



Optimal strategies to retAIN and re-use water and nutrients in small agricultural catchments across different soil-climatic regions in Europe

1st OPTAIN Webinar
on “Benefits of Natural/Small Water Retention measures”
April 30, 2024

u^b

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WOCAT
World Overview of Conservation Approaches and Technologies

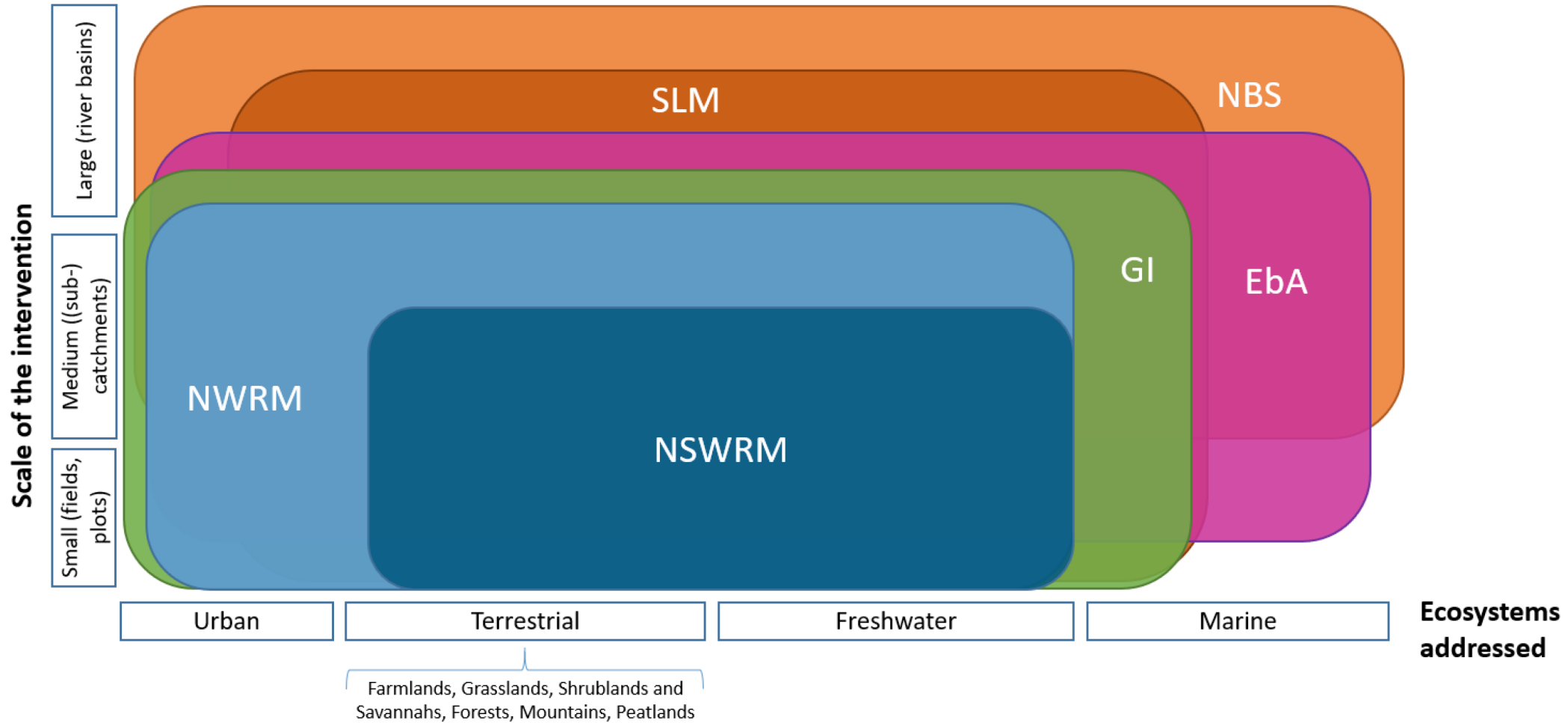
slido



**Which ecosystem-based concepts
are you familiar with?**

① Start presenting to display the poll results on this slide.

