Excreta disposal in emergencies: Bag and Peepoo trials with internally displaced people in Port-au-Prince

DEEPA PATEL, NICHOLAS BROOKS and ANDY BASTABLE

After a series of earthquakes devastated Port-au-Prince, Haiti, on 12 January 2010, safe excreta disposal became an urgent priority. To mainstream innovative approaches to sanitation within the realities of urban humanitarian response, Oxfam GB undertook a trial from April to May 2010, of standard bag and Peepoo excreta disposal systems in two IDP settlements. Trial results demonstrate that with proper collection and removal, both bags and Peepoos are viable excreta disposal options in emergencies. A reduction was seen in ‘flying toilets’, open defecation and user reports on diarrhoea in both settlements. For in-home use, the Peepoo was preferred over bags, 84 per cent to 55 per cent ($\chi^2 = 6.15$, p=0.013) based on its ability to contain odour. Key programmatic recommendations include contingency planning for disaster-prone areas and further analysis of cost effectiveness and phase-out points for bag excreta disposal systems. Additionally, the Peepoo size should be adjusted to be more widely applicable in diverse emergency settings.

Keywords: defecation in bags, flying toilets, Haiti, Peepoo, sanitation, urban humanitarian response

A series of earthquakes struck Haiti on 12 January 2010, in the area around the capital, Port-au-Prince, the strongest of these reported at 7.3 on the Richter scale (Government of Haiti, 2010). The earthquake affected Haiti’s most populous area, killing approximately 225,000 people, as well as devastating its economic and administrative centre (UN OCHA, 2010). The number of internally displaced people (IDP) identified is 1.5 million in over 1,000 spontaneous settlements throughout the affected area (UN OCHA, June 2010), ranging from substantial camps of up to 50,000 people to hundreds of small to medium camps with fewer than 5,000 residents.
Haiti pre-earthquake sanitation situation

Improved sanitation facilities in urban areas of Haiti have been steadily declining from 1990, with 44 per cent improved access, to 2008, with 24 per cent improved access (WHO/UNICEF, 2010). In the absence of a regulatory agency responsible for sanitation, individuals arranged their own sanitation according to their economic means (IFRC, 2010). The most recent figures prior to the earthquake state the remaining 24 per cent of urban dwellers shared toilets while 43 per cent had access to unimproved facilities and 9 per cent defecated in the open (WHO/UNICEF, 2010).

Sanitation coverage statistics are not available disaggregated to reflect the lower coverage amongst poor and vulnerable populations living in densely populated or marginal areas of Port-au-Prince. Nor do they account for the anecdotal evidence of the widespread use of plastic bags for defecation.

Post-earthquake sanitation situation

The earthquake damaged the limited sanitation infrastructure that existed in Port-au-Prince and surrounding areas. The scale of devastation, death and displacement after the earthquake and imminent rainy season created challenging contexts which limited the ability of humanitarian response to utilize existing best practices.

Conventional emergency sanitation approaches

There is an assortment of conventional sanitation systems ranging from septic tanks to bucket latrines and each approach has strengths and weaknesses with no firm panacea to be rapidly adopted and scaled up. Any sanitation solution utilized should be examined based on appropriateness of: 1) coverage; 2) space limitations; 3) modularity; 4) maintenance; 5) socio-cultural acceptance; and 6) economics (Fenner et al., 2007).

Oxfam Great Britain (Oxfam GB) rapidly scaled-up its existing country programme to deliver a major water, sanitation and hygiene (WASH) response. Sanitation components included portable toilets, latrine construction (trench latrines, elevated tank latrines and urine diversion toilets), latrine maintenance and desludging, supported by comprehensive public health promotion.

The diversity of activities was necessary because of the myriad challenges of providing sanitation for the quantity of affected people in the Haitian urban context. These challenges included high-density camps, complex landownership, ground conditions (e.g. concrete, unstable soil), insufficient permission to excavate, IDP-perceived security
risks, frequency and availability of desludging and absence of official plans for camp futures. In the face of such unprecedented need for innovative sanitation solutions coupled with the pre-earthquake legacy of minimal access to improved sanitation, consequential established coping mechanisms (habits and attitudes regarding toilet use in particular) needed to be considered if sanitation programmes were to be technically deliverable and socio-culturally acceptable in the timeframe necessary.

