This handbook was prepared by the 2013 Mexico Clean Water Team, a team of University of Michigan Medical and Nursing students and West Point cadets.

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Access to potable drinking water is a major burden around the world. Each year, diarrheal diseases related to unsafe drinking water, sanitation, and hygiene cause 1.8 million deaths around the world, 90% of which are among children under the age of 5 years.\(^1\) Natural disasters, especially flooding, can greatly increase the health threat from contamination of drinking water systems from inadequate sanitation, industrial waste, and by refuse dumps. In such situations, diarrheal diseases quickly can be a major cause of morbidity and mortality, and providing potable water must become an immediate priority for emergency responders.

### 1.1 A Problem in Mexico

Due to its unique geographical location and climate, Mexico is subject to frequent natural disasters such as flooding and earthquakes. For example, recurrent flooding affects over 100,000 people annually in the state of Tabasco, and floods can last anywhere from 4 to 6 months at a time. While government agencies and relief organizations understand the importance of providing potable water during emergencies, current methods of addressing the problem rely heavily on the distribution of bottled water, a solution that tends to be high in cost and transportation burden. The cost of the water, including procurement, transportation, and distribution, is difficult to sustain over long periods of disaster response and rebuild.

### 1.2 Point of use water treatments (PoUWTs)

Point-of-use water treatments (PoUWTs) are cost-effective methods to reduce water-associated disease burden.\(^2\) The P&G Purifier of Water is a scientifically proven and widely used PoUWT; it has provided over 6 billion liters of potable water in more than 65 countries for both disaster relief and community development programs. As a combination flocculent – disinfectant technology, P&G Purifier of Water uses an approach similar to municipal water treatment facilities (flocculation, sedimentation, and disinfection) to eliminate 99.9% of pathogenic microorganisms as well as suspended matter contributing to turbidity.

Several advantages make the P&G sachets an attractive option for use in emergency situations. Notably, their use greatly reduces burdens of transportation and cost. Each 4-gram sachet of P&G Purifier of Water costs 1 MXN and can purify 10L of water—enough to supply an entire household for one day. Other benefits include the product’s stability and long shelf-life (3 years) allowing it to be stockpiled in areas of frequent disasters, classification as non-hazardous material allowing for air shipment, robustness to treat even very turbid surface waters, and acceptability to users because of the visual improvement of
the treated water. When used with strong water infrastructure and bottled water distribution, these sachets form a logical, life-saving link in disaster relief for communities around the world.

1.3 Purpose

The purpose of this handbook is to facilitate the use of P&G Purifier of Water in emergency situations to prevent disease and ultimately save lives. This handbook is intended for emergency relief organizations interested in incorporating the use of P&G Purifier of Water into existing protocols, where emergency is primarily defined as a natural disaster. Other organizations may also find assistance in using this handbook to bring P&G Purifier of Water into other settings where access to clean water is threatened or limited.

Aquaya Institute and P&G have also developed a brief Standard Operating Procedure for the deployment of P&G Purifier of Water in emergency response settings, which can be downloaded online at http://www.aquaya.org/resources/pur%C2%AE-standard-operating-procedure/.
SECTION 2: P&G PURIFIER OF WATER

A Solution for Contaminated Drinking Water

P&G Purifier of Water (formerly known as PUR™) is a powdered mixture that removes pathogenic microorganisms and suspended matter such as dirt, allowing the purification of contaminated water into safe drinking water.

2.1. Ingredients and Mechanism

P&G Purifier of Water contains two main ingredients:

- Calcium hypochlorite: a chlorine disinfectant for killing bacteria; and
- Ferric sulfate: an iron salt coagulant for removing suspended matter, protozoa, and viruses.

The powder also contains a buffer (clay and polymer) to provide thorough coagulation and flocculation. All of these ingredients are used by municipal systems in Mexico, the United States, and other nations around the world. The difference is that the P&G Purifier of Water provides these ingredients at the level of the household, rather than a centralized treatment facility.

2.2. Safety and Efficacy

P&G Purifier of Water is safe for long-term use by the entire family including infants. It is considered a ‘protective’ technology by the World Health Organization (WHO) and produces a water quality that meets WHO guidelines. It was approved by COFEPRIS in 2011 (Appendix A).

Field and laboratory studies have proven P&G Purifier of Water to remove:

- 99.99999% of bacteria, including those that cause cholera and typhoid fever;
- 99.99% of intestinal viruses, including those that cause hepatitis A; and
- 99.9% of protozoa, including Giardia and Cryptosporidium.

Numerous randomized, controlled health intervention studies conducted by the U.S. Centers for Disease Control and Prevention (CDC) and Johns Hopkins University have also shown P&G Purifier of Water to reduce diarrheal disease incidence by up to 90%, with an average of about 50%. Furthermore, P&G Purifier of Water can reduce levels of heavy metals (i.e. arsenic, lead) and chemical contaminants (i.e. pesticides) from water. More details about the efficacy of P&G Purifier of Water are provided on the following page.
### Pruebas de laboratorio y de campo con PUR

#### Efectividad en remoción de bacterias

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Inicial (org/L)</th>
<th>Post-tratamiento</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. coli</em></td>
<td>$2.0 \times 10^4$</td>
<td>ND</td>
</tr>
<tr>
<td>10 bacterias fecales comunes</td>
<td>$9.2 \times 10^7$</td>
<td>ND</td>
</tr>
<tr>
<td><em>Salmonella typhi</em></td>
<td>$1.6 \times 10^8$</td>
<td>ND</td>
</tr>
<tr>
<td><em>Vibrio cholerae</em></td>
<td>$1.2 \times 10^8$</td>
<td>ND</td>
</tr>
<tr>
<td><em>Shigella sonnei</em></td>
<td>$2.2 \times 10^8$</td>
<td>ND</td>
</tr>
<tr>
<td><em>Klebsiella terrigena</em></td>
<td>$2.8 \times 10^8$</td>
<td>ND</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td>$2.0 \times 10^8$</td>
<td>ND</td>
</tr>
<tr>
<td>ND = no detectable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Efectividad en remoción de virus

<table>
<thead>
<tr>
<th>Virus</th>
<th>Inicial cuentas/ml (log 10)</th>
<th>Reducción logarítmica-media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poliovirus</td>
<td>7,1</td>
<td>&gt;5,0</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>7,9</td>
<td>&gt;5,0</td>
</tr>
</tbody>
</table>

#### Efectividad en remoción de cistos

<table>
<thead>
<tr>
<th>Cistos</th>
<th>Inicial (org/L)</th>
<th>Reducción logarítmica-media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptosporidium parvum</td>
<td>$1.76 \times 10^6$</td>
<td>4,0</td>
</tr>
<tr>
<td><em>Giardia lambia</em></td>
<td>$1.84 \times 10^6$</td>
<td>3,6</td>
</tr>
</tbody>
</table>

#### Reducción de metales pesados

<table>
<thead>
<tr>
<th>Metal</th>
<th>Inicial (ppb)</th>
<th>Post-tratamiento (ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsénico</td>
<td>229</td>
<td>1,2*</td>
</tr>
<tr>
<td>Cromo (III)</td>
<td>1300</td>
<td>3,1*</td>
</tr>
<tr>
<td>Plomo</td>
<td>270</td>
<td>&lt;10*</td>
</tr>
<tr>
<td>*Por debajo del Standard de la OMS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Reducción de orgánicos y pesticidas

<table>
<thead>
<tr>
<th>Compuesto</th>
<th>Inicial (ppm)</th>
<th>Post-tratamiento</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acido húmico</td>
<td>24-30</td>
<td>&lt;1</td>
</tr>
<tr>
<td>DDT (ppb)</td>
<td>6</td>
<td>0,34*</td>
</tr>
<tr>
<td>Lineamiento de la OMS para DDT = 2ppb</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Efectividad en muestras de campo

