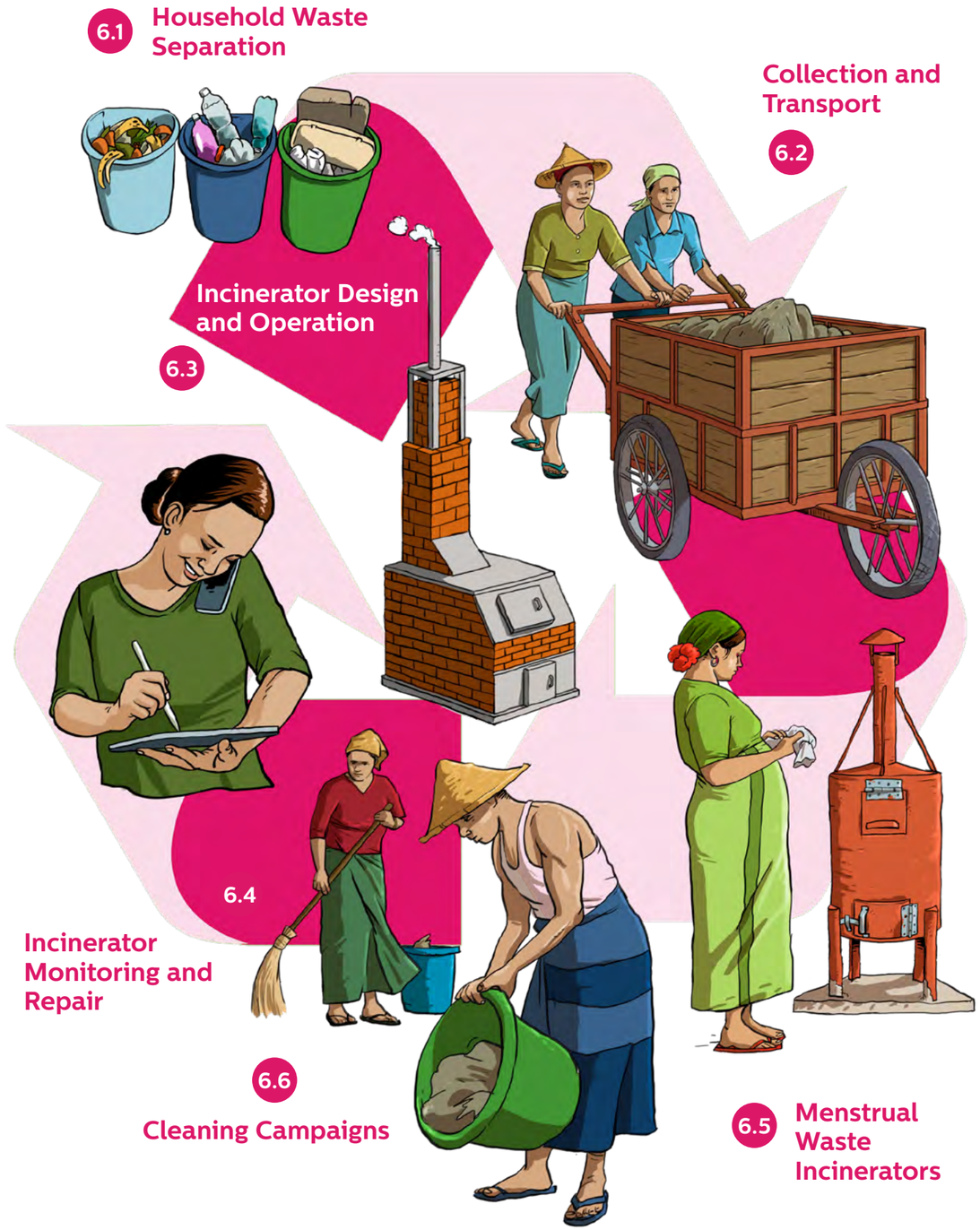


C6. Solid Waste Management

In many countries, including Myanmar, municipal solid waste management (SWM) is still not prioritised outside of large cities, leaving many households to deal with solid waste on their own. Sophisticated SWM, especially disposal, is often too expensive for humanitarian programmes, leading to imperfect and unsustainable solutions, which becomes particularly problematic in prolonged emergencies. However, SWM plays a key role in WASH programming to reduce public health risks and keep the environment clean. WASH agencies collect, transport, and dispose of solid waste while drawing the link between SWM and disease reduction in hygiene promotion sessions and engaging communities to help keep their surroundings clean.

