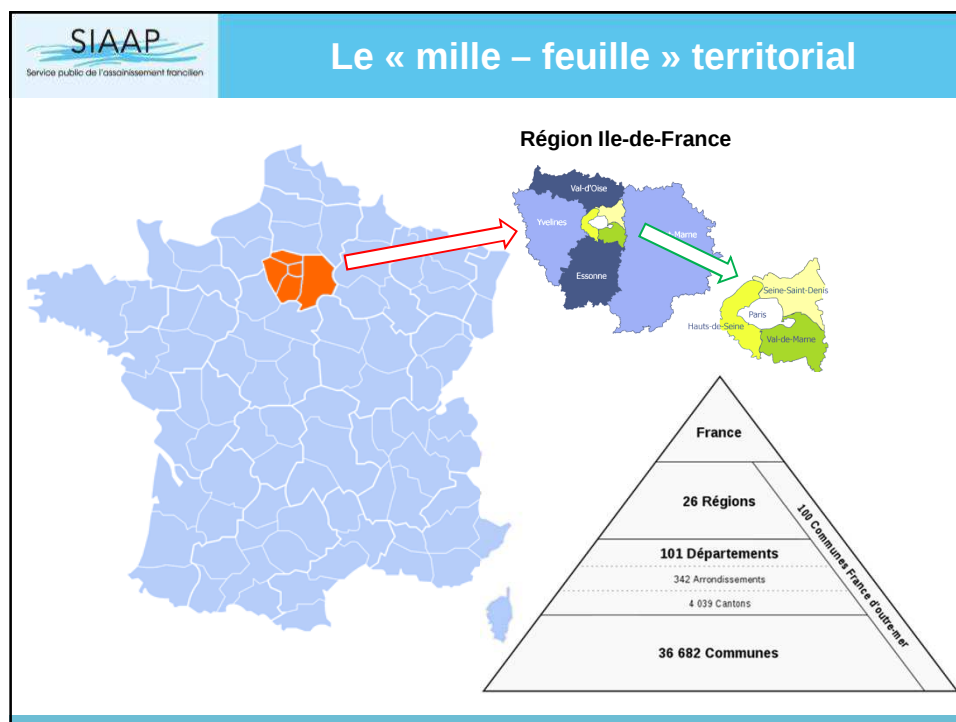
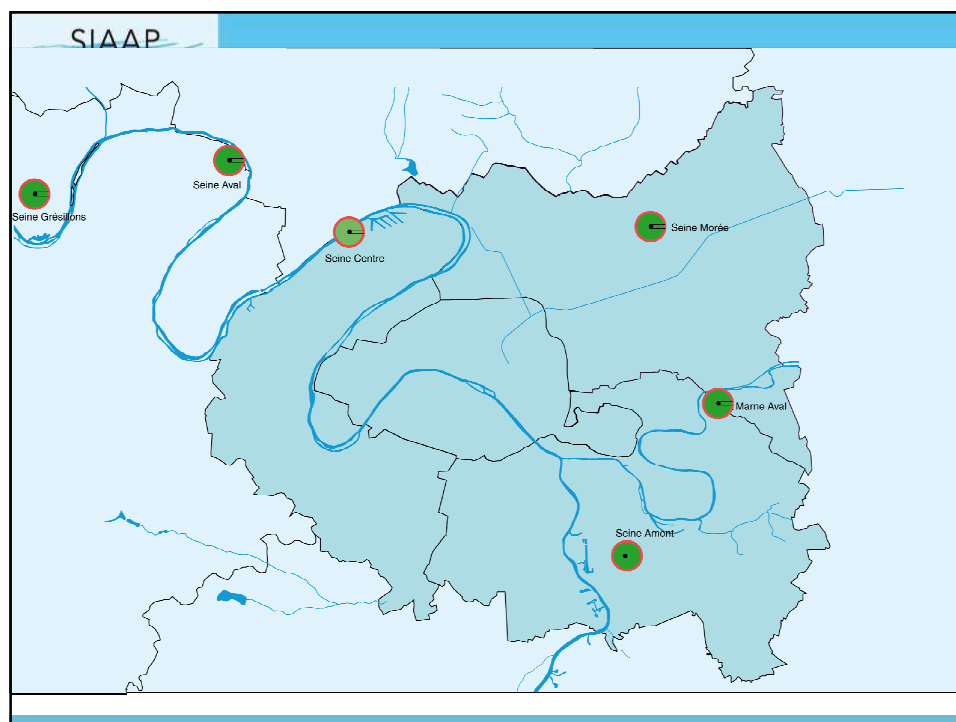
