

The VUNA project: purpose, packages and partners

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VUNA Symposium, Durban, 27 August 2015

82,000 UDDTs in peri-urban eThekweni



Urine-diverting dehydration toilets (UDDTs)

Volume of feces is reduced,
most pathogens are killed.

Usually, urine is infiltrated into
the ground.

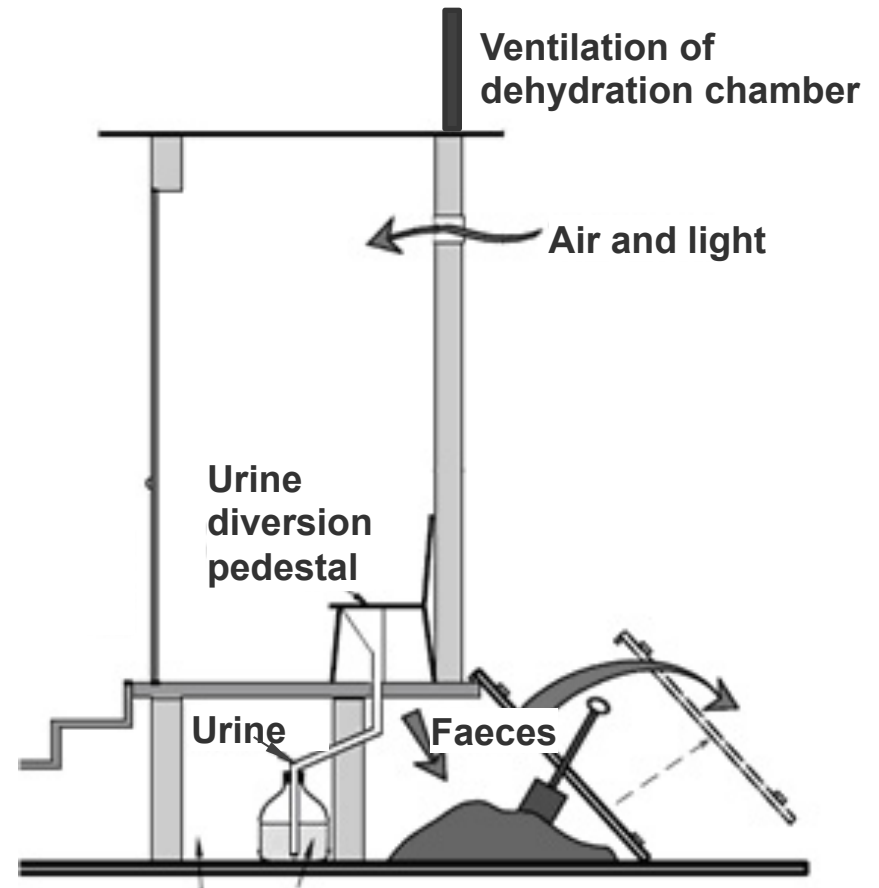
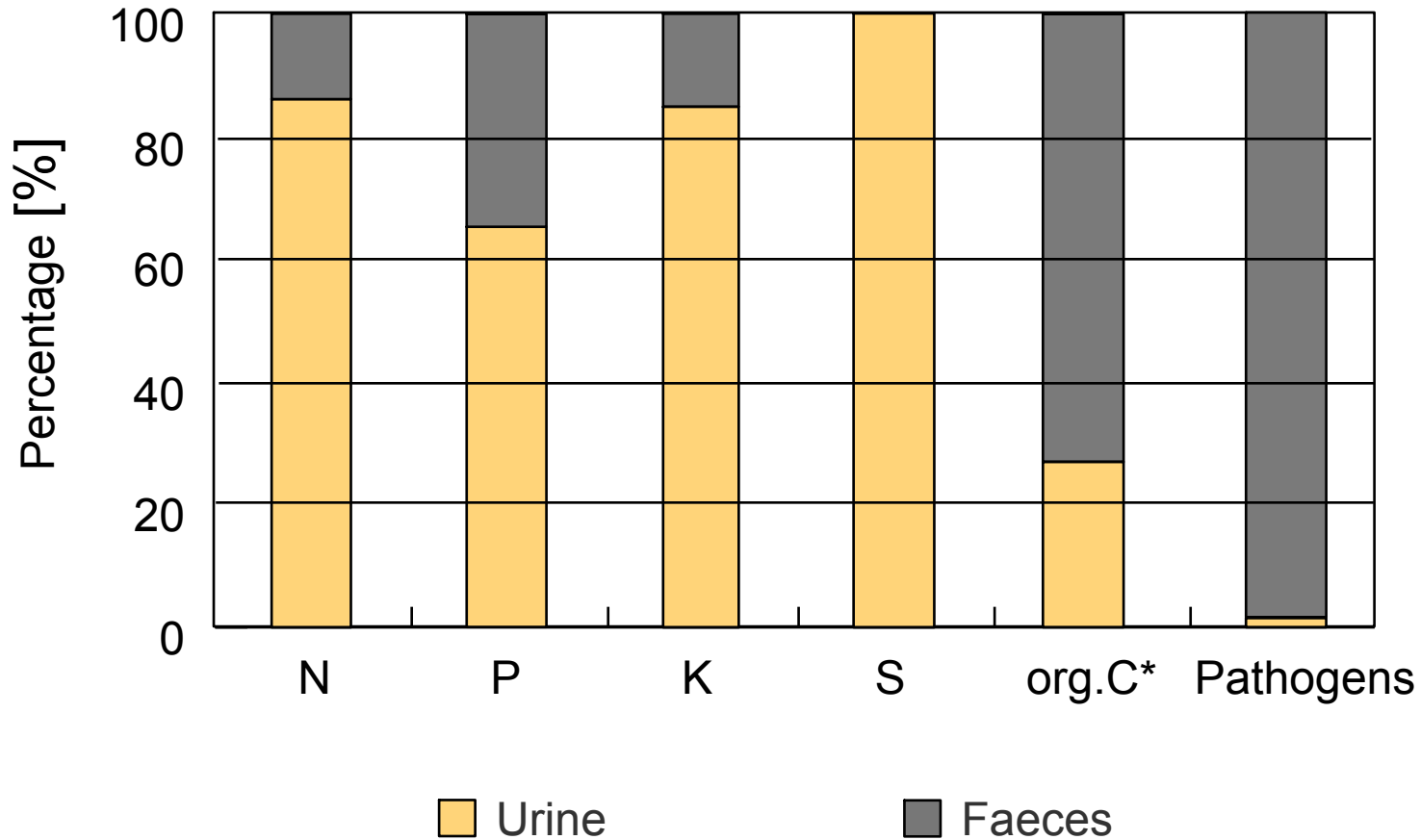


