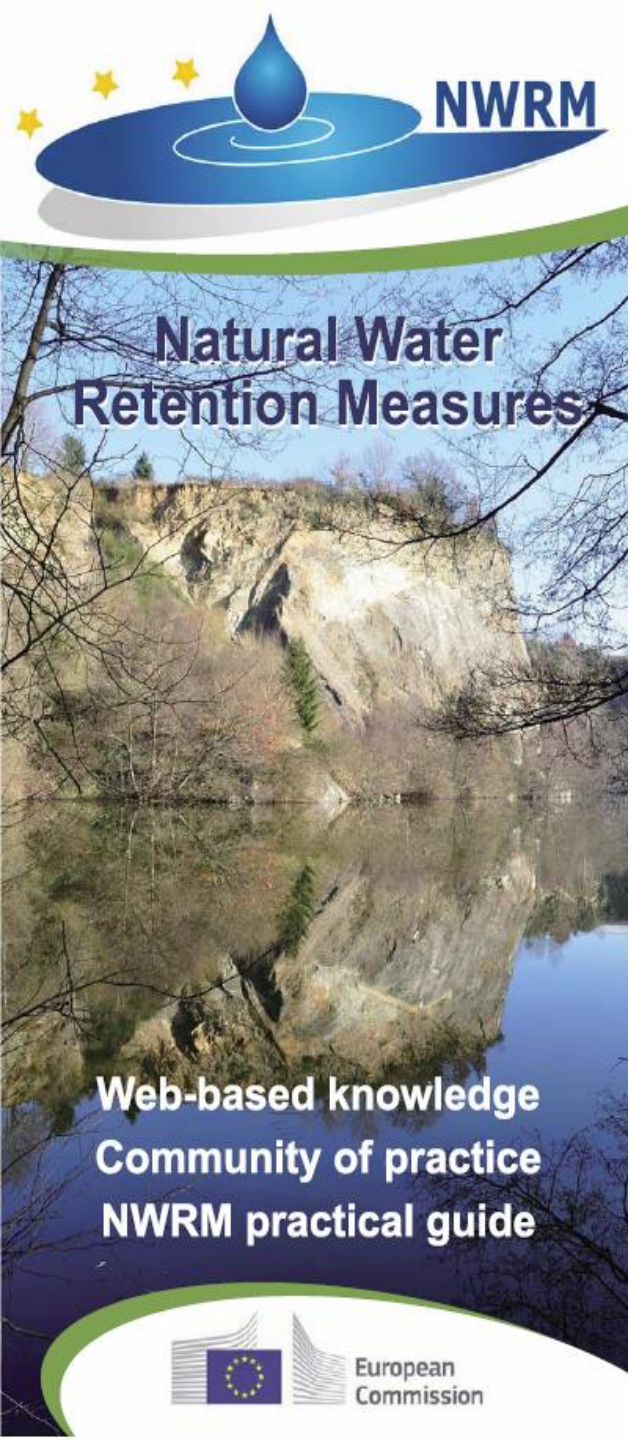

Pilot Project - Atmospheric Precipitation - Protection and efficient use of Fresh Water: Integration of Natural Water Retention Measures in River basin management

Service contract n° ENV.D.1/SER/2013/0010

Policy and economic issues related to the multiple dimensions of NWRMs

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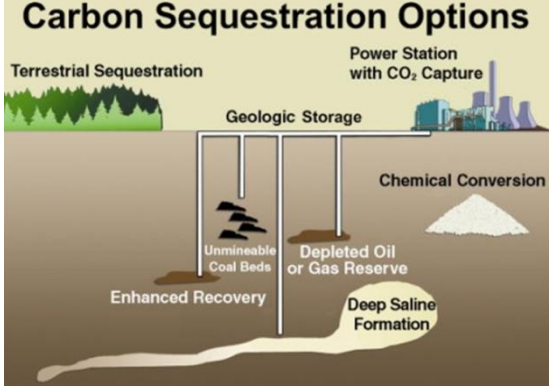
institute imdea water

