

two different chambers or vaults for a minimum period of six months. The first vault can be left to compost for six months while the other vault is being used. By alternately using the two vaults, proper compost can be obtained twice a year and night-soil compost can be made continuously by shifting from one vault to another. Night-soil compost from the composting room is normally emptied in October/November and March/April. The composting room has a special door for the removal of the compost. It is carried to the fields and dumped in a series of piles. The heaps of compost remain in the fields for four or five months. Soon after the melting of the snow and before the beginning of the crop season, it is scattered all over the fields. This allows sufficient time for composting of the material, and the night-soil compost is then safe and fit for use. Due to the social stigma, this task is generally conducted during night time, particularly when there is a full moon. To avoid nutrient losses, compost heaps should be protected against rainwater in the fields. Night-soil compost should be mixed with the soil before sowing the seeds, and the dosage has to be appropriate.

### Associated health risks

The mixture of urine and faeces should never be used as it not only smells foul but also the slurry produced by this mixture has a high number of enteric micro-organisms. Urine can be treated by storing it separately for a period of six months; this makes it free of bacteria and safe for use in the fields. By consistently following these procedures, the presence of enteric bacteria,



Photo: Author

**It is important to wear the right protective clothing when removing the night-soil compost from the composting room.**

viruses, protozoa and helminth eggs in faeces can be fully controlled. Some possible diseases due to partial treatment and unsafe use of night-soil compost are amoebic dysentery, human tapeworm, cholera or viral hepatitis. Safe and hygienic use of night-soil compost is important for protecting the health of the users, as well as the environment. In order to prevent diseases,

## Changing attitudes to night-soil in

**Farmers in Ileje district rarely used night-soil, believing it to be unsafe. One farmer's efforts started a change in thinking and now night-soil is a valued commodity. As benefits have been realised, changes in practice and attitudes, as well as improvements to soils, have been seen.**

**Patrick Mwalukisa**

Cereal production has been declining in many parts of Tanzania since the late 1970s, when input subsidies were removed. In the late 1980s a study was conducted in Ileje district in the southern highlands, which revealed high rates of malnutrition and mortality of the under 5s due to insufficient food intake per day. The major reason for this was judged to be low agricultural production, caused by poor soil fertility in the area. In response, COOPIBO (a Belgian NGO), CDTF (a Tanzanian NGO) and the Ileje District Council signed a tripartite agreement to form the Ileje Food Crop Production Project (IFCPP) in 1988. IFCPP started to train smallholder farmers to practise resource efficient agriculture, through Participatory Research and Extension groups. The main objective of the new techniques was to use the naturally available resources for soil fertility improvement. This would be a way of reclaiming land that has become exhausted due the intensive agriculture practised when there were enough industrial inputs subsidised by the government.

Mbebe is one of the villages where resource efficient agriculture techniques were introduced, but with great difficulties in changing people's mindsets. Farmers were trained to decompose

farmyard manure prior to application as basal fertilizer for maize production. This practice was possible for farmers with livestock. Farmers who had no animals started improving their farms by using other techniques such as burying crop residues, use of sunn hemp (*Crotalaria juncea*) and crotalaria (*Crotalaria ochroleuca*), crop rotation and compost.

Night-soil was introduced as another technique. When farmers were first introduced to it, they found it difficult to accept due to the fact that human waste was commonly regarded as unsafe, unhealthy and useless. However, one farmer, called Bahati Simbeye, secretly emptied his toilet which was about three years old, and used the materials for maize production. Some people saw what Bahati was doing, and found it interesting that the maize he planted was growing very well and looking healthier than in previous years. Bahati came to the office to report on what he had tried and asked us to go and look at his maize plot. We went and were impressed by his efforts. We asked him if we could bring some more farmers to his plot and he agreed. We then organised a farmers' field day, inviting farmers from the surrounding villages. We showed them the different technologies practised, of which Bahati's plot was a main attraction. All farmers who attended the field day appreciated what they saw and decided to try using night-soil. This happened in 2004.

In the following year, the number of farmers applying night-soil increased. The notion that human waste was useless declined with time. Farmers began buying the contents of old toilets for between 800 and 1000 Tanzanian shillings (US\$ 1) per pit, which have now become a commodity in Ileje. Farmers who have been applying night-soil and other organic fertilizers have

proper management of night-soil and its treatment are essential. So for proper conversion of night-soil into compost, a series of control measures need to be followed. The World Health Organization has also produced guidelines relating to the safe use of wastewater, excreta and greywater (see Box, p.25).

### Highly beneficial

The G.B. Pant Institute promotes night-soil as one of the organic farming practices in the region. Enhancement of soil nutrients through night-soil compost in the Lahaul valley is highly beneficial to the local inhabitants. The survey found that after proper treatment of night-soil through the double vault toilet system, the night-soil compost is free of pathogens, reducing health risks to the users. The survey also revealed that the use of night-soil compost can play a vital role in maintaining soil fertility and increasing the crop yield in a region that has a limited growth period (mid April-mid August). This model of sustainable traditional soil management can be scientifically validated and may be replicated in many regions of the world, which could contribute to more efficient and chemical-free cropping systems.

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Photo: Author

**Mr Admin Lungwe in his maize plot fertilized with night-soil.**

While night-soil is ranked as one of the better organic fertilizers in the area, the major difficulty is availability. In addition, some farmers still query whether it is hygienic and safe to handle with bare hands.

The application of organic fertilizer in Ileje district has reclaimed farmers' land. The nature of the soil has improved in comparison to previous years. Crops are growing as well as they did before the introduction of chemical inputs.

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realised an average increase from two to fifteen 100 kg bags of maize per acre. This has attracted many farmers to apply night-soil as basal and top dressing fertilizer. Because night soil was previously regarded as useless, latrine pits were constructed far away from homesteads, and were dug up to 15 feet deep. Nowadays, toilets are constructed closer to the homestead and not to that depth. This has been done purposely to reduce the workload of emptying the pits. Other improvements have been made, such as putting crop residue and other organic material in the pits, to increase the volume of fertilizer.

### Collection of night-soil

When the toilets are full of human waste, farmers cover them with soil, and leave them for at least two years for the decomposition process to take place. After this, the cover layer of soil is scraped off and the pits are emptied using spades and hand hoes. As protection, farmers wear gloves and gumboots. Before using night-soil as fertilizer, people used to throw dangerous materials like broken glass and nails in latrines. Now, family members are aware of the danger of such material, and dispose of them elsewhere.

Night-soil has been found to be the best fertilizer, compared to other organic fertilizers, as it tends to give a quick response, especially when used as top dressing. Farmers have noted that night-soil should be applied in small quantities as it may lead to crop burn (scorch) if applied in large amounts. They also mention that it is worth paying for this organic input, as yields are so much better than when no fertilizer at all is used. Fields planted with night-soil are fertile for more than two years. It is possible to get good harvests on the same plot for three years consecutively without applying other fertilizers.