



SSWM

*sustainable sanitation
and water management*

SSWM - Linking up Sanitation, Water Management & Agriculture

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Depending on the initial situations and respective local circumstances, there is no guarantee that single measures described in the toolbox will make the local water and sanitation system more sustainable. The main aim of the SSWM Toolbox is to be a reference tool to provide ideas for improving the local water and sanitation situation in a sustainable manner. Results depend largely on the respective situation and the implementation and combination of the measures described. An in-depth analysis of respective advantages and disadvantages and the suitability of the measure is necessary in every single case. We do not assume any responsibility for and make no warranty with respect to the results that may be obtained from the use of the information provided.



Introduction

Water...

What is Water?

Where does it come from?

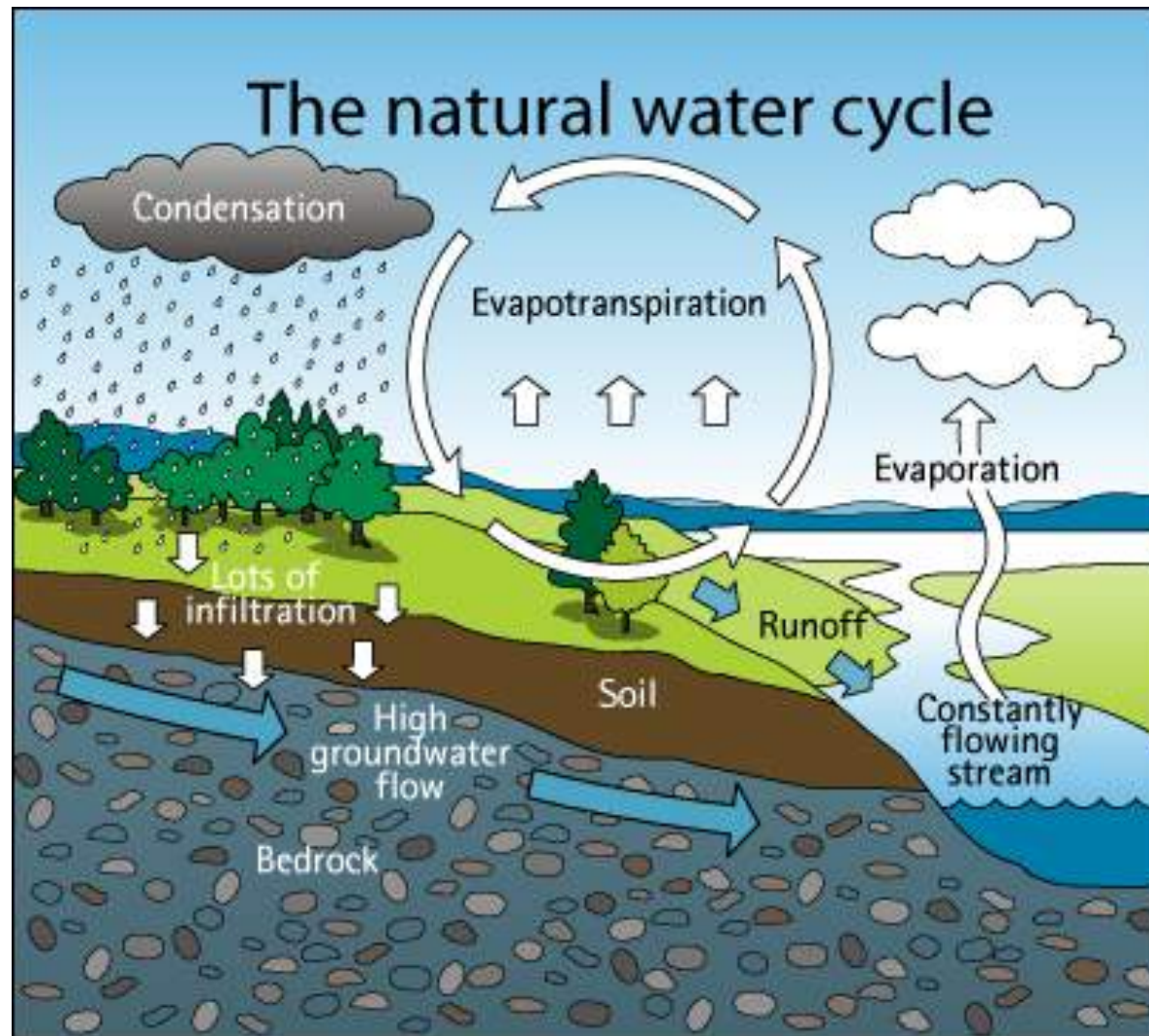
Where does it go?



Source: M. Kropac 2009

Introduction

The Natural Water Cycle...



