Webinar “Introduction to sponge measures”

Questions and Answers

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Speakers :

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1. Are there any SpongeScapes projects in India on flood/drought?

Yes, there are projects in India, particularly in urban areas but also related to river management, such as a project in the Brahmaputra (Assam). Understanding the landscape system is essential to assess feasibility of sponge measures in each location.

2. Are there pilot projects incorporating karst systems into sponge measures? In Rochefort, Belgium, hydrogeological studies have explored rainwater retention as a flood measure in a karst system, though no measures have been implemented yet.

SpongeScapes includes several Greek examples of sponge measures in a karst system, such as in the Kavouropotamos stream (link). However, sponge measures in karst landscapes remain poorly understood, with significant gaps in implementation and evidence, due to the complex nature of the terrain. SpongeScapes also includes UK examples in chalk catchments, focusing on safe infiltration and recharge.

3. Economic Integration of Sponge Measures. Are there links with economists to reintegrate nature into the economy? (Costs of soil decontamination, revaluation of the role of farmers, more machines to do the work with energy consumption or also to promote manual work?)

Quantifying the broader benefits of sponge measures is essential, including their (social and economic) impact on agriculture and urban populations. It is also important to quantify what kind of damages you avoid and the costs related to both implementation of measures and their

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maintenance needs afterwards. It is also important to consider the multiple functions of sponge measures: the benefits, the trade-offs, everything has to be considered. Both projects address this:

- SpongeWorks: IIASA (Austria) is conducting economic modeling.
- SpongeScapes: The University of Padova and Etifor (Italy) are analyzing economic aspects.

Financing sponge measures is another key consideration within SpongeWorks.

Additionally, it is important to keep in mind that the effectiveness of sponge measures to prevent damage is greater when implemented at a landscape scale, aligning with broader hydrological and ecological functions.

The Vecht River Basin provides an example of implementing measures across an entire catchment, involving multiple stakeholders from urban, agricultural, forestry, and natural areas. Achieving coordination among these sectors is a significant challenge. For further insights, see SpongeWorks website (link).

4. Methods for calculating water retention. What methods would you recommend to calculate retention especially for small rivers, ditches? Using some remote sensing like NDVI can be useful?

Retention calculations depend on context. A water balance approach using topography and bathymetry data can estimate storage capacity. But it is also needed to estimate the “dynamic storage” concept, and drainage dynamics. Also, monitoring water levels is a minimum requirement.

Different metrics apply based on objectives: reducing flood peaks or retaining water on land or having water available for vegetation use.

Retention is dynamic and influenced by soil moisture, climate, and topography. SpongeWorks employs satellite data and indicators like NDVI and soil moisture, in combination with field monitoring information. Site-specific factors must be assessed to determine appropriate measures.

For additional resources, visit: NWRM website www.nwrm.eu

5. Ensuring Maintenance of Nature-Based Solutions. How would you ensure the maintenance of nature-based solutions, especially in disadvantaged areas?

Both nature-based and grey infrastructure require maintenance. Maintenance planning should be integrated from the design stage, considering long-term evolution. For example, unmanaged floodplain vegetation growth can increase upstream flood risks.

Sponge measures are often based on ecosystems so ideally you can rely on self-sustaining ecosystem. In urban areas, maintenance of sponge measures often aligns with standard management practices of green areas and parks.

Defining maintenance objectives together with local communities is crucial. Stakeholder engagement ensures alignment with local priorities and prevents mismanagement.

6. Citizen Science in Sponge Measures. Are there any projects that involve citizen science in the development of sponge measures and river contracts?

Citizen science plays a key role especially in urban, but also in rural areas. Examples include:

- UK projects: Evenlode Catchment, Chess Smarter Water Catchment, and CASTCO.
- SpongeWorks: Engages landowners in water quality monitoring via a user-friendly app.
- Biodiversity monitoring: Community-led initiatives tracking natural area development.

These approaches provide meaningful data while enhancing public engagement.

7. Impact of Sponge Measures on Crop Yields. Are there any studies that show that sponge measures are able to directly/indirectly improve crop yield production?

It is related to how do you define crop yield, in terms of your total production or in terms of resilience extremes like floods or droughts? Sponge measures primarily enhance resilience rather than maximizing yields.

