



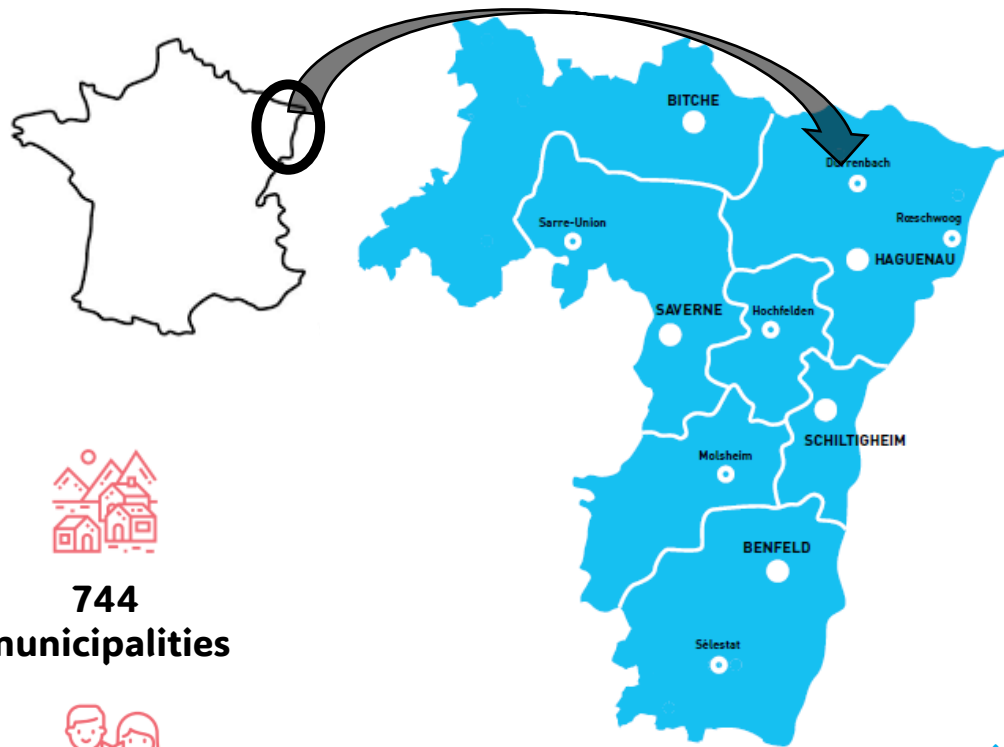
EUROPEAN ASSOCIATION  
OF PUBLIC WATER OPERATORS



