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Sustainable Sanitation in Eastern Europe and Germany

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WECF
(Women in Europe for a Common Future)

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Legal framework in the EU

- Urban Waste Water Treatment Directive -UWWTD (1991/271/EEC)
- Water Framework Directive - WFD (2000/60/EC)
- Guide for Extensive Wastewater Treatment Processes adapted to small and medium sized communities (500 to 5,000 population equivalents) 2001
- Integrated Pollution Prevention and Control Directive
- Nitrates Directive

Urban Waste Water Treatment Directive - UWWTD (1991/271/EEC)

- obliges the EU member states to collect the wastewater and install treatment plants in agglomerations with more than 2,000 people equivalent (PE) by 2015.
- According to the UWWTD, agglomerations with 2,000-10,000 PE must set up appropriate treatment (biological treatment without nutrient removal), but also the agglomerations with less than 2,000 PE which have already a sewerage network (Article 7 of the UWWTD).
- For agglomerations with less than 2,000 PE not having any sewerage network, there are no standards to meet.

Urban Waste Water Treatment Directive - UWWTD (1991/271/EEC)

Regulations instituted by the "Urban Wastewater Treatment" directive for agglomerations having between 2,000 and 10,000 PE:

Parameter	Concentration (min % of reduction)
Biochemical oxygen demand [BOD_5 at 20°C]	25 mg/l O_2 (70-90 %)
Chemical oxygen demand [COD]	125 mg/l O_2 (75 %)
Total suspended solids [SS]	35 mg/l

In case of in sensitive areas which are subject to eutrophication, further requirements are N and P removal.

Population in agglomerations with less than 2,000 pe in different countries

Country	pe in millions	% of total population
Bulgaria	1.9	24 %
Czech Rep.	2.7	26 %
Germany	7	9 %
Poland	15	39 %
Romania	2	9 %
Slovakia	1.7	31 %

(partly from GWP 2007)

Water Framework Directive - WFD (2000/60/EC)

• commits EU member states to achieve good qualitative and quantitative status of all water bodies (surface water and groundwater) by 2015.

2008	Present draft river basin management plan	Art. 13
2009	Finalise RBMP including progamme of measures	Art. 13/11
2010	Introduce pricing policies	Art. 9
2012	Make operational programmes of measures	Art. 11

Guide for Extensive Wastewater Treatment Processes (2001)

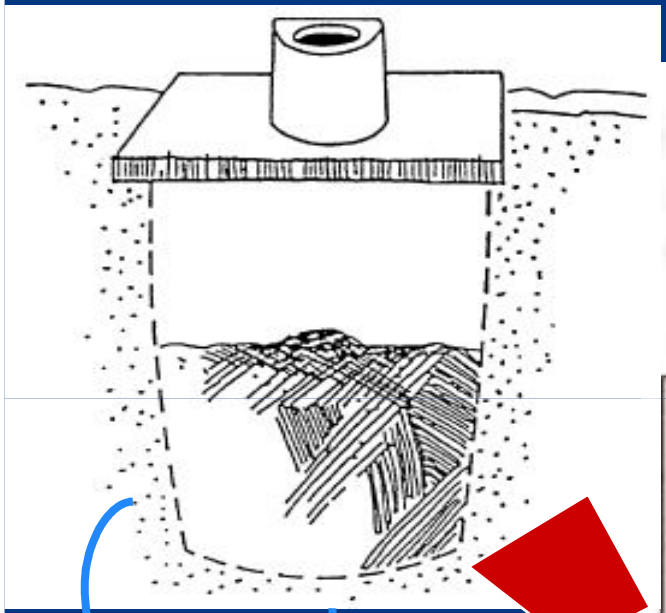
- **targets small and medium sized communities (500 to 5,000 population equivalents)**
- for elected officials and those responsible for technical departments of small and medium sized European agglomerations, so that they can determine their choices on the best possible technical and financial bases, with a concern for ecological integration and sustainable development
- gives case studies for natural treatment (infiltration-percolation, reed bed filters and lagoons)

-> needs update and not available in all languages

Why Sustainable Sanitation?

