



**Sven Wunder**  
**EFI**

# **Forests, trees and watershed- based PES: pre-conditions and impacts**

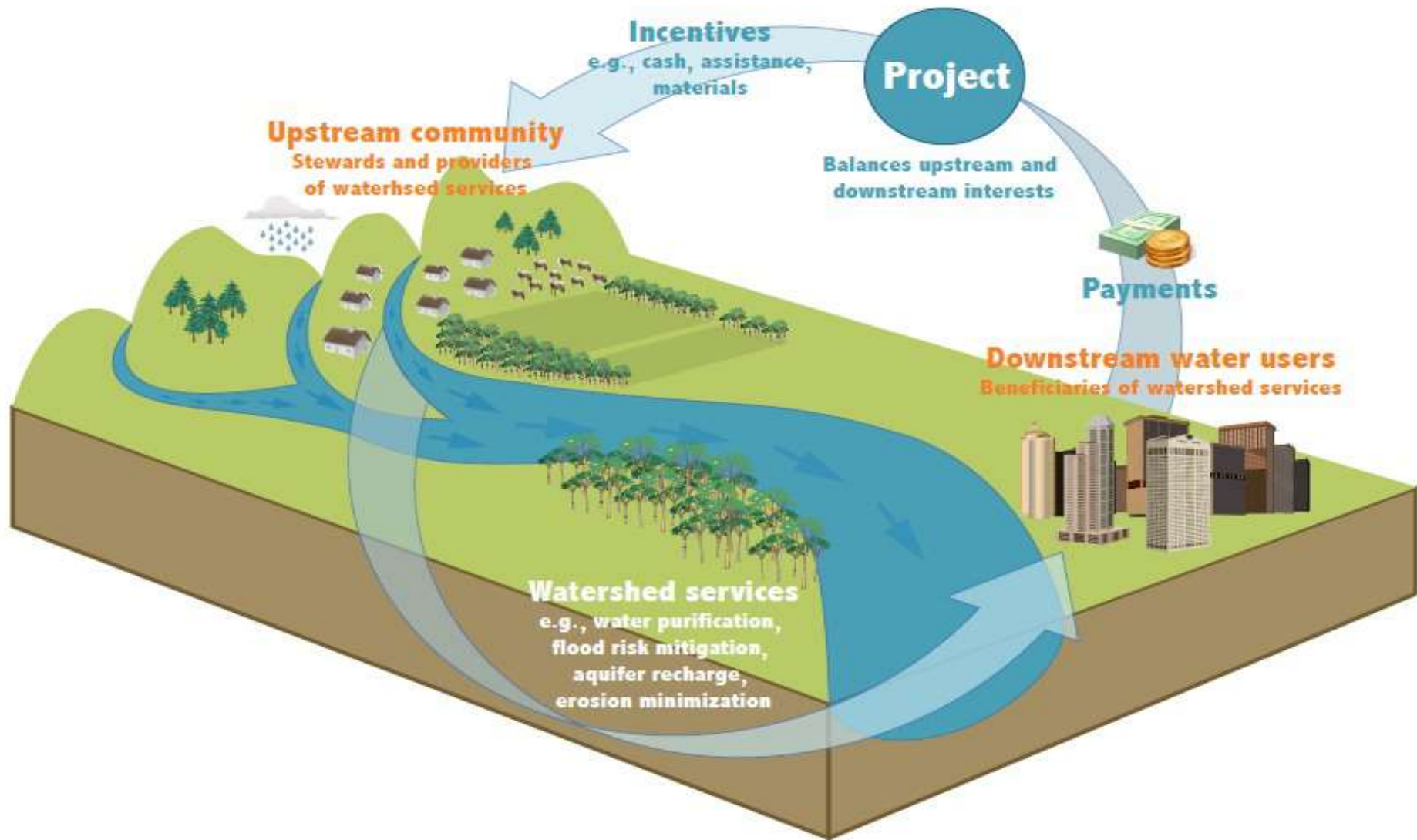
# Structure

- I. Paying for watershed services (PWS)
- II. PWS in Europe
- III. Is PES working for watersheds?
- IV. Concluding perspectives