Source: aucklandcity.govt.nz

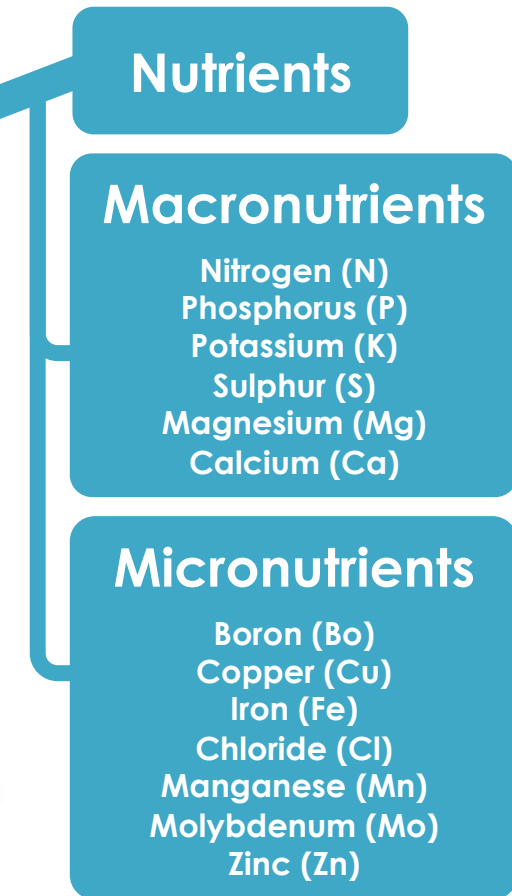
Introduction

Nutrients...

What are Nutrients?

Where do they come from?

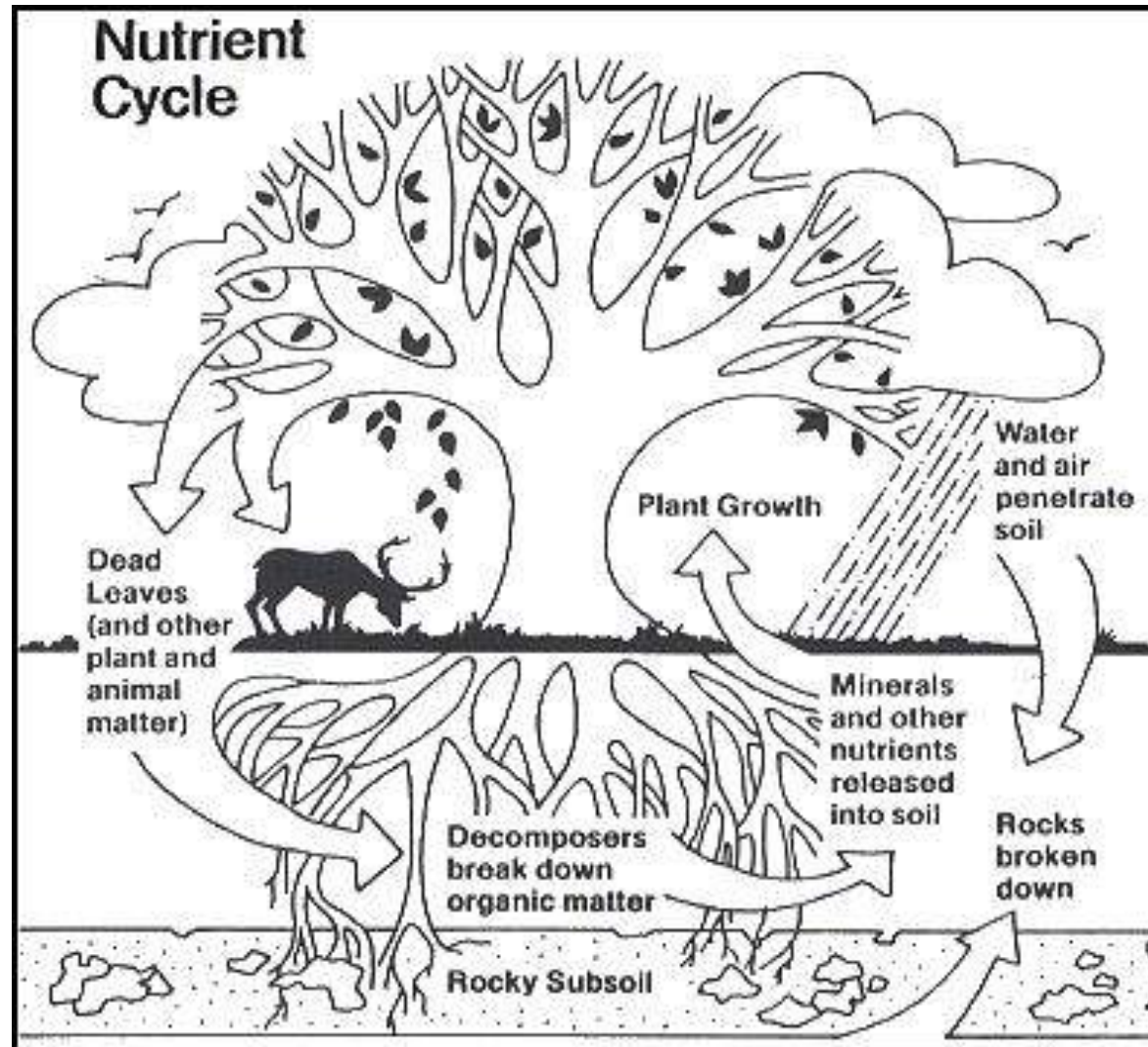
Where do they go?



