



WES-BCA Type of Meeting

C1_N-JO-2: Review of Key Regulatory Frameworks Relevant to the Integration of NBS for Water-Related Challenges

24 June 2026

Online

Title of Presentation: Introduction to Water-related Nature-Based Solutions

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Nature-based Solutions Definitions

- **NbS:** Actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, while simultaneously providing human well-being and biodiversity benefits (IUCN, 2020).
- **Water related NbS:** Multi-functional measures that aim to protect and manage water resources and address water-related challenges by restoring or maintaining ecosystems as well as natural features and characteristics of water bodies using natural means and processes. Their main focus is to enhance, as well as preserve, the water retention capacity of aquifers, soil, and ecosystems with a view to improving their status (European Commission).

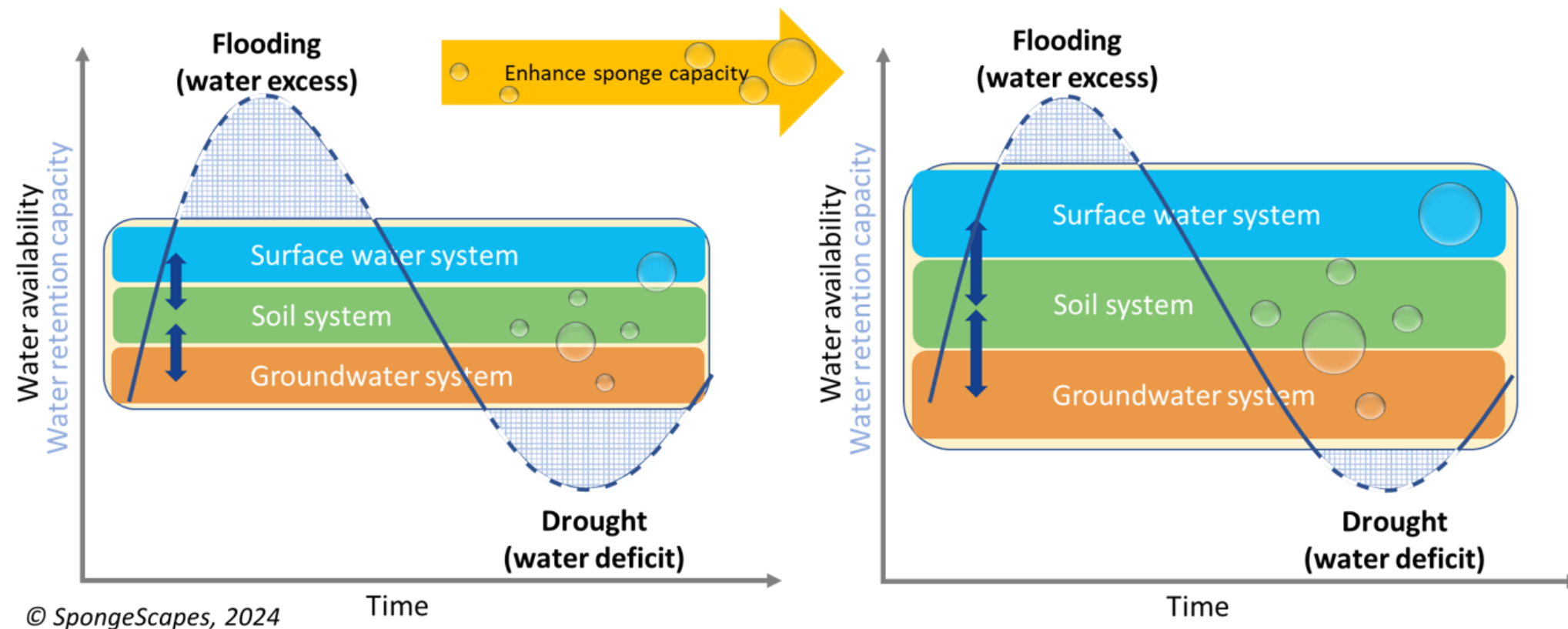


<https://www.haskoning.com/en/services/nature-based-solutions#whitepaper>

Timeline and Terminology by Region

Period	Term	Region / Origin
1970s–1980s	Best Management Practices (BMPs)	USA
Late 1980s - early 1990s	Water Sensitive Urban Design (WSUD)	Australia
Early 1990s	Sustainable Urban Drainage Systems (SUDS/SuDS)	UK & Europe
Mid-1990s	Low Impact Development (LID)	USA (Maryland)
2000s	Green Infrastructure (GI)	USA (EPA), EU
2000s	Integrated Urban Water Management (IUWM)	Global (UN, World Bank, GWP)
Early 2010s	Natural Water Retention Measures (NWRMs)	Europe (EU, WFD/Floods Directive)
2010s	Blue-Green Infrastructure (BGI)	UK, Europe
2010s	Nature-Based Solutions (NBS)	EU, UN
2013 onwards	Sponge City	China