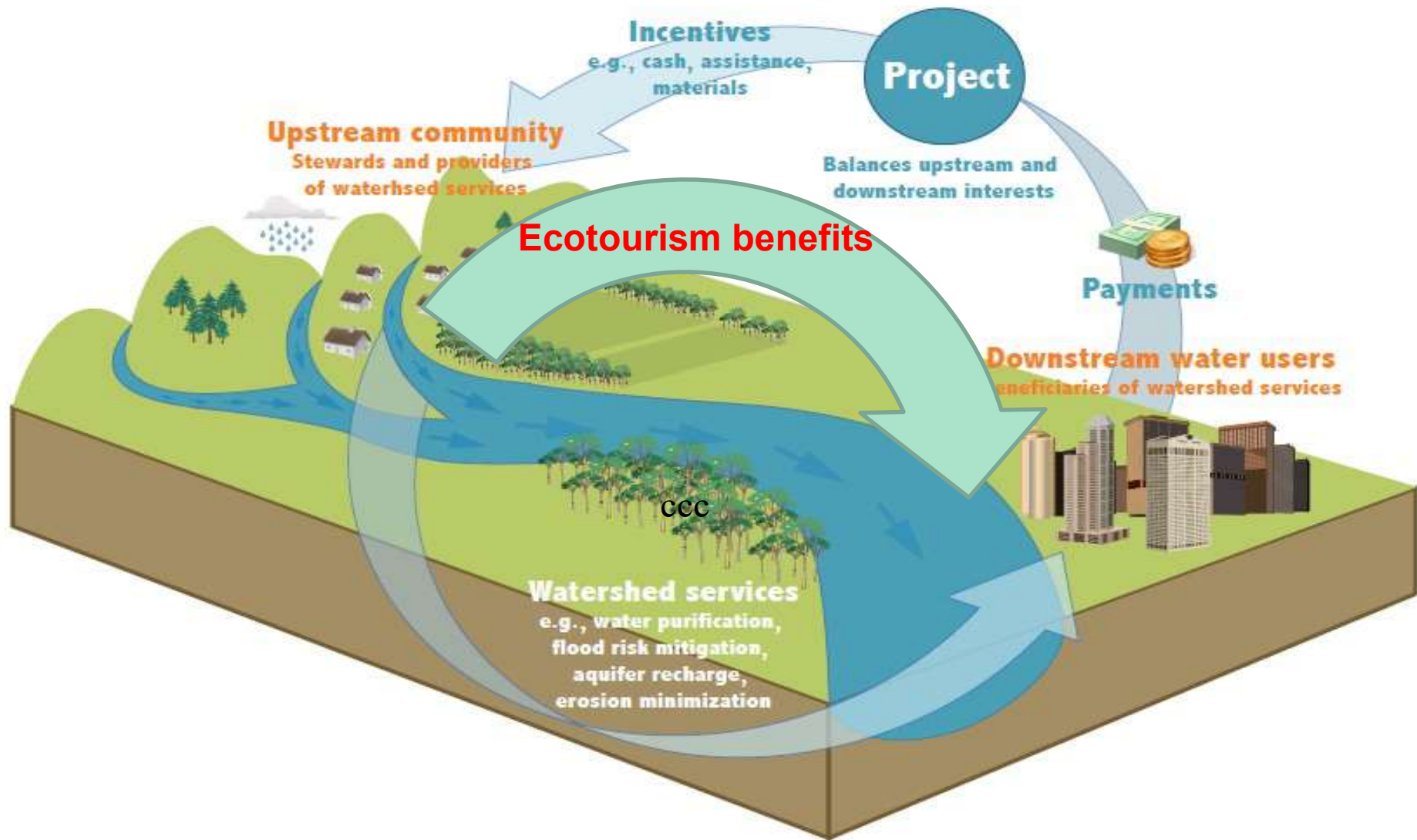


# **I. Watershed PES: paying for what?**

# Spatial ES externality justifies PES



# Not all ES externalities are offsite



# My (narrow) PES definition:

1. **Voluntary** transactions
  2. between service **users**
  3. and service **providers**
  4. that are **conditional** on agreed rules of natural resource management
  5. for generating **offsite** services.
- ⇒ Different from PESFOR-W (e.g. buying land)

