

Short of sediment: so what?



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Outline

- Introduction to H2020 INSPIRATION
- Narrative short of sediment
- Your desired input

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INSPIRATION

- **INSPIRATION** = **IN**tegrated **S**patial **Pl**anning, land use and soil management **R**esearch **Ac**TION
- Initiated by the **German Federal Environment Agency**, University of Nottingham, Stadt+, Common Forum, Deltares
- Funded by EC under Grant Agreement No. 642372
- Duration: 36 months (1 March 2015 - 28 February 2018)



21 INSPIRATION Partners

Integrated Spatial Planning, land use and
soil management Research ActTION



16 countries &
International
Advisory Board



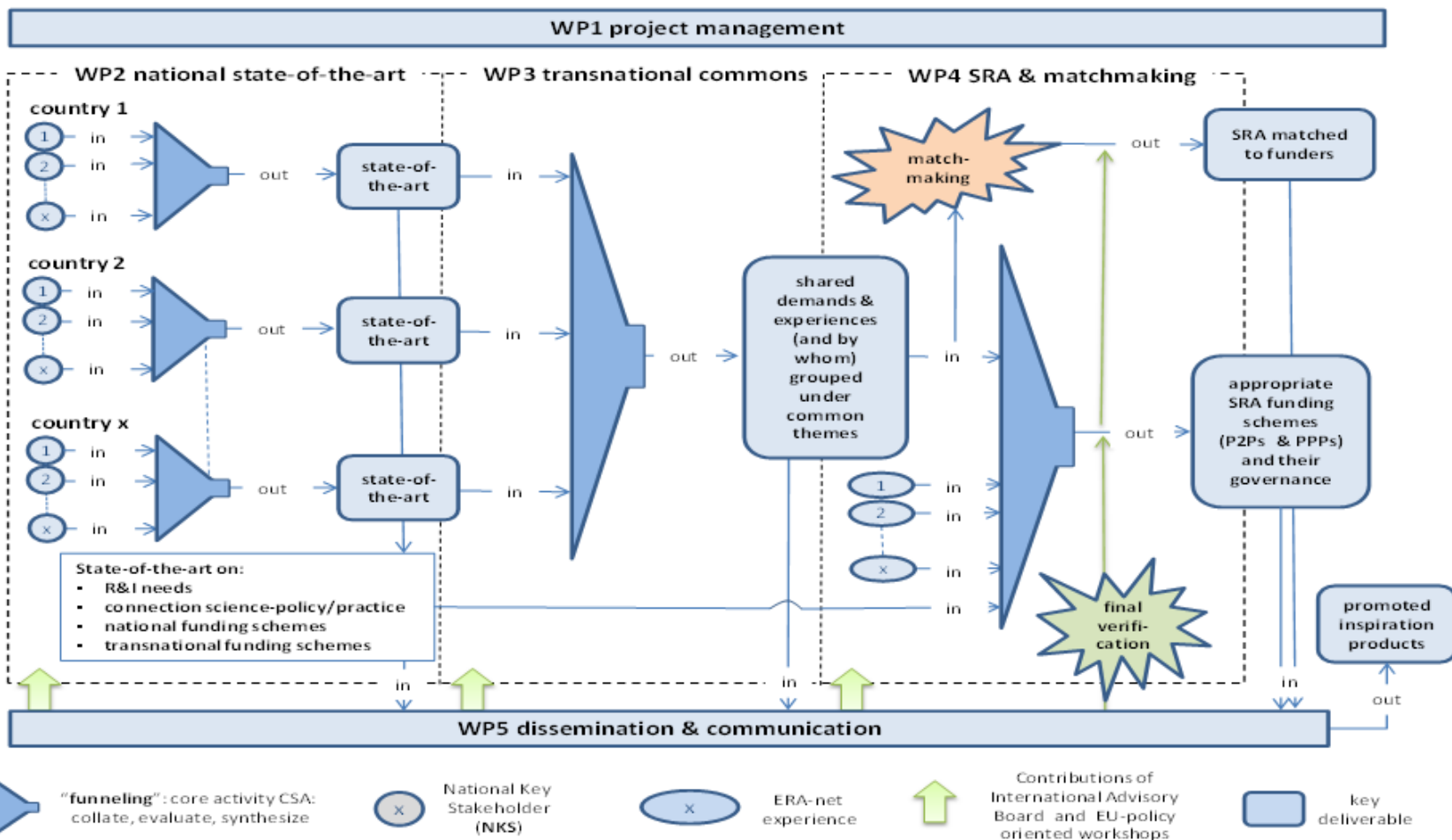
Swiss Federal Institute for Forest,
Snow and Landscape Research WSL



