



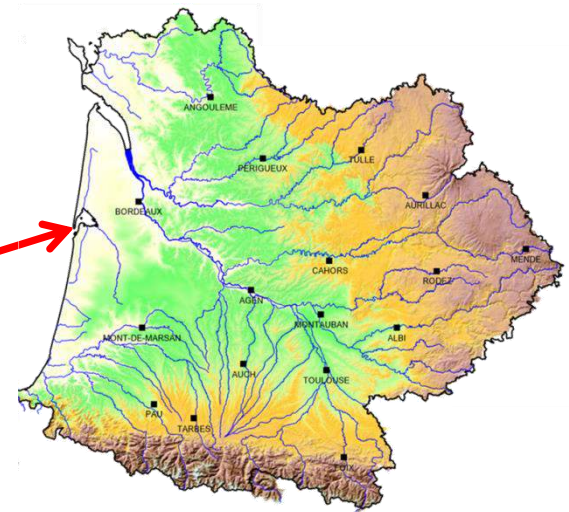
**Agr'eau:** developing a resource-efficient, eco-friendly, climate-smart agriculture across the Adour-Garonne watershed (South-West France)

**Fabien Balaguer, French Agroforestry Association (AFAF)**  
**Agroforestry Event at Expo Milano**  
**Saturday 12 September 2015**

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# The Adour-Garonne watershed – Where?



Adour-Garonne watershed


**What** context brings about the need for change?



Agriculture  
that leads to deserts –  
climatically, ecologically,  
agriculturally... and humanly speaking!





A photograph showing a flooded agricultural field. In the foreground, a large, turbulent stream of muddy, brown water flows over a grassy bank. The water is fast-moving and carries a lot of sediment. In the background, a vast field of young green plants is completely submerged in water. The sky is overcast and grey, suggesting a recent or ongoing rain event. Utility poles and wires are visible in the distance.

**Not enough water?  
Too much water?  
A matter of (degraded) soils...**

**20%** of the rain water falling on a field is lost through **runoff** and **erosion**





**Water degrading  
the soils...**

**... And soils  
degrading the  
water...**





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# The new assessment of soil loss by water erosion in Europe



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### ABSTRACT

Soil erosion by water is one of the major threats to soils in the European Union, with a negative impact on ecosystem services, crop production, drinking water and carbon stocks. The European Commission's Soil Thematic Strategy has identified soil erosion as a relevant issue for the European Union, and has proposed an approach to monitor soil erosion. This paper presents the application of a modified version of the Revised Universal Soil Loss Equation (RUSLE) model (RUSLE2015) to estimate soil loss in Europe for the reference year 2010, within which the input factors (Rainfall erosivity, Soil erodibility, Cover-Management, Topography, Support practices) are modelled with the most recently available pan-European datasets. While RUSLE has been used before in Europe, RUSLE2015 improves the quality of estimation by introducing updated (2010), high-resolution (100 m), peer-reviewed input layers. **The mean soil loss rate in the European Union's erosion-prone lands (agricultural, forests and semi-natural areas) was found to be 2.46 t ha<sup>-1</sup> yr<sup>-1</sup>, resulting in a total soil loss of 970 Mt annually.**

A major benefit of RUSLE2015 is that it can incorporate the effects of policy scenarios based on land-use changes and support practices. The impact of the Good Agricultural and Environmental Condition (GAEC) requirements of the Common Agricultural Policy (CAP) and the EU's guidelines for soil protection



The new assessment of soil loss by water erosion in Europe



Panos Panagos<sup>a,\*</sup>, Pasquale Borrelli<sup>a</sup>, Jean Poesen<sup>c</sup>, Cristiano Ballabio<sup>d</sup>, Emanuele Lugato<sup>a</sup>

- Mean soil loss in EU: **2.46 t/ha annually**
- 12.7% of European arable lands have soil loss **>5 t/ha annually**
- Among all land uses, **arable and sparse vegetation** have the highest soil loss rates



