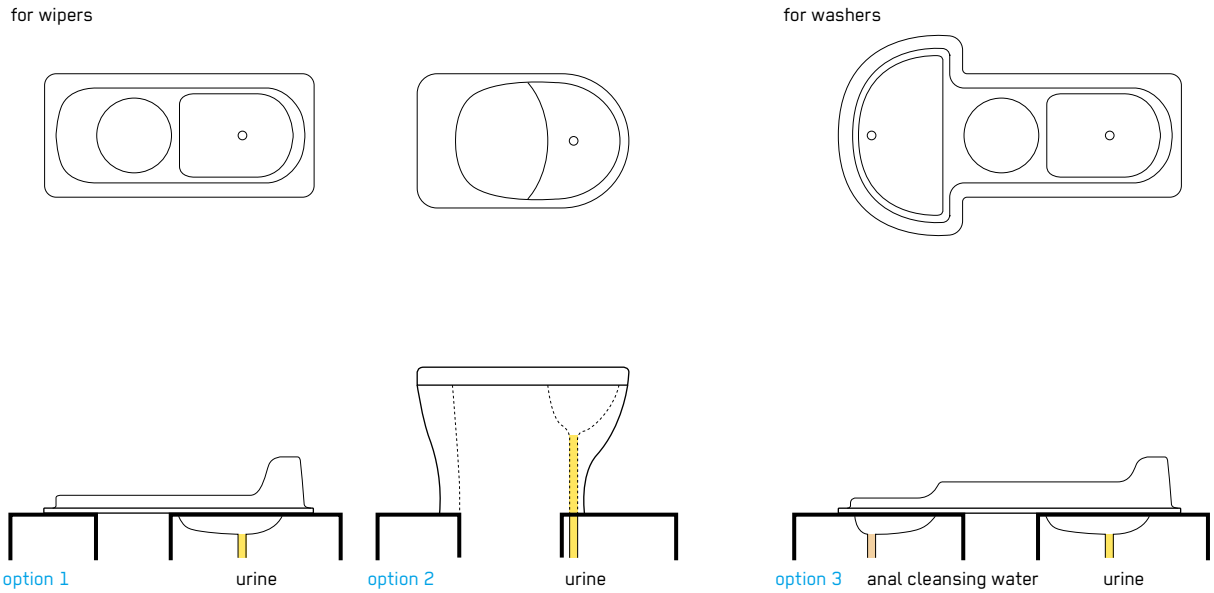
Urine-Diverting Dry Toilet

Phase of Emergency	Application Level / Scale	Management Level	Objectives / Key Features
* Acute Response ** Stabilisation ** Recovery	** Household Neighbourhood City	** Household * Shared * Public	Barrier between user and excreta, Urine / faeces separation, No flush water needed
Space Required	**Technical Complexity**	**Inputs**	**Outputs**
* Little	* Low	● Faeces, ● Urine, (● Anal Cleansing Water), (● Dry Cleansing Materials)	● Faeces (+ ● Dry Cleansing Materials), ● Urine, (● Anal Cleansing Water)



A Urine-Diverting Dry Toilet (UDDT) is a toilet that operates without water and has a divider so that urine does not mix with the faeces. The separation facilitates subsequent treatment processes (such as dehydration of the faeces) and nutrient recovery as well as considerable odour reduction.

The UDDT is built such that urine is collected and drained from the front area of the toilet, while faeces fall through a large chute (hole) in the back. Depending on the collection and storage/treatment technology that follows, drying material such as lime, ash or sawdust may be added into the same hole after defecating **(S.8, S.9)**.

Design Considerations: It is important that the two sections of the UDDT are well separated to ensure that a) faeces do not fall into and clog the urine collection area in the front, and that b) urine does not splash into the dry area of the toilet. There are also 3-hole separating toilets that allow anal cleansing water to go into a third, dedicated basin separate from the urine drain and faeces collection. Both sitting and squatting UDDT designs can be used to separate urine from faeces depending on user preference. To limit scaling, all connections (pipes) to storage tanks should be kept as short as possible; whenever they exist, pipes should be installed with at least a 1 % slope, and sharp angles (90°) should be avoided. A pipe diameter of 50 mm is sufficient for steep slopes and where maintenance is easy. Larger diameter pipes (> 75 mm) should be used elsewhere, especially for minimum slopes, and where access is difficult. The pipe should be insulated in cold climates to avoid urine freezing. To prevent odours from coming back up the pipe, an odour seal should be installed at the urine drain.