<table>
<thead>
<tr>
<th>País</th>
<th>NTU inicial</th>
<th>NTU post-tratamiento</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guatemala</td>
<td>0-501</td>
<td>0,0-2,6</td>
</tr>
<tr>
<td>Kenia</td>
<td>0,7-1850</td>
<td>0,4-3,2</td>
</tr>
<tr>
<td>Marruecos</td>
<td>0-244</td>
<td>0,0-1,1</td>
</tr>
<tr>
<td>Filipinas</td>
<td>0-550</td>
<td>0,0-1,2</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>10-35</td>
<td>0,0-1,1</td>
</tr>
<tr>
<td>Sudáfrica</td>
<td>&lt;0,2-54</td>
<td>0,2-0,4</td>
</tr>
</tbody>
</table>

*Incluye eficacia microbiológica y mejora en la claridad del agua

### Pruebas de campo en poblaciones rurales en Guatemala

#### Datos del CDC
- PUR redujo significativamente las enfermedades diarreicas.

#### Reducción en porcentaje de días con diarrea

![Gráfico de barras mostrando reducción en porcentaje de días con diarrea](image)

#### Reducción en episodios prolongados de diarrea

![Gráfico de barras mostrando reducción en episodios prolongados de diarrea](image)

#### Experiencia del Consumidor
- Los consumidores reportan un agua más clara
- Encuentran el proceso fácil de usar
- El precio de introducción es aceptable
- Se necesitan esfuerzos de educación para lograr el cambio de hábito
- Los esfuerzos de colaboración con gobiernos locales, ONGs, enfermeras, y otros trabajadores de la salud fueron críticos para lograr una educación efectiva.

#### Resumen de los resultados de PUR
- Provee una reducción robusta de contaminantes microbianos y químicos, aún en aguas turbias.
- Reduce significativamente la diarrea.
- Es bien aceptado por los consumidores
- Requiere un refuerzo educacional para lograr el cambio de hábito
2.3. How to Use

P&G Purifier of Water comes in a 4-gram sachet that treats **10 liters** (2.5 gallons) of water.

2.3.1. Materials

- A pair of **scissors or knife** to open the sachet;
- A **spoon or other utensil** to stir the water;
- **Cotton fabric and clips** to filter the treated water; and
- **2 buckets with a capacity of >10 liters**: One for the treatment process, and one clean bucket for storing the treated water.

2.3.2. Instructions

**The purification procedure is as follows:**

1. Open the sachet with scissors. Pour the contents into 10 liters (2.5 gallons) of contaminated water.
2. **Stir** the water with enough vigor to create a vortex for **5 minutes**.
3. Let the water **stand** for **5 minutes**. Large particles ("floc") will begin settling on the bottom of the container. If the water is still colored at the end of 5 minutes, it can be mixed again and left to rest for another few minutes.
4. Once the water looks clear, **filter** the water through a cotton cloth into a clean container. The filter cannot have holes that will allow floc to pass through.
5. Allow the clean water to **stand** for another **20 minutes** before drinking. This is an important step because during this time, the remaining pathogenic bacteria are killed.
6. **Cover** the container to prevent recontamination. **Discard** the flocculated waste in the latrine or on the ground away from children and animals.
7. If the smell or taste of chlorine is bothersome, let purified water stand **covered** overnight.
Box 1. Important points for the use of P&G Purifier of Water:

- **Do not open the sachet with teeth.** This is to prevent ingestion of concentrated powder.
- **Use as close to 10 liters of water as possible.** Although extreme precision is unnecessary, significantly more than 10L will not be properly purified, and significantly less than 10L will have a strong taste of chlorine.
- **Respect the time schedule.** For optimal disinfection and flocculation, it is essential to follow the 5:5:20 minute timing as explained above.
- **Do NOT drink the water if the final product is colored (e.g. yellow) or cloudy.** This indicates the water source may not be compatible for P&G Purifier of Water usage (i.e. sewer or salt water)
- **Avoid recontamination by covering the treated water with a lid.** The chlorine in the water gradually disappears, and after 24 hours it will not be active in sufficient concentrations to continue to remove new microbes. A solid lid is preferred; you may use a large plate or towel.

### 2.3.2 First Aid

**IF IN EYES**
- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses (if present) after the first 5 minutes, then continue rinsing.
- Call poison control center or doctor for treatment advice.

**IF ON SKIN**
- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call poison control center or doctor for treatment advice.

**IF SWALLOWED**
- Call poison control center or doctor for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to by a poison control center or doctor.
- Do not give anything to an unconscious person.

### 2.4. Limitations of Use

P&G Purifier of Water is effective in eliminating most common water contaminants, including pathogenic microbes, suspended matter, pesticides, high molecular-weight organic chemicals, and undissolved heavy metals such as arsenic and lead. However, there are some contaminants it cannot remove.

**Water contaminants that are NOT removed by P&G Purifier of Water include:**

- Salinity
- Nitrate and fluoride
- Low molecular-weight organic chemicals (i.e. Industrial solvents like TCE, PCE, vinyl chloride)
- Dissolved heavy metals in high concentrations (i.e. in mine tailings)

These are not common contaminants in disaster settings, but be aware that P&G Purifier of Water will not work with soapy water, sea or saltwater, blackwater, or water contaminated with gasoline.
P&G Purifier of Water can be an extremely effective intervention for bringing safe water to emergency situations given that there is a reliable supply chain, a distribution plan that allows for rapid deployment, and adequate training to ensure appropriate and consistent use. These considerations must be kept in mind as organizations begin to implement P&G Purifier of Water into emergency protocols. Sample protocols are provided in Appendix B.

3.1. Pre-emergency Preparation

**Overview:** Preparedness is critical to rapid deployment and appropriate use of P&G Purifier of Water sachets; its importance cannot be emphasized enough. Preparedness includes:

- Identifying populations at risk for disasters;
- Obtaining and stockpiling supplies in areas of frequent disasters;
- Forming close partnerships and a distribution plan to allow for rapid deployment;
- Training Community Leaders to demonstrate correct product use; and
- Training and familiarizing the at-risk populations in advance of disasters.

3.1.1. Identifying Populations at Risk for Disasters

Relief organizations should work closely with government agencies such as Civil Protection in order to map areas at risk for disasters. The National System of Civil Protection and CENAPRED also provide disaster hazard maps at [http://atlasnacionalderiesgos.gob.mx/](http://atlasnacionalderiesgos.gob.mx/).

The number of households in these areas should be calculated to inform how many demonstrators will be needed for community education and training. This is estimated using Mexico’s average household size: 4 people/household. 11

3.1.2. Purchasing Supplies In Advance

During an emergency response, relief organizations should be prepared to provide:

- 1 sachet of P&G Purifier of Water per day for each household; and
- Instructional materials, trainings, and demonstrations on correct P&G Purifier of Water use.

Each sachet costs 1 MXN, the at-cost price from P&G. Sachets arrive from the manufacturing facility in cases containing 20 strips of 12 sachets each, for a total of 240 sachets per case. Dimensions are provided in Table 1.
Relief organizations should purchase sachets for vulnerable populations in advance and stockpile them in the areas of frequent disaster. In many disaster settings, major transportation systems can be severely compromised. For instance, flooding, high winds, and power outages can seriously impair air and land transportation. These conditions can make deploying sachets from a central location to the affected areas difficult in an acute emergency response. Decentralizing sachets strategically and storing them in areas of frequent disaster will allow for more rapid access and deployment of sachets in an actual emergency.

It is recommended that relief organizations purchase and store enough P&G sachets to support vulnerable populations for 3-4 weeks (approximately 24 sachets per household). This allows enough time for more sachets to be purchased and mobilized to the disaster areas.

Sachets and cases should be stored out of direct sunlight and protected from rain given they are in cardboard shippers. The packaging is designed with plastic and foil laminate to block moisture. Sachets are tested to ensure seal integrity in high-temperature and humidity conditions (40°C, 75% relative humidity).