The details of a SWM system will vary, depending on the type of waste generated, contextual limitations, and preferences for waste storage, collection, and disposal. Prior to setting up a new system, WASH agencies should understand what happens with waste, both at the household level and the community level, and to evaluate routes, required frequency, and number of workers needed for waste collection, as well as identify final disposal sites and methods.

6.1 Household Waste Separation

An analysis of waste at the household level will indicate the amount of waste separation already occurring, if any.

Separating waste at the household level generally makes solid waste management more efficient, but that depends on several factors, such as the type of waste produced, feasibility of recycling, and the final disposal method. The analysis conducted in Sittwe camps showed that households already receive incentive to separate waste—for example, many households feed food scraps to chickens or sell recyclables to shops that collect recycling. Analysing waste streams also revealed that organics and recyclable plastics, glass, metal, and paper do not make up a significant portion of dumped waste, which gave OXSI the information needed to set up the SWM system.

In a previous programme, Oxfam conducted a pilot to further encourage residents of one camp in the Sittwe restricted area to separate waste. Because waste collected in camps is incinerated, removing non–flammable items such as glass and metal helps the incinerator workers process waste faster, and separating out wet waste such as food trimmings makes combustion more efficient and produce less smoke. The waste separation pilot involved raising awareness and the distribution of containers for organic waste and dry waste. The pilot led to mixed behaviours, with some households starting to separate waste for the first time, while others continued to mix all the waste in one bin.

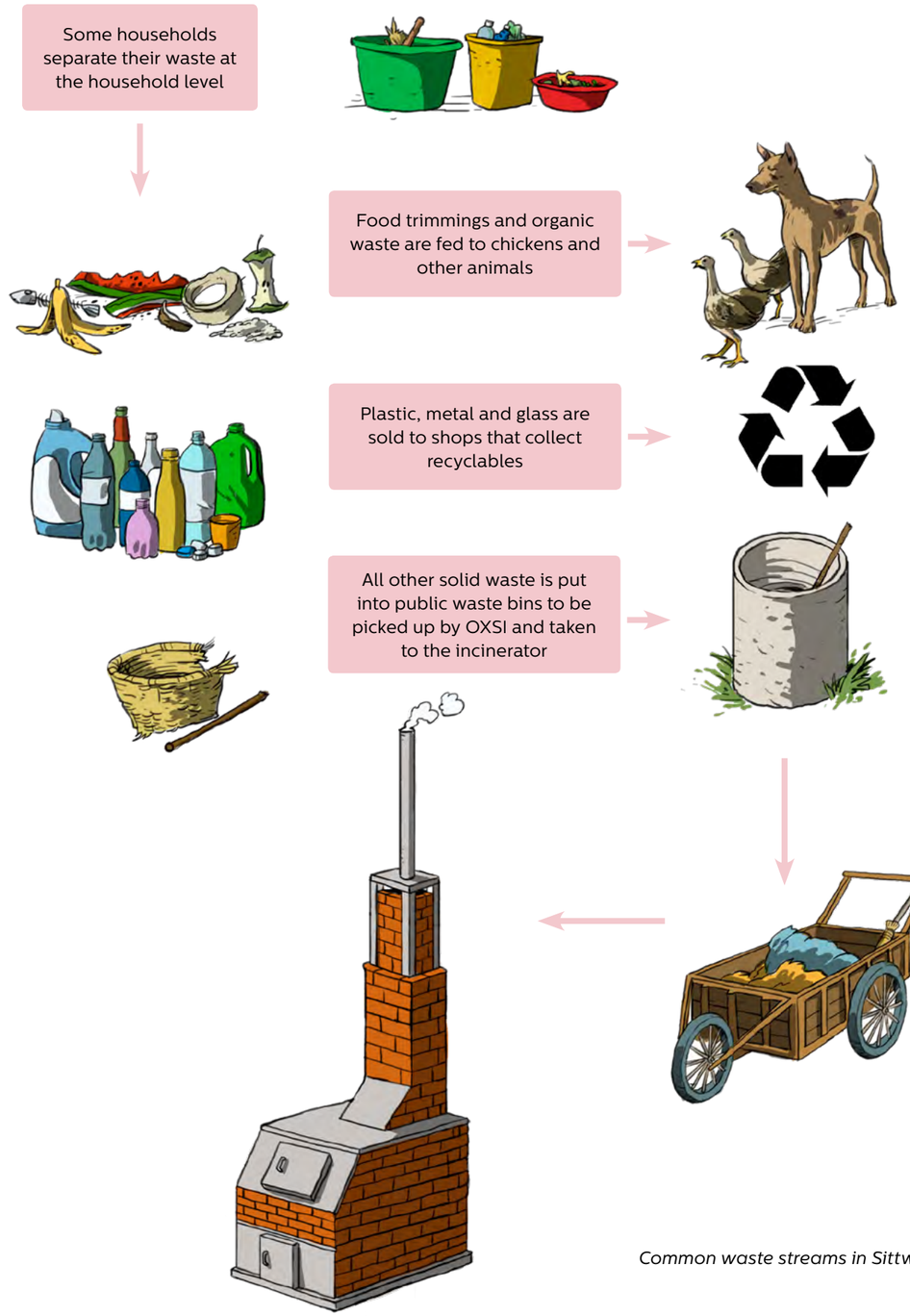
During this programme, OXSI has continued to encourage waste separation, with similar mixed results. Households that feed food waste to animals and/or sell recyclables to recycling vendors continue to do so, while others mix waste because they are far away from recycling shops or unaware of them, don't have chickens or other animals, do not have enough bins in their rooms to separate waste, or simply don't like to separate waste. In general, the separation of waste at household level was not incentivised enough to become habitual for those not already practicing household waste separation. In the future, OXSI could explore other factors that drive or hinder household waste separation based on the special needs of each household.