A survey conducted in the Pétion-ville Club Camp by Oxfam GB in February 2010, found that only 50 per cent of camp residents surveyed used the latrines provided by Oxfam GB while 33 per cent continued to use latrines in earthquake damaged structures. Furthermore, 12 per cent used plastic bags as a sanitation coping mechanism in their post-earthquake environment. A particular public health concern was that use of bags for defecation in camps without effective waste management and hygiene promotion would increase the impact of ‘flying toilets’, whereby bags filled with excreta are thrown into ditches, on the roadside, or simply as far away as possible (UNDP, 2006).

Bags for defecation

A particular problem found with the range of conventional sanitation systems is the effect on dignity and protection, especially for women, children, and elderly or disabled individuals with mobility limitations. Additionally, night-time use of latrines in IDP settlements in Port-au-Prince, particularly by women and children, had been found to be limited owing to perceptions of insecurity, the lack of lighting, distance to facilities and rainy weather. Therefore, multiple options to achieve safe excreta disposal had to be considered.

Recognizing that, during an emergency response, the aim of a safe excreta disposal system is to provide and maintain an environment free from contamination by human faeces (Sphere, 2004), and, keen to add value and raise critical discussion about the range of sanitation options for urban contexts (Global WASH Cluster, 2009), Oxfam GB utilized participatory action research to ascertain the applicability of standard bags and ‘Peepoos’ for defecation in the controlled location of two spontaneous settlements in the Delmas suburb of Port-au-Prince (Table 1).

There is a dearth of research on the structured applicability of bags in emergency response or the ability to improve upon bag usage through 100 per cent community coverage, proper storage mechanisms, adequate collection and hygiene promotion. Given the lack of research on the applicability of bags as part of an emergency excreta disposal system, their mobilization in humanitarian response often
relies on impromptu uptake by populations without adequate support and little to no documentation exists to record the approach taken, what was successful or what was inappropriate (Global WASH Cluster, 2009). While anecdotes of individual and agency approaches exist, there is an urgent need for field-based research and development into emerging technologies and pragmatic approaches to fill gaps and meet the challenges of adequate and appropriate sanitation systems for urban humanitarian response.

The ‘Peepoo’, an emerging toilet technology created by the Swedish company Peepoople, is marketed as an improvement upon traditional bags used for defecation. To date, medium-scale feasibility studies have been conducted in Kenya and Bangladesh to gauge the usefulness of the Peepoo as an alternative for urban slums (Muench et al., 2009). The results of the studies point to high user-satisfaction, but the Peepoo had not been trialled in an emergency setting nor in a situation with minimal direct input from the implementing agency as would be more appropriate to an emergency setting.

**Methodology**

**Trial setting**

The trial was conducted over a 6-week period in April–May 2010, in two spontaneous IDP settlements, Camp Garage and Camp Cité aux Cayes, in Delmas 31, Port-au-Prince. These camps were selected for the trial based on the challenges in assisting the camps (Table 2) and, at more than two months post-earthquake, IDP had not received WASH assistance. Trial participants were consulted prior to any intervention to ensure potential strategies implemented were acceptable.

To swiftly meet the needs of IDPs, locally available bags (grocery-size) were purchased for this trial. With a limited number of Peepoos available, the smaller settlement, Camp Garage, was chosen to trial two weeks of the Peepoo followed by two weeks of standard bags and
Camp Cité aux Cayes trialled four weeks of standard bags. All research was supported by representatives in each camp and carried out by local enumerators with all research materials drafted or translated appropriately to Haitian Creole.

**Selection of trial participants**

No sampling was conducted for participation since the aim of a sanitation system is 100 per cent population coverage. The nature of an IDP settlement is such that it is difficult to census it completely, but population characteristics were ascertained as accurately as possible given the constraints. Prior to the trial, a baseline census was conducted in both camps (Table 3) to enable random selection of participants for data collection.

**Data collection**

Oxfam GB undertook field-based, participatory action research that was sufficiently rigorous to be confident in disseminating the outputs to a wide external audience, yet was operationally feasible within an acute emergency response (Oxfam GB, 2010).