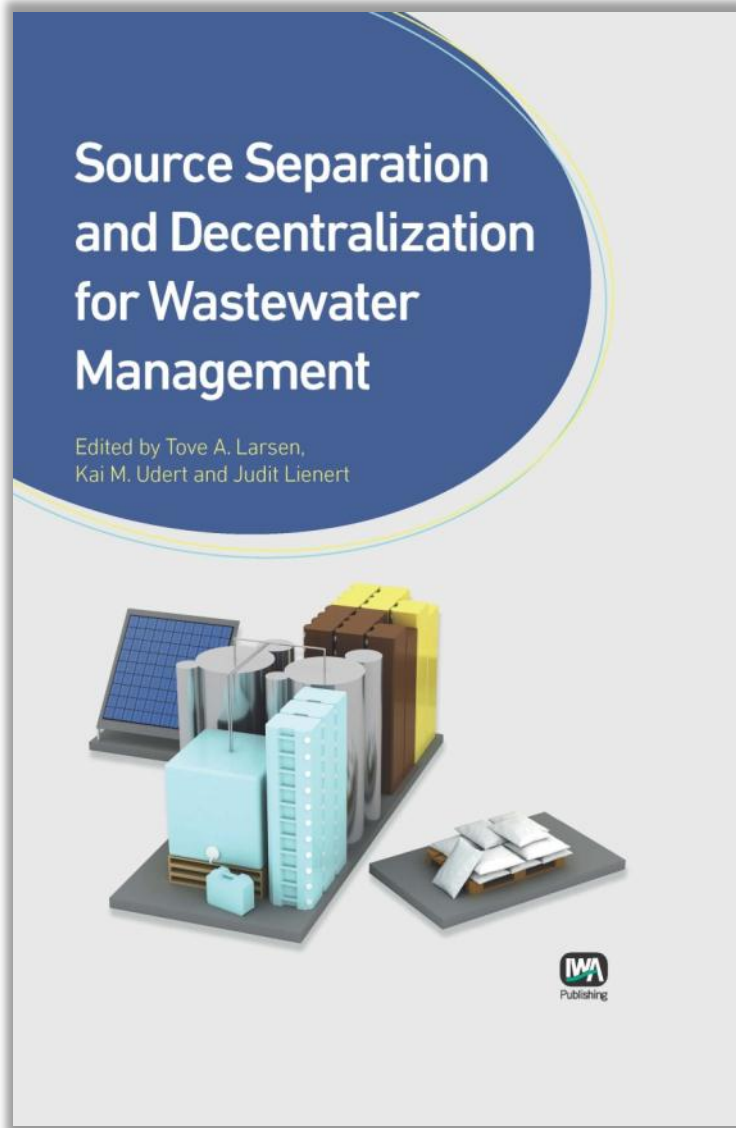
Figure: © WEDC

What is so special about urine?



