

IR 5

Presentation:

Introduction to Water Management in the EU
Case Study: Flanders

Dar Es Salaam, 28th – 29th November 2013

Rob Van Deun
(Thomas More Kempen)



VLIR UOS South Initiatives 2011-2013

Promoter: Thomas More Kempen University College

Local Partner: University of Dar Es Salaam, WSP and CW Research Group

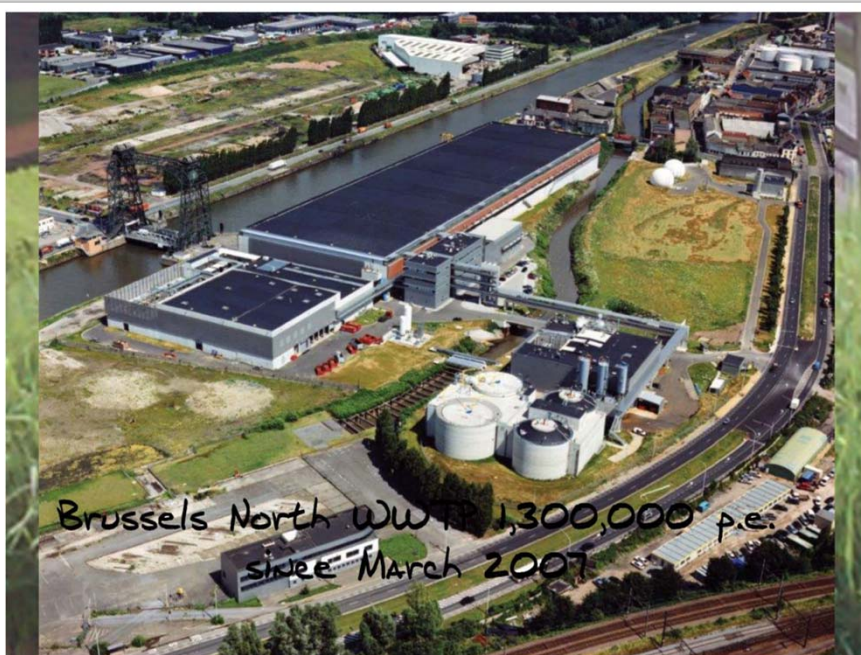
Introduction to Wastewater Management in the EU Case Study: Flanders

Rob Van Deun

University of Dar Es Salaam
28th - 29th November 2013
Dar Es Salaam, Tanzania



VLIR UOS South Initiatives
University of Dar Es Salaam
Thomas More Kempen





EU European Union

EU Directives:
Lay down certain end results that must be achieved in every Member State. National authorities have to adapt their laws to meet these goals, but are free to decide how to do so.

EU Regulations:
Are the most direct form of EU law - as soon as they are passed, they have binding legal force throughout every Member State, on a par with national laws.

COUNCIL DIRECTIVE of 21 May 1991 concerning urban waste water treatment (91/271/EEC)

DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy

Urban Waste Water Directive (91/271/EEC)

- Aims to reduce the pollution of freshwater, estuarine and coastal waters by domestic sewage and industrial wastewater.
- Requires Member States to draw up lists of sensitive and less sensitive areas which receive the treated waters.

Member State	Population	Urban Wastewater Treatment	Industrial Wastewater Treatment
Belgium	10,500,000	95%	95%
France	64,000,000	95%	95%
Germany	82,000,000	95%	95%
Italy	58,000,000	95%	95%
Spain	45,000,000	95%	95%
UK	58,000,000	95%	95%

Water Framework Directive (2000/60/EC)

Policy integration

Ecology:
All water bodies must reach "good ecological status" by 2015.

Governance:
New water management authorities were created at the river basin scale and were charged with more participatory decision making.

Economy:
Water suppliers should aim for full cost recovery and begin economic analyses to charge the "true cost" of water by 2010.

EU Euro

EU Directives:
Lay down certain end results that must be achieved in every Member State. National authorities have to adapt their laws to meet these goals, but are free to decide how to do so.

EU Regulations:
Are the most direct form of EU law - as soon as they are passed, they have binding legal force throughout every Member State, on a par with national laws.

Urban Waste Water Directive (91/271/EEC)

- Aims to reduce the pollution of freshwater, estuarine and coastal waters b

European Union




COUNCIL DIRECTIVE
of 21 May 1991
concerning urban waste water treatment
(91/271/EEC)

DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 23 October 2000
establishing a framework for Community action in the field of water policy

Water Framework Directive (2000/60/EC)

Policy integration



Urban Waste Water Directive (91/271/EEC)

- Aims to reduce the pollution of freshwater, estuarine and coastal waters by domestic sewage and industrial wastewater;
- Requires Member States to draw up lists of sensitive and less sensitive areas which receive the treated waters.