The sponge logic منطق النهج الإسفنجي



Category 1: Stormwater retention and infiltration (urban / peri-urban)

احتجاز مياه الأمطار وتسربها إلى التربة في المناطق الحضرية وشبه الحضرية



- Infiltration zones مناطق التسرب إلى التربة
- Bio-swales الأحزمة النباتية الحيوية
- Urban green spaces المساحات الخضراء الحضرية
- Retention/detention ponds برك الاحتجاز/التخزين المؤقت
- Rain gardens الحدائق المطرية
- Soakaways آبار/حفر التسرب إلى التربة
- Green roofs الأسطح الخضراء



<http://autodesk.com/>



[https://www.nwrm.eu/measure/soakaways`](https://www.nwrm.eu/measure/soakaways)

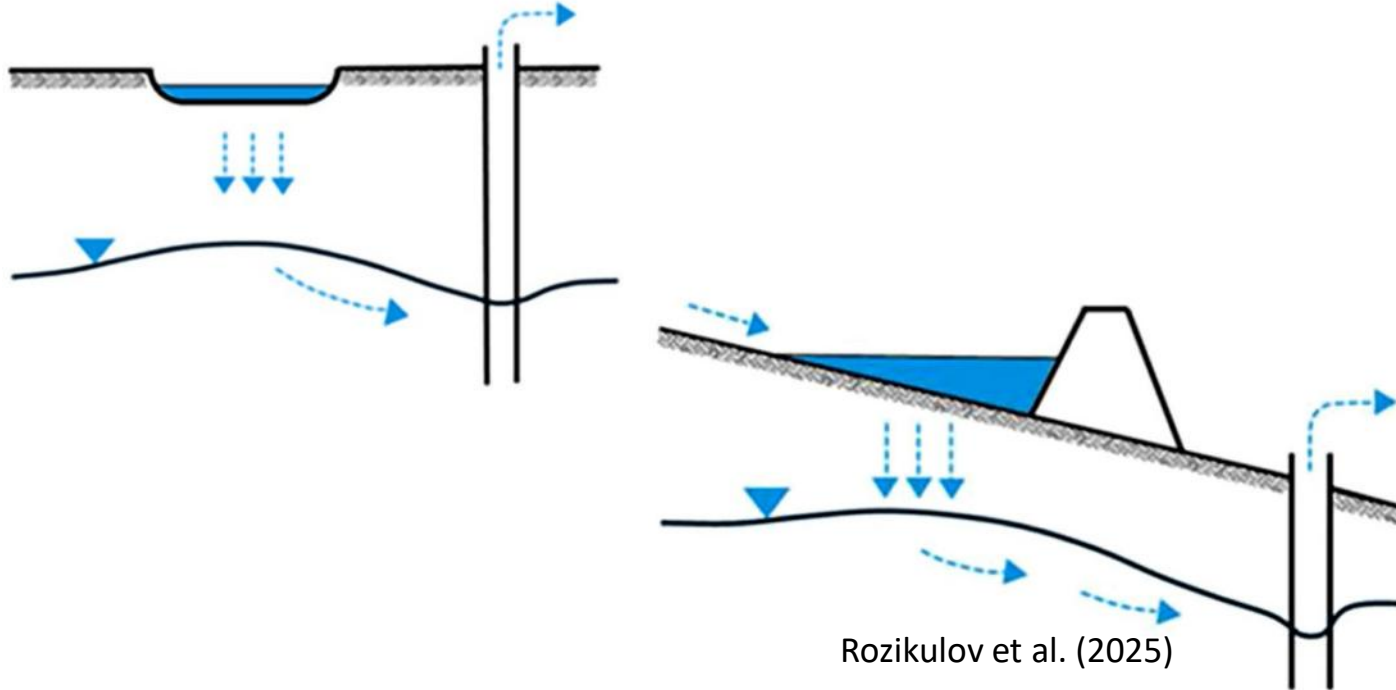


Chicago City Hall Green Roof. Author: TonyTheTiger CC BY-SA 3.0

Category 2: Managed aquifer recharge (MAR)