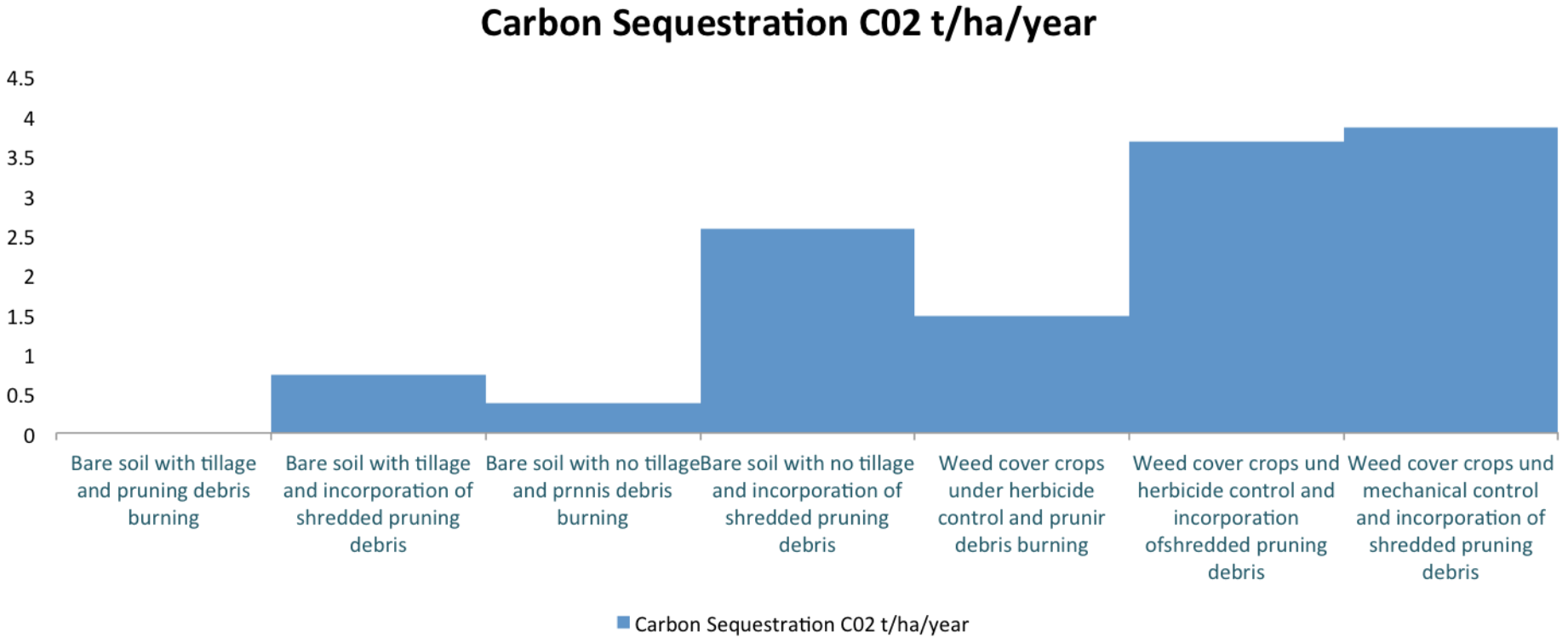
ACTeon environment

Why better not call them

Natural Carbon Sequestration Measures?



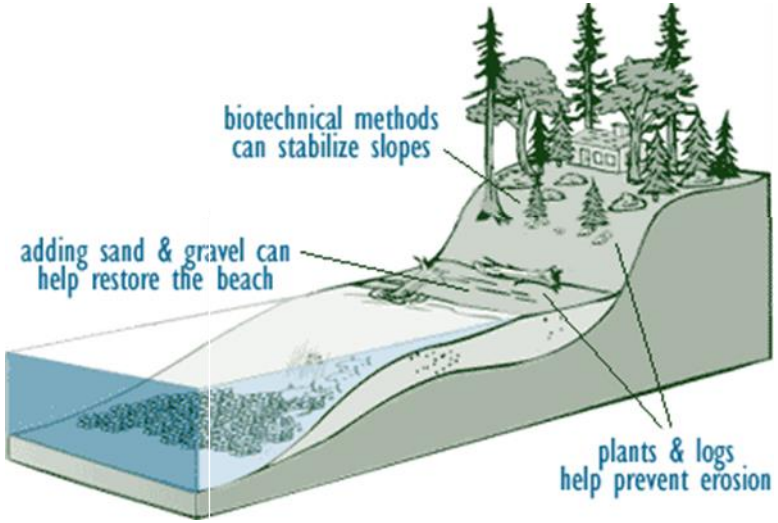
Source: Nieto et al. (2010): Smith et al. (2008): Sofo et al. (2005): IPCC (2003).

