

PATEL

---

**35th WEDC International Conference, Loughborough, UK, 2011****THE FUTURE OF WATER, SANITATION AND HYGIENE:  
INNOVATION, ADAPTATION AND ENGAGEMENT IN A CHANGING WORLD****Excreta disposal in emergencies:  
the use of bag systems in challenging urban contexts***D. Patel, India***BRIEFING PAPER 1128**

---

*While anecdotes of approaches to sanitation in complex urban humanitarian response exist, there is a need for research and development to mainstream emerging technologies to meet the challenges. In response to the wide-spread devastation and mass internal displacement caused by the January 12, 2010 earthquake in Port-au-Prince, Haiti, Oxfam GB trialled standard bag and Peepoo excreta disposal systems in two IDP settlements. Trial results demonstrated that both bag types are viable excreta disposal options. Based on these positive results, bag excreta disposal methodologies were further studied in additional IDP settlements in Port-au-Prince to create key programmatic recommendations including a six-step methodology for contingency planning for disaster-prone areas. Further research is still needed into the cost effectiveness and phase-out points for bag excreta disposal systems.*

---

**Background**

A series of earthquakes struck near Port-au-Prince, Haiti on January 12, 2010, affecting Haiti's most populous area and leaving approximately 1.5 million internally displaced people (IDP) in over 1,000 spontaneous settlements throughout the affected area (UN OCHA, June 2010). Safe excreta disposal is critical components in an emergency response as a primary barrier to provide and maintain an environment free from contamination by human faeces (Sphere, 2004). 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**

From a public health perspective, there is little to choose between the assortment of emergency sanitation technologies available, as long as the technology implemented is correctly used, well maintained and that personal hygiene is adequately addressed to prevent transmission of faecal-oral diseases. There is no firm panacea to be rapidly adopted and scaled up.

In rural emergency settings, land is often available to implement traditional sanitation approaches such as simple pit latrines (Harvey, 2006). However, the limited range of excreta disposal options in urban environments results in difficult decisions for agencies. People living in high population density urban emergency contexts are often forced to adopt unsafe defecation practices due to the lack space, poor access, cramped conditions, and other factors.

In addition to technical issues found with conventional approaches, there is concern over the effect on dignity and protection, especially for women, children, or individuals with mobility limitations. Night-time use of latrines in IDP settlements can be limited due to perceptions of insecurity, the lack of lighting, distance to facilities, and adverse weather conditions. As a result, they are left far more vulnerable, not only to potential disease outbreaks, but to physical dangers and gender based violence. Therefore, multiple innovative solutions to achieve safe excreta disposal must be considered.

**Bags for defecation**

Sanitation interventions often require large time and resource investments not readily available in large scale emergencies. Given the dearth of research on the applicability of bags as part of an emergency sanitation

system, their mobilisation often relies on impromptu uptake by populations without adequate support. Moreover, little to no documentation exists on the approach taken, what was successful or what was unacceptable in order to improve upon practices (Global WASH Cluster, 2009).

Oxfam Great Britain (Oxfam GB) conducted field-based, participatory action research on standard bags and Peepees in April-May 2010, in two spontaneous IDP settlements in Port-au-Prince. Key results pertaining to the technical, sociocultural and programmatic comparison of bags and Peepees for excreta disposal in urban humanitarian situations are discussed in Patel, Brooks and Bastable (2011). Due to the overall positive results of the trial, more bag sanitation systems were implemented in the post-earthquake response to develop key programmatic details and system designs.

### **Programmatic recommendations for the bag approach**

There are myriad challenges to providing sanitation for the quantity of affected people post-emergency (Box 1), as seen in the various IDP settlements where bag systems were utilized in Haiti. When traditional excreta disposal options are not possible, bags were found to be a viable option and rapid solution to problems of open defecation.

#### **Box 1. Contexts for bag excreta approaches**

- First phase response, before emergency or semi-permanent latrines can be constructed
- Where latrines/toilets cannot be constructed, urban settlements or camps with:
  - High population density
  - Limited open space
  - inability to excavate ground conditions (e.g. settlement on concrete, unstable soil),
  - Low soil infiltration rate/high water table
  - Complex landownership issues, insufficient permission to excavate
  - IDP-perceived security concerns (i.e. night time, women)
  - Inaccessible for latrine emptying services
  - Absence of official plans for camp futures
- To fill gaps in traditional approaches for specific individuals (i.e. women, children, people with limited mobility).