التغذية المُدارة للطبقات المائية الجوفية

- Infiltration basins أحواض التسرب إلى التربة
- Check dams السدود الصغيرة/حواجز إبطاء الجريان
- Recharge wells integrated into the landscape آبار التغذية الجوفية المدمجة ضمن المشهد الطبيعي

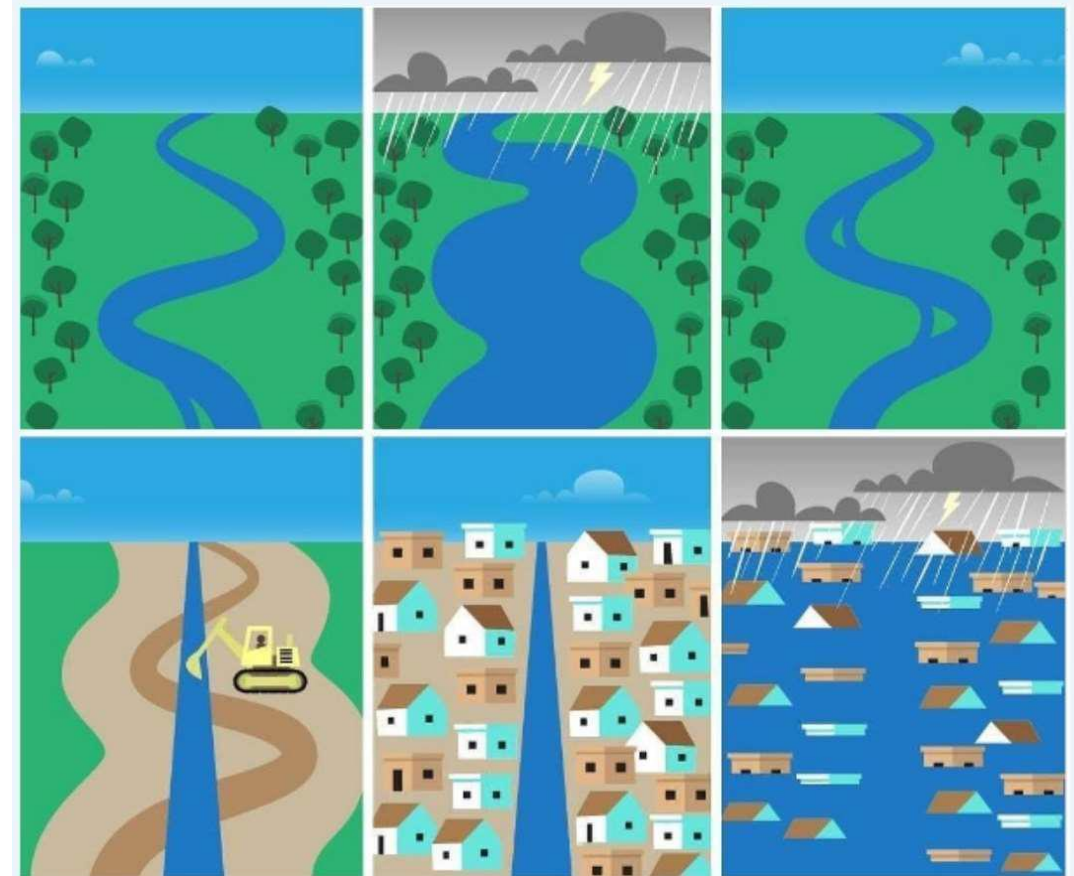


(WWF-Pakistan)

Category 3: Wadis, rivers & floodplain restoration

استعادة الوديان والأنهار والسهول الفيضية

- Floodplain reconnection إعادة ربط السهول الفيضية بالمجاري المائية
- Riparian habitat rehabilitation إعادة تأهيل الموائل المشاطئة
- Bioengineered bank stabilization تثبيت ضفاف المجاري المائية باستخدام الهندسة الحيوية
- Sediment continuity management إدارة استمرارية انتقال الرواسب
- Upstream erosion control مكافحة التعرية في أعالي الحوض