Some households separate waste into three categories: organic waste, recyclables, other.

(6A Waste Separation IEC)

Tip

Responsible solid waste management includes avoiding the creation of more waste as much as possible. OXSI takes care to minimise packaging in non–food item distributions—for example, monthly hygiene kits are distributed in cardboard boxes, which camp residents use for storage or as a fire starter, and only the sanitary pads have plastic packaging.



Common waste streams in Sittwe camps.

6.2 Collection and Transport

After household bins get filled up, solid waste must be either picked up or deposited in a central location for pick up and transport to the waste processing area.

Through consultations and experience, OXSI has found advantages and disadvantages with different public bin designs. For example, bamboo waste bins are light, moveable, and allow ventilation, but must be replaced every six months; concrete bins are durable but not moveable; plastic bins are sturdy and moveable, but the most expensive option.

Considerations about collection efficiency, value for money, and accountability led OXSI to hire environmental cleaners assigned to collect waste from public bins and to pick up litter in specific zones in the camps where they live. In dense camp settings with small unpaved roads, environmental cleaners cannot navigate heavy machinery to collect waste. Instead, they collect the waste in pushcarts, and when full, take the pushcarts to incinerators in each camp. The placement of public bins is important, especially to allow women and girls to dispose of waste during the day and night without walking too far from their shelters; however, too many bins are a burden for environmental cleaners to empty and if not emptied frequently, will become a public health risk or will be removed by nearby households bothered by the smell of old waste.

Pilot

To increase the efficiency of waste collection, OXSI piloted a collection service in one camp. During the pilot, environmental cleaners moved along a predetermined path on the same days and at the same time each week and used a bell to signal people to come out and dispose of their household waste directly into pushcarts. If someone was not home at the time of the waste collection, they continued to use public waste bins as usual. When full, the environmental cleaner took the pushcart of collected waste to the incinerator.

The pilot ran successfully for a month, and a survey of 60 households showed that the majority (82%) liked the new waste collection system. In addition, although the total quantity of waste collected during the pilot did not change significantly compared to the volume collected using the old system, the number of days the environmental workers needed to collect the same amount of waste per week decreased. Environmental cleaners also reported that the new system made their jobs easier, since they no longer had to shovel out the waste from each waste point. They still needed to empty public waste points, but not as frequently.

