

# The Use of Poo Bags for Safe Excreta Disposal in Emergency Settings

**Safe excreta disposal is a top priority in an emergency, but one that takes time and extensive resources to implement. This Technical Briefing Note examines the use of poo bags for safe excreta containment and disposal in urban emergency settings. The Brief also explores ways of building more complete excreta management systems to ensure not only safe disposal, but also to ensure the dignity and safety of users.**

## Introduction

Safe excreta containment and disposal are critical components in an emergency public health response. Safe excreta management is one of the main barriers for preventing faecal-oral related diseases. From a public health perspective, there is little to choose between the various emergency sanitation technologies available, as long as the technology implemented is correctly used, well maintained and that personal hygiene issues are adequately addressed. This is particularly true in high population density urban environments, where the lack of space, poor access and cramped conditions limit the range of excreta disposal options that can be implemented. The use of **Poo bags** provides a quick and effective means of containing both excreta and urine in the first phases of an emergency.

### Excreta Disposal - Key Concepts

#### Immediately - 1<sup>st</sup> Phase Response

- Minimize high-risk practices (i.e. indiscriminate open defecation, flying toilets, etc.)
- Reduce the transmission of faecal-oral disease in high population density areas

#### Stabilisation- 2<sup>nd</sup> Phase Response

- Improve technical designs to increase user comfort, dignity and physical safety
- Develop more sustainable excreta disposal systems that can be managed by the community

## Safe Excreta Management

Deciding what technological option to use for containing excreta in emergencies is not an easy choice for agencies. Each disaster, each affected community, each setting is often unique and must be considered on a case-by-case basis. However, the primary goal of any public health intervention is to prevent the transmission of faecal oral diseases caused by inadequate/unsafe defecation practices. Sanitation interventions require not only good technology, but also a heavy investment in terms of time and resources. Effective public health promotion and community participation are critical key elements of the sanitation response to be undertaken alongside the technical interventions.

### Known Bag Usage - Past Emergencies

Anecdotal information from past emergency responses highlights a number of situations where bags of varying types were used as "defecation coping" mechanism:

- Philippines, 2009 – Typhoon response
- Haiti, 2008 – Hurricane response
- Indonesia, 2004 – Tsunami response
- Bangladesh, 1998 – Dhaka flood response

Affected populations either continued their pre-emergency defecation practice (i.e. defecating in bags) or began using bags as a coping mechanism in response to the emergency. Often this was due to either the breakdown of their previous system or the inability to access other toilet options.

Sustainability is rarely a priority early in the emergency; however, the need to act quickly and decisively is critical in preventing potential disease outbreaks. Sanitation responses must be based on detailed needs assessments that identify the key sanitation problems, and the needs arising from these problems. A number of factors should be considered when planning the intervention. The Oxfam's TB Notes 1, 2 & 7 give more details on key factors to consider when planning a response:

<http://www.oxfam.org.uk/resources/learning/humanitarian/index.html>



**Figure 1:** An area used for open defecation by 4,000 plus IDPs for 3 months. Haiti Earthquake, 2009.

## The Poo Bag Approach

In rural emergency settings, land is often available to implement traditional sanitation approaches such as simple pit latrines. However, men, women and children living in an urban emergency context are often forced to adopt unsafe defecation practices due to the lack space, poor access, cramped conditions, and a whole range of other factors. As a result, they are left far more vulnerable, not only to potential disease outbreaks, but to physical dangers and gender based violence.

During and after an emergency, populations will try to continue using their traditional defecation practices wherever possible. When this is not possible, people will adopt new “coping mechanisms”, and adapt to the new situation. Often, this will result in inadequate and unsafe defecation practices. When assessing the type of sanitation intervention needed, people’s previous practices and their current context must be considered. The opportunities and limitations of working in the new context must also be evaluated.

Poo bags provide, not only, a flexible excreta containment option, but they also offer a rapid solution to problems of open defecation. Especially when other traditional emergency excreta disposal options are not possible/viable.

### Contexts for the Poo Bag Approach

- 1<sup>st</sup> Phase response before emergency or semi-permanent latrines can be constructed
- Where latrines/toilets cannot be constructed
- Urban settlements or camps with
  1. High population density
  2. Limited open space
  3. Inability to excavate
  4. Low soil infiltration rate/high water table
  5. Landownership issues
  6. Insecurity concerns (i.e. night time, women)
  7. Inaccessible for latrine emptying services
- To fill the gaps in toilet access in consultation with specific individuals (i.e. women, children, elderly, 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.