Category 4: Wetland & riparian corridor rehabilitation

الأراضي الرطبة والممرات المشاطئة

- Wetland restoration
- Riparian corridor rehabilitation

استعادة الأراضي الرطبة
إعادة تأهيل الممرات المشاطئة



© volgariver/stock.adobe.com

riparian area **before** restoration



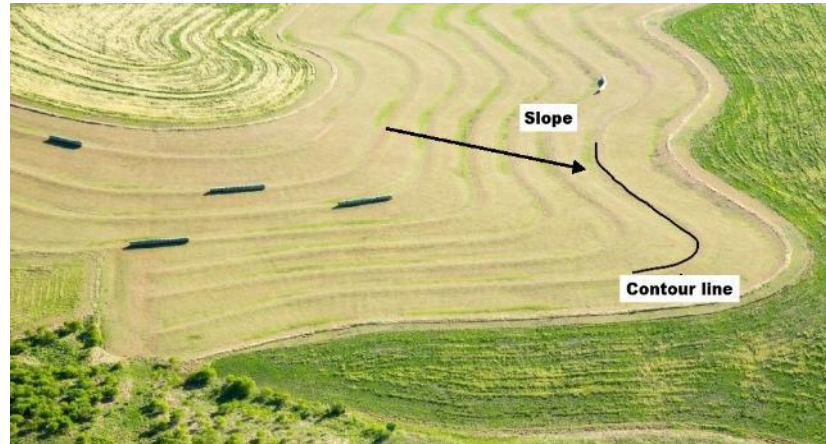
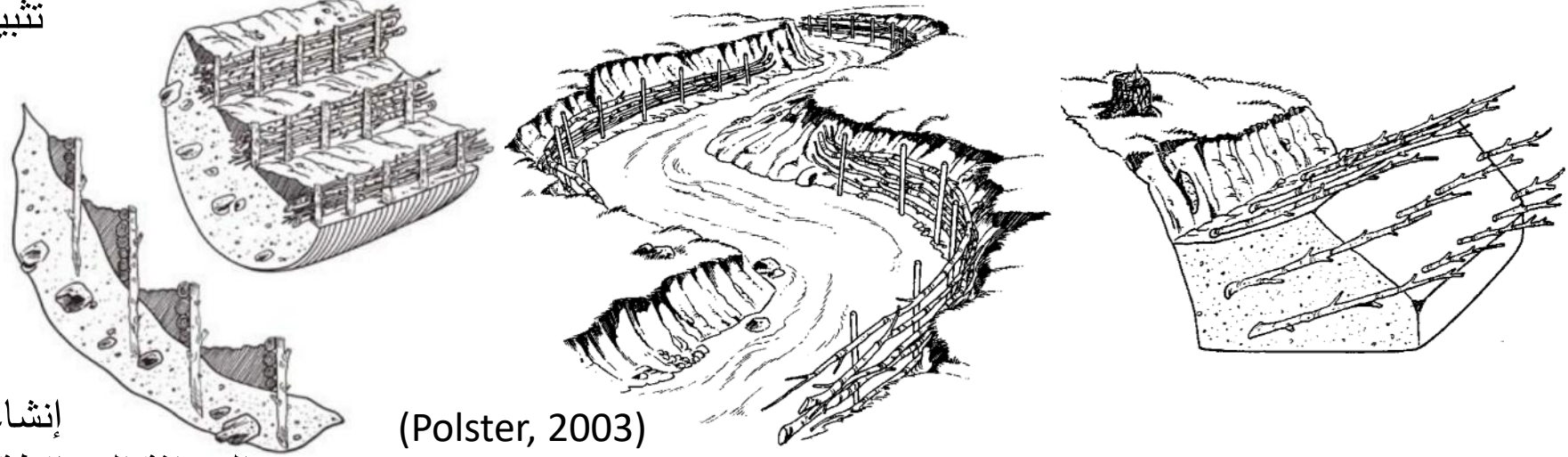
riparian area **after** restoration



Category 5: Soil-water conservation and erosion control

الحفاظ على المياه والتربة ومكافحة التعرية

- Slope stabilization تثبيت المنحدرات
- Agroforestry الزراعة الحراجية
- Rangeland reseeding إعادة بذر المراعي
- Contour farming الزراعة وفق الخطوط الكنتورية
- Terracing, mulching إنشاء المصاطب والتغطية العضوية للتربة
- Conservation tillage الحراثة المحافظة على التربة
- Cover cropping زراعة محاصيل التغطية