Conventional decentralised/onsite systems

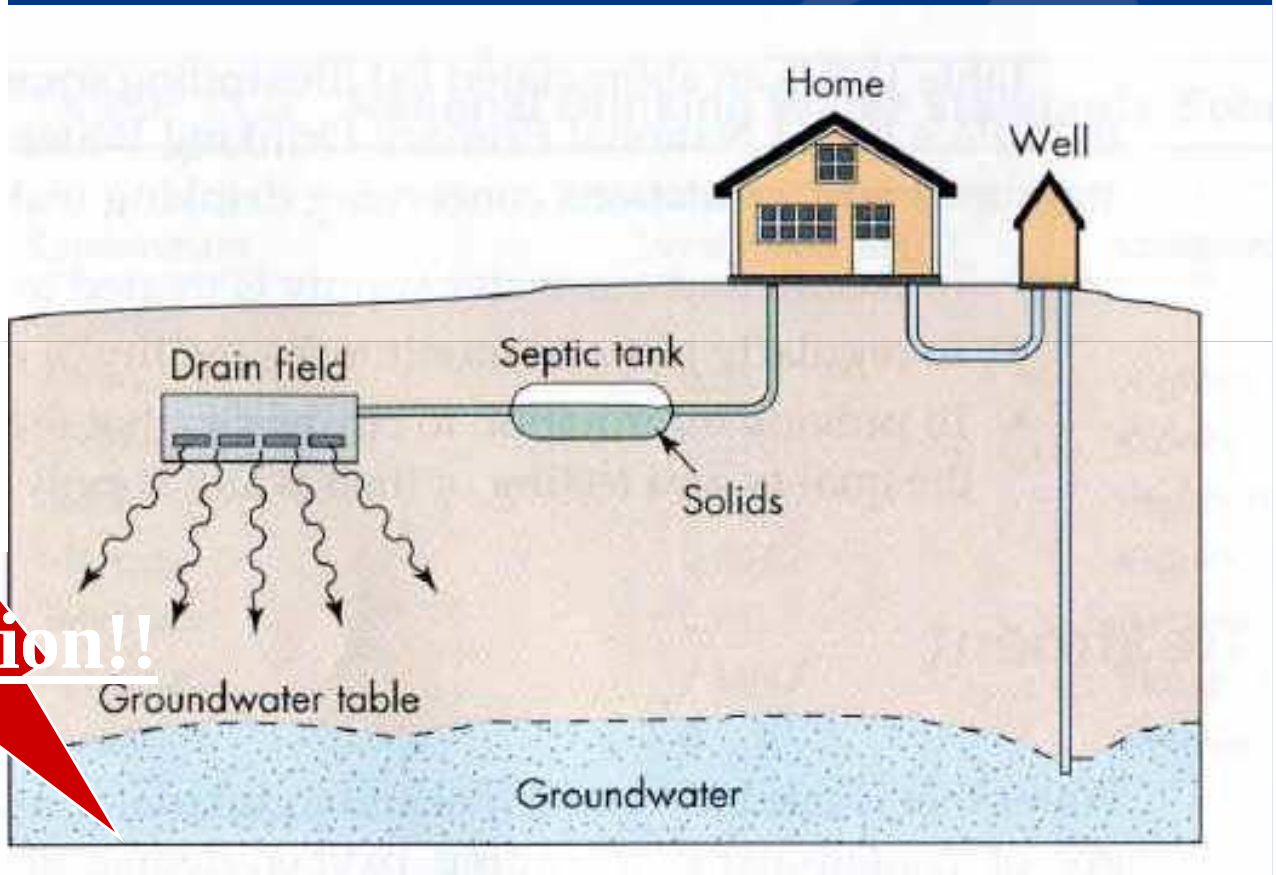
Pit latrines



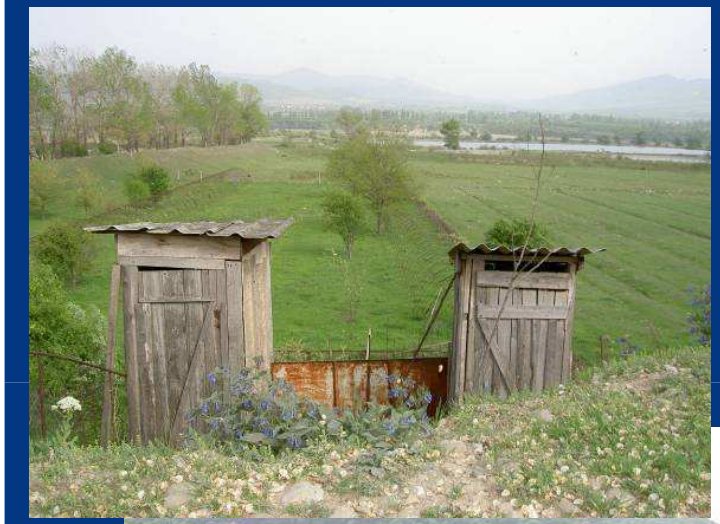
Pollution!!

groundwater

Septic tanks



Health risks of conventional sanitation systems in rural areas



Pit latrines and risks of groundwater pollution

- Since pit latrines are not sealed to the ground, there is a danger of groundwater contamination by pathogens and nitrate
- They cannot be used in crowded areas, on rocky ground, where the groundwater level is high or in areas periodically flooded
- Require access to open ground and require digging of new pits or emptying of existing ones every few years
- Emptying of pits can be very difficult (may require manual labour, pits may collapse)
- Usually high level of odour and flies
- Toilets cannot be situated in houses, hence lack of privacy, comfort and safety concerns especially during night time and winter

From Nitrate contamination to Methaemoglobinaemia

- Controlling nitrate levels in drinking water sources to below around 50 mg/litre is an effective preventive measure avoiding methaemoglobinaemia (WHO 2007).
- Young infants are more at risk because of a relatively high intake of nitrate (WHO 2007).
- Cases of methaemoglobinaemia are reported in countries with severe nitrate-contaminated wells for example in Romania, Moldova, Belarus and Ukraine.

Why do we need to manage wastewater?

Wastewater contains:

- Pathogens
- Nutrients
- Organic matter

(Drinking) water pollution

Danger for health and environment

Sanitation problems in rural areas are not addressed by the UWWTD. They should be addressed in the RBMP (not only under diffuse pollution).

Appropriate Sustainable Sanitation Options are available

Sustainable Sanitation addresses the following issues -1:

Microbial Risks, Environmental Contamination

-> Safe handling of excreta (this is counteracted by dilution which takes place in the conventional sanitation system)

Water Scarcity

-> Reuse of water (from wastewater streams which are part of the water cycle ⇨ greywater)

Sustainable Sanitation addresses the following issues-2:

Malnutrition

-> Reuse of nutrients and soil conditioning materials contained in excreta (related to food cycle)

Wasting of Financial Resources

-> Decentralized concepts at least in rural areas (avoiding sewer systems which are consuming around 70 % of investment in conventional sanitation)

Examples from Germany

Eco-Settlement ‚Braamwisch', Hamburg, Germany

- Blackwater separate, treatment in composter
- Greywater in constructed wetlands
- Solar energy usage