Prior to starting any sanitation intervention, it is important to establish a good relationship with target users, which may require a competent translators and/or local staff. The affected community should be consulted to ascertain how women, men and children manage defecation. It will also be necessary to consult the elderly and those with reduced mobility. The consultations should also be cross-referenced with observations in the

field of the context and actual practices (i.e. ditches used, paths walked to field, etc.). The differing situations for men, women, children, elderly, and handicapped individuals should be analysed, as this is likely to have a big impact on eventual outputs.

To enable **poo bags** to function successfully, users need to understand why it is important to keep the environment free of faeces and how the bags can be used as an excreta containment tool. It is important not to focus on the bag, but rather to highlight the benefits of an effective excreta management system, where the bag plays a vital role in containing and storing people’s faeces. Effective public health promotion is crucial in understanding current practices and in raising awareness of the need for safe excreta management. Individuals within the target communities can be used to champion sanitation in their settlements/camps, and to assist in presenting messages and linking excreta management to broader health messages.

Overall, agencies must be realistic with their target groups, as to if and when it will be possible to provide any bag based facilities. The system for disposing of and replacing the bags must also be clearly explained and be acceptable to everyone.

## Poo Bag Systems

Any Poo bag excreta disposal system must consider all of the following elements:

1. Hygiene promotion
2. User interface
3. Poo bag distribution
4. Poo bag deposits and storage
5. Poo bag collection and transport
6. Poo bag treatment and/or disposal

### 1. Hygiene Promotion

For any sanitation system to impact positively on the health and wellbeing of target groups, the system must be shown to function correctly and be properly maintained. Hygiene promotion is an essential component of the poo bag approach. HP will ensure bags are used correctly; that they are collected, removed from the site, and ultimately, safely disposed of. IEC materials must be designed specifically for the bag type, and for the collection system put in place.



**Figure 2:** IEC materials designed for “in-home use” in Haiti. (Left: normal bags, Right: Peepoo bags).

Ongoing hygiene promotion messages should include education on the importance of separation of bagged excreta from general household waste; provision of separate facilities for urine and excreta; disposal of children's excreta; and vector control by ensuring "bag deposit drums" are correctly closed. In addition, adequate hand-washing facilities, complete with soap, must be provided. Further information on hygiene promotion approaches can be found in Oxfam TBN ##:

<http://www.oxfam.org.uk/resources/learning/humanitarian/index.html>

### Monitoring and evaluation

Ongoing monitoring is necessary to ensure bags are always disposed of in a suitable container/location and to ascertain user perceptions of the system. Sample forms were developed for the poo bag approach in Haiti and are adaptable to other settings.

## 2. User Interface

Poo bag excreta disposal systems are intended to be low-cost and rapidly implemented, and not labour or resource intensive. Keep the technology as simple as possible. For "in-home" only systems (i.e. household level provision), the minimum components are the bag for containing the excreta and eventually a container to facilitate bag use.

### Types of Bags Available

A wide range of bags are available on the market, with each type having specific advantages and disadvantages. Bag degradability will depend on UV light, moisture, and oxygen availability. Globally, bag degradability terminology is not yet fully standardized. Table 1 (below), highlights the key parameters to be considered when designing a poo bag excreta disposal programme.

	Polyethylene	Biodegradable	Biodegradable	Peepoo
Cost	\$	\$\$	\$\$-\$\$\$	\$\$\$ (?)
Size	Varies	Varies	Varies	"small"
Procurement	Easy	Moderate	Moderate	Not mass produced
Environment impact	Polluting/non degrading	Degrades, but variable safety	Degrades, no impact	Degrades no impact
Degradation	None	Fragmentable Aerobic or anaerobic (landfill)	Complete degradation, can be rapid. May require composting	Rapid, complete degradation
Health impact	None	None	None	Pathogen break down

**Table 1:** Criteria for Selecting a Poo Bag Type

The choice on bag type will depend on a number of factors including "what is available locally" and the cost per unit. Ordinary plastic "non-degradable" bags can be

used in the absence of other options, particularly at the start. As the response develops, other more "sustainable" options can be developed through the use of biodegradable bags, etc. However, a number of factors, including: user preference, impact on local markets, availability and cost per unit, etc. should all be considered. Independently of the bag type used, darker coloured bags are recommended for "obscuring" the contents, and decreasing the potential for shame/offence amongst users.

