



Natural Water Retention Measures

Web-based knowledge
Community of practice
NWRM practical guide



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

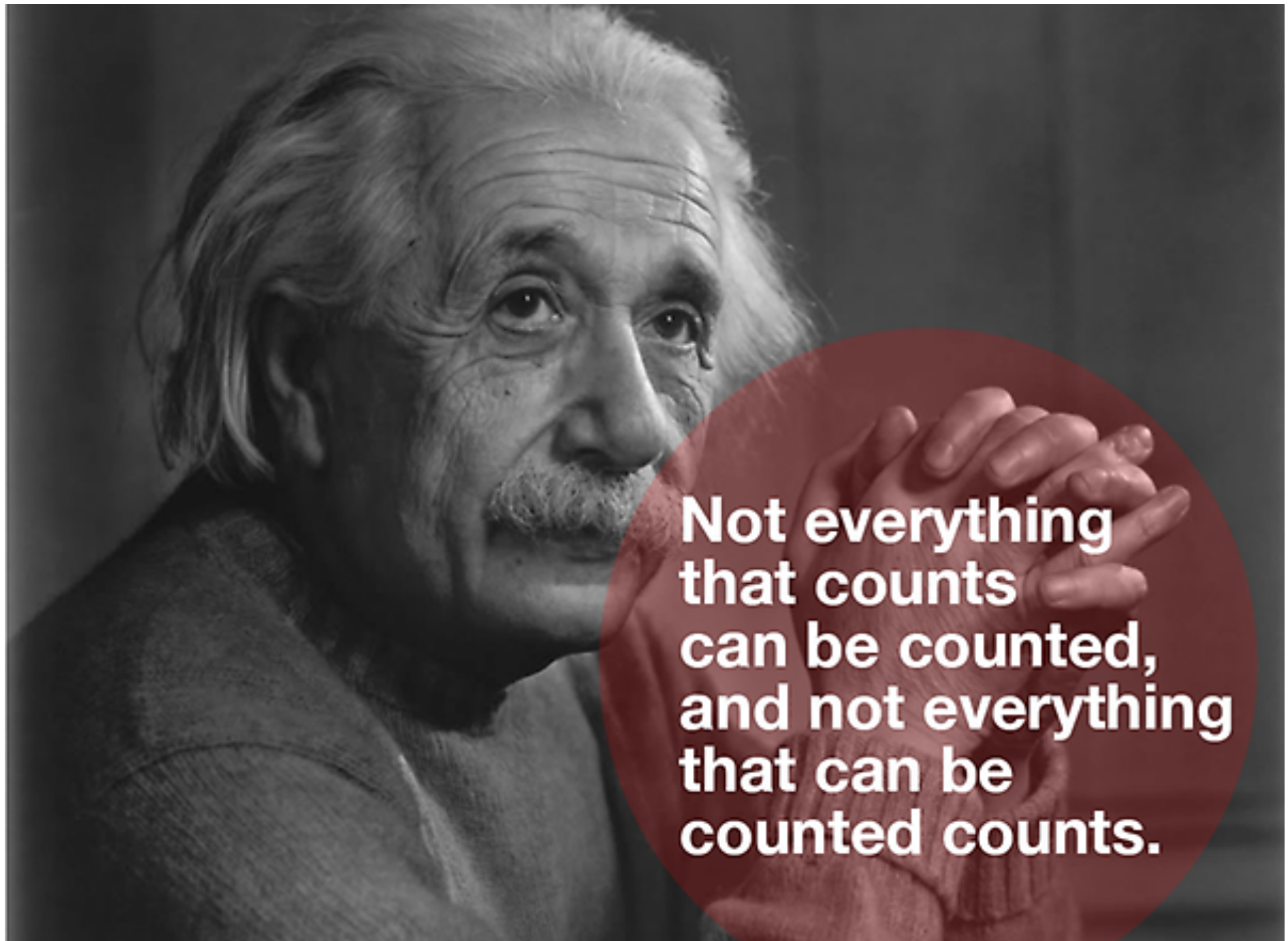
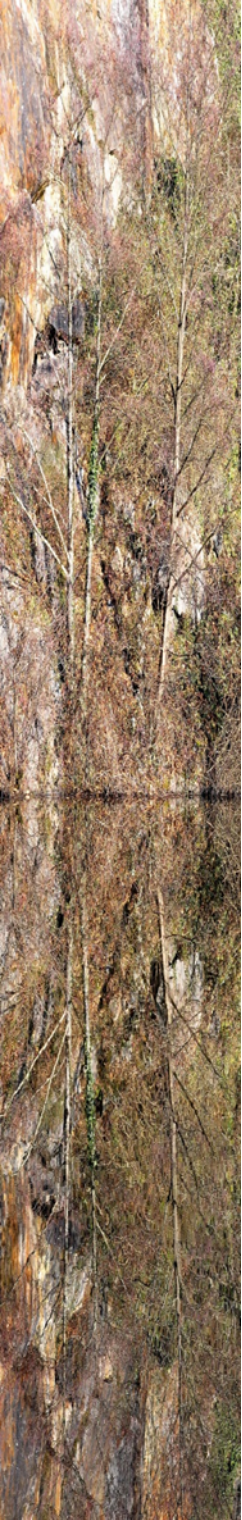
Service contract n°ENV.D.1/SER/2013/0010