<table>
<thead>
<tr>
<th>Table 1. Dimensions of P&amp;G Purification of Water Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>Single sachet</td>
</tr>
<tr>
<td>CASE</td>
</tr>
<tr>
<td>PALLET w/o pallet</td>
</tr>
<tr>
<td>PALLET with pallet</td>
</tr>
</tbody>
</table>

3.1.3. Pre-Training
Training is a critical step for ensuring the appropriate use of P&G sachets. Two levels of training must occur before the disaster:

(A) Training Community Leaders. First, community leaders must be trained to lead product demonstrations intended to educate the public and at risk communities. Community leaders are ultimately responsible for training and follow-up, to ensure proper use of P&G sachets for their assigned households, and report to suppliers when more sachets are needed by the community. Community leaders can be identified by relief organizations or the local government, and they will be trained through workshops held by the P&G sachet supplier, government agencies such as Civil Protection, and/or relief organizations. This training should occur at least 2 months prior to periods at high chance for a natural disaster to occur. Sample materials for training community leaders are provided in Appendix C.

One way to assess the competency of the demonstrators is to have them teach other volunteers about the product. This gives community leaders a chance to practice and simultaneously promotes
dissemination of knowledge about the product among the entire relief organization. Indeed, it is best if all emergency responders and volunteers are familiar with appropriate use of the P&G sachets. In an emergency situation, any volunteer could be approached with questions about product use and should be prepared to help conduct emergency demonstrations and/or educational follow-ups.

The volume of community leaders needed depends on how many households are in the disaster-prone area, as each leader is responsible for training a set number of households. Leaders should live in the same communities as the populations they are responsible for training. A trial model in Thailand is using a ratio of 1 community leader for every 80 households.

### Purpose of Community Demonstrations:

- To teach about the appropriate use of P&G Purifier of Water;
- To educate about the health risks associated with drinking contaminated water; and
- To instill trust and confidence in P&G Purifier of Water and its associated health benefits.

**(B) Training At-Risk Communities.** Communities in areas of frequent disasters (i.e. flood areas) should be familiarized with appropriate use of the product at least 1-2 months **before** an emergency is predicted to occur. Community leaders are responsible for holding demonstrations for all the households they are responsible. Initial product trainings and demonstrations should be held in community meeting places such as schools, churches, and health clinics; ideally they will be incorporated into already regularly occurring events such as town meetings. Community leaders should also conduct follow-up education for these households, either at community meetings or at the individual household level. Uptake of the product is much higher when individuals receive follow-up education (89-95%) compared to receiving only centralized trainings (10-54%).

**Box 2. Key steps for Demonstrations:**

- **Use a local source of water.** Dirt may be added to the water before the demonstration to highlight that P&G Purifier of Water sachets work even in very turbid water.
- **Discuss the health risks associated with contaminated water.** This provides the audience with context about why purifying their water is important.
- **Drink the treated water.** Demonstrators should always be the first to drink the final water to show confidence in the P&G Purifier of Water’s efficacy.
- **Allow time for follow-up questions.** This promotes the audience’s understanding of P&G Purifier of Water, and increases trust in the product.
Box 3. P&G Purifier of Water for emergency relief: Learning from the experiences of Thailand.

**During the massive 2011 flood in Thailand that affected 13.6 million people**, the P&G Purifier of Water was introduced as an emergency relief product. In a reactionary fashion, 200 community leaders and 50,000 households were trained to use the P&G sachet through Red Cross Volunteers and a Thai language instruction leaflet. An estimated 1 million sachets were distributed from project’s partners including trade partners; 7-Eleven, Tesco, Big C, The Mall, Foodland, and Tops, still operating in flooded areas. Red Cross and military resources were used to centrally distribute the product to communities in need; however, this method is no longer being used as central storage takes much longer to reach the communities after an emergency.

P&G formed key partnerships to promote proper use of the product with:

- **P&G Employee Volunteers** (Involvement in community service; Promote company pride)
- **Trade Partners** (Engage customers for support; Distribute sachets; Donate supplies)
- **NGO-Princess Pa Foundation** (Distribution, Training, Volunteer Base)
- **Government** (Public Health Depts., Dept. of Disaster & Mitigation, Ministry of Interior; Dept. of Community Development, Ministry of Interior, Prime Minister office)
- **Media** (Public awareness of need for support; Spread information on sachet use and safety)
- **Key Opinion Leaders** (KOLs: build trust and confidence in product safety)

To increase the use of the P&G Purifier of Water during the 2012 rainy season in Thailand, P&G continued to donate sachets and other daily household products during flood response. P&G Communications used videoconferencing technology to train 60 members of the Ministry of Interior’s Community Development Department on Safe Drinking Water Preparedness.

**To continue improving the P&G Purifier of Water protocol for the 2013 rain season**, P&G plans to train community leaders during July and August, approximately one month before floods are expected. Three provinces in Thailand were identified as high flood risk zones to have one hundred community leaders receive training in each of these provinces for a total of 300 community leaders. The provinces of Chiangmai, Uttaradit and Nakornsrithammarat have a total population of 2,135,588, similar to Tabasco’s 2,238,603.

Community leaders will receive training by the P&G Thailand Communications Leader and a representative from the Princess Pa Foundation, Red Cross Society of Thailand. One half-day workshop per province will be held for 100 community leaders at an already existing meeting such as a town hall meeting, public health meeting, or religious gathering. The half-day agenda includes an introduction on the Children’s’ Safe Drinking Water Program, presentation on the current need for clean water in daily and emergency use in Thailand, demonstration video, live demonstration of the P&G Purifier of Water, discussion on emergency response preparation by the Foundation, and distribution of training materials such as video clips, factsheets, instruction sheets, 2 demonstration buckets, and 10-20 cases per community leader.

Each community leader is responsible for 80 households in his or her village to 1) train the villagers, 2) follow up to ensure accurate use, and 3) report to the Princess Pa Foundation on village demand for P&G Purifier of Water. Community leaders follow up with their households bi-weekly during informal meetings or household visits. For villages that need the P&G purifier of water for daily use, community leaders are tasked to distribute one month’s supply of 1 strip or 24 sachets per household. For villages that need P&G Purifier of Water stored in case of emergency use, community leaders are tasked to store their 10-20 cases in their homes until distribution is needed.
Table 2. Summary of Steps for Emergency Response Preparedness

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Calculation/Notes</th>
</tr>
</thead>
</table>
| (1)  | Identify Vulnerable Areas and how many households are in these areas | - Local government agencies such as Civil Protection can provide vulnerability maps to extract at-risk populations. - Estimate an average of 4 people per household: 
  \[
  \text{# of Susceptible Households} = \frac{\text{Susceptible Population}}{4}
  \] |
| (2)  | Purchase enough sachets to supply these households during the first month of an emergency | - Assuming 24 sachets/month/household: 
  \[
  \text{# of Sachets} = \frac{24 \text{ P&G sachets}}{\text{month/household}} \times (\text{# of households affected})
  \] 
  \[\begin{align*}
  \text{# of Pallets to order} &= (\text{# of sachets needed}) \times \frac{1 \text{ case}}{240 \text{ sachets}} \times \frac{1 \text{ pallet}}{473 \text{ cases}} \\
  \text{Cost} &= (\text{# of sachets needed}) \times 1 \text{ MXN per sachet}
  \end{align*}\] |
| (3)  | Establish a storage and distribution plan | - Store 1-month supply of P&G sachets for each household in decentralized locations for rapid deployment. - One possible mode: Use Community Leaders to store the sachets. |
| (4)  | Calculate how many Community Leaders are needed for community training and follow-up | - Assuming a ratio of 1 community leader to 80 households: 
  \[
  \text{# of Community Leaders} = \frac{\text{Number of Susceptible Households}}{80}
  \] 
  \[\begin{align*}
  \text{# of Cases per Community Leader} &= \frac{1 \text{ Case}}{10 \text{ Households/Month}} \times (\text{# of Households Assigned})
  \end{align*}\] |
| (5)  | Identify and Train Community Leaders | - Local government and relief organizations can identify community leaders. Community leaders should live in the same area as the households they are responsible for. - P&G supplier, relief organization, or government agencies such as Civil Protection lead half-day workshops. - Timeline: >2 months before disaster |
| (6)  | Train Community Leaders | - Community leaders hold weekly or bi-weekly demonstrations for their communities. These should occur in churches, schools, clinics, or other community centers. Ideally they are incorporated into already regularly occurring events (town meetings, religious gatherings). - Timeline: >1 month before disaster |
3.2. Emergency Response

Overview: Preparation is critical, but when an emergency occurs, there are still several important steps to ensure a successful response and the appropriate use of P&G Purifier of Water, including:

- Assessment of whether or not P&G Purifier of Water is appropriate for the emergency setting;
- Appropriate distribution of P&G sachets and accompanying instructional handouts; and
- Continued training and education about proper use of the P&G sachets.

