The Urban Affordable Clean Toilets (U-ACT) project, headed by the Centre for Development and Coopera-
tion (NADEL) of the Swiss Federal Institute of Technology (ETHZ), aims at overcoming the cons-
traints to private sanitation investment in poor ur-
ban areas. Field research was conducted in 40 ran-
domly selected low-income areas of Uganda’s
capital Kampala where people rely on on-site sani-
tation. The sanitation situation in these urban slum
zones is characterised by a high number of users
per toilet, and full or overflowing latrines that are
not regularly emptied. The U-ACT project activities
include the construction of ventilated improved pit
(VIP) latrines. This factsheet provides information
on the construction and cost details.

Ventilated Improved Latrine construction
in the slum areas of Kampala, Uganda

U-ACT: The Urban Affordable Clean Toilets Project

After an analysis of the sanitation conditions in 40
urban slum zones, U-ACT designed and empirically
tested financial interventions with the aim to improve
sustainable sanitation access.
About 1200 randomly selected households were of-
ferred a one or double-stance ventilated improved pit
latrine at different subsidised rates and payment
modalities to understand how sensitive sanitation
demand is to price and financing mechanisms, and to
analyse non-price-based constraints, such as space
limitations or the lack of land rights. In total, 156 VIP
latrines were built under the supervision of the project
engineer. In 85% of the cases, double-stance facilities
were desired by the households, which is why con-
struction and cost details are given only for double-
stance U-ACT toilets.
Main features of the U-ACT toilet
U-ACT toilets feature one- or double-stance toilets with a lined pit and a brick superstructure. Pit lining prevents groundwater contamination and ensures that a facility can be emptied when it is full (ideally by a vacuum truck). To guarantee ease of access for the hose from the vacuum truck, the pit is equipped with a removable brick. The solid brick and cement structure makes the latrine very durable. All latrines are equipped with wooden doors and a sturdy lock. To reduce flies and odours, the U-ACT latrine is provided with a ventilation pipe. Furthermore, it is equipped with a handwashing facility that can be filled with rainwater or piped water. In locations where there is a risk of flooding and/or a high water table, the latrine is raised. The space required for a ground-level double stance U-ACT toilet is 4.5m². For a raised double-stance VIP with stairs it is 8m² (see Figure 3). During the construction period, a total area of around 15m² is required to store materials and tools.

Costs (capital expenditure CAPEX)
Establishing the generic costs of VIP latrines is difficult due to varying site conditions and individual design adaptations. Table 1 provides the average construction costs for the lined double-stance U-ACT toilets built in Kampala in 2011/2012 as pictured above. Material costs constitute 78% of total costs, while labour costs are only 22%. Operation and maintenance (O&M) costs are not included. An interesting finding is that transport costs of construction materials (and of the soil from pit excavations) amounts to around 5 to 7% of overall construction costs. This is due to the fact that the construction sites are difficult to access. Building raised VIP latrines for flood-prone areas adds around 9% to the cost of construction (see Table 1). Also, worth noting is that the construction of single-stance toilets is only 25% cheaper than the double-stance toilets.

Training of masons and construction time
The Kampala-based NGO SSWARS was responsible for organising and training local builders to build the VIP latrines. All of the builders were community-based masons who received a 2–3 day training, especially regarding the substructure and pit lining. Overall quality control was guaranteed by a SSWARS civil engineer who made sure that the construction met U-ACT standards. Construction time, including pit digging, varies according to the soil conditions, size of the pit and the size of the working team. Table 2 provides an overview of the man-days needed for constructing the raised and non-raised VIP latrines.

Further reading:
Lined Double-Stance Ventilated Improved Pit (VIP) Latrine

**Construction details:**
Construction time to build these pits varies according to the size of the pit and the size of the working team. With a team of 4 labourers you need 1 day for a 1-stance non-raised pit, and 2 days for the raised pit (without superstructure).

In addition to labour costs, additional features add to the overall costs:
- a handwashing facility adds US$ 12
- installation costs of the handwashing facility adds US$ 22
- water gutters for rainwater harvesting (material and installation) cost US$ 28.6

**Spatial footprint**
A double-stance VIP latrine requires 4.5 m² space, whereas a raised latrine has a spatial footprint of almost 8 m², due to the required stairway. During the construction period, a total area of around 15m² is necessary (excavation, materials, tools).

**Table 1: Costs of ground-level and raised U-ACT VIP latrines**

<table>
<thead>
<tr>
<th></th>
<th>Ground-level double-stance VIP</th>
<th>Raised double-stance VIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substructure</td>
<td>1’742’00 UGX (≈695 US$)</td>
<td>2’011’500 UGX (≈803 US$)</td>
</tr>
<tr>
<td>Superstructure</td>
<td>1’003’467 UGX (≈400 US$)</td>
<td>1’003’467 UGX (≈400 US$)</td>
</tr>
<tr>
<td>Total</td>
<td>2’745’467 UGX (≈1095 US$)</td>
<td>3’014’967 UGX (≈1203 US$)</td>
</tr>
</tbody>
</table>

*The cost information is based on prices from November 2011 and the US$ exchange rate used for conversion is: 1 US$ = 2506.26 UGX (09.11.2012).

**Table 2: Average construction time for one double-stance VIP latrine**

<table>
<thead>
<tr>
<th>Type of latrine</th>
<th>Pit volume</th>
<th>Avg. man labour days for pit digging</th>
<th>Man labour days for construction</th>
<th>Total construction time (man labour days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-stance latrine</td>
<td>Raised VIP</td>
<td>5.5</td>
<td>12–16</td>
<td>32</td>
</tr>
<tr>
<td>Ground-level VIP</td>
<td>4.7</td>
<td>4–8</td>
<td>28</td>
<td>32–36</td>
</tr>
</tbody>
</table>

Note: Man labour days include both man days of a skilled mason and of a casual labourer.
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www.nadel.ethz.ch/forschung/u-act