Different Ecosystem Based Concepts



Magnier, J.; Fribourg-Blanc, B.; Lemann, T.; Witing, F.; Critchley, W.; Volk, M. Natural/Small Water Retention Measures: Their Contribution to Ecosystem-Based Concepts. *Sustainability* **2024**, *16*, 1308. <https://doi.org/10.3390/su16031308>

Different Ecosystem Based Concepts

NSWRM	NWRM Categories	GI	SLM Technology Group	EbA	NbS
GRASSING TARGETED INTO RECHARGE AREA	a01 meadows and pastures	Buffer zones	Improved ground/vegetation cover	- Ecosystem restoration - Ecosystem protection approaches	Restoring or creating ecosystems
RIPARIAN BUFFER ZONES	a02 buffer strips and hedges	Buffer zones	Area closure (stop use, support restoration)	Ecosystem-based management approaches	- Preserving ecosystems - Restoring or creating ecosystems
REDUCED TILLAGE—NO TILLAGE IN AUTUMN	a06 no-till agriculture	Multifunctional zones	Minimal soil disturbance	Ecosystem-based management approaches	Improving the sustainable management of ecosystems
GRASSED WATERWAYS	n05 stream bed re-naturalisation	Restored habitats	- Improved ground/vegetation cover - Water diversion and drainage	- Ecosystem-based management approaches - Ecosystem protection approaches	Restoring or creating ecosystems
WATER LEVEL ADJUSTMENT THRESHOLD	u10 detention basins	Buffer zones	- Natural and semi-natural forest management	Not EbA	Not NbS
Not NSW RM	U01 GREEN ROOF	Artificial feature: green roof	- Improved ground/vegetation cover - Home gardens	Infrastructure-related approaches	Restoring or creating ecosystems
Not NSW RM	Not NWRM	ARTIFICIAL FEATURE: FISH LADDER	Not SLM	Not EbA	Not NbS
Not NSW RM	Not NWRM	Not GI	SUSTAINABLE NATIVE BEE KEEPING	Not EbA	Improving the sustainable management of ecosystems
Not NSW RM	Not NWRM	Restored habitat	- Forest plantation management - Ecosystem-based disaster risk reduction	MANGROVE REFORESTATION	Restoring or creating ecosystems
Not NSW RM	Not NWRM	Not GI	Not SLM	The landscape approach may cover one or more ecosystems.	LANDSCAPE MANAGEMENT FOR REDUCING GRAVITATIONAL RISK

REFERENCE MEASURES IN CAPITALS AND GREY SHADING

green = strong match

orange = partial match

red = mismatch

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Natural Small Water Retention Measures (NSWRM)



Natural



Small



Water Retention



Measure

- **Headwaters**
- **Farmscale**

- Set of techniques with objectives:**
- Ecosystems direct modification
 - Practice change/adaptation

Mean: using or mimicking nature

- Multifunctional
- Improve and/or restore soil water retention, capacity, aquatic ecosystems, aquifers
- Localised, cumulative
- Not only natural entities

Direct effect:

increase water retention in river basin
(slow down, store, reduce run off)

Indirect effect:

biophysical impacts from retention
(reduce pollution, conserve soil,
create habitat, alter climate)

Natural Small Water Retention Measures (NSWRM)

Examples of NSWRM in OPTAIN

a) Experimental retention wetland
(photo: Petr Fucik)

b) River buffer zones
(photo: Dominika Krzeminska)

c) Grassed Waterway (photo: Jörg Voß)

d) Direct driller machine for reduced tillage agriculture
(photo: Zoltan Toth)

WOCAT and NWRM.eu

Databases/platforms find and document good practices

AGRICULTURE		FOREST	
A01	Meadows and pastures	F01	Forest riparian buffers
A02	Buffer strips and hedges	F02	Maintenance of forest cover in headwater areas
A03	Crop rotation	F03	Afforestation of reservoir catchments
A04	Strip cropping along contours	F04	Targeted planting for 'catching' precipitation
A05	Intercropping	F05	Land use conversion
A06	No till agriculture	F06	Continuous cover forestry
A07	Low till agriculture	F07	'Water sensitive' driving
A08	Green cover	F08	Appropriate design of roads and stream crossings
A09	Early sowing	F09	Sediment capture ponds
A10	Traditional terracing	F10	Coarse woody debris
A11	Controlled traffic farming	F11	Urban forest parks
A12	Reduced stocking density	F12	Trees in Urban areas
A13	Mulching	F13	Peak flow control structures
		F14	Overland flow areas in peatland forests

HYDRO MORPHOLOGY		URBAN	
N01	Basins and ponds	U01	Green Roofs
N02	Wetland restoration and management	U02	Rainwater Harvesting
N03	Floodplain restoration and management	U03	Permeable surfaces
N04	Re-meandering	U04	Swales
N05	Stream bed re-naturalization	U05	Channels and rills
N06	Restoration and reconnection of seasonal streams	U06	Filter Strips
N07	Reconnection of oxbow lakes and similar features	U07	Soakaways
N08	Riverbed material renaturalization	U08	Infiltration Trenches
N09	Removal of dams and other longitudinal barriers	U09	Rain Gardens
N10	Natural bank stabilisation	U10	Detention Basins
N11	Elimination of riverbank protection	U11	Retention Ponds
N12	Lake restoration	U12	Infiltration basins
N13	Restoration of natural infiltration to groundwater		
N14	Re-naturalisation of polder areas		



Agriculture



Urban



Forest



Hydro



Search SLM data Add SLM data

Search SLM data All SLM Data SEARCH



SLM Technologies
An SLM Technology is a land management practice that controls land degradation and enhances productivity and/or other ecosystem services.