3.2.1. Assessing if P&G Purifier of Water is Appropriate for the Emergency Situation

P&G Purifier of Water can be successfully implemented in many emergency response settings, but not all. A PoUWT option like the P&G sachets should always be one among many strategies a relief organization has to ensure safe water access in emergencies. In some cases it is more practical to provide other options such as bottled water (i.e. when threats of violence or instability may interfere with the ability to conduct product demonstrations). Choosing the correct emergency situation to respond to with P&G sachets is critical, and considerations should include the available water source, training capability, and availability of materials. A decision map (Box 4) is provided and intended to help quickly determine if P&G Purifier of Water sachets are appropriate for the emergency situation.

3.2.2. Deploying P&G Purifier of Water Sachets

When a disaster is expected or a warning is issued, relief organizations should start coordinating the distribution of a one-month supply of P&G Purifier of Water (24 sachets) to each household. While distributing sachets, relief organizations and community leaders should also ensure:

- **Households have all materials (i.e. buckets) necessary for the treatment process.** If not, the community leader should help them obtain missing materials.
- **Households receive accompanying instructions that are in the local language.** Instructions should also be illustrated in case of illiteracy.
- **Household members are physically capable of carrying out the water treatment process.** If not, community leaders will be responsible for preparing the water for that household or identifying someone who can (i.e. neighbor).

3.2.3. Following-up

Community leaders should follow-up with households to ensure appropriate use of P&G Purifier of Water during the emergency response phase. Follow-ups provide the community members an important opportunity to ask any questions or express any concerns they may have. Community leaders should also take inventory of how many sachets households use and need.
Box 4. Map for assessing if P&G Purifier of Water is appropriate for a given emergency situation.

1. Has normal access to potable water been compromised?
   - No
   - Yes
     - Is there access to any type of water locally, including contaminated water?
       - No
       - Yes
         - Is the available water salt water?
           - No
           - Yes
             - Is the water free of other contaminants P&G Purifier of Water cannot eliminate, including industrial waste (Section 2.4)?
               - No
               - Yes
                 - Has the community had significant product pre-exposure and training?
                   - No
                   - Yes
                     - Are there accompanying instructions that are illustrated and in the local language?
                       - No
                       - Yes
                         - P&G Purifier of Water may be used

   - Yes
     - Is the emergency environment stable enough to provide training?
       - No
       - Yes
         - Does the organization have the capacity to train beneficiaries?
           - No
           - Yes
             - P&G Purifier of Water should NOT be used

   - No
     - Is the organization able to provide the missing materials?
       - No
       - Yes
         - Do families have the supplies needed for the treatment process (e.g., buckets)?
           - No
           - Yes
             - P&G Purifier of Water may be used
3.3. Post-Emergency Phase

**Overview:** P&G Purifier of Water can also provide a source of clean water during post-emergency phases. In these periods of reconstruction and development, relief organizations should ensure:

- A consistent supply of P&G Purifier of Water sachets;
- Continued distribution to families who need them;
- Appropriate use of product; and
- Training and follow-up education as needed.

3.3.1. Monitoring and Assessment of Use

To ensure that the sachets are actually being used before additional sachets are provided, relief organizations may choose to use a system in which families exchange empty used sachets for new ones. To ensure that the sachets are being used properly, relief organizations may also be interested in conducting assessments of product use knowledge, or testing household water samples for chlorine uptake.\(^2\) A worksheet for assessment of correct knowledge and use is provided in Appendix D.

3.3.2 Prolonged Use and Potential for Everyday Use

P&G Purifier of Water can be used to serve communities until a safe water source has been re-established or identified. The distribution of 1 free P&G Purifier of Water sachet per day per household can be continued in the post-emergency phase.

Relief organizations interested in bringing P&G Purifier of Water to such communities should have a commitment to providing sachets long-term, confirm that community members have a strong understanding in how to use the product, and ensure that the community or organization is able to provide frequent training and education for continued correct use.

P&G Purifier of Water may also be used as an intervention for populations lacking the infrastructure to provide potable water, including developing, rural, nomadic, and/or indigenous populations. For these situations, a similar model to that of disaster relief may be adopted, where community leaders are responsible for training and distributing sachets to a set number of households. Community leaders, after training the households, should immediately provide households with a supply of P&G sachets, and then provide more sachets during follow-ups.
SECTION 4: EXPECTED CHALLENGES

Several factors may limit the adoption of P&G Purifier of Water in disaster settings. With the help of trained volunteers, P&G sachets can be successfully deployed and used by carefully addressing these:

1. Knowledge about the importance of clean water. Many people are unaware of the associations between contaminated water and health risks such as diarrhea and malnutrition. This knowledge gap is an important barrier in the use of water purifying technologies. Demonstrators should always explain why clean water is important, as well as clarify that clear water is not always clean water. To further promote education about the importance of clean water, relief organizations can also partner with other agencies promoting public health initiatives such as handwashing.

2. Product Awareness. Many beneficiaries may not know about the P&G Purifier of Water product, so it is important to pre-expose and familiarize communities with the product before the disaster occurs. This will promote uptake and usage during an actual emergency response and is especially important for communities at high risk for disasters (i.e. flood areas). Product awareness may be increased through community demonstrations, media campaigns, and the distribution of educational materials (such as pamphlets and posters) about the problem of contaminated water and the P&G Purifier of Water product.

3. Education in appropriate use. Training to use P&G Purifier of Water is critical, as the treatment process requires several steps and each step is critical for producing the final, potable water. As above, communities at high risk for disasters should be trained to appropriately use the P&G sachets before the disaster occurs. Furthermore, beneficiaries should always receive instructions that are in the local language and illustrated in case of illiteracy. If possible, household or community follow-up sessions should be conducted.

4. Education around chlorine taste and odor. Water treated with P&G Purifier of Water will have a slight chlorine taste similar to municipal water, but in some cases, these sachets will be distributed to people who have never tasted municipal water and are not used it. Demonstrators should explain that chlorine is important in removing microbial pathogens, and these odors and tastes are indicators of water safety. Because the chlorine taste and odor will diminish over a few hours, it can be recommended that beneficiaries prepare the water at night, cover it to prevent recontamination, and drink it the following day; most of the chlorine taste will have disappeared by then.

5. Explaining the color change. When the P&G powder is added to water, a color change or darkening can occur even if the water is initially clear. The color might be orange or brown depending on the nature
of the source waters. Demonstrators should explain that this may happen and that this is a sign that the product is working properly. However, remind end users that the final drinking water should be clear.

6. Other beliefs about using the product. A number of other beliefs or behaviors may hinder product acceptance and use, including:

- Concerns about self-efficacy (The process is too hard or complicated)
- Perceptions that the process is too time and/or labor-intensive
- Perceptions that the process requires too many materials

Once again, these concerns are best addressed by the demonstrator, so it is critical that the he or she is well prepared to tackle these concerns (Appendix B.3).

7. Understanding what water treated with P&G Purifier of Water may be used for. In some communities, households may not drink the final, purified water but instead use it for washing dishes, vegetables, clothes, or even their children. While the use of water treated with P&G Purifier of Water for these other purposes is certainly harmless, it is important to recognize that these actions can reflect miscommunication about the product's purpose, a lack of trust in the product's safety and efficacy, or an aversion to the purified water’s smell or taste. Thus, when such behaviors are observed, volunteers should try to elicit the reasons behind not drinking the treated water and address them properly.

8. Adequate supplies for using the sachets. In order to successfully treat contaminated water, P&G Purifier of Water requires, at a minimum, two buckets, a cloth, and a stirring rod. In emergency situations, these materials may not be readily available or difficult to find. It is very important for organizations to assess whether or not these materials need to be provided for beneficiaries.

