the delivery of health services globally. Although no global definition of mHealth exists, the Global Observatory for eHealth (GOe) defines the practice as follows:

Medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices...mHealth involves the use and capitalization on a mobile phone’s core utility of voice and short messaging service (SMS) as well as more complex functionalities and applications including general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems), global positioning system (GPS), and Bluetooth technology.

There are many facets of mHealth, one of which is patient compliance or appointment reminders. Mobile technology has been used to address compliance across multiple health issues, ranging from HIV/AIDS to tuberculosis and eye health.

II. Literature Review

Studies on mHealth and Compliance

While mHealth is a growing area of interest in service delivery less research has been conducted on the impact of the trend on compliance rates. The majority of the existing studies on this topic have emerged from the UK and China with a greater number of disease-specific treatment compliance studies coming from African countries.

In a study currently being conducted in Cameroon by Bediang, Stoll et al, Short Messaging Service (SMS) reminders are used to ensure patient compliance with Directly Observed Treatment (DOTS) regimens. The SMS initiative is widespread, and the

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3 Ibid.
4 SMS Reminders to Improve TB Cure Rate
program falls under the auspices of the National Tuberculosis Control Program, receiving funding from both the Cameroonian government and international donors. Treatment and control groups have been formed, and SMS messages will be sent to the treatment group daily to see if compliance to DOTS regimens will increase as a result of constant reminders of treatment necessity. The current cure rate is at 65 percent, and the study hypothesizes that SMS messaging will increase the cure rate to 85 percent. SMS reminders also served as appointment reminders for the second, fifth, and sixth months. The study was designed as a blinded randomized controlled trial, with the stipulations that the patient must read French or English and own a cell phone for personal use. To make sure participants do not delete SMS messages without reading them after many days of receipt, the messages themselves were updated every two weeks and included encouraging phrases. This study is still in the recruitment phase, and thus has no solid results yet.

In the United Kingdom, a meta-data analysis of 18 surveys—including eight randomized controlled trials (RCTs) and 10 observational studies—was conducted by Guy, Hocking, et al to see if attendance rates for pre-scheduled appointments increased as a result of SMS messaging within either 24 or 48 hours of the scheduled appointment time. A failure to attend health appointments generally has a negative impact on patient health, regardless of the type of ailment. The study found that SMS reminders positively affect attendance rates for follow-up appointments, increasing attendance by 50 percent. This cross-survey review revealed the major causes of patient non-attendance: forgetting, competing employment and family commitments, poor health, poor patient-provider relationships, adverse clinical experiences. SMS reminders mainly targeted “forgetting” and “poor patient-provider relationships” by increasing access to information and opening new channels of communication. Studies that sent reminders via telephone or mail had similar results to SMS messaging in terms of increased compliance. However, these approaches require significantly more manpower, thus increasing the cost in comparison to mHealth initiatives. A closer look at the stratification of results by age category for SMS treatment groups in comparison to control groups reveals a relatively equal impact on all age groups, although a higher percentage of youth owned cell phones overall.

A study by Haotian Lin et al examined the effectiveness of SMS reminders on compliance rates for follow-up treatment post pediatric cataract surgery, and analyzed the impact of SMS reminders on attendance rates in China. Inclusion criteria stipulated that patients be younger than 18 years of age, diagnosed with a congenital or development cataract, and have parents who owned a mobile phone. Illiterate parents were permitted to participate if assisted by a literate partner. Participants were randomly selected and assigned to either the treatment group (including 135 parent-child pairs) who received an

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6 Ibid.
SMS, or to the control group (123 parent-child pairs), who received no reminder. All participants were directed to attend a total of four follow-up visits, which were free of charge. The SMS sent to study participants read (in Chinese):

_This is a reminder of the appointment for routine ophthalmic examination of your child at Zhongshan Ophthalmic Center at _time_ on _date_. Rigorous and regular follow-up is essential to timely and successful management of childhood cataract. Please make your preparations in advance and be on time._

Automated SMS reminders were sent at 10am and 4pm, one and four days prior to the appointment date (four reminders in total). The results show an increase of 47.2 percent for attendance rates in the treatment group, and that on average, three SMS reminders translated into one additional appointment attended by the patient.

In comparison to the SMS approach, Guofu, Huang et al studied the effect of telephonic reminders on increased compliance post-cataract surgery in rural China.\(^8\) The study was conducted in areas with the lowest socioeconomic status in the Western (Yunan) and Northeastern (Qujiang) parts of the Province of Guangdong. Subjects were indentified from the list of post-surgery patients, and considered eligible for the study if they had undergone cataract surgery at least three months prior to enrollment at the county-level eye hospital. Subjects received a phone call to their household to remind them of appointments, and were also exposed to television advertisements and posters encouraging compliance. Study results show that attendance for medium-term (≥3 month) follow-up appointments increased from 20 to 60 percent from the combination of telephone contact and a USD $7 compensation for travel costs.

A study by Koshy, Car, and Majeed tested the effectiveness of SMS-based reminders for hospital outpatient appointments as a method to reduce the non-attendance rates in an inner city London teaching hospital.\(^9\) Participants were chosen from among patients who were due to attend their first ophthalmology consultation during the study period. They were sent an automated SMS reminder one day prior to the appointment if it had been booked within seven days of the appointment date. Patients who received an SMS formed the intervention group, while non-SMS receivers made up the control group. The text message read: "This is a reminder of your appointment at Barts and the London Hospital at <time> <date>. Please call xxxx or reply to text to cancel." The results showed that among patients who received an SMS reminder, non-attendance was 11.2 percent, while the control group non-attendance rate was 18.1 percent. Therefore, the absolute reduction in the non-attendance rate between the intervention and control groups was 6.9 percent. Hence, patients who received a text reminder were 38 percent less likely to fail to attend their appointment.

\(^8\) Huang, Guofu. “Compliance with Follow-up after Cataract Surgery in Rural China” Ophthalmic Epidemiology (2012) 19(2), 67–73.

Challenges to Uptake

While existing studies have found positive results in terms of increasing compliance rates through the use of SMS reminders, there are also challenges to the uptake of appointment attendance that should be noted.

Lack of Research in Developing Countries: One major challenge in assessing the effect of mobile technology on increased compliance is a lack of research in developing countries. Most of the previous studies on this subject have been conducted in developed countries, with the exception of China, and so the value of mHealth in the developing world has yet to be fully explored. As such, additional research, including RCTs and observational studies, accompanied by rigorous evaluation, should be conducted in order to fully understand the complexities involved in mobile technology use in low-income countries.

Technological Challenges: Education of workers on the use of new systems and their intended impact will be critical in ensuring the success of mobile technology initiatives. Outdated medical record systems may need to be overhauled or upgraded to adapt to mHealth initiatives. New systems can create an additional burden for health providers as they have to deal with new channels of patient interaction. A risk of mobile technology is that incorrect information might be sent in error, and thus controls must be put into place to minimize this chance.

Infrastructure Challenges: Infrastructure challenges may occur where there is a lack of mobile reach or where networks are unstable. This generally occurs in many remote areas in developing countries.

Language and Literacy Challenges: SMS reminders must be sent to subjects in a language that they can understand—for example, text messages may be composed in English, Telegu, or a tribal language. Patients with poor reading skills or who are visually impaired may also struggle with SMS messaging. Voice messaging may be a solution to language and literacy challenges.

Legal Challenges: Health records are confidential and confidentiality issues arise when a patient shares a mobile phone, or in the case of loss or theft of the phone. Requiring a patient to sign a consent form acknowledging these risks prior to the receipt of SMS reminders transfers the legal risk from a health provider to the subject.

Spam: SMS and voice-recorded messages may be misinterpreted as spam, particularly when subjects receive numerous advertisements from companies or messages soliciting

business. As a result, patients may ignore SMS reminders or hang up immediately on a recorded voice message.\textsuperscript{12}

**Invalid Phone Number:** Patients may use multiple SIM cards in one phone, or fail to correctly remember their phone number when relaying information to health care providers. Hospitals would then be unable to reach patients with the cell number on file.\textsuperscript{13} Up-to-date information listing all contact numbers for a patient is critical in ensuring that the subject successfully receives an SMS reminder.

**Space Limit of an SMS:** As SMS messages are short by nature, the phrasing of reminders must be kept precise, limiting the amount of information that can be included.\textsuperscript{14}

**Sharing Mobile Phones:** It is common for family members or even neighbors to share a mobile phone, which complicates the dissemination of information to the correct parties, and creates confidentiality issues.

\textsuperscript{12} Bullen, Piroska A. Bisits. "Operational challenges in the Cambodian mHealth revolution." \textit{Journal of Mobile Technology in Medicine} 2.2 (2013): 20-23.

\textsuperscript{13} Ibid.

\textsuperscript{14} De Tolly, Katherine, Helen Alexander, and Cape Town Cell-Life. \textit{Innovative use of cellphone technology for HIV/AIDS behaviour change communications: 3 pilot projects}. World wide web consortium (W3C), 2009.
III. Proposed Design and Implementation Strategy for LVPEI Pilot Study on Mobile Technology for Post-Cataract Surgery Compliance

Overview

Drawing from the results of the Barriers to Compliance study conducted by LVPEI in conjunction with the Johns Hopkins University School of Advanced International Studies in January 2014 and our review of prior published studies on use of mobile technologies for compliance, this implementation study outlines the rationale, approach, and basic framework for a randomized control trial to look at the correlation between SMS and voice-recorded reminders on LVPEI patient compliance post-cataract surgery.

Rationale

LVPEI sees compliance as an important issue to be addressed, and hopes to increase overall patient compliance post-cataract surgery to 95 percent. In India, mobile penetration is less than the global average, with 906 million active phone numbers. While this corresponds to 71 percent of the country’s population, the average number of SIM cards per cell phone holder is 2.2.15 As such, mobile technology for increased compliance will continue to grow as a greater percentage of the Indian population gains access to a mobile phone. Observations made during LVPEI/SAIS Barriers to Compliance study revealed that many cell phone holders might share one phone with family members and neighbors, but that most participants had access to a mobile phone. Despite lower mobile coverage rates currently in India, access to a mobile phone may prove equally impactful on compliance rates. Generally, previous studies have found that mobile phone messaging has been an effective way to improve compliance rates.16

Data analysis from the January 2014 indicated that specific target groups are more prone to non-compliance; a mobile technology intervention may increase compliance rates for several of these groups. The study found that of the 50 non-compliance respondents, all went for the first follow-up, 10 did not go for the second or third follow-ups, and 40 did not go for only the third follow-up, which indicates that the last visit is the major reason for non-compliance. SMS messaging has the potential to target populations missing both 2nd and 3rd appointments, by keeping the follow-up visits at the forefront of patient minds.

SMS messaging may also indirectly increase patient satisfaction with the Secondary Center, as improved communication between the patient and provider will increase the flow of information and overall understanding of the process on the part of the patient. Satisfaction with the Secondary Center is also linked to compliance: the more satisfied a patient is, the more likely he/she is to be compliant.

The LVPEI/SAIS study revealed that unschooled individuals were less likely to comply than formally schooled participants; for illiterate patients who fall under this category,

16 See Literature Review.
voice recorded messages may help them to both understand the timeline for and importance of follow-up visits, and serve as a reminder for pre-scheduled appointments. Tribal groups were found to have higher non-compliance rates than non-tribal groups, which could correlated with level of schooling as well.

The second most frequently stated barrier to compliance is the information gap between patients and doctors. Many patients reported not knowing that they needed to go back for a third appointment post-surgery, and thus attended only two of the three required follow-up visits. In conjunction with superior communication between the doctor and patient at the time of surgery, SMS and voice messaging may help to close this information gap by making the need to return for three mandatory follow-up visits very clear to the patient.

The LVPEI/SAIS study also determined that when relatives or neighbors encourage prospective patients to get cataract surgery, the individual is less likely to comply— a characteristic we attribute to social learning. If a non-compliant patient is giving information to a potential cataract patient, the likelihood of non-compliance increases. Likewise, if patients in a village are receiving SMS or voice recorded reminders for pre-scheduled appointments, there may be positive spillover effects to other patients needing to return for follow-up visits around the same time.

Proposed Study Approach & Design

Objective

To test the effectiveness of SMS and voice recorded messaging on compliance rates for patients post-cataract surgery in rural India using a combination of one or two text message reminders for the 2nd and 3rd required follow-up appointments one day prior to the scheduled appointment date. For the purposes of this pilot study, SMS and voice-recorded messaging will be tested at one Secondary Center.

Participant Inclusion Criteria

• Signed consent form and patient informed of the objective of the study and understands expectation
• Age 18 or older
• Had cataract surgery within one month in either one or two eyes
• Family ownership of a mobile phone
• Ill or hospitalized patients to be excluded

Ensuring the Accuracy of Electronic Medical Records

It is critical that patient information be up to date in the Electronic Medical Record (EMR) system prior to the commencement of the pilot study in order to facilitate post-study analysis. The EMR database must include literacy status, preferred language, hearing and sight abilities, home address including village name, number of follow-up
visits already completed, preferred cell number, paying vs. non-paying status, age, gender, income level, type of housing, mode of transportation to the health center, and distance of residence from the Secondary Center.

**Timeframe**

The pilot study will include rolling enrollment until enough subjects are recruited for both the treatment and control groups. Required follow-up visits occur 1 day, 1 week, and 1 month post-surgery, and so patients in the intervention group will receive one text per follow-up appointment, starting with the 2nd visit.

**Randomization**

Randomization will occur at the village level, with equal numbers of villages served by the Secondary Center falling into each of the two intervention groups, and the control group (1/3 of the total number villages covered by the Secondary Center will fall into each category after randomization). Patients will be required to sign a consent form prior to surgery at the selected Secondary Center, and to confirm that their information on file is up to date. After completing the required paperwork, the patient will be placed in one of three groups: SMS intervention, voice-recorded intervention, and control (no appointment reminder received).

**Study Population: Intervention & Control Groups**

The pilot study will include two intervention groups and one control group.

- **Intervention Group 1:** SMS received one day before appointment
- **Intervention Group 2:** Voice-recorded message received one day before appointment

**Sample Size**

Sample sizes for each of the two intervention groups and the control groups will be calculated as followed:

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17 Please note: Randomization is occurring at the village level to avoid contamination of the results through a social learning effect. Otherwise patients living in the same villages would theoretically be receiving SMS or voice messaging interventions, while other village members in the control group received no reminder. Neighbors and family members are in close communication, and so randomization at the village level avoids the potential positive bias anticipated for compliance rates.
<table>
<thead>
<tr>
<th>Statistical Power</th>
<th>Sample Size Required&lt;sup&gt;18&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6</td>
<td>46</td>
</tr>
<tr>
<td>0.7</td>
<td>60</td>
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<td>0.8</td>
<td>79</td>
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<tr>
<td>0.9</td>
<td>109</td>
</tr>
<tr>
<td>0.99</td>
<td>198</td>
</tr>
</tbody>
</table>

<sup>18</sup> The sample size is calculated based on the assumptions that the current compliance rate is 75%, and we want to increase this compliance rate to 90% through mobile technology, allowing 5% type 1 error. Here is a website that you can calculate the required sample size if you assume different compliance rates, different power, and different type 1 error: [http://www.stat.ubc.ca/~rollin/stats/ssize/b2.html](http://www.stat.ubc.ca/~rollin/stats/ssize/b2.html)

Sending SMS or Voice Messages

A software program will be used to send SMS or voice recorded messages to the appropriate intervention groups after they have been flagged in the EMR database, based on their pre-scheduled appointment date. Messaging will be sent for both 2<sup>nd</sup> and 3<sup>rd</sup> appointments. The language used in the SMS and voice recording will be identical, and decided upon by LVPEI to ensure cultural appropriateness and accuracy of information.

Evaluation

Evaluation will consist of a statistical analysis of descriptive characteristics of the study population and intervention and control groups, and single and multivariate analysis of the intervention effect and levels of significance to assess the effectiveness of SMS and voice recorded messaging on compliance rates for post-cataract surgery patients.
International Development Program
Practicum 2013 – 2014

Deliverables for
Reap Benefit

Bangalore, India
Johns Hopkins SAIS
International Development Practicum with Reap Benefit

Julie Collins, Tendai Madenyika, Julian Osterwalder, Laura Sennett
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Terms of Reference

Terms of Reference given to the Project Team are to:

- Design a framework and monitoring and evaluation (M&E) tool that enables Reap Benefit to capture and measure quantitative and qualitative behavioral changes regarding waste, water, energy and biodiversity.

In carrying out its work and making appropriate recommendations to Reap Benefit, the Project Team will need to pay particular attention to the following pertinent issues:

- Tools used to collect qualitative information on behavioral change.
- Indicators used to measure behavior change.
- Estimating behavioral change in the homes based on knowledge learned at school.
- The impact of the program workshops on school leavers.
- The differences in measuring behavior change in private versus government schools.
- The role of the technology platform in capturing data and measuring impact.
- Indicators that can be used to measure long-term impact.

I) Aim of Project

- The overall aim is to measure the behavioral change of students who took place in Reap Benefit workshops.
- Reap Benefit is able to capture quantifiable measures of waste, water and energy management, however, the Company does not have an understanding of or tools necessary to collect qualitative information of their program impact.
- This study will provide research on students’ understanding of and behavior concerning waste, water, energy and biodiversity at the self, school and home, step out, neighborhood, and community levels.

II) Roles and Responsibilities

- Reap Benefit:
  - Provide timely and continuous feedback during the development of the baseline study and development of the M&E tool.
  - Provide the project group with all relevant information including previously collected data and research reports.
  - Work with project team to develop interactive card game.
• Project Team:
  o Develop an M&E tool, which allows Reap Benefit to continually track the impact of their programming on student behavior.
  o Perform an initial study that will describe the behavior change of students.
  o Provide timely work and observe set time frames.
  o Communicate any questions and progress throughout the entire project.
  o Share all findings and insights with Reap Benefit.

III) Tasks of the Project Team

In Bangalore:
  • While in Bangalore, develop a questionnaire to be used during data collection
  • Collect data at four to five schools (both private and government) through face-to-face interviews with students. The aim will be to interview between 30-40 students.

In Washington D.C.:
  • Review interviews and data collected to develop a written report based on the outcome of the questionnaire.
  • Develop an M&E tool with the following elements:
    1. Redesign existing internal monitoring tool to track interventions in schools
    2. Develop external indicator system to track impact on behavior of students. Develop sub-indicator system to quantify and measure indicators. Modify indicators based on comments and feedback from Reap Benefit.
    3. Design an assessment tool to track behavioral change.

IV) Deliverables

  • Initial report summarizing data collection in Bangalore.
  • Questionnaire used to collect data.
  • Internal monitoring tool tracking implementation of programming in schools and guidelines.
  • List of indicators used to measure behavior change.
  • Focus Group materials
  • Consulting report
V) Time Frame

- The Project Team will conduct site visits with focus groups in government and private schools in January 2014.
- Work on the project will continue over the next five months.
- All deliverables will be completed by the end of May 2014.

<table>
<thead>
<tr>
<th>Date</th>
<th>Study Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>Meeting and briefing with Reap Benefit</td>
</tr>
<tr>
<td></td>
<td>Government School Visits</td>
</tr>
<tr>
<td></td>
<td>Private School Visits</td>
</tr>
<tr>
<td></td>
<td>Review data and information collected so far and check-in with Reap Benefit</td>
</tr>
<tr>
<td></td>
<td>Project team will provide initial report with findings from interviews and</td>
</tr>
<tr>
<td></td>
<td>preliminary recommendations.</td>
</tr>
<tr>
<td>February</td>
<td>Project team will provide initial student questionnaire</td>
</tr>
<tr>
<td>March/April</td>
<td>Project Team will create focus group questionnaire</td>
</tr>
<tr>
<td></td>
<td>Project team will develop indicator system</td>
</tr>
<tr>
<td></td>
<td>Project Team will create monitoring tool</td>
</tr>
<tr>
<td></td>
<td>Project team will write explanatory guides for tools</td>
</tr>
<tr>
<td>April</td>
<td>Presentation to interdisciplinary team and study participants.</td>
</tr>
</tbody>
</table>
Initial Report

Executive Summary

This report provides a summary of the project team's data collection and analysis from interviews conducted in schools that have received Reap Benefit programming. The project team was composed of four graduate students of International Development from The Johns Hopkins University School of Advanced International Studies: Julie Collins, Tendai Madenyika, Julian Osterwalder, and Laura Sennett. The first section describes the data collection and interview process. The second section describes key findings. The third section outlines the challenges and barriers identified by the project team. In the final section, the project team provides recommendations.
Methodology / Explanation of Interviews

The project team used semi-structured questionnaires for this study. A survey was administered to a sample of school administrators and a sample of students participating in the Reap Benefit program. While it would have been preferable to have a random or probability sample, limitations such as the amount of time spent at each school, which students were present that day, and varied interview structures prevented this ideal scenario. Data was gathered over a period of six days, involving nine school visits in Bangalore, and one school in Hosur, Tamil Nadu. Table 1.1 summarizes the schools visited and the number of people interviewed. A complete listing of the questionnaires used for the student, teacher, and administrator interviews can be found in Appendices A - C.