INSPIRATION Key Challenges

1. Identify **societal challenges** related to soil, land use and land management
2. Identify **research and stakeholders** for structuring
3. Contribute to **EU policy and research**

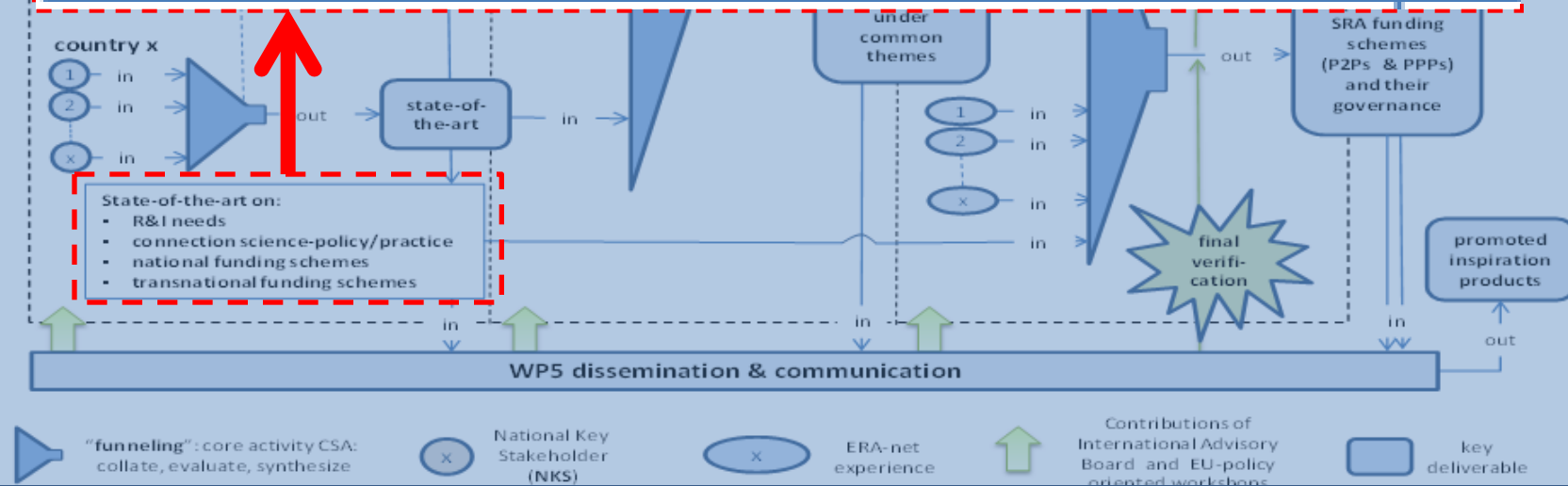
Our workflow



Our workflow

State-of-the-art on:

- R&I needs
- connection science-policy/practice
- national funding schemes
- transnational funding schemes



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Why a narrative?

Goedele Vanacker, opening presentation, Wednesday 23/9/2015:

“We are not thinking machines, but feeling machines”

- Start with why, not with what: so it is about “so what?”
- Why you do it touches more to people’s perception than what you do
- Why works on the emotional brain, what on the rational



by telling a story
you connect (hart to hart)
and thus you convey
a message*

The narrative outline

A. Introduction

B. What is the issue?

C. **So what?**

D. What can we do?

E. Where to start?

- SPI
- Research
- Funding

F. Appendix:

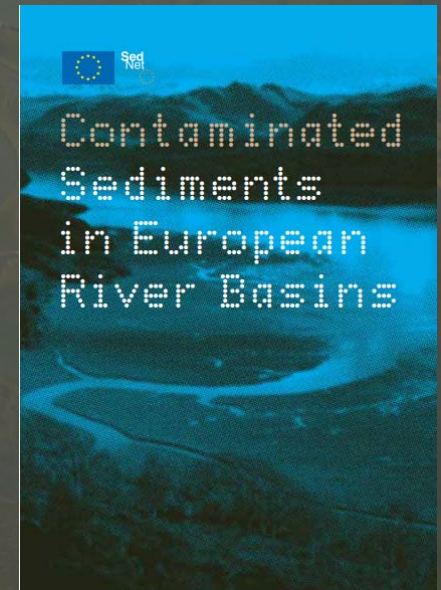
Underpinning literature/documentation/websites/presentations, relevant networks etc.