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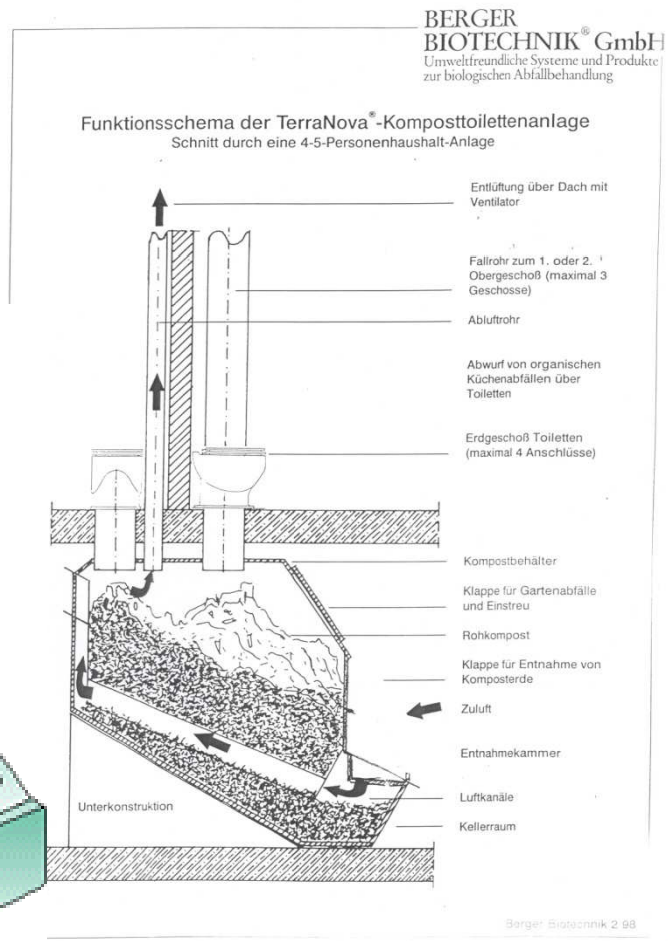
Composting-toilets

- Cheap, but maintenance needed
- better with urine separation



Pilot Project “Lambertsmühle”

Elements of the Sanitation Concept:

- Urine diverting toilets and waterless Urinals
- Storage Tank for Yellow Water
- Pre-Composting Tank (2 chambers, Filter Bags)
- Constructed Wetland for filtered Grey- and Brownwater

Urine-Tank 10 Persons (Glass-Resin)

Fertilizer for 200 to 400 m² in agriculture is produced per perso

6 month storage work into brown land

Potential problems with use of urine: residues of pharmaceuticals and hormones

Problem is relevant in flush-sanitation, too: direct link to water supply

Flintenbreite
Reed bed for greywater

Flintenbreite

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Greywater treatment

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Vacuumstation

Vacuum Toilette

Vacuum-Biogas-System

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Waterless urinals in many public toilets in Germany standard

(e.g. company Keramag)

Examples from WECF

Sustainable Water and Sanitation Projects

by WECF & Partner Organisations in the EU and the EECCA region

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Belarus

Our partner organisations:
ECOPROJECT PARTNERSHIP

Monitoring nitrates in well water with school pupils

Ukraine

Our partner organisations:
BSWC, MAMA-86, VOZROJDENYE

1) Room with urinals in a school with urine diverting dry toilets and 2) training on making pumps

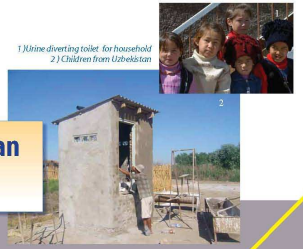
Kazakhstan

Our partner organisations:
YOUNG GUARDS OF NATURE MCJM, UGAM

Inside view of urine diverting dry toilet in Kazakhstan

Uzbekistan

Our partner organisation:
MEHRIBAN



1) Urine diverting toilet for household 2) Children from Uzbekistan

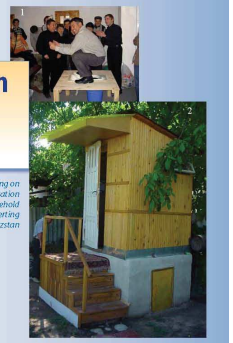
Azerbaijan

Our partner organisation:
EKOT

Introduction to sustainable sanitation in Azerbaijan

Kyrgyzstan

Our partner organisations:
SOCIAL UNION AGERKECH ALGA, BIOM, CAAW, HFHK, ULGU, UNISON



1) Training on sustainable sanitation 2) and household urine diverting toilet in Kyrgyzstan

Romania

Our partner organisations:
EUROTELEORMAN, FEMEI PENTRU UN VIITOR CURAT FVC , MEDIUM ET SANITAS, SLOBOZIA, O ILO