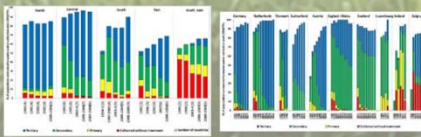
	0	2,000	10,000	15,000	150,000 p.e.
sensitive area	31/12/2005	31/12/2005	31/12/1998	31/12/1998	31/12/1998
	appropriate treatment	secondary treatment	advanced treatment	advanced treatment	advanced treatment
normal area	31/12/2005	31/12/2005	31/12/2005	31/12/2000	31/12/2000
	appropriate treatment	secondary treatment	secondary treatment	secondary treatment	secondary treatment

Parameter	Value (concentration)	Value (% reduction)
Biological Oxygen Demand BOD ₅	25 mg/l	70 - 90 %
Chemical Oxygen Demand COD	125 mg/l	75 %


(24 hour average; either concentration or percentage of reduction shall apply)

Parameter	Value (concentration)	Value (% reduction)
Total nitrogen		
Plants of 10 000 - 100 000 p.e.	15 mg/l	70 - 80 %
Plants >100 000 p.e.	10 mg/l	
Total phosphorus		
Plants of 10 000 - 100 000 p.e.	2 mg/l	80 %
Plants >100 000 p.e.	1 mg/l	

(annual averages, either concentration or percentage of reduction shall apply)



Belgium fined €10 million for wastewater



- Requires Member States to draw up lists of sensitive and less sensitive areas which receive the treated waters

Deadlines

	0	2,000	10,000	15,000	150,000 p.e.
sensitive area	31/12/2005	31/12/2005	31/12/1998	31/12/1998	31/12/1998
	appropriate treatment	secondary treatment	advanced treatment	advanced treatment	advanced treatment
normal area	31/12/2005	31/12/2005	31/12/2005	31/12/2000	31/12/2000
	appropriate treatment	secondary treatment	secondary treatment	secondary treatment	secondary treatment

a) standard provisions

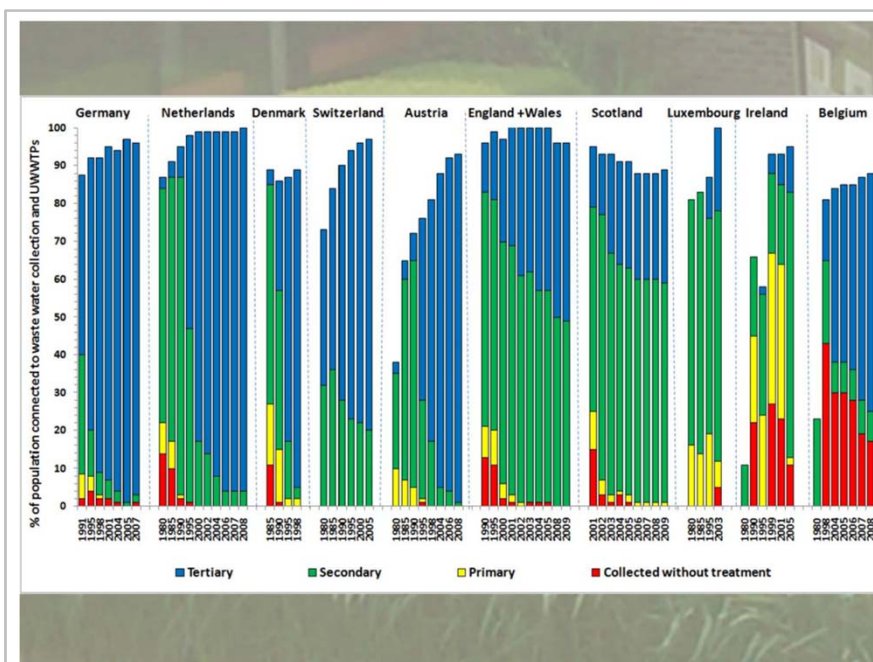
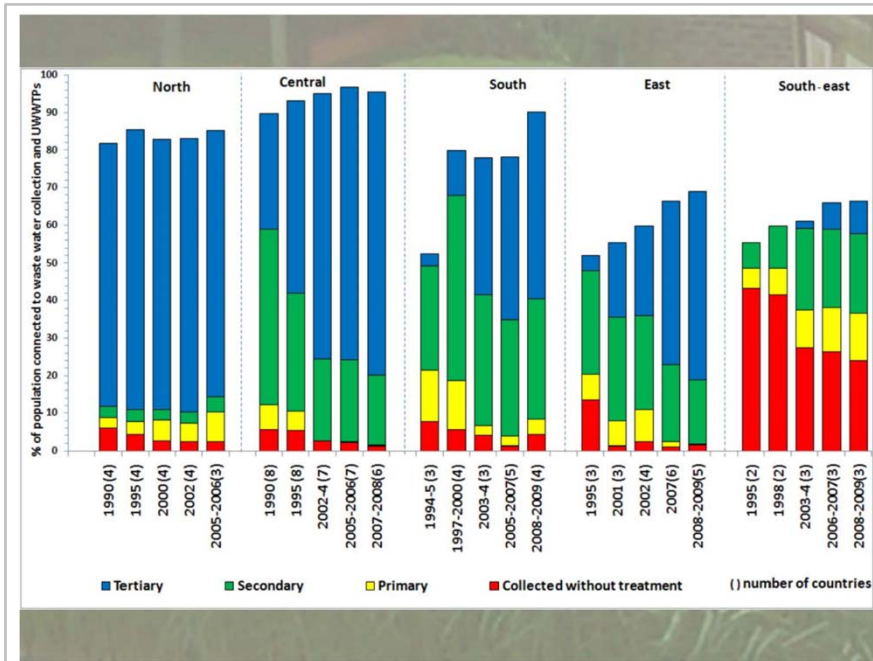
Parameter	Value (concentration)	Value (% reduction)
Biological Oxygen Demand BOD ₅	25 mg/l	70 - 90 %
Chemical Oxygen Demand COD	125 mg/l	75 %