Wunder (2015) – *Ecological Economics*

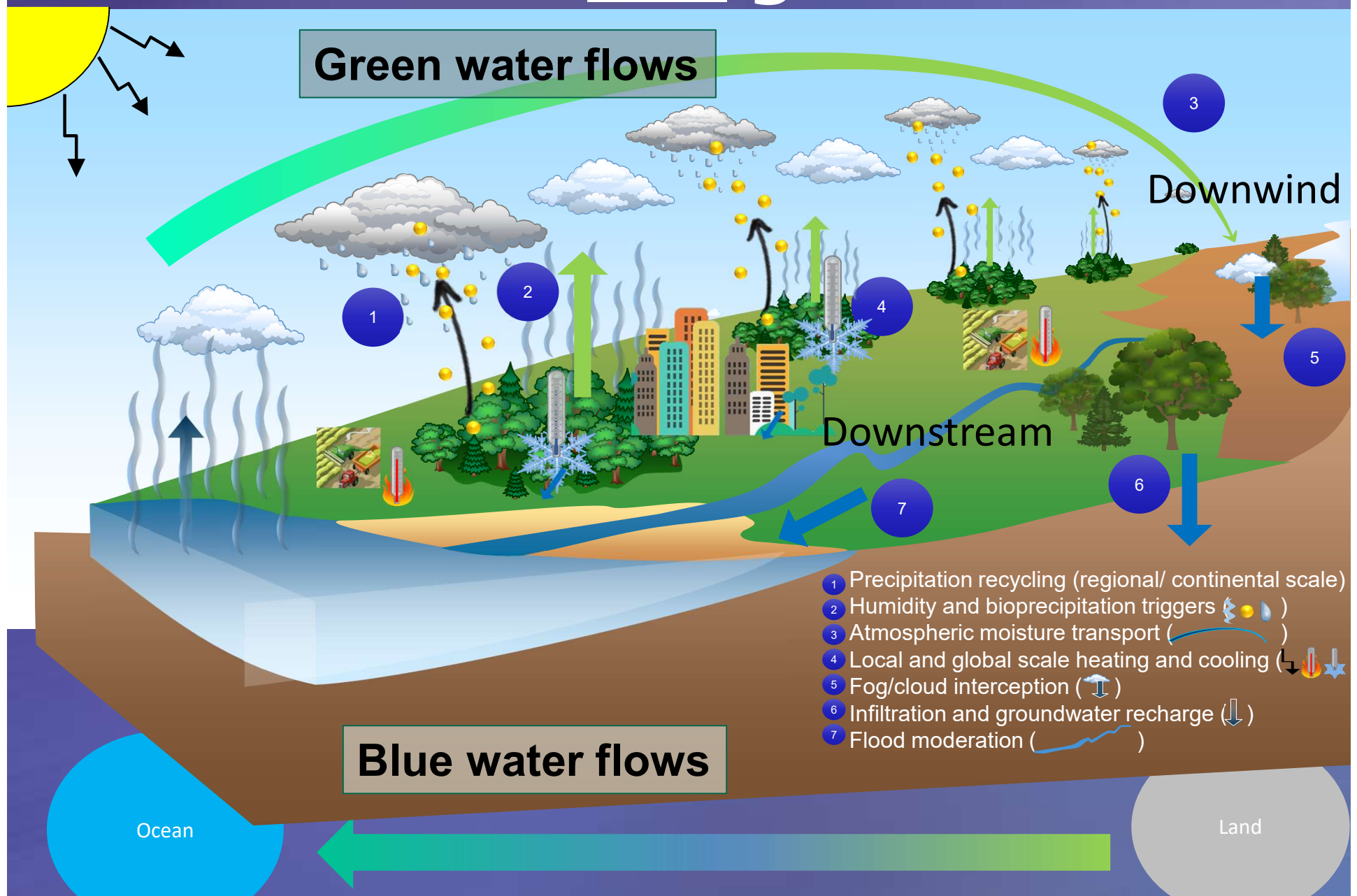
# Preconditions for PES

1. *Economics*: Social benefits of ES provision need to exceed the social costs ( $\Rightarrow WTP > WTA$ )
2. *Buyer & seller institutions*: ES providers and users can organize payments (coordination, intermediary) to their best economic interest – ex. legitimate institutions, free-riding controlled
3. *Tenure*: land stewards have *de facto* effective exclusion rights – critical in global South! ☠

$\Rightarrow$  PES less suited to lowest-income, poorly governed regions; preconditions don't hold

Wunder et al. (2020) – *ARRE*