A. Introduction

“Sediment is an essential, integral and dynamic part of our river basins. In natural and agricultural basins, sediment is derived from the weathering and erosion of minerals, organic material and soils in upstream areas and from the erosion of river banks and other in-stream sources.

As surface-water flow rates decline in lowland areas, transported sediment settles along the river bed and banks by sedimentation. This also occurs on floodplains during flooding, and in reservoirs and lakes. At the end of most rivers, the remaining sediment is deposited within the estuary and in the coastal zone.

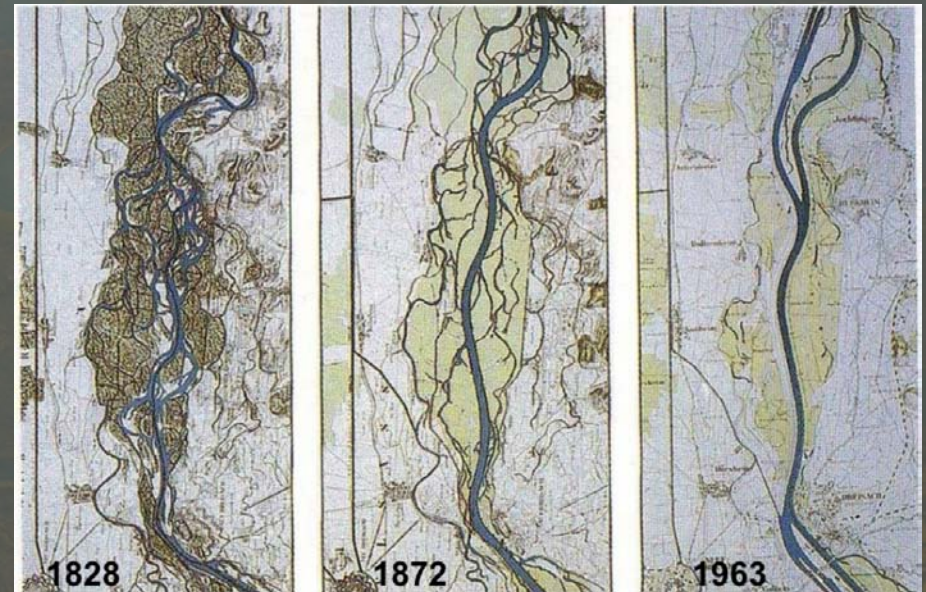
Natural river hydrodynamics maintain a dynamic equilibrium, regulating small variations in water-flow and sedimentation by re-suspension and resettlement. In estuaries, sediment transport occurs both downstream and upstream, mixing fluvial and marine sediment as a result of tidal currents”



B. What is the issue?

Worldwide natural **sediment equilibriums are seriously obstructed** by human interventions. Examples are:

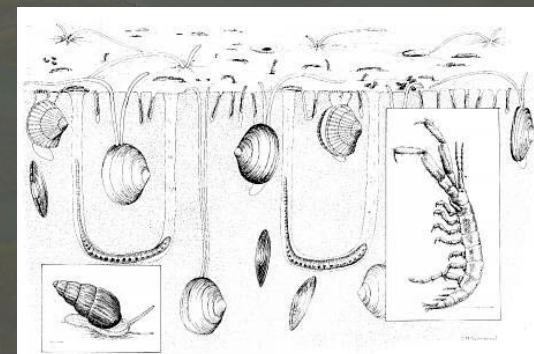
- Damming for hydro-power production and for flood protection
- River training for improving navigability
- Water diversion for water supply and irrigation
- Dredging for improving navigability, for improving drainage capacity and for mining of building material (sand and gravel extraction)
- Dike construction for flood protection and land reclamation



C. So what?: why we should do

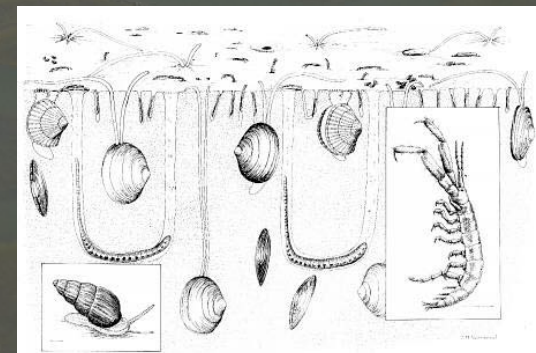
the societal challenge: a balancing act

Too much sediment	Too little sediment	Sediment as resource
Obstruction of channels Rivers fill and flood Reefs get smothered Turbidity	Beaches erode Riverbanks erode Wetlands are lost River profile degradation	Construction material Sand for beaches Wetland nourishment Soil enrichment Habitat and food for life