9. Acceptance by key opinion leaders (KOLs). It is important to engage KOLs, such as various community leaders, so that they understand that P&G Purifier of Water is a quality product, safe for their communities, and will provide an effective and practical solution to providing emergency drinking water. It is very important to gain the support and help of community leaders. Local dignitaries, medical personnel, nurses, and religious leaders can be important allies. The emergency response also needs to be coordinated with the local government recommendations so that there are not conflicting messages. For example, the community may not understand there is no need to both boil water and use P&G sachets.
This handbook provides a general approach to using P&G Purifier of Water as a means to provide clean water in emergency situations. Its contents can also be adapted for using P&G Purifier of Water to bring potable water to communities in need.

Training is key for uptake and appropriate use of point-of-use water treatment technologies during—and potentially after—emergencies. For areas at high risk for disasters, training should occur in advance to emergency situations through community leaders. Pre-exposure and familiarization can promote rapid deployment and implementation of P&G Purifier of Water sachets during a disaster.

The training process requires an organization and community leaders committed to educating communities about the proper use of P&G Purifier of Water. This process provides a great opportunity to cultivate a stronger culture of preparedness and prevention, and it also creates an opportunity to educate the public about the importance of clean water and sanitation. The lack of knowledge about health risks associated with contaminated water, such as diarrheal disease, malnutrition, and infant mortality, is a key barrier that prevents many communities from using safe water options.

Furthermore, P&G Purifier of Water has a huge potential in reducing the burdens of cost and transportation associated with current protocols. A 4g pack of P&G Purifier of Water can provide 10L of purified water at the cost of 1 MXN. Two 12-pack strips can supply 240L of clean water, enough to supply a family for approximately 1 month. Relief organizations would have to provide almost 500 bottles of 500mL water bottles to provide the same amount of clean water. This also greatly reduces the environmental burdens that are created by a heavy reliance on bottled water.

Once a relief organization establishes close partnerships with the supplier and communities it serves, provides a commitment to educating and training the community, and invests in the overall benefits of maximizing community preparedness for emergencies, the P&G Purifier of Water can be an effective and promising intervention for providing potable water to emergency situations.
REFERENCES


ADDITIONAL RESOURCES

- http://www.pghsi.com/safewater/ - P&G Health Sciences Institute
  http://www.psi.org/pur%2Demergency%2Drelief/
  http://www.csdw.org/csdw/home.shtml
APPENDIX
Appendix A. COFEPRIS Approval

CLAUDIA HERRERAMORO JUAN
Vice-Presidenta de Relaciones Externas y Asuntos Corporativos
P&G México
Loma Florida No. 32
Col. Lomas de Vista Hermosa
Delegación Cuajimalpa de Morelos
C.P. 05100, México, D.F.

PRESENTES

De conformidad con su solicitud presentada a esta Comisión, y considerando la necesidad de tener disponibles productos adecuados para atender en situaciones de contingencia hidrometeorológica y los requerimientos de la población de agua microbiológicamente segura, le comunico, que esta área considera que la sustancia germicida denominada PUR es un producto valioso para suministrar agua a población marginada, por lo que se deben considerar las siguientes indicaciones:

- Proporcionar un entrenamiento inicial al consumidor.
- Incluir en su etiqueta instrucciones gráficas y textuales en español.
- Asimismo, anexar un instructivo que le permita al consumidor final un uso seguro del mismo.

Sin otro particular, lo envío un saludo.

SUFRAIGIO EFECTIVO. NO REELECCIÓN.
COMISIONADA DE EVIDENCIA Y MANEJO DE RIESGOS

M. en C. ROCÍO DEL CARMEN ALATORRE EDEN WYNTER

Monterrey 33, Col Roma, Del. Cuauhtémoc, México D.F., C.P. 06700,
Tel. 5080-5200 [Ext. 1404]- 01800-033-50-90
www.cofepris.gob.mx
Appendix B. Sample protocols

B.1: Sample protocol for Disaster Relief

Scenario: Communities at risk of being affected by annual flooding in Tabasco, Mexico due to 3 water sources: Sierra, Chontalpa, Usumacinta-San Pedro. Flood season is May-Nov in Tabasco.

**PREPAREDNESS**

Tasks:

1. Identify vulnerable areas and how many households are in each area
2. Purchase enough sachets to supply these households during the first month of an emergency
3. Establish a storage and distribution plan
4. Calculate how many Community Leaders are needed for community training and follow-up
5. Identify and train Community Leaders
6. Train community

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<th>Water Source - Sierras</th>
<th>Districts</th>
<th>Susceptible Population</th>
<th>Susceptible Households*</th>
<th>Total Population (INEGI)</th>
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*Total: **101,112** | **25,278** | **185,863**

*Susceptible Households estimated by assuming an average of 4 people in each household

**Districts unaccounted for** (No data available):

- Centro, Nacajuca, Jalpa de Mendez, Paraiso, and Comalcalco
(2) Purchase enough sachets to supply these households during the first month of an emergency.
- Sachets calculated by assuming 24 sachets provide a one month supply of potable for a family.
- Relief organization or agency should purchase these in advance of disaster.

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<thead>
<tr>
<th>Water Source</th>
<th>Districts</th>
<th>Approx. Susceptible Households (Avg. 4 People/ Household)</th>
<th>Sachets needed in Month 1 (24 sachets/ household/ month)</th>
<th>Cases needed in Month 1 (1 case/240 sachets)</th>
<th>Cost of Sachets for Month 1 (1MXN / sachet)</th>
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Approximately 5 pallets (473 cases/pallet) are needed to supply the susceptible population for the first month of a disaster; this will cost around $600,000 MXN (not including transportation or storage).
- This is calculated assuming that only P&G Purifier of Water sachets will be used to provide potable water.
- Organizations may purchase less and use it as a supplement to bottled water.

(3) Establish a storage and distribution plan
- Store a one-month supply of P&G sachets for each household in decentralized locations for rapid deployment
- One model is to have Community Leaders to store the sachets and then distribute them to the households they are responsible for.

(4) Calculate how many Community Leaders are needed for community training and follow-up
Based on the Thailand model, a Community Leader: Households ratio of 1:80 is feasible.

<table>
<thead>
<tr>
<th>Water Source</th>
<th>Districts</th>
<th>Approx. Susceptible Households (Avg. 4 People/ Household)</th>
<th>Community Leaders (CL) needed (1 CL/80 households)</th>
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Around 300 Community Leaders for 25,278 households will need to be identified in order to train and educate the susceptible population.
(5) Identify and Train Community Leaders

**Timeline:** 2-3 months before flood season in Tabasco, so this should occur before March

- Relief organizations and local government can help identify the 316 community leaders needed
- Community leaders should live in the same districts as the households they are responsible for
- A training team from the P&G sachet supplier (and partnering with a relief agency) will lead half-day workshops for identified community leaders
- Three workshops will be held: one for each group of districts affected by different water sources.
  - Workshop agenda should include:
    - Introduction about the importance of clean drinking water;
    - Informational videos about the product (history and use in Latin America);
    - P&G Purifier of Water demonstration; and
    - Distribution of training materials.

(6) Train Community

**Timeline:** 1-2 months before flood season in Tabasco, so this should occur before April

- Community leaders hold weekly demonstrations for the communities they are responsible for.
- Initial trainings can occur in churches, schools, clinics, or other community centers, and ideally they are incorporated into already-existing, regular events (town meetings, church).
- Follow-up education should occur at least once a month and can take place at community meetings or at an individual household level.

**DEPLOYMENT**

**Tasks:**

1. Assess situation and if P&G Sachets are appropriate for the emergency situation
2. Deploy and distribute sachets
3. Follow-up to monitor and assess further needs

(1) **Assess situation and if P&G Sachets are appropriate for the emergency situation**

- Consider: Available water source, distribution/training capacity, and availability of necessary materials such as buckets
- Use decision map (Box 4)

(2) **Deploy and distribute sachets**

- Begin deployment as soon as possible, i.e. when a flood warning is issued by CGPC
- Community Leaders can help ensure distribution to each household they are responsible for.
- Community Leaders should also ensure each household’s understandings of the process, possession of proper materials, and physical capability of completing the process.