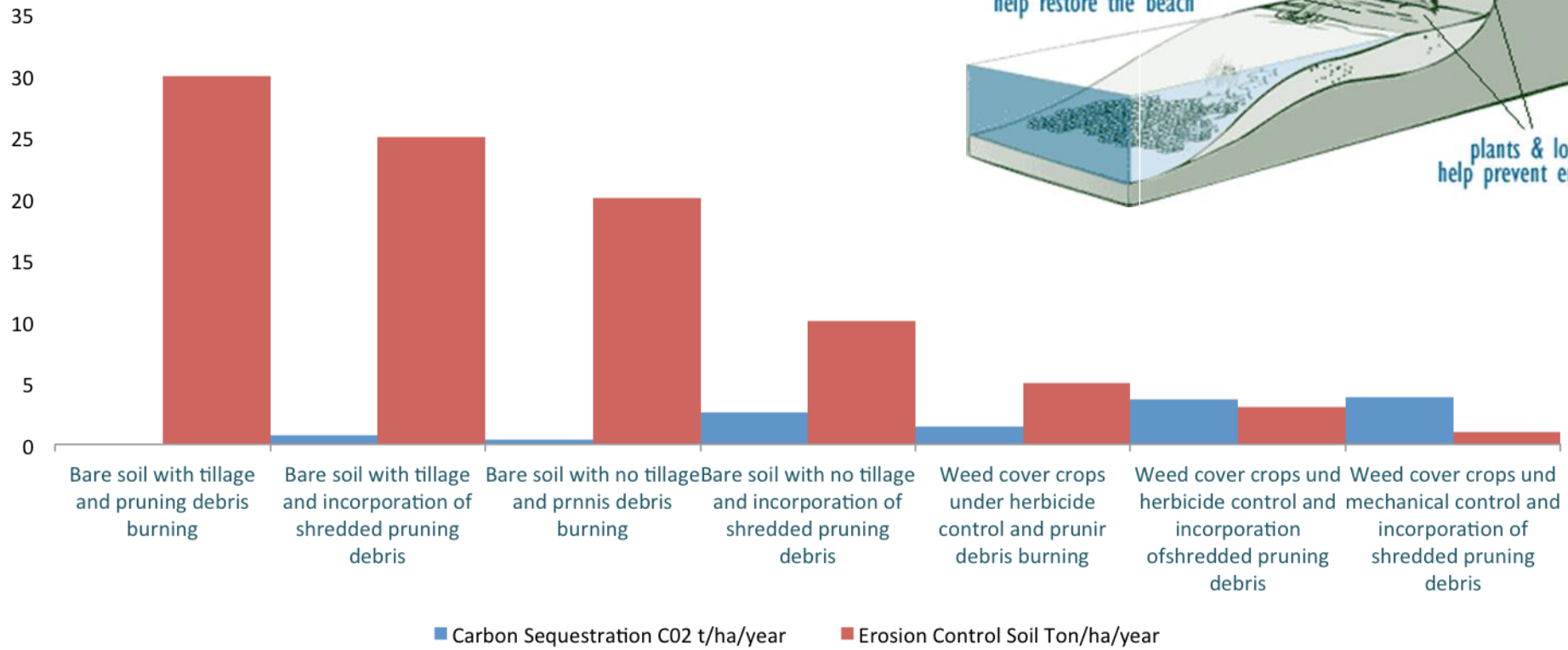


Why better not call them

Natural Sediment Retention Measures

Source: Gómez-CaIgo et al (2009): Francia et al (2006).