The overall research design was intensive with four complementary data collection procedures to provide a comprehensive representation of the sanitation situation experienced in both settlements. Primary data was collected before and after the trial through household

### Table 2. Constraints to conventional emergency sanitation approaches in trial setting

<table>
<thead>
<tr>
<th>Camp Garage</th>
<th>Camp Cité aux Cayes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private land owner, threat of eviction</td>
<td>Private land owner</td>
</tr>
<tr>
<td>Inability to excavate because settlement on concrete parking area around semi-collapsed school</td>
<td>Inability to excavate because only open space is adjacent to eroding ravine</td>
</tr>
<tr>
<td>Density/space restrictions</td>
<td>Extremely dense, impossible-to-reach appropriate ratio of people to toilets</td>
</tr>
<tr>
<td>Landowner permission not granted to provide on-site excreta disposal of any type (elevated, porta-loo etc.)</td>
<td>No road access, limited desludging capabilities</td>
</tr>
</tbody>
</table>

### Table 3. Baseline camp census

<table>
<thead>
<tr>
<th></th>
<th>Garage</th>
<th>Cité aux Cayes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>54</td>
<td>391</td>
</tr>
<tr>
<td>Population</td>
<td>290</td>
<td>1,921</td>
</tr>
</tbody>
</table>
Primary data was collected before and after the trial through household questionnaires and focus group discussions. Questionnaires (HHQs) and focus group discussions (FGDs) that were pre-tested for accuracy and appropriateness. Supplementary data was gathered through participant observations, camp infrastructure/environment observations and informal interviews with key informants.

FGD participants were recruited through simple random sampling within geographic strata (defined by location mapped in camps) to cover the entire camp and avoid volunteer bias. Two experienced enumerators of the same sex conducted gender segregated FGDs and took detailed notes. Recordings were taken for transcription whenever possible.

HHQs were administered orally to head of household and/or other respondents present after consent was received. Households were chosen through simple random sampling within geographic strata to avoid volunteer bias. In Camp Cité aux Cayes, a sample size of 77 households was needed to have a confidence level of 95 per cent with a ±10 per cent margin of error. In Camp Garage, a sample size of 35 households was needed to have a confidence level of 95 per cent with ±10 per cent margin of error. Actual sampling was larger in both camps to compensate for refusals or households without anyone home.

Data analysis
Observations were recorded daily and provisionally coded according to emerging themes to identify gaps in analytic issues to explore during subsequent, more focused data collection. FGDs were transcribed to English and coded according to salient themes. HHQs were entered in Excel and analysed using statistical tools.

Sanitation system design
To test the requirements for bags to be part of an appropriate and adequate sanitation system in emergency contexts, six key areas were examined: 1) user interface; 2) distribution; 3) deposit and storage; 4) collection and transport; 5) treatment or disposal; and 6) hygiene promotion. Feedback from pre-trial FGDs and key informant interviews was incorporated into the design of each step.

User interface. In-home and community interface options were provided in both camps to offer participants freedom of choice for toilet access. In Camp Cité aux Cayes, in-home provision consisted of one commonly available recycled container (T-malice bucket) per household and bags. Communal cabins with prefabricated commodes were erected as part of hygiene units at the perimeter of the camp, geographically segregated by gender. In Camp Garage, in-home provision consisted of one appropriately sized bucket (purchased new at a local
market) per household and Peepoos. Communal cabins were erected on the road that intersected the camp to contain prefabricated commodes with specially welded buckets (created in Haiti) sized to hold a Peepoo.

With a limited number of Peepoos available for the trial, and to decrease bag waste, male and female urinals were also provided in both camps. Urinals were placed within superstructures for added privacy, which based on pre-trial data was found to be important, especially for women.

**Distribution.** During the first week of the trial, household distribution was undertaken utilizing pre-packaged ‘kits’. One bag or Peepoo per person per day for a week’s supply were placed inside the respective containers and distributed to households along with information, education and communication (IEC) materials. For the remainder of the trial, cabin attendants and camp committee members handled weekly household distribution based on the needs of households.

