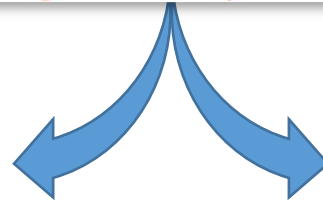


# Smart Aquaponics



Vlaams Aquacultuur Symposium 2021:  
blik op verduurzaming

Pannecoucque Nick  
Provinciaal Technisch Instituut



Campus Techniek & Design



Campus Wetenschap & Groen

# Aquaponics: Project examples

## Education:



PTI, 2010  
Secondary school



Uliège, 2012  
University



PCG, 2015  
Research center



Aquaponiris, 2015  
NGO



Aquaponie BXL, 2016  
NGO

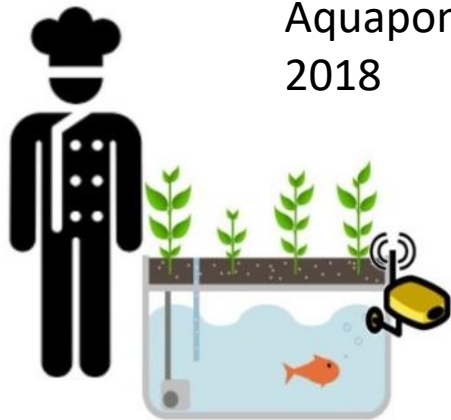


Don Bosco, 2017  
Secondary school



# Aquaponics: Project examples

## Small Professional:



Jardin de l'usine  
Aquaponie BXL  
2018



Atelier de Bossimé  
2019

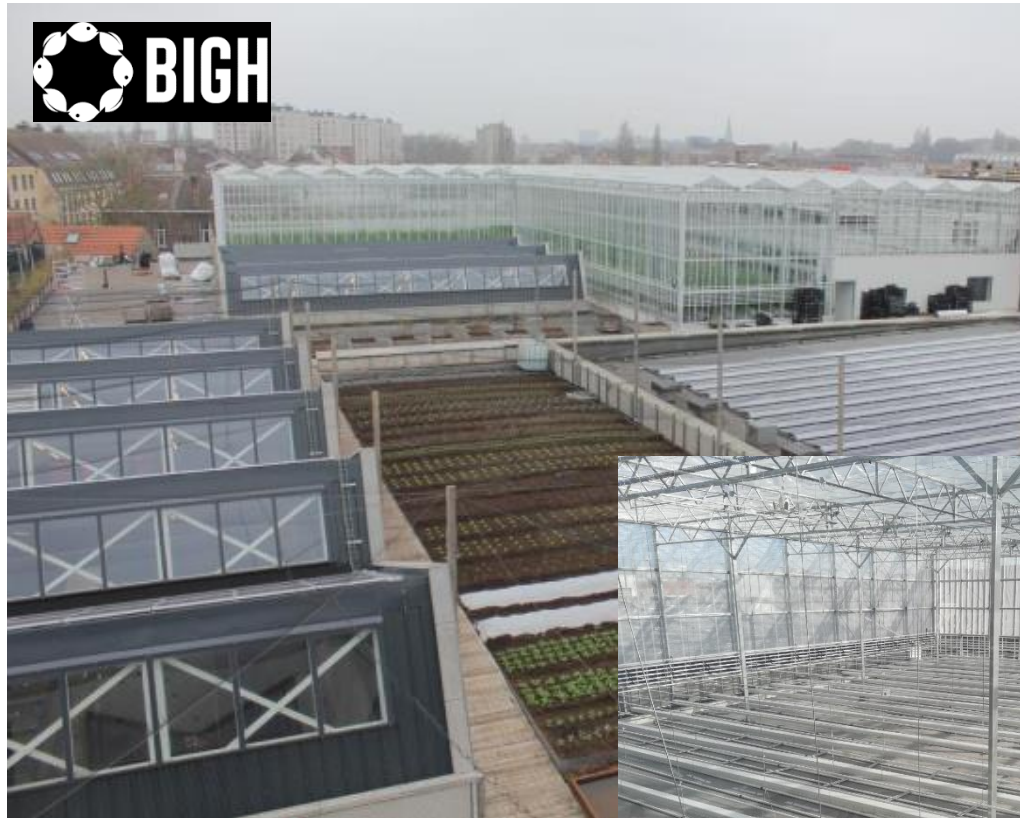


Ferme des 3 moutons  
2021



# Aquaponics: Project examples

Professional:





# Aquaponics: Project examples

**Professional:**



TomatoMasters 

AQUA4C 



# Aquaponics emergence

Aquaponic systems are diverse

Aquaponics is a new technology

-> No advanced teaching programs

-> No specific tools

# How to foster aquaponics development?

Smart Aquaponics, an application with:

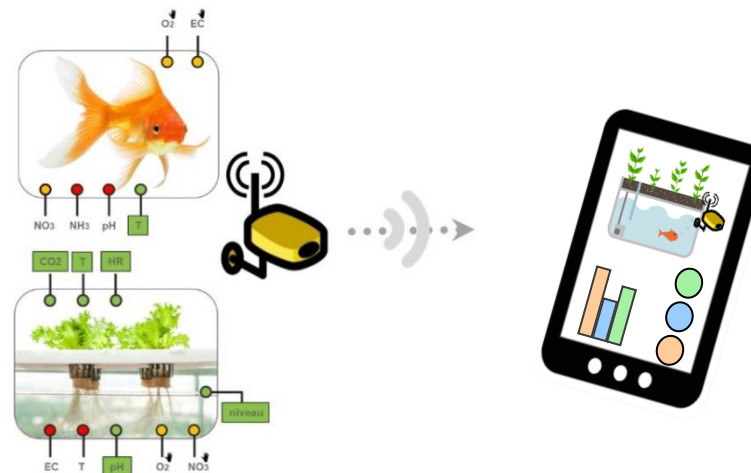
- Monitoring tool
- Simulator
- Training program





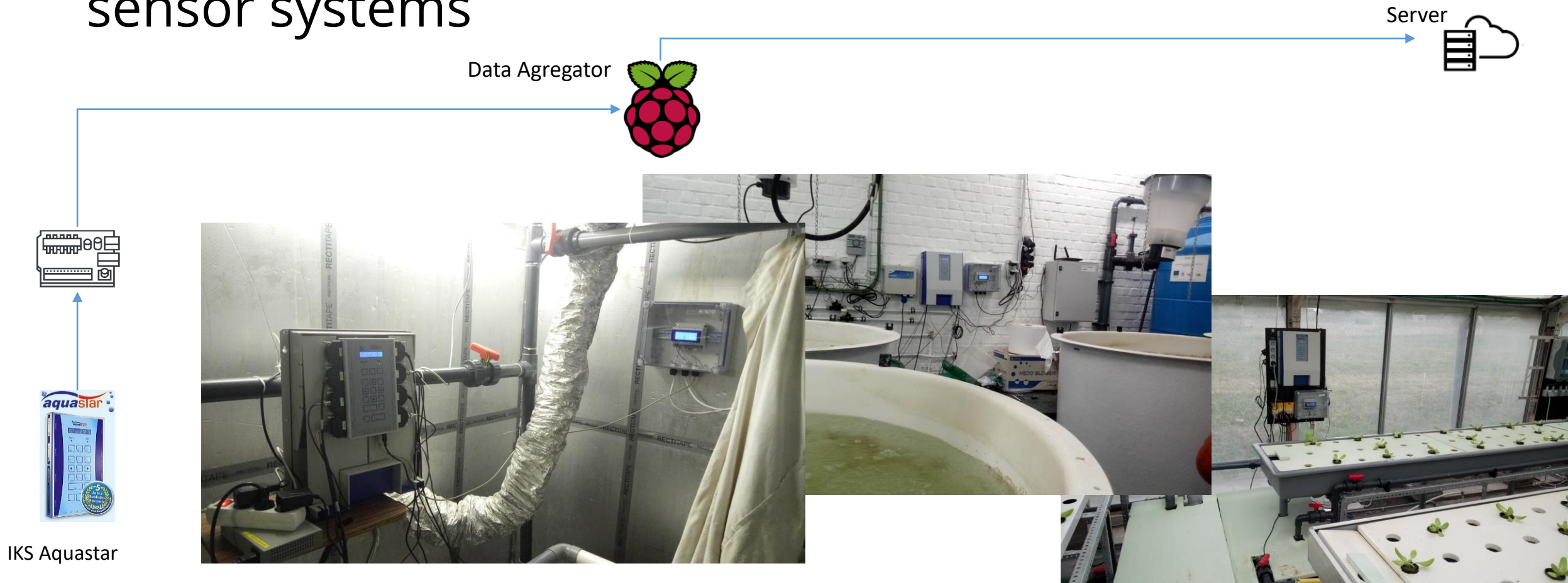
# Monitoring tool

- Stay **connected** with your aquaponics system
- Fish & plant informations in one application
- **Anticipate** accidents