(24 hour average; either concentration or percentage of reduction shall apply)

b) additional provisions for 'sensitive areas'

Parameter	Value (concentration)	Value (% reduction)
Total nitrogen Plants of 10 000 - 100 000 p.e. Plants >100 000 p.e.	15 mg/l 10 mg/l	70 - 80 %
Total phosphorus Plants of 10 000 - 100 000 p.e. Plants >100 000 p.e.	2 mg/l 1 mg/l	80 %

(annual averages, either concentration or percentage of reduction shall apply)



(annual averages, either concentration or percentage of reduction shall apply)

18
Oct '13

Belgium fined €10 million for wastewater

by Alan Hope, EU hands Belgium fine for sub-par wastewater treatment

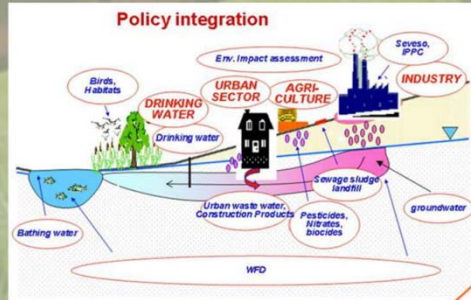
The Flemish government says it will not contribute to a €10 million fine imposed by the European Court of Justice (ECJ) in Luxembourg. The fine was handed down yesterday after Belgium failed for more than a decade to bring its urban wastewater treatment into line with EU regulations.



However Flanders' wastewater system has been meeting regulations since 2011, before the current case was brought, according to environment minister Jobe Schauvliege. Brussels has also been in compliance since 2011.

The ECJ is only able to rule on cases against member states, so the judgement was given against the Belgian state – even though the matter is, under Belgium's system, the responsibility of the regions.

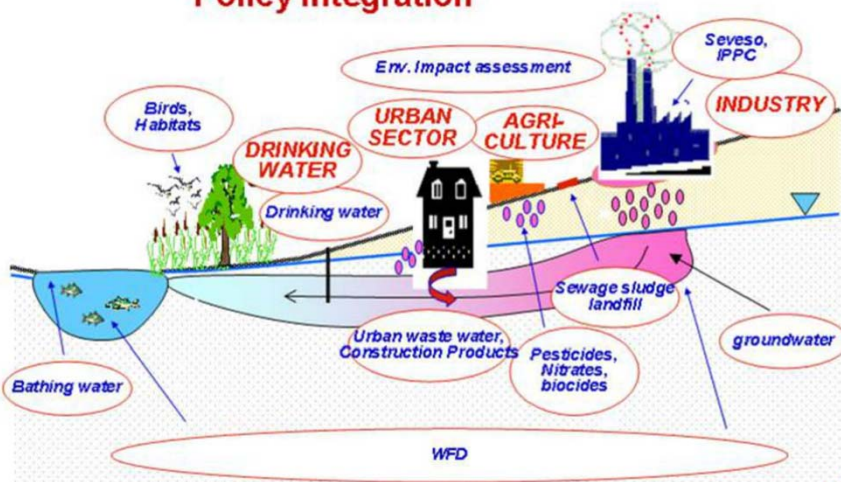
Water Framework Directive (2000/60/EC)



Emission limit values approach:
Takes into account the natural capacity of dilution of water at the point of discharge when setting standards: "public health oriented";
Emission limit values approach:
Applying best available technologies (BAT) to ensure the lowest discharge possible: "environment oriented".

- Ecology:**
All water bodies must reach "good ecological status" by 2015;
- Governance:**
New water management authorities were created at the river basin scale and were charged with more participatory decision making;
- Economy:**
Water suppliers should aim for full cost recovery and begin economic analyses to charge the "true cost" of water by 2010.

Policy integration



The diagram illustrates the water cycle and the impact of various sectors. It shows 'Bathing water' and 'Drinking water' being affected by 'Urban waste water', 'Construction Products', 'Pesticides, Insecticides, Biocides', and 'Sewage sludge treated'. Sectors contributing to pollution include 'URBAN SECTOR', 'AGRI. CULTURE', and 'INDUSTRY'. A 'WFD' (Water Framework Directive) box is shown at the bottom. To the right, a scatter plot shows 'Emission' on the y-axis and 'Immission' on the x-axis, with 'Quality focus' on the left and 'Quantity focus' on the right. Countries are plotted: Germany, The Netherlands, Belgium, WFD (circled in red), France, Spain, Italy, Switzerland?, and UK.