Table 1.1 Summary of Surveys Conducted

<table>
<thead>
<tr>
<th>School Name</th>
<th>School Type</th>
<th>Administrators Interviewed</th>
<th>No. of Students Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>GEAR Innovative International School</td>
<td>Private</td>
<td>Mr. Srinivasan (Founder), Mrs. Srinivasan, Seema (Vice Principal), Rashmi (Academy Coordinator)</td>
</tr>
<tr>
<td>Day 2</td>
<td>Ulsoor*; NJBN*</td>
<td>Government; Government</td>
<td>Mrs. Malathi (Headmistress), [ ] (District Administrator); NA</td>
</tr>
<tr>
<td>Day 3</td>
<td>Sri Kumaran Children’s Home (SKCH)</td>
<td>Private</td>
<td>Ms. Deepa Sridhar (Headmistress)</td>
</tr>
<tr>
<td>Day 4</td>
<td>TVS Academy</td>
<td>Private</td>
<td>Vidhya (Principal), Lithiya (Chemistry Teacher, RB Program Coordinator)</td>
</tr>
<tr>
<td>Day 5</td>
<td>Ulsoor*</td>
<td>Government</td>
<td>None</td>
</tr>
<tr>
<td>Day 6</td>
<td>Parikrma (Jayanagar); Apollo National Public School; Parikrma (Koramangala)</td>
<td>Private; Private; Private</td>
<td>[ ] (Principal); Ms. Radha Sampath (Principal), [Ms. ] (Teacher and RB Program Coordinator); None</td>
</tr>
</tbody>
</table>

Note: *Translation provided by Reap Benefit team members
Key Findings:
- An increase in general ecological knowledge
- Opportunities for demonstrating knowledge through action seem to lead to a stronger comprehension of the subject matter
- A positive reaction from students to gamification, despite reservations from a few teachers
- Despite the increase in knowledge, overall students exhibit a lack of a sense of responsibility towards their environmental surroundings beyond Reap Benefit programs
- Students draw personal inspiration from Reap Benefit’s program coordinators, who constantly challenge them to do good for the environment

1. Ecological Awareness and Knowledge

The Reap Benefit program seeks to move participants through a 4-stage behavioral change process: “Unconsciously Wrong,” “Consciously Wrong,” “Consciously Right,” and “Unconsciously Right.” The transition from a “Consciously Wrong” mindset to a “Consciously Right” one was evident in several students who expressed feelings of guilt associated with non-green behaviors such as littering. A majority of students surveyed mentioned that the Reap Benefit program raised their conscious awareness of environmentally consequential actions such as constantly charging phones or laptops even when batteries are full, and leaving the faucet running while brushing teeth.

Reap Benefit’s program seeks to teach students new ecological concepts, as well as provide context for practical uses of the knowledge they learn in school. Some students expressed a previous awareness of broad ecological problems facing India, and stated that Reap Benefit taught them ways in which they could mitigate these problems through small changes in habits. Additionally, other students mentioned that they already knew about practices such as waste segregation, but identified the Reap Benefit program as explaining why those practices are important in the broader picture.

2. Demonstrations of Knowledge Through Action

Reap Benefit has developed a package of scientific and engineering innovations that conserve water and energy, decompose organic waste, and make waste segregation easier. Reap Benefit’s programs aim to engage students and equip them with the skills necessary to implement these innovations in their schools and homes. Active participation in the implementation process reinforces students' understanding of water and waste management. These activities allow them to demonstrate the ecological knowledge that they have internalized. A majority of the interviewed students could clearly identify how to implement the innovations in which they took part, such as installing aerators, fixing leaking pipes, constructing innovative dustbins, and composting.

A minority of students was able to discuss more complex innovations such as biogas plants, since they had direct experience constructing and using one. Students are likely to take individual action when it is convenient, but admit that they fail to follow best practices when it requires more effort. For instance, most students noted that the implementation of transparent dustbins made them participate actively in waste segregation, which led to an overall cleaner...
environment. However, when the transparent dustbins were removed, the students did not follow up with the school administration to have them replaced.

3. Gamification and Course Structure

Gamification engages students in problem solving through competition, a reward system for completing tasks, and making “green habits” feel more like games. The project team observed that the program’s group activities and gamification prompts students to not only come up with solutions to the various environmental challenges they face in their communities, but to also view themselves as being part of the solution. One student noted, “I see everything as a game now, even at home when I am composting.” In addition, teamwork further enhances the knowledge of students as they cooperate and actively share ideas, as well as challenge each other. Many students indicated that they learn from their peers and actively share their knowledge. However, the project team observed that the competitive aspect of the games sometimes distracts students from the actual learning experience and shifts the focus away from the intended purpose of the game.

Teachers view gamification as an exciting way to instruct students. They appreciate the non-conventional model that focuses on innovative actions rather than merely discussing eco-topics. As one teacher noted, the Reap Benefit programming is innovative in that it takes up issues that are normally not addressed and, “sometimes things that [people] might actually find disgusting." Teachers highlighted that each session introduces the students to new topics and activities.

4. Responsibility Outside of Reap Benefit’s Programs

Since Reap Benefit’s ultimate goal is behavior change at the community level, the next step in achieving that goal is for students to take what they learn from Reap Benefit in school and apply those lessons at home and in the larger community. Reap Benefit gives the students the ability to, “think about solutions as to what can be done” instead of just being bystanders to water and waste management. Students have some knowledge regarding what happens to water and waste at school and in their homes, but only up to a certain point. Even after Reap Benefit programs, students do not know what happens to waste or water after it leaves their sight.

When discussing responsibility for water and waste management, some students indicated that everyone was responsible for waste management in their homes, in that everyone disposes of their own waste. Many students put any further responsibility on others explaining that a family member or maid is responsible for waste removal from their homes. Students from wealthier families speak with their parents about the waste and water conservation techniques that they learn through Reap Benefit, but students from families of a lower economic status reported that they do not share such information. When asked why, students indicated that their families would not listen to them. Private school students indicated that they told their parents about the flow restrictors that they installed at school with Reap Benefit and have now installed them at home. A small minority of students, mostly from wealthier backgrounds, indicated that they have now started composting their wet waste at home.
Challenges and Barriers

1. Spreading Knowledge

Despite an increase in understanding of waste, water and energy management, many students face challenges in actively sharing their acquired knowledge with people outside school. Many students indicate that this is due to their lack of authority within their communities. In particular, students from poorer public schools indicate that they could not share and implement innovations at home or in their community. Additionally, many of these students seem to quickly give in to resistance within their households and/or communities, and do not actively push against boundaries.

2. Responsibility to Take Further Action

Students surveyed displayed an understanding of environmentally positive behavior, but do not feel responsible for always following these practices, be it at school or at home. For example, many students claim to tell their friends not to litter; yet they do not take action to stop them from mixing their waste. When asked why neither they nor their friends segregate waste, students cite reasons such as being too busy or general laziness. Furthermore, when discussing actions that could be taken, students often described them as being the school staff or “someone else’s responsibility.” Two students stood out because they felt that they had already fulfilled what they view to be their obligation, stating that they and their schools had already done enough regarding water and waste conservation. One student, who was highlighted as being a leader in Reap Benefit's program, displayed in-depth knowledge of challenges and solutions to ecological issues, but did not feel personally compelled to change all daily behaviors to fit the solutions.

3. Age

Students from 9th and 10th grades appear to be more uniformly knowledgeable about ecological issues, while those in grades 6th through 8th seem to have more varied levels of knowledge. Many of the younger students involved in the Reap Benefit program seem to grasp the overall concepts, especially those accompanied by hands-on experiences, but are unable to explain ecological interventions in detail. One 8th grade student expressed a feeling of discouragement because “all the good ideas had already been implemented” at the school by the group of older students that had previously worked with Reap Benefit. Interventions that only need to be implemented once have a significant impact on the students who implement them, but less of an impact on subsequent participants because physical actions are important in reinforcing and personalizing knowledge. Therefore, that is why in schools where Reap Benefit has already implemented innovations with earlier classes, they recreate the original conditions in order to teach the same concept to new students.

4. Income

Previously learned behaviors are different for students from lower income and upper-middle income families. Motivations for those behaviors are also different, which affect the outcomes of Reap Benefit programming. The majority of students from higher income families explained that their mothers or maids handle waste and water management in the home.
However, the students from higher income households were also the ones who were more easily able to implement easy innovations, such as installing flow restrictors, at home. Lower income schools, on the other hand, have greater student ownership of innovations at school than higher income schools. These students faced challenges implementing innovations at home, but were more directly involved in everyday water and waste management activities. However, one of the government schools had only one or two students who were clear leaders and took the majority of the responsibility over maintaining innovations such as water filtration systems and biogas plants. If this concentrated responsibility continues Reap Benefit’s interventions may not be sustainable.

4. School Policy and Administration Support

Students face challenges within schools in sharing their knowledge and pushing for innovations. Reap Benefit is aware that different schools in which they work have varying levels of administrative support for their programming, as well as for student initiated ideas. While some teachers and principals stated that anything the students wanted to implement would be pursued, this is not always the case. There is sometimes a disconnect between the true level of influence the students have versus the level teachers and administrators claim. Students noted that their suggestions to school administration are not always carried out. In addition, some schools fail to equip them with the necessary tools to implement innovations and thus share their practical knowledge.

Preliminary Recommendations

- **Documentation**
  - Create a one-pager that clearly explains Reap Benefit programming to potential investors and clients. Key information to include:
    - The overall mission of the organization
    - Strategy and/or plans to reach stated goals
    - A simple model of engagement with students
    - An explanation of gamification and its role in programs
    - Background information of the founders or management team
    - Significant milestones
  - Keep accurate and up-to-date records of program implementation, as well as back-up copies of data, which are accessible to the entire Reap Benefit team
  - Maintain electronic or online copies of data

- **Data Collection to Measure Impact**
  - Use adequate behavior change measurement indicators
  - Employ independent monitoring and evaluation specialists to prevent bias
  - Conduct maximum of 8 annual focus group discussions to measure behavioral change

- **Programming / Continuity**
  - Devise modules for initial school engagements that may vary depending on the demographics of the school, and which can be adjusted for continued involvement. These modules can then be replicated in new engagements
  - Observe allotted time for program activities during school engagements in order to achieve stated objectives
School policy and support affects student engagement and thus program outcomes:
  • Reap Benefit should help students advocate for the implementation of initiatives whenever possible. In addition to providing legitimacy to students’ ideas, this will also demonstrate to the students how critical it is for environmental issues to be addressed.
  • After evaluating the amount of support, be realistic about how far students will be able to carry initiatives forward and/or make lasting changes at their schools, and adjust programming accordingly.
  • When using gamification methods, have a specific set of intended outcomes to ensure students learn, as opposed to just playing games. Either directly or indirectly, each gamification element needs to be connected to the green activity, especially given the limited time Reap Benefit has to work with students.
  • Periodically review and analyze data from monitoring records in order to assess program effectiveness and make any necessary adjustments.
  • Develop or engage a broad base of support from students and administration at government schools, in order to increase program sustainability.

Sense of Responsibility to Take Further Action (Ownership)
  • Include activities that highlight individual responsibility for water and waste management and provide tasks that students can do at home.
  • Possibly role-play what students can do when they meet internal and external obstacles to behavior change.

1 Random sampling: It is preferential to use random sampling when gathering data to prevent selection bias. A random sample is a representative of a larger population because each member of the population has the same probability of being selected into the sample. To have a random sample in this case we would have to have a list of all participants in Reap Benefit programming at a school and interview every 5th or 6th student on the list.

Indicators System

I. Activities & Inputs
Activities & inputs form the base of the impact chain. They refer to the interventions undertaken by Reap Benefit (“Reap”) in addition to the required resources. Activities & inputs are measured through the program-monitoring tool, which is used to collect data after each intervention. Activities describe the type of program and associated content, while inputs measure the costs and materials deployed during interventions. Examples include the following:

1. Number of different engagement programs by subject (waste, water, energy, biodiversity) per school
2. Materials distributed during interventions (e.g. posters, booklets, etc.)
3. Number of Reap staff deployed to interventions
4. Costs per intervention
5. Number of joint events between schools
6. Bangalore districts covered by activities
7. Cities in India covered by Reap interventions

II. Output
Output refers to the quantifiable results of the interventions. They are determined by measuring the number of participants and overall outreach. Similar to activities & inputs, output is measured continuously after each intervention through the program-monitoring tool. Examples include the following:

1. Number of students that participated in interventions
2. Number of schools visited
3. Percent of schools visited in Bangalore
4. Total age groups covered
5. Total number of classes taught
6. Number of classes taught by school
7. Number of students per school
8. Number of students per age group per school
9. Number of long-term engagements
10. Number of short-term engagements
III. Direct Benefit (Outcome)
Direct Benefit measures the overall impact interventions have on students that participate in the Reap program. The main indicators (variables) reflect the structure/logic behind the interventions, which are then measured by quantifiable sub-indicators. Outcomes are measured yearly through focus group discussions.

IV. Indirect Benefit (Impact)
Indirect benefit measures the wider impact Reap interventions have on the population in Bangalore (and/or any other city they operate in). It consists of high-level indicators that do not aim to measure any form of causality, but reflect possible contributions of the programming to the ‘greenification’ of Bangalore over the long term. As a result, they are not and cannot be measured by Reap. Examples include the following:

1. Schools in Bangalore save X amount of liters per year
2. All schools in Bangalore segregate waste
3. Schools in Bangalore save X amount of energy units per year
4. In all schools in Bangalore students actively participate in the segregation of waste
5. Schools in Bangalore are energy self-sufficient
6. Graduating high school students act green (segregate waste, save water, save energy, plant tree and compost)

Background on Indicators

Theory of Reasoned Actions (TRA) / Theory of Planned Behavior (TPB)

According to the above theories:[1]

- Individual behavior is driven by behavioral intentions, which are a function of individual attitudes and subjective norms.
  - Attitudes are the individual’s positive or negative feelings about performing a behavior. These are determined through an assessment of one’s beliefs regarding the consequences arising from a behavior and desirability of these consequences.
  - Subjective norms are an individual’s perception of whether people important to the individual think the behavior should be performed.
- The best predictor of behavior is intention, which is determined by:
  - Attitude toward specific behavior
  - Subjective norms
  - Perceived behavioral control
Theory of Planned Behavior

Behavioral Intention Indicators
Do students indicate / demonstrate active intention to act consciously green?

A. Attitudes
Attitudes are the individual's positive and/or negative thoughts and feelings about performing a particular behavior. These are determined through an assessment of individually held beliefs regarding the consequences arising from a behavior and the desirability of such consequences.

Attitudes towards waste, water, energy, biodiversity:

1. Littering is more convenient
2. Littering is harmful to the environment
3. Littering makes you feel guilty
4. Throwing my waste in a bin is a waste of time
5. Picking up litter and disposing it in the waste bin increases your self-esteem
6. Separating dry and wet waste makes you feel that you contribute positively to the environment
7. Recycling is cool
8. Not separating waste damages the environment
9. Closing the tap after washing my hands is crucial
10. Controlling my daily water usage is important for the environment
11. Saving water is annoying and limits my daily behavior
12. Conserving energy is important because some energy sources are limited
13. Conserving energy is good for the environment
14. We have enough energy, we don't need to conserve
B. Subjective Norms
Subjective norms refer to individual perception of whether people important or close to them think the behavior should be performed. To what extent do students act in a manner their peers or elders would approve? How much would significant others approve or disapprove of their behaviors towards the environment?

Social norms towards the environment:
1. Most people in Bangalore litter / do not segregate their waste
2. Most of my friends and acquaintances think that waste should be segregated and disposed of properly
3. Students who compost, save water, conserve energy, and/or plant trees are a positive example to others (or are the coolest kids at school)
4. Occasionally littering / taking a long shower / keeping the lights on in all rooms is acceptable
5. My parents think that I should conserve energy / not litter / waste water / plant trees
6. My best friend thinks that I should not care so much about the environment
7. My fellow students think I should recycle, separate waste, save water
8. Students who separate waste and recycle are lame

C. Perceived Behavioral Control
Perceived behavioral control influences intentions and refers to people's perceptions of their ability to perform a given behavior.

Self-efficacy:
How difficult is it to perform green behaviors? How confident are students that they can perform green behaviors?
1. I can easily push through innovations for waste separation/water and energy management in school
2. I feel empowered to bring green innovations back home and implement them
3. I am confident that I can easily share my knowledge about green innovations with other students
4. I want to recycle/save water/separate waste/conserve energy in school, and I am confident that I can do it
5. If I decide to adopt green habits, I can do it and stick to them
6. I have often tried to adopt green habits such as waste segregation, but I cannot

Controllability
Is performing green behaviors up to the students? Are there factors beyond their control that determine their behavior?
1. I feel that the environment in my school or home community undermines my ability to introduce innovations for waste segregation
2. I would be more or less likely to litter if I was in a hurry and there was no waste bin in sight
3. I can segregate my waste even when those around me either at home or school are not doing so
4. It is frustrating to conform to green behavior when others around me are not doing so
5. It is easy for me to conform to green behavior when others around me are doing so
6. Being green is a question of personality: those who choose to do so will manage

**Pre-Engagement Questionnaire**

Name:  
Date:  
Date of Birth:  
School Grade:  

**Gamification:**  
1. Who is your favorite person in the world and why?  
2. Name 3 activities or hobbies you enjoy doing:  
   a.  
   b.  
   c.  
3. What are 3 things you are really good at?  
4. Describe a time when you were recognized for an accomplishment:  
   ____________________________________________________________  
5. If we gave you Rs 500, what would you buy for yourself?  
   ____________________________________________________________  

**Ecological Knowledge Check:**  

I. Are you involved in any ecologically friendly activities at school? Yes / No  
   If yes, what? ____________________________________________  
II. Think about the past month. When you had food waste, what did you normally do with it?  
   ____________________________________________________________  
III. How many glasses of water do you think you use on a typical day?  
    ___________________________  
IV. What are the different kinds of waste you produce in a typical week?  
    ____________________________________________________________
V. What do you do with different kinds of waste? ________________________

VI. How many different bins do you have at your home? ______________________

What are they each for? ____________________________________________________

VII. In your home, which activity uses the most water?

________________________________________________________________________

VIII. In your home, what item uses the most electricity?

________________________________________________________________________

IX. Which of these can be recycled? (Circle all that apply)

   a) Banana peel   b) CDs   c) Biscuit wrapper   d) Thermocol

X. The last time you ate a snack, what did you do with the wrapper?

________________________________________________________________________
Monitoring System

Monitoring Tool

See attached Microsoft Excel template.