**Deposit and storage.** In Camp Cité aux Cayes, used bags were to be deposited in 55-gallon drums with lids, located behind the male and
female hygiene blocks. Due to density of the shelters and inability to access many areas, additional excreta deposit drums were not placed around the camp. In Camp Garage, 55-gallon deposit drums with lids were provided near the cabins and in other locations around the camp. In both camps, to stem the ‘flying toilet’ practice and encourage proper collection, trial participants were instructed that deposit drums were exclusively to collect used Peepoos or bags.

Collection and transport for treatment or disposal. Deposit drums were transported by wheelbarrow, Monday–Saturday, to the nearest road access outside of Camp Cité aux Cayes for collection by a Haitian company handling excreta disposal. Drums were emptied into the company’s truck and combined with excreta collection from other camps to be discarded at an excreta-specific pit in Trutier (in line with current practices by other organizations).

Deposit drums filled with Peepoos were collected Monday–Saturday from Camp Garage on a flatbed truck, and transported to a composting site run by New Directions Foundation in a suburb of Port-au-Prince. When Camp Garage participants switched to bags, their collection was appended to the collection from Camp Cité aux Cayes.

Drums were not collected on Sundays because it is a holiday in Haiti. There were also occasions on which the excreta drums could not be picked up (e.g. heavy rains blocked road access to the camps). The filled drums remained in the camp and were kept covered so vector and smell control was maintained. There was no resistance from camp leaders or residents when these exceptional circumstances occurred.

Hygiene promotion. Hygiene promotion is an integral programme component to bag excreta disposal systems to ensure proper usage, collection and removal of bags. IEC materials were specifically drafted for the Peepoo and bag systems and pre-trialed for cultural sensitivity
and ease of understanding through FGDs and key informant review (Haiti WASH Cluster, camp committees). Ongoing hygiene promotion messages included education on the importance of segregating excreta from general solid waste, the reasoning behind separate urinal and toilets provisions, disposal of children’s excreta, vector control provided by closing lid on excreta deposit drums, and hand-washing with soap. In both camps, hand-washing facilities and soap were provided.

Results and discussion

Analysis of key results from the HHQs and FGDs (summary in Table 4) pertaining to the potential to utilize bags for excreta disposal in urban humanitarian situations are discussed below. Note, fewer post-trial HHQs were completed in Camp Garage because a larger percentage of households had returned to work or school by May 2010 when the HHQs were conducted.

Pre-trial

Pre-earthquake facilities. Participants’ pre-earthquake toilet situation was ascertained (Figure 1). In contrast to the anecdotal information available, no HHQ or FGD participant stated they defecated in bags prior to the earthquake. This may be due to the perspective taken by respondents when answering questions. For example, many households did not state they ‘defecate in the open’ during the administration of the pre-trial HHQ because they consider defecating into a ravine as a different concept (a designated spot).

Upon observation, it was found that the high percentage of households who stated they had flush toilets (31 per cent) compared with JMP data (14 per cent) (WHO/UNICEF, 2010) is due to the fact that many of the respondents previously lived in houses that were along a ravine and had toilets that directly emptied into the ravine when

<table>
<thead>
<tr>
<th>Table 4. Summary of data collection</th>
<th>Pre-trial</th>
<th>Post-trial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FGDs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garage</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Cité aux Cayes</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td><strong>HHQs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garage</td>
<td>43</td>
<td>31</td>
</tr>
<tr>
<td>Cité aux Cayes</td>
<td>109</td>
<td>115</td>
</tr>
</tbody>
</table>

"Fewer post trial HHQs were completed because a larger percentage of households had returned to work or school by May 2010 when the HHQs were conducted."
flushed. This is not considered an improved sanitation system. Of the 144 households who had access to toilets prior to the earthquake, 81 (56 per cent) shared the facility with other households.

Post-earthquake toilet options. After the earthquake, households reported defecating as follows: in 65 per cent of households, one or more members used plastic bags; in 43 per cent of households, one or more members returned to pre-earthquake houses; in 21 per cent of households, one or more members defecated in the open; in 18 per cent of households, one or more members defecated into containers; and in 9 per cent of households, one or more members used a facility by their workplace. Furthermore, in households where the adults were utilizing toilets at their workplace or returning to earthquake-damaged buildings, 100 per cent of the children from those households were defecating in the open or into buckets and the excreta was thrown into nearby open areas.