Ecology:
All water bodies must reach "good ecological status" by 2015;

Governance:
New water management authorities were created at the river basin scale and were charged with more participatory decision making;

Economy:
Water suppliers should aim for full cost recovery and begin economic analyses to charge the "true cost" of water by 2010.

Immission limit values approach:
Takes into account the natural capacity of dilution of water at the point of discharge when setting standards; "public health oriented";

Emission limit values approach:
Applying best available technologies (BAT) to ensure the lowest discharge possible; "environment oriented".

The scatter plot shows 'Emission' on the vertical axis and 'Immission' on the horizontal axis. The horizontal axis is divided into 'Quality focus' (left) and 'Quantity focus' (right). Countries are plotted as follows: Germany (high emission, low immission), The Netherlands (medium emission, low immission), Belgium (medium emission, low immission), WFD (medium emission, medium immission, circled in red), France (low emission, high immission), Spain (low emission, high immission), Italy (medium emission, high immission), Switzerland? (medium emission, high immission), and UK (low emission, low immission).

Immission limit values approach:
Takes into account the natural capacity of dilution of water at the point of discharge when setting standards; "public health oriented";

Emission limit values approach:
Applying best available technologies (BAT) to ensure the lowest discharge possible; "environment oriented".

Flanders (Belgium)

Integrated Water Invoice

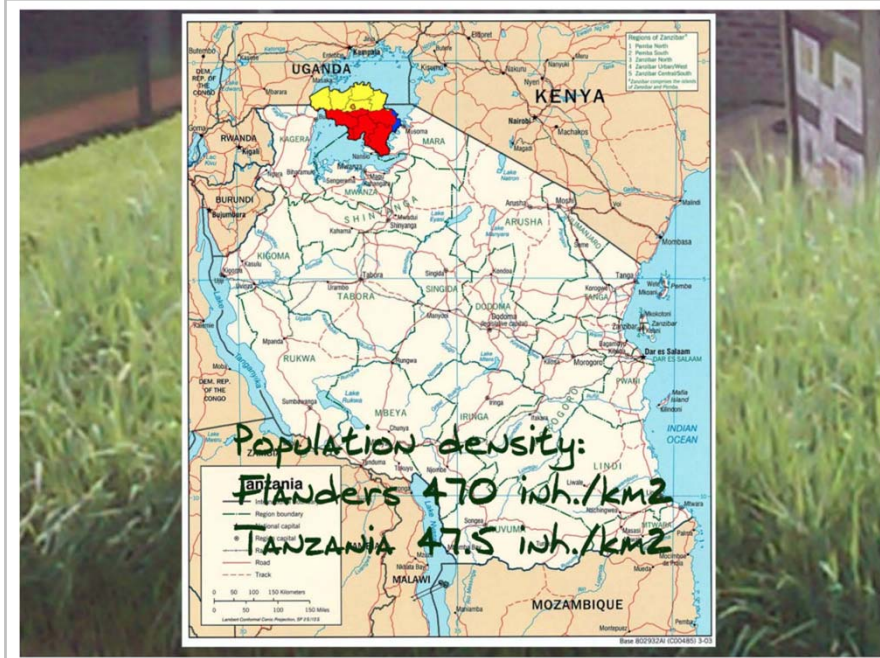
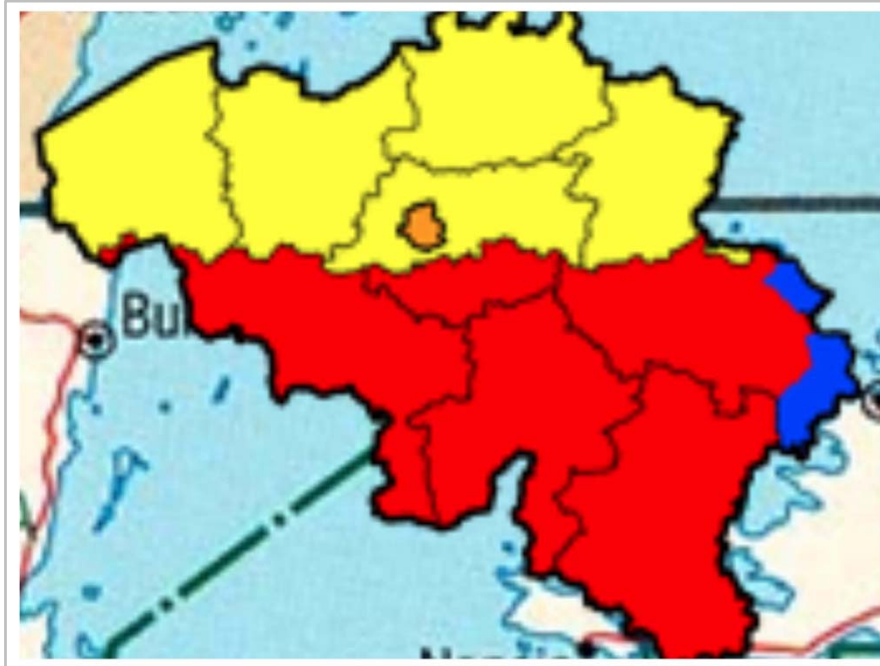
2005