Economic evidence of benefits of NWRM

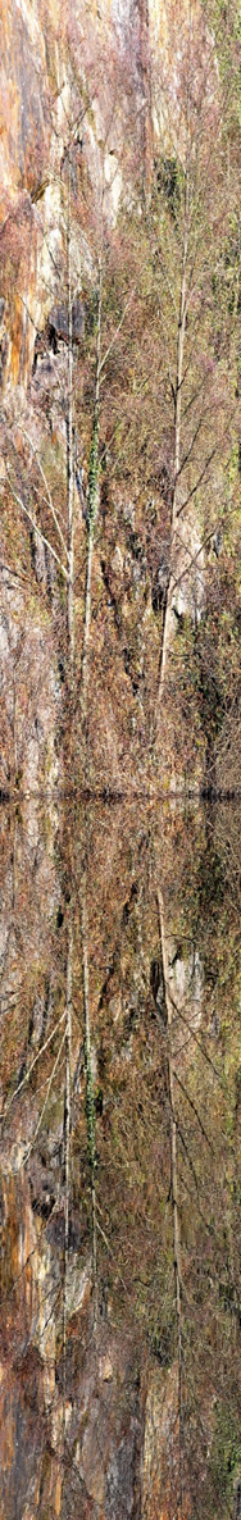
Gonzalo Delacámara



NWRM Mediterranean Workshop // Turin (Italy), September 11th-12th, 2014



**Not everything
that counts
can be counted,
and not everything
that can be
counted counts.**



Confluence of Arga and Aragón rivers, Navarre (Northern Spain).

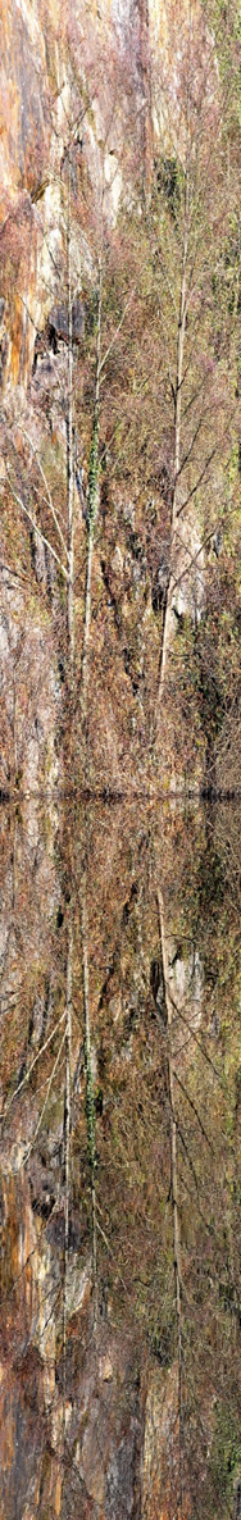
Source: Magdaleno, F., 2014. River and floodplain restoration – natural water retention for combined outcomes (CEDEX). Presentation NWRM Mediterranean Workshop, Madrid, January 28th-29th, 2014.



Overflow of the Arga river in the riverine towns of Villada and Burlada in January 2013 (Greater Pamplona, Navarre, Spain)

Source: www.diariodenavarra.es; 16/01/2013.