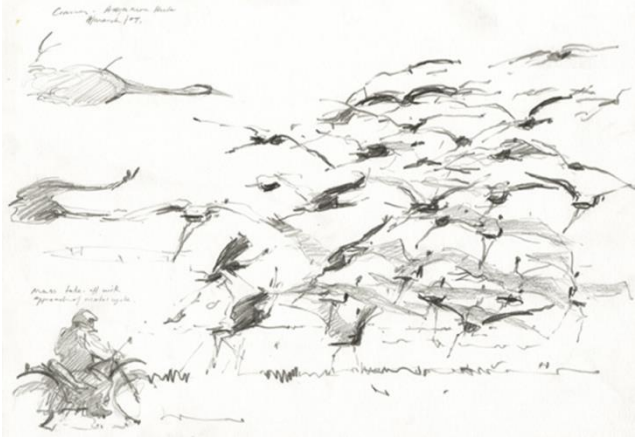


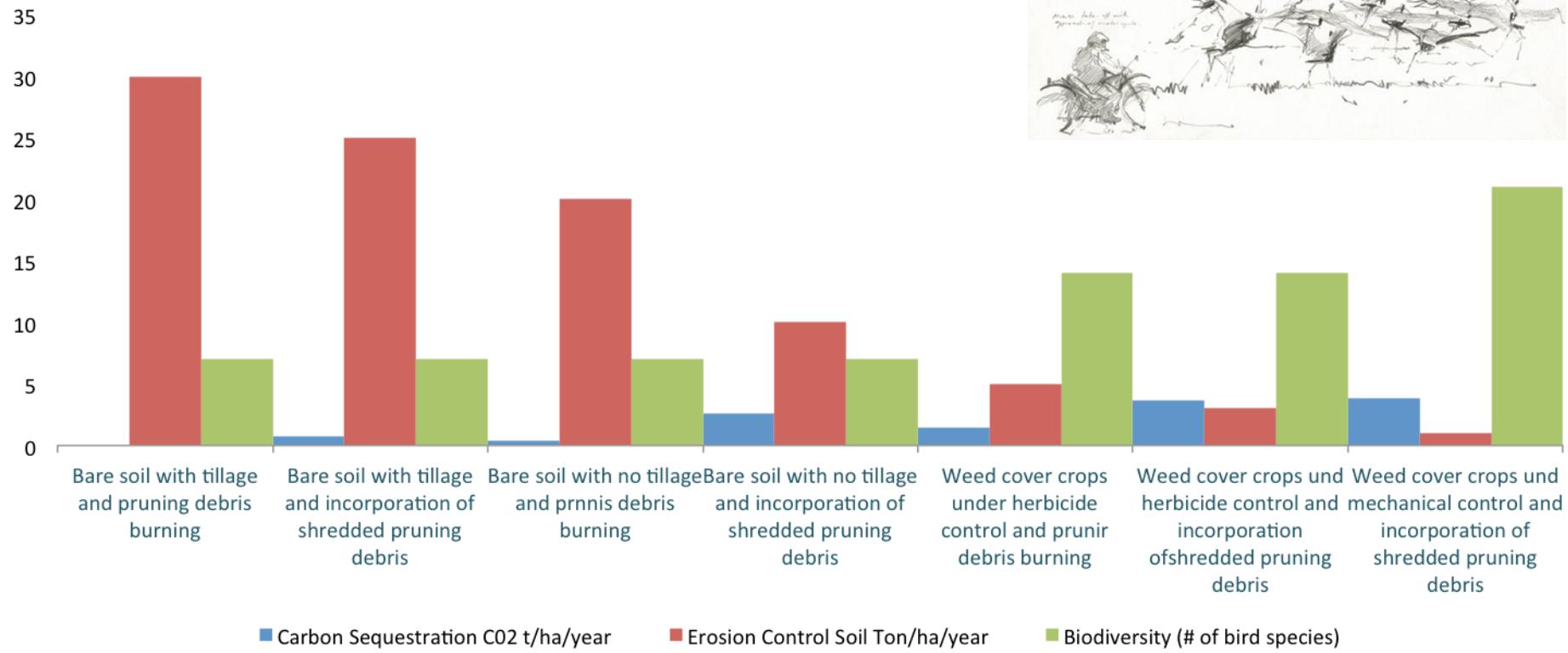


Why better not call them

Natural Birds Retention Measures

Source: Duarte et al. (2010): De la Concha et al. (2007); Muñoz-Cobo et al. (2003).

