

# Removing human waste - the Vacutug solution

By Graham Alabaster and Iole Issaias

While world and civil society agonise over how to meet the Millennium Development Goal of halving the number of people without access to adequate water and sanitation by 2015, interim solutions have to be found to remove human waste safely from slums that are home to almost 1 billion people around the world.

According to the latest UN-HABITAT statistics, the majority of these 1 billion people live in developing countries where over 40 percent of the urban populations live in slums.

The interim solutions also help sustain the goals set as improvements gradually come into place. Moreover any future investments in sanitation infrastructure will need to go hand-in-hand with investments in adequate human waste removal from either on-site or off-site sanitation systems, if these goals are to be truly met and sustained in the years to come.

Thus in 1996, UN-HABITAT in association with Manus Coffey Associates, designed a machine to provide sanitation services for the residents of densely populated low income settlements to remove the human waste from pit latrines. Known as the *UN-HABITAT Vacutug*, it is engineered for access to pit latrines in the narrow, unpaved streets of poverty stricken slum settlements where larger removal vehicles cannot pass.

Composed of a vacuum tank and a pump assembly with a capacity of 500 litres, it is operated by a small gasoline engine that has the capacity to remove waste at 1,700 liters a minute.

In 1997, the machine was tested on the outskirts of the Kenyan capital, Nairobi, by a local NGO in Kibera, the largest informal settlement in East Africa, to see whether or not its design and overall management would be feasible. The sustainability factor of the *UN-HABITAT Vacutug* was its potential to generate income because it is operated by a team of five that is able



The UN-HABITAT Vacutug on field testing in Kibera, Nairobi. Photo © UN-HABITAT.

to remove human waste at a cost equivalent to US\$ 7 per load.

The pilot phase has shown a huge demand and willingness to pay for this service in Kibera. It also meant that for the community there was no need to close down pit latrines when they became full and thus no need to relocate them, or manually empty them.

Together with good hygiene promotion, the machine can be fully integrated into a sanitation system, which would altogether be more effective in providing adequate sanitation. Furthermore it was deemed a success in terms of its income generating and cost recovery potential — it earned about 36 per cent profit on total initial cost.

But before any claims can be made on the viability of the machine providing adequate removal of human waste in low-income areas, more information on the socio-cultural and financial sustainability factors will be required.

There are certain design modifications which have to be made to make the machine more durable and efficient under the rough conditions in which it operates.

Currently there are nine machines undergoing field trials in Africa, Asia

and Latin America under a programme funded by the Department for International Development (DFID) of the United Kingdom and Irish Aid.

The machines will be tested for a year in various cities in developing countries, under different conditions and managerial structures: some will be tested in informal settlements, rural areas, a refugee camp, and by a local municipality. UN-HABITAT will share the results via the *Internet*. It is hoped after the trial period any final design changes will be made and the machine can then be sold commercially.

*Graham Alabaster is a Human Settlements Officer in the Water, Sanitation and Infrastructure Branch of UN-HABITAT and a Programme Manager of the Water for African and Asian Cities Programmes.*

*Iole Issaias is a consultant with UN-HABITAT's Water and Sanitation Branch who also manages the vacutug project.*