Category 5: Soil-water conservation and erosion control



Category 6: Vegetative and riparian buffers/ forests

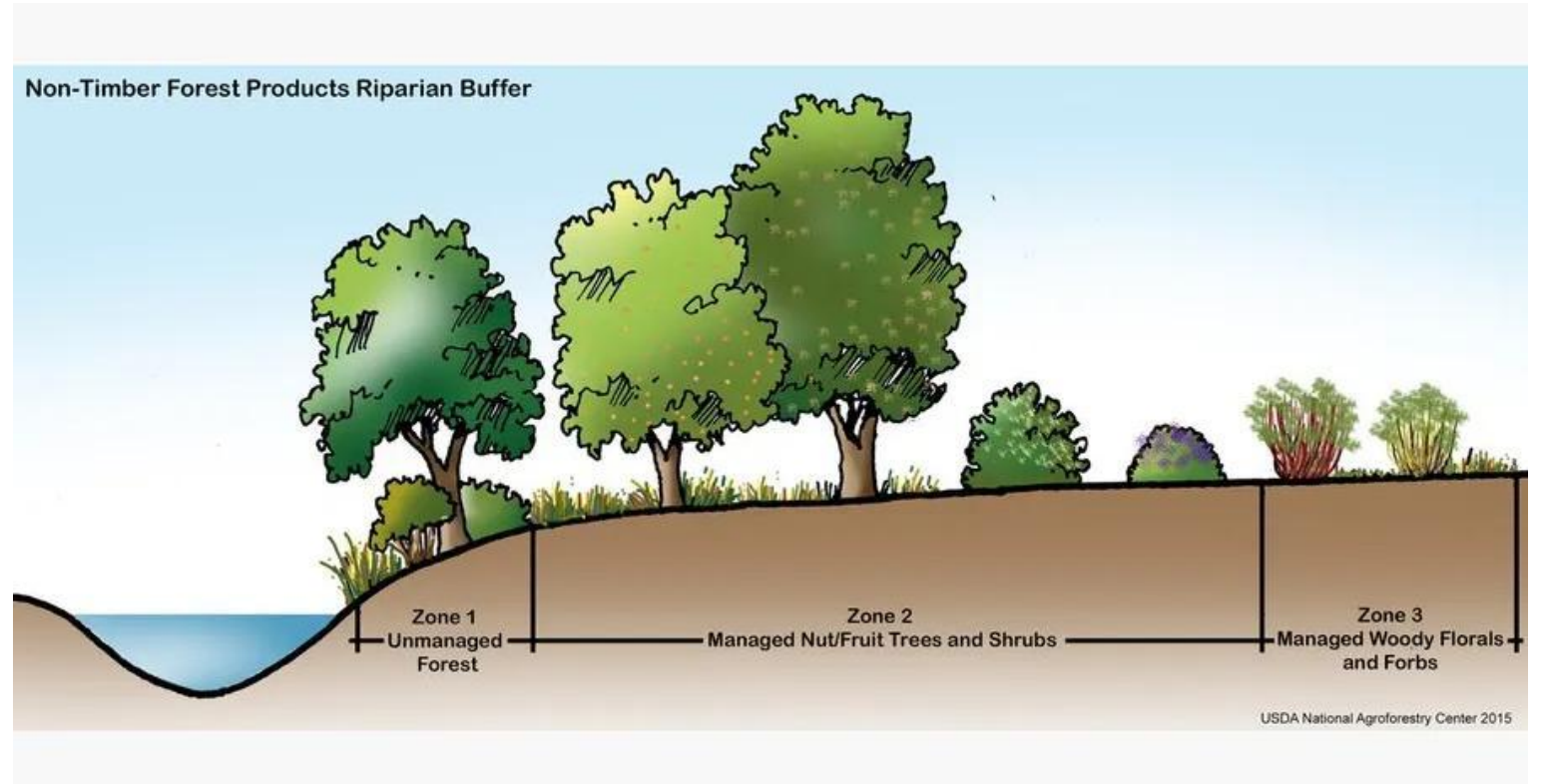
الأحزمة النباتية والمشاطئة العازلة والغابات المشاطئة

Vegetative and riparian buffers and forests protecting water bodies, recharge areas and wadis from sediment and nutrient runoff.