# Managing water with Nature-based Solutions: SDEA's management of rural and urban rainwater



# SDEA: MANAGING WATER IN EASTERN FRANCE



Water

420 municipalities



Wastewater

533 municipalities



River/Basin management

691 municipalities



744 municipalities

744 municipalities



1 080 000 inhabitants



240

Water Tanks



120

WWTPs



11500 km Network  
WW – mainly combined



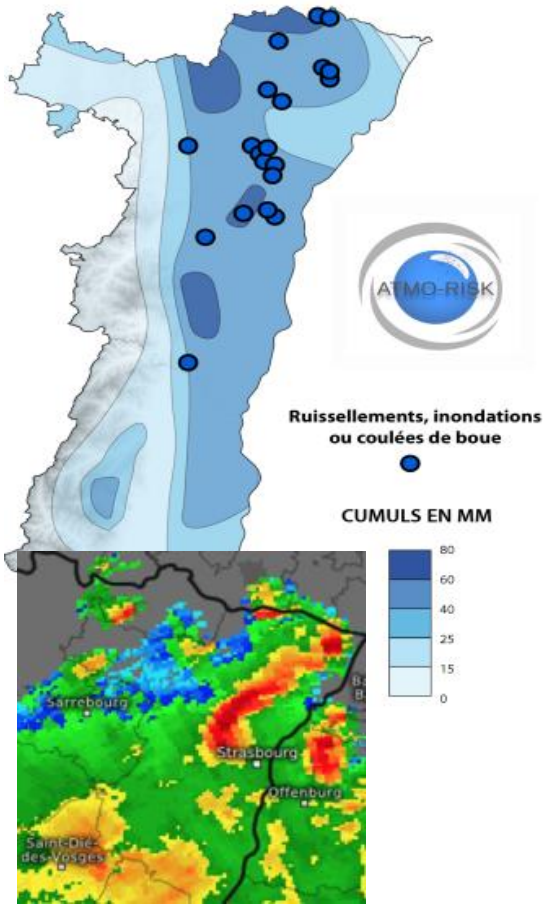
6500 km  
Rivers



# Climate change effects – more frequent intensive rain events



Visible effects: floods, erosion, wastewater grid flooding, overflows

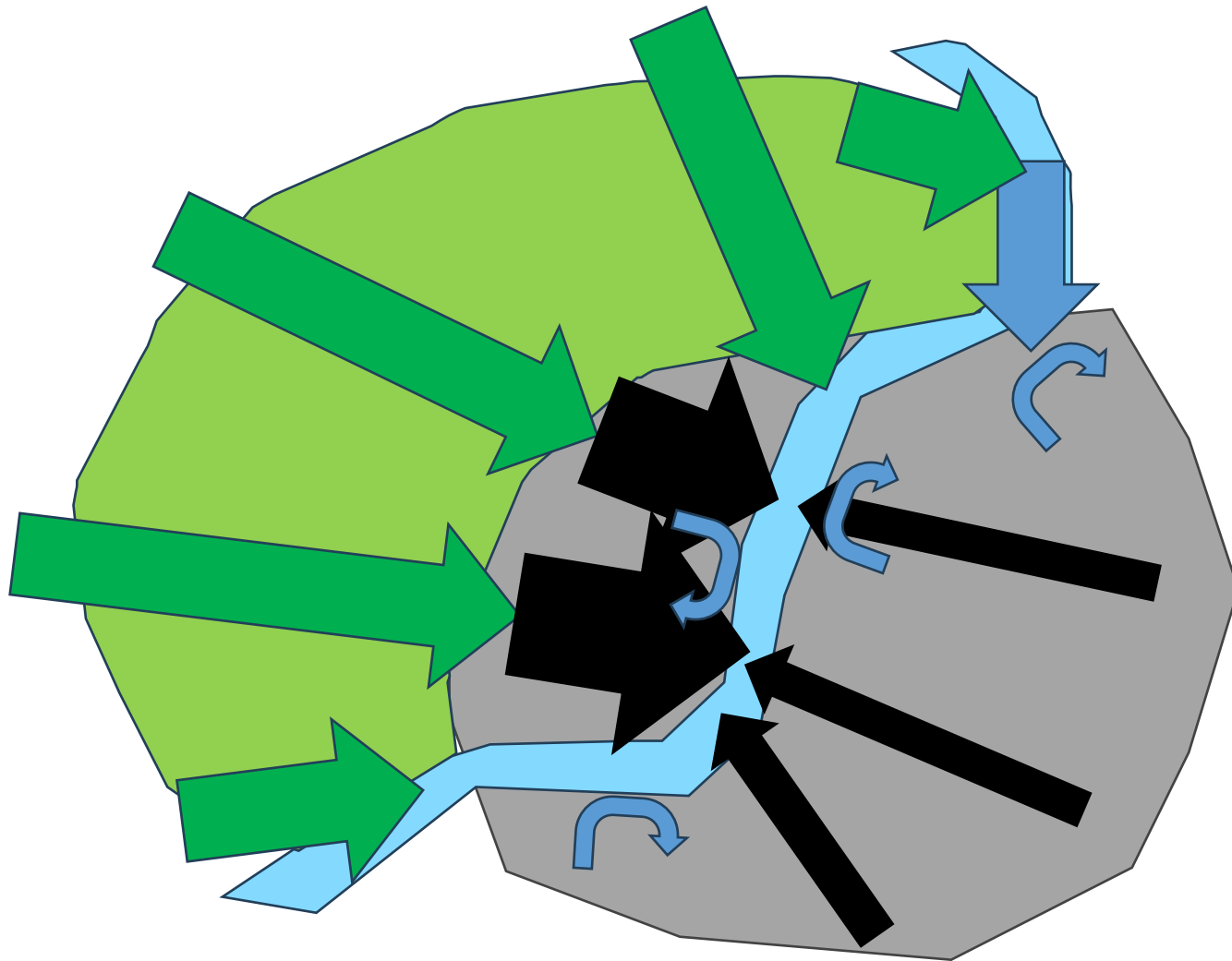


Indirect effects: catchment and environmental pollution



Objectives : reduce floodings & keep combined sewer overflows under 5%

# Stormwater in rural areas : a multilayered approach



EXTERNAL FLOWS

From upstreams

From farmlands (mudslides)