*Note:* Various powder and gel coagulants are available to solidify excreta by absorbing moisture. Handling and disposal is easier. However, the products are expensive and not recommended for large-scale emergencies.

### Containers (bag supports)

Where possible, a container should be used to support the bag for ease of use. Locally available containers, such as those recycled from food or drink packaging, can be used. Ensure the container is both clean and intact (i.e. will not cause bags to tear). Containers must also be sized correctly according to the volume of the bag being used (i.e. stretching bags will cause them to tear).



**Figure 3:** "In-home" provision of locally available, recycled container with bag used in Port-au-Prince, Haiti

### Urinals

Where possible, the provision of male and female urinals is recommended as an effective way of reducing overall operating costs. Providing urinals will decrease overall bag consumption, and ultimately facilitate handling bag contents, as they are likely to be less wet. A number of urinal designs are available using simple plumbing materials or by using recycled materials. The use of urinals will also decrease waiting time at cabins (especially for women).

When soak-aways are built for urinals, one upgrading option to consider is the use of urine diversion (UD) bag toilets. This is particularly appropriate in smaller settlements/camps where PHP is feasible.

Further details of urinal designs can be found in Oxfam GB fact sheets:

[LINK: Under construction](#)

### Communal Facilities and Commodes

Where feasible, communal facilities for bag use should also be provided. As a minimum package, an "in-home" system (bags + basic container) can be provided inside a basic superstructure at a communal location. Such a structure offers privacy and comfort for users, and is easy to manage through community toilet attendants. Improved options could include a simple commode system.



**Figure 4:** Rapid, low-cost toilet construction (left) by MSF-B for bag (right) used post-EQ in Cité Soliel, Haiti



**Figure 5:** Existing commode with low-cost modification of welded bucket that was the appropriate size of the Peepoo, Port-au-Prince, Haiti



**Figure 6:** Prefabricated commode (often available in Western nations) requires larger bags; used with a "grocery-style" bag in Port-au-Prince, Haiti

### 3. Poo Bag Distribution

For "in-home" bag distributions, enlist the help of community leaders and volunteers from the target community. This is particularly relevant in large settlements/camps where programme teams may not have the capacity to reach the entire population. When biodegradable or Peepoo bags are being distributed, it is important to ensure 100% coverage and usage amongst the target groups, if the full environmental/health benefits are to be obtained. In the case of the Peepoo, no benefits will be obtained from the "pathogen die off" if coverage is not universal. "In-home" usage bags should be provided on a ratio of **1 bag/person/day**.

Where "in-home" bag distributions are not feasible (i.e. high risk bags will not be collected and properly disposed of), bags should be provided directly at communal facilities. "Communal" bag usage should be provided based on a ratio of **1 bag/person/day**. However, extra provision should be made assuming a certain percentage of the population having diarrhoea. Extra bags can be provided at a ratio of **3 bags/person/day** for this percentage.

If Poo bag approach is to be used for longer periods, the community should be empowered to take on the function of supplying themselves from commercial sources. To prevent the misuse of Poo bags, people should also be made aware of the importance and value of safe excreta disposal in their community. In Haiti, beneficiaries were found using bags for selling charcoal and vegetables.



**Figure 6:** Community-assisted distributions of "in-home" Poo bags. Port-au-Prince, Haiti

### 4. Poo Bag Deposits and Storage

To ensure the safe management of excreta, Poo bags will require a collection and storage system. The use of a designated "deposit container" will ensure the bags are collected at specific locations, and stored prior to removal off-site. Suitable storage facilities are essential to prevent the "flying toilet" phenomenon, which commonly occurs because there is no deposit system in place. The availability of storage containers can vary in post-emergency context. However, at minimum, deposit containers should have tight fitting lids for smell and vector control, and can be upgraded as the emergency

stabilises. If possible, the container should have a handle on the lid, to minimise contact with the container. The lid should also be tight fitting to prevent vermin and other vectors from entering. Also, in the event container falls over, the lid will prevent the contents from spilling.

In flood emergencies where populations may be inaccessible, it may not be possible to establish a deposit and storage system. Further research is required into the various bag options in such settings. One option is to bury the bags on-site, providing suitable bag burial locations are available at a suitable distance from people's dwellings (smell) and from water sources (> 30 m). However, this is only recommended for biodegradable bags and is not appropriate in flood prone areas or on land with a high water table.