Key Performance Metrics

- Type of School (Gov. / Pvt.)
- Number of Sessions Planned
- Number of Sessions Completed
- Average Number of Hours per Session
- Total Number of Students in Program
- Average Student Age
- Total Number of Interventions Implemented

Static Questions for Each Engagement Iteration

- Name of Institution
- Type of School (choose one)
  - Public
  - Private
  - Other: ____
- School Address / Location
- Principal Name
  - Phone number
- Teacher Name
  - Phone number
- Other Main Contact Name
  - Phone number
- Group Type (choose one)
  - Class
  - Club
  - Afterschool
  - Other
- Class Level (Grade) of Students
- Number of Students in School
- Number of Students in Group
- Engagement Start Date
- Iteration of Involvement in School
- Iteration of Involvement with these Students
- Number of Planned Sessions
- School Lead / Relationship Manager (from Reap)
Individual Engagement Questions

- Timestamp
- Entry Made By:
  1. Name of the institution
  2. Main facilitator
  3. Co-facilitator
  4. Date
  5. Session number
  6. Hours spent at school
  7. Distance traveled (km)
  8. Hours spent traveling
  9. Other costs incurred
  10. Was the teacher present at the session? (Yes / No)
  11. Number of students who participated
  12. Type of session
      a. Regular Engagement
      b. Step Out
         i. Where
         ii. With whom
         iii. Activity
      c. One-day Engagement / Workshop
         i. Where
         ii. With whom
         iii. Activity
  13. Topic of the Session
      a. Introductory - Ice Breaker
      b. Energy
      c. Water
      d. Solid Waste
      e. Biodiversity
      f. Final Wrap-up Session
      g. All of the above
      h. Other:
  14. Sub-topic of session (if applicable)
  15. Activities
      a. Energy audit
      b. Planting
      c. Install aerators
      d. Creating compost containers
      e. Constructing segregated waste bins
      f. Installing energy saving software
      g. Building / maintaining biogas plant
      h. Other ___________________
Monitoring Tool Guidelines

1. Overview Documents

The monitoring tool is based on an excel spreadsheet prepared for each client. It tracks progress and outcomes of every session engagement. During each engagement session at a client, Reap Benefit’s lead responsible person should collect data by using monitoring sheets (printouts of the engagement questions). These sheets will be used to update the monitoring spreadsheet, and then saved in a centralized file for each client. It is essential for each client to have its own monitoring excel document in order to avoid problems created by large files, which potentially lead to data loss.

2. Overall Process

**Lead Responsible Person, Monitoring**

Reap has to internally appoint a lead responsible person for monitoring activities. Responsibilities include:

I. Creating a centralized digital filing system that stores all the excel files for each individual client

II. Maintaining the central file by making sure that there are no duplicates of excel documents and that file names are coherent

III. Compiling and filing monitoring sheets after each engagement. All hard copies need to be stored in a physical file for each client.

IV. Transfer data for each client engagement session from monitoring sheets into excel

**Instructions for Data Collection and Entry for each Client Engagement Session**

Step 1: Print monitoring sheet for use by the Reap Benefit engagement session leader.

Step 2: Reap Benefit engagement session leader fills out monitoring sheet during/after the session, and delivers completed sheet to the monitoring lead responsible person.

Step 3: The Lead Responsible Person updates the monitoring document for the respective client. Data from the monitoring sheets has to be manually entered into the excel document for the respective client.

Step 4: File monitoring sheets in the respective client folder.

3. Logic of Monitoring System

**I) Summary Sheet**

The Summary sheet includes key performance indicators that Reap Benefit should track to inform program operations. Examples include total number of students in program, total number of interventions implemented.
II) Static Data Sheet
This sheet contains static information about Reap Benefit clients. Data should be entered at the very beginning of the engagement, and updated only when there have been material changes at the client or at Reap Benefit e.g. a change in school principal or client lead at Reap Benefit.

III) Engagement Question Sheet
This sheet provides dynamic information about each engagement session. The engagement session leader will collect data during the session on printed copies, which should then be entered into the monitoring tool immediately after each session by the monitoring lead responsible person. Hard copies of the collected data should be filed in the appropriate folder.
Focus Groups

Focus Group Questionnaire

Introduction

Thank you for taking the time to meet with us today. My name is _________________ and we are working with Reap Benefit.

We would like to talk to you about your experiences with Reap Benefit. Specifically, we would like to know what you and your peers do with waste, water, energy, and biodiversity at school. We will be taking notes to record the information that you share with us. This is not a test, so please answer without any hesitations. All your answers will remain anonymous. [Pause]

GROUND RULES:
1. WE WANT YOU TO DO THE TALKING.
   We would like everyone to participate.
   I may call on you if I haven't heard from you in a while.
2. THERE ARE NO RIGHT OR WRONG ANSWERS
   Every person's experiences and opinions are important. Speak up whether you agree or disagree.
   We want to hear a wide range of opinions.
3. WHAT IS SAID IN THIS ROOM STAYS HERE
   We want folks to feel comfortable sharing when sensitive issues come up.
4. WE WILL BE TAPE RECORDING THE GROUP
   We want to capture everything you have to say.
   We don't identify anyone by name in our report. You will remain anonymous.

Opening:

1. To start, why don't you introduce yourself, tell us who is your favorite celebrity, and one interesting fact about yourself. Purpose: An easy opening question makes participants comfortable speaking in the group setting and introduces participants to each other and the topic.

Introductory:

2. If Reap Benefit were an animal, which animal would it be?
   Probe: What about ______ [that animal] makes it like Reap?
   Probe: [Ask other students] What do you think? How do you agree or disagree? Why did you choose a different animal?
   Purpose: To assess participants' attitudes and feelings about Reap Benefit.

Transition:

3. As a group, physically create a spectrum of school subjects ranking from least interesting to most interesting. [Have students physically put different subjects on the spectrum that you have created.]
Ask: Where do you place Reap Benefit on this spectrum?
Probe: Why did you place Reap here?
[You can have voting on placement. The goal is to create debate/discussion around where different students place Reap, not to create a unanimous consensus.] Purpose: To assess how receptive students are to Reap Benefit’s style of programming.

**Key Questions:**

4. What do you like the most about Reap Benefit’s program?
   Probe: “Can you give an example?” Tell me an aspect of Reap Benefit's programming that was memorable to you. Purpose: To assess which aspects of Reap Benefit’s program are most engaging to the students.

5. What do you like the least about Reap Benefit’s program? Purpose: To identify aspects of Reap Benefit’s program which discourage participation/behave change/positive attitudes. To assess which aspects of Reap Benefit’s program should be modified.
   Probe: “Can you give an example?”

6. Think back to the last time you talked about environmental issues. Please describe that conversation.
   Probe: Where were you? Who were you talking to? What were you talking about?
   Purpose: To assess participants’ feelings of self-efficacy and controllability in regards to knowledge.

7. Can you give me an example of an action that somebody in your class has taken because of Reap Benefit?
   Probe: Do you think there are many people at school who have done something like that? Why or why not? Do you think students who don’t participate in Reap Benefit are more eco-aware?
   Probe: What other Eco-activities take place at school? What could the school do better?
   Purpose: To assess participants’ feelings of self-efficacy and controllability in regards to eco-practices.

**Ending:**

8. What would you change to make Reap Benefit better next year? Purpose: To assess participants’ attitudes towards Reap Benefit’s overall programming techniques (i.e. gamification, casual atmosphere, etc.)
   Probe: “Can you give me examples,” ”Why do you feel this way?”

We are now going to take a 5-minute break so that we can summarize the discussion today. [Invite participants to get a drink/snack. Summarize the discussion points on a flipchart.]

9. Is there anything we missed? Is there anything that you came wanting to say that you didn’t get a chance to say? Purpose: To gather additional data that was not expressed in answering the above questions.
Focus Group Screener

All information collected during the focus group will remain anonymous. Thank you for providing the information below.

Name _____________________________________________

Age ______________________________________________

Gender ____________________________________________

School ____________________________________________

Class/Grade _________________________________________

Focus Group Guidelines

Purpose

• Provide a forum for an organization and its stakeholders to discuss issues and explore subjective matters, such as expectations, attitudes, feelings, behaviors and experiences
• Produce qualitative data - the goal is not to reach a consensus or solve a problem
• Obtain detail about gaps in current programming and inform future decisions
• Conduct focus groups at 8 schools per year

Key Characteristics

The ideal focus group will include the following characteristics: (Create screening document to collect background demographic data on participants.)

• 8-12 participants
• Homogeneous participants, within a 2 year grade level
• Two facilitators; one lead facilitator and one note-taker
• A group interview format
• 1.5-2 hour duration
• Predetermined, sequenced, open-ended questions
Planning Focus Groups

Focus groups require a lot of planning. The following steps need to be followed in determining focus group scope and process:

• Ensure that each group has reasonably similar membership, so that all people feel they have the opportunity to contribute
• Recognize outliers in your group. If students volunteer, your results might have a higher representation of the more outgoing, "natural leaders"
• Use a standard format so that the findings can be reliably interpreted
• Plan and design how results will be recorded, collated, presented, analyzed and communicated

Conducting Focus Groups

1. Preparation

• Ensure the room is comfortable, quiet, and that the seating allows participants to see and interact with each other
• Agree who will take the lead interviewing role and who will take notes and keep time
• Generally refreshments are offered on arrival in all focus groups, but do make sure this doesn’t occupy too much time!
• Ensure consent is freely given

2. General discussion

• Greet each participant and start the session with introductions
• Open by thanking the group for their time
• Introduce yourselves and group members – quickly!
• Restate the purpose of the focus group, the beginning and ending times, and the respective roles of the two facilitators
• Outline any ground rules of the session
• Make a clear statement about the confidentiality of the information provided by participants
• Ask group members to respect confidentiality too
• Ask if participants have any questions before you start
• Explain what will be done with the information after it is collected

During the discussion

• Work through your questions with the group; encourage discussion but keep the pace moving, to be sure you cover the areas you wish to cover
• Paraphrase and summarize long, complex or ambiguous comments. It demonstrates active listening and clarifies the comment for everyone in the group.
• Because the facilitator holds a position of authority and perceived influence, remain neutral, refrain from nodding/raising eyebrows, agreeing/disagreeing, or praising/denigrating any comment made.
• Aim for balance between:
  o Questions as planned and unexpected directions
An individual’s desire to tell their story and the need of the group to fully participate in the discussion
• Positive and negative feedback. If an individual has a horror story to tell, you may need to see whether there are more positive stories of the same service
• Ensure all participants have reasonable airspace; a few suggested techniques:
  o Self-appointed experts: “Thank you. What do other people think?”
  o The dominator: “Let’s have some other comments.”
  o The rambler: Stop eye contact; look at your watch; jump in at their inhale.
  o The shy participant: Make eye contact; call on them; smile at them.
  o The participant who talks very quietly: Ask them to repeat their response more loudly.
• If there is specific positive feedback, record it to pass on to the people involved
• If there is a specific problem aired, take notes and follow up later
• If you begin to run out of time, there are several options:
  o Ask if you can extend the current interview time
  o Work quickly through the key questions in the remaining time
  o Finish before having all your questions answered
  o Allow for follow up feedback to be given – e.g. by email
• Immediately after all participants leave, the facilitators should debrief while the recorder is still running and label all tapes and notes with the date, time, and name of the group.

3. Probing Questions:
When participants give incomplete or irrelevant answers, the facilitator can probe for fuller, clearer responses. A few suggested techniques:
• Repeat the question: it gives more time to think
• Extension and clarification: A question that builds on information already provided or gets further explanation about something already said. Ask when, what, where, which, and how questions
• Laundry list: Provide a list of choice options to the interviewee. This encourages the participant to see beyond a single choice and to state a preference
• Neutral comments: Anything else? Why do you feel this way?

4. Note-taking
• Both facilitators may take brief notes, but one should have primary responsibility for note taking
• Notes should summarize the key points being made by focus group participants
• The note-taker should record comments, as they are happening, to ensure reliability and avoid the need for organization afterwards.
• Avoid bias; ensure comments are recorded accurately and objectively
• Where there is agreement between several group members on an issue, tick the comment by the number of people who agreed (even nonverbally) to it
• Record good quotes verbatim, as they can provide flavor to the report

5. Closure
• Take a five minute break to summarize the discussion on a flipchart
• Spend 10-15 minutes summarizing the key issue raised and key points made
• Repeat what actions will be taken as a result of their feedback, and how this will be communicated
• Thank the group for their time and input

Nonverbal skills:
• Adopt a relaxed open posture
• Look at the speaker
• Listen for attitudes, opinions, or beliefs
• Do not interrupt the speaker
• Use positive, non-verbal communication to prompt the speaker
• Be aware of the speaker's body language and non-verbal communication

Active listening skills:
Active listening is a valuable but underused skill. It basically consists of summarizing your understanding of what the other person is trying to say by:
• Repeating key phrases: ‘more specific information...’
• Summarizing messages: ‘So, what you’re wanting to see here is...’
• Showing empathy: ‘It must have been really frustrating...’
• Repeating your understanding of their comments in your own words
• Asking the speaker if that is correct and for any clarifications
• Making sure key points of the speaker are captured

Assertion skills:
Be clear, firm and respectful when a focus group is not going in the desired direction.
Key assertion skills are:
• I statements – ‘I’d like to move on...’
• Selective ignoring–don’t overuse
• Address the process, not just the content–‘We’re going off the track here.’
Consulting Report

A. Organization and Operations

1. Mission Statement
   Having a clearly written and defined mission statement will protect Reap Benefit from mission drift. The mission statement should guide the actions and decision-making of the organization to reach Reap Benefit’s overall goal. It should target the organization’s key market (clients or customers), describe what services are provided to customers, and describe what makes Reap Benefit’s services unique. Reap Benefit should avoid pursuing projects that are outside the scope of Reap Benefit’s mission statement since resources such as time and money are limited. Each member of Reap Benefit that interacts with funders, clients, or beneficiaries should automatically be able to present Reap Benefit’s mission statement as a pitch.

2. Business Model Canvas / Management System
   Reap Benefit should develop a business model canvas which is dynamic and should inform their operations. The business canvas is dynamic, iterative, and hypothesis driven. The book *The Lean Start-Up* is recommended for further information. The business canvas should include the following aspects:
   - Value proposition
   - Target market
   - Channels
   - Key resources
   - Revenue model
   - Cost structure
   As Reap Benefit grows in size and scope, assigning specific and distinct roles and responsibilities will ensure that the organization runs smoothly. An organization chart that is accessible and transparent to everyone in the organization will provide increased efficiency and accountability.

3. Administrative Barriers
   If Reap Benefit seeks to expand its program (in effect, create franchises) administrative issues will need to be addressed. Reap Benefit should use information learned from prior experiences to improve efficiency. Reap Benefit should track:
   - Budgets
   - Expenses
   - Distribution of hours working on specific tasks
   This will allow Reap Benefit’s management to make decisions based on the organization’s priorities and share that information with others. The key to expanding Reap Benefit’s mission is documenting the lessons learned and being able to communicate them effectively.

B. Documentation

1. Vision and Mission
   It is extremely important the Reap Benefit has a clear vision statement and mission statement. Reap Benefit management must be able to describe the purpose or the organization to various stakeholders, clearly and succinctly. Reap Benefit should create a brief (one page) document that outlines the organization mission and purpose. This should be a visually engaging
2. Document curriculum
Reap Benefit should create standard curriculum modules that can be used for engagements with schools. Because Reap Benefit works with a wide variety of schools with different demographics and different needs, Reap Benefit may need to devise different versions of the curriculum modules. The standard set of modules can also be adjusted and adapted depending on the specific needs of an engagement. These standard modules can then be repeated replicated in new engagements. Creating a standard set of base modules for Reap Benefit programming will help with scale and replicability of the program. It will be easier and less work intensive to enter new schools and new markets if a standard starting curriculum for the different engagements already exists. These starting modules can also be use to show to prospective clients and help Reap Benefit sell its programming by providing a concrete example of what Reap Benefit programming entails.

3. Observation guide
Reap Benefit should produce an observation guide for each school in which it is engaged. The observation guide should be completed before the start of the first engagement with students. The findings of the observation guide should inform Reap Benefit of the level of attention the school gives to energy and water resources. The guide should include the following elements:
   a. Map of school and location details;
   b. Number of staff, teachers, students and relevant responsibilities for each; and
   c. Number of bathrooms, kitchens, taps, bins, lights, computers, fans, speakers and any other relevant elements that concern use of water, electricity, or waste.

4. Data Collection
Reap Benefit should think carefully and critically about any data associated with their programming. Reap Benefit should consider:
   a. What types of data the organization would like to have;
   b. How they are going to collect it;
   c. In what form they are going to collect it; and
   d. How they are going to use it.
If it is Reap Benefit’s goal to measure behavior change and impact, it will be necessary to conduct a baseline study so that initial data is collected before any Reap Benefit programming is conducted. Then, an impact evaluation could be conducted by employing an independent consultant. Because this is a labor intensive and expensive process, it is our recommendation that Reap Benefit attempt to conduct an impact evaluation no more than every two years.
C. Programming / Continuity / Replicability

1. Scalability

When Reap Benefit is thinking about scaling up its programming, continuity and replicability will be very important. Keeping the organization’s overall goal in mind should inform how Reap Benefit’s programs are designed, implemented, and evaluated. As Reap Benefit expands, the organization leadership should consider how to react to competition or other organizations that are replicating the Reap Benefit programming model. The pending technology platform should be used strategically to further Reap Benefit’s overall goals. Reap Benefit should avoid using so many resources on new projects to the detriment of Reap Benefit’s main mission.

2. Incorporating Changes and Updating the Model

Reap Benefit should periodically review and analyze data in order to assess program effectiveness and make any necessary adjustments. Data should be gathered from focus groups conducted with student participants, follow-up surveys with teachers and administrators, and observations made by the Reap Benefit team during programming. This analysis should be reviewed and used to improve Reap Benefit’s programming and organizational design. Reap Benefit should develop and engage a broad base of support from students and administration at schools to increase program sustainability.
Appendix

Student Interview Guide

Introduction
Thank you for taking the time to meet with us today. My name is _________________ and we are graduate students at Johns Hopkins University in Washington, DC and we are working with Reap Benefit. We would like to talk to your experiences with waste management. Specifically, we would like to know what green practices you and your peers follow at school. We will be taking notes to record the information that you share with us. Are there any questions you have for us right now? [Pause] We will begin with some general information about you.

Probing Questions
Use the following probing questions as needed to get respondents to elaborate on or clarify their responses:

- Would you give me an example?
- Can you elaborate on that idea?
- Would you explain that further?
- Is there anything else?

General information

<table>
<thead>
<tr>
<th>Project Team Member(s):</th>
<th>Student name:</th>
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</thead>
<tbody>
<tr>
<td>Date and time of interview:</td>
<td>Number of students in class:</td>
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<tr>
<td>School:</td>
<td>Neighborhood/district:</td>
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<td>Address or precise location:</td>
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</table>

As you may have been told in class, waste/water/energy management is an important activity to help protect the environment. I would like to talk about your understanding of and practices regarding waste/water/energy management at school and home:

1. What do you know about waste/water/energy management?

2. What do you throw away every day? How do you throw it away? If there’s food leftover on your plate, what do you do with it? How much waste do you generate per day? What happens to waste at your school? How can you reduce waste (i.e. the things you throw away)?

3. How do you use water in your school? Is there any place where water is wasted in the school? Can you describe the school bathroom?

4. Where do you obtain information about water/waste/energy management?
   - How much prior knowledge about water/waste/energy did you have before the Reap Benefit program?
5. Who is responsible for waste/water/energy management/collection at your school?
   - What do you do to the waste?

6. What changes have you noticed in your school regarding waste management?
   - Who is responsible for these changes?
   - Have you implemented any innovations in your school regarding waste management?
   - Thinking about waste and water, what are some of the things you do not like at your school? What are some of the changes/improvements you would like to see at your school?

7. What do you do with waste/water at your home? And then what happens to it?
   Are you involved in any waste/water management practices at home?
   - Who is responsible for waste/water management at your home (i.e. who handles waste at home)?
   - Have you implemented any innovations in your home regarding waste/water management?
   - Which ones?

8. What do your friends do with their trash? What do you do when you see your friends litter? What do you do when you see litter?

9. What impact has the Reap Benefit program had on you, your environmental knowledge, and your green behaviors?
   - Have you made any changes in your habits since you have started the Reap Benefit program?

Conclusion
Thank you for sharing all of this information with me. [Now is a good time to clarify or reconfirm responses using statements such as, ‘I want to make sure I understood what you said about ______’].
Teacher Interview Guide

Introduction
Thank you for taking the time to meet with us today. My name is _________________ and we are graduate students at Johns Hopkins University in Washington, DC and we are consulting for Reap Benefit. We would like to talk to you about waste, water and energy management at your school. We will be taking notes to record the information that you share with us. Are there any questions you have for us right now? [Pause] We will begin with some general information about you.

Probing Questions
Use the following probing questions as needed to get respondents to elaborate on or clarify their responses:
• Would you give me an example?
• Can you elaborate on that idea?
• Would you explain that further?
• Is there anything else?