Source: R. Gensch

Introduction

The Natural Nutrient Cycle



Source: http://www.pikeconservation.org/soil_ecosystem.htm

Now, how do we handle the
water and nutrient cycle?

Everything OK?

Maybe not...



Water wasted.
TODAY.

Source: <http://www.grida.no/publications/rr/sickwater/>



Lack of
water.
TODAY.

Source: REUTERS



783 million people
without access to
clean water.
TODAY.

Source: J. Heeb



Poor yields.
TODAY.

Source: <http://crs-blog.org/wp-content/uploads/2009/02/afg2008018673.jpg>

Source: WHO-UNICEF 2012

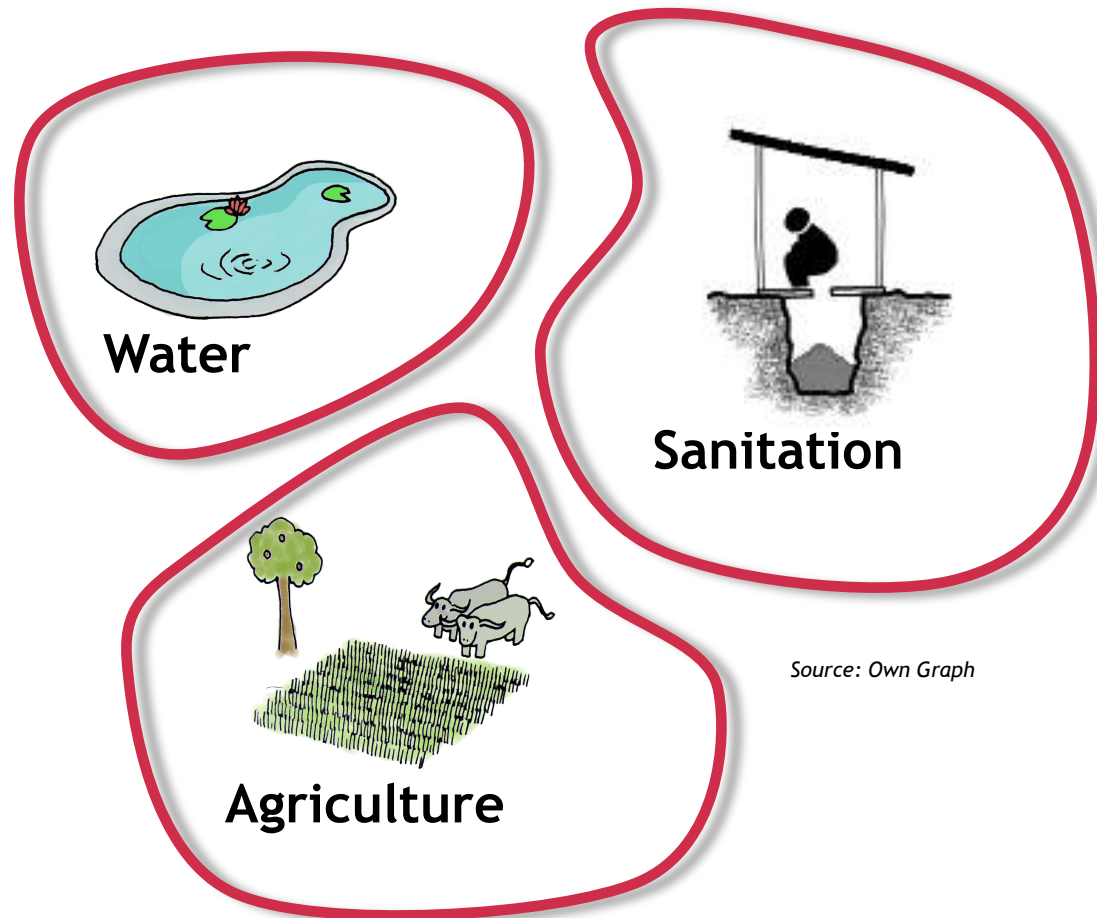
What is going wrong?

There are three main reasons that lead to today's situation of unsustainable management of water and nutrients:

1. Sectoral thinking
2. Unsustainable conventional approaches
3. Linear approaches to water and nutrient management

What is going wrong?

(1) Sectoral thinking



Source: Own Graph

What is going wrong?

(1) Sectoral thinking



Source: J. Heeb



Source: K. Conradin

Providing Water / Toilets

→ But what about the wastewater?

Providing Food

→ But no recycling of organic wastes

Providing Water

→ But not recycling it for agriculture

... etc.

What is going wrong?

(2) Unsustainable current approaches: Energy intensive transport of drinking water in Germany:

Water
transported
over 200
km! (uphill)



Stuttgart

Lake
Constance

What is going wrong?

(2) Unsustainable current approaches: Mixing what shouldn't be mixed..