(3) **Follow-up to monitor and assess further needs**

- Community leaders should follow-up during the disaster, if possible, and assess:
  - Are households using sachets correctly?
  - Do they still have the correct materials?
  - Do they have any questions about the treatment process or use of treated water?
  - How many sachets do they have left?
- Consider community need and the state of transportation in the affected area in deciding if and how many more sachets should be ordered.
B.2: Sample protocol for Daily Use

Scenario: Communities without CEAS coverage in Tabasco may lack access to potable water.

**PREPAREDNESS**

Tasks:
1. Identify vulnerable areas and how many households are in each area
2. Purchase enough sachets to supply these households during the first month of an emergency
3. Establish a distribution plan
4. Calculate how many Community Leaders are needed for community training and follow-up
5. Identify and train Community Leaders
6. Train and supply community

(1) Identify vulnerable areas and how many households are in each area
- Information about water coverage in Tabasco was provided by CEAS.

<table>
<thead>
<tr>
<th>No.</th>
<th>District</th>
<th>Total Population</th>
<th>Coverage (%)</th>
<th>Population w/o Coverage</th>
<th>Approx. Households w/o Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cardenas</td>
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<td>87.73%</td>
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<tr>
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<td>3,900</td>
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<tr>
<td>4</td>
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<td>112,856</td>
<td>89.27%</td>
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<tr>
<td>5</td>
<td>E. Zapata</td>
<td>29,033</td>
<td>98.36%</td>
<td>476</td>
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<tr>
<td>6</td>
<td>Huimanguillo</td>
<td>96,778</td>
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<td>7</td>
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<tr>
<td>8</td>
<td>Jalpa de Mendez</td>
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<td>90.45%</td>
<td>7,200</td>
<td>1,800</td>
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<tr>
<td>9</td>
<td>Jonuta</td>
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<td>95.17%</td>
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<tr>
<td>10</td>
<td>Nacajuca</td>
<td>112,109</td>
<td>97.43%</td>
<td>2,881</td>
<td>720</td>
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<tr>
<td>11</td>
<td>Paraiso</td>
<td>75,111</td>
<td>86.71%</td>
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<tr>
<td>13</td>
<td>Teapa</td>
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<td>94.07%</td>
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<tr>
<td>14</td>
<td>Tenosique</td>
<td>53,866</td>
<td>91.36%</td>
<td>4,654</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
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<td><strong>87.01%</strong></td>
<td><strong>158,512</strong></td>
<td><strong>39,628</strong></td>
</tr>
</tbody>
</table>

*Susceptible Households estimated by assuming an average of 4 people in each household

Autonomous Districts unaccounted for:
- Centro, Balancán, Macuspana

(2) Purchase enough sachets to supply these households during the first month.
- Sachets calculated by assuming 24 sachets provide a one month supply of potable for a family.
- Relief organization or agency should purchase these in advance of disaster. The price of sachets are 1 MXN/sachet.
<table>
<thead>
<tr>
<th>No.</th>
<th>District</th>
<th>Susceptible Households</th>
<th>Sachets needed/month (24 sachets/household)</th>
<th>Cases needed/month (1 case/240 sachets)</th>
<th>Cost of sachets/month (1 MXN/sachet)</th>
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<tbody>
<tr>
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<td>2,857</td>
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<tr>
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<td>39,628</td>
<td>951,074</td>
<td>3,963</td>
<td>$951,073.76</td>
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</tbody>
</table>

About 8 pallets (473 cases/pallet) are needed to supply this population for each month; this will cost almost $1 million MXN/month.

- This is calculated assuming that P&G Purifier of Water sachets will be used to provide the main source of potable water. Organizations may choose to purchase less and use it as a supplement.

(3) Establish a distribution plan

- One-month supplies of P&G sachets for each household should be given to the Community Leaders responsible for training these communities in need.
- Community leaders distribute additional supplies of P&G sachets as needed during follow-ups.

(4) Calculate how many Community Leaders are needed for community training and follow-up

Based on the Thailand model, a Community Leader: Households ratio of 1:80 is feasible.

<table>
<thead>
<tr>
<th>No.</th>
<th>District</th>
<th>Susceptible Households</th>
<th>Community Leader needed</th>
</tr>
</thead>
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<tr>
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</tr>
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<td>79</td>
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<td>4</td>
<td>Cunduacan</td>
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<td>Jonuta</td>
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</tr>
<tr>
<td>14</td>
<td>Tenosique</td>
<td>1,164</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
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<td>39,628</td>
<td>495</td>
</tr>
</tbody>
</table>

Almost 500 Community Leaders will need to be identified in order to train and educate approximately 40,000 households.
(5) Identify and Train Community Leaders

- Relief organizations or the local government will identify the needed communities.
- Community leaders should live in the same districts as the households they are responsible for, or already frequent these in-need communities for other humanitarian or relief work.
- A training team from the P&G sachet supplier (and partnering with a relief agency) will lead half-day workshops for identified community leaders.
- Three workshops will be held: one for each group of districts affected by different water sources.
  - Workshop agenda should include:
    - Introduction about the importance of clean drinking water and how it is threatened in emergency settings;
    - Informational videos about the product (history and use in Latin America);
    - P&G Purifier of Water demonstration;
    - Distribution of training materials (i.e. buckets and sachets, sample demonstration script, demonstration video, FAQ sheet).
    - Distribution of 10-20 cases/community leader

(6) Train Community

- Community leaders will hold an initial training for the communities in need and distribute the first month supply after this training.
- Follow-ups must be conducted to ensure that the communities are using the sachets, understand the process and use, and have the appropriate materials.
  - First follow-up should be 1-2 weeks after initial training.
  - Later follow-ups can be after long periods, such as a month.
Appendix C. Tools for Training Community Leaders

C.1: Sample Workshop Agenda for Training Community Leaders

Half-day Agenda

- Introduction on the importance of clean water and how it is compromised in emergency settings
- Show promotional video about P&G Purifier of Water and its use in Latin America (3 minutes)
- Show demonstration video (10 minutes)
- P&G Purifier of Water Demonstration (30 minutes)
- Discuss Disaster Response Preparation
- Distribute:
  - Training materials (Factsheet, Demonstration Script, FAQs, Video clips);
  - Demonstration buckets (2 per community leader); and
  - Cases of Sachets (10-20 cases for each community leader), if applicable.
C.2: P&G Purifier of Water Demonstration Script

Setup: You will need
- 1 P&G Purifier of Water sachet
- Scissors or a knife to open the sachet
- A stirring utensil
- A clean utensil to dispense the clean water
- A watch or timer
- 1 bucket holding 10L of contaminated water (Use local water; you may add dirt to demonstrate that it works even in the most turbid waters)
- 1 clean, empty bucket covered with a clean, cloth filter that is secured with clips

You will also need an assistant; an audience member may assist you if you do not have one.

Demonstration Outline:

1. Introduce yourself
2. Talk about the health risks associated with drinking contaminated water
   - Ask the audience what they already know about contaminated water
   - Contaminated water is associated with diarrheal disease, malnutrition, and infant mortality
   - Clear water does not necessarily mean clean water
3. Introduce the product
   - This sachet contains a powder that acts as a water purifier. It is made by Procter & Gamble and turns contaminated, turbid water into pure drinking water
   - It uses the same ingredients as municipal water treatment systems all over the world including Mexico. The two main ingredients are:
     a) A flocculent that causes dirt, debris and parasites to clump together, and
     b) A chlorine disinfectant that kills bacteria
   - It can be used by the entire family and is recommended for infants. It has been used all over the world since 2004, in response to natural disasters and in clean water community programs. It has provided >6 billion liters of clean water in >65 countries.
4. Explain the materials and set up needed
   - The product requires only a few household items which you probably already have: 2 buckets, scissors or a knife, something to stir with, and a clean cloth filter (like a shirt)
   - One bucket will be for dirty water, and the other for storing pure water. These should never be mixed up! Cover the clean bucket with a clean cloth filter, which can be secured with clothespins.
5. Demonstration: Clearly explain each step as you demonstrate
   During the ‘waiting’ steps, encourage questions, address any concerns the audience may have, and re-emphasize the steps and timings.
The treatment process is simple: collect 10L of water from the nearest water source and wash your hands with soap and water before starting the process.