General information

<table>
<thead>
<tr>
<th>Project Team Member(s):</th>
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<tbody>
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<td>Number of students in class:</td>
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<tr>
<td>School:</td>
<td>Neighborhood/district:</td>
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<td>Address or precise location:</td>
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</tr>
</tbody>
</table>

1) How is water/waste/energy managed at your school?
   • **Who is responsible for waste management at your school?**
   • **Where does the school dispose of its waste?**
   • **Has the school conducted a waste, water, energy, or biodiversity audit?**

2) What elements of waste, water, energy, and biodiversity issues are incorporated into your teaching curriculum?
   • **How many times a week/month do you teach these topics?**
   • What problems or challenges have you faced in teaching these subjects?
   • What training do teachers receive regarding issues pertaining to waste, water, energy, and biodiversity management? (How often?)
   • Where do you see opportunities for increased incorporation of green information and projects into the curriculum?
   • What kinds of interventions would you like to see in the future?

3) What green practices are habits among students in your school? What changes have you seen with the engagement of Reap Benefit?
   • To what extent have you noticed students taking initiative to incorporate green practices in the school?
     • **What level of empowerment do students have to implement changes in the school?**
   • Why do you think the students are motivated to participate in these activities?
What are the barriers or challenges that are keeping more students from participating in these behaviors? Is it uncool?

What would be necessary for behavior change to happen? (Or is there room for improvement?)

4) What is the feedback you receive regarding environmental interventions at the school or related to Reap Benefit’s programming? (From parents? local government)

5) In your opinion, what has been the impact of Reap Benefit programming on your students and on your school?

**Conclusion**

Thank you for sharing all of this information with me. [Now is a good time to clarify or reconfirm responses using statements such as, ‘I want to make sure I understood what you said about ______’.]

**Optional Questions**

6) What are some of the challenges or needs specific to your school with regards to waste, water, energy and biodiversity? (Examples may include lack of infrastructure, inefficiency in the city’s public works department, lack of funding, lack of interest from the community, lack of personnel staff to manage these needs, etc.).

How much support (not just financial) to do you receive from government/school board/community/parents to pursue these practices?
Administrator Interview Guide

Introduction
Thank you for taking the time to meet with us today. My name is _______________ and we are graduate students at Johns Hopkins University in Washington, DC and we are consulting for Reap Benefit. We would like to talk to you about waste, water and energy management at your school. We will be taking notes to record the information that you share with us. Are there any questions you have for us right now? [Pause] We will begin with some general information about you.

Probing Questions
Use the following probing questions as needed to get respondents to elaborate on or clarify their responses:
• Would you give me an example?
• Can you elaborate on that idea?
• Would you explain that further?
• Is there anything else?

General information

<table>
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<td>Number of students in school:</td>
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<tr>
<td>School:</td>
<td>Neighborhood/district:</td>
</tr>
<tr>
<td></td>
<td>Address or precise location:</td>
</tr>
</tbody>
</table>

1) How is water/waste/energy managed at your school?
   • Who is responsible for waste management at your school?
   • Where does the school dispose of its waste?
   • Has the school conducted a waste, water, energy, or biodiversity audit?

2) To what extent have there been any changes to school management of water/waste/energy/biodiversity in the past year? Can you please describe these changes?
   • When did your school begin to actively focus on waste/water/energy/biodiversity management?

3) What elements of waste, water, energy, and biodiversity issues are incorporated into the school’s education curriculum?
   • How do teachers emphasize the importance of green practices with their students in the classroom?
   • What training do teachers receive regarding issues pertaining to waste, water, energy, and biodiversity management? (How often?)

4) What role do students have in green practices in the classroom?
• To what extent have you noticed students taking initiative to incorporate green practices in the school?
• What green practices are habits among students in your school?

5) What is the feedback you receive regarding environmental interventions at the school or related to Reap Benefit’s programming? (From parents? local government)

6) What are some of the challenges or needs specific to your school with regards to waste, water, energy and biodiversity?
   (Examples may include lack of infrastructure, inefficiency in the city’s public works department, lack of funding, lack of interest from the community, lack of personnel staff to manage these needs, etc.).

7) Can you describe your school’s long-term plan regarding green practices and water, waste and energy management?
   • Does the school plan to incorporate similar projects to the school overall?
   • How are students involved in these plans/practices?
   • Is there a committee dedicated to the school’s policy on green practices?
   • Do you have any partnership/collaborations with other environmental or similar organizations?

How much support (not just financial) to do you receive from government/school board/community/parents to pursue these practices?

Conclusion
Thank you for sharing all of this information with me. [Now is a good time to clarify or reconfirm responses using statements such as, ‘I want to make sure I understood what you said about ______’].
International Development Program
Practicum 2013 – 2014

Deliverables for
Water and Sanitation Program
World Bank

Washington, D.C.
Rural Sanitation
Market Development: Applying Lessons Learned from Cross-Sectoral Analysis

May 16, 2014

Kayoko Lyons • Mark Radin
Mallory Baxter • Megan Davidow
Executive Summary

Currently, 2.5 billion people are without access to improved sanitation. Despite years of targeted sanitation interventions, progress has been disappointingly slow in reducing this number, especially in rural areas. The World Bank Water and Sanitation Program (WSP) has been working toward closing this gap by supporting private sector entrepreneurs to increase sanitation provisioning.

To create a successful business in the sanitation market, an entrepreneur must overcome a myriad of challenges. These occur at all points along the value chain, from design and production through to creating durable distribution networks. Although numerous private actors are involved in the sector, achieving scale remains difficult and is a significant obstacle to providing reliable and improved sanitation to millions at the bottom of the pyramid.

This report aims to shed light on best practices and lessons learned in overcoming the difficulties faced by entrepreneurs in three sectors similar to sanitation: cookstoves, solar panels, and household water filters. Studying other sectors allows for a wider perspective on strategies for success in selling goods with a public benefit to the bottom of the pyramid.

This study builds on work done by WSP and the IFC on identifying challenges to the private sector provisioning of rural sanitation services. To do this, the authors examined each stage of the sanitation value chain and identified areas of overlap between the challenges facing the sanitation sector and those facing the three target sectors. For each of these sectors, a combination of primary and secondary data from key informant interviews and an extensive literature review were used to conduct a qualitative analysis to identify lessons learned and the best practices to overcoming the diverse array of challenges along the value chain.

A few key observations became apparent over the course of the research. First, no business is profitable only serving the bottom of the pyramid. Firms can reach the lowest quintile through cross-subsidization schemes, vouchers, or through the engagement of social enterprises, but a focus solely on the BOP has not proven to be profitable. Second, behavior change is essential for the engagement of the private sector and is the largest challenge for businesses in their attempts to reach scale. WSP has been focusing on behavior change and rightly so, as it allows businesses to concentrate on marketing their own specific product instead of marketing their sector. Third, those firms that have been successful have had the advantage of well-connected networks and access to advantageous financing. And finally, the private sector cannot solve the scale problem on its own. Numerous organizations interviewed for this report expressed optimism at the role of commercially viable models in reaching a greater number of people, but were also realistic about the limitations of these models without outside involvement.
In light of these observations and challenges, the authors developed eight key recommendations to guide the work of WSP in supporting businesses to reach scale:

1. Plan on a long term time horizon
2. Invest in building linkages along the value chain
3. Design products with input from actors along the value chain
4. Support innovative financing mechanisms for all actors along the value chain
5. Use below-the-line marketing to engage consumers
6. Target low-hanging fruit first
7. Work towards developing a diagnostic tool to assess market characteristics
8. Establish local knowledge centers
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1. Introduction

To create a successful business in the sanitation market, an entrepreneur must overcome a myriad of challenges. These occur at all points along the value chain, from design and production through to creating durable distribution networks. Although numerous private actors are involved in the sector, achieving scale remains difficult and is a significant obstacle to providing reliable and improved sanitation to millions at the bottom of the pyramid.

This report aims to shed light on best practices and lessons learned in overcoming the difficulties faced by entrepreneurs in three sectors similar to sanitation: cookstoves, solar panels, and household water filters. Studying other sectors allows for a wider perspective on strategies for success in selling goods with a public benefit to the bottom of the pyramid. Looking at common challenges faced by the target sectors and sanitation allows for the creation of common, innovative solutions for private sector provisioning of sanitation.

These three sectors were specifically chosen for analysis because of their similarities with sanitation. First, cookstoves, solar panels, and water filters are purchased and used at the household level and, aside from household solar systems, are “push products.” Push products are those where there is low natural demand because the products do not, for example, provide a large financial or social benefit to the consumer. Improved latrines are classic example. They are difficult to sell to populations because the alternative to use of a latrines is free to the individual. In the case of water filters, many households cannot justify the large purchase because the benefits of water filtration are not well understood. It represents an additional cost and does not provide the individual savings or other perceived benefits. Cookstoves face a similar challenge as the health, environmental, and cost-saving benefits of improved cookstoves are not clear to households. Solar home systems are not push products, as lighting is an expressed need of many poor households, but the sector shares many similarities to sanitation because they have high upfront costs and can require expensive, custom installation. Second, while these products are not extremely costly, they still represent a monetary burden for those in the lowest income quintile. Finally, all four sectors are looking to utilize the private sector to achieve scale and create thriving-markets for their products. There has been a wholesale movement away from heavy subsidization to identifying and supporting those approaches with market potential to reach consumers at all income levels.

But analysis shows that, in all the target sectors, including sanitation, businesses are not currently reaching the bottom of the pyramid and scaling-up and making profits is happening very slowly. There are, however, ways to reach the bottom of the pyramid that need to be further explored. These include cross-subsidization, the creation of a vibrant market that can be accessed by the lowest quintile through vouchers, and the engagement of social enterprise firms who consider and quantify benefits other than financial profits. These solutions are not perfect, but are good alternatives to subsidization, which damages markets by selling below cost.
The key observations of this research are first, no business is profitable only serving the bottom of the pyramid. Firms can reach the lowest quintile through cross-subsidization schemes, vouchers, or through the engagement of social enterprises, but a focus solely on the BOP has not proven to be profitable. Second, behavior change is essential for the engagement of the private sector and is the largest challenge for businesses in their attempts to reach scale. Third, those firms that have been successful have had the advantage of well-connected networks and access to advantageous financing. And finally, the private sector cannot solve the scale problem on its own. Numerous organizations interviewed for this report expressed optimism at the role of commercially viable models in reaching a greater number of people, but were also realistic about the limitations of these models without outside involvement.

And this space is where WSP needs to take action. Although there are many challenges, this research has brought to light a great number of successes. Whether it is using creative and culturally appropriate production techniques to appeal to consumers, applying novel financing techniques, or working in new ways through existing networks to reach more customers, businesses are innovating at a rapid pace. Based on these observations from other sectors, this report outlines key attainable recommendations for WSP to support the work of the private sector.

Key recommendations include:
1. Plan on a long term time horizon
2. Invest in building linkages along the value chain
3. Design products with input from actors along the value chain
4. Support innovative financing mechanisms for all actors along the value chain
5. Use below-the-line marketing to engage consumers
6. Target low-hanging fruit first
7. Work towards developing a diagnostic tool to assess market characteristics
8. Establish local knowledge centers

The report reads as follows: In the first section, the value chain for sanitation is broken-down into its discrete parts, problems are analyzed, and solutions from the target sectors are explained. Then, the role of outside actors, including governments, multilaterals and donors, NGOs, corporations, and coordinating bodies, in providing market-based solutions are analyzed. Case studies of specific businesses in each sector that have been successful in scaling or have a unique business model are provided. Finally, key recommendations to WSP are outlined.
2. Methodology

This study builds on work done by the Water and Sanitation Program and the International Finance Corporation on identifying challenges to the private sector provision of rural sanitation services. Their recent report “Tapping the Market: Opportunities for Domestic Investments in Sanitation for the Poor” outlined a number of constraints along the sanitation value chain, that have impeded the scaling of sales in the sector. Some of these challenges are unique to the sanitation market; others have commonalities with a number of sectors that primarily target poor, rural consumers.

The goal of this study has been to examine how a variety of actors (including businesses, donors and NGOs) in related sectors have grappled with and overcome these common obstacles and to apply these lessons to the development of sanitation markets. To do this, the team examined each stage of the value chain and identified areas of overlap between the challenges facing the sanitation sector and the three sectors that are the focus of the study (see figure below).

This approach is innovative in that it identifies and isolates specific challenges throughout the entire process of bringing a good to market. By first drilling down into these specific challenges and then situating them along the value chain, one is able to identify common obstacles to market development in our sectors of interest. To link the analysis back to sanitation the report aligns the challenges and solutions identified in this analysis with the obstacles identified in “Tapping the Market.” Each of the challenges identified along the sanitation value chain are in some way represented by the chosen sectors.
<table>
<thead>
<tr>
<th>Demand side</th>
<th>Sanitation</th>
<th>Cookstoves</th>
<th>Solar Products</th>
<th>Water Filters</th>
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<tbody>
<tr>
<td>Demand Side</td>
<td></td>
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<td>Public good component</td>
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<td>Lack of market demand</td>
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<td>Private health benefit</td>
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<th>Design</th>
<th>Production</th>
<th>Quality Control</th>
<th>Marketing</th>
<th>Sales</th>
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<tbody>
<tr>
<td>Customized product based on price points</td>
<td></td>
<td>Onsite production</td>
<td></td>
<td>Product differentiation</td>
<td>High cost due to needed behavior change</td>
</tr>
<tr>
<td>Customized product based on market needs</td>
<td></td>
<td>Fragmented production</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Mass production needed</td>
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<table>
<thead>
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<th>Supply side value chain</th>
<th>Distribution</th>
<th>Installation</th>
<th>Financing</th>
<th>Maintenance &amp; Warranties</th>
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</thead>
<tbody>
<tr>
<td>High transportation costs</td>
<td></td>
<td>Onsite installation</td>
<td>High upfront cost for consumer</td>
<td>Ongoing maintenance</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td>Unexpected repair costs</td>
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</table>
This study uses a combination of primary and secondary data from key informant interviews and a literature review. This research design is unique in that it did not set out to test a hypothesis. Instead, an inductive approach was used, which allowed for a wide range of insights from the interviewees. To conduct the interviews, open-ended questionnaire were used to guide the discussions. (See Appendix 1) The report contains 30 interviews with individuals from a wide range of organizations in each sector from NGOs, to coordinating actors to the private sector. Each interview lasted approximately one hour. (See Appendix 3 for a list of interviewees)

Organizations Interviewed

<table>
<thead>
<tr>
<th>Cookstoves</th>
<th>Water Filters</th>
<th>Solar</th>
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</thead>
<tbody>
<tr>
<td>o Aprovecho</td>
<td>o IDE Cambodia</td>
<td>o Gates Foundation</td>
</tr>
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<td>o Grameen Gateway</td>
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<td>o Global Alliance for Clean Cookstoves</td>
<td>o Whitten &amp; Roy Consultancy</td>
<td>o Selco</td>
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<td>o SunEast Power</td>
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<td>o Prakti Design</td>
<td>o Basic Water Needs</td>
<td>o National Renewable Energy Laboratories</td>
</tr>
<tr>
<td>o Geres</td>
<td>o UNESCO University</td>
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</table>
3. Value Chain

A value chain, plainly defined, is the “full range of activities required to bring a product or service from conception through the intermediate phases of production to delivery to consumers and final disposal after use.” At its core, value chain analysis is a way to conceptualize the series of relationships in the process of production, theoretically and visually. This section of the paper will examine the challenges identified above at each stage along the value chain. It will discuss common obstacles and highlight ways in which actors in the cook stove, solar lighting and water filter sectors have attempted to overcome them.

3.1 Behavior Change

Behavior change and education is an important step for creating demand for many socially beneficial products, specifically those that impact consumers’ health. Many targeted consumers are unaware that their traditional practices can have negative health consequences. One traditional way to increase demand for a product is to provide public health education. Challenges arise as it is often unclear whose responsibility it is to fund and coordinate such campaigns; while such behavior change is seen as intrinsic to raising demand for products and can be important for private sector development, it is also expensive and often beyond the capacity of small firms.

Altering well-established customs and norms can be a long, expensive and culturally challenging process. The challenge is especially difficult in the case of sanitation, when open defecation has no direct financial cost to the individual. The private sector may be unwilling to engage in such behavior change if there is no clear profit-making opportunity that arises from these investments. Governments, NGOs, and international donors have long worked to educate populations on the importance and value of proper sanitation, however, many people continue to undervalue the service and live without access to a proper sanitation facility. Therefore, without a clear return on investment, behavior change is often insufficiently funded or promoted by entrepreneurs.

Effective behavior change strategies begin with a clear understanding of local knowledge. Before engaging in educational or behavior change programming, it is essential to understand local awareness of public health issues. Often times there is existing knowledge about public health concerns but the population might not be aware of products available to address the problem.

- GERES Cambodia found local adoption rates of their improved cookstoves to be very high because the population was already using a similar, unimproved model. Therefore, the company did not need to engage in behavior change communication, but instead just provided an improved version.
Hindustan Unilever was able to market its Pureit water filter to be “as safe as boiled water” because the target consumers already understood the need for treated water.

Choosing the appropriate strategy for each target market will allow behavior change communication to be more effective. This can take the form of demonstrations, traditional advertising, working through women’s groups, or door-to-door campaigns. The following is a chart listing the common strategies for approaching behavior change:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrations and Marketing Campaigns</td>
<td>○ Mercy Corps was able to introduce its cook stove to the general market in East Timor through television advertisements.</td>
</tr>
<tr>
<td></td>
<td>○ PSI uses radio, newspaper advertisements, posters, point-of-use displays, and shows to promote a number of environmental health products.</td>
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<tr>
<td></td>
<td>○ In Bolivia, researchers found that attendance at a community workshop led to increased usage of solar disinfection technology.² This study also found that radio advertisements and health fairs more effective than radio advertising or working through women’s groups.</td>
</tr>
<tr>
<td>Womens’ Groups</td>
<td>○ Barefoot College works with women from eight different countries to train them how to bring clean water, electricity, education, and healthcare to at least half a million people around the world.</td>
</tr>
<tr>
<td>Village Health Workers and Door-to-Door Campaigns</td>
<td>○ Department of Water and Sanitation in Developing Countries at the Swiss Federal Institute of Aquatic Science and Technology (SANDEC) found that in Nepal “personal appeals through door-to-door solicitation by community workers are generally necessary to procure attendance at training sessions, and follow-up is essential to ensure continued use.”³</td>
</tr>
<tr>
<td></td>
<td>○ In a 2000 field study published in Health Promotion International, Thevos, Quick, and Yanduli shows that motivational interviewing in Zambia effectively increased uptake of the Safe Water System, a water cleansing technology adopted by the United States Centers for Disease Control.²</td>
</tr>
<tr>
<td>Schools</td>
<td>○ CARE Kenya helped lead a pilot project in a school that used teachers to promote water treatment, which resulted in lower rates of diarrhea for school children as well as increased water treatment at homes.⁵</td>
</tr>
</tbody>
</table>
Clinics
- In Haiti, the Jolivert Safe Water for Families project is based out of a local clinic that employs technicians to sell, train, and visit families using the Safe Water System.

Doctors and Nurses
- When an individual is already at a medical facility they are willing to learn more about new products. To maximize the strength of a behavior change campaign companies can take advantage of “a visit to a health facility” as “a ‘teachable moment’ that could help reinforce the health need for water treatment.”
- In Kenya, nurses were trained to incorporate the Safe Water System as part of their trainings.
- In Uzbekistan, SANDEC found success in promoting solar disinfection technology by working with provincial public health units to train nurses who trained district level workers that then trained households on how to use the technology.

Multi-Pronged Approach
- Hindustan Unilever instituted a large-scale campaign that used television, press, and in-store advertising and promotion to educate people on proper hygiene. Concurrently, the company worked in a partnership with the government to run an educational campaign, developed initiatives that focused on children as agents of change, visited mothers to convince them to attend health trainings, and created self-help groups. By 2010, the campaign had reached over 130 million people in more than 44,000 villages.

Sales Approach
- IDE Cambodia, Hydrologic, and their sales consultancy Whitten and Roy Partnership advocate a strategy of making behavior change an integral part of their direct sales strategy.

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**High upfront investment is needed.** These campaigns are expensive and require patience. There is a concern that these costs are irrecoverable for small private sector actors. Additionally, since these campaigns require a significant time investment, entrepreneurs will only likely see returns from the behavior change in the long run, which could make funding these campaigns riskier.

**Selling a product as an aspirational good can serve to change behavior.** Not all respondents have shared the view that behavior change is a critical first step. Many market their products as an aspirational good. (See Section 3.5 for examples.)
3.2 Design

Product design is a crucial component of the value chain. Risk-averse customers will make large capital purchases only if they get a product that meets their unique needs, and quality expectations. Once one bad product hits the market and word spreads, many other households may be turned away, spoiling the market. The diversity of customer needs across various markets makes the design process challenging as it is expensive and often difficult to fully understand each local environment.