Water:

Responsibilities:
- Drinking Water Companies

Operational responsibilities:
- Drinking Water Companies

Invoice:



Flanders (Belgium)

Integrated Water Invoice

2005

Drinking water:

Responsibilities:

- Drinking Water Companies

Operational responsibilities:

- Drinking Water Companies

Invoice:

- Drinking Water Companies

Domestic Wastewater:

Responsibilities:

- VMM Flemish Environment Agency
- Investment scheme Aquafin
- Subsidy scheme Municipalities

Operational responsibilities:

- Aquafin nv
- Wastewater Treatment Plants
- Supra-municipal collection and transport
- Municipalities
- Collection

Invoices:

- VMM: taxes on wastewater treatment
- Municipalities: taxes

Drinking water:

Responsibilities:

- Drinking Water Companies

Operational responsibilities:

- Drinking Water Companies

Invoice:

- Drinking Water Companies

Domestic Wastewater:

Responsibilities:

- Drinking Water Companies
- VMM: Policy objectives, economical supervision

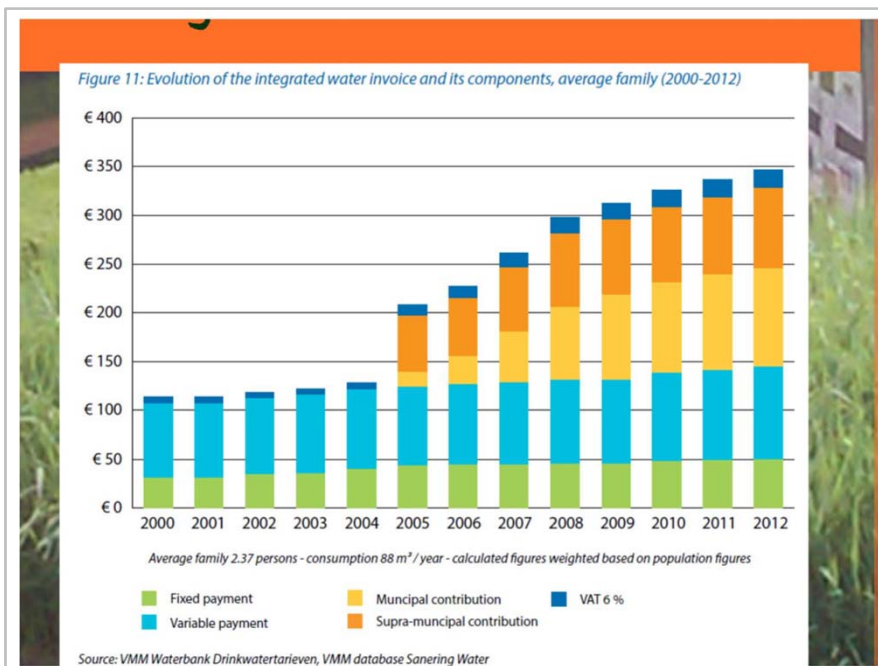
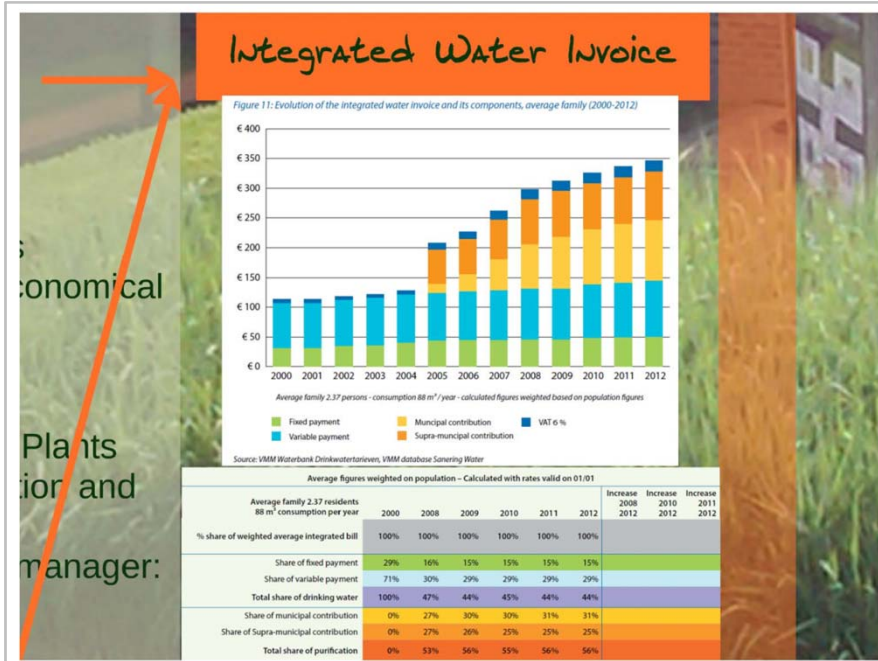
Operational responsibilities:

- Aquafin nv
- Wastewater Treatment Plants
- Supra-municipal collection and transport
- Municipalities / Sewerage manager:
- Collection