# PES for blue and green water?







# Paying for what watershed ES?

- “enhancement of **stream flow quantity**, control of its **variability** and **quality** (incl. sediments, pathogens, nutrients, and pollutants) and **risk management** (including flood, landslide and erosion prevention)” (*Bellagio Conversations* 2008)
    - Typically, bundles of water ES (quality & quantity) are being demanded – not an “either/or”.
    - Sectors: WTP high from hydroelectricals, drinking water – irrigation less, fisheries, tourism ~zero.
    - Public PES: Hydro benefit part of larger ES bundle
- => Contracts seldom for ES; for land-use proxies

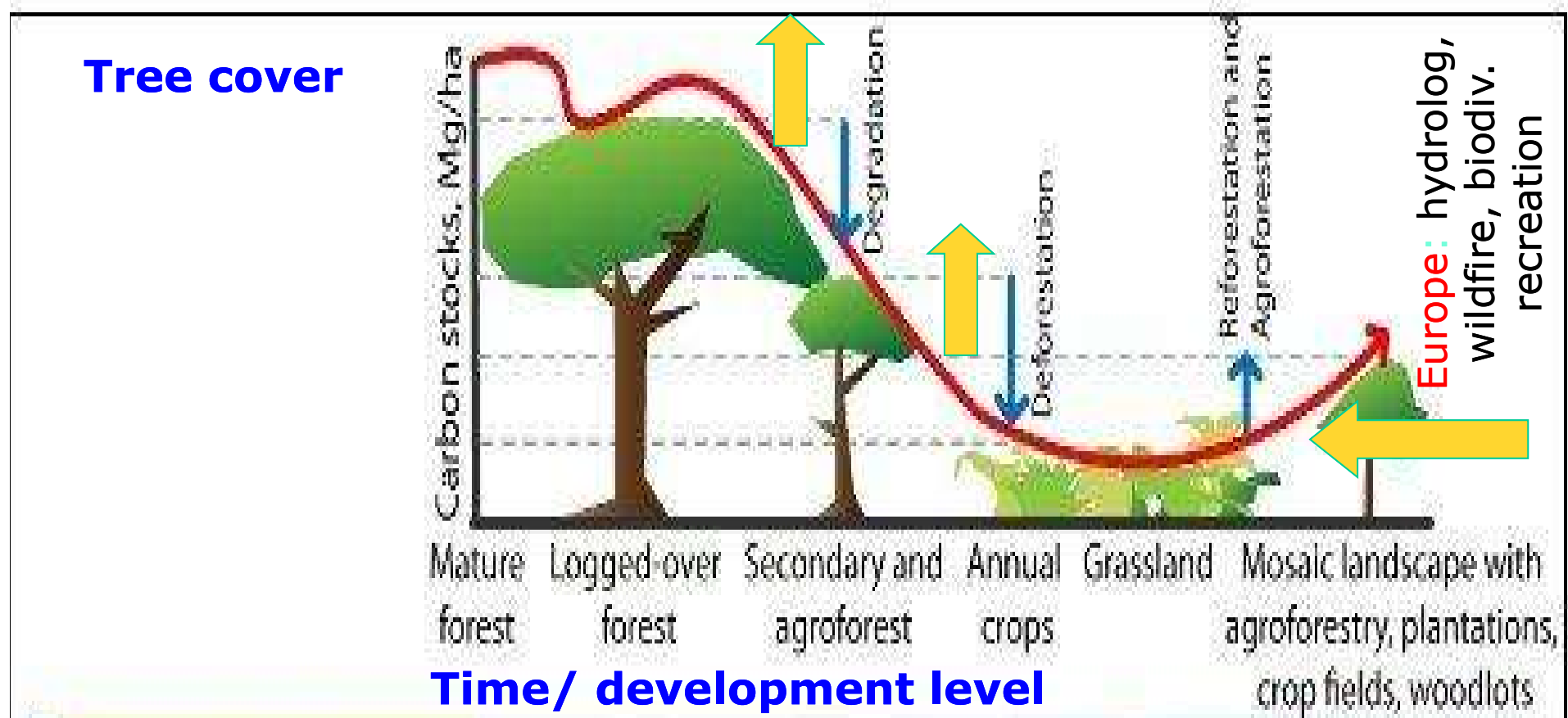
# What land use is being paid for? (in my PES database)