INTERNAL FLOWS

From urban run-off

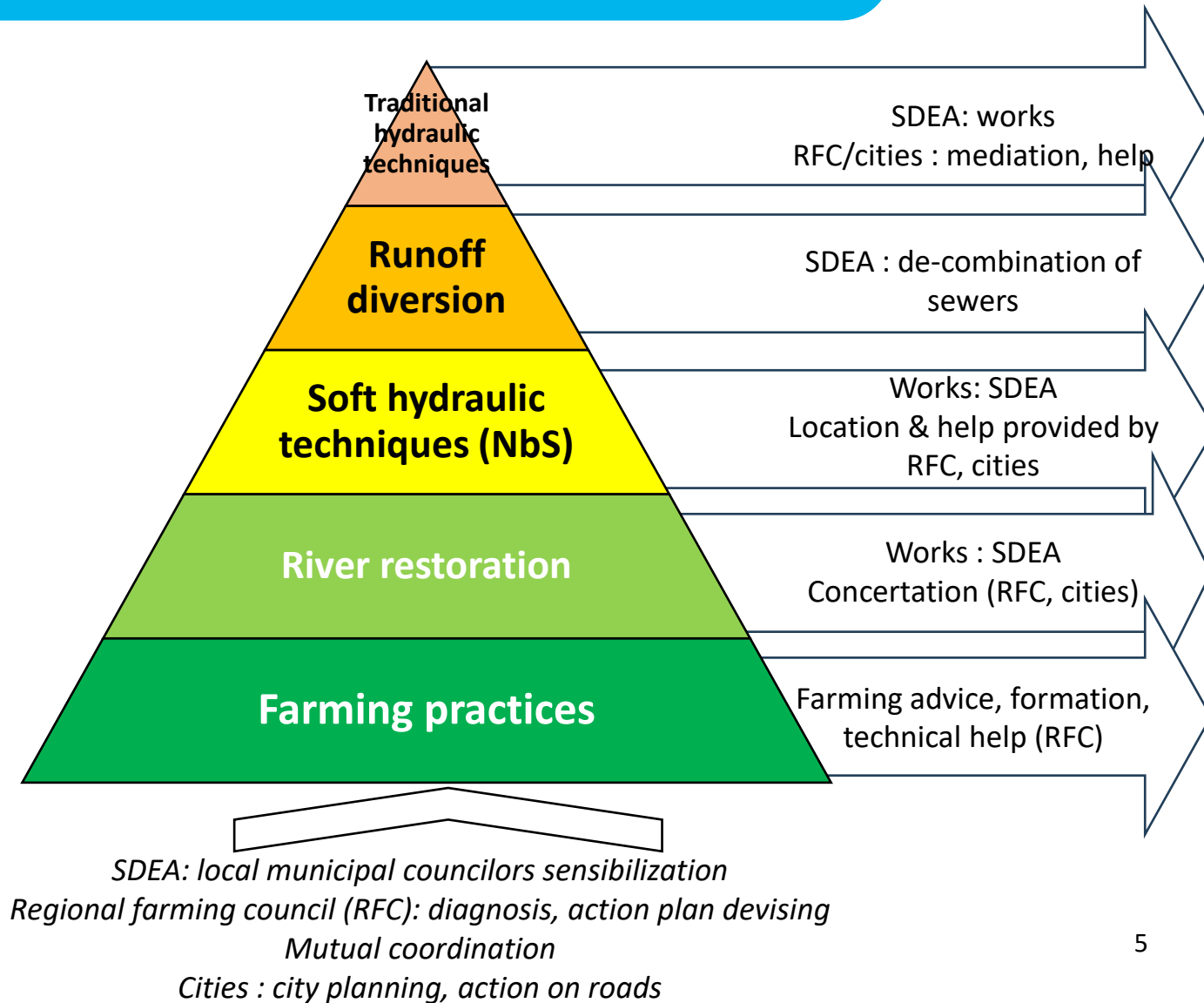
# Mudslide and runoff control strategy



Common solutions based on SDEA/farmers/cities own responsibilities : importance of partnerships

→ 3-tier preventive/remedial action plan:

1. **AVOID:** hazard limitation via NbS > farming practices (no plow, concerted farming rotation), NbS hydraulic solutions, concerted planning (farming planning, hydraulic planning, city planning)
2. **REDUCE:** individual protection, small hydraulic works, urban grid diversion
3. **COMPENSATE:** grey hydraulic infrastructure (basins, dikes – SDEA)



