**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

**Contact information**

**Eawag**
Swiss Federal Institute of Aquatic Science and Technology
Department for Water and Sanitation in Developing Countries
Überlandstrasse 133, 8600 Dübendorf, Switzerland
Phone +41 44 823 50 48, Fax +41 44 823 50 28
www.eawag.ch/stun, struvite.nepal@eawag.ch

**ENPHO**
Environmental and Public Health Organization
GPO Box 4102, 110/25 Aadarsha Marg
New Baneshwor, Kathmandu, Nepal
Phone +977 1 44 68 641/44 93 188, Fax +977 1 44 91 376
www.enpho.org, enpho@mail.com.np

**KDF**
Khotang Development Forum
PO Box 354, Patan Dhoka, Lalitpur, Nepal
Phone +977 1 55 70 187, Fax +977 1 55 70 187
www.kdf.org.np, khotangdev@gmail.com

**Further readings**


> Download the publications from 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

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.

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 leaf 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.

**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.

**Drip irrigation & urine fertilization = Fertigation**

- irrigation tank: • 50 L polypropylene drum (or larger)
- screen filter (inside): • prevents particles from entering lines
- outlet valve: • about 5 cm above the tank’s bottom
- main distribution line: • 12 mm hose connecting tank and drip lines
- drip line: • 8 mm hose extended over the field
- drippers/emitters: • small holes spaced 60 cm