الأحزمة النباتية والمشاطئة العازلة والغابات المشاطئة التي تحمي المسطحات المائية، ومناطق التغذية الجوفية، والوديان من الجريان السطحي المحمل بالرواسب والمغذيات



A riparian buffer of vegetation lining a farm creek in Story County, Iowa (Wikipedia)



National Agroforestry Center

Category 7: Landscape-based water conservation (drylands)

الحفاظ على المياه على مستوى المشهد الطبيعي في المناطق الجافة



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- Terracing
- Stone bunds
- Soil-moisture retention in drylands

إنشاء السلاسل الحجرية/المصاطب

الحواجز الحجرية

حفظ رطوبة التربة في المناطق الجافة



https://www.researchgate.net/figure/Stone-Bund-Construction_fig3_364547824

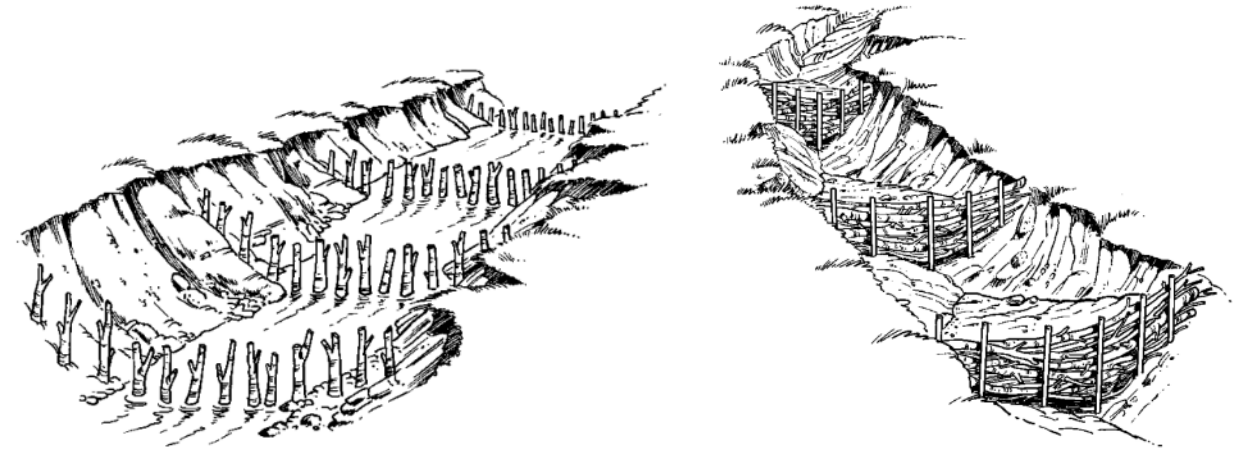
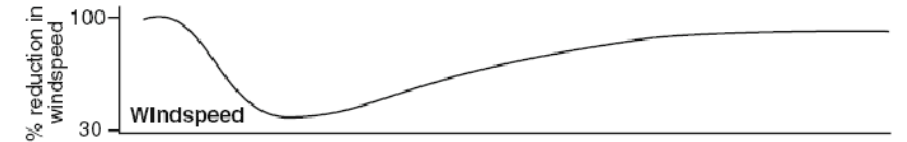
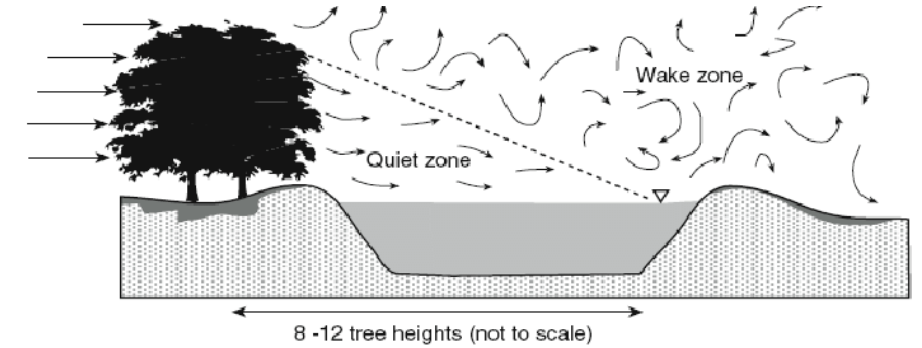


<https://timesofmalta.com/article/agricultural-terracing-malta-lens-2m-research-project.1102655>

Category 8: Nature-based measures linked to dams and reservoirs

التدابير القائمة على الطبيعة المرتبطة بالسدود والخزانات

- Nature-based Evaporation Reduction (Windbreaks) الحد من التبخر
باستخدام تدابير قائمة على الطبيعة (مصدات الرياح النباتية)
- Vegetated Sediment Traps مصائد الرواسب النباتية
- Check Dams لسدود الصغيرة/حواجز إبطاء الجريان
- Terracing إنشاء السلاسل الحجرية/المصاطب
- Stone Bunds الحواجز الحجرية
- Catchment Management Through Upstream Revegetation إدارة الحوض المائي من خلال إعادة الغطاء النباتي في أعالي الحوض
- Catchment Restoration استعادة الحوض المائي
- Vegetated Sediment Traps مصائد الرواسب النباتية