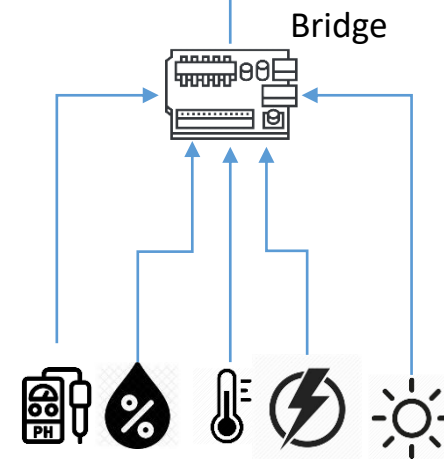
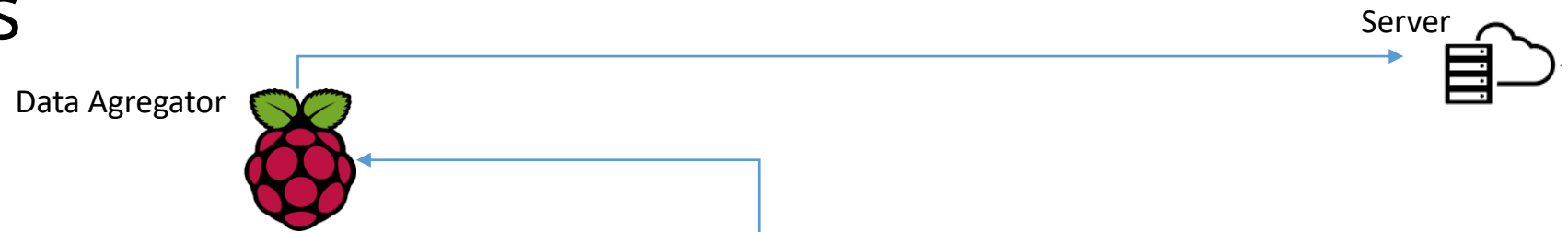
# Smart Aquaponics: Sensing

The **data acquisition chain** collects data from different sensor systems



# Smart Aquaponics: Sensing

The **data acquisition chain** collects data from different sensor systems

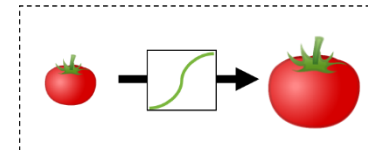
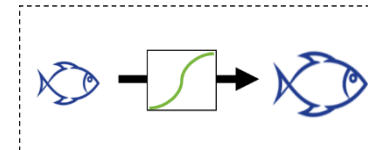
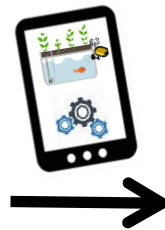
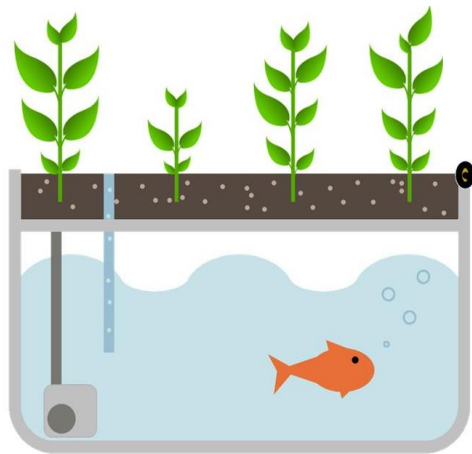


