

# Constructed wetlands for natural wastewater treatment

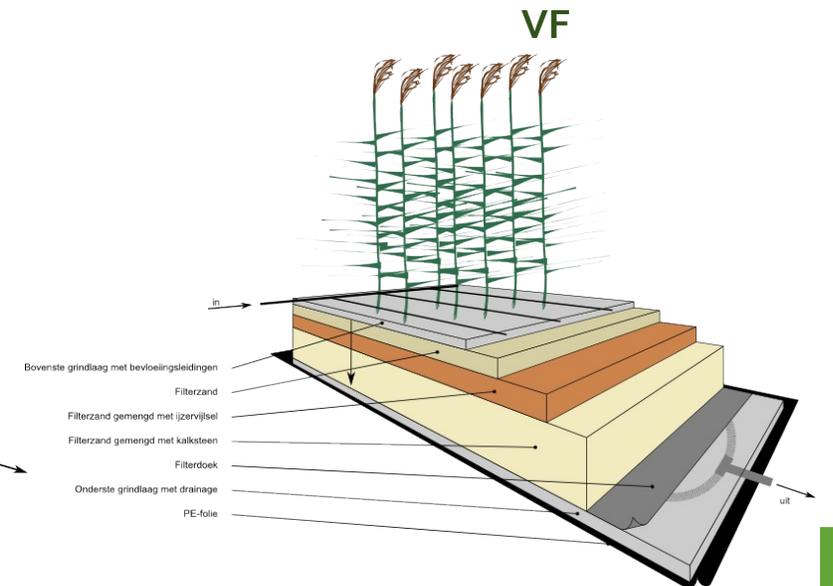
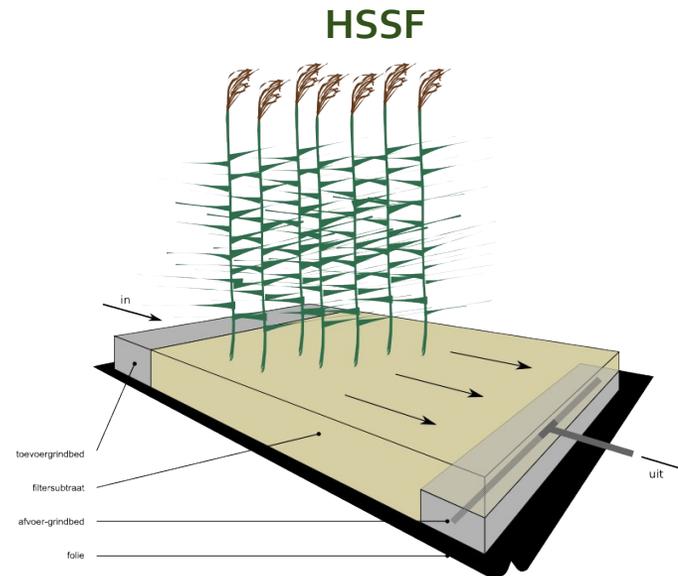
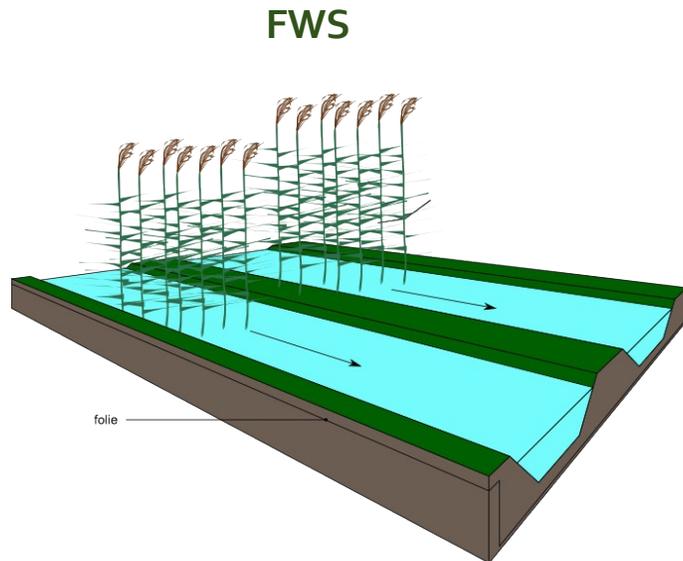
Dion van Oirschot - Rietland



## Topics:

- 🚩 Classical types of constructed wetlands (FWS, HSSF, VF)
- 🚩 Intensification by aeration (Phytocube<sup>®</sup>, Phytoair<sup>®</sup>)
- 🚩 Multifunctional surface (Phytoparking<sup>®</sup>)
- 🚩 Integration raw waste water treatment and aeration: Rhizosph'air<sup>®</sup>

# Classical types of constructed wetlands



# Aerated constructed wetlands



Phytoair®



Phytoparking®



Phytocube®



# Phytoair®



## Phytoair aerated constructed wetland (ACW)

- Patent Naturally Wallace Consulting (USA) – Forced Bed Aeration
- 0,75 m<sup>2</sup> in stead of 3 m<sup>2</sup> per PE = factor 4 smaller
- Intermittent aeration: better TN-removal
- Flexible: fixed water level (underload) and adaptable aeration (peak loads)