Some examples include:

- Increased soil organic carbon, improving water retention and drought resistance.Increased organic carbon in the soils makes the land much better able to withstand the drier parts of the season. However, if the drought is a multi-year drought and there's overuse of water in the whole area, sponge measures cannot be a panacea, but it may help to get through that difficult situation a little bit easier.
- Reconnected floodplains, maintaining soil moisture during dry seasons. For instance, at Blenheim Estate (UK), efforts were made to reconnect the floodplain by installing small leaky dams in the stream itself, thereby increasing floodplain moisture and enabling farmers to utilise it for sheep grazing during droughts.

8. Soil Improvement for Sponge Function.

In SpongeScapes and SpongeWorks, Greek case studies demonstrate significant organic carbon increases in soils by covering soil under olive trees.

Common practices promoted among farmers include cover cropping, especially in winter, which enhances soil structure, reduces erosion, and increases water retention.

9. Open Access to Monitoring Data: Is there a plan to establish an open database for monitoring data from sponge projects?

Most of the data generated by the sponge projects will become available on request after formal publication of the results. In addition, we rely on regular monitoring as carried out by local and regional authorities. Most of that data is also open access.

10. Scaling Up Sponge Measures in Europe. What considerations would need to be taken into account in order to scale up the number of "Sponge" projects at European level? What are the main bottlenecks from a political point of view?

The implementation of sponge measures at the landscape scale provides numerous benefits, including improvements to the water cycle, soil quality, food production, and overall well-being. These benefits can be linked to a wide range of policy areas, extending beyond the scope of water policy. Expanding sponge measures requires an integrated policy approach beyond water management, covering the soil-water-food-energy nexus. Key challenges include:

- Cross-sectoral collaboration: Policies are to be better linked and referring to each other (for instance linkages between water quantity and quality management and agricultural policies) and better guidance must be given to address multiple benefits under different funding streams.
- Geographical and temporal scales: theiImpacts span of administrative boundaries can hamper long-term commitment (for instance increasing soil organic carbon is a slow process, and stimulating this impact therefore needs such long-term commitment and associated rules and regulations from the policy domain to keep stimulating this also on this longer term).

11. Sponge Concept vs. Nature-Based Stormwater Solutions. How does nature-based stormwater solutions relate to the concept of sponge - are we talking about the same thing in an urban context?

The term "sponge" is chosen for its simplicity; it is well understood that it refers to a process that absorbs water and retains it for a period of time before gradually releasing it.

The "sponge concept" follows in essence a nature-based solutions approach, and we advocate for the utilisation of nature-based solutions in general. This approach involves protecting, enhancing and restoring key natural functions, thereby assisting in addressing water-related challenges.

However, we also acknowledge the role of conventional or grey measures. For instance, implementing large-scale nature-based solutions in a landscape that has been extensively modified may present significant challenges. In such instances, small-scale engineering measures, such as flexible weirs in agricultural areas, could prove highly advantageous. It is therefore imperative to gain a thorough understanding of the specific location in order to effectively utilise nature-based solutions. We therefore follow the general principle 'green where we can, grey where we must'.

12. Basin-Scale Hydrological Impacts of Plot-Scale Measures. Are you also looking at the hydrological impacts of these plot-scale NbS at a broader, basin-wide scale?

The SpongeScapes project, and more broadly the SpongeWorks projects have a dedicated activity involving the use of modelling to understand the relationships between (combinations of) individual measures and basin-wide implementation and impacts. The hydrological impacts are included in these modelling exercises.

13. Discussing Acceptable Risk with Communities. In the Greek example the picture showed an extreme flood event. It was mentioned that some risks cannot be reduced to zero. Are there regions with experience in discussing acceptable risks with communities?

France's GEMAPI law (2017) transferred flood protection responsibilities to local authorities, leading to debates on the maintenance of the flood protection infrastructure, their funding, and their value to efficiently protect economic activities and households. In some cases, when the cost of maintenance is too high, the decision is taken to better relocate the economic activities and households concerned. This highlights the need for public dialogue on acceptable risk levels and shared responsibility.

In the UK, an emerging issue is the pressure to have insurance even for small sponge measures, which is challenging given that part of their attractiveness is the lower cost of installation and maintenance.

Visit the SpongeScapes website for the webinar replay and the presentations:
https://www.spongescapes.eu/sponge-academy