A number of existing sanitation products could satisfy public health needs, however, people are hesitant to adopt ill-conceived sanitation solutions. Products and facilities with fragile or hard to replace parts can break down and fail a consumer. Other options may not consider how to dispose of the human waste and therefore only provide a temporary solution. The sanitation products must be durable and consider the entire process of using the facility, cleaning the facility, and disposing of human waste if necessary. If a well functioning technology exists but no one is willing to adopt it, than it does not solve the challenge.

Additionally, designers must consider the cultural environment by considering the needs of different users. Specifically, women may require a wall or barrier around a sanitation facility to feel safe and protected. Therefore, design is extremely important to the sanitation sector.

Multiple rounds of market testing are necessary to develop a commercially viable push-product that reflects local tastes, preferences and culture. Given the inherent challenges of selling a product for which there is little upfront demand it is even more critical to engage in an iterative process perfecting the product with user input. Few organizations succeed on their first try and must engage in extensive market testing that meaningfully utilizes consumer feedback.

- Shell Foundation’s early attempts at entering the cookstove market took at least six rounds of back and forth with a test group of women. Each time a stove met the required benchmarks for Shell based on emissions reductions, the women did not like the stove, so it was redone.
- In India, Grameen Gateway Infra tested 10 prototypes over 12 months, utilizing large amounts of consumer feedback, before they began selling any stoves.
- SELCO has developed more than 14 models of its solar home systems to meet many different user needs. For example, they designed a portable solution for semi-nomadic communities and a notably smaller system especially for highly dense populations. In addition they created rural innovation labs to inform design and seek input from all actors including consumers and installation and maintenance technicians who are often best poised to identify areas for improvement.

Product design must not only consider the preferences of the end user but of the actors along the value chain as well. Although all actors along the value chain are not ultimately using the product, they are responsible for its production and deployment through a region and thus careful consideration must be given to how a product fits with their
distribution channels. Distributors and salespeople are essential links for achieving scale and therefore their preferences for products are important. If a distributor is concerned that product is not durable enough to sustain transportation, than consumers will most likely never even see the good in the market. The actors along the value chain must have confidence that a good will make it to the market and that end-users will purchase the product before they will join the supply chain.

- GERES promoted the sale of a cheaper clay cookstove for rural populations that did not have a metal component like the more expensive urban stoves. Despite not having promoted the more expensive stove in rural areas, they’ve found that it is far more abundant than the cheaper stove because distributors do not like to carry the fragile clay-based stove to remote areas for fear of breaking it and having to pay for the cost.
- Potential Energy, with the assistance of the University of California Berkeley, designed a flat cookstove model, which can be easily stored during transportation and assembled on site. This design clearly reflects the needs of the distributor.
- Literature on the design processes has also suggested that at times, a simplistic technology that relies predominately on locally available products is preferable as it is more easily manufactured and can lower costs.

**A human centered design approach is crucial.** Numerous organizations have cited the priority of putting the user at the center of the development process. One must have a good idea of how a person plans to use a product in order to understand the user experience and create a desirable product. The design process must invite local input on questions of both functionality and appearance. Furthermore, designers must address possible failures of the product. For example, if a cookstove or water filter has a handle, can the handle break? Is it necessary to have a handle? Is the handle replaceable? These questions must be considered throughout the process.

- IDEO worked with IDE Cambodia to develop a locally acceptable water filter that fit with local tastes and performed just as the consumer demanded.
- In Guatemala, international development workers had been promoting the use of chlorination to purify water, yet none of the Guatemalans liked the taste of the chlorine so it was not adopted. Years later, EcoFiltro has had success in selling a ceramic water filter designed by at a Guatemalan Research Institute that better meets the local taste preferences.

**Cooperating with technical and specialized partners can ensure quality and reduce R&D costs.** Many companies are unable to finance the product development process or simply lack the technical capacity to create their own technologies. Instead, they outsource the product design to an expert, often in developing countries. This strategy can also prove beneficial for those products utilizing carbon credits, as the design of the product must be highly technical to ensure the necessary reduction in emissions.
• The Center for Disease Control and Prevention created a chlorine-based water purifier, Safe Water Systems, which was then distributed by many different partners.
• The Central American Industrial Research Institute supported research by Fernando Mazariegos, who produced the basic prototype of a ceramic filter used by Ecofiltro, Potters for Peace, and a number of other organizations.
• Potential Energy partners with the University of California Berkeley to design an effective cookstove. This partnership was established many years ago as Potential Energy has their origins in a university funded project. However, as the organization spun off to build a commercial model, they continue to use the university to design the stove as they do not have the staff capacity to do so.
• EnviroFit is the spin off of a clean energy lab at Colorado State University, which seeks to “unite top-tier energy research with consumer driven product design.” EnviroFit has partnered with Shell Foundation and many other organizations to sell 1 million cookstoves across the world.

## Selco’s Integrated Approach to Design

Selco sees itself as a system integrator. They have worked to slowly to build market linkages between producers, rural banks and consumers, offering a comprehensive package including installation, component warranties and system maintenance to the end consumer. Selco also operates rural labs to foster innovation and bottom up design.

Sanitation designers could benefit from this approach because the sector requires the same linkages. Additionally, product innovation and bottom up design could help address what some interviewees believe as a lack of quality and appropriate sanitation options.

### 3.3 Production

When developing a new product, or entering a new market, firms must choose how and where they will produce. Their options can be characterized by four stylized models: First, firms can import a completed final product that is produced at low cost in another country (for ex China or India). Second, they can import components of a final good but set up a domestic factory to assemble the final product. Third, they can set up a centralized factory to produce domestically if inputs are available. Finally, they can adopt a decentralized model of domestic production where products are made and assembled locally, similar to the mason model in the sanitation market.

**Context is critical in determining which production model will be economically viable.** How a firm chooses its production model depends very much on context – i.e. the specificities of the product, transportation costs and government policy. Economical in-country production requires available inputs, skilled labor, suitable facilities, and favorable government policy.
Model 1: Imported Final Product
Organizations that have opted to import final products, often produced in affiliated Chinese factories, cite quality control, cost reductions, and a lack of local capacity as the principal reasons for their decision.

- Aprovecho decided to source cookstoves from a partner factory in China and ships a packaged product to distributors around the world. They believe that in order to get the health and carbon efficiency benefits, an improved cookstove must be highly standardized and produced in a setting with rigorous quality control. Production in China is the only way they have been able to achieve a high quality product at an affordable price.
- Basic Water Needs produces water filters in a factory in Pondicherry, India and is opening a second factory in Addis Ababa, Ethiopia. From these factories they export the filters to customers across the world.

In sum, this methodology is preferred when there is a steep price discount associated with foreign production, when the domestic market lacks the necessary inputs or technical capacity for production and/or assembly, and when government policy favors importation.

This model is especially important when local markets do not have capacity to produce their own toilets or sanitation technologies. This is particularly relevant as a new generation of plastic products emerge. In markets where plastic manufacturers are unwilling or incapable of producing these products, importing could be an effective strategy.

Model 2: Imported Components, Domestic (or Regional) Centralized Assembly
Rather than importing final products when local manufacturing is too costly or there are insufficient local inputs and technical capacity, many favor a production model where component parts are imported and assembled domestically.

- Potential Energy has successfully implemented the local distribution model. They determined that local production would be too expensive and of a low quality. Instead, they produce flat stoves’ components in India, import them to Sudan where they are assembled at a facility in North Darfur and then distributed through an NGO network. Import taxes were waived as cookstoves were determined to be a humanitarian good, even though the product was being sold rather than distributed for free.

This model is preferred to importing final products by some because it allows an organization to achieve cost savings while also contributing to local economic development and capacity building. This model is not always practical because for example, the upfront costs of creating a suitable assembly facility and training staff might be prohibitively high, or government tariffs might discourage the import of certain goods. It was noted for example that in some countries you could import completed solar lights with low tariffs, but one would face high tariffs if importing only components.
Model 3. Domestic Centralized Production
Domestic centralized production works in environments where inputs and local capacity are readily available, or when cost savings from foreign production are negated by high import tariffs.

- IDE’s Hydrologic has established this model in Cambodia. They have found this model works because clay, the main input is readily available and manufacturing is not technically complex. They purchase the specialized inputs, i.e. plastic components, from another domestic manufacturer.
- BURN Cookstoves has set up a regional manufacturing hub in Kenya with assembly plants in Uganda, Rwanda and Tanzania. They believe that the upfront investment in domestic manufacturing will pay off with cost savings over the long-run. With this effort they expect to create 200 jobs in East Africa and aim to sell 3.6 million cookstoves by 2020.8

If it is possible to achieve a per unit cost that is competitive with foreign imports, this model is preferable from a local development perspective as it allows for positive spillover effects to the domestic economy while achieving economies of scale from centralized production.

Model 4: Domestic Decentralized Production
The decentralized production model does not involve a single firm, but rather a collection of small-scale local actors that build and install at the local level. In the sanitation sector, this is known as the mason model.

This model works in circumstances where there are readily available local inputs, the product is relatively simple to manufacture, solutions must be tailored to highly unique situations, and transport costs are high. Like the domestic centralized model, this manner of production can also create positive economic spillovers at the local level.

- Toyola in Ghana is an example of a semi-decentralized model. They make their Coalpot stove using a franchise model in which self-employed artisans in peri-urban and rural communities make certain components of the device that are then combined with elements that the company itself produces.9 Using this model also allows Toyola to engage the poor in its value chain. For example, scrap metal collectors supply the input directly to Toyola.10
- GERES produces cookstoves locally in Cambodia. When they entered the market, there was already a vibrant cookstoves sector and GERES worked with existing producers to introduce a new improved design. The New Lao Stove then qualified for carbon financing at a competitive price point.

The clear drawbacks to this approach are lack of economies of scale and lack of standardized quality control. In addition, for products with relatively low turnover there is often not enough local demand to sustain an on-going local manufacturing business that relies on one specific product. This may be a real concern for sanitation for which there is not a huge market to begin with.
Government policy can play a critical role in influencing production decisions. National policy has a significant influence on the cost benefit trade-offs between all of these models. Trade policy was the most commonly mentioned point of leverage a government has in terms of incentivizing or discouraging local production. Other policies, such as grants for the establishment or retrofitting of manufacturing facilities, tax benefits for local producers, or specialized training programs, could also have a significant impact on production decisions. Policy coordination may help lower the costs of domestic production and promote positive economic spillovers such as job creation and local market development.

- Lighting Africa noted that importing certain types of inputs for the domestic assembly of solar lighting products is costly in some countries due to high import tariffs. The government maintains these tariffs because they cannot distinguish between, among others, wire to be used for solar lighting versus wire for other purposes. Possible solutions could be tax incentives or subsidies to producers of these socially minded products.
- Potential Energy was able to import without tariffs cookstoves produced in India to assemble in Sudan because they were considered to be humanitarian products.

### Hindustan Unilever’s Production Model

The water filter is produced in one of two factories in India and is then distributed and sold as an aspirational product through supermarkets, retailers or Pureit partners. A centralized production center would enable manufacturers in the sanitation sector to produce a large volume of quality-controlled goods. This is important when solutions require complex production practices and can benefit from economies of scale.

### 3.4 Quality Control

Quality control due to a lack of national and international standards can be a significant obstacle to creating a functioning private market. While firms can adopt their own standards, how can they be enforced? And what infrastructure is needed to ensure quality? Without standardized quality control, poorly designed and produced products can enter the market and pollute perceptions, turning populations away from adopting newly introduced products. Problems affecting quality can also occur during storage and distribution, making it important to consider quality issues along the entire value chain. As GERES noted, customers pay for quality. Without it, the whole system would fail.

**Focus on low-risk products.** While cost is always an issue, even those consumers who are cost-constrained will pay premiums for quality and want to be assured that their product will work as intended. This is connected to the idea of an aspirational good; generally, the poor
want well-designed products, not the cheapest ones offered to them. Given their particularly constrained budgets, the poor are highly risk-averse. Producers should focus on crafting low-risk products instead of cheap ones.

- Hindustan Unilever’s water filter is of such high quality that only 1% of filters have maintenance problems or defects after sale. The product also meets international quality standards and provides a 6-month warranty for any problems.  

**Have company policies in place to assure quality.** But recognize as well that there might be a trade-off between factory-produced goods and artisanal approaches. Local production centers create jobs in-country by employing unskilled labor and build more market linkages than overseas production, but working with large factories can also help bring down costs and usually results in more complex goods of higher quality.

- Burn Manufacturing has an internal quality control manager at their factory. The company also believes that using a factory approach versus an artisanal approach decreases their quality control issues.
- GERES plans to institute a quality control system where managers travel from one production center to another
- Shell Foundation worked with the University of California, Berkeley to create the Berkeley Air Monitoring Group to evaluate its projects in the cookstove sector
- MFIs in Kenya eventually stopped selling solar home solutions because the batteries were de-charging in storage. Batteries must be charged periodically to function and low sales by MFIs led to low turnover, making batteries ineffective when they reached consumers, polluting the market

**Consider setting industry-wide standards.** Though difficult to coordinate, industry-wide frameworks can ensure the whole sector progresses together. Experts suggest it is unlikely that one company can set these standards alone because of fear of bias, but a market coordinator can be successful in this space.

- In the cookstove sector, the Partnership for Clean Indoor Air (which later became part of the Global Alliance for Clean Cookstoves), an industry-led organization backed by the US Environmental Protection Agency, designed a ratings mechanism for cookstove standards. Even though it is only an interim agreement, it provides a basis for future work.

Incorporating quality control into household sanitation infrastructure is especially important because different components of the latrine come from different sources, many of which are artisanal. Without production standards, unskilled labor may result in an inferior product. Additionally, quality control during the installation process is a unique challenge that sanitation faces and should be considered by firms.
3.5 Marketing

Marketing products to the bottom of the pyramid can be particularly challenging given the geographic dispersion and frequent lack of infrastructure channels through which to engage in above the line marketing (radio, television, newspapers). Furthermore, the push factor component of many socially beneficial products adds an additional component of behavioral change to the agenda of marketing departments. Products which require maintenance or upfront financing options make the marketing pitch that much more difficult.

The sanitation sector shares these challenges, arguably to an even greater degree than those sectors surveyed in this report. Where as households may already boil water or use dirty cookstoves – making the sales pitch to switch to water filters or clean cookstoves much easier – in sanitation, many households do not use any form of improved sanitation and instead practice open defecation. For sanitation firms, not only must they try to convince populations to buy their particular product, they must first convince these populations there is a need to use improved sanitation at all.

**Know your customer by gathering vast and deep market intelligence.** Firms often and incorrectly believe that the bottom of the pyramid (BOP) is a homogenous population with identical needs, price points, and preferences resulting in misplaced marketing campaigns and the promotion of unprofitable products. Segmenting the market by consumer ability to pay and preferences is imperative to avoid such pitfalls. In addition, understanding who makes the purchase decision is important as women may be the end user of the product in many countries, yet the financial purchase decision may ultimately rest with the male in the household.

- Where consumers may make purchases based on status rather health benefits, organizations position their products as aspirational goods. In one campaign, Grameen Gateway Infra markets cookstoves directly to the husband, using a slogan devoid of any allusion to health benefit: “Give your wife the modern kitchen she’s always wanted.”
- IDE Cambodia distributed thousands of filters at subsidized rates to reach the extreme poor but the filter became seen as a symbol of poverty, reducing purchase by those customers able to afford it without the subsidy. This experience highlights the power of a brand image.13

For the sanitation sector, a key finding from consumer focused research is that in many markets, individuals are more likely to purchase a sanitation product for the aspirational value it holds compared to its health benefits. Such a finding is crucial in building a marketing strategy that will result in actual purchase.

**Target low hanging fruit first before attempting to reach the very BOP.** A study by Monitor Inclusive that surveyed over 400 business models across Africa and India found that none were profitable serving just the $1 a day population. The same was found for those organizations surveyed for this study. The majority of firms begin by focusing on higher
income, urban populations where they can become profitable, then plan to expand to lower income households as they scale. Where companies are reaching the BOP, it is through cross-subsidized sales models or after profitability has been achieved with higher income populations.

- EcoFiltro uses higher prices water filter sales in urban areas to cross-subsidize the provision of cheaper filters in rural areas.
- After 15 years in business, Selco, a distributor of solar home systems, made a concerted effort to focus on poorer customers who purchase smaller, less profitable, solar systems, resulting in a decline in total revenues.\(^{14}\)

A great percentage of the population without access to improved sanitation lies at the very BOP, thus from a social perspective, deprioritizing this segment appears counter-intuitive. However, to reach this population using commercially viable business models, a long-term vision should be adopted, even if it means first building a market by targeting individuals closer to the top of the bottom 40 percent.

**Utilize established and trusted networks over traditional marketing tactics.** Given the uneven nature of cash flows among poor households, they are often highly risk averse. This suggests that poor households will avoid products which provide unclear benefits or may fail to live up to promised performance. As such, engaging these consumers through trustworthy networks such as community leaders, health centers, neighbors, etc. can be a powerful marketing tactic. Such an approach is believed to instill greater trust in consumers and reduce perceived risk of purchasing products. Many organizations provide income incentives to key figures in communities to help build demand for products. Others, provide free products to schools or health centers in order to expose populations to the product and its benefits through a trusted institution. For sanitation, placing improved sanitation products in schools may contribute to long-term behavior change through younger generations.

To further build trust with clients, many organizations interviewed emphasized the importance of providing public demonstrations that, in particular, highlight the durability of the product as well as its tangible benefits. Many organizations pour water on their products or throw them against the wall to prove they can withstand high amounts of wear and tear.

- Grameen Greenway Infra and Hindustan Unilever both utilize local microfinance organizations to demonstrate and sell products at group meetings.
- Burn Manufacturing works with distributors to do demonstrations to increase word-of-mouth marketing.
- Selco staff perform public demonstrations of solar products in communities at night so they can see the full benefit of the product.

Given the private nature of sanitation product usage, demonstrations may be more challenging to provide; however, creative and culturally sensitive approaches may contribute to reducing the social stigma surrounding sanitation practices.
Customer satisfaction can be the most effective marketing tool. Where studies have shown that a large percentage of BOP customers make purchase decisions based on recommendations from friends and family, it is important to not just focus on making the sale, but ensuring that customers are satisfied post-sale. However, some organizations profiled in a report by Hystra noted that reliance on donor funding often forces the business to only focus on meeting sales goals rather than ensuring the products were being used and benefitted the customers post-sale\(^\text{15}\).

- Grameen Shakti in Bangladesh took an innovative approach to building trust with their clients by providing high-end after-sales services instead of spending large amounts of money on marketing campaigns. Such an approach relies predominantly on post-sale positive word of mouth reviews to build awareness for the product.\(^\text{16}\)
- Husk Power provides potential customers with a model solar panel to test their technology. This has proved to be an effective method of showing people that their product is of high quality\(^\text{17}\).

For the sanitation sector, consideration must be given to the level of cultural acceptance surrounding the discussion of sanitation. Where communities may not discuss such activities, relying on satisfied customers to engage future demand may be less effective.

### SELCO MARKETING AND SALES FORCE INTEGRATION

“Associates” are responsible for sales and marketing and are paid on a commission model. The company relies heavily on word of mouth and product demonstrations to build awareness and demand for their products.

This approach could benefit the sanitation sector by reducing costs consolidating demand creation, marketing, and sales costs.

### 3.6 Sales

While many organizations interviewed utilized retail networks to sell their products in semi-urban and urban areas, the lack of a retail presence in sparsely populated rural areas has spurred the use of direct sales force models. Such models employ local sales agents on both a part-time and full-time basis to go house to house selling one, or several products. This sales model provides local people with income-generating opportunities, increases access to hard-to-reach populations and adds a valuable trust component to the sales process. However, substantial training is often necessary, especially when the product has a health benefit which requires an educational pitch in addition to the sale.

Many of these sales agents hold many other positions, and turnover can be quite high, making investment in training programs very expensive. Building cost-effective sales models for consumer durable goods is even more challenging as households make purchases.
infrequently, and sales teams need to move frequently once a market becomes saturated.

**Choose the sales-force model best suited for the product being sold.** Many different direct sales force models have developed, each uniquely reflective of the local context, desired cost structure and the product being sold.