OXSI scaled up this waste collection system in half of the camps where OXSI manages WASH. In the remaining camps, environmental cleaners continue to collect waste from public waste bins and transport it in pushcarts to the incinerators. Different systems will work in different situations, so it is important to pilot options and consult communities to find what works best.

Focus on Equity – gender, protection, and inclusion

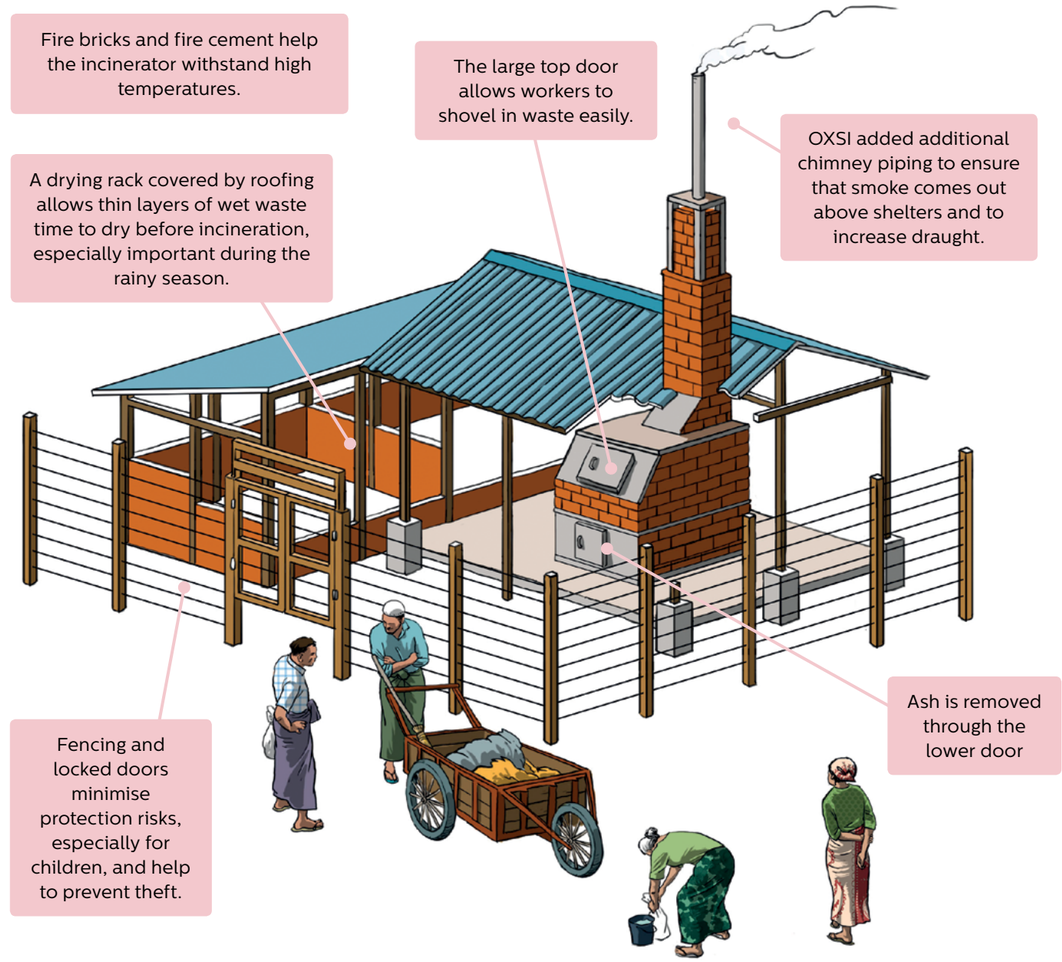
Environmental cleaning can provide an income–generating opportunity for affected populations during a humanitarian response. In WASH programmes, where construction activities tend to favour male workers, women may have less access to livelihood opportunities. For better or worse, women are often accepted as environmental cleaners, and therefore this activity provides an important opportunity for women to earn income. In some OXSI camps, environmental cleaners split a monthly shift, with each cleaner working for two weeks of the month to allow more people an opportunity to earn income.