With conventional waterborne flush-toilets, we mix

roughly 50 kg of faecal matter (per person/year)

 50 kg

roughly 500 l of urine (per person/year)

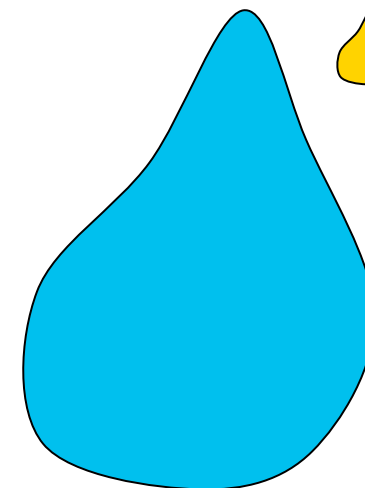
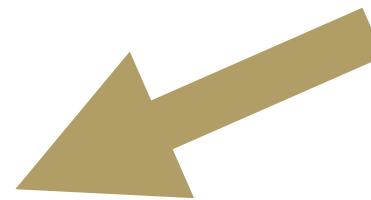
 500 L

with roughly 20'000l of *clean* flushwater*

20'000
L



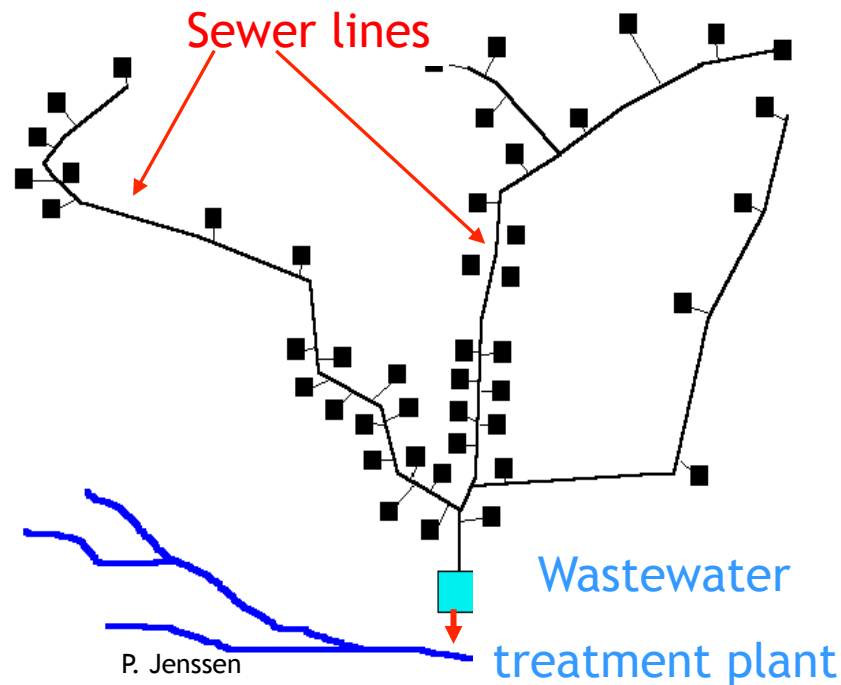
<http://thomasmayerarchive.de>



If this wastewater is discharged untreated into rivers, an even higher amount of water is polluted!

What is going wrong?

(2) Unsustainable current approaches: Centralisation costs a fortune...



Initial investment costs for centralised sewage collection system make up for the largest part, i.e. 70 to 90% of the total cost of sewage treatment.

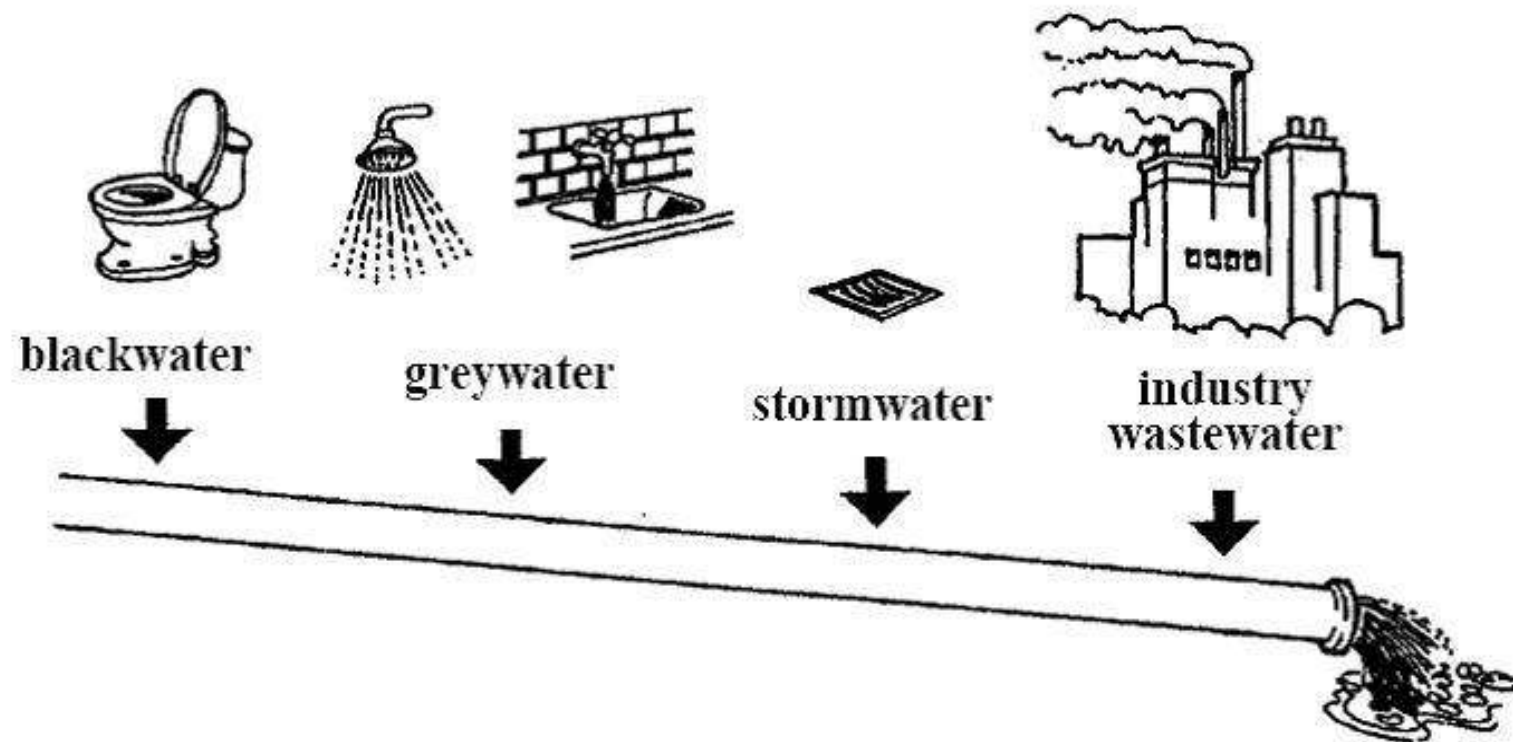
- Collection system 70 - 90 %
- Treatment 10 - 30 %