Experience with bags. Baseline data collection confirmed the perceived widespread use of bags for defecation amongst IDP after the earthquake. Of the 65 per cent of households with one or more members using bags for defecation, the location used to defecate was not specified (in home or other) but 100 per cent of respondents stated they discarded the bag in indiscriminate locations.

In Camp Cité aux Cayes female FGD participants discussed why they chose bags over open defecation. Those who could not find bags or afford to buy them were forced to go to the ravine to defecate in the open. Women spoke about how ‘shame’ drove them to defecate at night, and there were cases of women ‘being snatched from behind’ and getting sexually abused. As word spread around the camp, women
began defecating in the ravine in the morning instead. However, this resulted in the women falling prey to a different type of abuse; people would throw rocks at those squatting in the ravine and scream epithets at them.

Overall, 49 per cent of households were interested in using a Peepoo or bag as a toilet in their homes.

The Peepoo was preferred for in-home use because of its ability to contain odour.

Overall, 49 per cent of households were interested in using a Peepoo or bag as a toilet in their homes for various reasons (Figure 2) and no households expressed aversion to using a bag for excreta containment in a communal cabin in the camp.

Post-trial

The Oxfam GB bag sanitation system was the primary toilet utilized by 91 per cent of households. Of the households that used bags, either in their home or in the cabins, 96 per cent stated they are ‘very satisfied’ or ‘satisfied’ with the system. There was also a significant reduction in safety, dignity and privacy issues post-trial (Figure 3). Comparing facilities utilized before and after the Oxfam GB intervention, pre-trial, 43 per cent of households returned to earthquake-damaged homes to defecate whereas, post-trial, only 7 per cent reported doing so. No open defecation was reported post-trial.

There was a significant reduction in self-reported diarrhoea; pre-trial, 42 per cent of households experienced diarrhoea in the previous two weeks while, post-trial, only 36 per cent experienced diarrhoea in the previous two weeks ($\chi^2 = 1.32, p<0.03$).

![Figure 3. Problems faced when defecating, pre- and post-trial](image-url)
Odour. For in-home use in Camp Garage, participants significantly favoured the Peepoo (84 per cent) compared with a bag (55 per cent) ($\chi^2 = 6.15, p = 0.013$). However, the preference for households to defecate in the privacy of their home, especially at night, was enough for an additional 10 per cent of households to state they would use bags as toilets in their home ‘if it was an emergency’. Coping mechanisms against odour included placing used bags directly outside the tent or in a container with a tight fitting lid. Of the 11 households who stated they do not use the bags in their home at all, nine (82 per cent) did use Peepoos in their home.

In every Camp Garage FGD, there was a consensus that the Peepoo was preferred for in-home use because of its ability to contain odour. In one FGD, a women stated, ‘you could leave a [used] Peepoo on the street for a week and even the pigs wouldn’t know it is there!’ Some people also stated they kept extra Peepoos they had from the first half of the trial solely for in-home use and used the cabins during the day with the other bag.

In Camp Cité aux Cayes, 65 per cent of households used bags in their home. Of the households who stated they do not use bags in their home, 75 per cent chose to do so because they prefer the cabins or have other toilet options. Only 8 per cent stated they did not use bags in their home because of the odour.

Ease of use. There was a consensus among post-trial FGD participants on the difficulty in using the Peepoo for two main reasons: inadequate circumference to spread it over a container and inadequate length which inhibited proper knotting after use. A majority of adults stated if it was not urgent (immediate onset of desire to defecate) they were able to use the Peepoo without too much difficulty. Respondents stated they also coped by keeping Peepoos already open in the communal commodes.

However, with children, disabled people, or in urgent situations, the standard bag was preferred because of the ease of use. Caretakers repeatedly stated that the preparation time required to use the Peepoo was a hindrance whereas with a bag, they could ‘quickly open it on the floor for a person to squat over’. The FGD with latrine attendants revealed that they preferred the bag to the Peepoo because ‘too many users’ had trouble properly opening the Peepoo in the commode and it would cause faeces to fall into the bowl.