**Figure 8:** Ideal deposit container- 32-gallon, lightweight with handle, lockable lid and attached wheels

## 5. Poo Bag Collection & Transport

A number of options exist to transport storage containers safely and effectively. The choice of option will depend on the volume and weight of the containers to be transported; access to the collection site; distance to the final disposal site; and cost of operation for the collection service. Options include wheelbarrows, handcarts, bicycles with trailers, horse and carts, pick-up trucks, and shoulder carried containers.

Depending on the distance to the final disposal site, the system put in place may require transfer stations, where the contents from many smaller containers are deposited and then collected by larger sized transport option such as a large truck. Vacuum operated sewerage trucks may be appropriate vehicles to use at such transfer stations.

In flood situations, it may be necessary to use boats or other aquatic transport to collect Poo bag containers. A bell or whistle can be used to warn the community that the boat is approaching and that containers should be placed outside for emptying/collection.

## 6. Poo Bag Treatment/Disposal

After collection and transport, the excreta filled bags must be handled in such that any potential to contaminate the environment or harm public health is mitigated. The options for treating or disposing of the bags will depend on the context. Specific examples are discussed in the following case study section.

## Contingency Bag Stocks

In disaster-prone urban areas, there is potential to design and stock appropriate poo bag sanitation systems, which can be deployed rapidly and scaled as required in the event of an emergency. With forward planning, it is possible to identify to raise awareness amongst potential future users on the options, and to stock more environmentally friendly materials, which may not normally be available locally. Depending on the type of bag kept, it may be necessary to work in some form of stock rotation, to ensure the shelf life of the bags is not exceeded.

Various containers for bag support and deposits will also be necessary, but it may be prohibitively expensive to stock these due to the large volumes. In this event, suitably commercially available drums/containers can be identified locally, and pre-agreements set-up with local suppliers to deliver specified quantities of drums/containers rapidly in the event of a rapid on-set emergency.



**Figure 10:** Distribution of household kits for in-home Peepoo use in Port-au-Prince, Haiti

Poo bag kits can be designed for rapid distribution. As a minimum, a kit should have an appropriately sized container to support the bag, and contain the corresponding IEC materials with instructions on knotting, disposal, and the collection scheme to be put in place. Ideally, the kits should fit into the container and be fitted with a lid.

## Use of the Poo Bag Approach - Case Studies

### 1<sup>st</sup> Phase Response

Bags can be rapidly deployed to an affected community and require minimal education. However, prior to any bag distribution, a suitable bag collection, storage and disposal system must be put in place and be effectively maintained over time.

#### *In-home only provision*

Bags, containers, and IEC materials can be distributed immediately so that beneficiaries can begin to use the bags in their home or in a place where they feel secure. However, proper receptacles or designated burial spots to deposit used bags must be provided. Acceptance of the system by users is also important. From a public health perspective, urine has minimal associated with it, and it is unnecessary to use bags for urine only. Users can be encouraged to use specific urinals.

#### **"In-home" Bag Provision in Port-au-Prince**

Camp Maranatha, a spontaneous IDP settlement isolated on a mountainside. It was considered that Oxfam GB would not be able to provide traditional latrines, as the nearest road access is 15 minutes walk over unstable terrain. There was also a land dispute. People were either defecating in the open around the camp, or into plastic bags that were thrown into a nearby ravine.



**Figure 11:** Camp Maranatha, surrounded by a riverbed that experiences flash floods during the summer rains

#### *On-site bag storage and/or burial*

Prolonged storage can limit the collection and transport costs. For example, if Peepees are properly used (i.e. no excreta outside of the bag and no leaks) they can be stored for 4 weeks then simply discarded. However, the length of time between collections or burials must be acceptable to the population.

On-site burial may be the most rapid and logistically feasible option available until off-site transport can be arranged. If biodegradable bags are used, it must be ensured that the pit remain undisturbed for at least 12-months to allow pathogens to degrade. Care must be

taken to ensure groundwater is not polluted due to leaching from the burial pit.

#### **"In-home" Bag Provision (continued)**

Buckets were distributed to each household along with weekly supplies of biodegradable bags. One small pit was excavated at the bottom of the hill (public land) and the population were instructed to deposit used bags there. Community mobilisers raised awareness about covering the pit daily with soil and/or ash.



**Figure 12:** IEC specific to carrying bag from usage point to pit for burial

After 2-weeks, an agreement was reached with the landowner to build pit latrines in the camp. In-home bag usage continued for over one month to fill the gap until the pit latrines were completed.