6.3 Incinerator Design and Operation

In an emergency, and especially in rural areas where local governments do not provide solid waste management services, WASH agencies may have limited options for the treatment and disposal of solid waste.

A waste analysis, including an understanding of community preferences, should be conducted prior to finalising treatment systems. In the flood–prone and densely populated Sittwe camps where managed landfills are impossible, incineration of solid waste is the most practical option, albeit not the most environmentally sustainable. In OXSI camps, there are two different incinerator designs. In the majority of camps, OXSI operates one of these large incinerators.

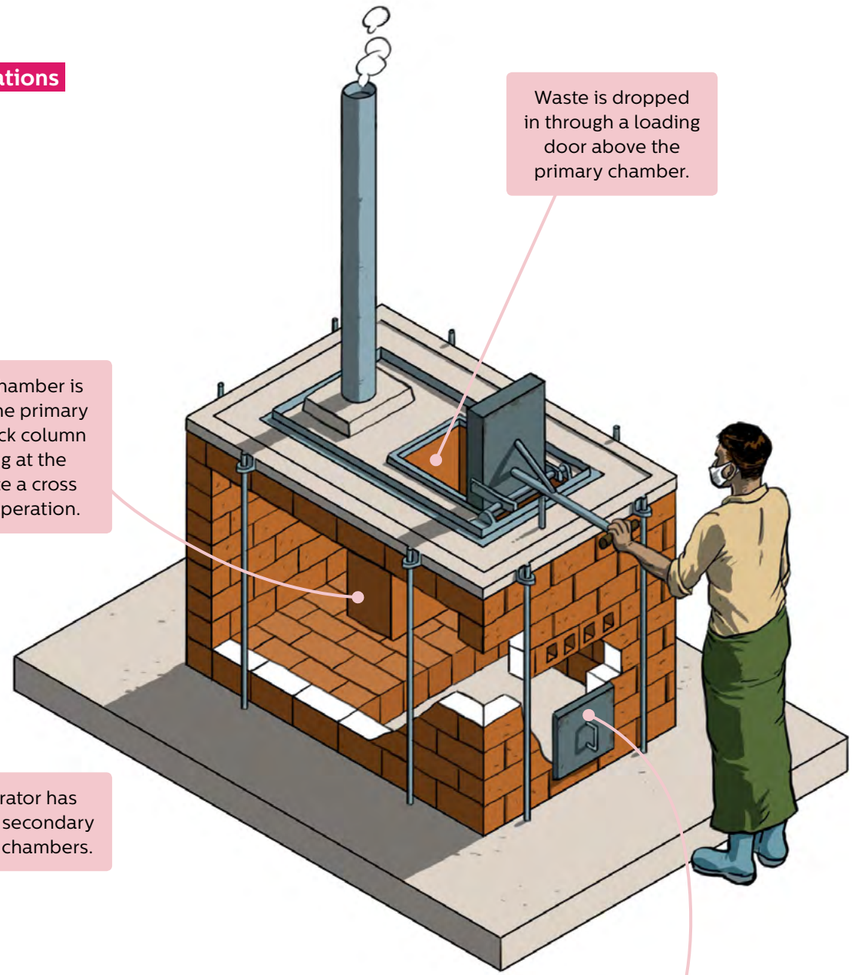
Design considerations



The remaining camps have two smaller De Montfort incinerators, which are designed to dispose of medical waste (endorsed by WHO), and thus reach higher temperatures and are more efficient. This means they process waste faster, despite a smaller capacity than the larger incinerators, but require more frequent loading, which translates into more manual labour for incinerator workers.

World Health Organization. (September 2004). Managing Health Care Waste Disposal. https://path.azureedge.net/media/documents/TS_waste_disposal_guide_part1.pdf

Design considerations



Quick Facts

The large incinerator can process 20 kg of dry waste per hour for 12 hours per day, and costs about **4,430 USD** (2020). The smaller De Montfort incinerator costs about **1,650 USD** (2020). (6B Incinerator BOQ and Drawings)

Incinerator workers bury organic waste and material not viable for burning.