* without C in urea

Nearly 20 years of research at Eawag on source separation



T.A. Larsen, K.M. Udert, J. Lienert (2013)

Source separation and decentralization
for wastewater management.

IWA Publishing

ISBN 9781843393481

Two major forerunner projects

Novaquatis

Urine separation in Switzerland



STUN

Struvite from urine in Nepal



Three main objectives

Promoting the use of toilets
by giving urine a value

Recovering nutrients in form
of a valuable fertiliser

Protecting the environment



Funding and project partners

BILL & MELINDA
GATES *foundation*

Funding

eawag
aquatic research **000**

Swiss Federal Institute of
Aquatic Science and Technology



eThekweni Water and Sanitation



University of KwaZulu-Natal



Swiss Federal Institutes of Technology
in Zurich and Lausanne

Five focus areas



Urine treatment

Bastian Etter



Urine collection networks

Heiko Gebauer



Risks of handling urine

Loïc Decrey



Socio-economic aspects

Nosipho Mkhize

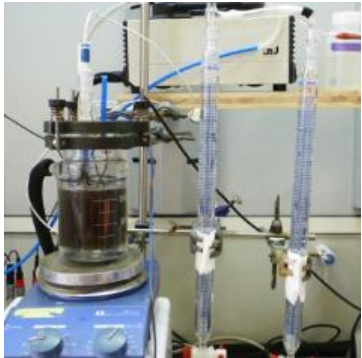


Agriculture

Urine treatment



Struvite precipitation
Phosphorus recovery



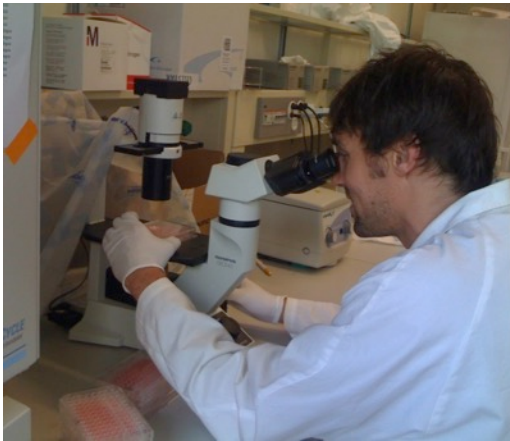
Electrolysis
Nitrogen removal



Nitrification/distillation
Recovery of all nutrients

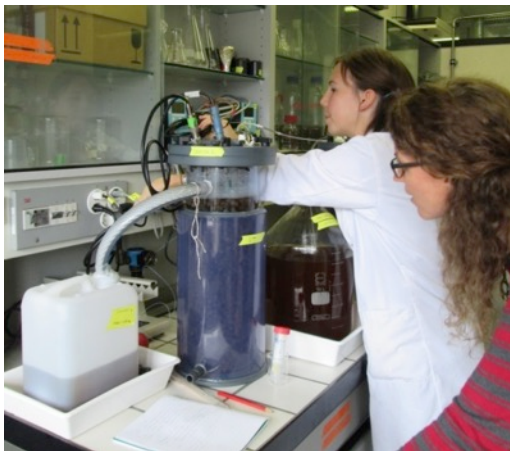
Risks of handling urine

Pathogens and pharmaceutical residues



Pathogen and pharmaceutical content in urine collected in eThekweni

Exposure risk during urine handling



Fate of pathogens and pharmaceutical residues during urine treatment

Additional **treatment** steps

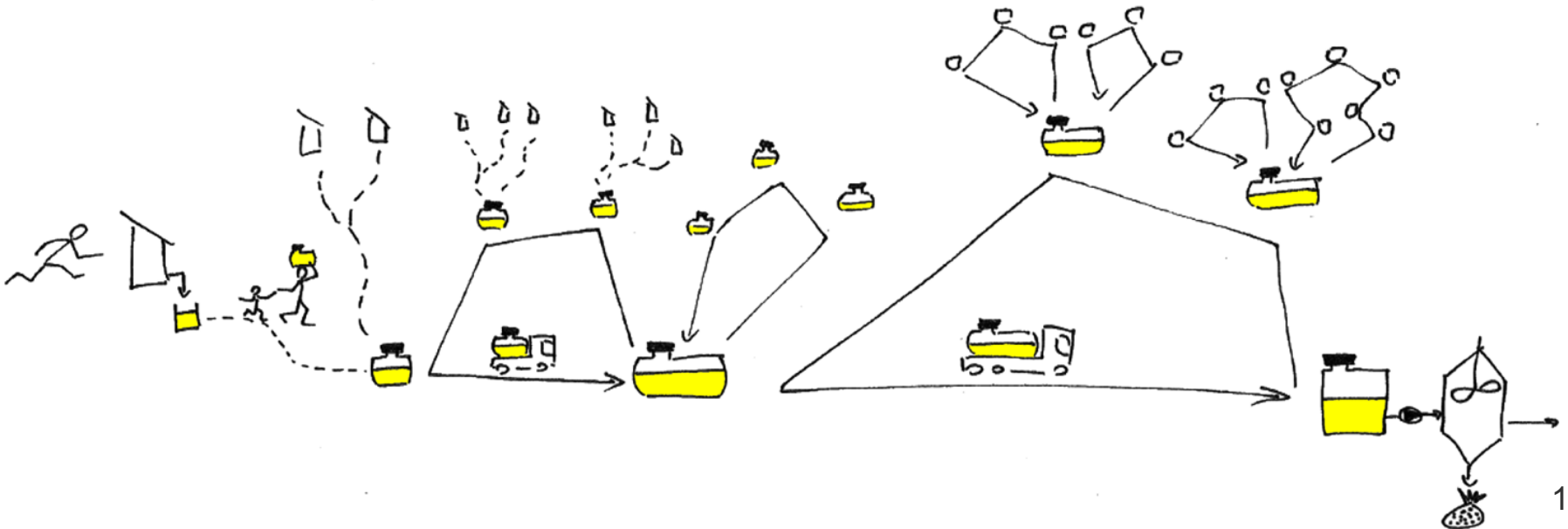
Urine collection network



Sampling campaigns

Computer model
to enhance performance

Business model



Socio-economic aspects



Social acceptance
of provided toilets
of dry sanitation in general



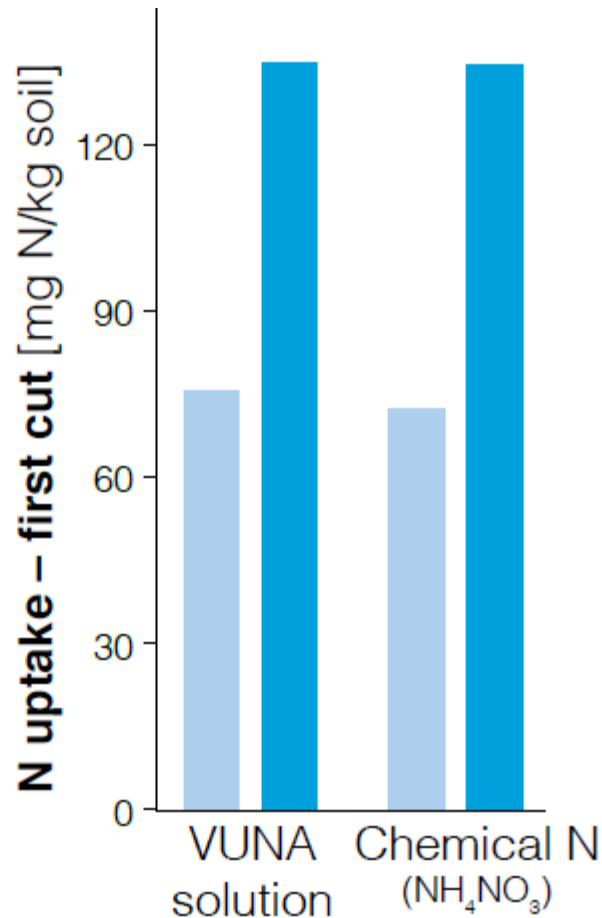
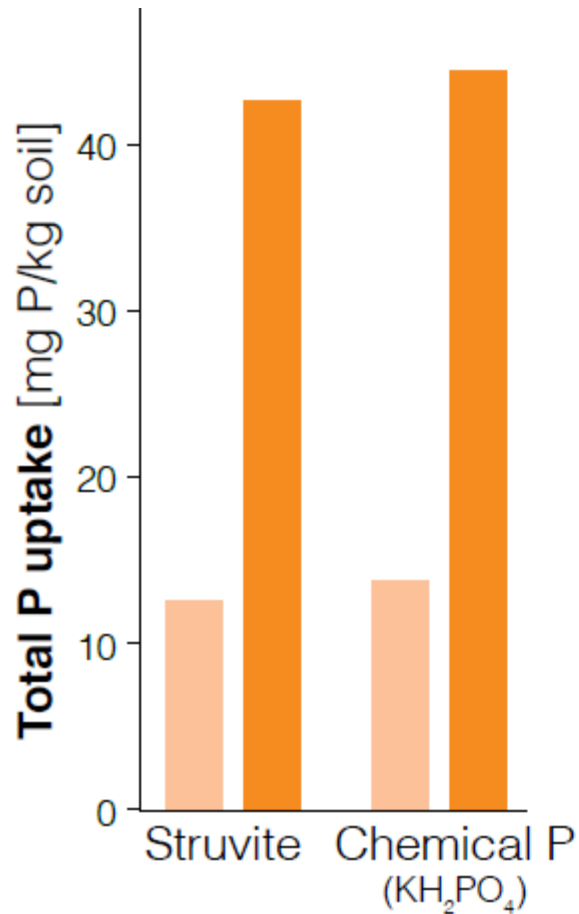
Health and hygiene campaigns
increasing the understanding for and acceptance
of dry sanitation