1) Demonstration of re-use of urine in a school and 2) training on how to make pumps in Romania

Tajikistan

Our partner organisations:
ASPD NAU, YECT, SAFO

Urine diverting school toilet building under construction in Tajikistan

Bulgaria

Our partner organisations:
EARTH FOREVER, ECO WORLD

1) Urine diverting dry toilet with a soil filter in a cultural centre in Bulgaria

2)Inside view of the urine diverting toilet

Moldova

Our partner organisations:
ECOTOX , ECO-SPECTRUM ECO-TIRAS , WISDOM

1) Urine diverting dry toilet and 2) a new drinking water well for a kindergarten in Moldova

Armenia

Our partner organisations:
AWHHE, CHARITABLE WOMEN, ECOLORE CLUB

1) Urine diverting dry toilet for a school and 2) water sampling from a public drinking water in Armenia

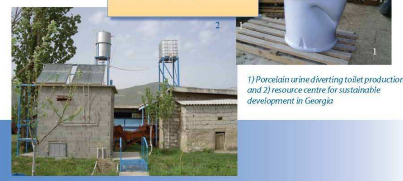
Afghanistan

Our partner organisation:
KATACHEL e.V.

A new school with urine diverting dry toilets for the children in Afghanistan

Georgia

Our partner organisations:
FOUNDATION CAUCASUS ENVIRONMENT, GERMA, FOE / GREENS MOVEMENT OF GEORGIA, RDCA, PAROS, SEMA, SDCA



1) Porcelain urine diverting toilet production and 2) resource centre for sustainable development in Georgia

WECF receives financial support from:

- Netherlands Ministry of Foreign Affairs
- Netherlands Ministry of Environment
- European Commission
- German Ministry of the Environment
- German Federal Foundation of the Environment
- Fondation Ensemble, France
- Private donors
- Federal Agency for the Environment

WECF the Netherlands, France, Germany, May 2009

Water and Sanitation projects by WECF and partner organisations:

- Construction of urine diverting dry toilets for households, public places and schools
- Production of porcelain urine diverting seats
- Construction of solar heated showers
- Demonstrating the effects of urine as a fertilizer
- Building soil filters and constructed wetlands for treatment of wastewater
- Monitoring of drinking water quality
- Cleaning and construction of drinking water wells
- Developing Water Safety Plans with involvement of schools
- Establishment of demonstration centres for sustainable development

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Raising Awareness and Mobilising Communities by Water Safety Plans (WSP)