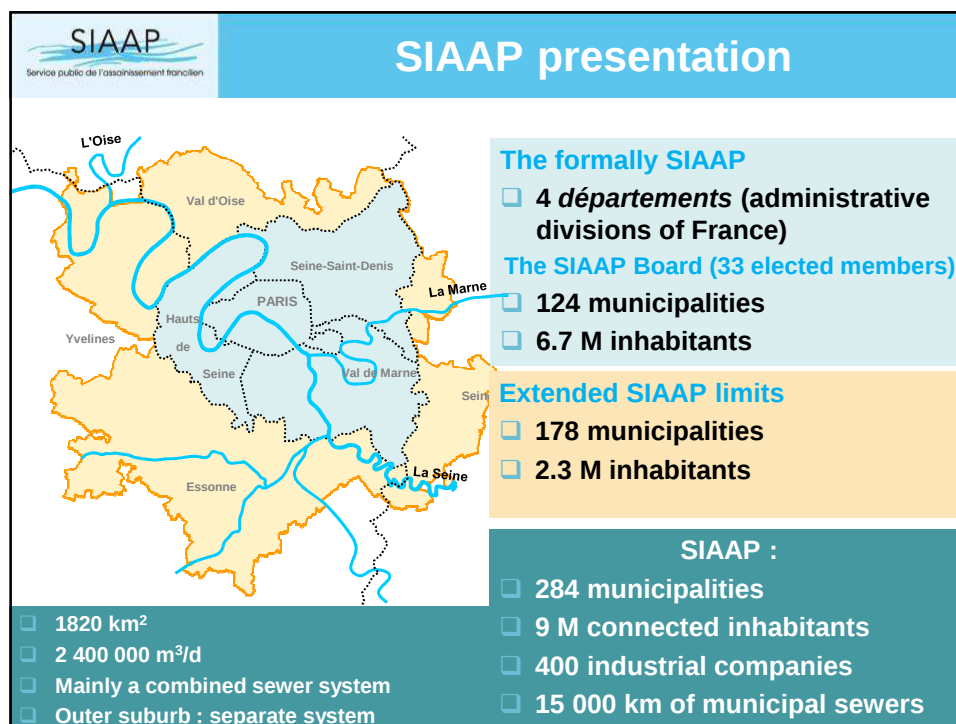