**What** are the solutions?



# Agr'eau – a farmer-centered initiative

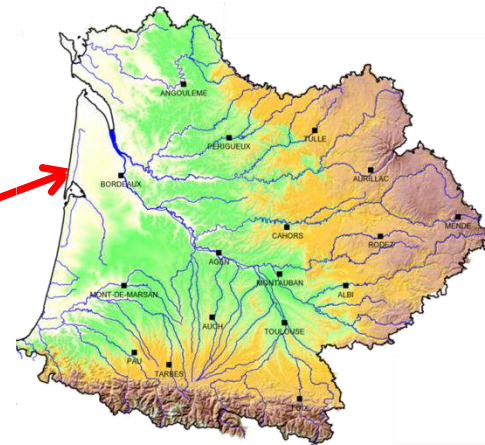
**Aim:** collaborative development of farming practices that allow for...

- **Sustainable soil & water management** (landscape approach)
- **Intensification & optimization** of farming systems

→ **Producing more, with less... while protecting the environment**



  
4-year program  
2013-2017



**Adour-Garonne watershed**



# Agr'eau – A multi-partner, local initiative

## The institutions

Program manager:

***French Agroforestry Association***



Founding partners:

***IAD : Sustainable agriculture Institute***

***A.O.C Sols: local soil conservation association***

***Arbre et Paysage 32: local farmer association***



Sponsors:



**Water Agency: 50% of program budget**

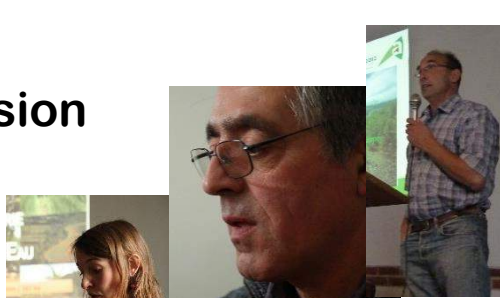
Associated partners:



# Agr'eau – A multi-partner, local initiative

## The people

Ag. extension officers



River conservationists



Farmers\*



Researchers



Road maintenance officers

Foresters

Bee-keepers

\*nearly 300 farms (still increasing)



**What** framework to use?

A photograph of an agroforestry field. In the foreground, there is a large, thick tree trunk on the left. The ground is covered in golden-brown harvested crop residue. In the middle ground, a red harrow is being pulled across the field. A person in a blue shirt is walking in the field to the left of the harrow. The background consists of a dense forest of tall, thin trees under a bright sky.