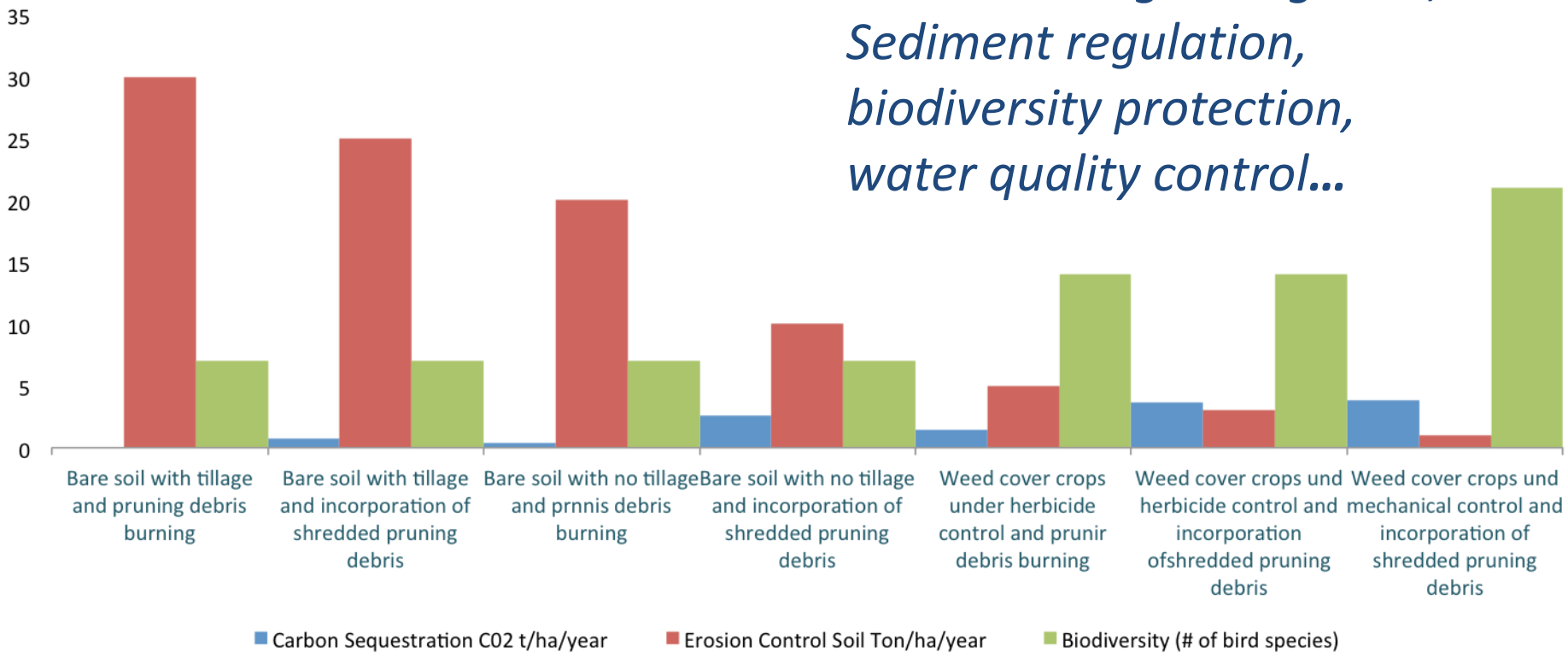




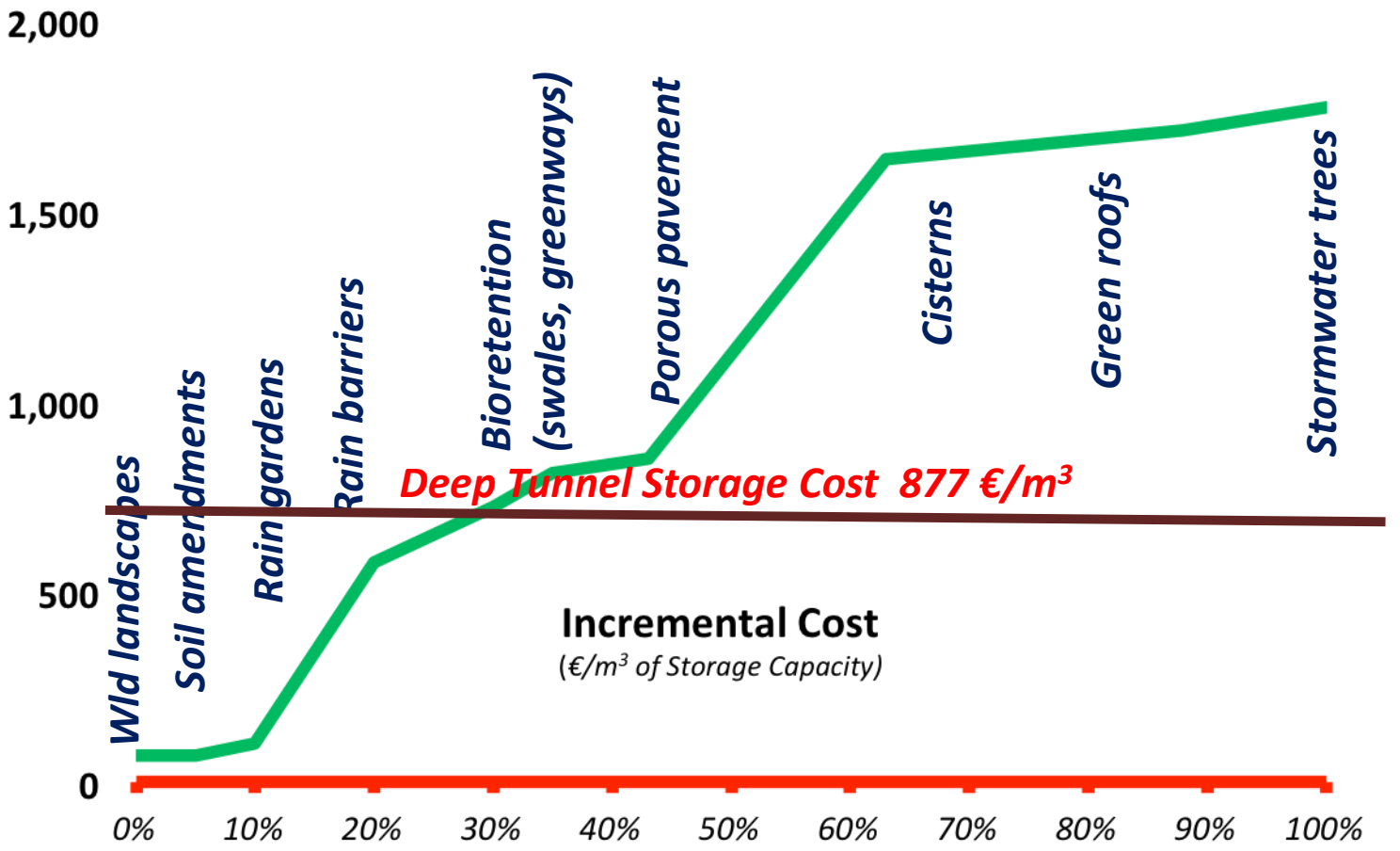
Because Natural Water Retention Measures is what they really are