[View all](#)



SLM Approaches
An SLM Approach defines the ways and means used to implement an SLM Technology, including the stakeholders involved and their roles.

[View all](#)



UNCCD Profs Practices
A UNCCD Profs Practice is a best practice in SLM, as previously shared through the UNCCD Profs system in the UNCCD reporting process.

[View all](#)



Carbon Benefits Project (CBP)
Tools for assessing the carbon benefits and greenhouse gas emissions of an SLM Technology.

[View all](#)



Land Degradation / Conservation
Mapping land management, degradation and conservation including driver, state and impacts.

[View all](#)



CCA Module
The climate change adaptation tool assesses whether a specific SLM Technology is adapted to gradual climate changes and climate-related extremes (natural disasters).

[View all](#)

WOCAT – The Global Network on SLM

The World Overview of Conservation Approaches and Technologies (WOCAT) is a **global Network established in 1992.**

WOCAT supports the compilation, documentation, evaluation, sharing, dissemination, and application of **sustainable land management (SLM) knowledge.**

In 2014, WOCAT's growth and ongoing improvement culminated in being **officially recognized by the UNCCD** as the primary recommended Global SLM Database for best SLM practices.



The Global Network on Sustainable Land Management

Consortium Partners

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 ISRIC
World Soil Information

 ICARDA
Science for resilient livelihoods in dry areas

 Food and Agriculture
Organization of the
United Nations

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 CIAT

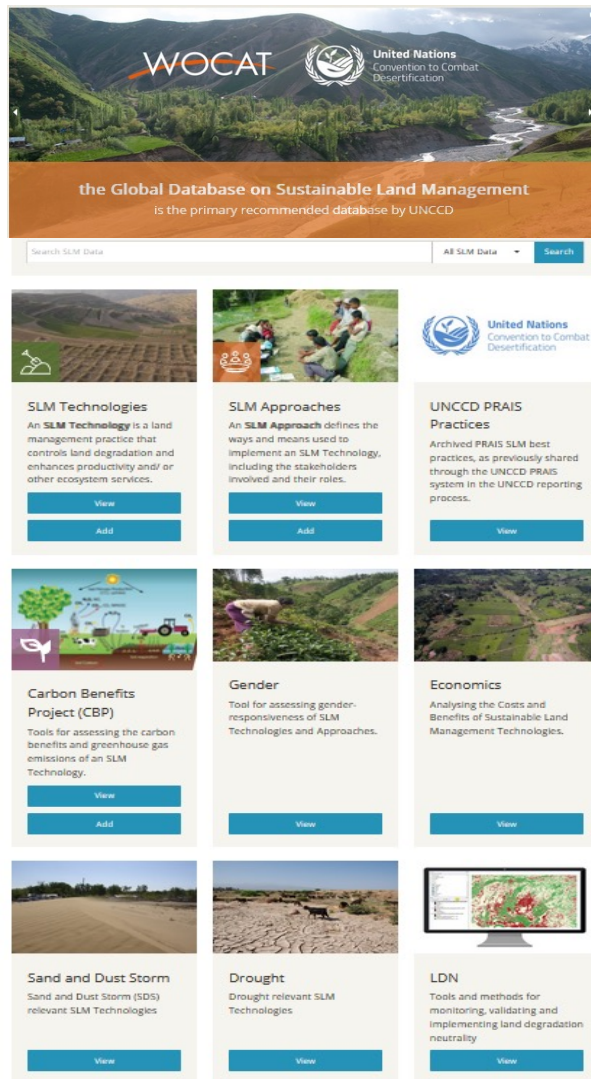
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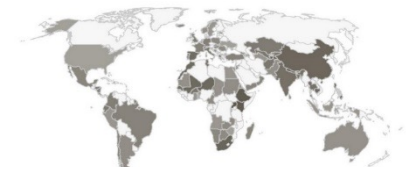
WOCAT Global SLM Database



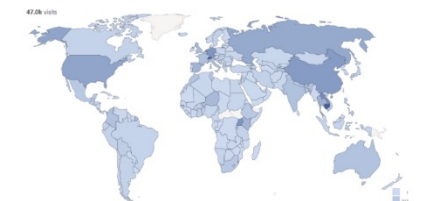
- ✓ **free upload and worldwide sharing** of countries' good SLM practices in English, Spanish, French, Portuguese, Russian and Chinese
- ✓ **free access** to 2300+ reviewed, proven, field-tested SLM practices from over 134 countries
- ✓ **standardized summary** of all Technologies and Approaches can be downloaded in various languages
- ✓ **database filter** to find relevant SLM practices for specific landscapes, land uses etc.
- ✓ possibility to integrate national SLM good practices in national/project/global platforms **through API**

Key Numbers

- **2279** SLM Practices published from **134** countries by **452** users.
 - 1320 SLM Technologies
 - 510 SLM Approaches
 - 442 UNCCD PRAIS Practices
- **103** new practices drafted in the past 90 days.



