

# New Sanitation Concepts for Condominium Housing

## Urine-Diverting Dry Toilets in Multi-Storey Buildings in Ethiopia

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### SANITATION IN ETHIOPIA

Ethiopia is one of the countries with the lowest sanitation coverage. Problems with current sanitation systems include:

- Collapsing of pit latrines
- Wastewater exfiltration from pits and septic tanks resulting in groundwater pollution
- Lack of faecal sludge management and treatment facilities
- Irregular water supply restricting the use of water-flushed toilets
- Need for inexpensive and hygienic fertiliser

### LARGE SCALE HOUSING PROGRAMMES

The Ethiopian government is currently pursuing large housing programmes to address the constant population growth and migration to cities. The multi-storey houses regularly face problems with regard to water supply and sanitation. Therefore, urine-diverting dry toilets were adapted for the use in multi-storey buildings.



Multi-storey condominium houses during construction and after finishing

### TOILET DESIGN

The urine-diverting toilets are produced locally out of fibreglass reinforced plastic. As soon as quantities pick up alternative production methods are going to be studied. In addition, a cooperation has been started with a local ceramic factory for the production of squatting toilets.

The urine is separately collected in large storage tanks outside the houses from where it is regularly collected and transported to agricultural areas. Urinals are installed for convenient collection of urine.

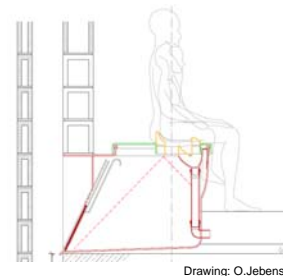


Urine-diverting sitting toilet (fibreglass)



Urine-diverting squatting toilet (ceramic)

The urine-diverting toilets are based on the double-vault system with two toilet boxes that are used alternately so that the faeces can dehydrate before they are pushed down a shaft at the rear of the toilet and collected at the bottom. Post-composting is recommended as treatment before application onto soil.



Drawing: O.Jebens

Side view of the toilet box and the shaft

### USE OF URINE AND COMPOST IN AGRICULTURE



Wheat fertilised with DAP (left) & urine (right)

Awareness raising, crop trials and training of farmers has been carried out to promote the use of urine and compost as fertiliser and soil conditioner.

First experiences regarding the reuse showed good results in terms of crop yields and social acceptance. Farmers appreciated the idea of using urine and composted excreta which provides an alternative to the unregulated and unhygienic use of septic and to the use of imported mineral fertiliser.

### OPERATION & MAINTENANCE

A cost analysis showed that investment costs are comparable to the implementation of septic tank systems. Operation and maintenance can be done in an adapted and cost-efficient way. Replacing mineral fertiliser by urine can result in additional monetary benefits particularly in the light of rising fertiliser prices.



Transport of urine and faeces

### CONCLUSION

The projected implementation of waterless, urine-separating toilets in the governmental housing programmes is showing an alternative approach for resource-efficient and non-polluting sanitation even in multi-storey buildings. This strategy creates a strong link between sanitation and agriculture and contributes to employment generation with regard to micro and small enterprises taking over the operations and management the sanitation system.

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