1) **Add the powder:** Open the sachet with a pair of scissors, knife, or razor blades. The sachet cannot be opened with your hands, and you should never use your teeth.
   - Add the powder to the bucket filled with 10L of water. Depending on the water source, a color change may occur, even if the water is initially clear. This is a sign that the product is working.

2) **Stir** (5 Minutes): Stir vigorously for 5 minutes and make sure you create a vortex.
   - During the stirring process, the water will become hazy; this will indicate that the process is working. Afterwards large sediments will form at the bottom.

   *At the completion of the stirring, make sure the audience can see the dirt separating from the water.*

3) **Wait** (5 minutes): Let the water stand for 5 minutes until it becomes clear.
   - The P&G sachets are proven to remove dirt particles, parasites, bacteria, and viruses. The CDC has confirmed that the powder reduces diarrhea.
   - If the water is still colored, stir again and let it rest for another 5 minutes.

4) **Filter:** Once the water is clear and the flocculated waste is at the bottom of the container, carefully filter the water through a clean cloth into a clean storage container.
   - The filter should be a clean, cotton cloth without any holes, such as a cotton shirt.

5) **Wait** (20 minutes): Let the water stand for another 20 minutes.
   - It is critical to wait the entire 20 minutes. During this time, chlorine is disinfecing the water.
   - Make sure to discard the waste from the first bucket far away from children. Thoroughly wash the cloth that you used as a filter with soap and water before you use it again.

6) **Considerations Before Drinking**
   - Do NOT drink the water if it is yellow or cloudy after treatment. If waste gets into the treated water, use another cloth to filter it out. The water is still good to drink.
   - ALWAYS use a clean utensil to dispense the water from the storage container. Otherwise, the water you just treated will become contaminated again.

6. **Drink the water**

   *Everyone can try the water, but ALWAYS make sure the demonstrator is the first to do so.*
   - There may be a harmless chlorine taste and smell, but these are signs that the product is working. The taste and smell will lessen over time, so if you really do not like it, let the water sit overnight, covered, and the chlorine taste and smell will be gone by the morning.
   - Remember, if you are storing the water for any reason, always COVER it to prevent recontamination. A solid lid is best; you may use a large plate or pan as a lid.

7. **End by asking if there are any more questions.**
**C.3: Tips for Demonstrators**

*Sample demonstrator messages to overcome potential barriers to use.* Experiences with introducing P&G sachets into communities around the world show that various perceptions and behaviors may hinder acceptance and use of P&G sachets. Demonstrators play a critical role in overcoming them:

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Sample messages provided by demonstrator</th>
</tr>
</thead>
</table>
| Knowledge about diarrheal disease     | • There are many bugs/pathogens in the water that can cause diarrhea and other health problems, even if you cannot see them   
• Clear water does NOT mean safe water   
• Children whose parents treat water with P&G sachets rarely get diarrhea                                                                                     |
| Trust                                 | • This product has been already used to make more than 6 billion liters of clean water in over 65 countries around the world   
• It is approved by Cofepris                                                                                                                                  |
| Self-efficacy                         | • It’s as easy as remembering “5:5:20:” 5 minutes of (vigorous) stirring, 5 minutes of sitting, filtering and then 20 minutes of sitting before drinking.                                                                                   |
| Perceived cost (time, materials)      | • Although the process takes 30 minutes, the amount of labor involved is only about 5 minutes (Stirring)  
• The materials you need to use the sachet are probably already in your house. You can be creative and use shirts as filters, and large plates or pans as lids.                                             |
| Color changes                         | • Sometimes even clear water will darken when you add the product, but this is a sign that the product is working. Just make sure the final drinking water is clear!                                                                |
| Odor and taste of the treated water   | • The smell and taste are due to chlorine, which is important in killing the pathogens/bugs, so they are actually signs of watery safety.   
• These tastes will go away after a few hours, so if you really do not like it, prepare the water at night, cover it, and the taste will be gone by the next morning.                        |

**Training different audiences.** Demonstrators may adapt the demonstrator depending on the audience.

<table>
<thead>
<tr>
<th>Audience</th>
<th>Sample techniques for target audience</th>
</tr>
</thead>
</table>
| Children     | • Promote an **Interactive** demonstration, for example:   
  o Allow children to come up and participate in the mixing (make sure they are stirring vigorously though)  
  o Countdown the final 30 or 60 seconds of each segment of the process  
  o Ask students questions throughout the presentation  
  • Integrate the lesson into already existing handwashing programs at the school  
  • Present the demonstration as a science experiment, explaining the two main ingredients of the sachets and how they work together to purify turbid, contaminated water. |
| Mothers      | • Emphasize links between contaminated water, diarrhea, malnutrition, and infant mortality  
• Train **healthcare workers (i.e. nurses, midwives)** as demonstrators. This will promote sustainable training as well as confidence in product credibility. |
C.4: FAQ about P&G Purifier of Water

1. **What does sustainability mean for P&G?**
   For P&G, sustainability is ensuring a better quality of life for the current and future generations. There is a need for a balance between social, economic, and environmental aspects. Derived from these needs, P&G has 5 strategies for sustainability: 1) Products, 2) Operations, 3) Social Responsibility, 4) Employment, 5) Business Partners.

2. **What is P&G Purifier of Water?**
   P&G Purifier of Water is an advanced technology developed by P&G that transforms contaminated water into potable water that is safe for drinking.

3. **What is Children’s Safe Drinking Water project?**
   This is a social responsibility program through which P&G helps people who need water the most. It is a part of P&G’s social contract to support the healthy development of children.

4. **What ingredients are in P&G Purifier of Water?**
   P&G Purifier of Water contains a disinfectant agent (Hypochloric Acid) that kills bacteria, and a coagulating salt (Iron Sulfate) that removes suspended matter and other microorganisms. It also contains other ingredients that favor the coagulation and flocculation process. P&G Purifier of Water uses the same process as well developed nations and large treatment facilities yet it permits that the process can be used in homes or places of need.

5. **What is the model for P&G Purifier of Water?**
   P&G Purifier of Water is used for two things: societies with poor water supply and in case of natural disasters. This is not a commercial product that is available for sale to the general public because its main goal is to help the people who need clean water the most. The product is distributed by NGOs and the government.

6. **Where has P&G Purifier of Water been distributed?**
   It has been distributed in over 65 countries in two uses. It has been used in countries with marginal resources such as Africa and India and has also been used in natural disaster in countries like Haiti, Guatemala, and Chile.

7. **How many people have benefited from P&G Purifier of Water?**
   Up to this date more than 2 billion people have benefited from this product.

8. **How much does a P&G Purifier of Water sachet cost?**
   A sachet costs approximately 1MXN, including the cost of importation and customs. The cost of this product is subsidized by P&G since it is a part of a social responsibility program.

9. **Is P&G doing this for profit or as a philanthropic effort?**
   P&G does not sell this product to the consumer. The object of this program is social responsibility, so it is distributed through organizations that reach out to people in need.

10. **Where is this product made?**
    P&G Purifier of Water packets are made in Pakistan and Singapore.

11. **Does P&G Purifier of Water kill viruses, bacteria, and parasites?**
    Yes, this product removes all of these things from the water.

12. **How does P&G Purifier of Water remove bacteria from water?**
P&G Purifier of Water uses a disinfecting agent called calcium hypochlorite that kills bacteria through an oxidation process.

13. **Can P&G Purifier of Water be used in any kind of water?**
   No, P&G Purifier of Water is not designed to treat salt water, water with high levels of nitrites and nitrates, treated water, or water that contains industrial solvents.