#### *Off-site bag disposal*

When biodegradable bags are used and on-site burial is not possible or not acceptable, deposit drums can be transported off-site to disposal sites or alternatively to composting facilities (see below). When ordinary plastic bags are used, off-site disposal by landfilling or incineration is the only viable option to remove excreta from the immediate living environment (refer to Oxfam GB TBN no. 15).

<http://www.oxfam.org.uk/resources/learning/humanitarian/index.html>

When excreta filled bags filled with excreta are disposed of in a landfill or dump site, special areas should be prepared for the bags, especially if there are people living in the vicinity or if there is a practice of scavenging refuse at the site. This area should preferably be cordoned off.

### Upgrading options

#### *Community level provision*

When space is available, superstructures can be erected to offer additional privacy and comfort for users, which is particularly important for women. Various toilet designs can be used inside the superstructure, depending on the preferences of the intended users.

For users accustomed to squatting, a simple bucket to hold the bag, with footrests, may be appropriate. For users accustomed to sitting or for the physically disabled and elderly, various chair/commode like structures can be made, modified, or purchased prefabricated. More details for adapting facilities for disabled can be found in:

*"Water and sanitation for disabled people and other vulnerable groups: Designing services to improve accessibility".*

Space permitting, simple urinals for men and women can be installed to limit the number of bags used and decrease waiting times at cabins.

### Community level bag provision Port-au-Prince, Haiti

At Cité aux Cayes camp, "in-home" bag provision was started 2-days after an assessment. During this time, superstructures for commodes and urinals were being built, with construction taking around one week. Following this, camp residents were given the choice to either use "in-home" bags or to use communal cabins.

Cité aux Cayes was not accessible by road. A wheelbarrow was used to transport excreta deposit drums and solid waste to the nearest road for pick up.



**Figure 13:** Bag commodes with superstructures

Post-trial data collected from household questionnaires found 94% of cabin users were "very satisfied" or "satisfied" with the community toilets. Additionally, 65% of households highlighted "in-home" bags were used by one or more members of the family.



**Figure 14:** Solid waste and excreta deposit drums being taken to the nearest road for pick up.

### Case Example – UD-bag toilets, Port-au-Prince, Haiti

Instead of providing separate urinals, to maximize the space available and minimize the number of bag used, Oxfam GB developed Urine Diversion (UD)-bag toilets. The urine was diverted to a soak pit and the back "bucket" style was used as with other bag systems, to contain faeces.



**Figure 15:** Low-cost, locally produced UD toilets (Left, fibreglass, right recycled materials)



**Figure 16:** IEC used to explain proper removal of bag from UD toilet and deposit for collection and disposal

### Composting Bags

Composting is the biological decomposition of organic material under aerobic conditions (in the presence of oxygen). With proper management, biological heat is generated and composting takes place followed by a period of stabilisation to produce a final product suitable for application to the land without adverse environmental or health effects.

In an emergency or post emergency setting, the composting of excreta (combined faeces and urine or source separated) should only be considered if there is sufficient technical expertise, space and trained staff to limit potential risks to health and safety. In the early stages of an emergency, establishing a new composting system is unlikely to be appropriate, and emphasis should be placed on removing bags from high population density areas.

If and when the decision is taken to develop composting, it is important to involve communities from the beginning, especially when excreta re-use is not taboo. Composting can be used to treat raw excreta and render it safe, providing this is done in a systematic way. Composting processes are discussed more in depth in Oxfam GB TBN 16.

<http://www.oxfam.org.uk/resources/learning/humanitarian/index.html>

### Composting in a 1<sup>st</sup> Phase Emergency Port-au-Prince, Haiti

Two months after the earthquake, the New Directions Foundation set up a pilot-composting project. The system used fungal inoculation in small compost piles on wooden crate-platforms.



**Figure 18:** A New Directions Foundation composting site in Port-au-Prince

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*Excreta disposal for people with physical disabilities in emergencies*
- Oxfam GB TBN no. 2  
*Vulnerability and socio-cultural considerations for PHE in emergencies*
- Oxfam GB TBN no. 7  
*UD Toilets and Composting Toilets in Emergency Settings*
- Oxfam GB TBN no. 15  
*Domestic and Refugee Camp Waste Management Collection & Disposal*
- Oxfam GB TBN no. 16  
*Composting of Organic Materials and Recycling*
- Oxfam GB TBN no. XX  
*Hygiene Promotion*
- [www.biodeg.org](http://www.biodeg.org)
- [www.peepoople.com](http://www.peepoople.com)