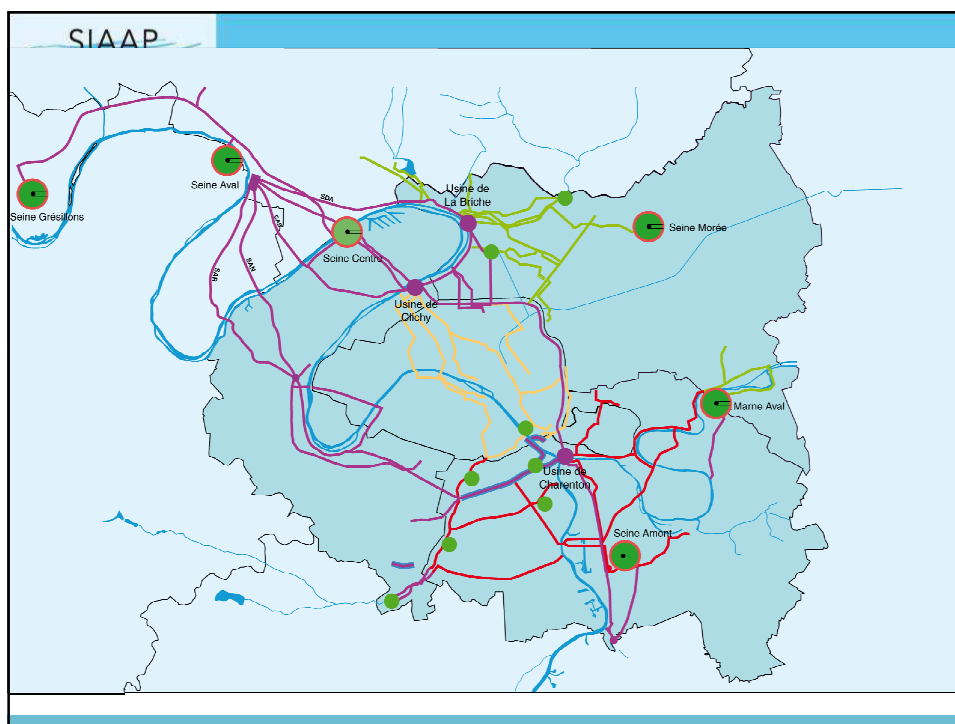
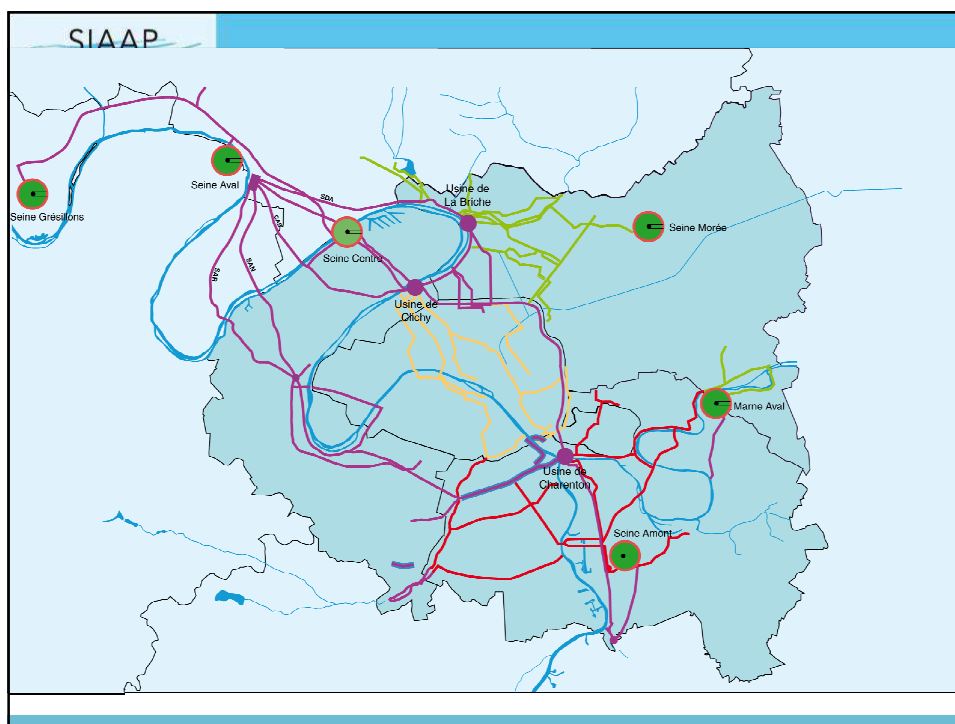
# Separate urine collection in Paris Region