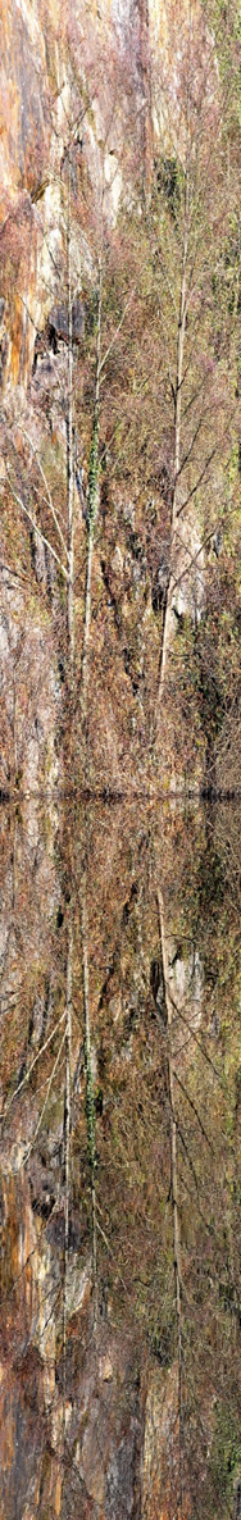
http://www.diariodenavarra.es/noticias/navarra/pamplona_comarca/2013/01/16/las_inundaciones_alteran_vida_normal_comarca_pamplona_104160_1002.html



National motorway N-113 flooded due to the overflow of Arga river in June 2013. Navarre (Spain)

Source: www.lainformacion.com; Monday, 10/06/13 -

http://noticias.lainformacion.com/medio-ambiente/rios/la-carretera-n-133-pamplona-madrid-cortada-en-castejon-por-las-inundaciones_hCU4EPd05G1eDVCpgAGd4/



Overflow of Arga river in Pamplona (June 2013. Navarre, Northern Spain)

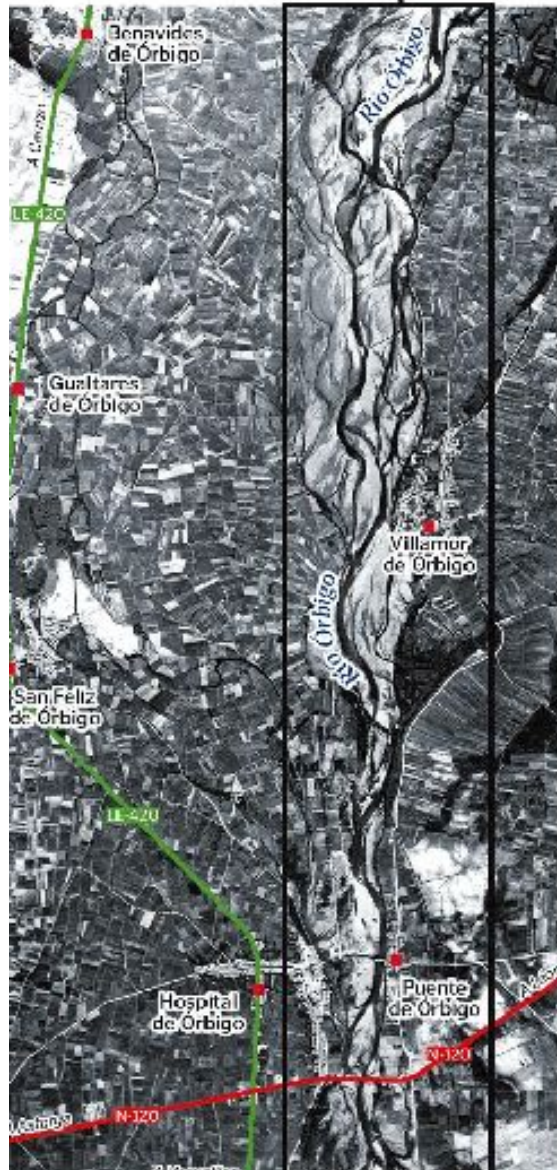
www.lainformacion.com; Sunday, 09/06/13 -

http://noticias.lainformacion.com/catastrofes-y-accidentes/inundaciones/el-ayuntamiento-de-pamplona-mantiene-el-nivel-de-alerta-por-las-inundaciones_5H6V18cyyhulxYIOwnSjK2/



EL ÓRBIGO AYER Y HOY

Fotografía del vuelo americano sobre el río Órbigo
Realizada el 16 de agosto de 1956