# Example : NBS for hydraulics + farming practices



→ *illustration*

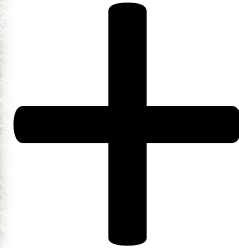


Live beamed hedge  
(aged 2 years)

Hedge  
(Aged 3 years)



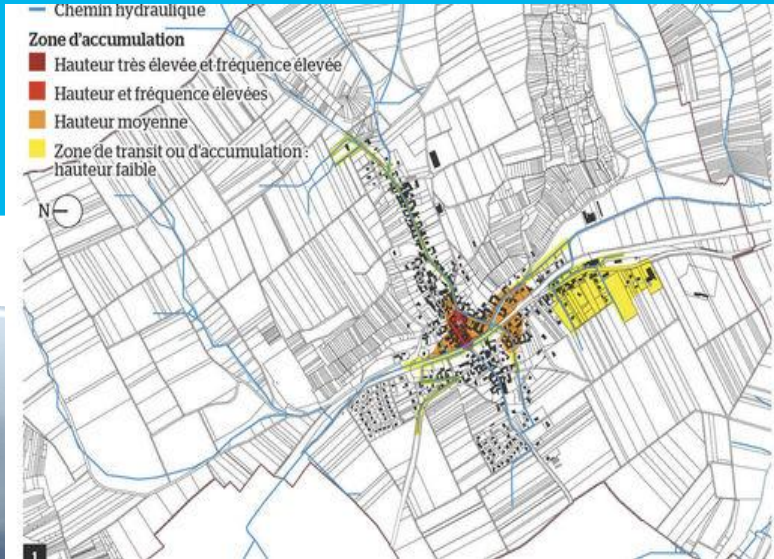
Miscanthus hedge  
(aged 2 years)



**No-plow techniques, crop selection**  
(e.g., corn -> wheat, soy...)

**Small rural hydraulics**

# Results



## Citizens and goods protection

- Mudslide limitation
- No economical interference
- Village protection
- Modified urban planning



## Biodiversity and local ecosystem preservation

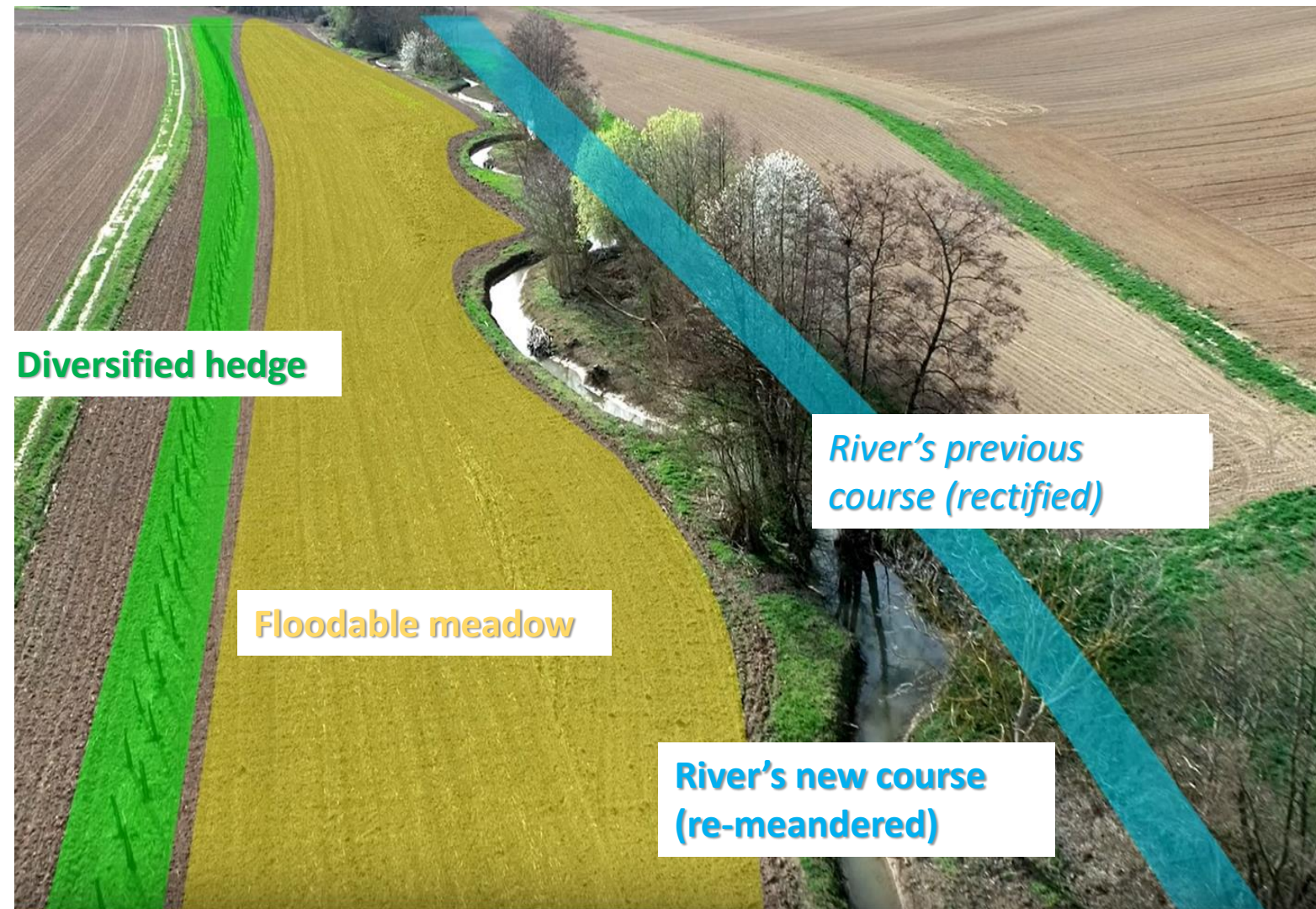
- Basin management: 7.41 km soft hydraulic solutions (2023)
- Local reimplantation of trees and arbustive hedges: 62 046 trees planted (obj. 126000)
- Green frame restoration/preservation
- Better and more durable farming practices