Materials: Urine-diverting pedestals and squatting slabs can be made out of fibreglass, porcelain, concrete or plastic. They are usually not available in local markets.

Wooden or metal moulds can be used to produce several units quickly and efficiently. Urine tends to rust most metals; therefore, metals should be avoided in the construction and piping of the UDDT.

Applicability: Applicability of a UDDT depends heavily on local user acceptance and may not be appropriate in every cultural context. The UDDT design can be altered to suit the needs of specific populations (i.e. smaller for children, people who prefer to squat, etc.). It is particularly suitable in areas with challenging ground conditions, or where there is an interest in using urine and dry faeces in agriculture. If there is no interest in using urine as fertiliser, it can be infiltrated, but in all cases faeces need further treatment until they can be safely used or disposed of. UDDT may not be suitable in very cold climates as urine can freeze in the pipe if not properly insulated.

Operation and Maintenance: A UDDT is slightly more difficult to keep clean compared to other toilets. Some users may have difficulty separating both streams perfectly, which may result in extra cleaning and maintenance, especially of the separation wall. Faeces can be accidentally deposited in the urine section, causing blockages, cleaning problems and cross-contamination of the urine. All surfaces should be cleaned regularly to prevent odours and minimise formation of stains. Water should not be poured in the toilet for cleaning. Instead, a damp cloth or single use disposable paper wipes may be used to wipe down the seat and inner bowls. When the toilet is cleaned with water, care should be taken to ensure that it does not flow into the faeces compartment. Because urine is collected separately, calcium- and magnesium-based minerals and salts can precipitate and build up in pipes and on surfaces where urine is constantly present. Washing the bowl with a mild acid (e.g. vinegar) and/or hot water can prevent build-up of mineral deposits and scaling. Stronger acid or a caustic soda solution (2 parts water to 1 part soda) can be used for removing blockages. In some cases manual removal may be required. An odour seal also requires occasional maintenance. It is critical to regularly check its functioning.

Health and Safety: Anal cleansing material should be provided, and a Handwashing Facility **(U.7)** has to be in close proximity. Appropriate toilet cleaning equipment, including gloves, should be available.

Costs: Capital and operating costs are relatively low, but the slab can be a significant investment for individual households, and is more expensive than a standard single-hole slab. The costs for faeces and urine management, if not done onsite, must also be considered.

Social Considerations: The UDDT is not intuitive or immediately obvious to some users. At first, users may be hesitant to use it, and mistakes made (e.g. faeces in the urine bowl) may deter others from accepting this type of toilet. User guidelines inside the toilet and hygiene promotion are essential to achieve good acceptance. For better acceptance and to avoid urine in the faeces collection bowl, the toilet can be combined with a Urinal **(U.3)**, allowing men to stand and urinate. The subsequent management of urine and faeces must be considered **(see S.8, S.9)**. In order to avoid the double hole user interface, some systems currently propose the separation of urine and faeces below the toilet hole with a sloping conveyor belt, which transports the faeces into a separate container, while urine falls through. The UDDT should reflect local user preferences (sitter vs. squatter, anal cleansing practices, direction etc.) and should account for the accessibility and safety of all users, including men, women, children, elderly and disabled people **(X.10)**.

Strengths and Weaknesses:

- ⊕ Does not require a constant source of water
- ⊕ No real problems with flies or odours if used and maintained correctly
- ⊕ Low capital and operating costs
- ⊕ Suitable for all types of users (sitters, squatters, washers, wipers)

- ⊖ Prefabricated models not available everywhere
- ⊖ Requires training and acceptance to be used correctly
- ⊖ Is prone to misuse and clogging with faeces
- ⊖ Men usually require a separate Urinal for optimum collection of urine

→ **References and further reading material for this technology can be found on page 190**