Pollutants emitted by incinerators pose health risks for workers, and WASH agencies should take these concerns seriously. Organisational health and safety measures should be in place and followed, with training and PPE provided to all SWM workers. There are also specific immunisations that WASH agencies should consider providing for SWM workers, such as tetanus. The OXSI Community Mobilisation team provides training for incineration workers, which includes how to separate waste, how to dry waste before incineration, how to load waste into the incinerator to maximise combustion efficiency, and the importance of and rules about wearing proper PPE on the job.

Incinerator workers bury organic waste and material not viable for burning (e.g. rusty metal sheets) in a pit in the incinerator compound and collect recyclables to sell to a recycling shop. They sometimes bury ash, especially during the dry season so the wind does not spread it; they also allow farmers from the surrounding areas to use the ash on their soil. The burying of waste in an informal landfill is not ideal, and a better solution should be explored in future programmes.

OXSI Challenges	OXSI Solutions
In some locations, incinerators were too close to shelters, causing complaints about smoke. However, if located more remotely, SWM workers struggle to make multiple trips to the incinerators per day, and remote incinerators attract more thieves – in OXSI camps, materials from incinerators (metal doors, hardwood, roofing sheets) are frequently looted.	WASH agencies should carefully consider the siting of incinerators in consultation with communities. Place incinerators as far from shelters as possible, and consider typical wind directions to minimise smoke reaching shelters. If not possible to build incinerators far away, increase chimney height and reduce the number of days incineration takes place. WASH agencies can reduce looting by partnering with communities to build ownership of infrastructure and by making infrastructure more difficult to loot. OXSI engaged camp leaders to monitor the incinerators to prevent looting. In addition, OXSI slowly replaced incinerator components with sturdier and harder to remove materials, such as concrete instead of timber posts.

6.4 Incinerator Monitoring and Repair

Involving communities in monitoring and repair is not always feasible for technically complex or dangerous infrastructure such as incinerators.

OXSI monitors incinerators with a monthly functionality check.

Unlike other WASH infrastructure, OXSI does not "hand over" incinerators to communities, and therefore, communities do not participate in any monitoring or maintenance. Once again, the OXSI MEAL team conducts a monthly functionality check to report the status of each incinerator (6C Incinerator Functionality Check). The results of the functionality check are transmitted to the construction team, who schedule in the repairs into their monthly workplans. Communities can also request repairs through the complaints response mechanism (CRM) at any time.

OXSI Functionality Check

6.5 Menstrual Waste Incinerators

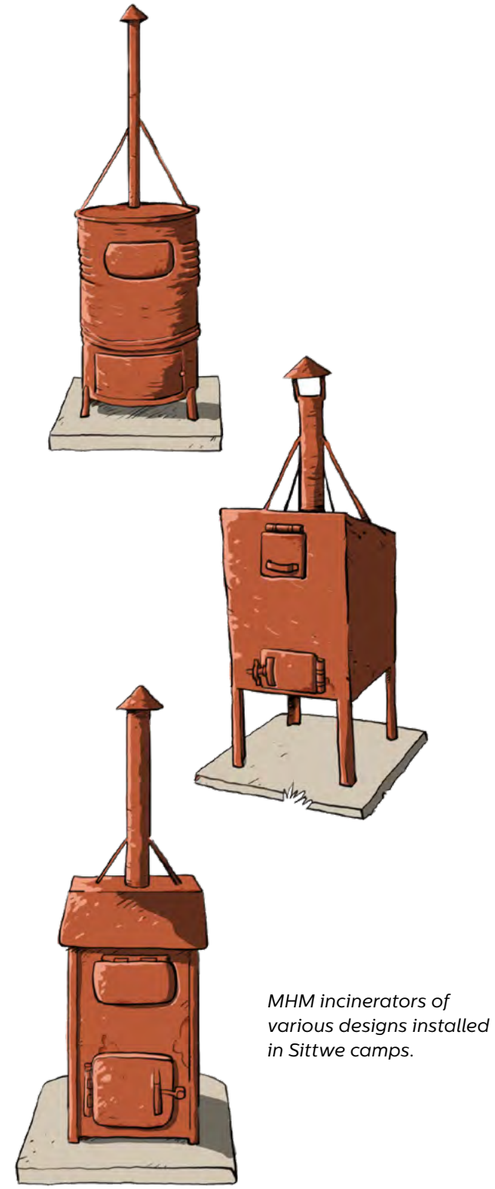
Although humanitarian actors have increasingly incorporated menstrual hygiene management (MHM) into emergency response, the distribution of menstrual materials continues to be the most common activity, which represents only one component of a complete MHM response.