The following four direct sales force models, each with their advantages and disadvantages, have been highlighted by Hystra:

<table>
<thead>
<tr>
<th>Source: Authors’ summary based on Hystra typologies</th>
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<table>
<thead>
<tr>
<th>Farming</th>
<th>Housing</th>
<th>Shifting Cultivation</th>
<th>Gardening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Product</strong></td>
<td>Products requiring installation and customization $&gt;50000</td>
<td>Simple low-cost products $&lt;20</td>
<td>Complex products requiring consumer education $&gt;500</td>
</tr>
<tr>
<td><strong>Sales Strategy</strong></td>
<td>Bundle equipment and services as package sold out of local branches by full-time sales teams</td>
<td>Full-time mobile sales agents with no branches. Utilize lead generators to determine demand before moving into a market.</td>
<td>Highly specialized full-time sales teams focus on one region at a time until they hit target penetration. Utilize lead generators to determine demand before moving into a market.</td>
</tr>
<tr>
<td><strong>After Sales</strong></td>
<td>Provide frequent follow-up with customer to maintain high after-sales satisfaction</td>
<td>As requested</td>
<td>Sales teams only return to region when replacement is needed</td>
</tr>
<tr>
<td><strong>Branches</strong></td>
<td>Hundreds or thousands of local branches</td>
<td>No branches</td>
<td>No branches</td>
</tr>
<tr>
<td><strong>Clients per agent</strong></td>
<td>Few hundred clients a year per agent</td>
<td>Thousands of clients a year per agent</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>Only model to have reached tens of millions in sales</td>
<td>Potential for success so long as products offered are unavailable to customers. Once products become trusted, retail distribution will take over</td>
<td>Potential for success so long as products offered are unavailable to customers. Once products become trusted, retail distribution will take over</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td>Bundled services after service allow for high enough margins to make model sustainable</td>
<td>Sales agents are able to cover large areas and their mobility allows them to move once an area becomes saturated</td>
<td>Well trained sales teams can provide educational component. Mobility allows for greater coverage once area becomes saturated</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>Limited radius around branches. Lack of mobility once area becomes saturated</td>
<td>Heavy products such as cookstoves require use of expensive trucks. Sales agents may not have trusted relationships with community.</td>
<td>Requires lots of expensive upfront training. Sales agents may not have trusted relationships with community.</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>Gramshakti Solar Home Systems (Bangladesh)</td>
<td>Toyota Cookstoves (Oman)</td>
<td>Pureit Water Purifier (India)</td>
</tr>
</tbody>
</table>

For the sanitation sector, where an educational component at the point of sale to ensure proper usage and installation may be necessary, a farming model utilizing local branches may be most applicable. However, as noted earlier, such models are expensive, especially where rural areas are sparsely populated and consumers are not repeat purchasers. Consideration must be given to whether after-sales service revenues can ensure branch sustainability. Where such services will not cover the cost of building branches, utilization of a mobile sales force may be key to reaching rural populations.

**Minimize sales force turnover by engaging in strong recruitment tactics and providing competitive compensation.** Sales force churn, or the rate at which employees leave after being trained, has been cited to range from 40 to 80 per cent. However, by providing competitive compensation packages and offering full-time positions where possible, churn can be reduced. Consideration of the product sale lifecycle must be given in determining pay structure, as customized products require longer sale lead times, necessitating a fixed, rather than commission based, salary. Hiring through recommendations from strong sales agents and clearly explaining the responsibilities of the job upfront have also been shown to reduce employee turnover. Furthermore, maintaining a low sales agent
to manager ratio has been shown to reduce turnover significantly, even though it increases staffing costs. Hystra’s study cites 7 agents per manager as the ideal based on their research.

- SELCO solar provides attractive compensation packages for their employees, offering a fixed salary coupled with sales based incentives. As a result, they’ve managed to maintain sales churn figures less than 10%, compared to industry averages between 40-80%.
- Hystra study of 15 leading consumer durable firms showed that sales force turnover was 48% for part-time employees and 22% for full-time employees.

**Use commission-based lead generators to increase efficiency of mobile sales.** Many organizations using a mobile sales teams select an individual or NGO to stir up demand for a product, or aggregate orders, prior to deployment of a full sales force team to a region. These individuals can also collect payments to save time for mobile sales teams and in return receive commission, usually 2-3% of sales. As retail networks reach more rural areas, they can help play this role. For now, it remains in the hands of individuals or NGOS.

- Toyola cookstoves in Ghana is a leader in utilizing what they call “evangelists” to promote their product and ensure there is sufficient demand prior to a sales team entering the community. Toyola uses 100 commission-based evangelists per cookstove vender, most of who are satisfied early adopters of the cookstove. As noted earlier, Toyola cookstoves was only one of 2 profitable businesses of 285 surveyed in Africa by Monitor Inclusive that utilized a direct sales model. Part of their success has been attributed to the efficiency gained by using their evangelists. Plus, while firms selling just one product may find it hard to break even, the benefit is that with specialization, sales forces become highly effective at their pitches.

- EcoFiltro in Guatemala also uses part-time sales agents to aggregate at least 25 families wishing to purchase a ceramic water filter before EcoFiltro will enter the village and sell their product. These part-time agents must be based exclusively in their own community and are overseen by a team of field coordinators.

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**EcoFiltro’s Sales Force**

The community entrepreneurs must find a minimum of 25 families before EcoFiltro will come to an area. The local entrepreneurs collect payments themselves. Each entrepreneur works part-time and can only work in their home community to maintain trust in the system. Community sales agents are hired and trained by field supervisors (as of 2014, there were 5 supervisors throughout the country).

This model is particularly appropriate for helping the sanitation sector expand its reach in rural markets.
3.7 Distribution

Achieving cost effective last mile distribution is a challenge for all the sectors in this report. The IFC estimates that distribution can account for up to half the final cost of a solar lighting product in certain markets in Africa. The importance of the problem was well summed up by a respondent who observed that “whoever cracks the distribution problem will be the winner.” Like production decisions, the choice of an appropriate distribution model relies heavily on context. The IFC’s 2012 Lighting Africa Report outlines five basic distribution models and discusses their benefits and drawbacks in various settings.

<table>
<thead>
<tr>
<th>Distribution Model</th>
<th>Product range</th>
<th>Company gross margin</th>
<th>Marketing</th>
<th>Distribution / Logistics</th>
<th>Last-mile sales</th>
</tr>
</thead>
</table>
| Distributor - Dealer Network | Bread range of complimentary, competitive and sometimes unrelated products | 10-40%               | Materials company | Logistics: distributor   | Final sales: handed by dealer  
Product financing: informal
After-sales support: distributor |
| Own distribution / Direct-to-Consumer | Exclusive to company           | 20-50%               | Materials company | Logistics: company      | Final sales: handed by sales team  
Product financing: rarely formalized
After-sales support: sales team |
| Institutional Partnership | Typically exclusive or limited to other value-added products | 10-30%               | Materials company | Logistics: shared       | Final sales: handled by partner  
Product financing: if partner is a financing institution (MF, SHG network, etc.), rental/charging kiosk model is optional
After-sales support: partner |
| Franchise                | Exclusive to company            | 10-30%               | Materials company | Logistics: company      | Final sales: handled by franchisee  
Product financing: rarely formalized
After-sales support: franchisee |
| Rental/Leasing System    | Typically exclusive or limited to other value-added products | 10-30%               | Materials company | Logistics: company      | Final sales: handled by leaser  
Product financing: rental model enables small cash payments
After-sales support: leaser   |

Source: IFC Lighting Africa, 2012
The majority of organizations interviewed for this report have either used some variant of the distributor-dealer model, leveraging existing networks to lower costs and expand their reach, or a direct-to-customer model, making significant up-front investments in establishing their own proprietary distribution networks. As the sanitation market is in early stages of development in many places, it might be useful to explore the potential of the institutional partnership model and the owner distributor model. Many of the companies surveyed here have found that the owner distributor model has high upfront costs but significant advantages in the long run.

**Leveraging existing networks can be an effective way to rapidly reach scale…**

Many organizations partner with NGOs, MFIs or existing private sector multi-product distributors to penetrate hard to reach markets and achieve last mile delivery of their products. The IFC notes that there is a rising trend of distribution through multi-product distributors that work with multiple manufacturers. This methodology lowers costs and obstacles to achieving scale (such as a lack of market intelligence) by working with groups already active with the target customer base.

- Potential Energy partners with the NGO Sustainable Action Group as well as smaller community based organizations (CBOs) to distribute cookstoves in Sudan. The CBOs acted as ‘on the ground’ informants and helped to transmit market information to Potential Energy. These strategic partnerships allowed Potential Energy to branch out in new regions.
- Greenway Grameen (cookstoves in India) has used partnerships with retail shops (approximately 25-30% of their sales) and with MFIs (remaining 70-75% of sales). They report considerable success in partnering with MFIs that have direct access to a group of receptive potential customers who have access to finance.
• Aprovecho’s model is one that builds on distribution capacity that already exists in a market. They see their role as coordinators, identifying a plausible network and bringing together a variety of actors to bring their product into the existing system.

... but, for this model to work, picking the right partner is critical. Many respondents expressed mixed views on whether using already existing retail channels can create scale in a sustainable manner.

• The IFC Lighting Africa noted that a significant problem with retail distribution networks is that local community retailers often carry high-turnover, low value, products. Stocking the inventory of high-value, low turnover products is not feasible in many cases due to lack of credit for high value inventory, storage/security problems, and lack of marketing capabilities.

• While microfinance is often critical to driving sales, MFIs have had a mixed record as distributors. Problems include a lack of specific product knowledge, long loan processing times and high interest rates.

• Further, building a market that is sustainable over the long term often requires having an on the ground presence in communities. A physical presence and long run relationship builds trust as well as facilitates maintenance and repairs.

Forging a new distribution network is costly and takes time but can bring benefits in terms of scale and sustainability over the long run. Building a business model that incorporates a direct sales relationship to customers is costly and time consuming. Two organizations that have made the upfront investment however have seen notable payoffs over the long run.

• Selco has worked for 15 years in India on building up an entire ecosystem around their product. They have created a branch model that provides a holistic service to their customers. Marketing, sales, installation and service are all managed locally through their network of 40 local energy service centers. While there was a significant learning period, this model has allowed Selco to reach the most remote communities profitably.

• When IDE Hydrologic started operations they used NGOs to distribute the water filters that they manufactured. To reach scale and create a sustainable model they invested in training a direct sales force. While they still uses sales to NGOs to target the very bottom of the pyramid, Hydrologic does the majority of its business through its own direct sales distribution model.
3.8 Installation

While cookstoves and water filters do not generally require installation, a few surveyed organizations sell customized solar systems that require customized home installation. Installation is a high cost, low margin service, but when needed can be critical in terms of optimizing consumer use and satisfaction with the product.

Having a physical branch network facilitates cost-effective installation. Organizations that provided effective installation services most often maintained a physical presence in the community, via a large branch network.

- Selco, a self-described “systems integrator,” works with different suppliers to source different parts, then interfaces with the user and offers a complete package. Therefore, the technician installing the product can make alterations based on their local expertise.
- Grameen Shakti, another solar company, also installs their product in homes. They have over 1000 branches in Bangladesh and each branch generally has two technicians employed by Grameen Shakti that install and service the product.
- Temasol, a solar home system company operating in rural Morocco, trains consumers during the installation process which helps to avoid simple maintenance problems. They use the same technicians to install and maintain the systems, which brings down training costs.

Installation is one of the largest barriers to successfully scaling a business in the sanitation sector, as it is necessary, but expensive. Using a branch system allows firms to lower costs in installation, while also employ skilled technicians to properly install the product. Post-sales servicing can also be provided by the network, increasing demand for technicians. However, as mentioned in Section 3.6, this model is costly given the one-time purchase nature of sanitation products. More research can also be done on producing solutions that are easy for consumers to install on their own, thereby eliminating this cost, as sanitation infrastructure is not as technical as products in the solar sector.
3.9 Financing

3.9.1 Consumer Financing

The high upfront cost of many consumer products can often impede purchase by those with low and volatile incomes. Purchasing decisions are further complicated for those products that lack immediate and tangible financial savings, paying returns through health benefits over time. Sanitation products in particular face the challenge of providing products that are seen as a financially viable investment for low-income populations. The alternative to purchasing a toilet is open defecation, which costs nothing. Additionally, the individual health benefits of improved sanitation may fail to materialize if the user is not washing their hands or no one else in the community is using improved sanitation.

To address this obstacle, many businesses surveyed have pursued partnerships with pre-existing microfinance institutions (MFIs) or built in-house financing mechanisms to offer their products on credit. Both strategies have their strengths and weaknesses depending on the product, firm and local environment.

Where available, partnerships with local financial institutions can be beneficial if done correctly. Given the higher cost of their products, the cookstove and solar sectors have had more success in partnering with MFIs as the cost of servicing very small loans deters many financial institutions. Those organizations that have benefited from partnerships with MFIs frequently cite the value of aggregating demand at a single point to reduce marketing costs. Local financial institutions often also have an established relationship with individuals in the community, allowing them to more easily evaluate credit risk than a cookstove or solar provider would be able to. The practice of bundling loans for multiple products can also simplify the process for customers and increase the incentive to make timely payments. On the other hand, bundling loans makes it more challenging to ensure the loan it is being used for its intended purpose.

- Grameen Greenway Infra has been successful in increasing sales by pitching their cookstoves during group lending meetings where individuals are already gathered, engaged and listening.
- Selco went beyond partnering with local MFIs and sought to work with rural banks in order to increase the loan size and tenor and lower interest costs for their clients.
- MicroEnergy Credits, an organization which helps microfinance organizations offer energy lending programs, offers a package which includes a solar light, a cookstove and a water filter at a price that allows consumers to pay back over 8 months.

Despite the benefits, many organizations have cited the following challenges in working with MFIs:
Low volumes of sales in rural areas can make adoption of lending programs for consumer durables economically unattractive to MFIs.

An absence of MFIs in rural areas limits partnership potential.

Some clients feel social pressure to purchase a product during group meetings, often leading to diminished product usage post-purchase.

Abundance of paperwork makes loan processing times lengthy and arduous.

In some MFI partnerships, the MFI requires the organization to collect on bad loans. However, many consumer good providers do not have experience with loan collections, making such programs unattractive financially and operationally.

For some, these challenges have meant a strong emphasis on finding the right financial partner, often one with technical experience in the consumer product sector to begin with. Such partnerships benefit from a clear and mutual understanding of the roles and responsibilities of each party.

Grameen Shakti in Bangladesh utilized the expertise of sister organization, Grameen Bank to build a platform allowing consumers to pay for their solar home systems (ranging in price from $115 to $840 as of 2012) in a wide range of installment plans, with rates varying on the size of the initial down payment.20

**Donor financed revolving loan funds can provide capital in challenging operating environments.** In those locations where MFIs may not operate or the ability to find a suitable partner is limited, external donors have provided the capital necessary to start in-house lending programs.

Given the restrictions on capital flows in and out of Sudan and the lack of MFIs operating in the Darfur region, clean cookstove provider, Potential Energy, received a pilot grant from the Global Alliance for Clean Cookstoves (GACC) to start a program that allows distributors to originate loans themselves. The program is still in its early stages of development, but management says the results look promising so far.

**Internally subsidized in-house financing platforms facilitate credit access in a sustainable way.** Seeking to develop a more commercially viable and sustainable mechanism for providing credit to their customers without the help of a microfinance organization, some organizations have constructed innovative internally subsidized models to free up capital for those who need loans.

Guatemalan-based EcoFiltro sells their ceramic pot water filter at a higher price point to its urban customers in order to subsidize the cost of providing a lower priced filter and payment program to its rural customers (see Case Study 6.2).

Toyola cookstoves in Ghana sells their cookstoves at a higher price to those individuals wanting to use the in-house payment plan in order to cover the extra costs of the credit program.
Some sanitation models have offered installment options for consumers but encountered problems with non-payment. Organizations such as GERES with their association-based financing mechanism (see Section 3.9.2), have also dealt with non-payment issues. However, such obstacles do not suggest the programs should be abandoned all together, but rather organizations may need increased capacity in building a strong underwriting framework. External actors may play a role in providing such technical training.

**Creative use of mobile technology can complement existing models.** With the proliferation of mobile phones in developing countries, creative use of mobile phones and mobile data can facilitate innovative business models to improve financing options for consumers.

- M-Kopa, a mobile money provider in Kenya, allows users to pay as they go for their electricity usage by sending in payment on their cell phone. Once they’ve paid, they receive a code which they can input to active their solar panel. Such a model can reduce the labor costs associated with collecting on loans or repayment plans.

### 3.9.2 Value Chain Financing

The growth of the impact-investing sector has ensured that a large amount of capital is available for those wishing to target the bottom of the pyramid population. However, many investors still view many social businesses as highly risky, and thus require a proven track record, multiple years of financial statements and a financially savvy management team as minimum requirements to investment. Given the scarcity of businesses with such credentials, lots of capital is flocking to a small subset of fairly established businesses. Thus, many young businesses still struggle to access finance at the seed and early growth stages.

Furthermore, there exists a lack of finance for those along the value chain as investors frequently target the larger, high profile entrepreneurs at the end of the value chain. Many distributors and manufacturers also cite a need for working capital lines and trade finance to support the growth of their operations. Such challenges are similar to those seen in the sanitation sector where many entrepreneurs use their personal or family money to invest in expansion as they do not have access to traditional banking products.21
Impact Investing Landscape

Early stage grants and technical assistance programs can help make businesses more investor friendly. Many management teams have a potentially scalable business model but lack the experience and expertise necessary to prepare for and solicit a formal financial investment. Some international donors have played an important role in providing early stage grants tied to more stringent restrictions in line with traditional non-philanthropic investors. By having to provide financial statements, large volumes of program data, or formalized operating policies and procedures even to receive grants, organizations can become more investor-friendly.

- The Global Alliance for Clean Cookstoves (GACC) launched a pilot innovations fund in which they provide early stage growth capital to test new initiatives. Grameen Greenway Infra received a pilot grant and has stated that the approval process they went through with GACC forced them to tighten up operations and as a result, they feel better prepared to reach out to traditional investors going forward.
- Shell Foundation partnered with First Light Ventures in India to create a business accelerator for energy and basic service sector businesses. The accelerator provides business development training as well as seed capital of up to $400k. Shell Foundation also established a credit fund in India with IntelleCash, to provide up to $250k for small businesses that do not have a financially sustainable track record or substantial collateral to make them attractive to traditional banks.  

Innovative externally coordinated financing arrangements can temporarily help to fill the financing gap. As market-based financing options for the missing middle continue to
develop, external actors can play an important role in supporting innovative financing mechanisms to secure funding for actors along the supply chain.

- **Carbon credit financing:** Many cookstove and water filter organizations have built businesses models on carbon credit financing. GERES managed the technical monitoring necessary to qualify for carbon credits that facilitated the sale of 2 million cookstoves (see Case Study). Caution must be exercised in becoming overly reliant on this volatile, yet substantial, funding source as some organizations have gone under as carbon prices fall. Though not necessarily applicable to sanitation, carbon financing highlights the need for outside of the box thinking when it comes to financing sources.

- **Loan-loss guarantees:** The Global Village Energy Partnership (GVEP) piloted a program in which it placed $100,000 across five financial institutions in Uganda, against which the institutions can lend up to $200,000 for energy related business which would have not been financed otherwise. The deposit acts as a 50% guarantee on loan losses. GVEP also mentors loan recipients on business and financial topics.23

- **Association-led financing:** An association of cookstove manufacturers and distributors was established by GERES to overcome value chain fragmentation. GERES noted many value chain actors needed financing but were too big for MFI yet too small for commercial banks. For several years, the organization used carbon-financing revenues to provide interest free loans to association members. Recently, they ended this program and created a group savings financing model through which members may borrow to support the expansion of their production or distribution business. Of the 300 association members, 50 contribute savings and are then eligible to receive near 0% interest rate loans. The other 250 members can borrow but at a higher rate. Currently, GERES is exploring ways to improve the repayment rate of the program.

- **Creation of multi-party financing ecosystem:** In Mongolia, the Asian Development Bank and Millennium Challenge Account coordinated a program in which Xac Bank, a microfinance institution, provides loans to both cookstove manufacturers and households wishing to purchase the cookstove. Carbon credits are also used to offset the costs of the program with the help of MicroEnergy Credits.24

Though carbon access is not an option for the sanitation sector, other such innovative financial arrangements may expand access to credit where the market does not. In markets characterized by many small local entrepreneurs, it may be advantageous to explore savings and loan programs within the framework of a local association.