Containers were provided to households for ease of use of the bags. Post-trial HHQ data shows a significant difference in the need for a container for bags (only 55 per cent of bag users stated they used a container), than for the Peepoo (100 per cent used a container) ($\chi^2 = 56.41, p<0.001$). The need for a container with standard bags may be even less considering that, of the households in the pre-trial
who stated they defecated in bags (n = 99), only 48 per cent used a container.

**Utilization of ‘improved aspects’ of bag excreta disposal system**

With the bag, Cité aux Cayes participants unanimously stated pre-trial (99 per cent) and post-trial (100 per cent) that the IEC material provided was sufficient for them to properly utilize the bag excreta disposal system. Although 86 per cent of pre-trial HHQ respondents stated they could easily follow the directions of the Peepoo instruction sheet, pre-trial FGD respondents unanimously expressed a need for demonstrations on how to use the Peepoo. Daily observations of collected Peepoos revealed there were multiple incidences of improper use (inner seal not opened, green liner with faecal matter present was not tucked into outer white layer before knotting, Peepoo not knotted at all) and repeated demonstrations over the first week of the trial were necessary. By the end of the second week, non-compliance with necessary steps to using the Peepoo was still present in approximately 10 per cent of collected Peepoos.

All HHQ respondents from both camps stated they deposited used bags in proper collection receptacles. However, in Cité aux Cayes, in 3 out of 13 post-trial FGDs, there were statements that people had observed others throw excreta-filled bags onto someone else’s tent. In daily observations undertaken by researchers, Oxfam-distributed bags were visibly thrown into the ravine during the first week of the trial, but never indiscriminately around the camp. After the first week, latrine attendants and camp volunteers conducted a superficial cleaning of the ravine edge and subsequently, more than 99 per cent of defecation bags were properly discarded.

**Limitations**

Though trialled in two markedly different IDP settlements, this trial occurred in a socio-cultural setting with a pre-emergency history of bag usage for defecation. Therefore, caution must be taken when utilizing this approach in other socio-cultural contexts.

Though the methodology utilized objective observations, the majority of the data gathered during the trial comes from self-reporting. HHQs were administered as interviews and consequently may be subject to enumerator interpretation. Oxfam GB attempted to reduce the effect of interpretation and variability between questionnaire administration by training all enumerators together and having them share their administration strategy. There was one case in the Cité aux Cayes pre-trial HHQ in which an enumerator (who completed 25 HHQs) incorrectly presented the question of using a bag in home as an either/or situation to using the bag in the cabin which likely
resulted in false negatives for households interested in using bags in their home.

Conclusions

Despite the limitations mentioned above, the results of this trial representing two different IDP settlement contexts supports bags and Peepoos as viable in the compendium of excreta disposal options, especially in complex urban humanitarian situations. The use of bags in emergency excreta management is appropriate and well-adapted for: 1) an immediate intervention at the household-level until community toilets can be provided; 2) a short intervention before proper latrines are built; 3) settlements with chronic space or land-use limitations; 4) settlements where desludging is difficult or impossible; and 5) populations where certain groups (women, children, disabled people) prefer to defecate in personal shelters.

Pre-trial data highlight unique aspects of urban emergencies and the coping mechanisms people adopt. The implementation methodology in both locations improved excreta containment and removal in hard-to-reach settlements and covered gaps in sanitation access and acceptability among vulnerable populations. Simultaneously, the approach was flexible enough to be implemented rapidly and was able to be community-managed with minimal Oxfam GB support (e.g. through scaled-down maintenance and hygiene messaging to facilitate behaviour change).

Trial data demonstrates the importance of coupling community-level and household-level sanitation access in emergencies, especially in dense settlements and those with security risks. This leads to the conclusion that there is a separate applicability for the Peepoo and other bags. Overall, Camp Garage trial participants appreciated the Peepoo over standard bags because of its ability to contain odour. Participants in both camps stated that standard bags do not contain odour. However, once the bags were deposited in collection drums and the lid closed, nearly all participants stated that there was no smell, no flies and their actual toilet interface (bucket in home or communal commode) remained clean.