Cauce del río en 1956



Fotografía de satélite que localiza la misma superficie
Año 2008

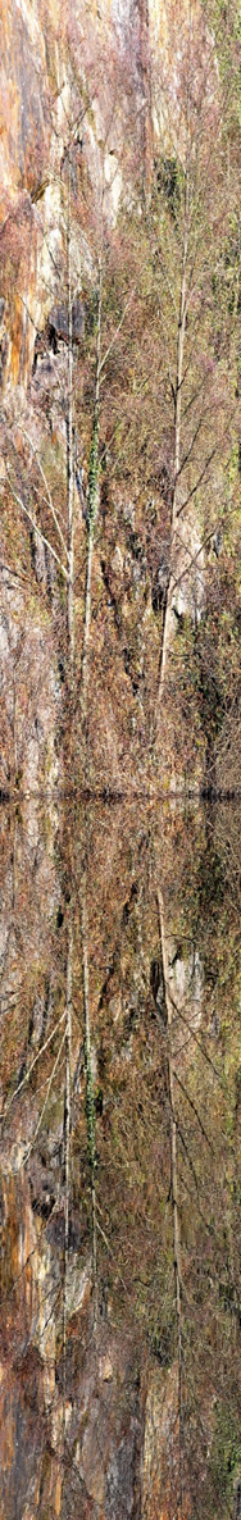


Cauce en el 2008



Órbigo river channel in 1956 and 2008. Effects of channelization and alteration of the river hydromorphology.

Source: Duero River Basin Authority (Confederación Hidrográfica del Duero, CHD).



Poplar crops in the Órbigo River Basin (Castille and León, Spain)

Source: Rodríguez I., Santillán J.I., Huertas R., Ortega L., 2012. The Órbigo River Restoration Project and its implications in flood risk prevention. (WGF Thematic Workshop: Stakeholder Involvement in Flood Risk Management. 17, 18 April, 2012. Bucharest-Romania. Session 4: Working with institutional stakeholders and other sectors, in particular in land use)



Poplar crops are compatible with flooding episodes. Órbigo River Basin (Castille and León, Spain)

Source: Duero River Basin Authority (Confederación Hidrográfica del Duero, CHD), 2013. River Órbigo Restoration Project.

Why do NWRM hardly ever seem to be cost-effective...

... even when they are? (Ashton Eaton vs. Usain Bolt, a parable by Carlos M. Gómez)



Bottom line // a fair comparison between a specialist and a multipurpose measure should be based on more than one criterion.



Does a NWRM help if your baby is crying? Are NWRM to blame when the soup cools down?

- Catchment scale is of paramount importance – individual measures may have little effect; it is rather the cumulative effect of (a set of) measures that is relevant when factoring in economic benefits.
- Challenges: when it comes to assess not only the performance & effectiveness of NWRM but also their contribution to welfare, benefits are often widespread – quite often interventions in one place (i.e. upstream) may generate benefits elsewhere (i.e. downstream). **Cost-effectiveness is a matter of choosing the right system boundaries rather than merely a monetary question.**
- This also has implications in terms of relevant (direct & indirect) benefits: NWRM provide multiple benefits way beyond water retention. **Water retention indeed is an ancillary benefit of measures (also) serving other purposes. If some benefits are overlooked, NWRM would not seem cost-effective (i.e. lack of incentives for engagement).**
- Valuing benefits is a challenging issue – currently evidence on effectiveness mostly refers to design conditions, not actual performance (this is a main drawback for economic valuation).



The need to go beyond (financial) project appraisal

- Avoiding self-indulgence – NWRMs are good in themselves because they serve to restore aquatic ecosystems and thus the biophysical flows of ecosystems services they deliver.

But

- Self-evidence of advantages tends to ignore the **opportunity cost** of the resources implied and the existence of alternatives that may serve the same purpose.
- Besides its rationale for restoration (and emulation of natural functions) NWRM need to be **judged against its potential contribution to other objectives** as stated in the WFD, FD, EU 2020 Biodiversity Strategy, Climate Change Adaptation Strategy, CAP reform...).
- Properly designed and implemented NWRM represent **opportunities that need to be adapted for the purposes of water management.**