This section focuses on OXSI's approach to finding solutions in a challenging environment for menstrual material disposal and waste management – to learn about peer–to–peer MHM educational groups and to see the menstrual products OXSI delivers, see Sections 4.2 and 4.3, respectively.

Consultations with women and girls are essential to understand needs, habits, taboos, and preferences for MHM. Through this process, OXSI learned that women preferred to bury or burn used sanitary pads to prevent men, including men working at the incinerators, from seeing the sanitary products brought in with the other waste. Burying is not a preferred option in the camps due to the population density and the high water table, so OXSI worked with women to improve the other option: to make incineration of sanitary waste accessible, private, and fully handled by women.

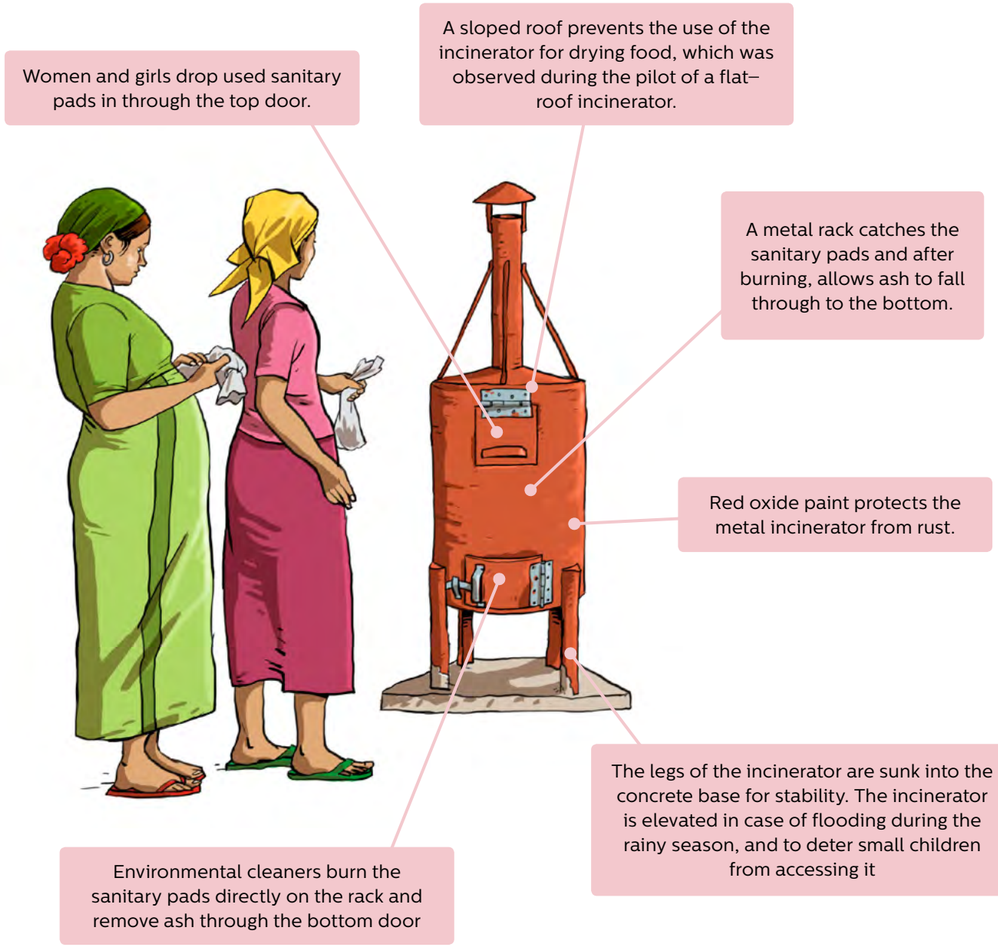
In a previous programme, Oxfam worked with women to conduct a pilot to design and test 24 small MHM incinerators in one camp. Female environmental cleaners checked the incinerators regularly and burnt sanitary products directly in the small metal incinerators, with no transport necessary. Women reported that they used and liked the boxes and requested more incinerators, so OXSI scaled up this process in other camps by consulting with women on incinerator design and locations.