C. So what?: why we should do

Too much sediment	Too little sediment	Sediment as resource
<p>Obstruction of channels Rivers fill and flood Reefs get smothered Turbidity</p>	<p>Beaches erode Riverbanks erode Wetlands are lost River profile degradation</p>	<p>Construction material Sand for beaches Wetland nourishment Soil enrichment Habitat and food for life</p>



Too much sediment: turbidity

Scientific evidence so far indicates:

Excessive fine sediment loadings delivered to rivers from a variety of sources including agriculture have detrimental impacts on aquatic ecology and thereby **degrade the ecological status** of freshwater as well as estuarine and marine environments



A river in Tuscany, Italy. Picture: J. Brils



Picture source: [animals.pawnation.com](https://www.animals.pawnation.com)

Too much sediment: turbidity



9th International SedNet Conference
23-26 September 2015 Krakow Poland

**Solving societal challenges;
working with sediments**

Special session on the
impact of fine sediment
on ecology

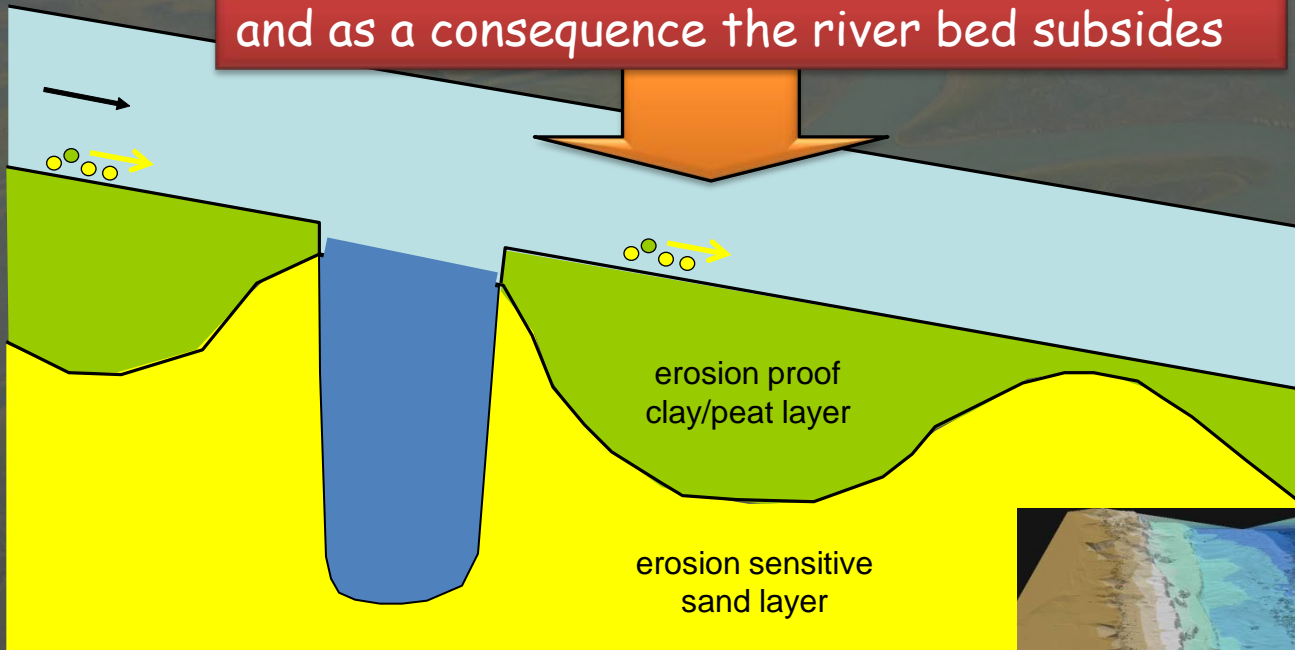
possible outcome:

proposal for how to
advance the scientific
state-of-the-art

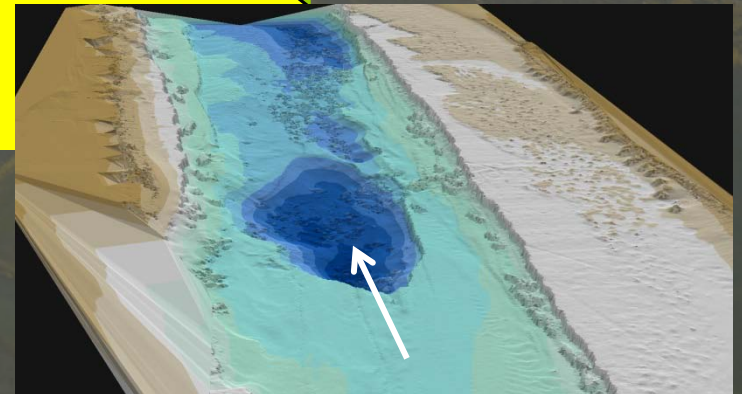
See:
www.sednet.org

Too less sediment: river profile degradation

Erosion: water flow flushes sediment away and as a consequence the river bed subsides



Source: Erik Mosselman



Too less sediment: river profile degradation

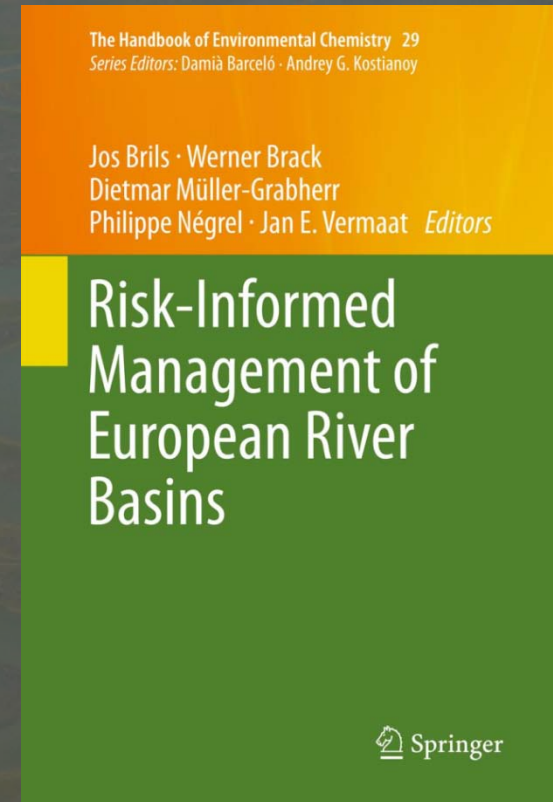
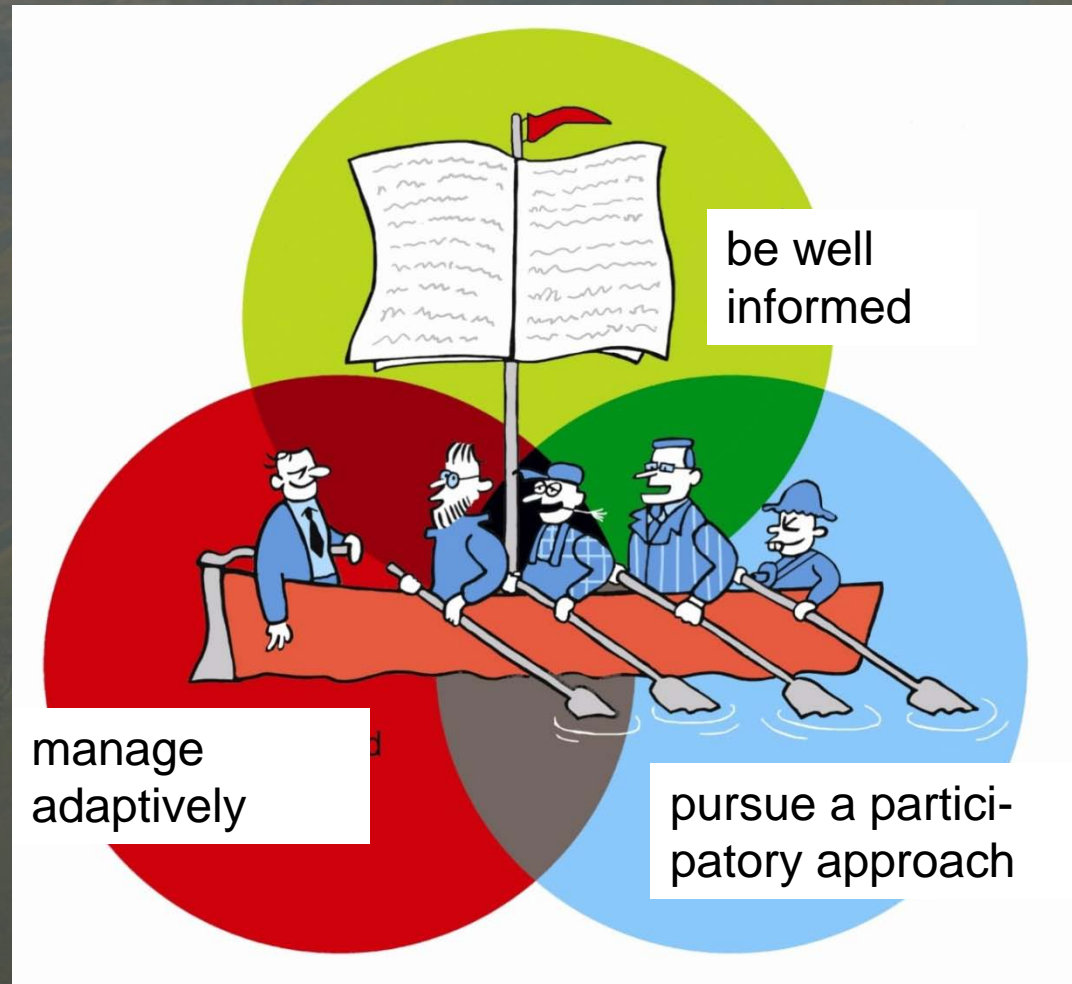