Use-restricting	Use-modifying
Forest conservation, (REDD, biodiv, water) <b>~70%</b>	Afforestation & reforestation (A/R), incl. CDM <b>~10%</b>
	SFM <b>0%</b>
	<b>~10%</b>
<i>Agric. land retirement</i> <b>~8-9%</b>	Agroforestry/ silvopasture
	Improved agriculture (organic, no-tillage, no-burn, etc.) <b>~1-2%</b>

 Agriculture
  Forestry

## **II. Payment for watershed services (PWS) in Europe**

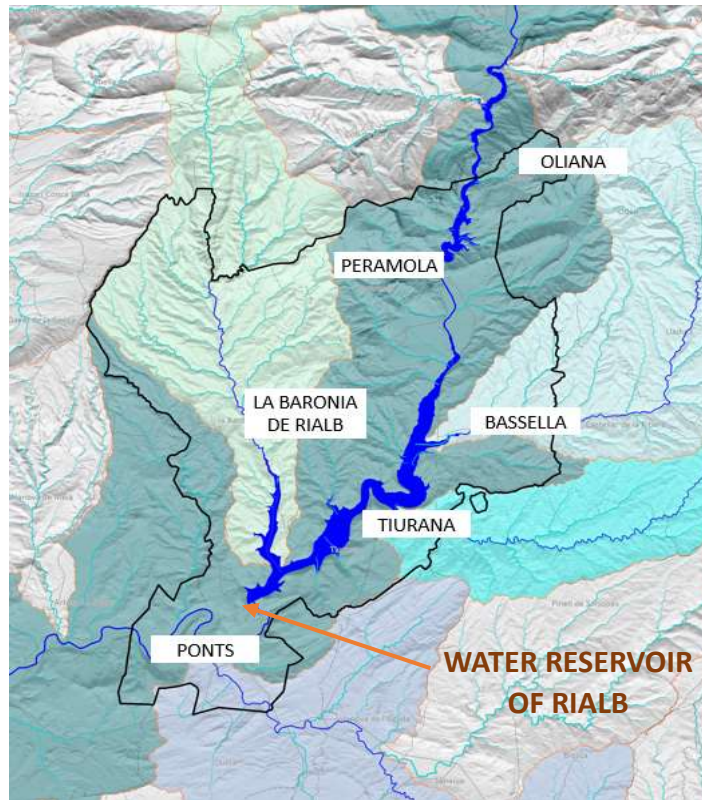
# PES and the forest transition





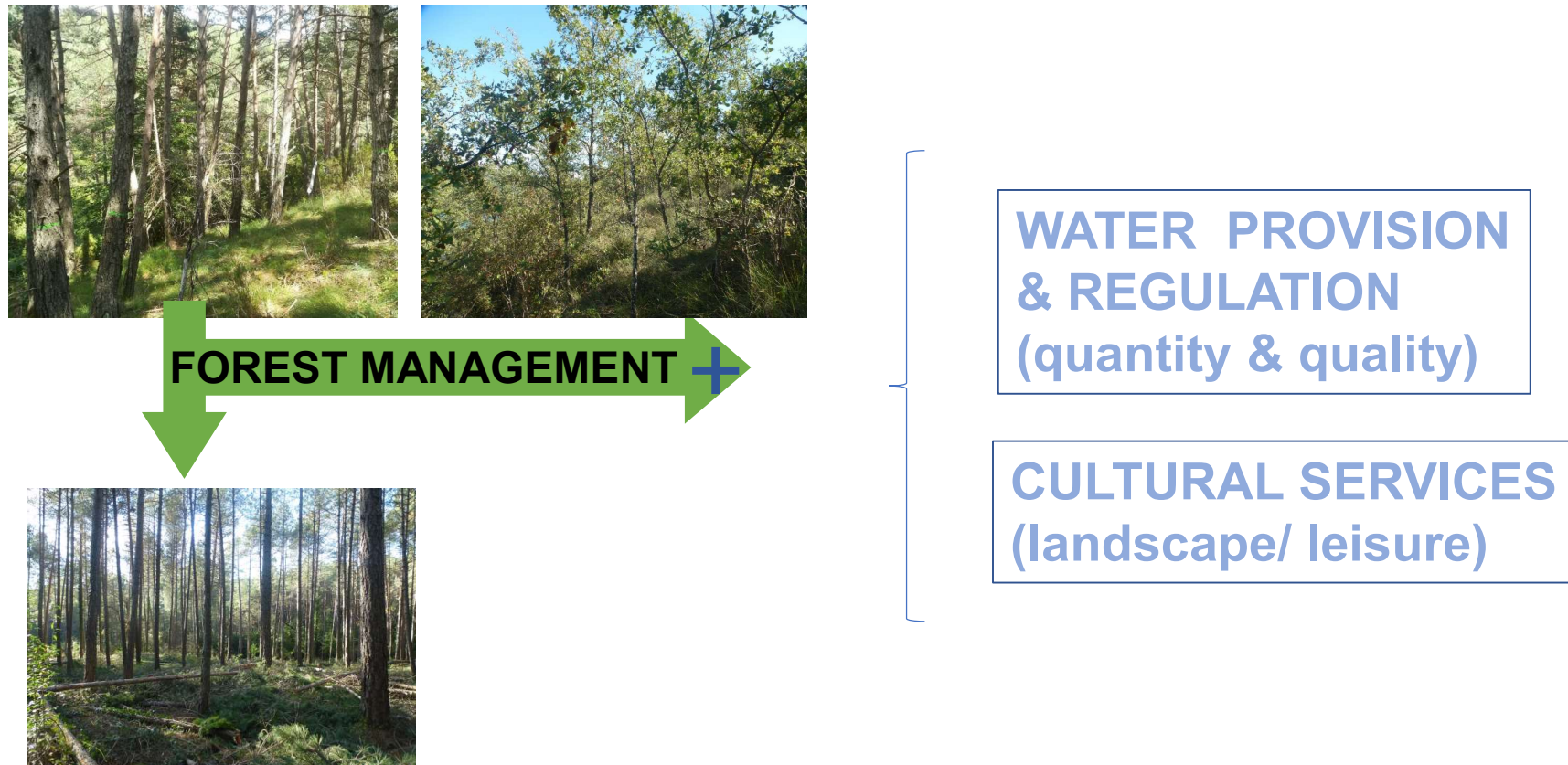
# Case from SINCERE: Rialb, Catalonia (ES)

## Forest management for watershed+ ES (350 Km<sup>2</sup>)



Courtesy: Teresa Baiges

**Objective of PES:** To finance more forest management by payments from ES users for positive forestry impacts on ES provision



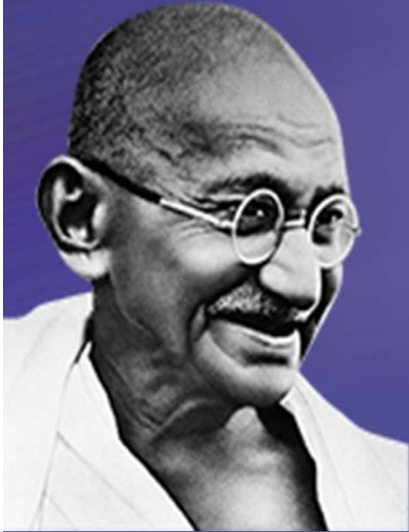
Courtesy: Teresa Baiges

# PRACTICAL CHALLENGES & POSSIBLE SOLUTIONS

## Design of local “Forests for Water” Fund

CHALLENGES	PRECONDITIONS	POSSIBLE SOLUTIONS
1. Financing mechanism: willingness to pay of ES beneficiaries	Economics (#1) Buyer institutions (#2)	Target demand side? Small expert committee? Networking & lobbying?
2. Engaging stakeholders from Forest Owner Association and Public Consortium	Seller institutions (#2)	Target key forest owners in the six municipalities?
3. Post-SINCERE sustainability	Buyer & seller institutions (#2)	Politically engaging Lleida Province?