A class conservation practices based upon making water work to restore different ecosystems functions and make possible the delivery of multiple ecosystems services such as:

Climate change mitigation,
Sediment regulation,
biodiversity protection,
water quality control…



Sometimes the cost effectiveness advantages of NWRM on financial grounds are clear…



Source: Own calculations based on MMSD (2011)

but just enough to pick the low-hanging fruit?

But traditional cost-effectiveness analysis uses only one environmental benefit (7) and just one economic criteria (2).

Economic Benefits

1 Green Job Opportunities
2 *Reduced infrastructure Cost*
3 Reduced Pumping and Treatment Cost
4 Increased Property values

Social Benefits

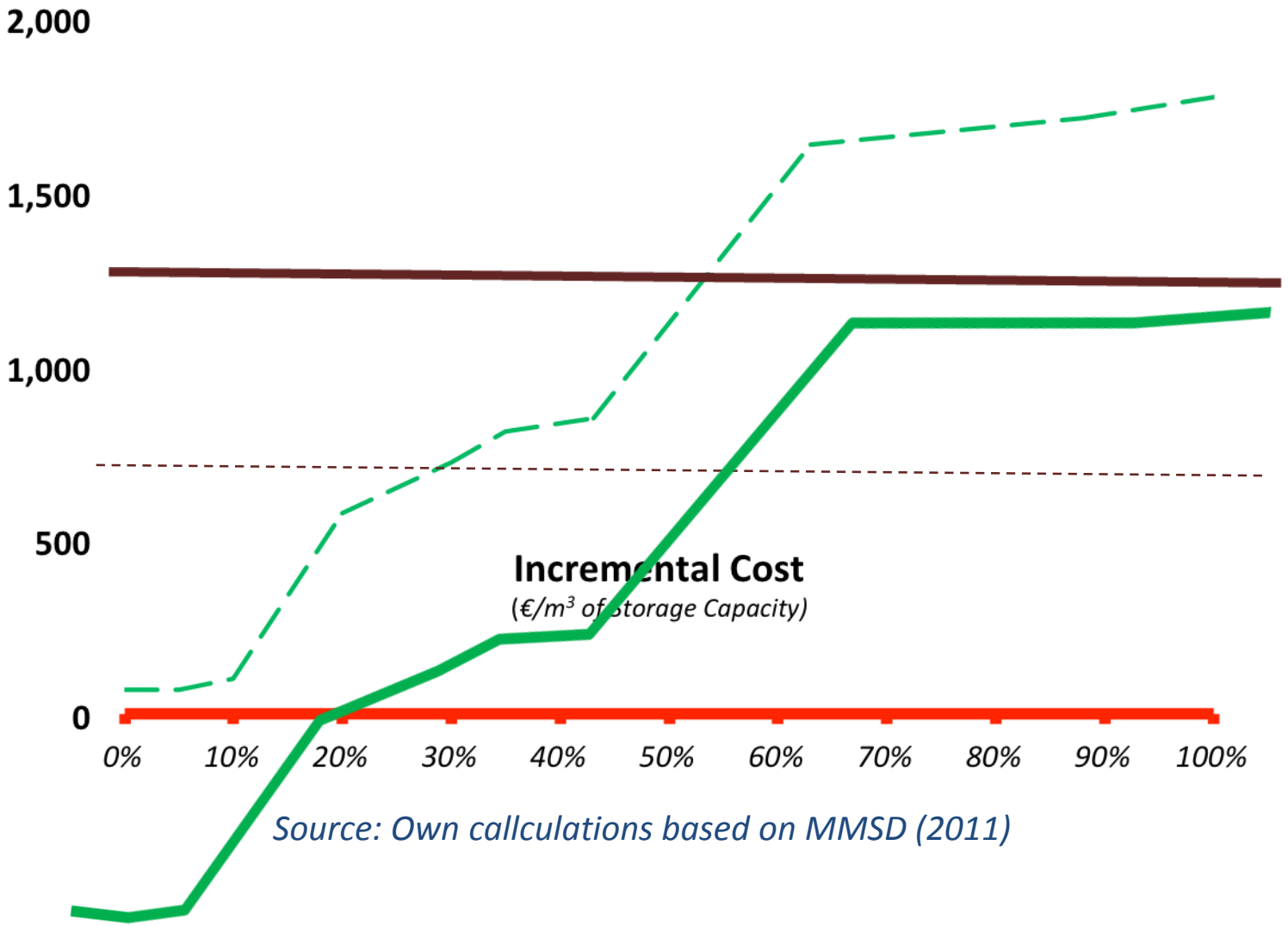
5 lmproved Quality of Life and Aesthetics
6 Improved Green Space

Environmental Benefits

7 *Captured Storm-water Runoff*
8 Reduced pollutant loads
9 Increased Groundwater recharge
10 Reduced Carbon Emissions
11 Reduced Energy Use for Cooling
12 Improved Air Quality

And then it ignores 10 of the 12 benefits of any sustainable urban drainage system.