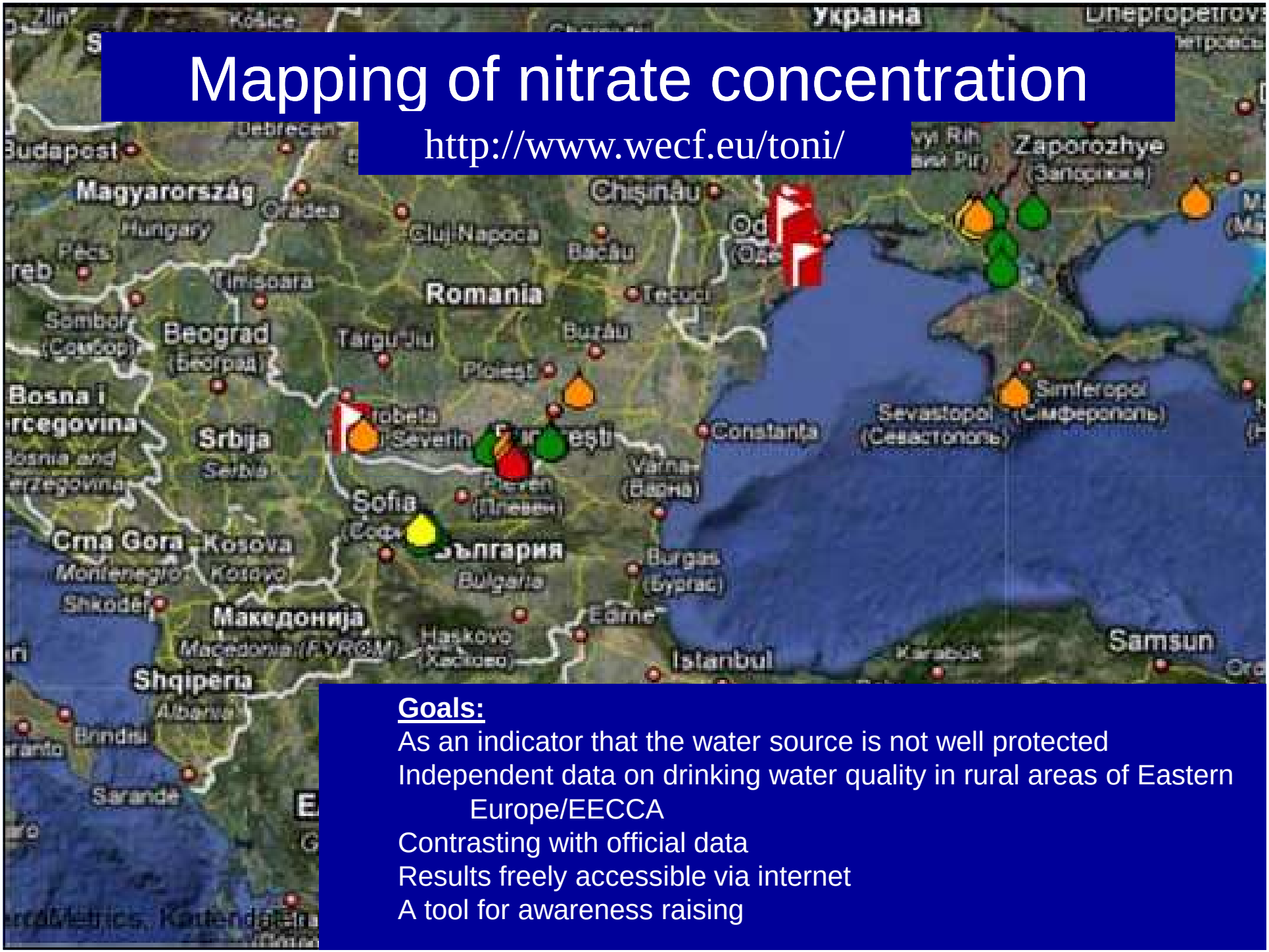
Tool developed by WHO to determine the risk assessment of the water supply system from the catchment to the tap

Involving schools for WSP

- Testing of nitrates
- Mapping of nitrate pollution in the village
- Presenting results to stakeholders and donors

Mapping of nitrate concentration

http://www.wecf.eu/toni/



Goals:

As an indicator that the water source is not well protected

Independent data on drinking water quality in rural areas of Eastern Europe/EECCA

Contrasting with official data

Results freely accessible via internet

A tool for awareness raising

Case study: village in Romania

- Romanian rural area pilot project in village Garla Mare
- Water testing since 2002
- Groundwater severely polluted with nitrates (up to 500 mg/l) and bacteria (source: pit latrines, animal waste)
- Since 2008: Public wells signposted: “no drinking water”
- No alternative safe drinking water sources available
- Most citizens cannot afford bottled water

Introduction of urine diverting dry toilets (UDDT) in Garla Mare

- Groundwater protection
- Improving of sanitary condition
- No water needed for flushing
- Toilet products are sanitised and reused (acc. WHO guidelines)

Demonstration of UDD toilet

Household toilets based on UDDT

Household UDD Toilet indoor

Socio-cultural and institutional barriers to sustainable sanitation

Lack of public interest in sanitation, no awareness about the link to health and environment

Lack of regulation on the safe reuse of human excreta on national and EU level

Conclusions

- Sanitation and wastewater treatment in agglomerations with less than 2,000 pe need more attention in the EU regulations
- Sustainable Sanitation contributes to groundwater protection and should be integrated into the RBMP (e.g. demonstrations)
- Awareness raising about the link between sanitation, health and water protection is necessary - WSP and nitrate monitoring are good tools

Thank you!

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