
# SUSTAINABLE WATER USE & RESOURCE RECOVERY IN A CIRCULAR CITY

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# ABOUT NIJHUIS

## *Turn (waste)water into PROFIT*

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### REDUCE

***ENVIRONMENTAL FOOTPRINT***

***Water | Energy | Chemicals | Sludge | Waste***

### REUSE

***WATER | HEAT***

### RECOVER

***RESOURCES***

***Nutrients | Raw Materials | Biofuel | Biogas | Water | Plastic | Oil | Fat***

# nijhuis FACTS

**SINCE**
**1904**
>100 years
of knowledge

**HQ**
Doetinchem,
the Netherlands

**>3600** $m^2$
Production
Area

**>130**
Countries
Active

**>250**
Employees

**20**
Trainees
in 2017

**>50**
Partners
& Agents

**10**
Sales & Service
Centers

**>100**
Million
Order Entry

**>2600**
References

**>100**
New projects
a year

**>150**
Real-time
monitored plants

**>40%**
Less drinking water
use by HQ in 2017

**>85%**
Reuse of waste
by HQ in 2017

**>30**
Rental
Solutions

Flow handling capacity
**1** $m^3/d$ to
**>15.000** $m^3/hr$

# NIJHUIS CAPABILITIES

***Design - Build - Finance - Operate - Maintain***

**Research & Development**

**Design | Engineering**

**Manufacturing**

**Electrical control panels**

**Installation | Operation**

**“Everything under the same roof”**

# 9 BILLION PEOPLE IN 2050…….

# DRYNESS ALL OVER THE WORLD

Cape Town out of drinking water

India's looming water crisis

Part of the Cantareira reservoir, in São Paulo state, in January 2015. São Paulo's state government warned six years ago of a water crisis by 2015, but little was done to avoid it.

# DUTCH SUMMER 2018

## Dryness affected flora and fauna in Gelderland

*"**Sustainable Water Use** was priority number one during this dry period"*

# THE CIRCULAR AND SMART CITY

## SUSTAINABLE WATER USE AND RESOURCE RECOVERY

### Decentral WWTP

*Modular and relocatable*


### Circular city – Botanic WWTP

*Odorless natural WWTP in glass house*

### Circular city - Sanitation

*From Waste to Taste*


### Manure - Nutrient recovery

*'An Achterhoek without artificial fertilizer'*

# DECENTRAL WWTP

*Modular and relocatable*

*"From **centralised** to **decentralised** treatment to keep water in the local area"*