(Otis 1996, Mork et al.2000)

Consider lifespan of pipe network!

What is going wrong?

(2) Unsustainable current approaches: Mixing different types of wastewaters...



What happens at the end of the pipe?

What is going wrong?

(2) Unsustainable current approaches: Example High-Tech Wastewater Treatment Plants

Which will need:

- Long sewer network & pumps to get the wastewater to the plant
- **Electricity** for aeration, pumps and other moving parts
- Skilled (and thus expensive) **operation & maintenance staff**
- High cost
- **Recycling difficult due to contamination of heavy metals, etc..**

→ *Who will pay for this?*



What is going wrong?

(3) Many people still act as we would live on a flat world...



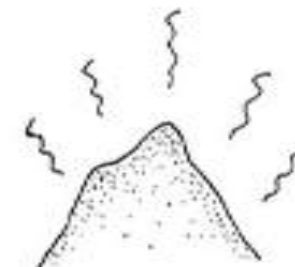
Source: <http://3.bp.blogspot.com>

What is going wrong?

(3) Many people still act as we would live on a flat world...



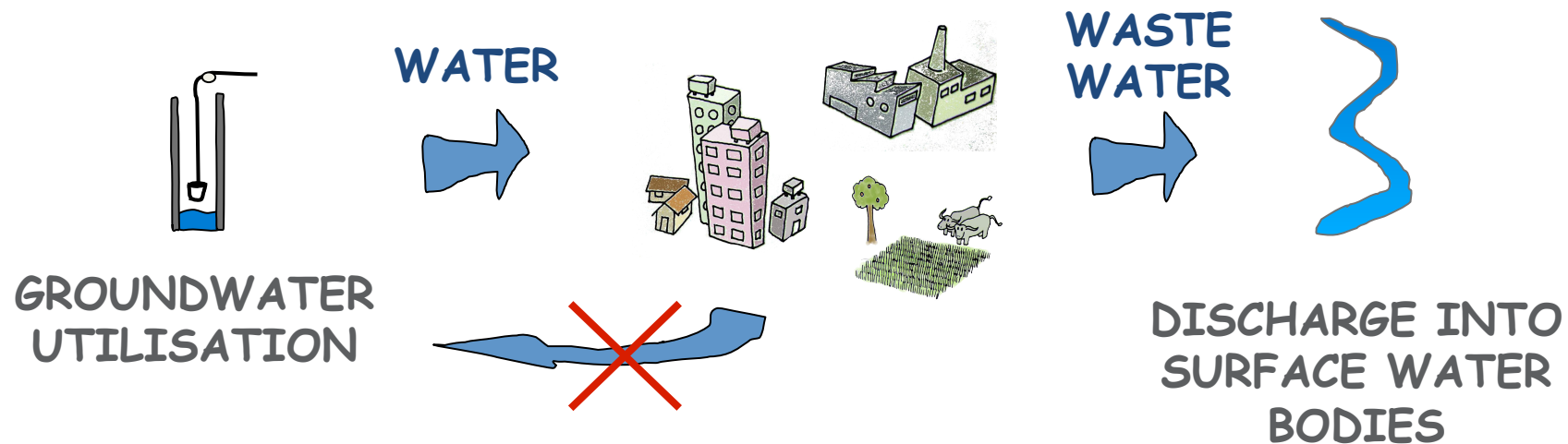
LIFE ON A FLAT WORLD...



What is going wrong?