Two Action from Community Engagement (ACE) groups (see Section 4.1) designed two more MHM incinerators with slightly different designs and manufactured 30 for one camp. These two groups contained a mix of men and women, and the men expressed just as much interest as women in working on this issue to help women and girls in their community. When scaling up MHM incinerators in all camps, women and girls heavily favoured the round MHM incinerator designed by the ACE group. OXSI installed over 300 MHM bins, about one for every 11 latrines.



MHM incinerators of various designs installed in Sittwe camps.

Design considerations



(6D MHM Incinerator Drawings)

Environmental cleaners, Community Mobilisation staff, or ACE members, depending on the camp, monitor and report on the functionality and use of the MHM incinerators and inform the Construction team if they need any repairs. This monitoring is not formalised like for other infrastructure, but since environmental cleaners routinely check on and burn the contents of the boxes, additional monitoring has not been necessary. Community Mobilisation teams and MHM groups continue to educate communities about the purpose of the MHM incinerators and to instruct children not to play with the incinerator bins.

Due to numerous challenges in camps, the MHM incinerators are not a perfect solution to ensure the desired level of privacy for women and girls. In most of the camps, latrines are shared by households and not sex–segregated (see Section 3.2), so both women and men see the MHM incinerators located near latrines. However, women and girls prefer the MHM incinerators over other solutions under the current circumstances, and OXSI continues to work with them through the MHM groups (see Section 4.2) to collect feedback and make adjustments in the design, use, and maintenance of the incinerators.

6.6 Cleaning Campaigns

In a protracted emergency, WASH agencies have the opportunity to work with communities to increase long–term engagement in WASH service provision.

This proves easier for some activities than for others. Communities often accept both women and men participating in the collection of solid waste, and it does not require technical skills or sophisticated tools. Even if employing environmental cleaners to collect solid waste, WASH programmes can improve ownership and accountability by organising regular camp cleaning campaigns to engage more people in the cleaning process. The OXSI Community Mobilisation teams organise cleaning campaigns and invite men, women, and older children to help clean up around their shelters. There are several types of cleaning campaigns, but all aim to bring people together and inspire them to take care of their environment:

- **Routine cleaning campaigns** are organised by OXSI Community Mobilisation teams weekly or bi–weekly, depending on the location and season. The team engages neighbouring shelters to participate in cleaning the area around their shelters with tools provided by OXSI or using their own tools (distributed by OXSI to every shelter). Environmental cleaners join the campaigns with pushcarts to take the waste to the incinerator.

- **Spontaneous cleaning campaigns** are sometimes conducted in response to a complaint, Transect Walk (see Section 4.5), or if there is waste around a borehole that fails a microbiological test (see Section 2.4). These cleaning campaigns are also organised after a storm or windy day to clean up debris.

- **Joint cleaning campaigns** are organised with OXSI and CMAs once a month. Both organisations contribute tools, pushcarts, environmental cleaners, and refreshments, and engage a large number of participants to join. (6E Camp Cleaning Campaigns)

- **Drainage cleaning campaigns** are conducted as–needed, but especially as part of monsoon season preparedness to ensure that rainwater clears more quickly and does not cause flooding or stagnant water. Drainage cleaning campaigns are sometimes organised together with CMAs. OXSI negotiates with camp leaders to identify a dumping location for drainage waste, since it is too wet for the incinerator. Clearing drainage is more difficult than a routine cleaning campaign and usually attracts mostly male participants.

- **Open Defecation (OD) campaigns** started in late 2019 as another way to engage communities in solving OD. OXSI held meetings with the community to develop a plan for the campaign to target problem areas once per month. These are similar to cleaning campaigns but focus on cleaning up OD only. The location for the OD campaign is identified through Transect Walks (see Section 4.5) as well as the results of the monthly latrine functionality check (see Section 3.3). The OD campaign is always conducted early in the month so as not to skew the functionality check OD data. (6F OD Cleaning Campaigns)

Environmental cleaners taking a pushcart of waste to the incinerator after a community cleaning campaign.