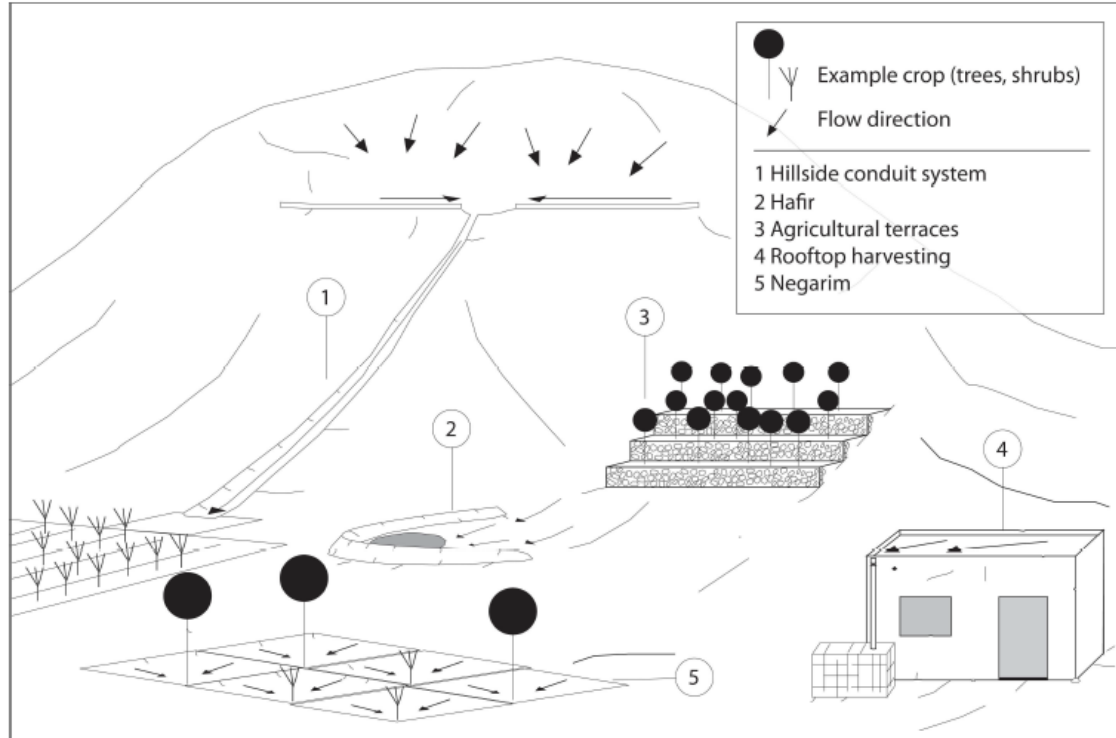


(Polster, 2003)

Category 9: Rainwater Harvesting حصاد مياه الأمطار

- Rooftop rainwater harvesting and cisterns
- Rainwater tanks linked to buildings
- Farm ponds and communal storage ponds
- Micro-catchment/runoff collection

حصاد مياه الأمطار من أسطح المباني وخزانات التجميع
خزانات مياه الأمطار المرتبطة بالمباني
برك المزارع وبرك التخزين المجتمعية
تجميع الجريان السطحي عبر المستجمعات الصغيرة



(Beckers et al., 2013, Fig. 7, p. 155)



<https://cgispace.cgiar.org/server/api/core/bitstreams/14/7ceede95-f16e-49d1-87c9-62bfdde1506b/content>