(3) Linear approach (to water management)

→ WATER FLOW →

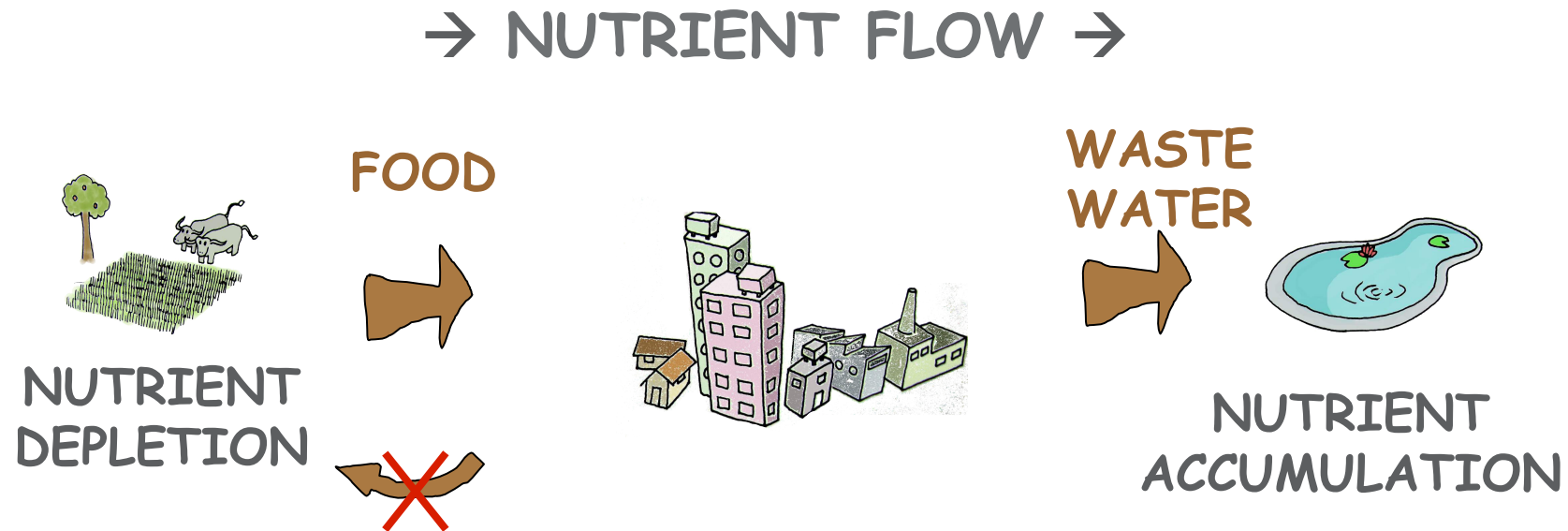


Source: Own Graph

- Often, non-renewable groundwater sources are used as a source of water.
- Groundwater is mostly not recharged.
- Instead, it is discharged into surface water bodies (rivers, sea).
- This leads to groundwater depletion.

What is going wrong?

(3) Linear approach (to nutrient flows)



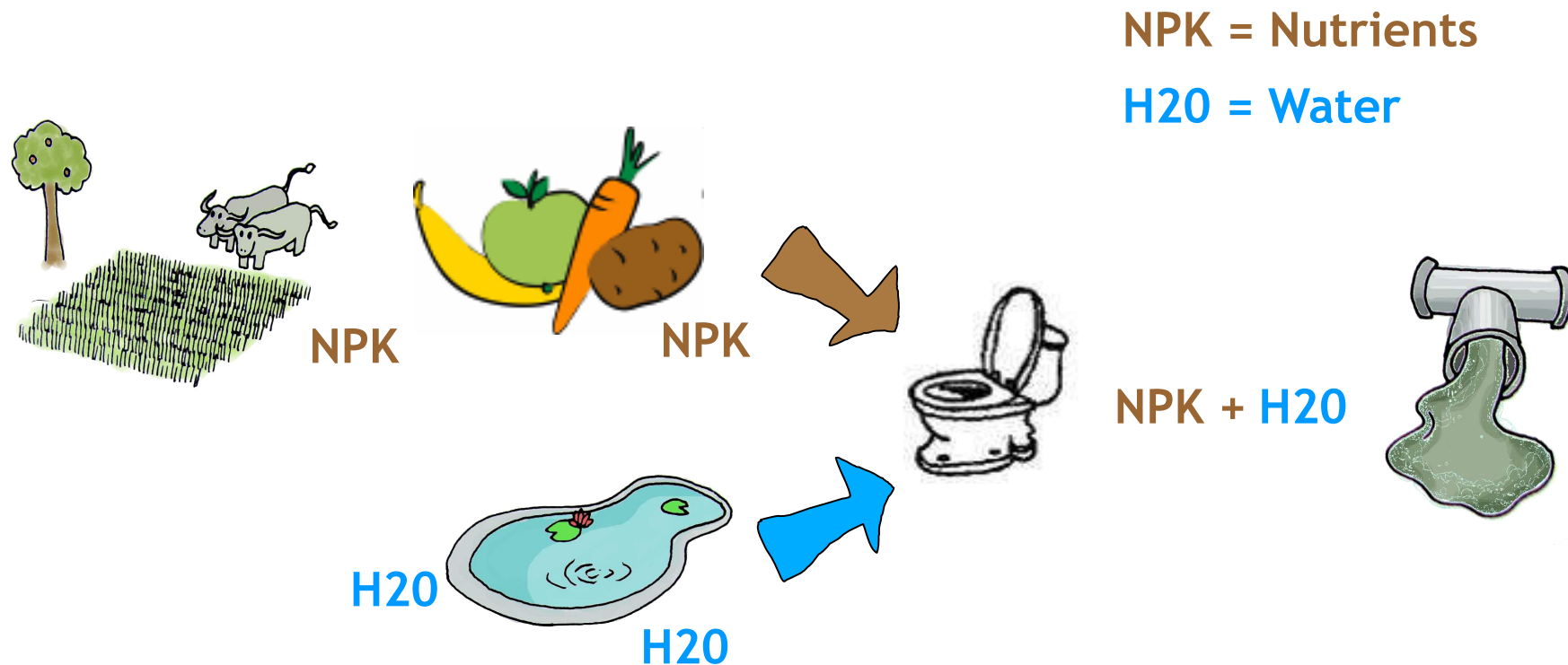
Today, there is a linear flow of nutrients, from soils (via agricultural food products) to cities.