# Agroforestry!

**Building on 20+ years of field  
and research experiences...**



# Plant (tree) cover... a survival blanket?



*Note: Forests never die from water shortage...*

# Capturing the sun...

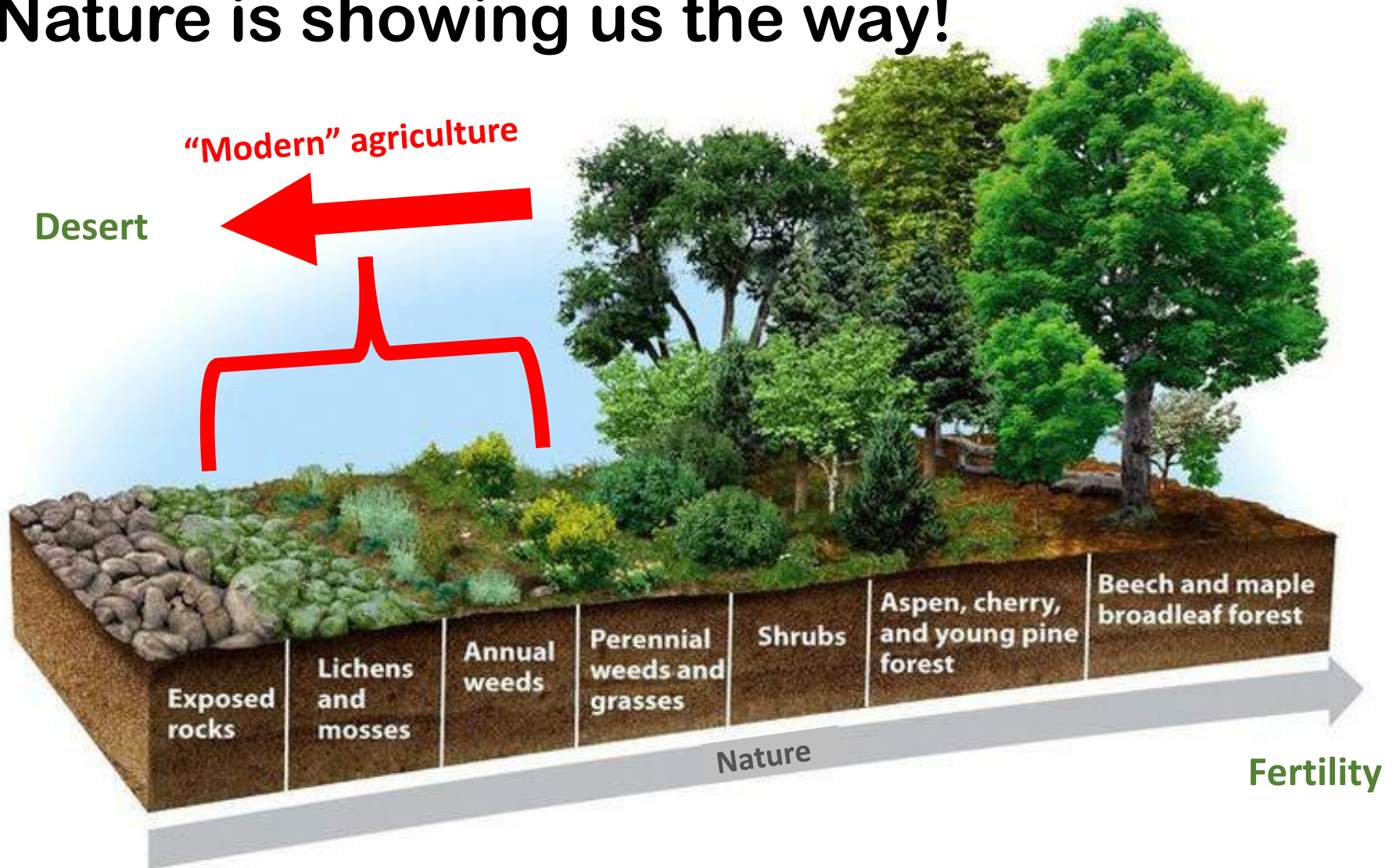


... and turning it into **biomass**  
(= carbon)

**Everything starts from here!**



# Nature is showing us the way!



**Principle 1** : retain plant cover **all year long**, **no soil disturbance**

**Principle 2** : plants as **big** as possible... and **on top of each other**

• **Principle 1** : retain plant cover **all year long**,  
**no soil disturbance**

→ Intermediate **cover crops**, **no-till** practices, **direct seeding** into standing crops

• **Principle 2** : plants as **big** as possible  
... and **on top of each other**

→ Multi-level plant systems that include trees and other woody perennials = **AGROFORESTRY**



A photograph of a forest with a red harvester and a person in a field of harvested crops. The harvester is a large red machine with a long, horizontal cutting bar, positioned in the middle ground. A person in a blue shirt and shorts is walking in the foreground on the left. The ground is covered with harvested, golden-brown crops. The background is a dense forest of tall, thin trees.

**Agroforestry?... Principle 2??...**

**Wait... did we miss a step?**



A landscape view of a field with rows of young trees planted in a field, with rolling hills and a clear blue sky in the background. The trees are in the foreground and middle ground, and the hills are in the background. The sky is clear and blue.

**Principles 1 + 2...**

**... Here we are!**



A red and white harrow machine is shown from a rear perspective, moving through a lush green field. The machine has a prominent red frame with white diagonal stripes on the side panels. It is positioned in the center of the frame, moving away from the viewer. The field is a vibrant green, and the sky above is a clear, bright blue. The overall scene is a typical agricultural landscape.