### **Socio-cultural considerations**

Effective excreta disposal systems often depend more on user perceptions rather than the technology itself. Numerous cases exist where users have rejected sound technical solutions due to social, cultural or religious preferences/taboo. Excreta disposal technologies work best when they are fully understood, managed and supported by the target communities.

To enable bags to function successfully, effective public health promotion is crucial in raising awareness of the need to keep the environment free of faeces and how bags can be used as an excreta containment tool. It is important not to focus on the bag itself, but rather to highlight the benefits of an effective *excreta management system*, where the bag plays a vital role in containing and storing faeces. All steps and components for bag systems must be clearly explained and be acceptable to everyone.

### **Bag excreta disposal system design**

For bags to be part of an appropriate and adequate sanitation system in emergency contexts, six key areas must be considered: 1) user interface, 2) distribution, 3) deposit and storage, 4) collection and transport, 5) treatment or disposal and 6) hygiene promotion.

#### ***User interface***

Bag excreta disposal systems are intended to be low-cost and rapidly implemented, and not labour or resource intensive. For “in-shelter” use (personal or household-level systems), the minimum components are the bag for containing the excreta and if possible, a container to facilitate bag handling.

#### ***Types of bags***

A range of bags are available on the market, each type having specific advantages and disadvantages (Table 1). The choice of bag type will depend on a number of factors including: user preference, local availability, cost per unit, and the possible/desirable disposal. In the absence of more environmentally friendly options, particularly at the onset of an emergency, locally available polythene bags can be easily

procured and readily used. The Peepoo has been found difficult to use due to inadequate circumference, the need for a container, and difficulty to self-knot after use (Patel, Brooks Bastable, 2011).

	<b>Polyethylene</b>	<b>Oxodegradable</b>	<b>Biodegradable</b>	<b>Peepoo</b>
<b>Cost</b>	\$	\$\$	\$\$-\$\$\$	\$\$\$\$ (?)
<b>Size</b>	Multiple options	Multiple options	Multiple options	“small”
<b>Procurement</b>	Easy	Moderate	Moderate	Not mass produced
<b>Environmental impact</b>	Polluting	Degrades, but variable safety	Degrades, no impact	Degrades, no impact
<b>Degradation</b>	None	Fragmentable Aerobic or anaerobic (landfill)	Complete degradation, can be rapid. May require composting	Rapid, complete degradation
<b>Health impact</b>	None	None	None	Pathogen reduction

*Bag support containers*

Where possible, a container should be provided with bags for ease of use. Locally available containers, such as recycled food or drink packaging, are ideal to prevent alternative use of the container. Ensure the container is intact and sized appropriately to bag size to prevent stretching bags which can cause tears. If the container has a lid, that should also be provided as an additional coping mechanism against odour and offense after use. Using containers with lids, bags can be stored in or near dwellings overnight without discomfort and can facilitate transport of the bag from the home to the disposal container/burial site.

*Communal facilities and urinals*

Where feasible, communal facilities for bag use should be provided. At minimum, the “in-shelter” provision (bags and container) can be placed inside a basic superstructure at a communal location. Such a structure can be gender segregated to offer additional privacy and comfort for users. Improved options for communal facilities include a commode with appropriately sized container to hold the bag type utilized. Various toilet designs can be used inside the superstructure, depending on the preferences of the intended users. Larger settlements/camps may require community toilet attendants to manage facilities.

***Distribution***

For “in-shelter” provisions, initial household distribution can be undertaken utilizing pre-packaged “kits.” One bag per person per day, in a week’s supply can be placed inside containers along with information, education and communication (IEC) materials. Community leaders and volunteers can be enlisted to create kits and manage subsequent bag distributions based on the needs of households, especially in large settlements/camps where programme teams may not have the capacity to reach the entire population.

***Deposit and storage***

Prior to bag distribution, a suitable bag deposit and storage system must be put in place to prevent “flying toilets,” excreta-filled bags that are indiscriminately discarded. Implementing agencies must work with communities to ensure the system is accepted by all and can be effectively maintained over time. The use of a designated deposit container will ensure bags are amassed at specific locations for safe storage and/or eventual transport. The availability of deposit containers can vary in post-emergency contexts, however, at minimum, deposit containers should have tight fitting lids for smell and vector control.