Courtesy: Teresa Baiges



## Paraphrasing a wise man:

**Q:** “What do you think about payments for forest environmental services in Europe?”

**A:** “Oh, I think it would be a good idea!”

**Fits both ways:**

- a) Against common belief, little PES exists
- b) Having more of it would be desirable

=> some agri-environmental, little forest-based PES exists in Europe



# What obstacles to PES in Europe?

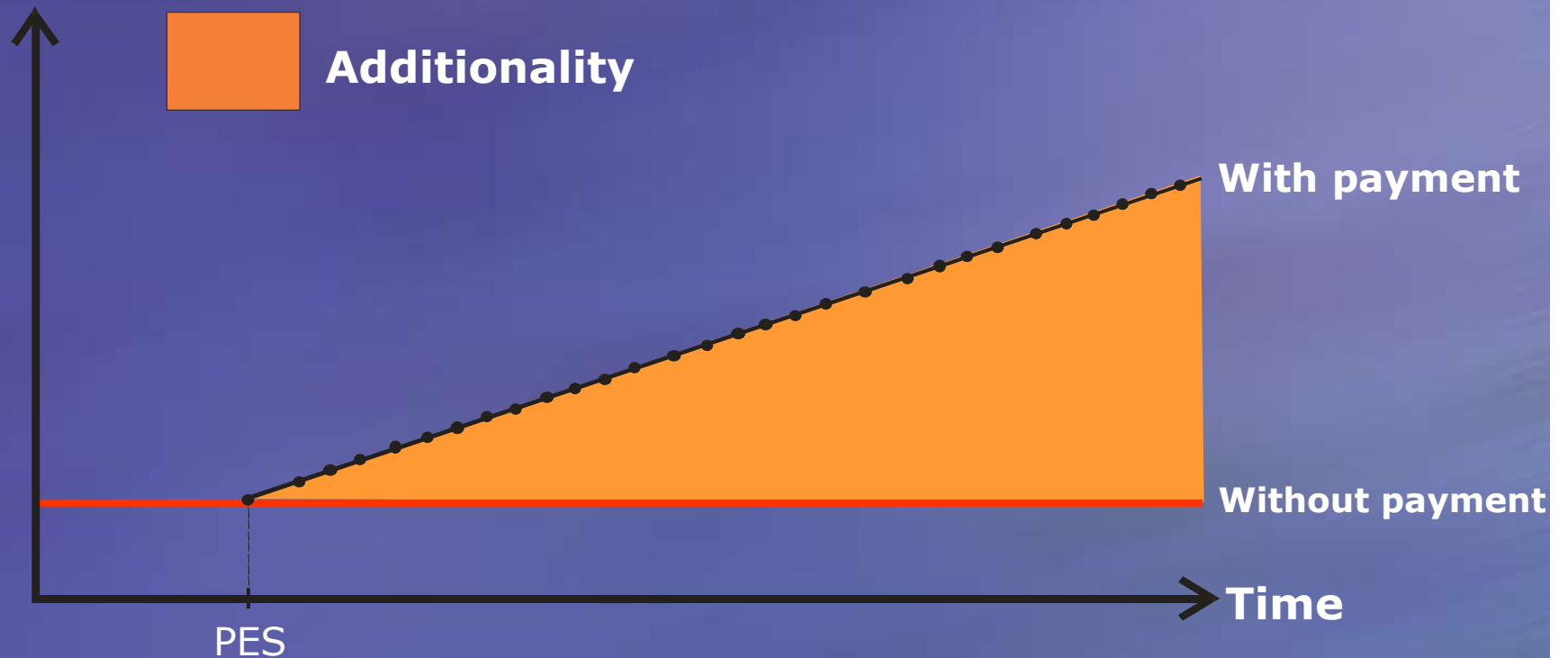
Europe has institutional/ land-tenure base, but:

1. Prevalence of some large protected areas
  2. Forest *tenure*: some have large state forests....
  3. ...elsewhere small, fragmented private forests
  4. ...or absentee owners (little *de facto* control)
  5. Societal vision prevails: ES provision is a public, regulatory, not “market-based” responsibility
  6. Insufficient willingness to pay (WTP) – cultural-institutional, rather than economic argument
- => Societal legacy (5) and low WTP (6) may be the key constraints