Sensors



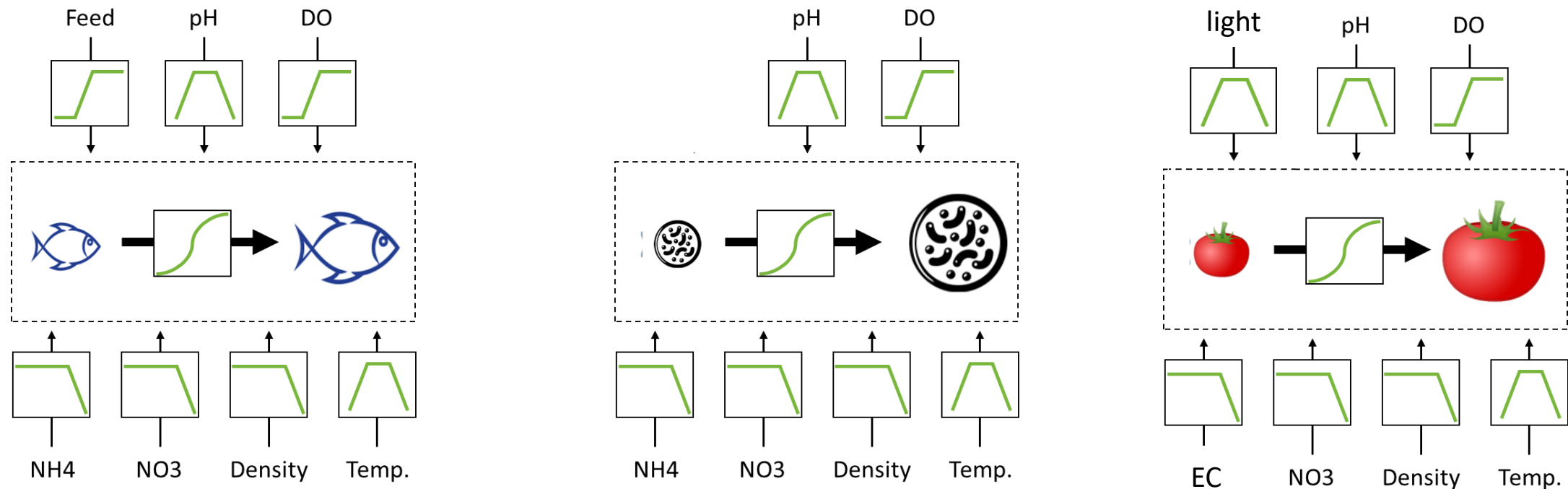
# Simulator

- **Design** aquaponic system in the application
- **Simulate** different scenarios