TROPHÉES  
DE L'ADAPTATION  
AU CHANGEMENT  
CLIMATIQUE  
ARTISAN



# Cooperative river flood management



## Local dual-use retention: flood management + ecological/biodiversity benefits

- ⇒ *Flow-slowing course modification*
- ⇒ *Secondary protection: floodable meadow (contract with local farmer)*
- ⇒ *Biodiversity effect of side trees + hedge habitat*



# Cooperative mudslide flood management (rural hydraulics + grid)



## Infiltration/floodable meadow + small embankment and grid overflow

*Last line of defence upstream of the village, in combination with hedges and small hydraulics :*

- Infiltration of small events
  - Retention of mud losses
- Regulation of the biggest events (rainwater grid)

# Urban NBS : Infiltration solutions and Multi-actor decision



1

Green solutions (NBS)

- Rain garden
- Infiltration ditch
- Dry basins
- Lake basins
- Vegetalized roofs
- Infiltration trench (green cover)



2

Trenches – grey-green solutions

Retention medium  
 N°1 Gravel  
 N°2 Plastic cage / other

Alimentation  
 N°1 Infiltration  
 N°2 Injection

- Infiltration trench via pipes
- Infiltration trench via mineral cover



+ Rainwater recuperation tanks

3

Grey solutions

- Permeable road
- Underground infiltration basin
- Combined sewer retention



## Multi-partner decision:

SDEA (**wastewater, rainwater management**), Road department, City (**gardens and public parks**)

Repartition: who will manage which elements ? **SDEA = hydraulics, city = gardening**