But standard cost-effectiveness leads to biased comparisons against NWRM and in favour of business-as-usual solutions



Source: Own callculations based on MMSD (2011)

What makes a NWRM special is not the ends pursued but the means used

A working example:

Would recharging an aquifer with treated wastewater at a cost of 1 €/m^3 be a good option in an agricultural area where water productivity averages only 0.2 €/m^3?

A LAST (Land Application System with a forest Mass), besides water injection, obtains the following co-benefits:
(E.g. Carrión de los Céspedes, small village in Salamanca, western Spain)

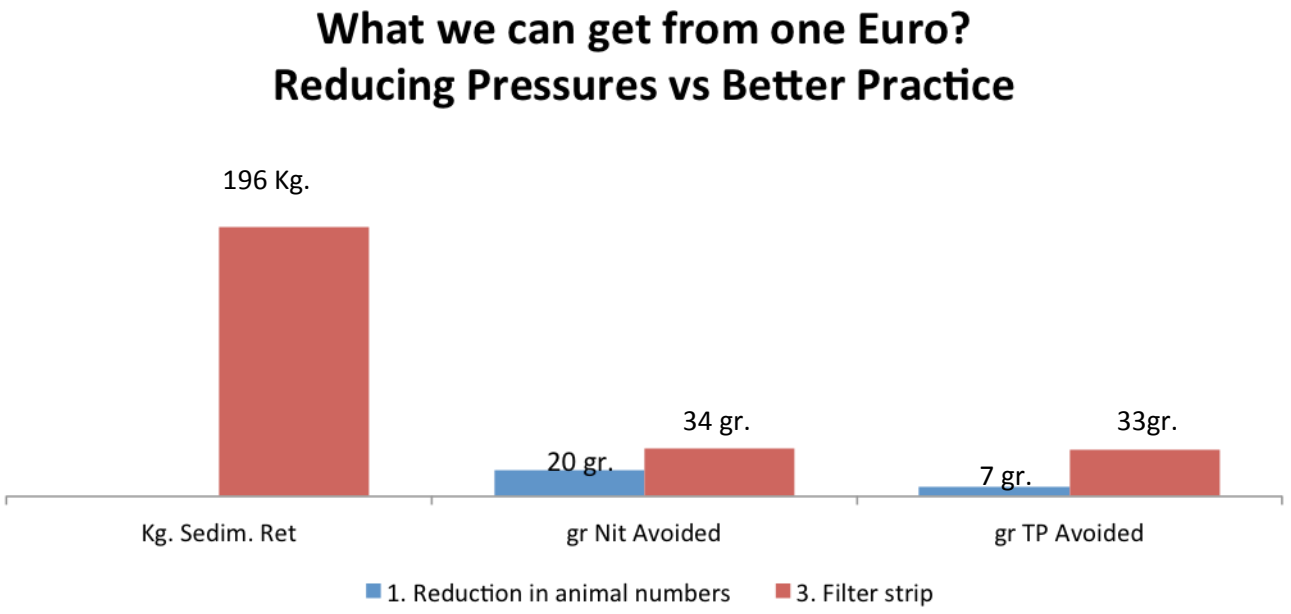
- Savings in wastewater treatment (0,30-0,60 €/m^3)
- Wood production (0,04 to 0,10 €/m^3)
- Carbon sequestration (6,3 tons/Ha)
- Landscape, and other recreation amenities.

The benefits that might justify NWRMs are context specific (no one size fits all)