Nutrients excreted are not recycled, but essentially end up in aquatic ecosystems.

Source: Own Graph

What is going wrong?

What links these two problems?



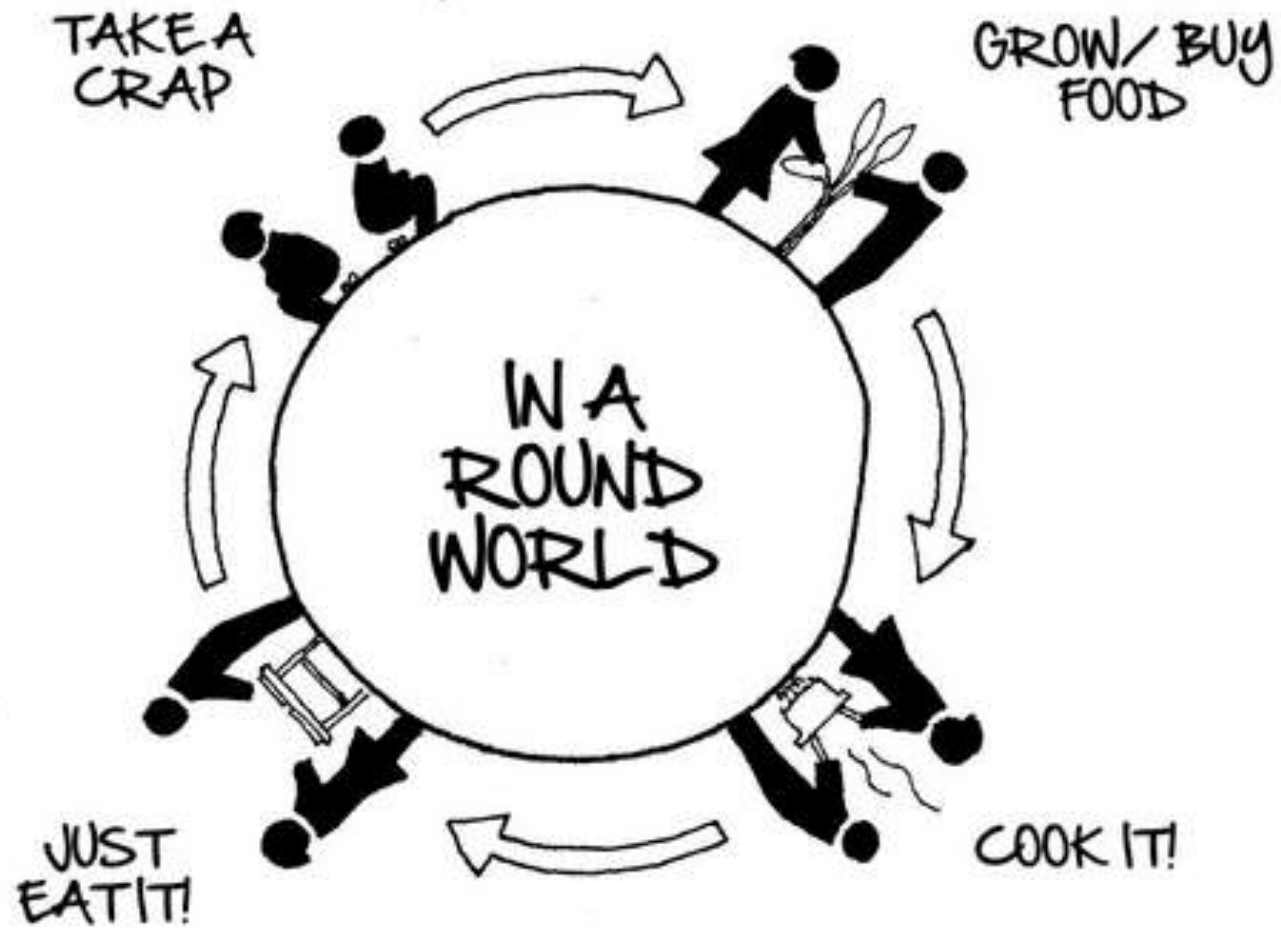
Agriculture, Water management and Sanitation are considered different fields. Yet, they are inherently linked.