Category 10: Nature-based wastewater treatment and reuse

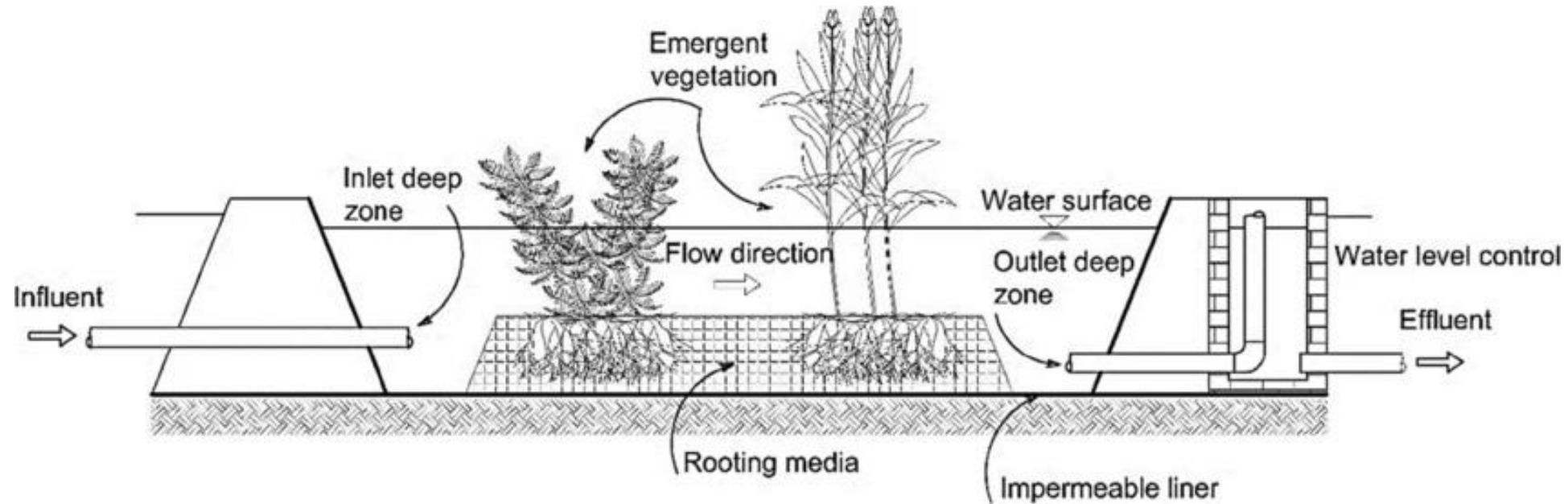
معالجة مياه الصرف الصحي وإعادة استخدامها باستخدام حلول قائمة على الطبيعة



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- Constructed wetlands
- Nature - Based tertiary treatment systems
- Reuse wetlands
- Buffer irrigation systems

الأراضي الرطبة المبنية
أنظمة المعالجة الثلاثية القائمة على الطبيعة
الأراضي الرطبة المخصصة لإعادة استخدام المياه المعالجة
أنظمة الري في الأحزمة العازلة



EU and International Instruments Reviewed

Instrument	Type / Jurisdiction	Main relevance for NbS
EU Water Framework Directive	EU Directive	Provides the overarching framework for integrated river basin management and ecological status objectives, supporting ecosystem-based water management.
EU Floods Directive (2007/60/EC)	EU Directive	Mentions restoration of floodplains and improvement of water retention.
NWRM Policy Document	EU Policy Guidance	Definition benefits and examples including green roofs and floodplain / wetland restoration
EU Nature Restoration Regulation	EU Regulation	Promotes restoration of river and floodplain ecosystems
Strategy for Climate Change	EU Strategy	Promotes restoring sponge like function of soils and wider role of NBS for water impacts.
EU Biodiversity Strategy for 2030	EU Strategy	Promotes ecosystem restoration and biodiversity protection, including wetlands and river systems.
Regulation Water Reuse	EU Regulation	Establishes minimum requirements for safe reuse of treated wastewater, including integration with natural treatment systems.
Urban Waste Water Treatment Directive	EU Directive	Allows alternative treatment systems (e.g., constructed wetlands), indirectly supporting nature-based wastewater treatment approaches.
World Bank Reservoir Sedimentation Handbook	International Technical Guidance	Guidance on reservoir sediment management, emphasizing watershed management, soil conservation, and vegetation restoration indirectly supporting nature-based sediment control approaches.
Flood and Water Management Act	UK Primary Legislation	Provides an example of mandatory approval systems for sustainable drainage measures in urban development.
Wales SUDS Guidance	UK Statutory Guidance	Provides technical standards and implementation guidance for sustainable drainage systems.
US EPA Federal Permitting Best Practices for Nature-Based Solutions	US Federal Guidance	Provides guidance on integrating nature-based solutions into environmental permitting and infrastructure planning.
EU Green Infrastructure Strategy	EU Strategy	Promotes green infrastructure and ecosystem-based approaches to enhance ecosystem services, climate resilience, and water management.
EU Habitats Directive	EU Directive	Supports protection and restoration of habitats and ecosystems through the Natura 2000 network, including wetlands and riparian ecosystems relevant for NbS.



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Thank you for your attention!

References



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