**Improvement in market intelligence and data aggregation may help broaden investor pipelines.** As much of the capital is flocking to the same small universe of high-profile businesses with successful track records, there very well may exist many lower profile businesses with potentially scalable models that are just not on the radars of investors, the creation of a data platform, such as MixMarket for microfinance organizations, could facilitate more investment in the sector.
Hindustan Unilever Pureit - IVDP Microfinancing Model

Source: Author’s creation based on IFC case study

EcoFiltro and Cross Subsidization

To reach rural populations, EcoFiltro has an in-house financing platform, which is subsidized by the sale of its filter at a higher cost (3 models ranging from $60 - $150) to urban populations. Rural residents pay $30 per filter and are able to pay $12 upfront and the rest in 3 monthly payments of $6 each. Repayment rates are 80%. In the rural areas, each filter is provided with a two-hour educational component on how to use the filter.

This approach could help address the inequality in access to sanitation in urban and rural areas. This would also require that the organizations or companies serving urban markets also serve rural markets. However, this could be a good strategy for providing high quality goods at affordable prices.

3.10 Maintenance and Warranties

Even the best produced goods need proper maintenance, have a lifespan, and are subject to breakdown. It may be difficult or expensive to transport the product to urban areas for repair, but it is usually difficult to find both available replacement parts and technicians to correctly repair the product in rural areas.

Require the upfront purchase of replacement parts, or include a free replacement. This works to combat the risk-aversion commonly seen by consumers at the bottom of the pyramid, but also ensures the availability of replacement parts. This is especially vital to those companies who produce internationally.
• IDE Hydrologic require the up-front purchase of replacement parts
• Prakti Design, a cookstove manufacturer based in India that ships stoves to Haiti, ships replacement parts with their product to ensure local distributors are able to access the parts immediately.
• Grameen Shakti offers a buyback program where customers whose solar home systems were deemed unusable because of floods or fire, or those who become connected to the grid, can recoup some of the initial cost
• Temasol, a solar company in Morocco, ships replacement parts to local branches so they are closer to the consumer

**Bring the maintenance to the rural customer.** This ensures proper upkeep and allows companies to reach under-served rural areas, though it should be noted that the cost of providing servicing and maintenance can be quite high.

• Potential Energy, because it works in remote areas of Darfur, brings repairmen to villages to ensure proper upkeep through mobile maintenance units. IDE also uses a similar strategy by placing people in rural areas to help with maintenance.
• Hindustan Unilever sells its water filters through its partnership with IVDP, a local not-for-profit which oversees several self-help groups. Filters are sold through the self-help groups and any maintenance issues are aggregated through IVDP, who then notify Unilever. Unilever then deploys a maintenance team within 3 days.
• Grameen Shakti uses its network of technicians to visit rural homes and service its solar homes systems for three years. The same technicians collect the loan repayments.
• TataBP has a service hotline for consumer concerns and complaints related to its solar systems and promises quick maintenance through its large network of authorized service centers.

**Make products easy to fix.** “Ikea-like” products are another key toward improving maintenance, as technical expertise ceases to be a problem and consumers can even repair their own products, lowering cost as well as purchasing risk.

• Prakti Design makes stove parts easy to replace with simple tools.

**Warranties can help reduce consumer risk perception and increase product up-take.** Given that consumers are risk averse and want to make sure they get value for their money, many organizations offer warranties, either within the cost of the product, or as an add-on.

• IDE has found that, while the warranties are not legal documents, they provide reassurance that defective products can be exchanged.
• Burn Manufacturing allows customers to sign up for the warranty program through text messaging and requires that the distributor manages the claims.
• Selco negotiates 5-year warranties with their suppliers and builds the cost of the warranty into the end product cost. Maintenance is provided through their distribution network of branch offices.
• Grameen Shakti customers can purchase a yearly maintenance contract as well as long-term warranties with differing life spans for panels, batteries, and controllers.
• Temasol services their solar panels for ten years after purchase and requires monthly payments, but offers a range of service options.
• Lighting Africa found that trust ceases if manufacturers and distributors are physically far away from consumers.

Maintenance and warranties are particularly relevant to the sanitation sector because latrines often contain complex parts manufactured abroad, meaning consumers cannot repair them themselves. By creating a market for replacement goods, organized by the same technicians who install the sanitation infrastructure, companies can ensure part availability. Warranties covering installation and not only parts should also be considered by sanitation companies because of the complexity of custom installation.

**SELCO’S APPROACH TO MAINTENANCE & WARRANTIES**

Product price includes installation, 1-year of maintenance, an 8-year panel warranty and a 5-year warranty on the rest of the system.

Sanitation technologies may require similar benefits to help ensure sustainable access. This is important because past interventions have managed to supply temporary solutions that eventually broke down or fell out of use.
4. Value Chain Governance

Value chains are made up of a diverse set of firms and actors maneuvering within one space. Without some level of outside coordination, often times these actors are unable to take advantage of synergies between firms and regions. Value chain governance, whether through a national government or international body, can help overcome these obstacles. In a more cohesive sector, disparate actors can better work together to achieve common goals such as reducing tariffs or gathering necessary information for market assessments.

Many interviewees expressed ideas on how a more supportive environment could foster scalability in their respective sectors. The following is based on common observations about how to improve the existing environment, rather than on examples of how different organizations approached the lack of an external coordinator.

4.1 Role of Government

Governments have an important role to play in creating an enabling environment for markets to reach the bottom of the pyramid. Governments set the legislative and regulatory context within which firms operate and can thus use this unique position to play a constructive role in facilitating market development. Further, as both sanitation and the sectors surveyed for this paper contain certain characteristics of a public good, there exists an economic rationale for public sector support to encourage market activity.

Governments have an important role to play in promoting behavior change. One critical component of behavior change is public education. Public health information campaigns can help to set the stage for more targeted product specific marketing campaigns. As mentioned previously, there is a natural role for government because this information has public good qualities. Individual companies may not have incentive to engage in this activity because their competitors benefit from their efforts. Additionally, many interviewees cited the high cost associated with engaging in effective behavior change.

Where there exists a financing gap, governments can help build the market early on. As highlighted earlier in the paper, there exists a substantial financing gap for early stage growth of socially beneficial companies. Where possible, the government can help by building loan pools, providing loan guarantees, or improving the investment climate to attract new funds.

Governments play a critical role in firm production decisions through their tax policy and regulatory environment. By reducing import tariffs on inputs the government can encourage more cost-efficient business models. Furthermore, by establishing a regulatory
framework to ensure consistent quality standards, the government can help keep bad products from spoiling the market.

**Governments must continue supporting the bottom of the pyramid.** The majority of the organizations surveyed in this report do not target the poorest of the poor. To maintain a viable business model, organizations have targeted customers with some ability to pay or access financing. There is a wide consensus that it is the role of the government to assist in creating programs that reach the very bottom of the pyramid. The design of these programs however must be done very carefully so as to not disrupt the market mechanisms at work in other segments of the population.

### 4.2 Role of Donors & NGOs

Donors, NGOs, and the international community have an important role in expanding access to these products. These groups are focused on effectively improving health outcomes rather than making a profit. Therefore, regardless of whether these sectors are profitable, these actors are committed to expanding access to these goods.

The sanitation sector has required assistance from outside groups and continues to need this support. Historically, donors and NGOs have not yet achieved scalable success in providing sanitation solutions. Therefore, their role should be focused on where they can add the most value and help support entrepreneurs.

**Concentrate on behavior change and understanding the market.** Since these groups are motivated by impact, they are able to invest in and support interventions and programs that create an enabling environment for the private sector to enter into underserved markets. By stimulating demand or gathering consumer information, these groups can decrease the costs for the private sector as well as help encourage increased interest in these sectors. Support can include further research in effective behavior change communication and campaigns as well as exploration in innovative ways of reaching consumers.

- Population Services International (PSI) focuses on creating behavior change and offers clients choices in environmental health products. This is an important service that decreases the needs for the private sector to fund large-scale marketing campaigns.

**Donors, along with governments, have an important role to play in financing public health education and behavior change efforts.** Because these activities have positive spillovers for the community, not-for-profit actors are better able to approach these areas than private sector actors. Profit seeking enterprises will not necessary reap the full benefits from these exercises and therefore are not incentivized to focus on education.
Donors and NGOs have an important role in expanding access to these products among the poorest of the poor. People in the lowest wealth quintile may be unable to afford many of these goods or may have other priorities guiding their purchasing decisions. Therefore, NGOs and donors can focus on financing or subsidizing the cost of the final product for the poorest.

Engage in a wide range of research efforts in the sector. A number of universities are directly involved in the research, coordination, and testing of these products. These services are instrumental in growing these sectors and developing a collection of research to inform future interventions. Evidence is essential for proving that these products have a health benefit.

- The University of North Carolina Chapel Hill manages communication for the International Network on Household Water Treatment and Safe Storage
- Research from the American University of Beirut looked into solar water disinfection

4.3 Role of Multinational Corporations

While leveraging the extensive resources and distribution networks of global corporations seems like a surefire way to achieve scale and reach the bottom of the pyramid, relatively few MNCs have been successful in doing so. Given the nuances of servicing the bottom of the pyramid, especially through selling push products, many MNCs have failed.

The sanitation sector requires a number of services and inputs that companies provide profitably in other markets. As other countries gain wealth these corporations should have a financial incentive to enter into new and emerging markets for sanitation products and services.

Multinational corporations can provide financing through their Corporate Social Responsibility (CSR) departments. Where companies wish to get involved in a socially beneficial market but lack the local knowledge to do so, acting as an early stage financier can be very important for building the market. Shell Foundation has successfully provided such support to the solar market through early stage financing funds.

Partnerships between NGOs and MNCs can prove fruitful. Many corporations have tried to tap the proclaimed fortune at the bottom of the pyramid but have been unable to do so as they lack an intimate knowledge of the social, political, economic and cultural dynamics of this population. Where corporations have succeeded in offering products to the BOP, partnerships with NGOs or organizations on the ground have proved advantageous.

4.4 Role of Coordinating Group
Whether it is a “coordinator,” “market-maker,” or “external actor,” groups working at a high-level have a vital role in guiding an industry. These coordinators can work on a country-level scale or be large enough to provide services over a wide geographic and functional range and provide services to small-scale firms that they cannot provide on their own. Alternatively, as described by Monitor Inclusive Group, they can provide only a few services or a wide-range, depending on what they are trying to achieve. The report notes that NGOs, corporate foundations, and MFIs can become active in this space.

The sanitation sector has a large number of actors that must work together to build a successful market. The sector also inspires many distinct groups, including public health officials, individual citizens, and entrepreneurs to speak out about their unique demands. However, the sharing of best practices for common obstacles has been limited. A coordinating group could help unite these diverse interests and actors.

**Coordinators can align a diverse set of actors along the value chain.** In the sectors surveyed for this report, the majority of firms do not work across the entire value chain; however, for those few who have achieved scale, successful vertical integration has been key. By identifying actors across all aspects of the value chain and bringing them together, the coordinator can eliminate search costs, ensure specialization or consolidate roles where needed to bring greater efficiency to a sector.

**The coordinating body can create a “space” in which firms can work through collecting data, managing knowledge, and providing guidance.** By having connections across a wide-range of actors, the coordinating body allows actors to tap into knowledge networks and make their own connections as necessary. GACC has been facilitating knowledge sharing by providing market analysis by country for the cookstove sector. Such market assessment tools, could be useful for the sanitation sector; however, caution must be exercised in ensuring the information is specific enough to be relevant for end users on the ground.

**A coordinator, if well-established, can ease the burden of accessing finance.** This is especially important because access to finance is a significant hurdle to achieving scale. The group can either provide financing or help build firm capacity to be more attractive to lenders.

**Advocacy by coordinating groups builds awareness of the sector both domestically and internationally.** This can create demand in-country where firms may not have funds to engage in behavior creation or marketing. Furthermore, heightened international awareness, such as GACC has done for cookstoves, can help to raise funds for investment.

**Assist with creation of standards and certification processes to assure quality.** Like the government, a coordinator can also lend its expertise to help establish domestic or international standards for quality, which help to keep out bad products and provide assurance to customers and investors alike. However, these groups must ensure that standards do not discourage innovation and new market entrants.
5. Case Studies

6.1 Selco India Case Study

Overview

Selco India was established in 1995 to provide “sustainable energy solutions and services to under-served households and businesses.” Selco sees itself as a system integrator. They have worked slowly to build market linkages between producers, rural banks and consumers, offering a comprehensive package including installation, component warranties and system maintenance to the end consumer.

Results

- Have sold 150,000 solar systems and achieved profitability 7 years ago
- Have established 40 local energy service centers and employ a staff of 295
- Have received numerous awards for social impact including the Ashden Award in 2007 and the Ramon Masayay Award in 2011

Business Model

Selco had worked to develop a market over a number of years. Their focus has been on perfecting a way to bring a quality product to the poor rather than on rapidly achieving scale. The company’s structure is based on a branch model with a head office, regional branch offices and local “energy service centers.” The ECSs cover a population within 25-50 km radius in order to facilitate a rapid response to complaints or maintenance requirements.

Selco’s inputs are sourced from Indian companies. Assembly and installation is done on site by Selco technicians. Sales and marketing is done by ‘associates’ on a commission model. The company relies heavily on word of mouth and product demonstrations to build awareness and demand for their products. Selco also operates rural labs to foster product innovation and bottom up design.

Selco offers 14 different products each designed to meet context specific needs. The most popular system (representing 50% of sales) is a four-light system that costs approx. $330 including installation, 1-year of maintenance, an 8-year panel warranty and a 5 year warranty on the rest of the system. In order to facilitate purchase by consumers who do not have cash, Selco has worked to build relationships with rural banks who offer loans for their products. A typical loan requires a 15% down payment, and has a 5 year term with a 13% interest rate. Selco also guarantees credit for those who cannot afford the initial down payment. Repayment rates were 97% in 2011. Selco generally works with rural banks rather than MFIs as they offer lower rates over a longer time horizon.
As of 2011, 80% of sales were solar home systems, 10% were larger systems for community centers or large houses and the remaining 10% was on a new solar water-heating product. That year, Selco generated 2.9 million in sales and $90,000 in profit.

**Challenges**

- Selco has had to build a value chain as they have grown. They negotiated with suppliers, convinced rural banks to lend to their customers, etc.
- Their focus on learning and providing a good quality product required a significant upfront investment in time and money; as such, they have not yet achieved scale.

**Keys to Success**

- Selco has maintained a focus on selling a high quality product to the poor. Because they offer custom installation and maintenance services to their customers, there is a high level of trust in their company and there is a greater likelihood that the products will function as intended and have a lasting social impact.
- Bottom up product design and innovation has been critical to ensuring their products are relevant in a wide variety of contexts.
- Significant declines in the price of solar panels in recent years has helped make the business profitable.

### 6.2 Hindustan Unilever India Case Study

**Overview**

After three years of product testing, Unilever launched its Indian arm, Hindustan Unilever in 2008 to sell its Pureit water filter. It sells a range of water filters to meet the needs and price points of various segments of the population.

**Results**

- Largest water filter sales by volume in India
- In those markets for which financing options are provided, Pureit filters have 40% penetration; for those markets without financing options, 1%.
- Expanded to Mexico, Indonesia, Mexico, Brazil and Sri Lanka
- 6 million water filters sold since 2008, majority of which are non-BoP customers

**Business Model**

The water filter is produced in one of two factories in India and is then distributed and sold as an aspirational product through supermarkets, retailers or Pureit partners.
In the past few years, HUL has piloted two main distribution models through which it hopes to reach the very bottom of the pyramid. Through its Shakti project Unilever trains local village entrepreneurs, often poor women, to sell multiple products in a low-cost door to door distribution model. This model spans 120,000 villages in India, with one representative covering 3 or 4 villages, and sold 100,000 filters as of 2011.

Through its partnership with IVDP, a not-for-profit organization which establishes self-help groups that provide microloans, Unilever is able to aggregate demand and provide financing options for purchase of a filter and replacement.

**Hindustan Unilever Pureit - IVDP Microfinancing Model**

<table>
<thead>
<tr>
<th>Hindustan Unilever: markets, distributes, promotes &amp; does after-sales maintenance</th>
<th>IVDP: aggregates demand, underwrites, approves the loan, collects payments</th>
<th>Customer: 50,000 customers in this program</th>
</tr>
</thead>
<tbody>
<tr>
<td>- IVDP pays 50% of the cost of the filter upfront</td>
<td>- IVDP provides loan at 7-8% interest rate to purchase water filter</td>
<td>- Customer pays back in $2 monthly installments for 20 months</td>
</tr>
<tr>
<td>- IVDP pays remaining 50% once it receives payment from customer</td>
<td>- IVDP receives no payment for its services as it passes the discounted price onto customers</td>
<td>- Customer pays due to be part of the self-help group of IVDP</td>
</tr>
</tbody>
</table>

Source: Author’s creation based on IFC case study

It is in the process of building more relationships with MFIs to expand this model. For each financing organization it works with, it changes the tenor, payments and interest rates on the loans to fit the profile of the financier.

**Challenges for HUL**

- Reaching the BOP with a financially sustainable model as there is a lack of local distribution partners that provide direct access to BOP
- Increasing market penetration as demand is still very low
- Providing financing options for BOP customers as it attempts to scale
- Ability to import components into countries where creation of manufacturing plants is not viable

**Challenges for partner MFIs**

- Loan sizes are too small to make servicing profitable
- Smaller MFIs have trouble accessing financing themselves
Reluctance to expand beyond underwriting profitable loans and be seen as product retailers

**Keys to Success**

- High durability of product as only 1% of water filters sold require maintenance or have defects. As such, Unilever is able to affordably offer a 6 month warranty.
- Benefits from global name brand recognition
- Started with middle-income customers and then moved up and down the pyramid, allowing for higher income customers to subsidize BOP sales
- Dedicated Partnerships division which manages relationships with key organizations that help Unilever deliver to bottom of the pyramid

### 6.3 EcoFiltro Guatemala Case Study

**Overview**

Originally founded as a philanthropic organization to distribute a ceramic water filter in Guatemala, EcoFiltro adopted a social business model in 2007 to develop a commercially sustainable organization.

**Results**

- Broke even in 2009, three years after converting to a social business
- Distributed 172,000 water filters across Guatemala since 2007. 75,000 of which were given away in rural areas prior to the organization converting to a for profit business
- Sold 50,000 water filters in three years in rural areas to the BOP
- Operates three factories across the country which produce their filter from start to finish

**Business Model**

Filters are produced domestically in one of three factories. To reach rural populations, EcoFiltro has an in-house financing platform which is subsidized by the sale of its filter at a higher cost (3 models ranging from $60 - $150) to urban populations. Rural residents pay $30 per filter and are able to pay $12 upfront and the rest in 3 monthly payments of $6 each. Repayment rates are 80%. In the rural areas, each filter is provided with a two hour educational component on how to use the filter.

Sales are aggregated (must get minimum of 25 families before EcoFiltro will come to area) and payments are collected in rural areas by community entrepreneurs. Each entrepreneur works part-time and can only work in the community from which they are from to maintain
trust in the system. Community sales agents are hired and trained by field supervisors (as of 2014, there were 5 supervisors throughout the country).

EcoFiltro recently made a deal with TIGO, a cell phone network in Guatemala, to provide 1,000 filters in classrooms across the country to educate children, build demand and engage parents to talk about clean water. Results have yet to materialize, but the organization is hopeful this will be an important channel for building awareness and demand.

**Challenges**

- Finding MFIs to work with that will provide small loans with minimal paperwork to expedite the process
- Reducing dependence on urban sales
- Objective is to reach 1 million individuals with clean water by 2020

**Keys to Success**

- Fortuitous access to “soft financing” at 1-2% from investors early on
- Recently accepted into a carbon financing program to offset costs
- Effective pricing strategy which allows “easy” sales in urban areas to subsidize rural purchases on credit
- Stopped giving away the filters and required NGOs with which they partnered to charge
- Business model is not reliant on any donations. All donations received are used to purchase a water filter for a classroom in order to build demand and educational awareness amongst children.
- CEO cites his experience and expertise in sales as a key success factor

### 6.4 GERES Cambodia Case Study

**Overview**

GERES Cambodia opened in 1994 to promote sustainable resource management. One of its largest projects is promoting improved cookstoves in the country. It currently produces two models: the New Lao Stove and the Neang Kongrey Stove, the former being designed for urban use and the latter for rural households.