14. **Is water treated with P&G Purifier of Water safer or is water from the tap better?**
   The P&G Purifier of Water system uses the same processes and ingredients that the government uses to purify water. Additionally, the water produced from the PuR process meets the quality standards set forth by the government.

15. **How many P&G sachets are recommended for distribution to a family?**
   A sachet purifies 10 liters of water and considering that a person should drink 2 liters of water a day. A family of five should use one sachet a day or 7 sachets a week.

16. **Why can’t you open the sachet with your teeth?**
   This product should not be ingested directly. This practice also reduces the risk of getting the product in ones eye.

17. **If I do not have a 10 liter bucket can I just use a 5 liter bucket and half a sachet?**
   While it is not recommended, it can be done if there is no other option. The same directions should still be followed to attain pure water.

18. **Can I use 20 liters and 2 sachets?**
   This is not recommended because the greater the volume, the harder it will be to properly mix the product; however, it can be done.

19. **Can I use more than 20 liters and more of the product?**
   No, this should not be done and will not produce the desired results of the product.

20. **If the product is still yellow after the process, can it be consumed?**
   If this occurs, the mixing process can be repeated to see if the water loses its yellow color. Water that is not clear after mixing should not be consumed.

21. **What if I drink the water before the process is complete?**
   This should not be done, since the water has not gone through the entire purification process because you run the risk of consuming live pathogens and bacteria. Water will also have a strong taste of chlorine of chlorine if this does not occur.

22. **If I accidentally spill sediment into the water what should I do?**
   You should re-filter the water. After this, the water can be consumed at no risk.

23. **Where should I dispose of the sediment from the water?**
   Away from pets, children, or other water sources.

24. **What if I accidentally ingest the material from the sachet?**
   While this product was designed to pose no risk to humans, the effects depend on age and health condition. The most adequate thing would be to consult a doctor.

25. **What if the powder gets in my eye?**
   Rinse with water. If irritation persists, contact a doctor.
C.5: Demonstrator Competency Assessment

1) Which of the following are correct ways to open the P&G sachets? Circle all that apply.
   Teeth  Knife  Fingers  Scissors

2) Why is the correct opening of the sachet important?

3) What are the two main ingredients of the sachet?

4) How many liters of water should be purified with one sachet?

5) Is it possible to use 20 liters of water? Why or why not?

6) In which types of water do the sachets not work?

7) After putting the sachet into the dirty water, for how long do you mix?

8) What should the water look like while mixing for 5 minutes? Circle correct option below
   Lightly spinning  Spilling from the bucket  Steady vortex

9) After stirring for 5 minutes, you must let the water settle for another 5 minutes: True/False

10) A clean bucket must be ready to have the water filtered into it, with a ________________ fully secured on top.

11) Everything in the mixing bucket, including the waste, should be poured into the second bucket: True/false

12) For how long should the filtered water be left to sit, with its cover on, before consumption? What is happening during this step?

13) What should the user do if the water is still dirty after correctly completing the steps?

14) Where should the waste be discarded?

15) What important step must you take if you want to store the water?
1) What are acceptable ways to open the sachets? Circle correct options.
   *Knife, Scissors*

2) Why is the correct opening of the sachet important?
   *If opened incorrectly, such as with the teeth, the contents of the sachet could get contaminated.*

3) What are the two main ingredients of the sachet?
   *(1) Calcium hypochlorite (a chlorine disinfectant for killing bacteria) and (2) Ferric sulfate (a flocculent to remove suspended matter, protozoa, and viruses)*

4) How many liters of water should be purified with one sachet?
   *1 4g sachet purifiers 10L of water*

5) Is it possible to use 20 liters of water? Why or why not?
   *Yes, you just have to use 2 sachets. However, mixing properly becomes more challenging with larger volumes of water.*

6) In which types of water do the sachets not work?
   *Salt water, black water, water contaminated with certain chemicals (industrial solvents)*

7) After putting the sachet into the dirty water, for how long do you mix?
   *5 minutes, about the length of 2 songs on the radio*

8) What should the water look like while mixing for 5 minutes?
   *Steady vortex*

9) After stirring for 5 minutes, you must let the water settle for another 5 minutes.
   *True*

10) A clean bucket must be ready to have the water filtered into it, with a clean cotton cloth fully secured on top.
11) Everything in the mixing bucket, including the waste, should be poured through the clean bucket filter.
   *False*

12) For how long should the filtered water be left to sit, with its cover on, before consumption? What is happening during this step?
   *20 minutes. The chlorine is disinfecting the water during this step*

13) What should the user do if the water is still dirty after correctly completing the steps?
   *Do not drink. Try the process again with another sachet. If the water is still dirty, then do not drink it because the source water may be incompatible with the P&G sachets.*

14) Where should the waste be discarded?
   *Outdoors, away from children and animals.*

15) What important step must you take if you want to store the water?
   *Cover it to prevent re-contamination!*

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### Appendix D. Questionnaire for Community Follow-Up

To evaluate understanding and appropriate use, ask households the following questions:

1. **How long have you used P&G Purifier of Water?**
   - Never
   - 0-2 weeks
   - 2 weeks – 1 month
   - 1-6 months
   - >6 months

2. **How do you make the water safer to drink?**
   (More than one answer may be possible)
   - Nothing
   - Water is already safe
   - Boil
   - P&G Purifier of Water
   - Other (specify)

3. **How do you store your drinking water?**
   (More than one answer may be possible)
   - Do not store water
   - In container with no lid or cover
   - In container with lid
   - Other (specify)

4. **Please describe how to use the P&G Purifier of Water.**
   - Describes steps in the correct order
   - Describes steps with correct timings
   - Describes steps with correct materials
   - Other (specify)

5. **Observation: Please show me how you use this method.**
   - Washes hands before starting
   - Timing of each step is correct
   - A vortex is observed when stirring
   - The cloth filter is clean
   - The cloth filter does not have any holes
   - The bucket with treated water is clean
   - Other (specify)

6. **Observation: Please show me how you get water from the container.**
   (More than one answer may be possible)
   - Hands do not touch water
   - Utensil or tap is clean (no visible dirt)
   - Other (specify)

7. **Observation: Please show me any stored drinking water in your house.**
   (More than one answer may be possible)
   - Completely covered with lid
   - Open, uncovered
   - Narrow opening spigot
   - Beyond reach of animals
   - Clean (i.e. free of dirt, debris, garbage)
   - Dirty
   - Other (specify)
   - No stored drinking water

8. **How often do children in your household drink untreated water?**
   - Always
   - Usually
   - Sometimes
   - Never
9. If NOT always, where do they drink untreated water?
   - Neighbor or another house
   - School
   - Religious Center
   - When traveling
   - Other (specify)

10. Have you used the P&G Purifier of Water treatment in the last week?
    - Yes
    - No

11. If for daily use: When do you NOT use it?
    - When there is no money
    - When there is no time
    - When there are no materials
    - During the dry season
    - During the rainy season
    - Other (Specify)

12. Do you know where to get new sachets?
    - Yes
    - No

13. Do you know where to replace materials needed (i.e. buckets)?
    - Yes
    - No

14. Do you feel a strong personal obligation to consume treated water?
    - Yes
    - Somewhat
    - No

15. Do you feel confident that you can do the process correctly?
    - Yes
    - Somewhat
    - No

16. Do your friends/community encourage you to make your water safer to drink?
    - Yes
    - Somewhat
    - No

17. What are other ways that you know of to improve the health of your household?
    - Improved Sanitation
    - Wash hands at critical moments (i.e. before eating)
    - Covering open water sources
    - Hygienic handling of foods
    - Other (Specify)

**Water Quality Indicators**
(If Testing is Available)

To evaluate if household is using the product effectively:
18. Can you provide me a cup of water as you would give to a child?
    - If treated, also collect paired untreated.
    - Test stored untreated and treated drinking-water pairs for indicator bacteria.
    - Report reduction of bacteria: _____________

To evaluate if households have FCR in water:
19. Can you please provide me a cup of water as you would give to a child?
    - Test stored drinking water for FCR
    - Report amount or presence/absence of FCR: ___________