SLM good practices in Database



Database Visitors

SLM Technology / Approach Summary

- ✓ reviewed by expert team
- ✓ automatically generated
- ✓ in various languages
- ✓ used for good practices compilations; learning materials for e.g. extension services; knowledge products, etc.

Where?

What?

How?

Technical specifications?

Costs?

Who?

WOCAT SLM DATABASE

Home Search SLM Data Add SLM data My SLM Data Visualize SLM Data 9248 Tereza Lemann English

Constructed wetland with tile drainage [Czech Republic]

Creation: 06/22/2021 11:45 a.m. Update: 02/03/2023 2:57 p.m. Compiler: Petr Fučík Editor: Reviewers: Rima Mekdaschi Studer, William Critchley

Umlý mokřad na drenáži

technologies_5939 - Czech Republic

Print summary See history

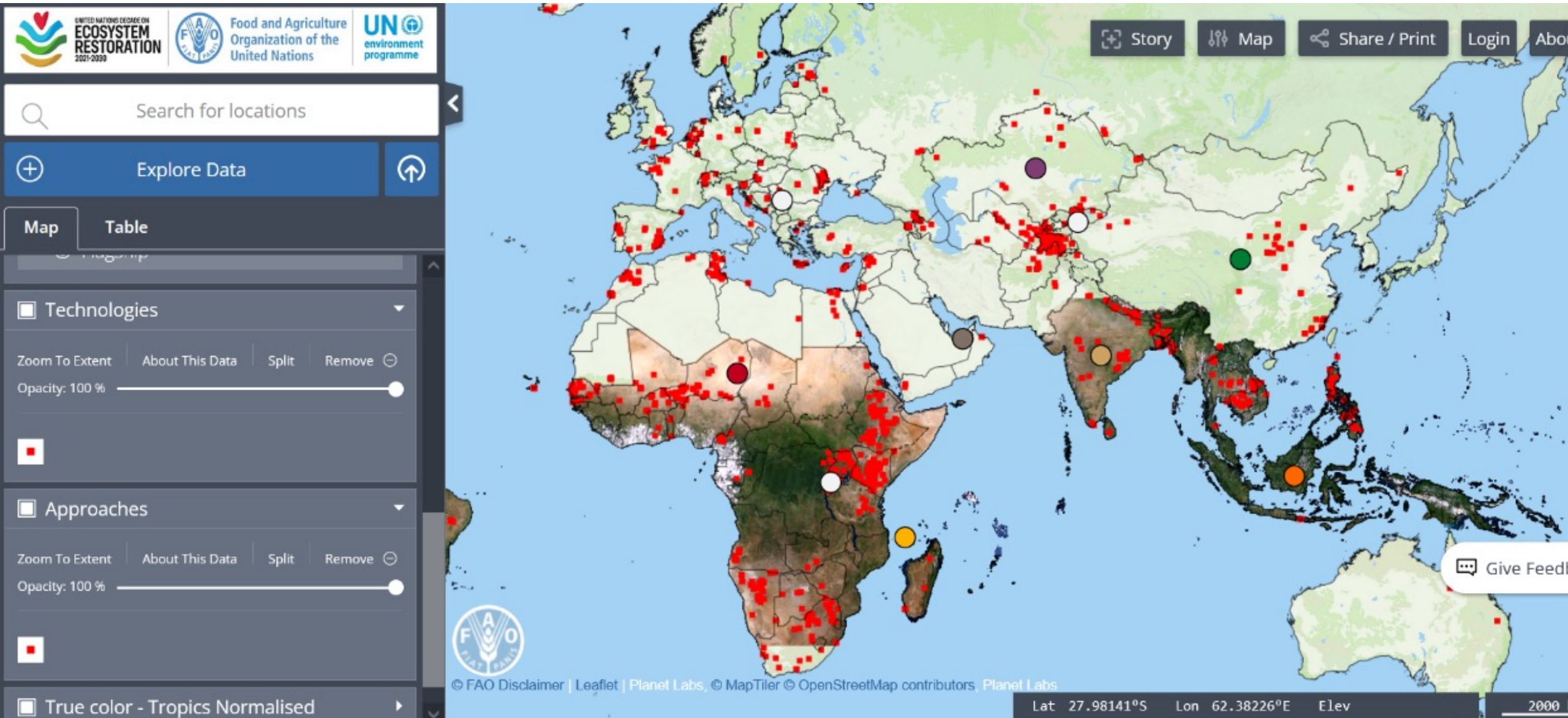
Full summary as PDF

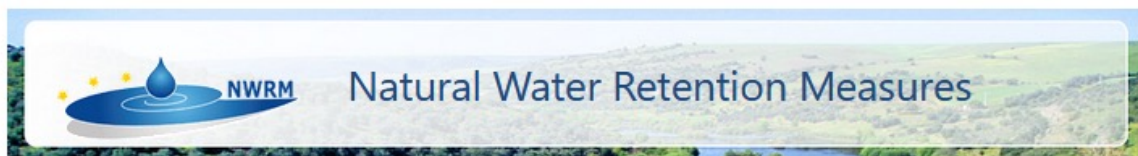
Full summary as PDF for print

Full summary in the browser

Full summary (unformatted)

WOCAT Global SLM Database



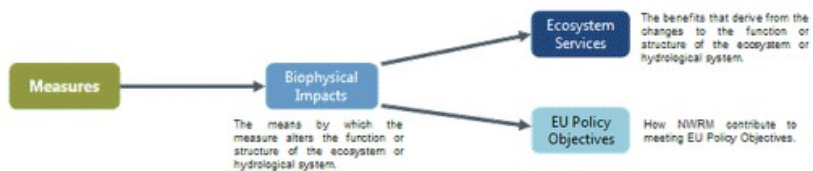


- Home
- Implementing NWRM ▾
- Catalogue of NWRM ▾
- Case studies ▾
- Glossary
- About NWRM project ▾

NWRM PER TYPE OF BENEFIT PROVIDED

To help you choose
the most appropriate NWRM

As NWRM could have multiple functions and co-benefits, you will find here qualitative links between measures and impacts, benefits and policy objectives.



Biophysical impacts

- Any - ▾

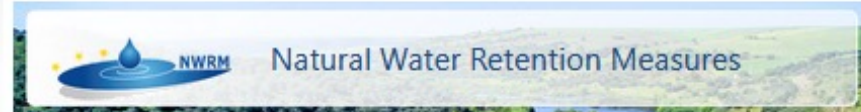
Ecosystem Services Benefits (ES)