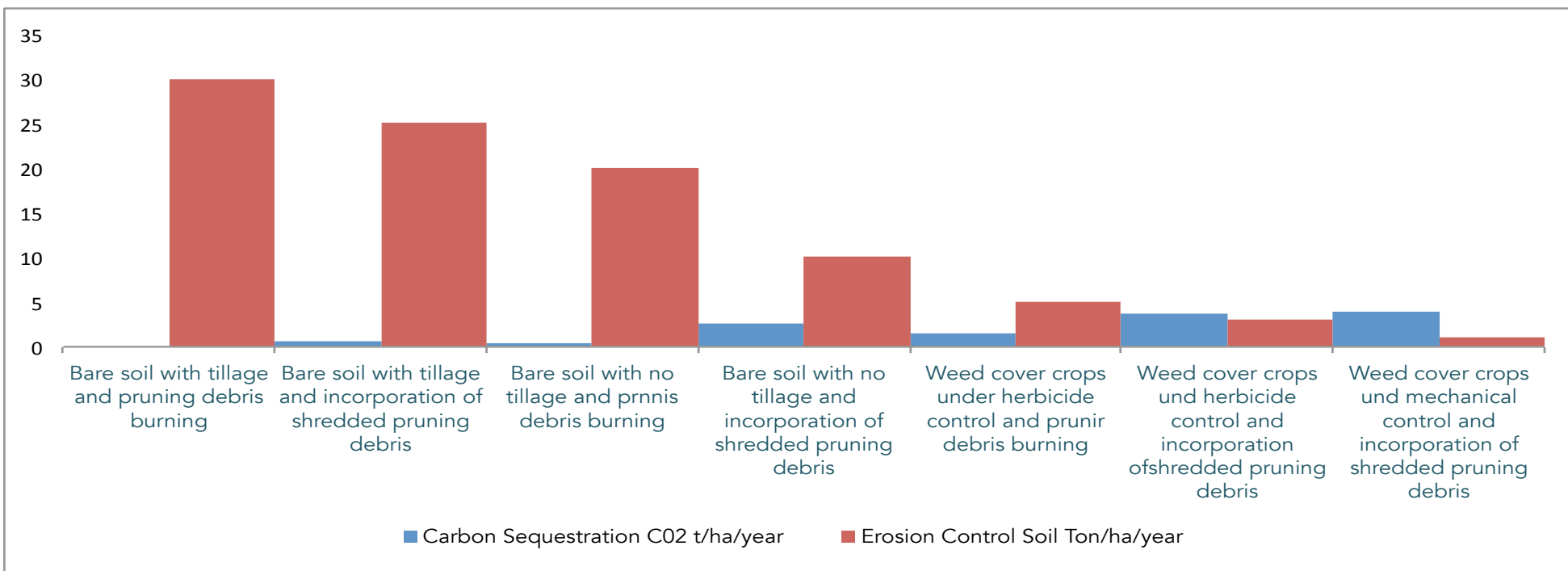
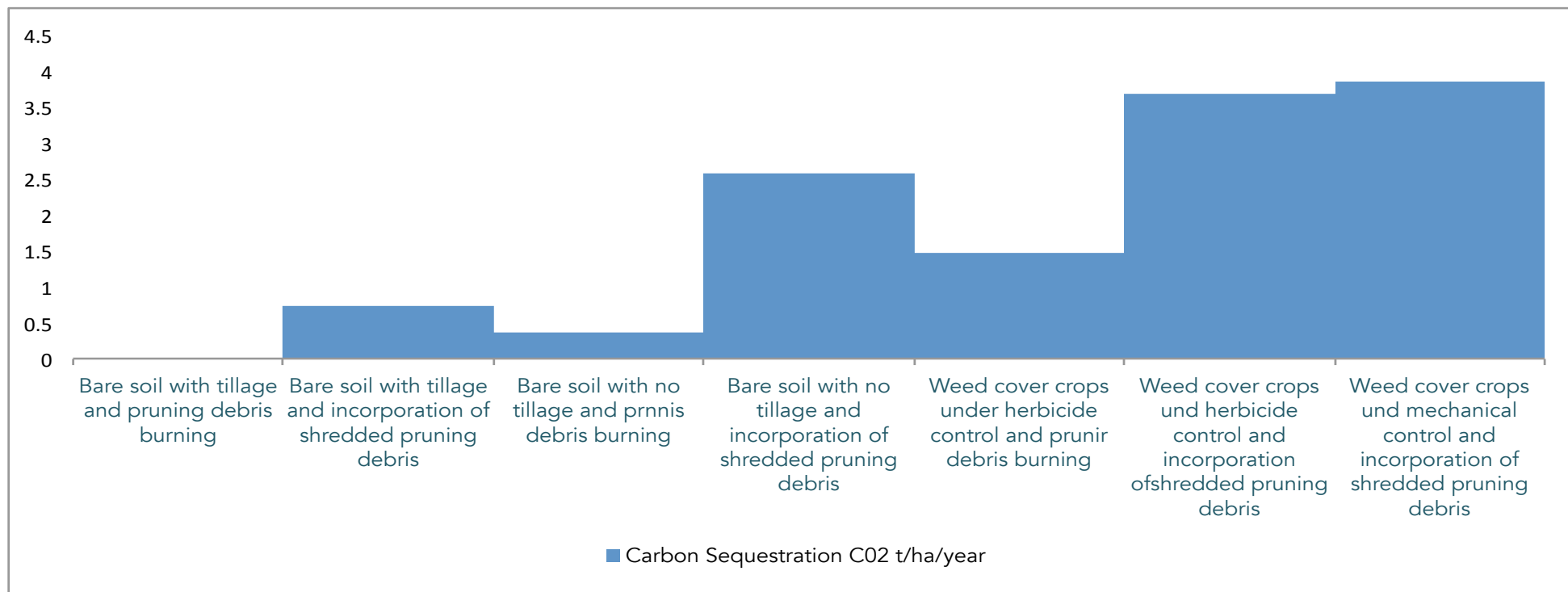
It's (almost) all about incentives