So after all, the world is round!



Source: <http://blogs.glam.de>

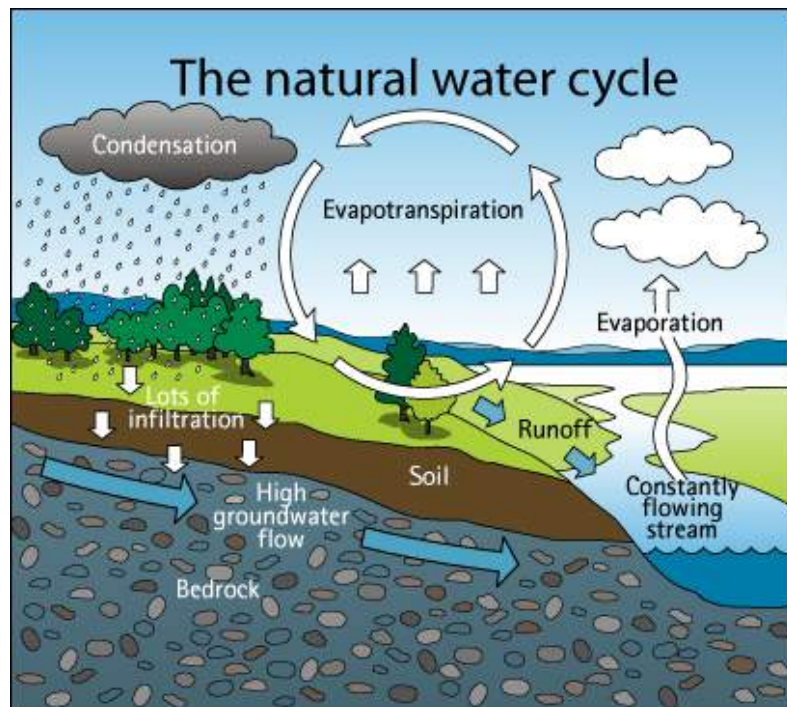
The world works in cycles!



Source: PHADKE 2009

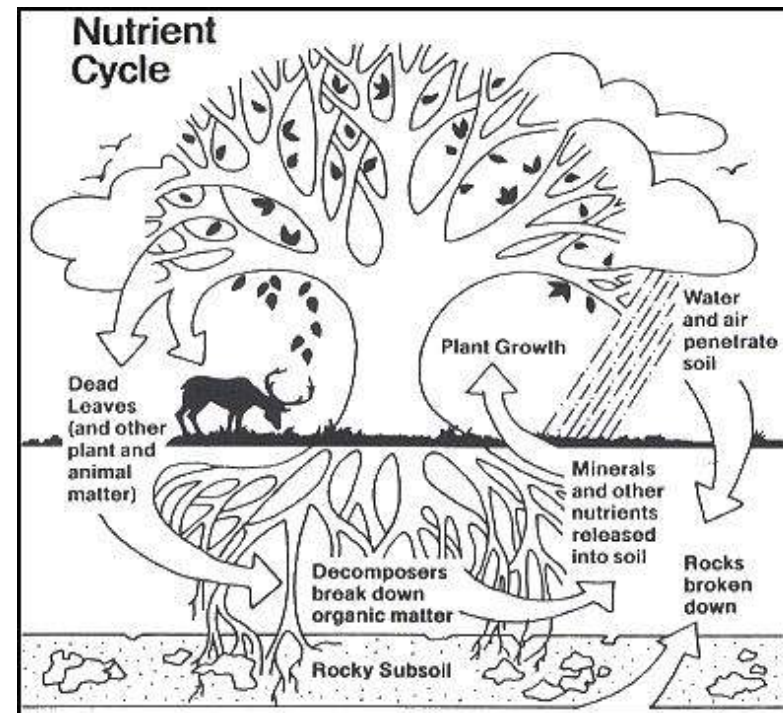
The world works in cycles!

The Water...



Source: aucklandcity.govt.nz

...as well as the Nutrient Cycle!



Source: http://www.pikeconservation.org/soil_ecosystem.htm

So, let's link the *water cycle*, the *nutrient cycle* and sanitation...



... and solve three big problems in one go!

Source: Own Graph

Linking the water and nutrient cycle

In SSWM, we focus on the human-influenced water and nutrient cycles on a local level.

Groupwork: Now, how are the human-influenced nutrient and water loops exactly linked?

References

PHADKE, S. (2009): Poo. Pune: Aman Setu Publications.

WHO-UNICEF (2012): Progress on Sanitation and Drinking Water. 2012 Update. Geneva: WHO Press.



“Linking up Sustainable Sanitation, Water Management & Agriculture”



SSWM is an initiative supported by:



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Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Foreign Affairs FDFA
Swiss Agency for Development and Cooperation SDC



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