**Principles 1 + 2**

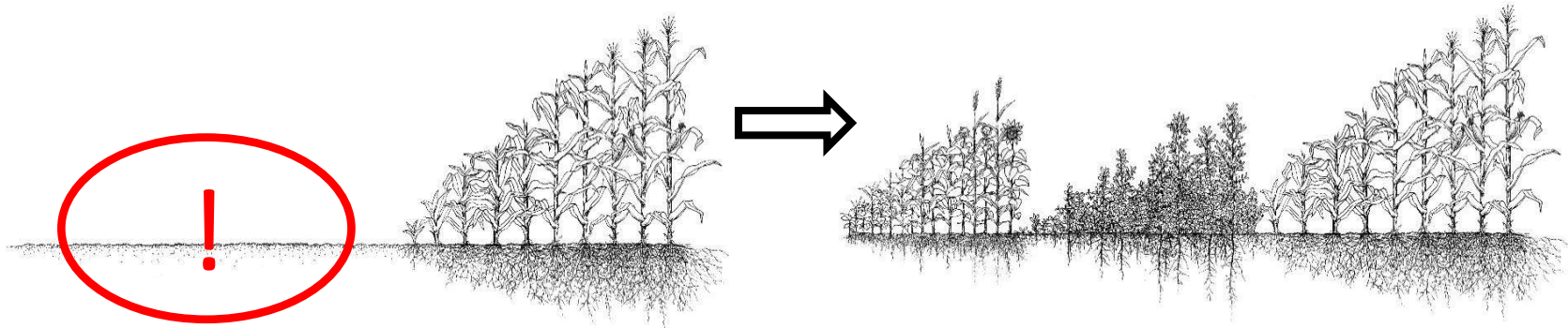


# Principles 1 + 2





# Crop succession (1 year)



## BEFORE:

- 1 crop a year
- Soil left bare part of the year
- Low biomass production

**Vicious** circle

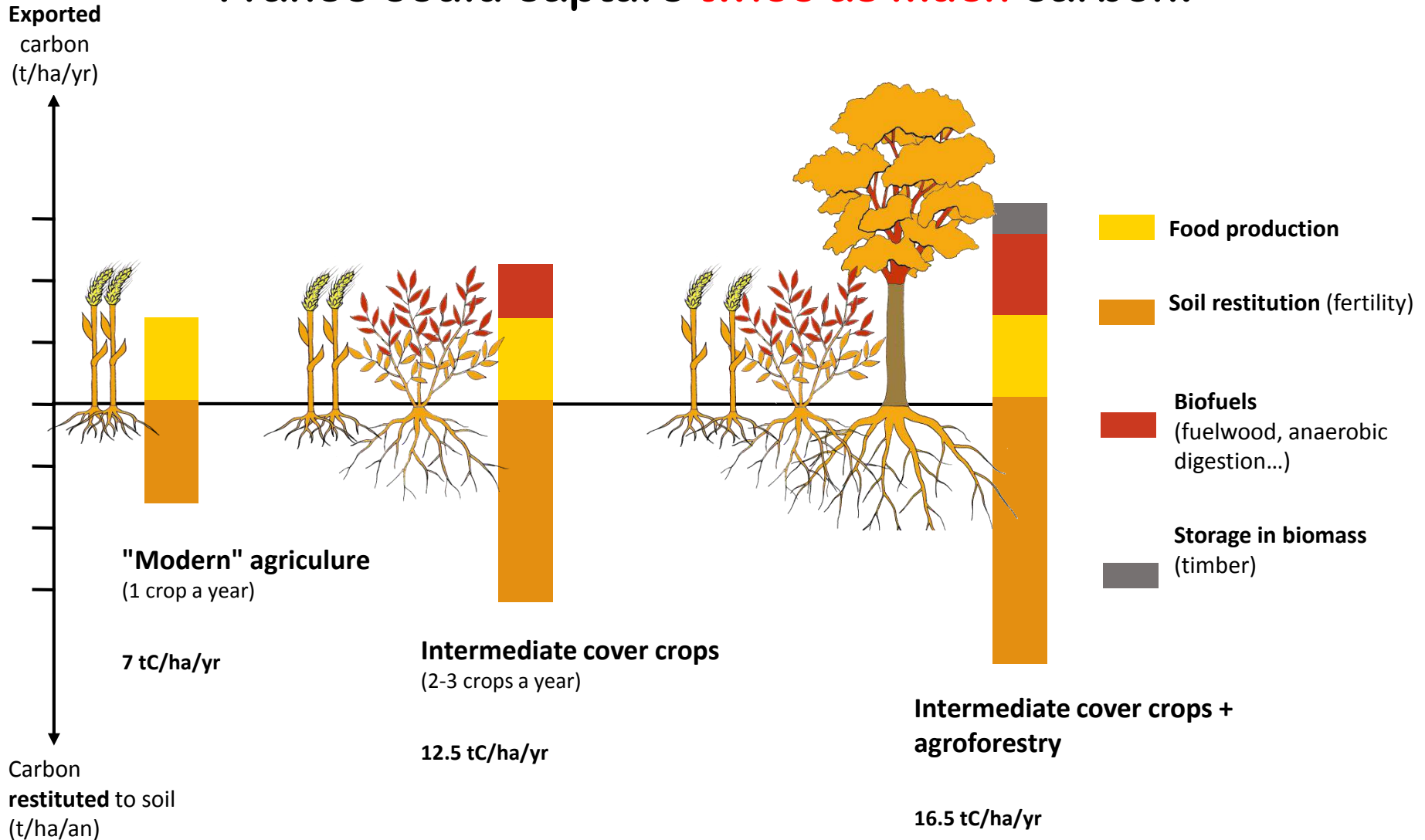
## AFTER:

- Up to 3 crops a year
- Soil permanently covered w/ plants
- High biomass production

**Virtuous** circle

# Carbon, fertility... and climate

France could capture **twice as much** carbon!









**More biomass means more life...  
... sustainably**





# The keystone of the **Agr'eau** initiative:

## The pilot-farms

- A 2-scale follow-up and evaluation:  
**farm & field-level**
- A constant interaction with **research**
- Expected: **125 pilot-farms** by the end of the programme

# Connecting farmers

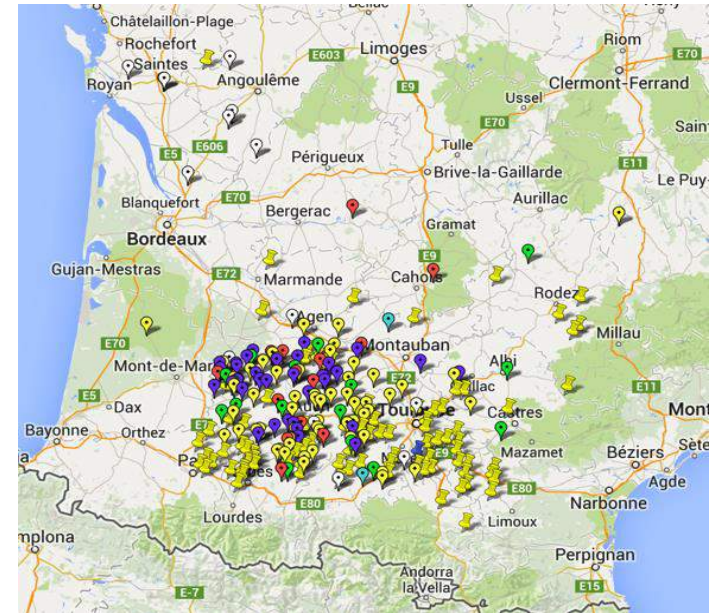
- Identify **innovative farmers** and bring them to the forefront
- Encourage **sharing** of views & ideas
- Gather and **analyze** the results (successes & failures)
- **Out-scaling & up-scaling**