Invoices:

- Drinking Water Companies

<ul style="list-style-type: none"> • Drinking Water Companies <p>Operational responsibilities:</p> <ul style="list-style-type: none"> • Drinking Water Companies <p>Invoice:</p> <ul style="list-style-type: none"> • Drinking Water Companies <p>Domestic Wastewater:</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • VMM Flermish Environment Agency • Investment scheme Aquafin • Subsidy scheme Municipalities <p>Operational responsibilities:</p> <ul style="list-style-type: none"> • Aquafin nv • Wastewater Treatment Plants • Supra-municipal collection and transport • Municipalities • Collection <p>Invoices:</p> <ul style="list-style-type: none"> • VMM: taxes on wastewater treatment • Municipalities: taxes 	<ul style="list-style-type: none"> • Drinking Water Companies <p>Operational responsibilities:</p> <ul style="list-style-type: none"> • Drinking Water Companies <p>Invoice:</p> <ul style="list-style-type: none"> • Drinking Water Companies <p>Domestic Wastewater:</p> <p>Responsibilities</p> <ul style="list-style-type: none"> • Drinking Water Companies • VMM: Policy objectives, economical supervision <p>Operational responsibilities:</p> <ul style="list-style-type: none"> • Aquafin nv • Wastewater Treatment Plants • Supra-municipal collector and transport • Municipalities / Sewerage manager: • Collection <p>Invoices:</p> <ul style="list-style-type: none"> • Drinking Water Companies
---	---



Average family 2.37 persons - consumption 88 m³ / year - calculated figures weighted based on population figures

■ Fixed payment ■ Municipal contribution ■ VAT 6 %
■ Variable payment ■ Supra-municipal contribution

Source: VMM Waterbank Drinkwatertarieven, VMM database Sanering Water

Average figures weighted on population – Calculated with rates valid on 01/01							Increase 2008-2012
Average family 2.37 residents 88 m ³ consumption per year	2000	2008	2009	2010	2011	2012	Increase 2008-2012
% share of weighted average integrated bill	100%	100%	100%	100%	100%	100%	
Share of fixed payment	29%	16%	15%	15%	15%	15%	
Share of variable payment	71%	30%	29%	29%	29%	29%	
Total share of drinking water	100%	47%	44%	45%	44%	44%	
Share of municipal contribution	0%	27%	30%	30%	31%	31%	
Share of Supra-municipal contribution	0%	27%	26%	25%	25%	25%	
Total share of purification	0%	53%	56%	55%	56%	56%	

Flanders (Belgium)

Zoning Plans

Objective:
Zoning plans establish how the domestic wastewater of each single family home in Flanders will be treated.



● Orange shaded clusters: Collection, transport and treatment in central WWTP.
● Green clusters: Collection, transport and treatment in central WWTP planned.
● Red clusters: Individual wastewater treatment plant (single family home) necessary.

Procedure

In the past:

- Houses connected to sewer system, sewer system connected to WWTP.
- Houses connected to sewer system, sewer system NOT connected to WWTP but connection planned.
- Houses connected to sewer system, sewer system NOT connected to WWTP and connection NOT planned.
- Houses not connected to sewer system.

Zoning plans:

- OK: orange shaded clusters.
- NOT OK: Economical analysis: costs for collective transport and treatment compared with costs for an individual WWTP:
 - < 0.7 * 6,869 eur: GREEN
 - > 1.3 * 6,869 eur: RED
 - in between: decision based on public inquiry, water authorities, municipalities.

Costs individual WWTP
6,869 eur (incl. VAT)
9,182 USD
14,555,000 TZS

Flanders (Belgium)

Zoning Plans

Objective:
Zoning plans establish how the domestic wastewater of each single family home in Flanders will be treated.



● Orange shaded clusters: Collection, transport and treatment in central WWTP.
● Green clusters: Collection, transport and treatment in central WWTP planned.
● Red clusters: Individual wastewater treatment plant (single family home) necessary.

Procedure

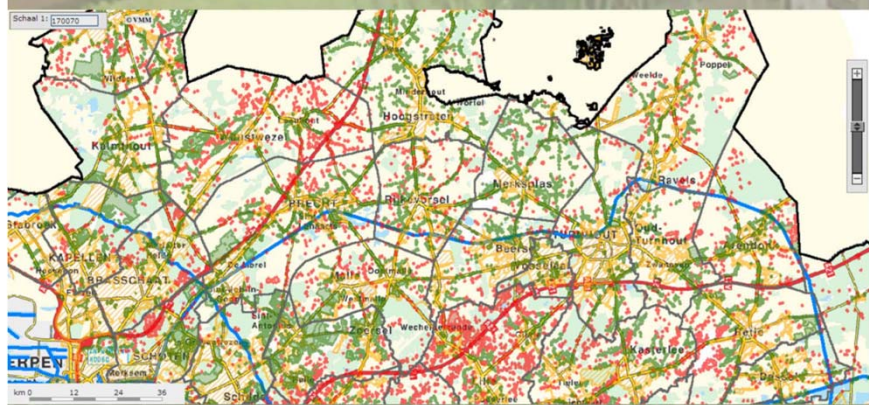
In the past:

- Houses connected to sewer system, sewer system connected to WWTP.
- Houses connected to sewer system, sewer system NOT connected to WWTP but connection planned.
- Houses connected to sewer system, sewer system NOT connected to WWTP and connection NOT planned.
- Houses not connected to sewer system.