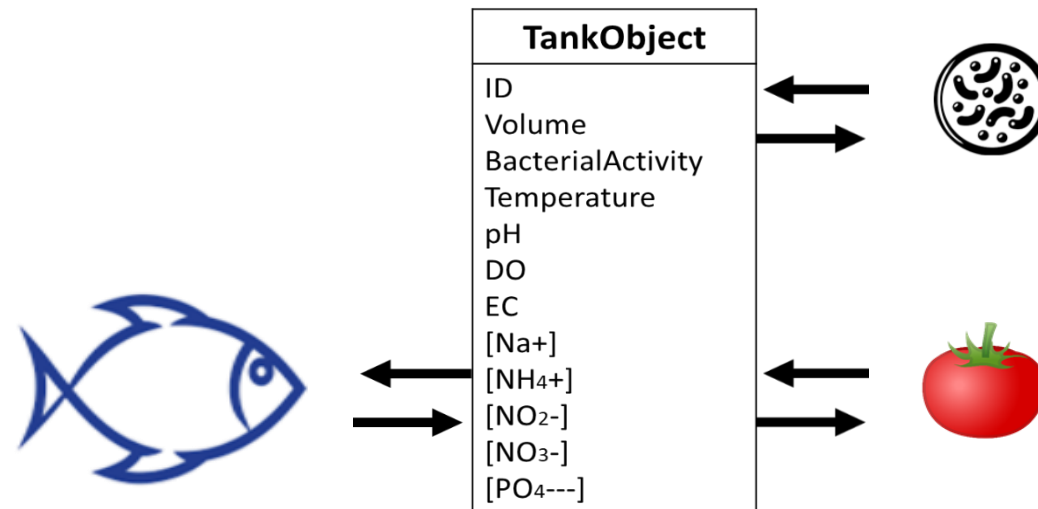
# Smart Aquaponics Model

Our model simulates each objects of a system



# Smart Aquaponics Model

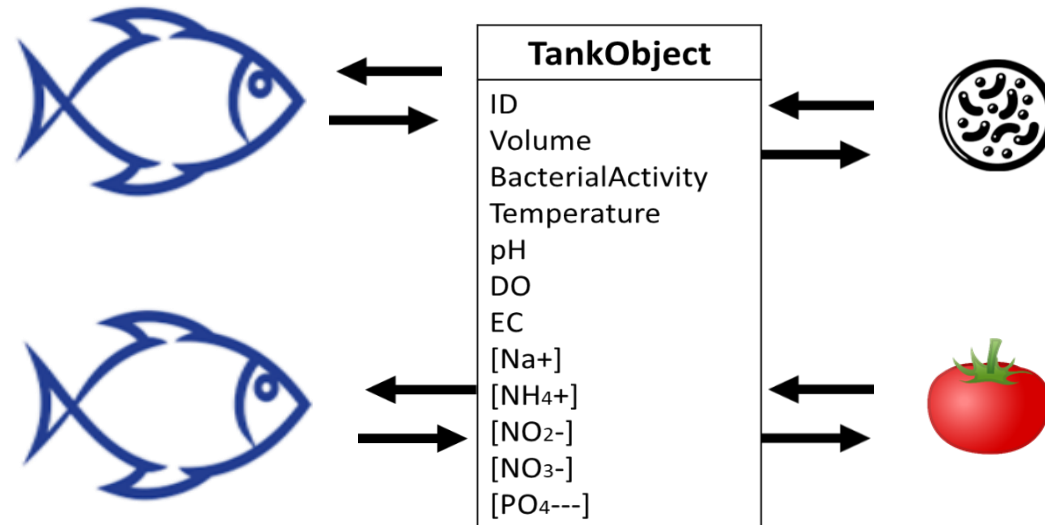
Interactions between objects enable simulation of **complex systems**