# CIRCULAR CITY - BOTANIC WWTP

*Odorless natural WWTP in glass house*

# CIRCULAR CITY - SANITATION

*From Waste to Taste for a festival or refugee camp*




# FUTURE FARMING

## Precision Agroculture

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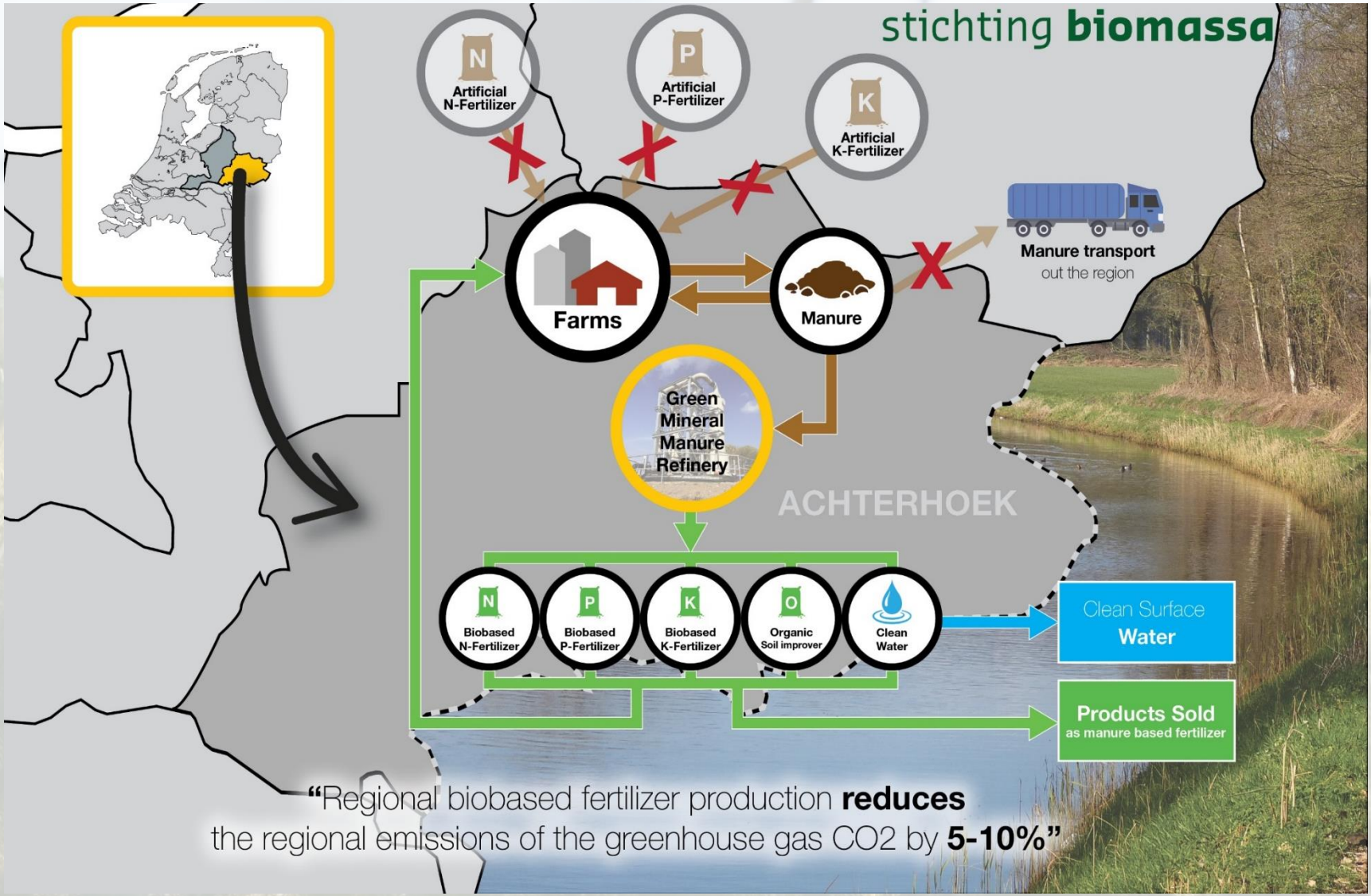
→ calls for individual N P K fertilizers


# MANURE - NUTRIENT RECOVERY

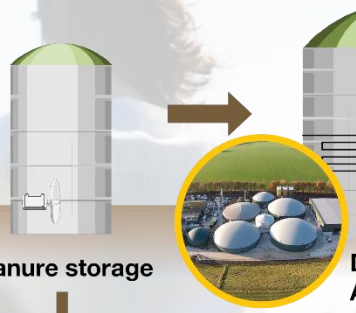
*'An Achterhoek without artificial fertilizer'*



# MANURE - NUTRIENT RECOVERY

*'An Achterhoek without artificial fertilizer'*

Farm



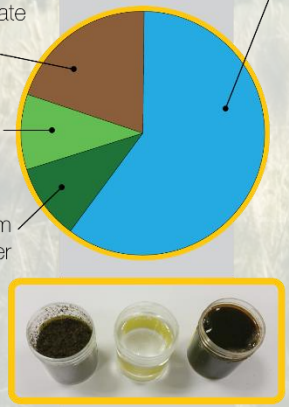
Manure storage

Digester
AECOMIX™-TAURUS

Biogas

Manure and/or digestate

Return flows to digester




Decanter

DAF

Ammonia Recovery

Membrane Filtration

60-80%
Clean **water**

Hygienisation process

Evaporation

10-20%
**Solid fraction**
with 3-6 % Phosphate

5-10%
**Nitrogen Artificial Fertilizer**
with 7-8 % Nitrogen

5-10%
**Potassium** fertilizer
with 7-10 % Potassium

# RECYCLING INSTEAD OF WASTING


1. Fresh water is used for households and commercial activities
2. Used wastewater is disposed as wastewater
3. Cleaned wastewater is disposed to environment with potential risks for pollution
4. In parallel agriculture is consuming fresh water for irrigation as well
5. Factories producing expensive fertilizers for crop production while impacting environment
6. Ready crops finding its route to community


1. Cities wastewater is purified to multiple level reuse qualities
2. Nutrient rich water is used in agriculture and avoiding chemical vertilizers production.
3. Cropfarming can be intensified by defined water availability and quality
4. Cropfarming can be located close to the consumers in the city, because of instant availability of water en nutrients.
5. Potable ready water is recycled back to potable intake and reducing environmental pressure on intake and discharge waters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