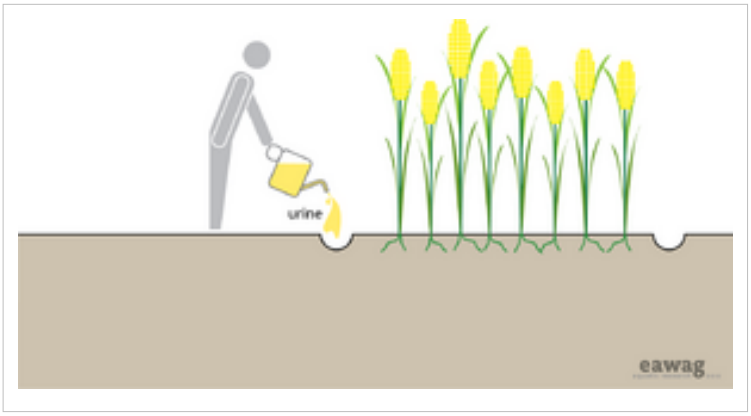
Application_of_Urine

Application level		Management level	
Household	XX	Household	XX
Neighbourhood	XX	Shared	XX
City	XX	Public	XX



Applicable to systems:	Languages / langues / idiomas
4, 8	

Inputs: Stored Urine

Outputs: -

Separately collected, stored urine is a high quality, concentrated source of nutrients that can be applied as a liquid fertilizer in agriculture to replace all or some commercial chemical fertilizer.

The guidelines for safe urine use are based on storage time and temperature (please see WHO guidelines for specific requirements). However, it is generally accepted that if urine is stored for at least 1 month, it will be safe for agricultural application at the household level.

If urine is used for crops that are eaten by those other than the urine producer, it should be stored for 6 months. Urine should not be applied to crops within one month before they are harvested.

From normal, healthy people, urine is virtually free of pathogens. Urine also contains the majority of nutrients that are excreted by the body. Urine varies depending on diet, gender, climate and water intake among other facts, but roughly 80% of nitrogen, 60% of potassium and 55% of phosphorus that is excreted from the body is excreted through urine.

Because of its high acidity and concentration, stored urine should not be applied directly to plants. Rather it can be used:

1) Mixed undiluted into soil before planting;

2) Poured into furrows sufficiently away from plant roots and covered immediately (once or twice during the growing season); and

3) Diluted several times and used frequently (twice weekly) poured around plants.

To calculate the application rate, one can assume that $1m^2$ of cropland can receive the urine from 1 person per day (1 to 1.5L), per crop harvested (e.g. 400 m^2 of cropland per year can be fertilized). A 3:1 mix of water and urine is an effective dilution for vegetables, applied twice weekly, although the amount depends on the soil and the type of vegetables. During the rainy season, urine can also be applied directly into small holes near plants, where it will be diluted naturally.

Advantages	Disadvantages/limitations
- Simple technique for all users. - Low cost. - Low risk of pathogen transmission. - Reduces dependence on costly chemical fertilizers. - May encourage income generation (tree planting.)	- Large volume compared to artificial fertilizer: urine is heavy and may be difficult to transport. - Smell may be offensive - Labour intensive. - Health precautions needed when applying urine.

Adequacy

Urine is especially beneficial where crops are lacking nitrogen. Examples of some crops that grow well with urine include: maize, rice, millet, sorghum, wheat, chard, turnip, carrots, kale, cabbage, lettuce, bananas, paw-paw, and oranges.

Urine application is ideal for rural and peri-urban areas where agricultural lands are close to the point of urine collection. Households can use their own urine on their own plot of land. Alternatively, if facilities and infrastructure exist, urine can be collected at a semi-centralized location for distribution and transport to agricultural land. Regardless, the most important aspect is that there is a need for nutrients otherwise, the urine can become a source of pollution and nuisance if dealt with improperly. Recommendations for storage time and application techniques must be fully understood and followed.

Urine should not be applied in areas with high salinity.

Health Aspects/Acceptance

There is a minimal risk of infection, especially with extended storage. Still, urine should be handled carefully and should not be applied to crops less than one month before they are harvested. The risk of disease transmission through handling and using human urine are related mainly to faecal cross-contamination, which can occur with urine-diverting toilets. With urinals, this risk is not present.

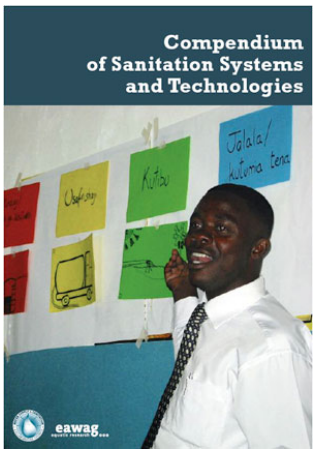
Social acceptance may be difficult. Stored urine has a strong smell and some may find it offensive to work with or be near. If urine is diluted, and/or immediately tilled into the earth, the smells can be reduced. The use of urine may be less accepted in urban or peri-urban areas where household gardens are close to houses than in rural areas, where houses and crop lands are separated.

Maintenance

With time, some minerals in urine will precipitate (especially calcium and magnesium phosphates). Any equipment that is used to collect, transport or apply urine (i.e. watering cans with small holes) may become clogged over time. Most deposits can easily be removed with hot water and a bit of acid (vinegar), or in more extreme cases, chipped off manually.

Acknowledgements

The material on this page was adapted from: Tilley, E. et al. (2008). Compendium of Sanitation Systems and Technologies [2], published by Sandec [3], the Department of Water and Sanitation in Developing Countries of Eawag [4], the Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland. The publication is available in English, French, and will be made available in Spanish. Available in the IRC Digital Library [5]



Download the Eawag Compendium of Sanitation Systems and Technologies! [1]

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[2] http://www.eawag.ch/organisation/abteilungen/sandec/publikationen/publications_sesp/downloads_sesp/compendium_high.pdf
[3] http://www.eawag.ch/organisation/abteilungen/sandec/index_EN
[4] http://www.eawag.ch/index_EN
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