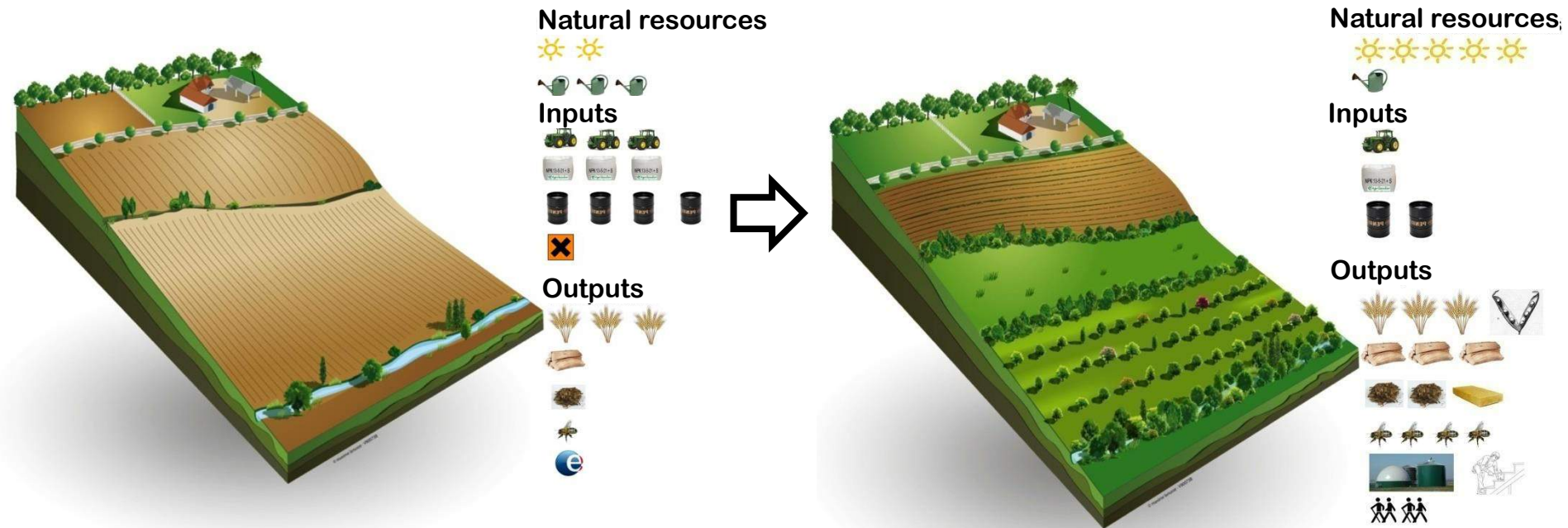
# A program for **all farmers**, regardless of:

- **Certification** scheme (conventional, organic... **everyone welcome!**)
- Type of **farming system**: arable, vegetable, mixed crop-livestock systems, viticulture...
- **Pedoclimatic** context
- **Size** of farm
- Level of **experience**...



... Just one "deal":

Being willing to engage in **continuous improvement processes** towards a **"more plant cover, less soil tillage"** target...





# More plant cover, less soil tillage...





A landscape photograph showing a road verge. On the left, there is a grassy embankment with several trees, some with brown leaves and others bare. The road is paved and curves to the right. The sky is blue with scattered white clouds.