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**SIAAP**  
Service public de l'assainissement francilien  
[www.siaap.fr](http://www.siaap.fr)









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## The questioning (1/2)

- ☐ **The Greater Paris**
  - 2030 : 9,6 M inhabitants (+ 700 000 inhabitants)
  - 2050 : ? > 10 000 000 inhabitants ?
- ☐ **Climate change effects**
  - 2030: ?
  - 2050: Seine river will decrease by 15 to 40 %

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## The questioning (2/2)

Low flow  
Deacrising

Rising pollutants  
production

Higher  
Yields & Reliability

Good Status

Seine River quality

5,3 t

4 t

$\text{NH}_4^+$   
 $\text{NO}_2^-$   
 $\text{PO}_4^{3-}$

What are the alternatives for sanitation ?

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## Findings 1/4

☐ SIAAP's treatment capacities:

| Année | Q (m³/j)     | DBO <sub>5</sub> | NTK         |
|-------|--------------|------------------|-------------|
| 2030  | <b>83.9%</b> | <b>95%</b>       | <b>106%</b> |

**Rendement NH<sub>4</sub>**

FeCl<sub>3</sub> : 51 000 t/an  
MeOH : 31 800 t/an

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## Findings 2/4

❑ **Biological treatment is based on ratios:**

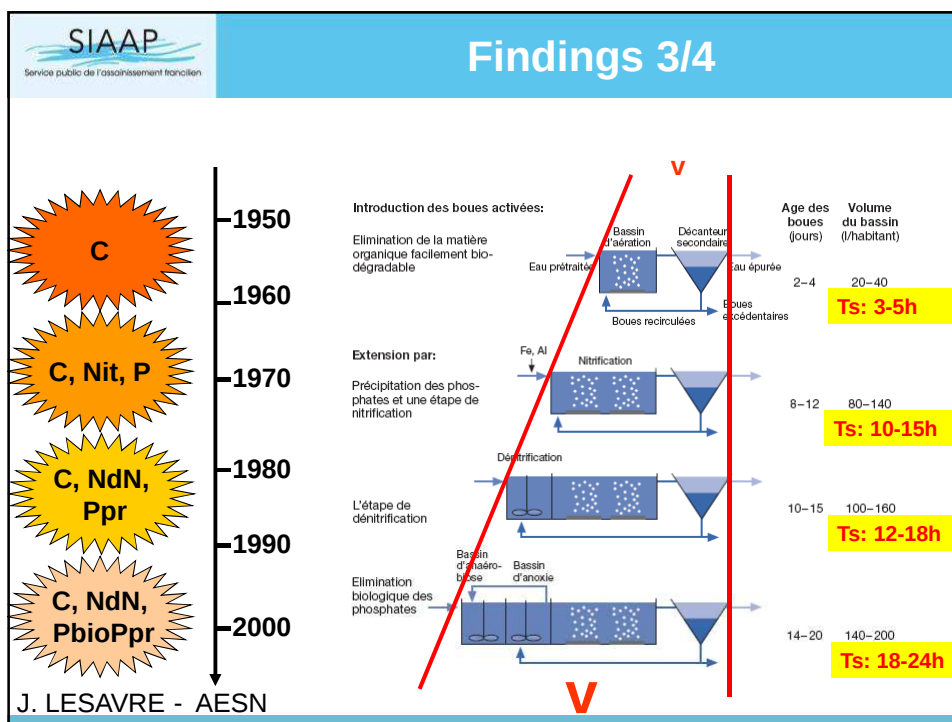
| BOD5 | N | P |
|------|---|---|
| 100  | 5 | 1 |