# Example strawberry farm, Zundert, the Netherlands



	Influent	Effluent	Unit	Rem. %
<b>Temp.</b>	14.5	15.00	°C	-
<b>pH</b>	7	8.30		-
<b>SS</b>	140	8.30	mg/l	94%
<b>COD</b>	410	17.00	mg/l	96%
<b>BOD</b>	150	<1.0	mg/l	100%
<b>TOD</b>	620.7	20.43	mg/l	97%
<b>N-Kj</b>	46.1	0.75	mg/l	98%
<b>NH<sub>4</sub><sup>+</sup>-N</b>	38.5	<0.0300	mg/l	-
<b>NO<sub>3</sub>-N</b>	0.0334	17.10	mg/l	-
<b>TN</b>	46	18.00	mg/l	61%
<b>TP</b>	6.0	1.10	mg/l	82%

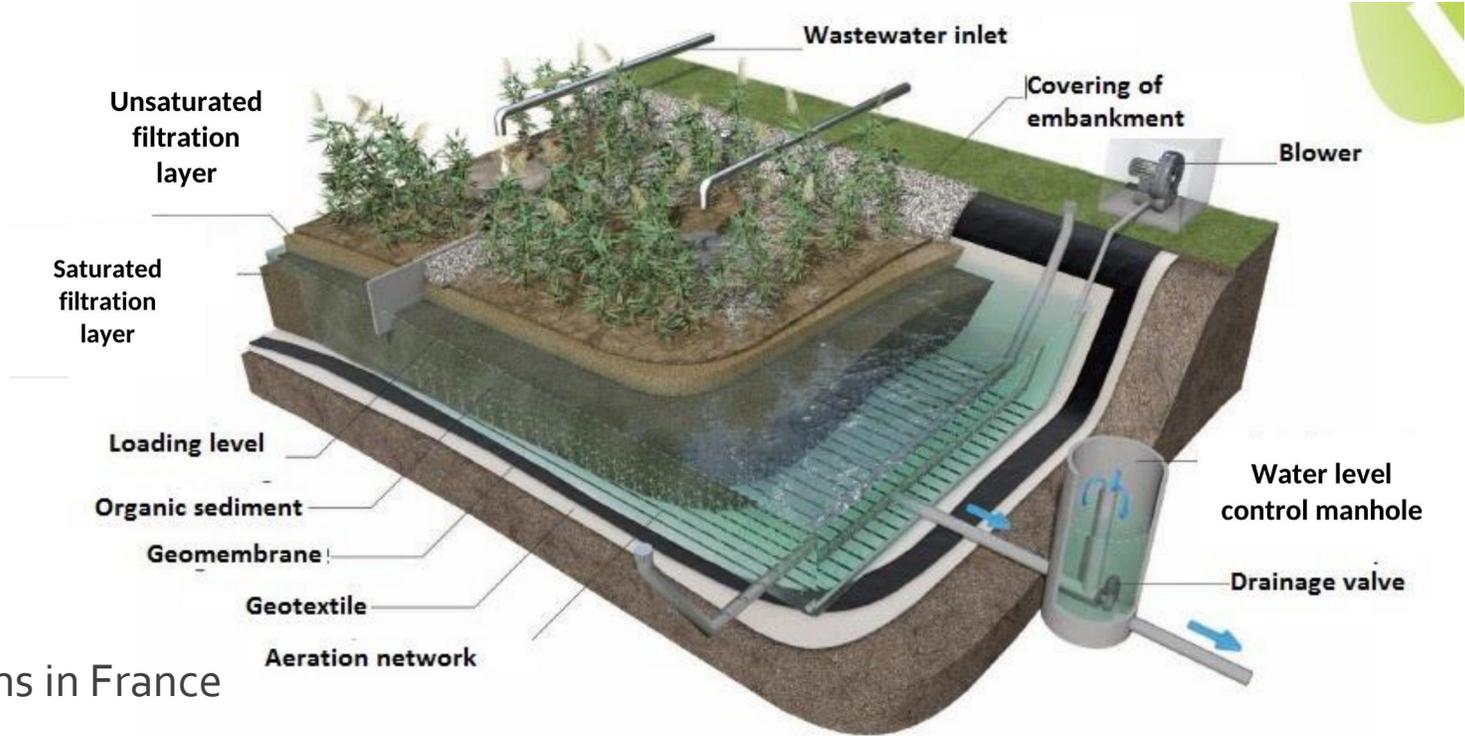
Aertbei – Zundert

# Examples Kunshan – Suzhou, China (in cooperation with DeHua Eco-tech)



# Raw waste water: Rhizosph'air®

Patent Rietland / NCW / Syntea  
Raw waste water direct to filter



- > 2.000 raw waste water treatment systems in France
- No methane-production in pretreatment
- No (big) septic tank needed for large systems
- Sludge decomposes on top of the filter.
- Rhizosph'air = Raw waster water treatment + aeration
- Surface area only 1 m<sup>2</sup> per PE

# Thank you for your attention!



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