## **Assisted Natural Regeneration (ANR)**

as a source of non-competitive biomass

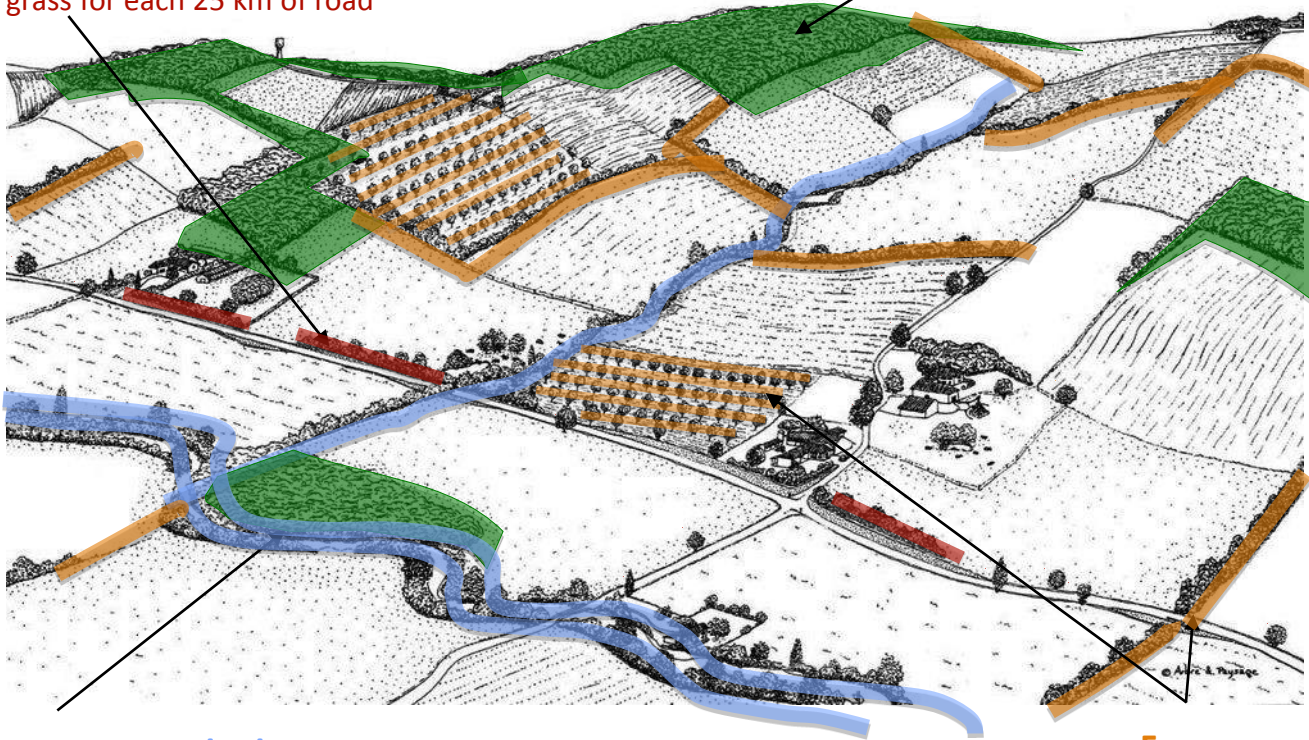
- On road verges
- On riparian zones
- On field boundaries...



# Diversifying and optimizing productions at a landscape level (*food, timber, fuelwood, RCW\*...*)

**Road maintenance officers**  
125 m<sup>3</sup>/yr of fuelwood  
75 t of grass for each 25 km of road

**Foresters**  
880 m<sup>3</sup> of fuelwood for an area of 800 ha



**River conservationists**  
460 m<sup>3</sup>/yr of fuelwood for each 55 km of river

**Farmers**  
30 m<sup>3</sup> of fuelwood/yr/farm  
(100 ha, of which 20ha are agroforestry  
+ 5km of hedges)

\*RCW= Ramial Chipped Wood

# The non-competitive biomass as a socio-economic leverage:

Development of new **jobs** and **market channels**





# Promising results within all cases, though with a variable extent:

- Higher **soil organic matter**
- Higher soil **porosity & biological activity**
- Lower **input** requirement (fertilizers, pesticides, irrigation)
- Reduction of the "**tractor working time**"  
= lower fuel consumption
- Diversification of **income sources**  
= lower economic risk

→ Most farms prove to be "healthier", both **ecologically & economically**

→ Farmers feel **happier & more peaceful!**





# Thank you for your attention

[agroforesterie.fr/agreau.php](http://agroforesterie.fr/agreau.php)



Why are they all going your side?

PFFF!

Instinct...

MIAM  
MEL

ERNST