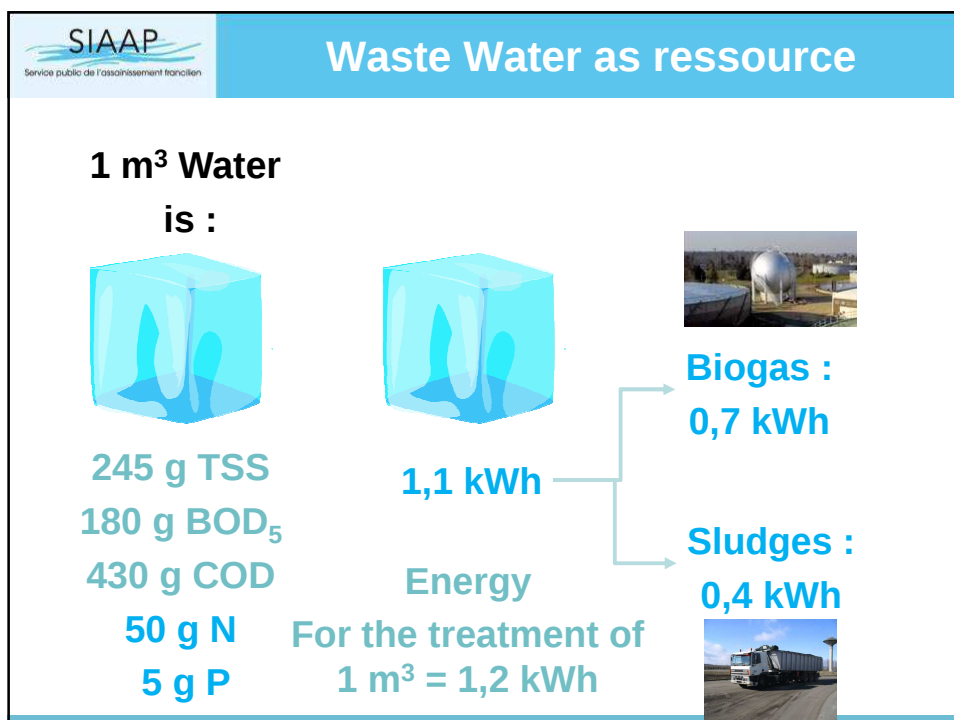
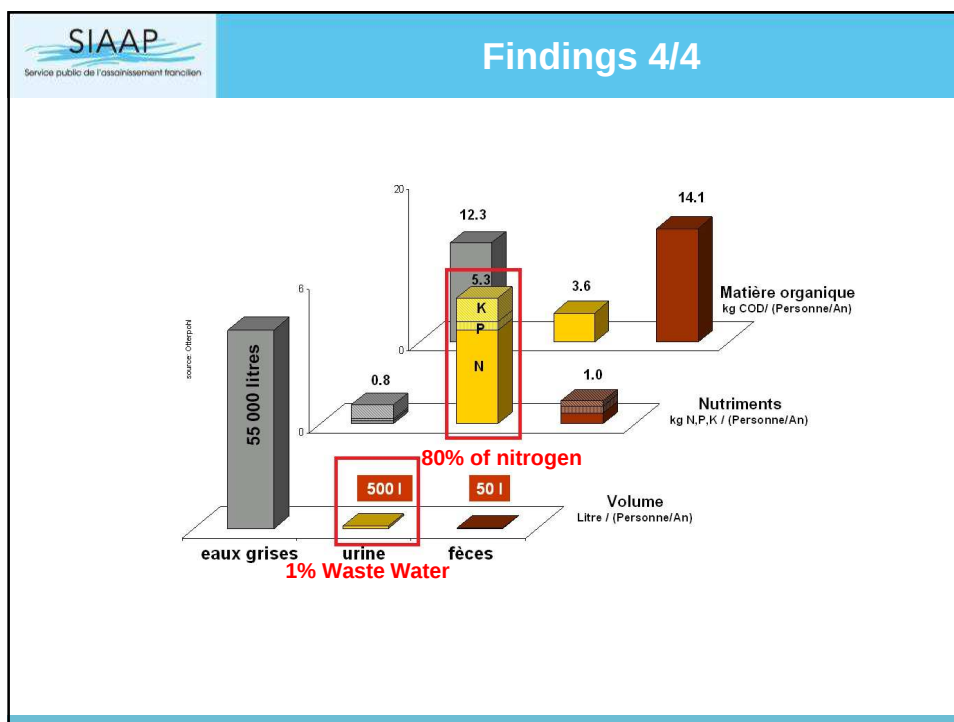
❑ **Waste ratios:**