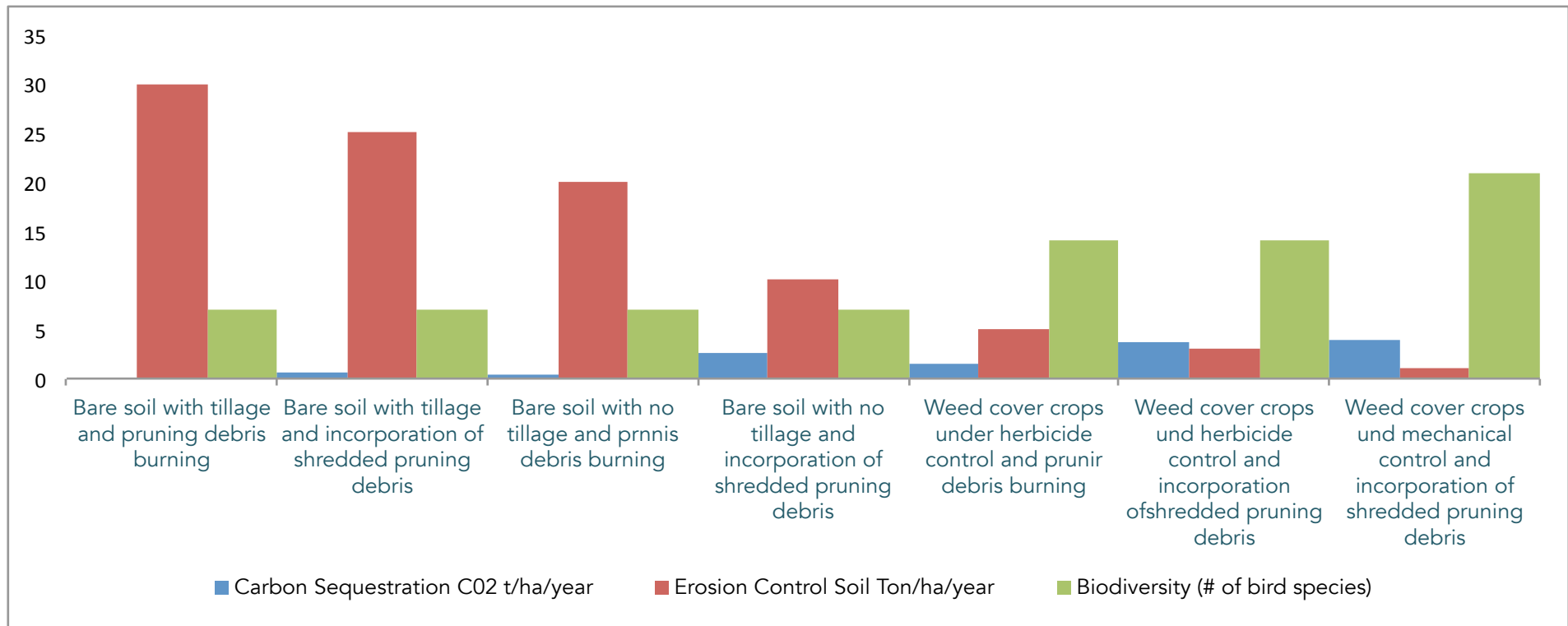
- Prevailing incentives favour the maintenance of the *status quo* (in semi-arid water scarce areas in the Mediterranean, **incentives to retain water** are weaker than in relatively water abundant areas).
- A NWRM might be rational from an overall cost-benefit perspective but still non-appealing for those in charge of implementing it. Voluntary acceptance, in forestry and agriculture, requires **properly designed economic incentives** - **The CAP reform** (CAP pillar 1: greening but also RDP) can be one example (more: ESIF // partnership agreements; CCA & DRR; R&TD and innovation funds; LIFE; EIB).
- If NWRM's benefits are not public goods (non-rival and non-excludable) **how could beneficiaries pay for them?**
- The cost-recovery issue: if in addition to water management, NWRM serve many other purposes **how should these measures be financed?**
- Can **payment for environmental services** be based upon public information and ex-post evaluation?