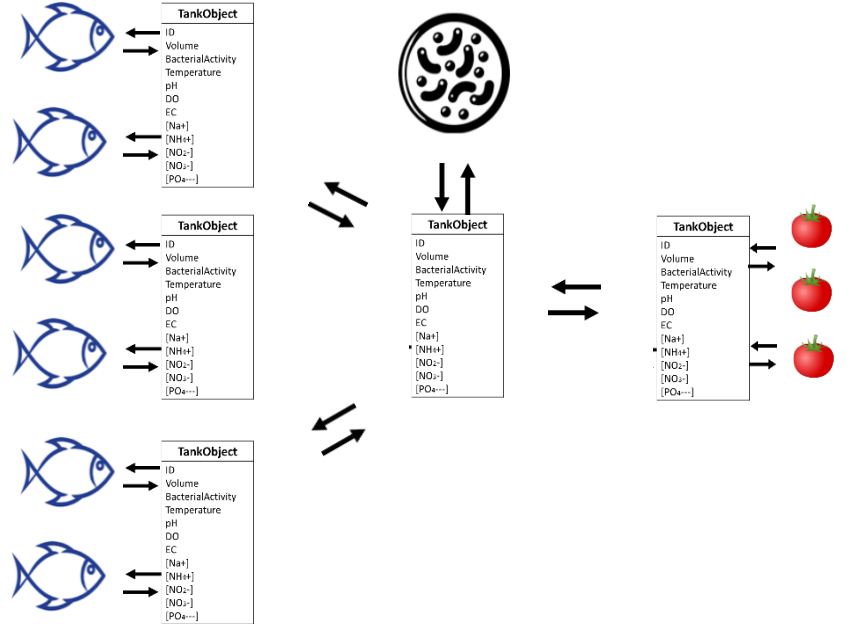
# Smart Aquaponics Model

Interactions between objects enable simulation of **complex systems**



# Smart Aquaponics Model

Interactions between objects enable simulation of **complex systems**



# Smart Aquaponics Model

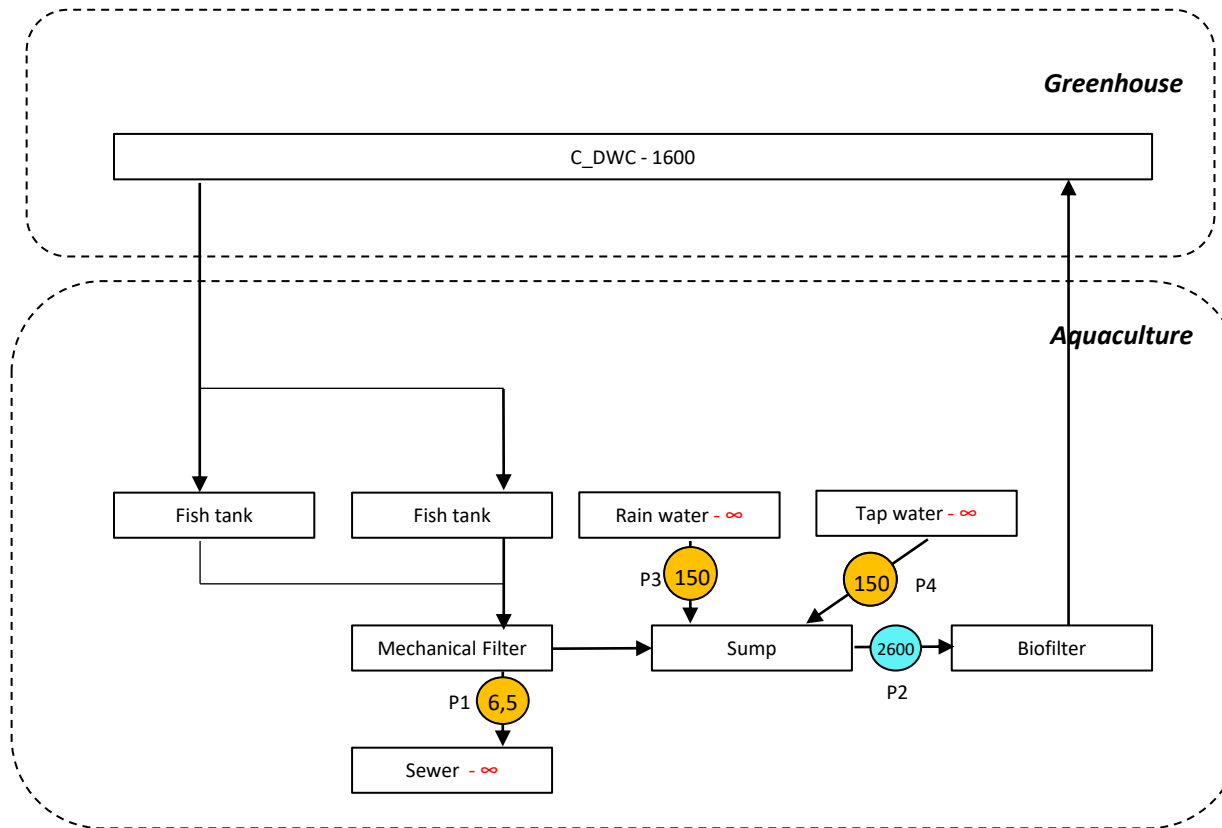
Practical example: Paff Boxx





# Smart Aquaponics Model

## Practical example: Paff Box

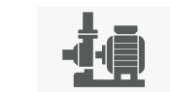
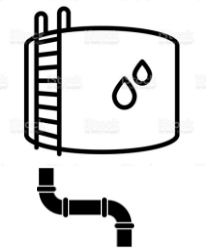
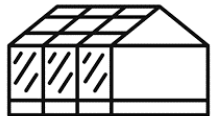