- Any - ▾

Policy Objectives

- Any - ▾

Apply

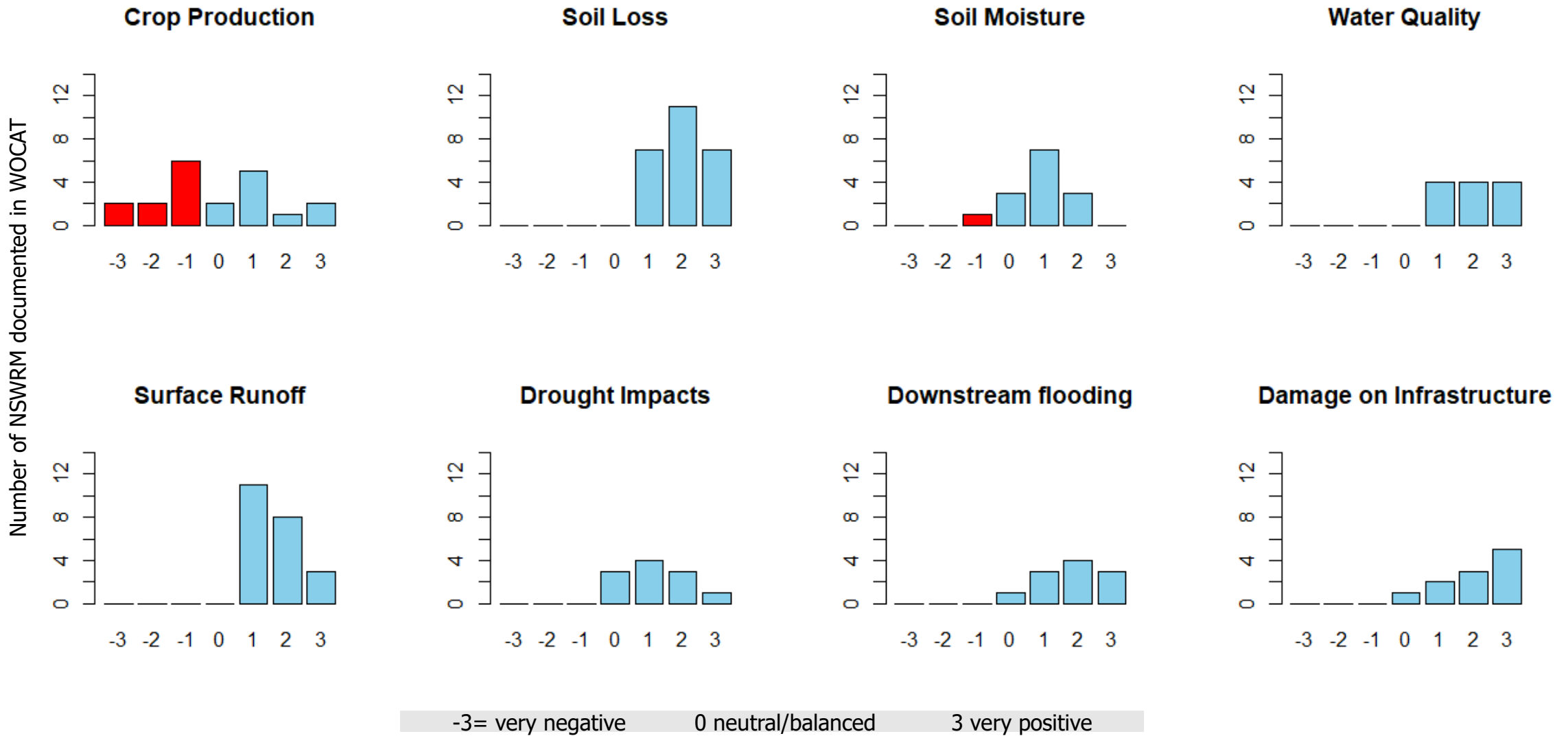


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BENEFIT TABLES

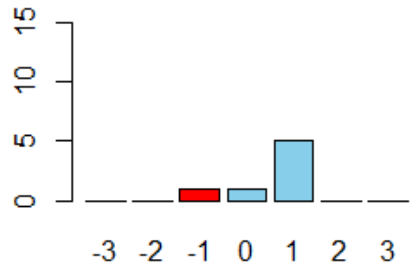
Biophysical Impact	Ecosystem services	EU Policy Objective
<p>AGRICULTURE</p>	<p>AGRICULTURE</p>	<p>AGRICULTURE</p>
<p>FOREST</p>	<p>FOREST</p>	<p>FOREST</p>
<p>URBAN</p>	<p>URBAN</p>	<p>URBAN</p>
<p>HYDRO MORPHOLOGY</p>	<p>HYDRO MORPHOLOGY</p>	<p>HYDRO MORPHOLOGY</p>