Marchland Levee in Louisiana, VS, 1983

... and this
may happen
thereafter

D. What can we do?

Integrated application of three key-principles:



thus we increase the effectiveness of our sediment equilibrium restoration measures

The three key-principles

- **Get well informed:** The better we understand (and exploit the available understanding of) the functioning of natural (river-delta-sea) systems – and especially of the role of sediment therein – the more effective our management interventions (measures) will be
- **Manage adaptively:** Learn-by-doing, so allow for experimentation, as the natural systems in which we are intervening are complex and dynamic and can respond in non-linear and unexpected ways. Hence, apply an iterative approach: plan > implement measures > monitor/learn > improve interventions > plan > etc.
- **Pursue a participatory approach:** Achieving a sustainable balance between human interventions that impact, and measures that restore the sediment equilibrium, depends on constructive dialogue between various stakeholders, better policy coordination and effective trans-boundary cooperation. Furthermore, stakeholders can bring in essential sediment understanding and expertise, especially at local scale.

apply
common sense

E. Where to start?

- SPI
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E. Where to start?

SPI:

- **Awareness raising**: Initiation MAES (Mapping and Assessment of Ecosystem Services) sediment
- Initiation of SedNet WG 'Sediment Shortage'
- Integration of/attention for sediment in WFD River Basin Management Plans (RBMPs)
-

Please comment, add, prioritize

E. Where to start?

Research:

- Dedicated R&I on sediment related ecosystem services (ES)
- Dedicated R&I on improving the process understanding and management of the connectivity of sediments between Land-Soil-Sediment-Water Systems and of the interaction of erosion, sediment transfer, deposition, remobilization and yield
- Dedicated R&I for developing/testing/demonstrating ‘Working-with-Nature’ kind of solutions to get sediment from overloaded sites (such as reservoirs) to areas where there is a sediment shortage (or use for solving other societal challenges, like soil subsidence)
- Make sediment shortage a key R&I issue in DANUBIUS-RI, if this initiative will be selected for the ESFRI roadmap in 2016
-

Please comment, add, prioritize

E. Where to start?

Funding:

- H2020: but need to lobby/influence to get topic(s) in Work Programme
- National, governmental research programs
- Industry: hydropower, dredging,
- Public-Private Partnerships (e.g. NL EcoShape: <http://www.ecoshape.nl/>)
-

Please comment, add, prioritize

An aerial photograph showing a coastal region. A large body of water is on the left, separated from the land by a dike. The land is divided into various agricultural plots, some green and some brown. A small town or village is visible on the left side. The sky is clear and blue.

Deltares

Enabling Delta Life



Looking forward to your input & have a nice session!