Therefore, in a simple comparison of a bag to the Peepoo, both proved useful to participants in this trial for different reasons. The results demonstrate that, in a comparison of a bag with the Peepoo, the improvement of the Peepoo in containing smell is not a major factor when proper collection mechanisms are in place. If used bags of any type are kept in a closed receptacle and removed from the camp or properly disposed of on-site with relative frequency, users are likely to be comfortable with any type of bag.
Recommendations

As this is the first time the Peepoo has been employed in an emergency situation, Oxfam GB feels the value of utilizing Peepoos in emergency situations cannot be realized until certain product improvements are implemented rendering the Peepoo more flexible in its application and practical in its utilization.

Specific technical recommendations on the Peepoo

Size. The Peepoo must be enlarged in order to facilitate ease of use in emergency situations. Oxfam GB recommends the inner green foil of the Peepoo be expanded from its current 52 cm circumference to at least 63 cm so it is more easily adaptable to locally available containers in a variety of settings. The ease of use should decrease the user-education and behaviour change requirements necessary to employ Peepoos rapidly in emergencies.

As a self-knotting bag (compared with handles on standard bags), the difficulty in knotting the Peepoo decreases or eliminates its ability to break down pathogens. Oxfam GB recommends the length of the Peepoo be increased from 38 cm to at least 43 cm so that knotting the Peepoo after use is easier, and decreases the chance of non-compliance, accidents, or knotting resulting in excreta above the knot.

Product specifications. During the trial, there was a strong detectable odour when many used Peepoos were stored together and approximately 20 per cent of Peepoos used were found to have small tears where the outer layer is welded to the inner layer, resulting in leakage of excreta after use. It is unclear if this was a manufacturing defect or a result of the length of time elapsed since production.

Oxfam GB recommends Peepoople examine the period of time between production and use that the Peepoo material remains effective. Additionally, if the Peepoo or biodegradable bags are to be used as contingency stock for emergency preparation, it is necessary to account for the shelf-life of the material and the necessary storage requirements such as temperature, moisture and proper handling.

Key programmatic recommendations

Both standard bags and Peepoos are viable options as part of wider excreta disposal systems in first phase emergency response.

- The Peepoo is advantageous for use in shelters since odour is minimal therefore providing users flexibility to deposit used bags in communal receptacles.
- Proper bag deposit and removal is crucial, and with this, any bag type may be equally acceptable for use.
Bag type has no affect on acceptance of a communal set-up.

- The hygiene promotion component of bag excreta systems is essential to ensuring continued safety and efficacy of the system.
- Current coping mechanisms in disaster-prone areas should be examined to design rapid-deployment bag excreta disposal contingency plans as preparation for emergency response.

**Further study**

Owing to the limited number of Peepoos available, the methodology of distributing one bag per person per day was utilized. However, further study is needed, especially in emergencies with high diarrhoea prevalence, into the number of bags to be distributed to balance between excessive, to prevent misuse of bags (e.g. for purposes other than defecation), and insufficient, to ensure populations do not have to rely on other unsafe methods of defecation.

Additionally, in settlements utilizing Peepoos, the benefit of rapid pathogen degradation over other bags cannot be ensured unless 100 per cent coverage is maintained. Accordingly, it must be ensured that the availability of Peepoos for all potential users in the area is achieved or people may pick up the behaviour of defecating in bags without the added benefit of biodegradation or pathogen reduction. Consequently, this will require a more robust method of distribution and monitoring, which in large camps may be labour intensive. Alternative methods to reach the entire population must be developed.

Though cost was not analysed in this trial, if the Peepoo or bags are to be utilized to scale in emergencies, it is essential to further examine the cost over the period of time utilized compared with other options. As a first-phase emergency sanitation system, cost of bags would have fewer implications. However, over time, the cost-effectiveness of the solution decreases in comparison with other systems, and therefore a proper phase-out strategy must be developed by any organization deploying bag sanitation systems.

The reuse of Peepoos or composted biodegradable bags as fertilizer was not analysed in this trial. Further research is recommended into the ability and willingness to pay for sanitation to increase sustainability, and whether there is an advantage (socio-cultural and financial) or ability to manage (technically and logistically) the agricultural reuse of human faeces in various post-emergency phases.

Finally, further research is needed into the ‘phase-out point’ of bags in post-emergency sanitation response and/or if entering the second phase, when facilities are upgraded and the ratio of people to toilets decreases, bags may still be utilized in-home to supplement gaps in
adequate sanitation coverage (women at night, children or people with a disability).

References