Incentives
involving the toilet users in urine collection
increasing toilet usage

Agriculture

Tests in the laboratory with synthetic fertiliser products



Legend:

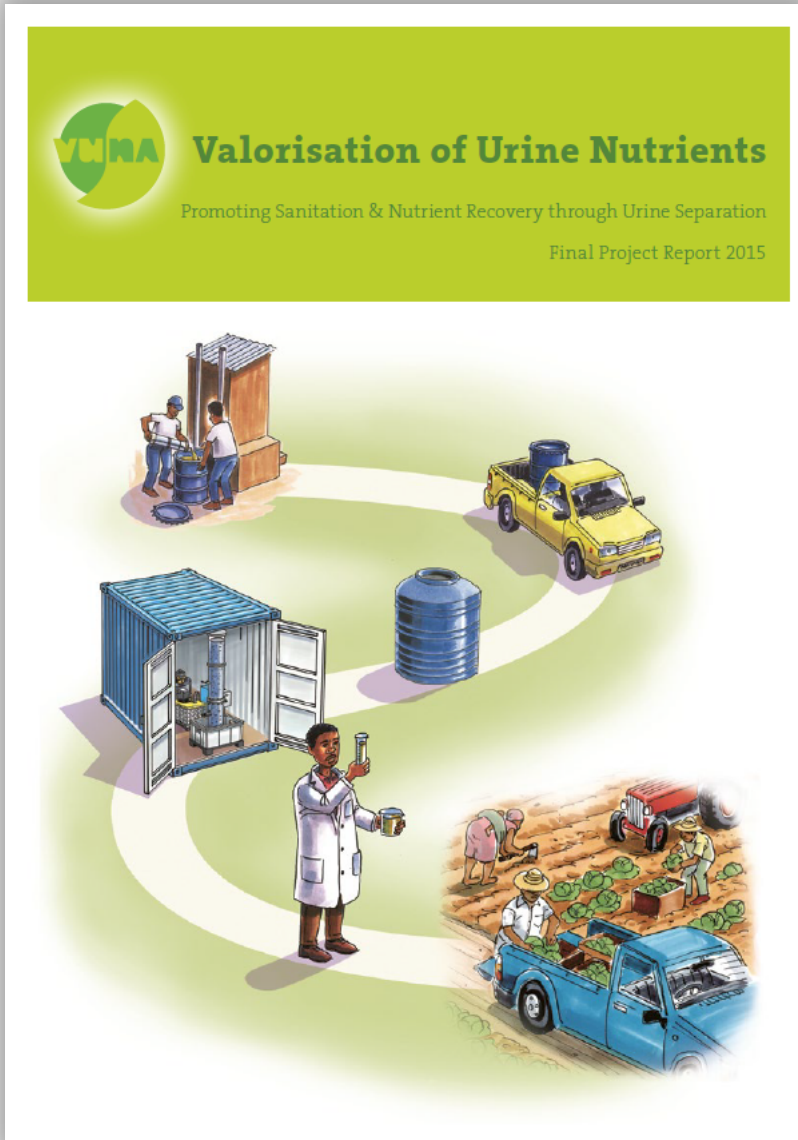
P N

nutrients
from fertiliser

P N

total nutrients

Final report



Overview of all work packages
Summary of main results

Further information and updates
www.vuna.ch

A big thank you to the whole team!



All pictures taken by VUNA team except where stated otherwise