Zoning plans:

- OK: orange shaded clusters.
- NOT OK: Economical analysis: costs for collective transport and treatment compared with costs for an individual WWTP:
 - < 0.7 * 6,869 eur: GREEN
 - > 1.3 * 6,869 eur: RED
 - in between: decision based on public inquiry, water authorities, municipalities.

Zoning plans establish how the domestic waste in Flanders will be treated.

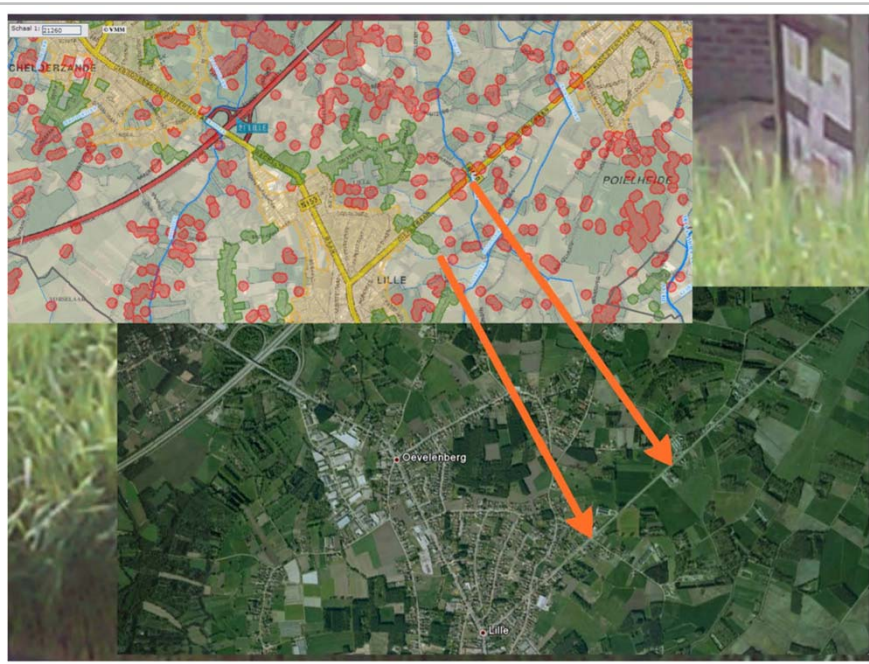


Procedure

Orange shaded clusters:
Collection, transport and treatment in central WWTP.

Green clusters:
Collection, transport and treatment in central WWTP planned.

Red clusters:
Individual wastewater treatment plant (single family home) necessary.





Collection, transport and treatment to central WWTP planned.

Red clusters: Individual wastewater treatment plant (single family home) necessary.

Procedure

In the past:

- Houses connected to sewer system, sewer system connected to WWTP;
- Houses connected to sewer system, sewer system NOT connected to WWTP but connection planned;
- Houses connected to sewer system, sewer system NOT connected to WWTP and connection NOT planned;
- Houses not connected to sewer system.

Zoning plans:

- OK: orange shaded clusters;
- NOT OK: Economical analysis: costs for collective transport and treatment compared with costs for an individual WWTP:
 - <math>< 0.7 \cdot 6,869 \text{ eur}</math>: GREEN
 - > - In between: decision based on public inquiry, water authorities, municipalities.

Procedure

In the past:

- Houses connected to sewer system, sewer system connected to WWTP;
- Houses connected to sewer system, sewer system NOT connected to WWTP but connection planned;
- Houses connected to sewer system, sewer system NOT connected to WWTP and connection NOT planned;
- Houses not connected to sewer system.



Collection, transport and treatment to central WWTP planned.

Red clusters: Individual wastewater treatment plant (single family home) necessary.