# Smart Aquaponics Model

## Practical example: Paff Boxx

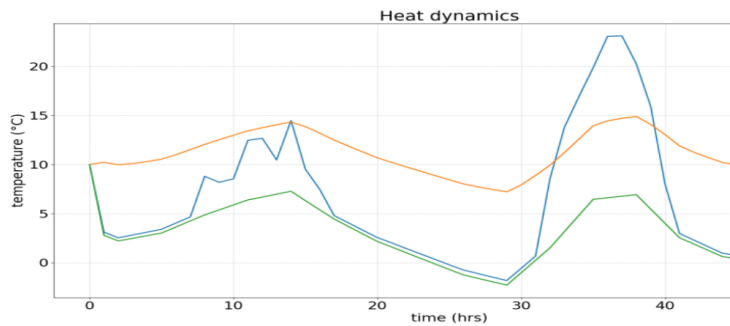
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| PaffBox_06.csv - Excel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <div> <div> <div>Fichier</div> <div>Accueil</div> <div>Insertion</div> <div>Mise en page</div> <div>Formules</div> <div>Données</div> <div>Révision</div> <div>Affichage</div> <div>Antidote</div> <div>Dites-nous ce que vous voulez faire.</div> </div> <div> <div> <div> <div>Couper</div> <div>Coller</div> <div>Reproduire la mise en forme</div> </div> <div> <div>Police</div> <div>Alignement</div> <div>Nombre</div> <div>Style</div> </div> </div> <div> <div> <div>Calibri</div> <div>11</div> <div>A A</div> <div> <div>Standard</div> <div>Normal</div> <div>Insatisfaisant</div> <div>Neutre</div> <div>Satisfaisant</div> <div>Avertissement</div> <div>Calcul</div> </div> </div> <div> <div>Renvoyer à la ligne automatiquement</div> <div>Mise en forme conditionnelle</div> <div>Mettre sous forme de tableau</div> </div> <div> <div>Somme automatique</div> <div>Remplissage</div> <div>Effacer</div> </div> <div> <div>Trier et Rechercher et filtrer - sélectionner</div> </div> </div> </div> </div> |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Presse-papiers  Police  Alignement  Nombre  Style  Cellules  Édition | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |


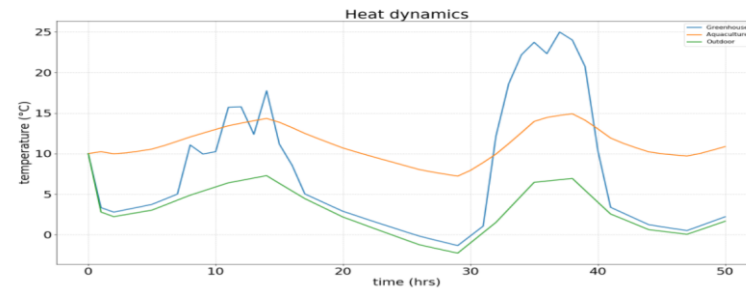
# Smart Aquaponics Model

Practical example: Paff Box: T°

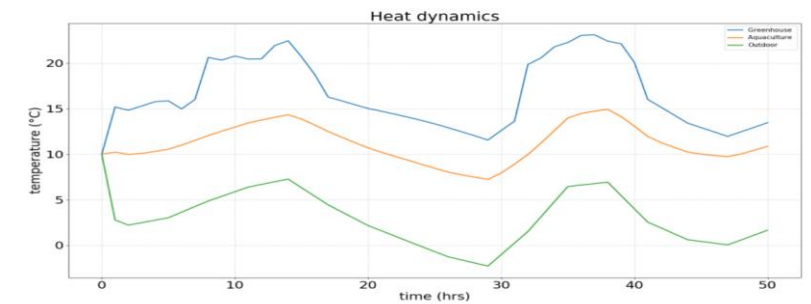
Greenhouse  
Fish Room  
Outside



Normal



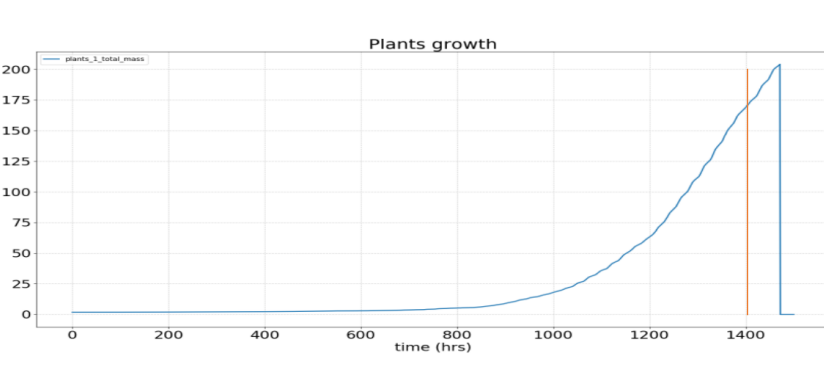
Insulation



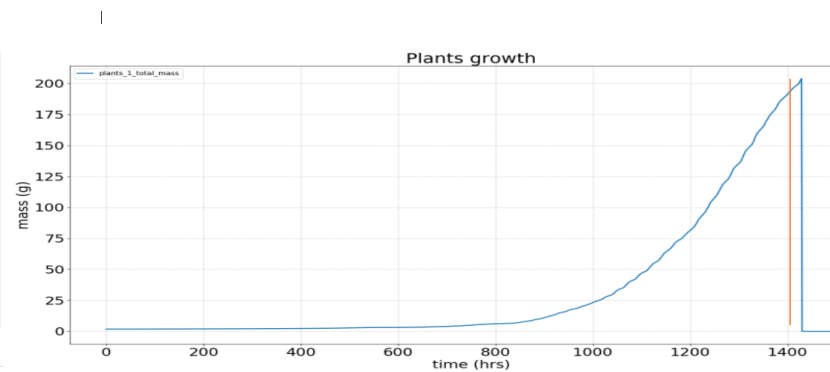
Heating system

# Smart Aquaponics Model

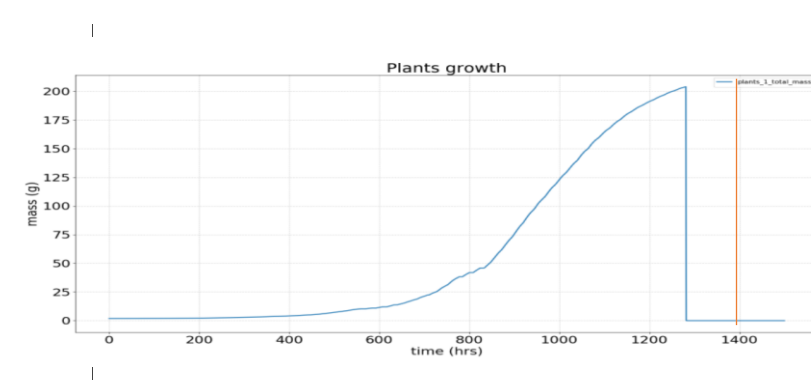
## Practical example: Paff Box: Lettuce



Normal



Insulation



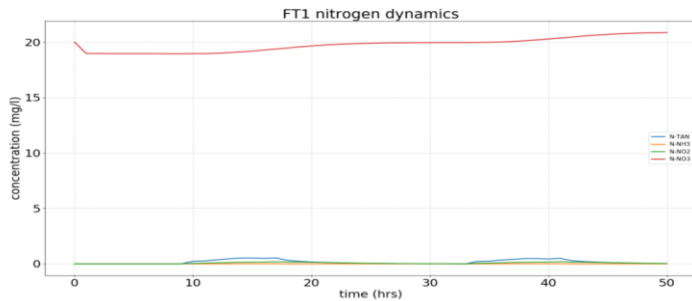
Heating system

# Smart Aquaponics Model

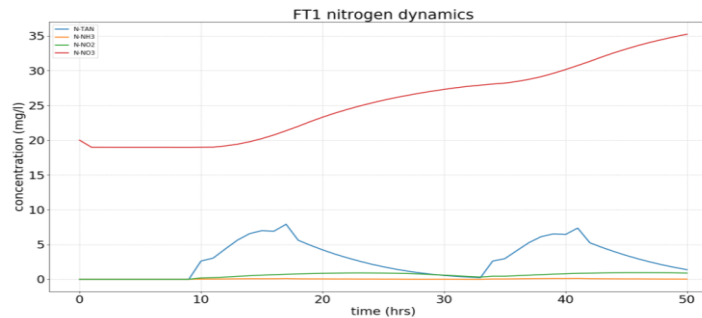
## Practical example: Paff Box: N

Nitrate

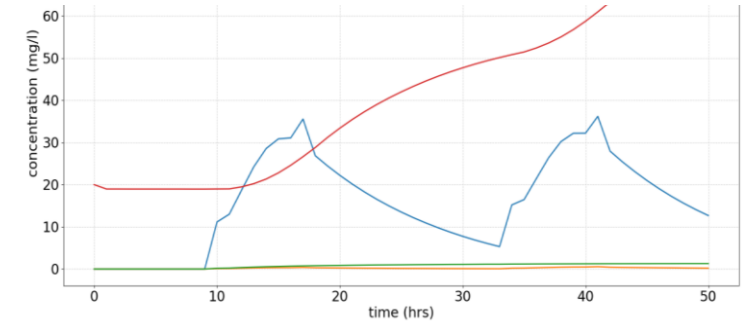
TAN (Amonia+Amonium)



20 fish/tank



200 fish/tank



800 fish/tank



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