

Dosing: When fertigate?

Irrigation:

Use water in your drip system as often as your plants need water.

Fertigation:

Use the urine & water mix (1 part urine per 3 parts of water) three times during one cropping season, i.e. from the planting until the harvest. As a general rule of thumb, use 0.7 L/m² of urine at every fertigation stage:

1. One week after planting
2. Half-time between planting and flowering
3. When the crops are flowering

For crop-specific urine dosing, refer to the publications indicated to the right (Further readings).

Calculation example:

Field size:

12 m length by 3.5 m width = 42 m² area

Urine volume (per fertigation stage):

42 m² · 0.7 L/m² = 29 L

The urine volume may be applied in three runs of 10 litres of urine mixed with 30 litres of water. Spread the runs over two days. Repeat the runs at every fertigation stage (1, 2, 3, as described above).

Suppliers of drip systems

In Nepal:

Thapa Mould and Die
Gwarkho
Lalitpur
+977 1 52 03 688

Outside Nepal:

Check the IDE website for contacts:
www.ideorg.org/OurTechnologies/DripIrrigation.aspx

Further readings

• Zandee, M. (2011): Basic urine use guidelines for Nepal. Eawag: Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland.

• Zandee, M., Etter, B., Udert, K.M. (2011): Clogging of drip-line emitters during urine fertilisation through drip irrigation equipment. Project report. Eawag: Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland.

• Richert, A., Gensch, R., Jönsson, H., Stenström, T.A., Dagerskog, L. (2010): Practical guidance on the use of urine in crop production. EcoSanRes Programme, Stockholm Environment Institute, Sweden.

Palada, M., Bhattarai, S., Wu, D., Roberts, M., Bhattarai, M., Kimsan, R., Midmore, D. (2011): More crop per drop: Using simple drip irrigation systems for small-scale vegetable production. The World Vegetable Center, Shanhua, Taiwan.

> [Download the publications from www.eawag.ch/stun](http://www.eawag.ch/stun)

Internet resources

- www.eawag.ch/stun
- www.ideorg.org/OurTechnologies/DripIrrigation.aspx
- www.kdf.org.np
- www.ecosanres.org
- www.sswm.info

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How to use urine in drip irrigation



Urine contains valuable nutrients; it is an excellent fertilizer if applied to crops.

With a **drip irrigation system**, a maximum of water reaches the crops directly: you save time and water used for irrigation.

From time to time, you may add urine to your irrigation system to provide your crops with a **balanced nutrient supply**.

Water: Irrigation

With drip irrigation:

- you **use less water**, because the water reaches the plants directly through a hose and does not evaporate.
- you **save time** used for irrigation, because you only have to fill the tank and open the tap, once the system is installed.

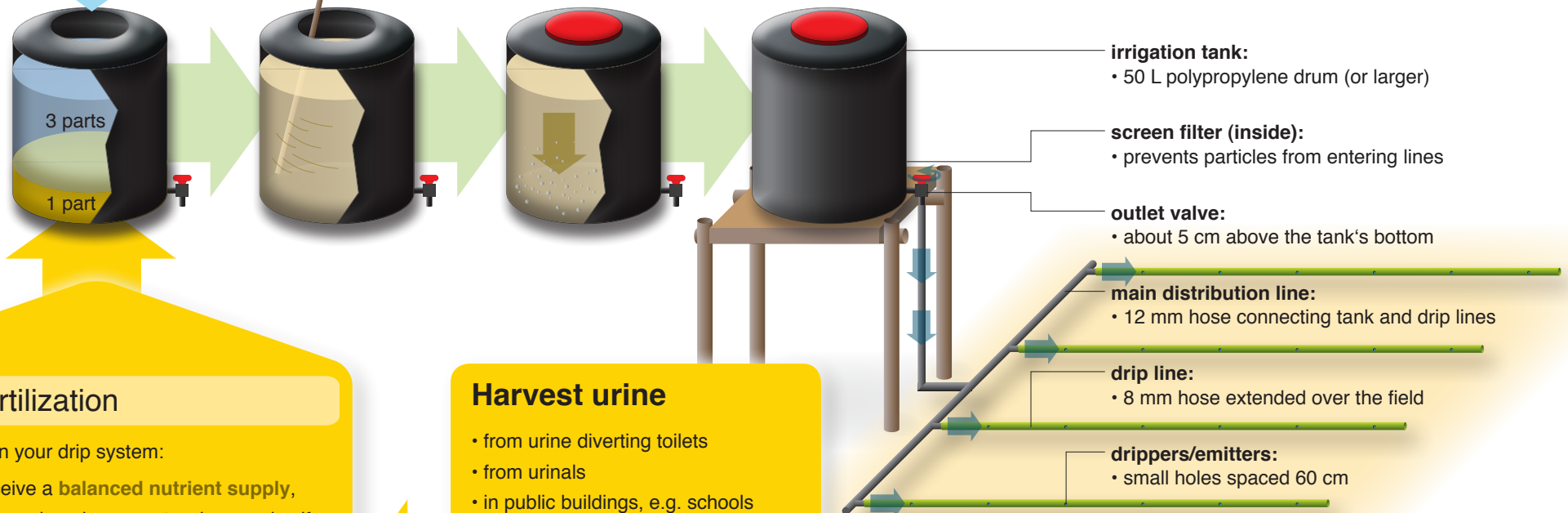
Drip irrigation & urine fertilization = Fertigation

Maintenance

Once a week:

- remove and clean the **cloth filter** at the tank outlet.
- while running your drip irrigation kit, check if any emitters have become blocked. If so, remove the precipitates with a ballpoint pen to **unblock** the emitters.

1. In a 50 litre tank add: 10 litres of urine + 30 litres of water.
2. Mix urine & water briefly with a stick.
3. Let the sediments settle during 30 min.
4. Open the the irrigation outlet.
5. Let the tank drain completely before closing the valve.
6. Invert the tank to remove the sediments – use them as a nutrient-rich fertilizer.



Urine: Fertilization

By using urine in your drip system:

- your crops receive a **balanced nutrient supply**, including nitrogen, phosphorus, potassium, and sulfur.
- the urine reaches the **root zone directly**, avoiding leave contact, which might damage the plants.
- **nitrogen does not evaporate** as ammonia, which would cause bad smell and nutrient losses.

Harvest urine

- from urine diverting toilets
- from urinals
- in public buildings, e.g. schools

Recommendation:

- Store the urine for 1 month.
- Use gloves and a face mask when handling urine.