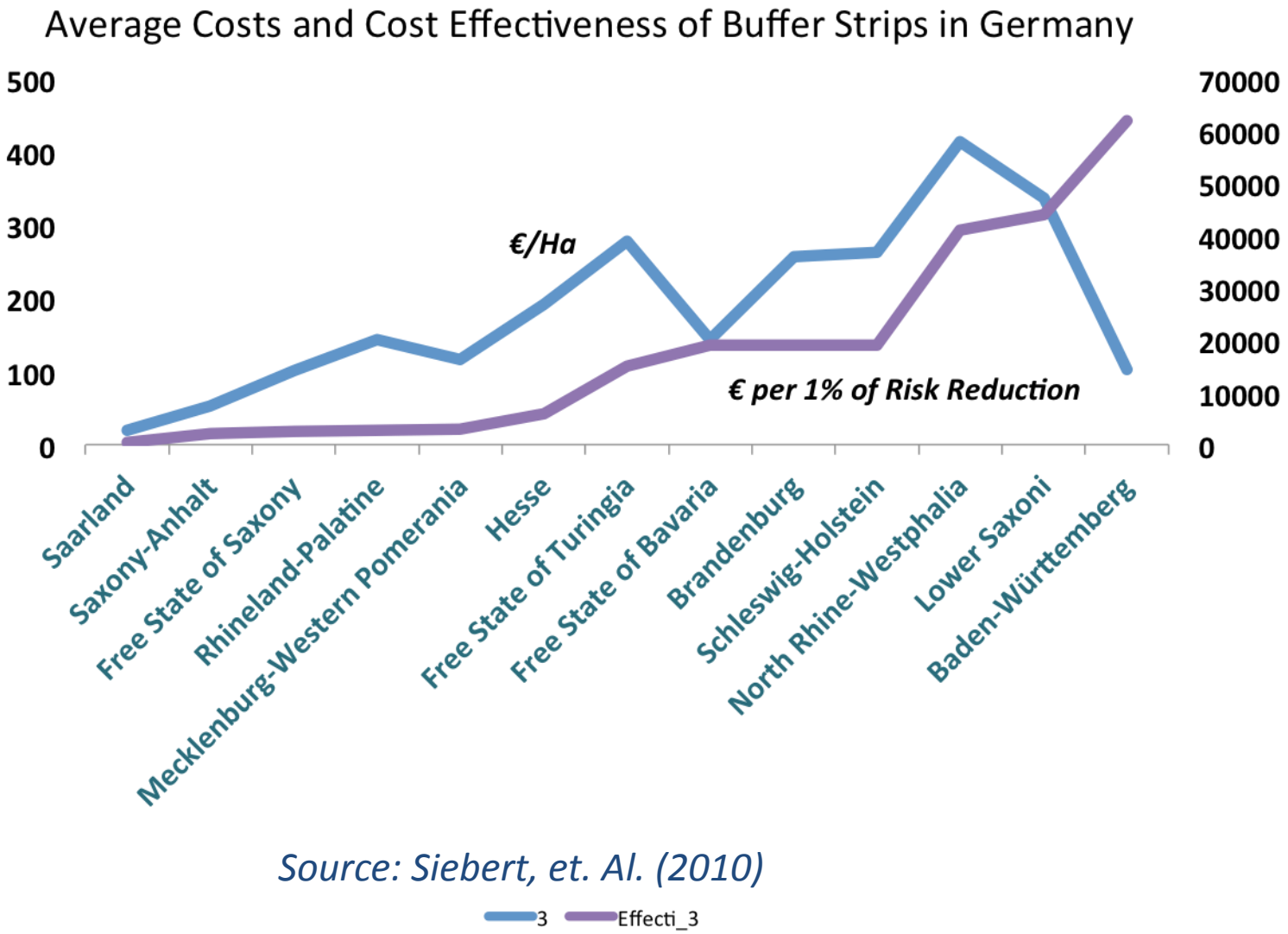
Sanz, J.; Miguel. A. Bustamante, I. Tomás, A. and Goy, J. (2014) Technical Financial and Location Criteria for the Design of Land Application System Treatments. Environmental earth Sciences. Vol. 71.1:13-21.
•Villar, A. Bustamante, I. Gómez, C.M. and Miguel, A. (2011) Land Application Systems and its Assessment on Financial and Economic Criteria: The Experience of CENTA in Southern Spain. IMDEA.
•Ortuño, F.; Molinero, J. ; Garrido, T. and & Custodio (2011) Seawater Injection Barrier Recharge with reclaimed water at Llobregat Delta aquifer (Spain). 8th IWA INTERNATIONAL CONFERENCE ON WATER RECLAMATION & REUSE. Barcelona, Spain. 26-29 September 2011

NWRMs' face value:

Turning cost-effectiveness analysis upside down



Source: Panagopoulos, et. al. (2011)



Source: Siebert, et. Al. (2010)

The same happens with opportunity costs. Then cost-effectiveness is context specific

Natural Water Retention Measures

- ✓ NWRMs are multi-purpose. Rather than one cost one benefit, they are one cost multiple benefits.
- ✓ Assessment and valuation methods must be improved to uncover the multiple benefits and costs advantages of NWRMs.
- ✓ Natural water retention can make outstanding contributions to the purposes of water management (reducing flood peaks, recharging aquifers, attenuating run-off, improving quality, etc.)
- ✓ Besides that, NWRMs are means to make ecosystems work and provide multiple services and co-benefits.