| BOD5 | N  | P |
|------|----|---|
| 100  | 19 | 2 |

❑ **Nitrogen is a problem:**

- Difficult to treat
- Disqualifying parameter for river quality









## Separate urine collection



## References

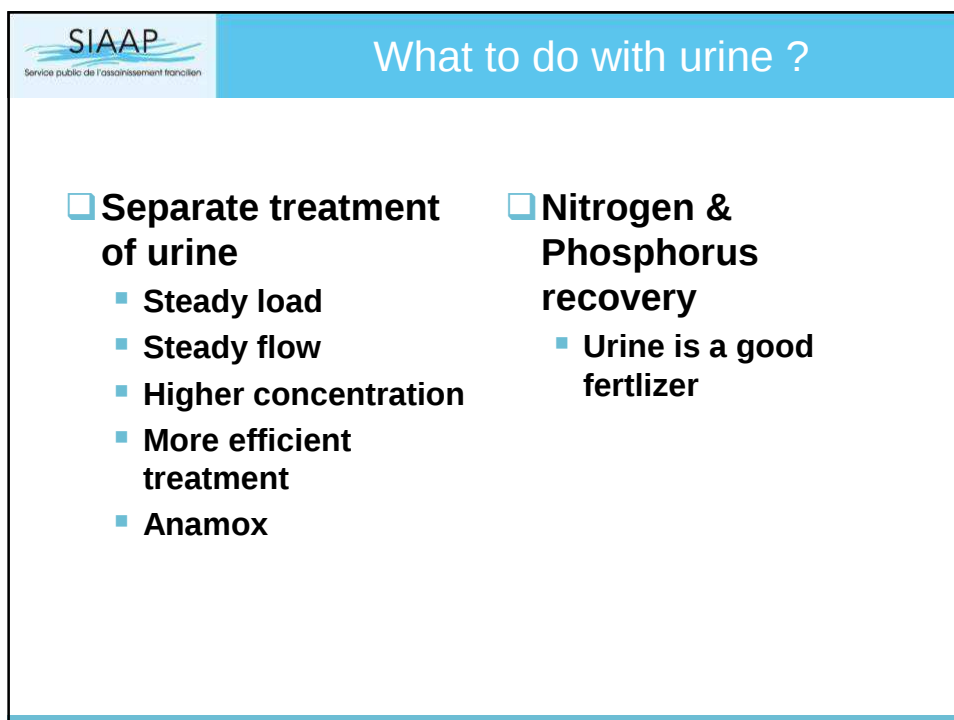
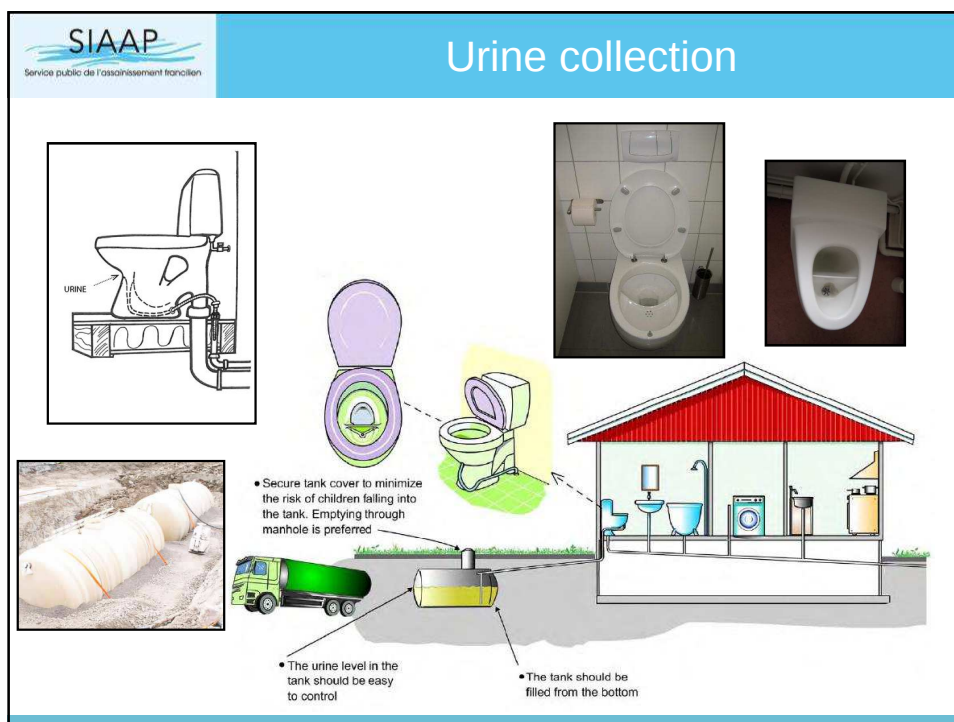
**Sweden: 200 references**