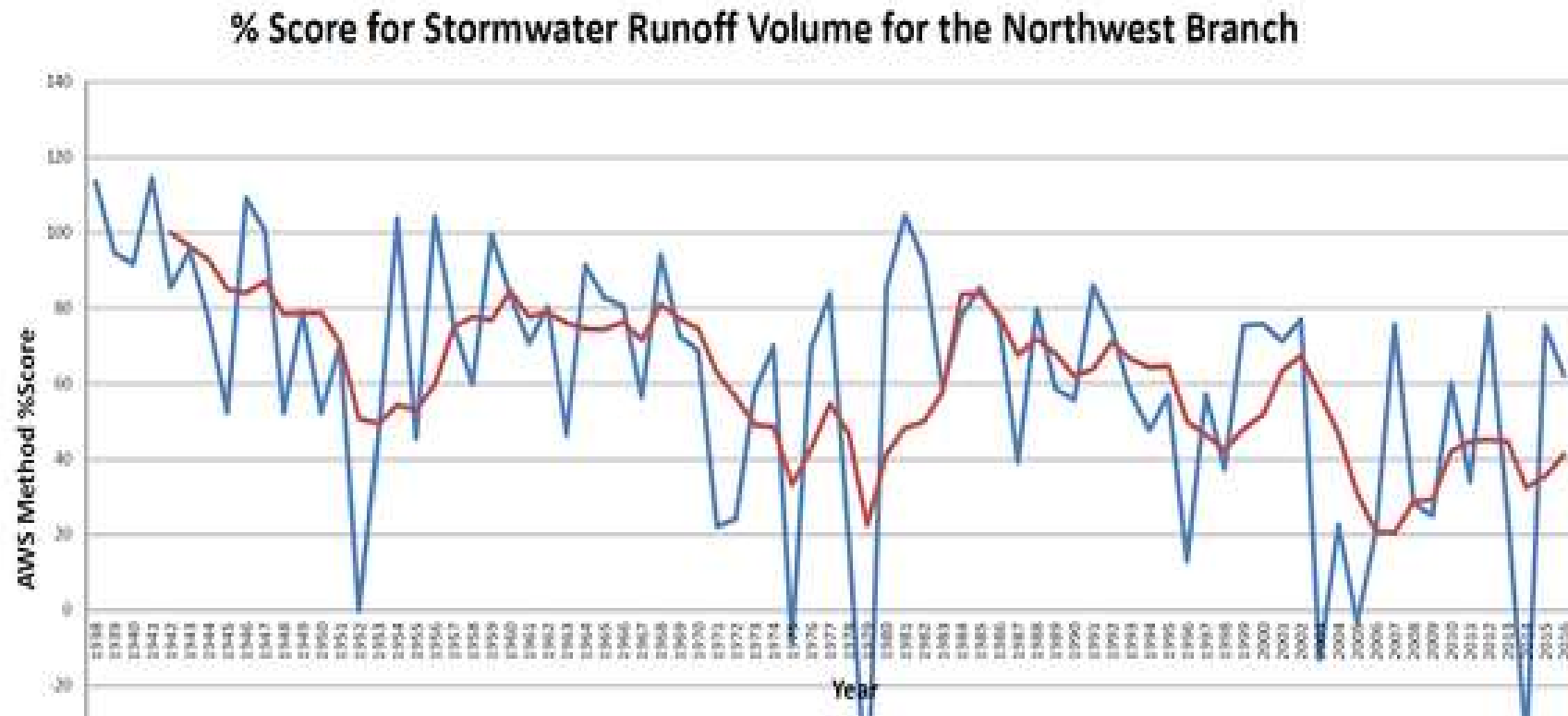
### **III. Is PES working for watersheds?**

# How to assess PWS impacts (in theory)?

Watershed  
services



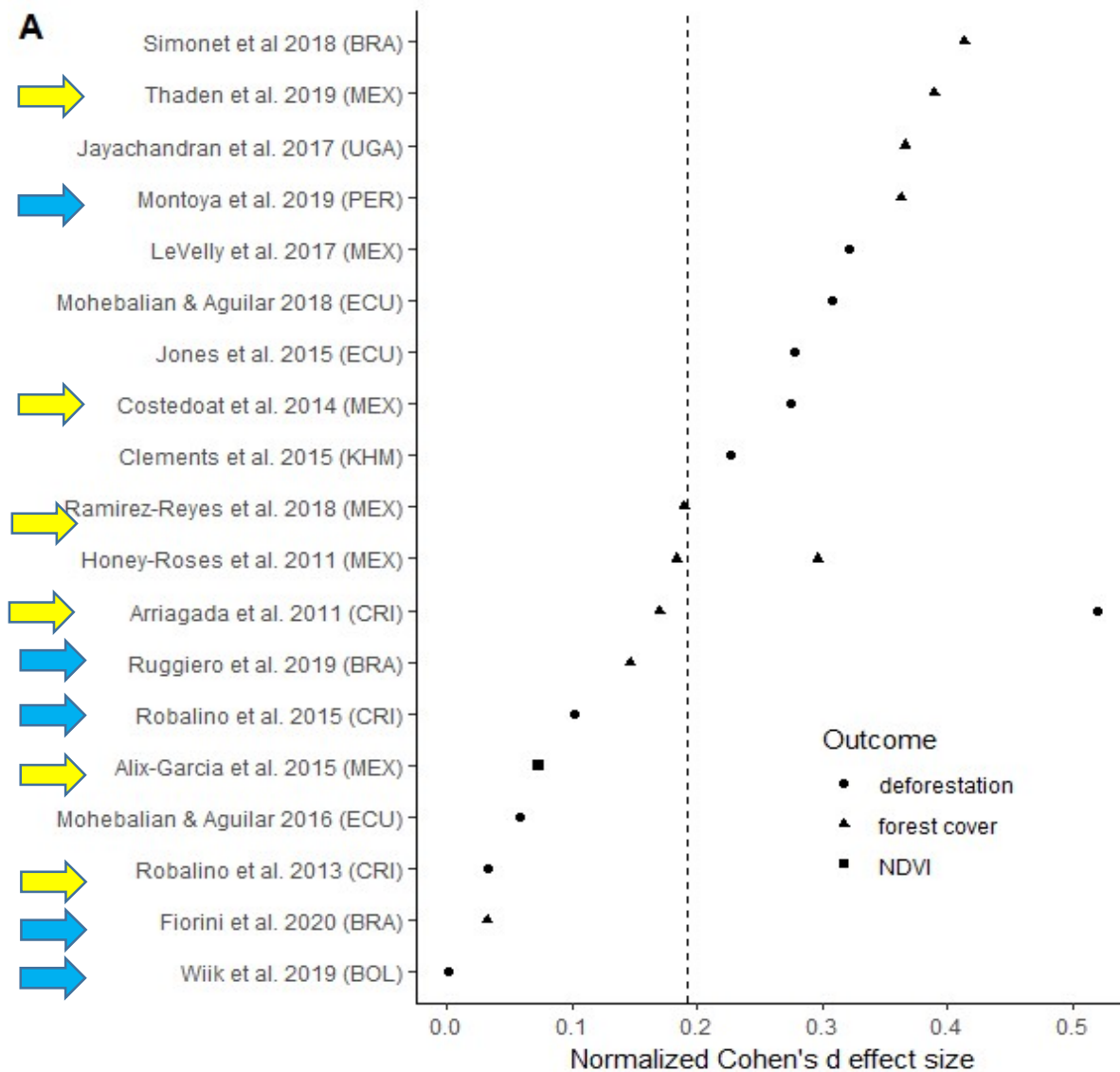
# How to assess PWS impacts (in practice)?