Please, bear trade-offs in mind (critical from an economic viewpoint)

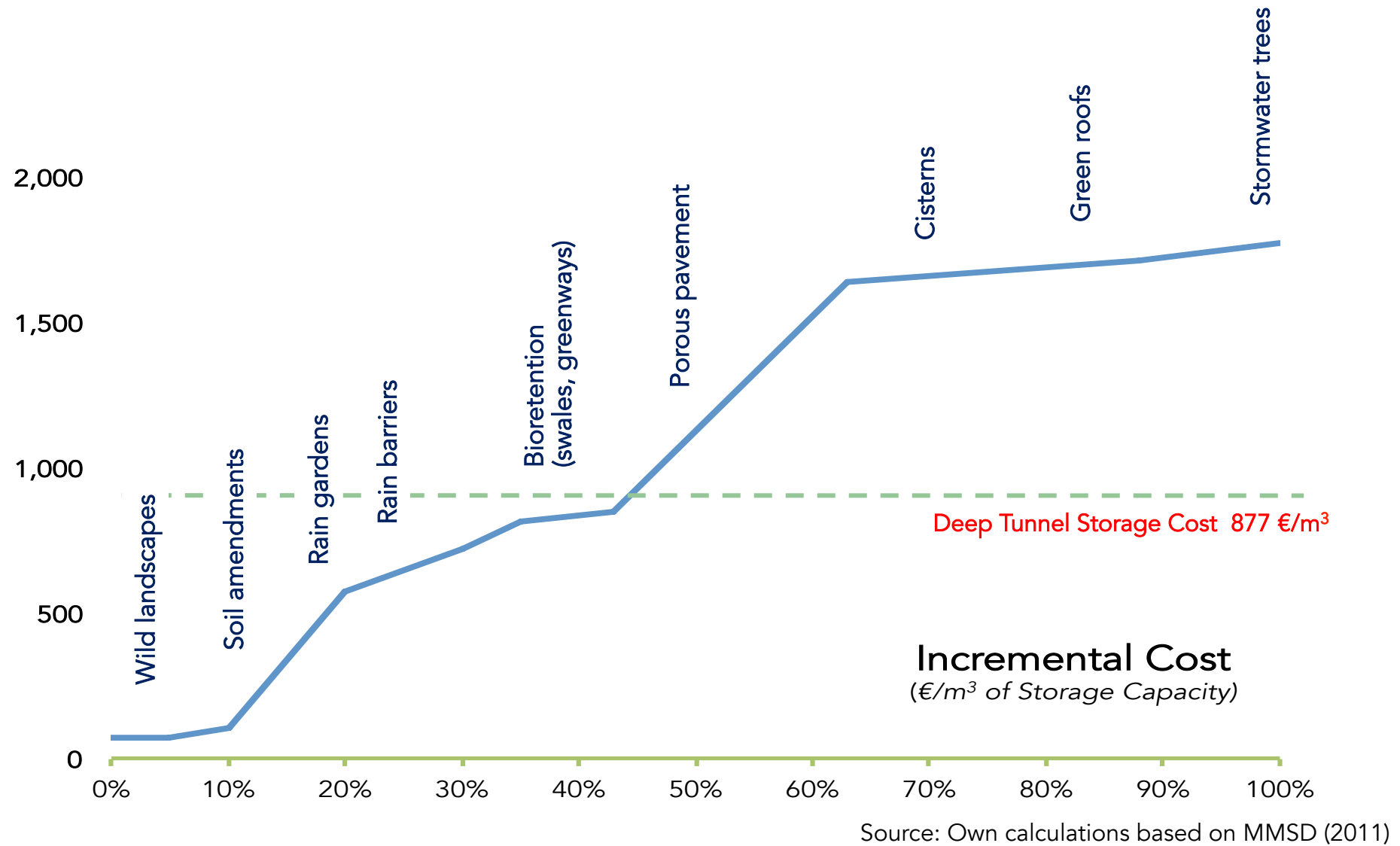
3.4 Crop practices					1.2 Afforestation in mountainous areas				
Change in [%] from the baseline 2030 scenario					Change in [%] from the baseline 2030 scenario				
For water stress change in [days per year] from					For water stress change in [days per year] from				
	Fast flow [%]	Evapotrans. [%]	Groundw. recharge [%]	Water stress [d per year]	Region	Fast flow [%]	Evapotrans. [%]	Groundw. recharge [%]	Water stress [d per year]
N. Scandinavia	0.0	0.0	0.0	-0.1	N. Scandinavia	-0.2	0.0	-0.1	1.0
S. Scandinavia	-0.3	0.1	0.0	-0.5	S. Scandinavia	-0.5	0.2	-0.2	0.4
Baltic	-1.1	0.4	-0.8	-1.4	Baltic	-0.5	0.2	-0.6	0.6
Denmark/N.Germany	-2.5	1.0	-1.9	-3.0	Denmark/N.Germany	0.2	0.0	-1.3	0.4
Odra/Vistula	-1.1	0.6	-2.1	-2.0	Odra/Vistula	-0.1	0.1	-0.3	0.6
Elbe to Ems	-1.2	0.7	-1.4	-2.0	Elbe to Ems	-1.1	0.4	-0.9	0.4
Rhein to Schelde	-0.9	0.6	-0.5	-2.0	Rhein to Schelde	0.0	0.0	-0.2	0.6
GB	-0.9	0.5	-0.7	-1.2	GB	0.4	-0.5	0.0	0.6
Irland/N.Ireland	-0.3	0.2	0.0	-0.9	Irland/N.Ireland	1.5	-0.8	0.1	0.6
France Atlantic	-2.2	1.0	-1.6	-2.6	France Atlantic	-0.3	0.2	-0.4	0.3
Danube	-1.9	0.8	-2.4	-1.8	Danube	-0.3	0.2	-0.4	1.2
Iberia Atlantic	-1.1	0.7	-1.1	-0.9	Iberia Atlantic	-0.1	0.1	-0.3	0.4
Iberia Mediterranean	-1.4	0.6	-1.7	-0.7	Iberia Mediterranean	-0.4	0.2	-0.3	0.3