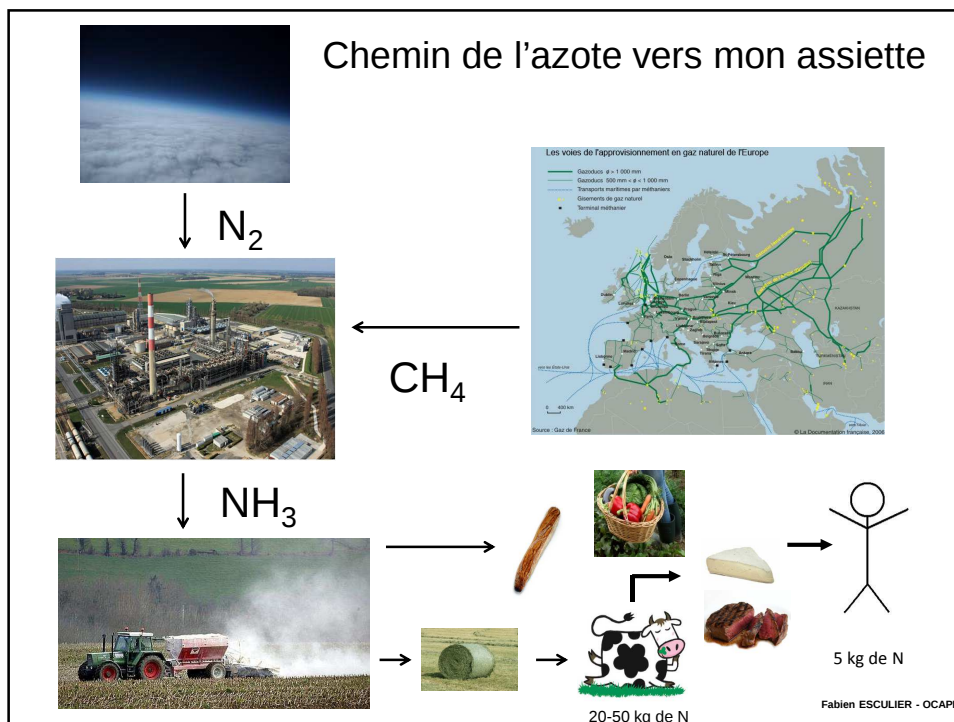
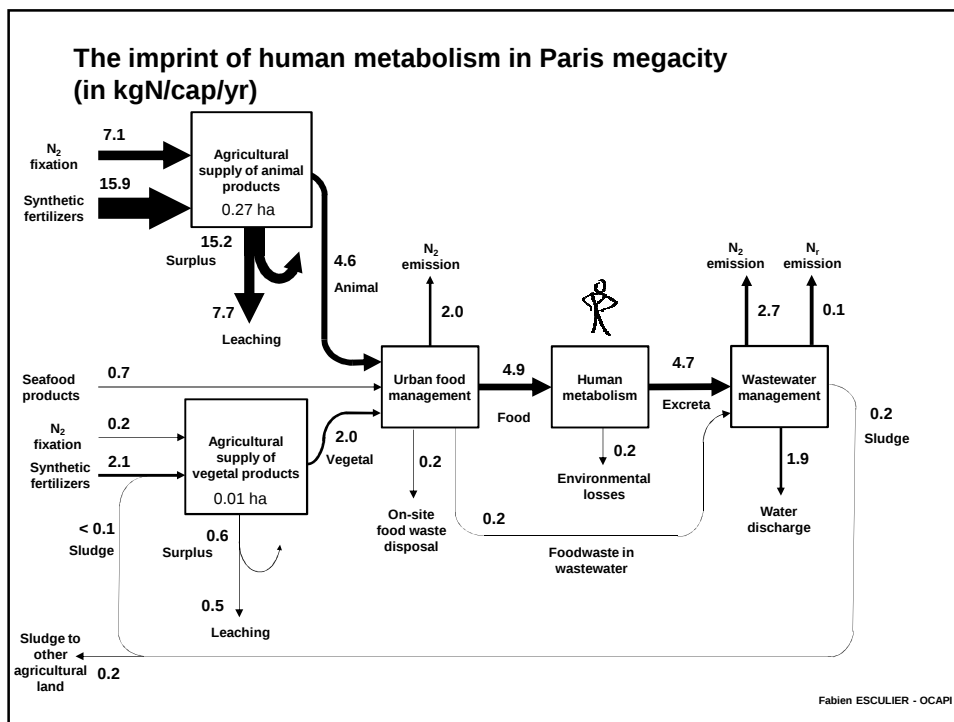


**Switzerland :**  
EAWAG research program

**Germany : Hamburg**

**Netherland**





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**Frem med gyllesprederen. Vi ved, du har den.**  
Whip out your fertilizer spreader. We know you've got one