- => Need ES data from long time series
- => Need controls (e.g. paired catchments)
- => Short run: monitor land use + model hydrology

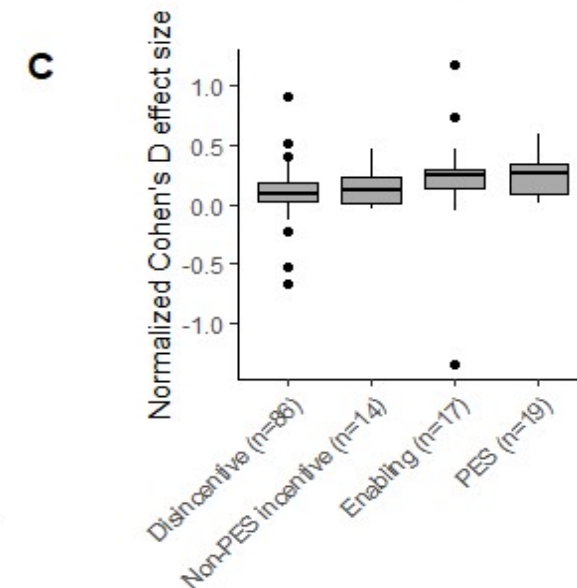
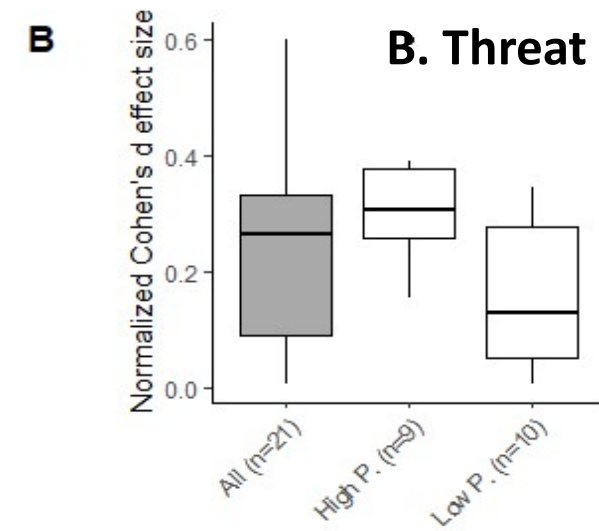


# PES (hard) evaluated impacts on forests



**A. PES cases**

Wunder et al. (2020)



**C. PES vis-a-vis other tools**

## **IV. Concluding perspectives**

# Payments for watershed services

1. A **classical PES** setup: well-defined ES users, providers, and a payment vehicle that just keeps running (water!)
2. PES is used worldwide much more for **forest conservation** than for planting woodlots
3. In **water-stressed settings**, quality-quantity tradeoffs around woodlot planting: adding trees may shift blue to green water (more transpiration).
4. **Monitoring** watershed ES impacts tricky, but PWS have had decent **land-use effectiveness** – though depending much on their design!

# Watershed PES in Europe

1. In **Europe**, so far very little private willingness to pay for watershed service ("state is responsible!")
2. Future risks as potential **game changers**:  
adapting to climate change? weather anomalies (droughts, floods, storm)? Mega-wildfires?
3. Public PES: reforms of Common Agricultural Policy?
4. Private PES: increased risks, regulatory failure?
5. PES  $\Leftrightarrow$  forest cover link more complex in European landscape mosaics: sometimes more trees, sometimes restricting forest regrowth (wildfires, water quantity, recreation, cultural ES).



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**Payments for  
Watershed Services**

**The Bellagio Conversations**

[https://www.researchgate.net/publication/236027847\\_Payments\\_for\\_Watershed\\_Services\\_The\\_Bellagio\\_Conversations](https://www.researchgate.net/publication/236027847_Payments_for_Watershed_Services_The_Bellagio_Conversations)