For certain inaccessible settlements in Haiti, it was not practical to establish a deposit and storage system for off-site removal. A logistically feasible option developed is for individuals to deposit excreta-filled biodegradable bags at a burial site a suitable distance from people’s dwellings and from water sources (> 30 m). Soil must be used to cover bags at the burial site frequently and the full site must remain undisturbed for at least one year to allow pathogens to degrade.

***Collection and transport***

A number of options exist to transport deposit containers safely and effectively. The method utilized will depend on local resources; the volume and weight of the containers to be transported; access to the

collection site; distance to the final disposal site; and operation costs for the collection service. Options include carrying containers, self-rolling containers, wheelbarrows, carts, trailers, and vehicles.

### ***Treatment or disposal***

Excreta filled bags must be handled so that any potential to contaminate the environment or downstream public health effects are mitigated. The options for treating or disposing of the bags will depend on the bag type used and the context of the emergency setting. Polythene bags should be incinerated or discarded at landfills in excreta-specific areas, in line with government regulations and organizational best-practices. Biodegradable bags can be composted, but this should only be considered if there is sufficient technical expertise, space and trained staff to limit potential risks to health and safety.

### ***Hygiene promotion***

Hygiene promotion is an essential component before implementation and throughout the use of bag excreta disposal systems. At minimum, the hygiene promotion component should be sufficient for populations to properly utilize the bag excreta disposal system: to ensure proper usage, collection and safe disposal. IEC materials must be community tested and drafted specifically for the bag type and collection system utilized in that community. Finally, adequate hand-washing facilities, complete with soap, should be provided. Frequent monitoring and evaluation is necessary to ensure bags are always disposed of correctly and to ascertain user perceptions of the system.

## **Conclusions and further study**

The results of the trials and case studies in Haiti representing multiple IDP settlement contexts support bags as a technically deliverable and socioculturally viable excreta disposal option in complex urban emergencies. Results from the case studies demonstrate that unlike traditional emergency sanitation options, the bag approach is flexible enough and well-adapted for access at the household-level. In dense settlements and those with security risks, in-shelter excreta management options are crucial to reaching vulnerable populations with safe excreta management interventions.

Each disaster, each affected community is unique and presents different opportunities and constraints. Therefore, more research is needed into aspects that will facilitate the programmatic adaptation of rapid-deployment bag excreta disposal systems as preparation for emergency response in disaster-prone areas. With forward planning, it is possible to raise awareness amongst potential future users on the options, and to stock more environmentally friendly materials, which may not normally be available locally.

The cost of bag excreta systems has not been analyzed, and is an essential component if the system is to be utilized to scale in emergencies. As a first-phase emergency sanitation system, costs would have fewer implications. However, the cost-effectiveness of bags over time in comparison to other systems may require a proper phase-out or upgrading strategy. Further research is needed into upgrading options and exit strategies in emergency sanitation response and/or if entering the second phase, bags may still be utilized “in-shelter” to supplement gaps in adequate sanitation coverage (women, children, or handicap).

---

## **References**

- Global WASH Cluster (2009) *Lessons learned in WASH Response during Urban Flood Emergencies*. WEDC, Loughborough University, UK.
- Harvey, P. (2006) *Excreta Disposal in Emergencies*. WEDC, Loughborough University, UK.
- Oxfam GB (2010) WASH Research and Development Strategy.
- Patel, D., Brooks, N. and Bastable, A. (2011) *Excreta Disposal in Emergencies: Bag and Peepoo trials with internally displaced people in Port-au-Prince, Haiti*. Waterlines Vol. 30, No 1, pp. 61-77.
- The Sphere Project (2004) Humanitarian Charter and Minimum Standards in Disaster Response.
- UN OCHA (2010) “Key Facts and Figures” Internal document.

---

## **Contact details**

Deepa Patel, 7 Mayurkunj Society, Mota Kumbnath Road, Nadiad, Kheda GJ 387001.  
Tel: +1 (443) 350-1985 Email: [deepa.patel@liverpool.ac.uk](mailto:deepa.patel@liverpool.ac.uk)

---