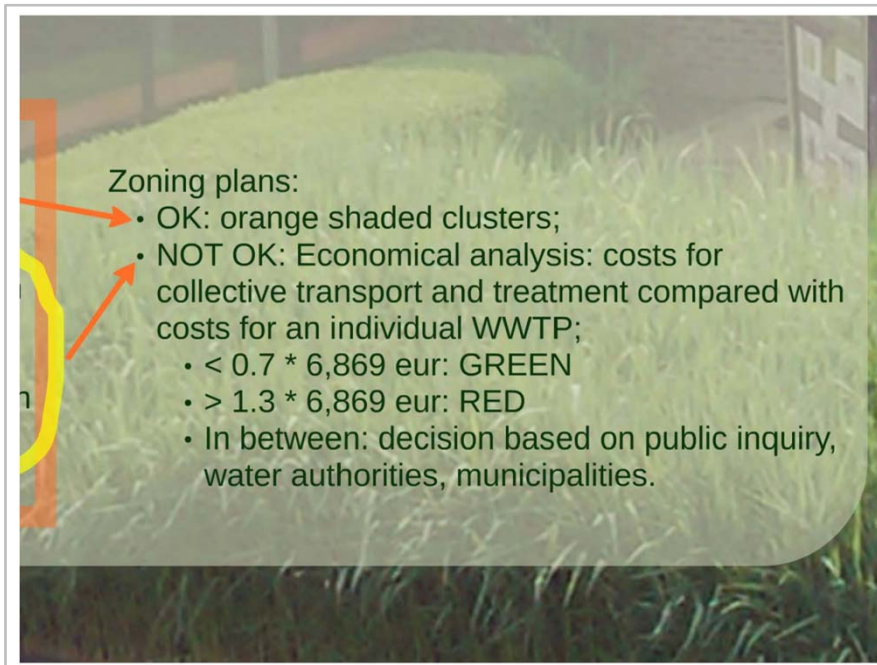
Procedure

In the past:

- Houses connected to sewer system, sewer system connected to WWTP;
- Houses connected to sewer system, sewer system NOT connected to WWTP but connection planned;
- Houses connected to sewer system, sewer system NOT connected to WWTP and connection NOT planned;
- Houses not connected to sewer system.

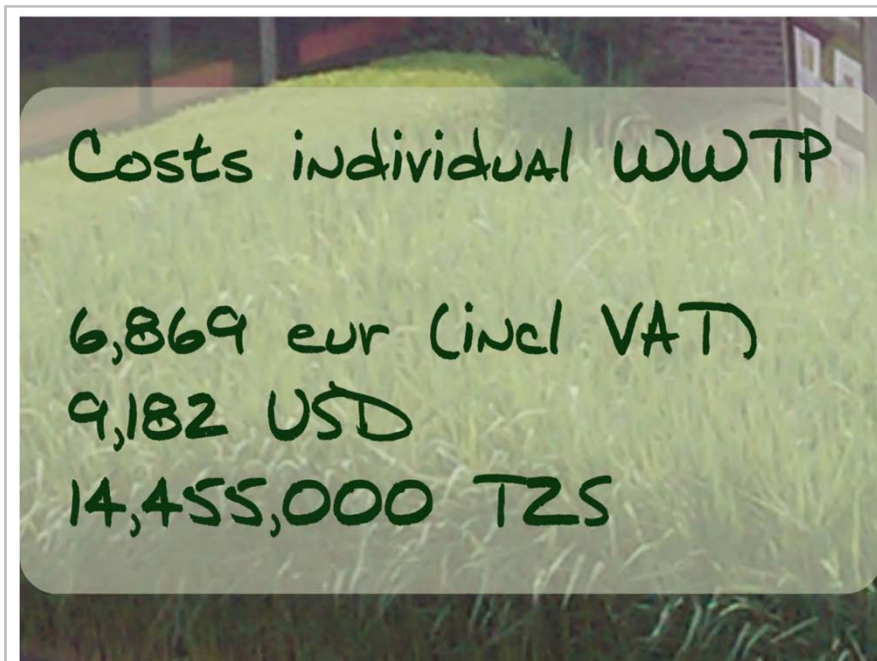
Zoning plans:

- OK: orange shaded clusters;
- NOT OK: Economical analysis: costs for collective transport and treatment compared with costs for an individual WWTP:
 - <math>< 0.7 \cdot 6,869 \text{ eur}</math>: GREEN
 - > - In between: decision based on public inquiry, water authorities, municipalities.



Zoning plans:

- OK: orange shaded clusters;
- NOT OK: Economical analysis: costs for collective transport and treatment compared with costs for an individual WWTP;
 - $< 0.7 * 6,869$ eur: GREEN
 - $> 1.3 * 6,869$ eur: RED
 - In between: decision based on public inquiry, water authorities, municipalities.



Costs individual WWTP

6,869 eur (incl VAT)
9,182 USD
14,455,000 TZS



Zoning plans:

- OK: orange shaded clusters;
- NOT OK: Economical analysis: costs for collective transport and treatment compared with costs for an individual WWTP;
 - $< 0.7 * 6,869$ eur: GREEN
 - $> 1.3 * 6,869$ eur: RED
 - In between: decision based on public inquiry, water authorities, municipalities.



VLIR-UOS

Mailing address: VLIR-UOS | PO box 103 Elsene Naamsepoort | 1050 Elsene | Belgium
[e] info@vliruos.be

Programme: **South Initiatives**

Dissemination of the sustainable wastewater technology of constructed wetlands in Tanzania

ZEIN2011Z097

2011-12-01 - 2013-11-30

Promoter:

Thomas More University College | Kleinhoefstraat 4 | 2440 Geel | Belgium
[e] rob.van.deun@thomasmore.be



Local Partner:

University of Dar es Salaam, College of Engineering and Technology (CoET)
Waste Stabilization Ponds and Constructed Wetland Research and Development Group (WSP-CW)
University of Dar es Salaam | P.O. Box 35131 | Dar es Salaam | Tanzania
[e] knjau30@yahoo.com