**Results**

- By 2012, GERES has sold 2 million cookstoves in Cambodia
- Their entire model has been financed by carbon credits
- Created an association of producers and manufacturers, ICOPRODAC, that now has over 300 members to improve coordination across the value chain
**Business Model**

Instead of creating a new supply chain, GERES worked with producers and distributors who were already involved in the traditional market. In fact, GERES did not train anyone who was not already involved in the sector. They centered their operations in the traditional center of Cambodian stove production and allowed for artisanal stove production. The first product, the New Lao Stove, cost twice as much as traditional, unimproved stove, but offered fuel savings, making it attractive to consumers.

By getting certified to trade carbon credits, GERES went through a rigorous process, but was able to sustain the business financially. After forming an industry-wide association, called ICOPRODAC, the organization observed the need for producer and consumer financing. GERES then used its carbon financing revenues to provide loans with 0% interest rates to its members. This enabled producers to purchase time-saving clay mixing machines and distributors to update their transportation. GERES provided these loans for about 6 years while developing a self-credit program for interested ICOPRODAC members.

Historically, GERES has been involved in the administration of the association, but is currently phasing out their involvement and handing over to the association themselves. Carbon financing will not be continued due to its expense and difficulty.

**Challenges**

- Maintaining quality over the stoves, as fuel efficiency is the reason consumers are paying the higher price. This is difficult since the stoves are produced by artisans
- Ensuring a smooth transition of all aspects of the business to the Association, especially ensuring the ICOPRODAC has the financial capacity to keep up with operations
- Maintaining a vibrant market in light of the shift to use LPG stoves

**Keys to Success**

- Producing a product already familiar to Cambodians, so no demand creation was necessary
- Tapping into already developed supply lines that were previously serving the traditional cookstove market
- Creating ICOPRODAC, which brought together producers and distributors, allowing them to agree on pricing so no one was undercutting the market
- Working closely with, and having the support of, the Cambodian government
- Using carbon finance to ensure a revenue stream and profitability
6.5 Global Alliance for Clean Cookstoves (GACC) Case Study

Overview

Launched in 2010, the GACC is a public-private partnership that is working to develop market-based solutions to address barriers in the cookstoves sector. It is focusing on creating an enabling environment for cookstoves.

Selected Programs

- GACC Grants
  - Pilot Innovation Funds provide up to $75,000 to finance entrepreneurs across the value chain with the potential to reach scale
  - The Women’s Empowerment Fund provides funding to those addressing gender issues
  - Spark funds provide up to $500,000 to businesses in the start-up and growth phases to support further growth and capacity development
- Capacity development through one-off trainings and one-on-one consultations
- Worked to create clean cooking standards that can be applied globally
- Created market assessment tools on a national scale, and now working to do assessments on the village level

Model

As the GACC describes in, they create “a space” where actors can work. The Alliance stays connected to different groups throughout the cookstove sector, providing numerous services to the sector from its headquarters in Washington, DC and five decentralized regional offices throughout the world. It provides market assessments for organizations, capacity building for entrepreneurs, gender and humanitarian trainings, financing, standards setting guidance, policy recommendations, and broad-based outreach and advocacy.

Challenges

- As a public-private partnership, the Alliance is dependent on outside fundraising to complete a wide-range of projects
- Because it is a young organization, the GACC is still deciding exactly what its role in the sector will be

Keys to Success

- There are many initial partners involved in the launch who were well-connected and could bring other partners in
• Because improved cookstoves work to mitigate climate change, the sector as a whole has benefited from increased funding and recognition
• Became well-known in the cookstove sector very quickly, and worked to connect diverse actors from the start
6. Recommendations for WSP

Recommendation 1: Plan on a long term time horizon

Observations

Across each sector, it has been observed that leading firms in their respective industries have taken a considerable amount of time to reach scale. GERES in Cambodia took 10 years to reach the point where they are today with 2 million in cookstoves sales. Before expanding their operations, Selco had a 5-year experimentation period where they sold only 500 solar home systems. This observation was also prevalent in the literature. Monitor Group reports that it often takes at least 10 years for social businesses to reach scale.

Because firms must engage in a myriad of activities to develop a market (building demand, relationships, trust, distribution channels etc.) before they can scale up, they must have the capacity to plan on a long-term time horizon.

Recommendation for WSP

- Establish a long-term road map for the development of the sanitation sector at a global and country level, identifying core role of WSP within each
- Include clear progress checkpoints along the way to complement a patient time horizon

Recommendation 2: Build linkages along the value chain

Observations

As mentioned above, many of the firms interviewed made considerable upfront investments in building market linkages before they were able to achieve significant growth in sales. Examples of these activities include:

- Creating an association to link manufacturers and producers (GERES)
- Engaging in conversations with, gaining the trust of, and creating linkages with various actors to create a value chain. For example, convincing rural banks to finance solar home systems, working with producers gain beneficial terms and a good product warranty etc. (Selco)

These firms report that upfront investments in creating these relationships were costly and time consuming but were critical in terms of building sustainable businesses in the long run.
Recommendation for WSP

- Help businesses establish relationships with actors (finance, producers, distributors etc.) along the value chain
- Explore ways to give businesses support to build components of the value chain themselves that might be missing in the environment where they operate (i.e. there are not always existing players to be integrated - some successful firms have provided consumer finance themselves, have built their own distribution networks where none existed, or produced their own products)

Recommendation 3: Design products with input along the value chain

Observations

There has been much discussion of the importance of user-centered design in all of the sectors examined for this study. Interestingly however, respondents also noted the importance of considering the needs of other actors along the value chain. A product must be desirable for the end user, but it also must be feasible to produce, transport and install. Examples of firms seeking input from other actors include:

- Selco has utilized feedback from technicians in order to improve product design and installation
- GERES found lower price point cookstoves were not reaching poorest areas because distributors did not want to sell them as they broke too easily
- Potential Energy imports flat cookstoves to facilitate transportation for its distributors

Recommendation for WSP

- Commission research on what each actor along the value chain desires in a product in a given local market. Further evaluate which products in respective markets suit these needs best.

Recommendation 4: Support innovative financing

Observations

A lack of access to financing is reported to have been a significant obstacle for actors all along the value chain, especially in the early stages of growth. Many early-stage businesses struggle to access impact investors and are not yet considered “investor-friendly” because they lack of financial records, operational procedures, etc. Those firms that have built
scalable business models have often done so in part because they have been able to overcome this barrier and have benefitted from access to low-cost capital from impact investors or philanthropic sources.

**Recommendation for WSP**

- Create multi-stakeholder partnerships to support innovative financing options for businesses along the value chain.
- Consider ways to support training programs which build financial management capacity through training and advisory services
- Consider building a sanitation awards program or competition to bring recognition and credibility to low profile organizations and also provide grant financing to facilitate early stage growth.

**Recommendation 5: Engage markets through trusted networks**

**Observations**

Many organizations expressed that using traditional forms of marketing (i.e. billboards, radio etc.) was incredibly challenging in the context of selling a push product. Instead, these organizations have built awareness for their products leveraging trusted networks in the community. For example, Selco put on nighttime demonstrations of their lighting systems and installed them in prominent places such as schools or community centers. Other firms have engaged with trusted community figures to create “product evangelists” and used after sale satisfaction to promote word-of-mouth marketing.

**Recommendation for WSP**

- Consider ways in which central community members can be built into business models to instill trust within customers.
- Explore opportunities for businesses to partner with schools and local community centers to create demonstration projects. This also could feed into the larger objective of behavior change by educating children about the importance of sanitation and familiarizing them with the use of and benefits associated with an improved latrine.

**Recommendation 6: Target low-hanging fruit first**

**Observations**

Nearly all of the organizations interviewed said they were not able to be financially sustainable while focusing exclusively on serving the very bottom. Instead firms have reached the BOP through cross subsidization. They target higher-income customers, often
times in urban areas, which are less costly to reach and use the revenues from that business line target poorer rural populations. Other organizations have focused on building a business that first targets the higher end of the bottom 40%. By investing in building a successful business model for this group of consumers first, these organizations aim to bring down their costs and expand into servicing the BOP at a later point.

**Recommendation for WSP**

- Support business models that may not be initially targeting the BOP. Encourage businesses to cross-subsidize sales or work with governments to provide vouchers for BOP

**Recommendation 7: Work towards developing a diagnostic tool to assess market characteristics**

**Observations**

The nuances of the problems facing many firms were very dependent upon the specific local context. Thus, making broad-based conclusions on which production model, distribution channel, marketing approach, etc. is most appropriate is challenging. Successful firms spend long periods of time determining and made high upfront investments to determine what business model best suits their local market.

**Recommendation for WSP**

- Continue documenting what approaches work in different contexts in order to eventually build diagnostic tools that allow for an assessment of local market characteristics and gives insights into which strategy marketing approach, production model, distribution channels, etc. is best suited for that particular environment

**Recommendation 8: Establish local knowledge centers**

**Observations**

As noted in the first two recommendations, developing market linkages was critical for a number of the successful firms we interviewed. Firms took a considerable amount of time to build trust and communication between different actors in nascent markets. Where they were present, firms report benefitting from knowledge sharing initiatives, particularly with universities at the product design stage.

**Recommendation for WSP**
• Support the establishment of sanitation knowledge centers that can promote innovation and partnership formation along the value chain. Consider partnering with local universities that may be natural homes for learning and innovation
7. Conclusions

To achieve the scale necessary to reach the billions of people who still live in extreme poverty, the sanitation sector will need to continue designing innovative solutions to overcome the challenges highlighted in this paper. And while it will take a combination of solutions across various parts of the value chain to successfully scale up, it is useful to consider some of the common themes seen across the organizations that have managed to achieve scale in today’s market.

**No organization is profitable serving only the bottom of the pyramid.** There are, however, ways to reach the bottom of the pyramid that need to be further explored. These include cross-subsidization, the creation of a vibrant market that can be accessed by the lowest quintile through vouchers, and the engagement of social enterprise firms who consider and quantify benefits other than financial profits. These solutions are not perfect, but are good alternatives to subsidization, which damages markets by selling below cost.

**Few organizations have successfully achieved scale, and when they have, it takes time.** In a 2011 survey conducted by Monitor Inclusive Group, of 439 social businesses in Africa, only 13% were operating at, or beginning to, scale. Another report by Monitor Group suggests that those organizations that have achieved significant scale often take at least a decade. Though outside the scope of this paper, it is interesting to consider the fact that it took the microfinance sector over 30 years to reach its current scale.

**Behavior change is essential for the successful engagement of the private sector.** WSP has been focusing on behavior change and this focus is justified. Behavior change is possibly the most difficult challenge for any business to overcome; if consumers are not aware of the need for a particular service, they will not purchase a product to provide this service. Once behavior change has occurred, firms can focus on overcoming other barriers along the value chain, such as creating a better distribution model. Finally, firms do not consider behavior change as being their responsibility, but falling squarely in the public sector.

**For those organizations which have scaled, advantageous funding has facilitated growth.** This point highlights the important role financing plays in the quest to scale socially beneficial business models. For most of the organizations that received funding, the investors had a social return dynamic and thus offered lower costs of funds enabling the organization to scale up. Access to such financing was often facilitated by extensive personal networks and international recognition of specific companies.

**The private sector cannot solve the scale problem on its own.** While the development of the private sector has been hailed as the solution to lifting millions out of poverty worldwide, reliance on market mechanisms alone will not suffice where significant externalities and market failures exist. Numerous organizations interviewed for this report
expressed optimism at the role of commercially viable models in reaching a greater number of people, but were also realistic about the limitations of these models without government involvement.

In light of these observations, the sanitation sector can benefit from the key recommendations put forth in this report. These recommendations are a mix of short and long term actions that can be taken to strengthen the sector. Most importantly, policy makers ought to plan on a long-term strategy to aid the private sector in reaching the bottom quintile with their vital and innovative products. This can be achieved by working with firms to strengthen their entire value chains and giving vital external support when needed. Support can take the form of leveraging academic institutions to create local knowledge centers, providing vital services such as market assessments, and building capacity to take advantage of preferential and innovating funding mechanisms.

Reaching the bottom of the pyramid profitably will take time and an immense amount of effort, but with sustained support from WSP, the engagement of social enterprise companies, and the use of cross-subsidization, the private sector can ensure those in extreme poverty can take advantage of the products already available to the rest of the population.
Appendix 8.1: Interview Guide

For key informant interviews in the cookstoves, solar panels, and household water filtration sectors

1. Background information provided by the interviewers
   a. Note: all interviews will be recorded
   b. We are creating a Learning Note for the World Bank and may be asked to provide quotations or ideas from the interview without attribution for the Note. Would this be ok, and can we include your name in the list of interviewees?
   c. “This survey will be conducted in three parts. The first is background information. The second part will address the sanitation market in general, with attention paid to the absence of businesses, particularly in rural areas, and the overall policy environment. The final part will address the individual actors in the rural market and ways these businesses can be scaled-up.

2. Background Questions
   a. Name
   b. Title
   c. Company
   d. Field Experience
   e. What is your involvement with X sector?
      i. Prompt: policy, program, research, all of the above?
      ii. Prompt: can you elaborate on that?

3. Overall Market/Policy Questions
   a. In your opinion, what are the main challenges to providing affordable (and safe) X to the rural and urban poor?
      i. Can you speak specifically to the challenges in rural environments?
      ii. Prompt: Demand creation, affordability, logistics, etc.
   b. Do you believe the X market is well-established or well-structured in rural areas?
      i. Who is actually providing the services to the poor?
         1. Do we need more actors providing services?
         2. What is the quality of the services?
      ii. Do we need someone coordinating and encouraging the market?
         1. Prompt: What would you like these actors to do?
   c. What do you see as the responsibilities of the public sector and private sector in provisioning?
   d. Are subsidies and vouchers necessary to reach universal coverage?
e. Can you provide examples of a successful market intervention in the X sector?
   i. Follow-up: What were the roles of different actors? The institutional environment?
   ii. Where on the value chain was the intervention?
      1. Prompt: marketing, demand creation, etc.
   iii. Did the market reach the poor and extreme poor?
   iv. Was the intervention sustainable?

f. Can you speak about an unsuccessful market intervention in the X sector and why it failed?

g. Can you tell us about sectors that you perceive to have been more successful, particularly in rural areas, and why that is so.
   i. Prompt: health sector, etc.

4. Individual Businesses Questions
   a. Do you think there is a space for small scale entrepreneurs in the rural X market?
      i. Do you have a specific example?
      ii. What are the challenges these entrepreneurs face in providing services to the rural poor?
   b. What is the typical profile of private sector providers across the value chain?
   c. Can you give us an example of a small-scale, rural business and how it could be scaled up?
   d. Do you know of any similarities linking the X sector and the rural sanitation sector?

5. Follow-up on comments of interest

6. Can you list three other people we should be in touch with? Can you help us contact them?

Notes for interviewers
- Interview duration should be 45 minutes, 1 hour at most, especially phone interviews
- Not looking at the private sector at large, or large-scale public works. If the interviewee mentions this, steer them away from the topic
- We are not looking at the role of government
- Just make sure ask the same questions to each interviewee, but do not have to ask them the same way
## Appendix 8.2: Information on Scale

<table>
<thead>
<tr>
<th>Name</th>
<th>Founded</th>
<th>Sector</th>
<th>Location</th>
<th>Product</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geres</td>
<td>1997</td>
<td>Cookstoves</td>
<td>Cambodia</td>
<td>New Lao Stove</td>
<td>1.9 million; 40% of rural households had their stove; 2011 budget $444k - all financed by carbon credits</td>
</tr>
<tr>
<td>Grameen Shakti</td>
<td>1996</td>
<td>Solar</td>
<td>India</td>
<td>Solar home system</td>
<td>1 million homes by 2012; plans to reach 2 million by end of 2015; installed more than 70% of solar home systems in country. More than 8 million rural people directly or indirectly benefit. Also installed 600k cookstoves.</td>
</tr>
<tr>
<td>Aprovecho</td>
<td>1976</td>
<td>Cookstoves</td>
<td>United States</td>
<td>Open Source Development</td>
<td>70,000 across a wide-range of countries through StoveTec, the recipient of Aprovecho’s technology.</td>
</tr>
<tr>
<td>Grameen Greenway Infra</td>
<td>2011</td>
<td>Cookstoves</td>
<td>India</td>
<td>Greenway Smart Stove</td>
<td>100,000 stoves in less than two years; 91 retail shops carry the stove.</td>
</tr>
<tr>
<td>Potential Energy</td>
<td>2009</td>
<td>Cookstoves</td>
<td>Sudan</td>
<td>Berkeley-Darfur/ Berkeley-Ethopia Stove</td>
<td>38,000 stoves sold/year in Darfur; Ethiopia is a new market</td>
</tr>
<tr>
<td>BURN Manufacturing</td>
<td>2011</td>
<td>Cookstoves</td>
<td>Kenya</td>
<td>Jikokoa Stove</td>
<td>11,000 stoves in urban markets</td>
</tr>
<tr>
<td>Prakti Design</td>
<td>2008</td>
<td>Cookstoves</td>
<td>India</td>
<td>Charcoal Stove, Wood Stove, Industrial Stove</td>
<td>Distributed 8,000 household stoves and 880 Institutional Stoves through WFP and other NGOs in India, Nepal, DRC, Sudan, Rwanda, and Haiti. Reaches 250,000 people daily</td>
</tr>
<tr>
<td>Toyola</td>
<td>2006</td>
<td>Cookstoves</td>
<td>Ghana</td>
<td>Toyota Charcoal Stove</td>
<td>30% of urban market; 150,000 stoves benefiting 750,000 people</td>
</tr>
<tr>
<td>Hydrologic</td>
<td>2001</td>
<td>Water filter</td>
<td>Cambodia</td>
<td>Ceramic water purifier</td>
<td>230k (110 by IDE 2001-2009 and 120k from 2010 - mid-2012); 400 filters/month at end of 2011</td>
</tr>
<tr>
<td>Hindustan Unilever</td>
<td>2005</td>
<td>Water filter</td>
<td>India</td>
<td>Pureit water filter</td>
<td>6 million water filters with 50% marketshare</td>
</tr>
<tr>
<td>SELCO</td>
<td>1995</td>
<td>Solar</td>
<td>India</td>
<td>Solar home systems</td>
<td>135,000 homes; in 2011, $90k in profit</td>
</tr>
</tbody>
</table>
Appendix 8.3: List of Interviewees

Sanitation

1) Libbett Loughan, Joint Monitoring Program (former)
2) Rokeya Ahmed & Malva Baskovich, Water and Sanitation Program
3) Phyrum Kov, Water and Sanitation Program
4) Yolande Coombes, Water and Sanitation Program
5) Yi Wei, IDE Cambodia
6) Maryanne LeBlanc, World Bank
7) Jim McHale, American Standard

Solar

8) Louis Boorstin, IFC/Gates Foundation (former)
9) Chris Saunders & Micah Melnyk, IFC Lighting Africa
10) Samuel Lakeou, DC University
11) Sarah Alexander, Selco
12) Nana Asamoah-Manu, IFC Lighting Africa
13) Nisha Thirumurthy, National Renewable Energy Laboratories
14) Pip Decker, SunEast Power

Cookstoves

15) Dean Still, Aprovecho
16) Francesca Jones, Grameen Greenway
17) Debra Stein, Potential Energy
18) Sonya Detweiler, Aprovecho
19) Raynee Chiang, Global Alliance for Clean Cookstoves
20) Peter Scott, Burn
21) Xavier Brandao, SNV
22) Charlotte Nivollet, Geres

Water Filters

23) Rachel Pringle, IDE Cambodia
24) Daniele Lantagne, Tufts University
25) Ryan Rowe, University of North Carolina
26) Laura McDonald, Bloomberg School of Public Health
27) Hector Nava, Water Supply Engineer UNESCO University
28) Scott Roy, Whitten & Roy
29) Philip Wilson, Ecofiltro
30) Martijn Smid, Basic Water Needs
9. End Notes

7 “Who We Are.” EnviroFit.
9 Ibid.
11 “Safe Water for All: Harnessing the Private Sector to Reach the Underserved.” IFC. 
15 Ibid
16 Ibid
20 “Marketing Innovative Devices for the BOP.”
“Marketing Innovative Devices for the BOP.”
“Beyond the Pioneer.”