France Mediterranean	-0.5	0.3	-0.3	-1.0	France Mediterranean	-1.0	1.3	-0.3	0.5
Po	-1.2	0.7	-0.8	-1.8	Po	0.0	0.1	-0.1	0.7
Corsica	-0.2	0.1	0.0	-0.5	Corsica	0.9	-1.0	-0.1	2.2
Sardinia	-1.5	0.7	-0.6	-1.2	Sardinia	1.2	-0.5	0.1	2.0
Sicily	-3.4	1.3	-2.5	-2.3	Sicily	0.3	-0.1	0.0	0.6
South Italy	-1.7	0.9	-0.7	-1.8	South Italy	-0.2	0.3	-0.3	0.8
Adige/Balkan	-0.5	0.4	-0.1	-1.2	Adige/Balkan	0.0	0.1	0.0	0.3
Greece/Evros	-1.8	0.8	-1.4	-0.9	Greece/Evros	-0.2	0.1	-0.1	0.4

Source. JRC (2012) Evaluation of the effectiveness of Natural Water Retention Measures: Support to the EU Blueprint. to Safeguard Europe's Waters





Sometimes cost-effectiveness advantages of NWRM on financial grounds are clear...



...but just enough to pick the low-hanging fruit?



Traditional cost-effectiveness analysis uses only one environmental benefit (7) and just one economic criterion (2).

Economic Benefits

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

Social Benefits

- 5 Improved quality of Life and Aesthetics
- 6 Improved Green Space

Environmental Benefits

- 7 *Captured stormwater 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.

A vertical strip of a forest landscape, showing trees with brown and orange foliage, and a rocky outcrop. The image is oriented vertically, with the top of the strip at the left edge of the frame.

Thank you!!!