# Overflow limitation – urban NBS - schoolyards

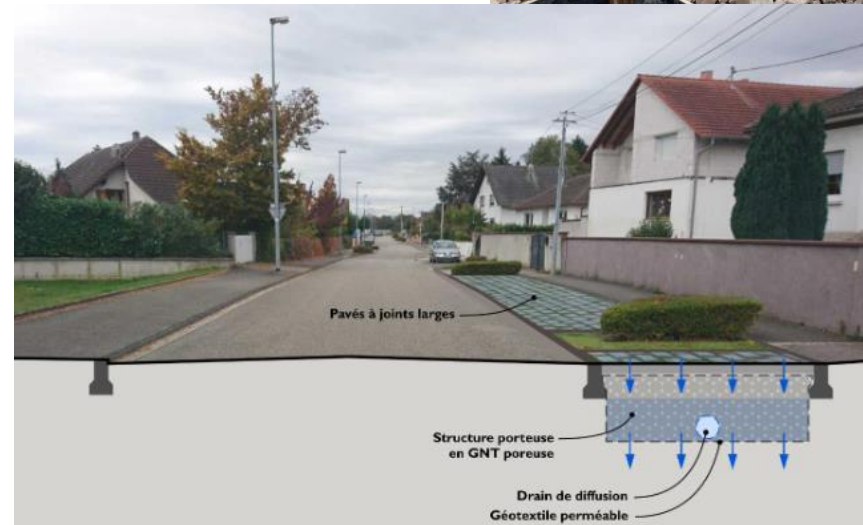
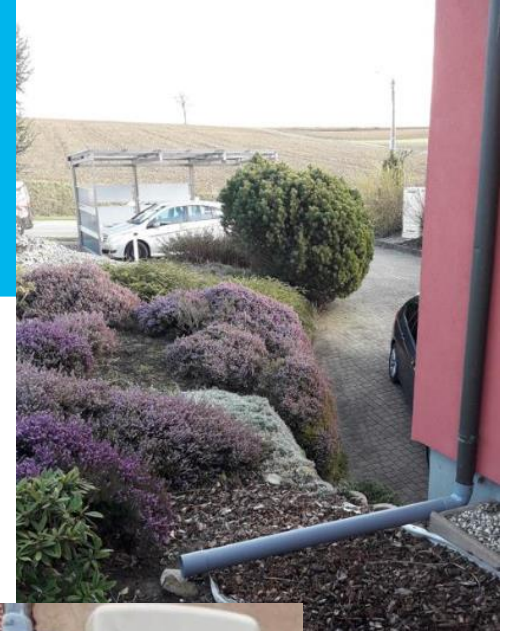
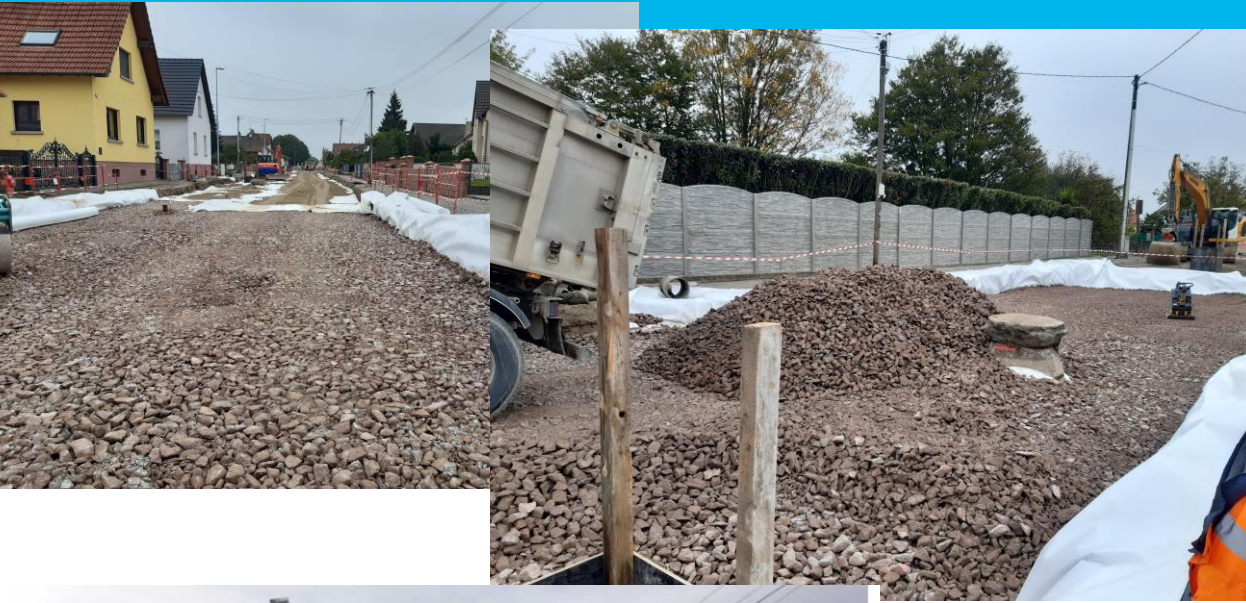


**Partners** : users (teachers, janitors, childrens and parents) + city services

- ➔ 95% of school surface disconnected from combined sewers
- ➔ By-effects : education to nature, less heat radiation in summer, gender inclusivity, ...



# Overflow limitation – urban NBS : “classic” techniques



**Road disconnection**

+



**Housing disconnection**



**Thank you for your attention**