**BEERCYCLING**

**PIS NIER**

**FOSFAAT UIT URINE**

De Heineken Music Hall verzamelt pure urine in. Dit is het punt waar WaterNet de urine ophaalt. In de fosfaatinstallatie in Amsterdam West zet WaterNet - in opdracht van Waterschap Amstel, Gooi en Vecht - de fosfaat om in struweit, een zeer vruchtbare meststof. Zo wordt de urine van concertgangers duurzaam hergebruikt. Lees meer op [www.watermet.nl](http://www.watermet.nl)

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## The Outputs

- ☐ **Storage (6 month pH 9): sanitization**
- ☐ **Volume reduction (EAWAG, Suède)**
- ☐ **Nutrients recovery for agriculture**
  - **Direct spreading**
  - **Phosphorus recovery by struvite precipitation:  $\text{MgNH}_4\text{PO}_4$**
  - **Nitrogen recovery: stripping of urine or ion exchange**

## What objectives in the frame of the Greater Paris

- ❑ **Modifying the sewage composition to fit with SIAAP's treatment capacity**

## 1 million inhabitants out of the system

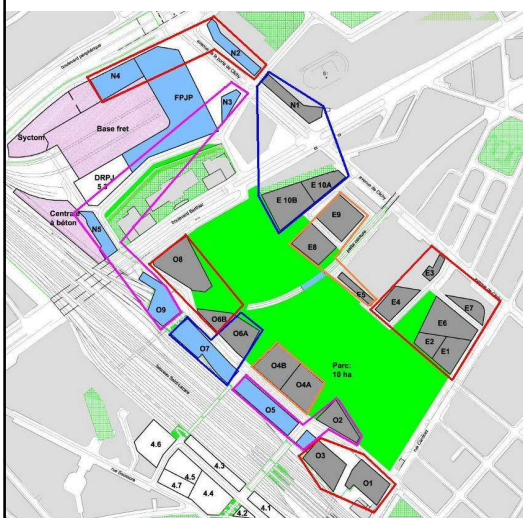
- ☐ **Grey water and faeces: to sewers**

- ❏ **Focus is put on:**

- New collective housing
- Tertiary sector

## 420 000 new housings

## ZAC des Batignolles, a new development area



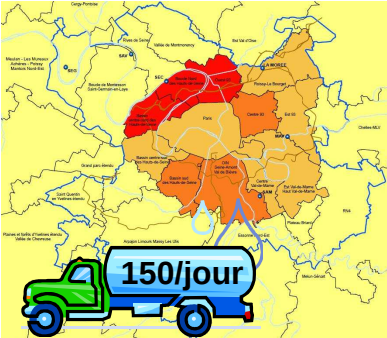
- ☐ 5200 inhabitants
- ☐ 3100 employees
- ☐ Objective :  
working on a real case
- ☐ Number of tanks,
- ☐ Location
- ☐ Number of trucks  
for emptying

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## Environnemental assessment

☐ **Hypothesis:**

- Transport truck (capacity de 10 m3)
- 1 million inhabitants
- 1,5L/day/inhab.
- Struvite production
- Anamox treatment



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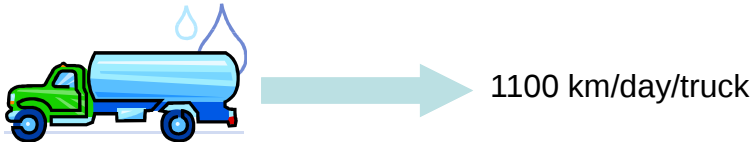
## Evaluation environnementale

☐ **Carbone balance for classical centralized treatment**

- 59 575 t eq CO<sub>2</sub>/year

☐ **Carbone balance for urine treatment :**

- 1 491 t eq CO<sub>2</sub>/year



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## Conclusions

- ☐ **Opportunity or utopia? Too early to answer...**
  - A real technical interest
  - Real questions on social acceptance
- ☐ **Undergoing projects :**
  - Pilot facility in SIAAP main WWTP Seine-Aval
  - Thesis undergoing
- ☐ **A well designed toilet is a key point for the development on urine separate collection**

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## Merci de votre attention