Impacts of NSWRM documented in WOCAT

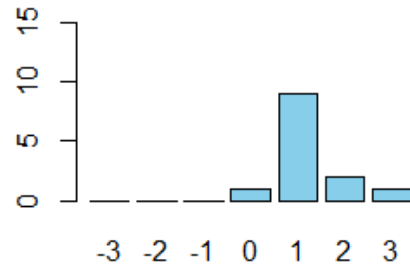


Impacts of NSWRM documented in WOCAT

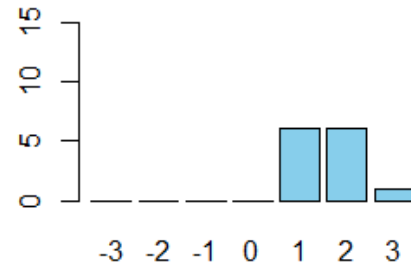
Evaporation



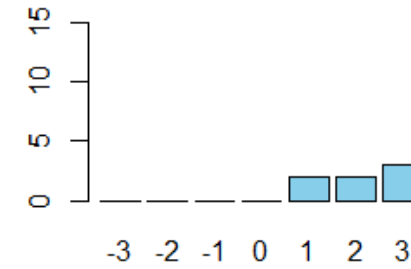
Plant Diversity



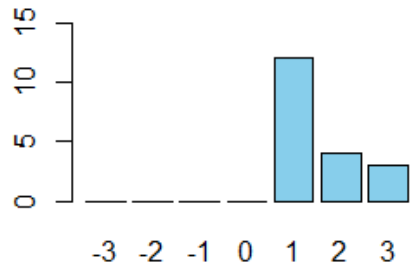
Animal Diversity



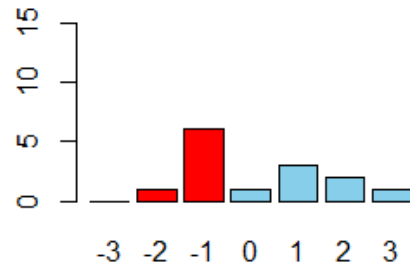
Flood Impacts



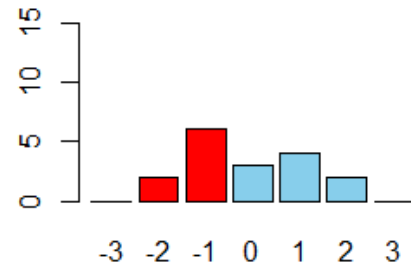
Water pollution



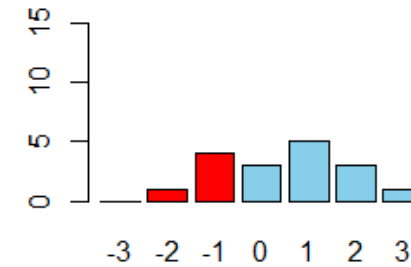
Expenses Agricultural Inputs



Farm Income

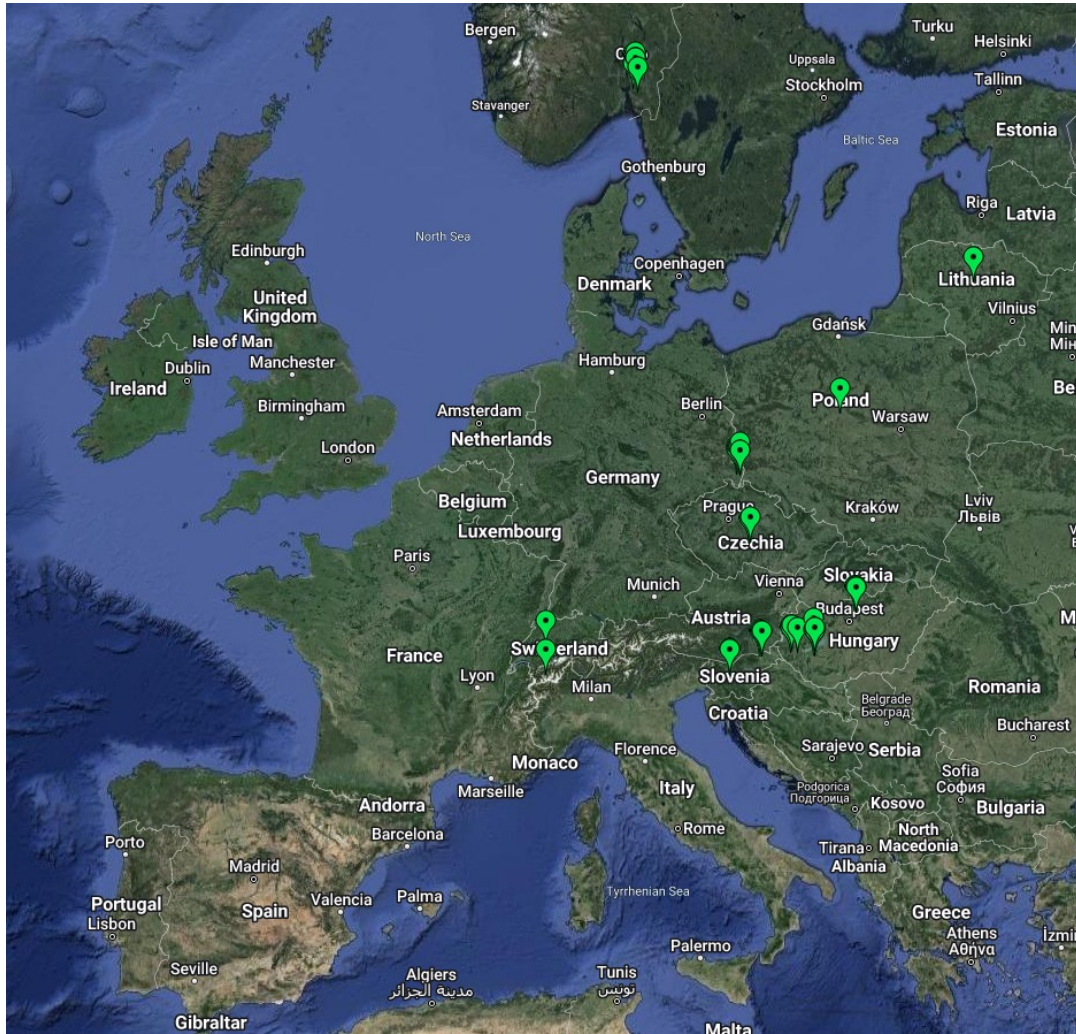


Workload

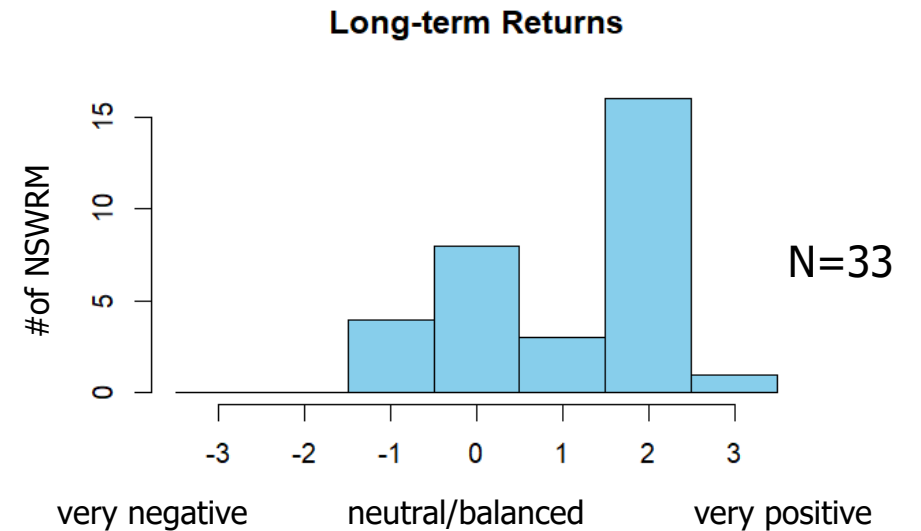
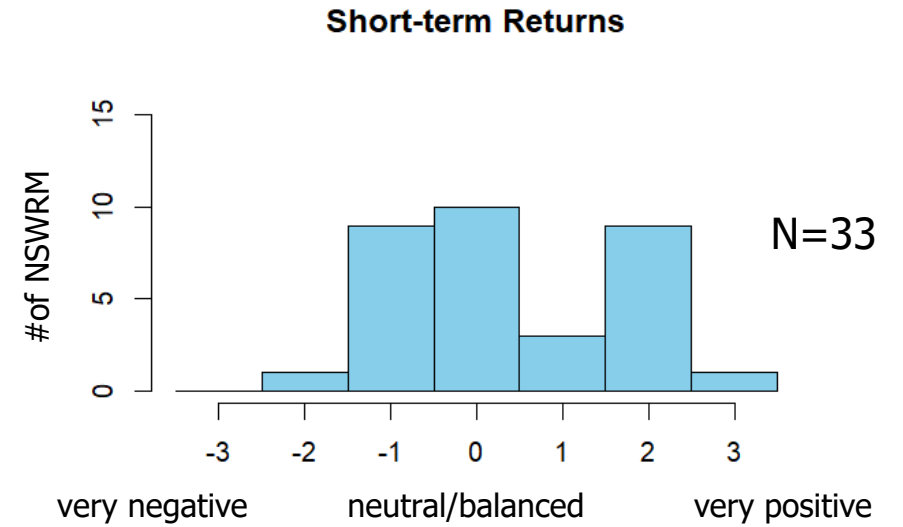


-3= very negative 0 neutral/balanced 3 very positive

How do the benefits compare with the establishment costs?



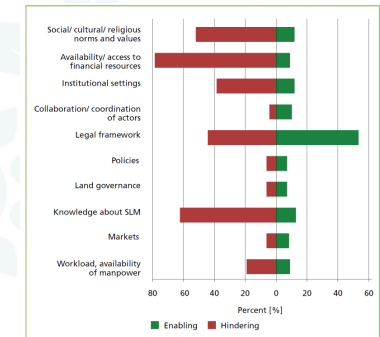
OPTAIN Case Studies with documented NSWRM (33/66)



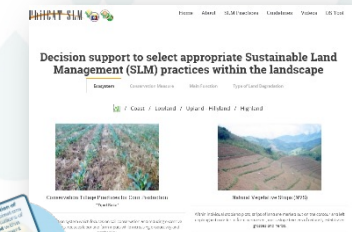
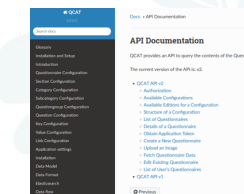
Principles for knowledge management

To enhance the **robustness and durability of knowledge management processes and products**, we focus on the following principles:

1. Tools and methods applied to generate data and evidence are **harmonized**
2. Data are **standardized** to allow exchange, comparison and analysis
3. Data and knowledge are **open access**, and **easy to access and use**
4. Data and knowledge are **integrated into platforms** that last beyond the duration of a programme/ project
5. Knowledge is **co-developed** and **co-produced** with multiple actors and social groups
6. Data and knowledge are produced in such a way that they can be integrated into knowledge products for **different audiences**
7. Knowledge/ evidence is **embedded at local, national, regional and global levels**



Enabling (green) and hindering (red) conditions for the implementation of SLM technologies. Sustainable Rangeland Management in Sub-Saharan Africa. Liniger et al. 2019.



Questions?



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