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NATURE BASED SOLUTIONS SEEM TO PROVIDE THE ULTIMATE ANSWER FOR A SUSTAINABLE WATER MANAGEMENT

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BUT...WHY IS IT *DIFFICULT* TO
IMPLEMENT NATURE BASED
SOLUTIONS THAT SERVE WATER
MANAGEMENT??



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THE ANSWER IS THAT

- IT IS DIFFICULT TO PROTECT ECOSYSTEMS FROM UNPAID USE (WE DO NOT PAY FOR ECO-SERVICES)
- WE DO NOT KNOW HOW TO ORGANIZE NSB INTERVENTIONS IN PUBLIC SPACE



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WHY IS IT DIFFICULT TO IMPLEMENT NATURE BASED SOLUTIONS FOR WATER MANAGEMENT?

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PRESENTATION

- * The need for NBS
- * Why is it difficult to implement NBS
- * NBS policies
- * Findings of case studies
- * A road map for NBS interventions



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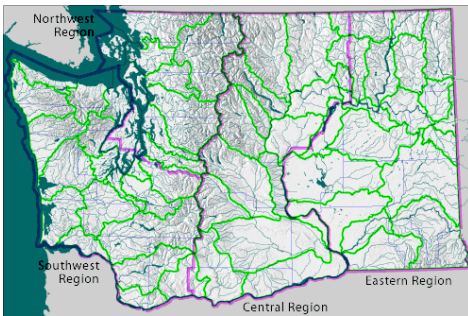
The need for NBS in water management

- * Rising demand for food
- * More affluent societies demand water rights
- * Destruction of ecosystems by conventional water management interventions
- * NBS water management interventions preserve integrity of ecosystems (sustainability)
- * Cost efficiency considerations



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Why is it difficult to implement NBS?



* Characteristics of ecosystems relate to non-excludability issues in water management:

- * Lumpy indivisible water bodies (aquifers, inland waters)
- * Distributed water flows require ample space
- * Interconnectedness makes all places equal
- * No 'closing down' if unprofitable
- * Difficult to protect from unpaid use





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Why is it difficult to implement NBS?

- * Consequences of non-excludability
- * Unpaid use of ecosystem services
- * No price signals of scarcity
- * Inadequate pricing results in:
 - * Free rider's behaviour ('Tragedy of the Commons')
 - * No incentive for production of eco-services
 - * No role for ecosystem custodians



Policies to deal with excludability

- * **Strict conservationism**
monitoring costly
- * **Monetizing eco-services**
 - * Production function analyses/Defensive expenditures
Process knowledge/empirical basis
 - * Surrogate markets (hedonic pricing; travel cost)
Confounding factors
 - * Contingent valuation (Willingness To Pay)
What does she/ he really wants to pay?
- * **Distribution of property rights**
Eco-services can not be partitioned



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Policies to deal with excludability

- * **Characteristics of these shared eco-systems are now better understood**
- * **Elinor Ostrom (Noble prize winner) shows that well functioning institutions are a proper answer to management of shared ecosystems.**
(reward good stewardship, penalize neglect, and sustain transfer to next generations).
- * **Which other elements are essential in this process?**



21 case studies

- * Study on NBS for water management commissioned by FAO analyzed 21 case studies
- * Factors considered in our evaluation are:
 - * Characteristics
 - * Country/region/ecosystem/farming system
 - * identification of stakeholders and beneficiaries,
 - * prevailing degradation process,
 - * typology of NBS intervention
 - * Qualification assessment
 - * stakeholder involvement,
 - * degree of transdisciplinarity,
 - * rewarding schemes for custodians,
 - * stability of institutional collaboration and
 - * success or failure of the NBS.



Rubrics for NBS evaluation

Code	Transdisciplinarity	Rewarding custodians	Institutional collaboration	Success/failure
--	Absence of transdisciplinary approach	Absence of rewarding schemes	No collaboration	Social and ecological NBS objectives were not achieved
-	Transdisciplinary approach present but implementation unsuccessful	Presence of rewarding schemes but unsuccessful implementation	Some collaboration	Either social or ecological NBS objective was achieved
++	Transdiscipline approach present with some results	Rewarding schemes present with some results	Collaboration established with minor results	Part of the social and ecological NBS objectives were achieved
+	Transdiscipline approach successful; clear involvement of transcendence stakeholder	Rewarding schemes successful; payments assure NBS objectives	Collaboration successful; alignment of activities	Social and ecological NBS objectives were achieved successfully
+++	Transdiscipline approach very successful; stakeholders of transcendent disciplines fully participate in NBS process from design to implementation	rewarding schemes very successful; payments assure NBS objectives and encourage other PES initiatives	Collaboration very successful; alignment of activities and establishment of sustainable relationships	Social and ecological NBS objectives were achieved successfully and mutually strengthened each other



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Examples from the 21 case studies

• Using compost pits in Nepal



Main characteristics: Success, type 2

Groundwater management in Aweil East, Sudan



Main characteristics: Failure, type 1

Example of the Inventory of case studies

Name	Country	Ecosystem	Initiator/funding	Stakeholders	Beneficiaries	Degradation process	NBS	NBS typology	Trans-disciplinarity*	Rewarding custodians	Institutional collaboration	Success/failure**
C1. Baviaanskloof/Tsitsikamma and uMngeni catchments	South Africa	Watershed	Development Bank, NGO's Governmental national/local	Municipalities, NGO's, provincial government researchers, farmers	Urban water consumers	Overgrazing	Restoring thicket	1	+-	--	--	+
C2. Izta-Popo	Mexico	Land	Private company	Private company/urban population/land users	Private company/urban population	Illegal logging, livestock grazing, fires	Reforestation/ infrastructure (pits and banks)	2/3	+	+	--	++
C3. Saye River bank failure	Nigeria	River	State	Communities/farmers	Communities /farmers	River bank erosion	Civil engineering structures	3	-	-	-	-
C 4. Athi River Kaiti, /Muuoni and Kikuu rivers	Kenya	Watershed	NGO's and local communities	NGO's and local communities	Local communities	Water scarcity and drought	Water harvesting technique (sand bars)/agroecology	2	+	--	--	+
C 5. Water fund for catchment management	Ecuador	Watershed	NGO's, private companies, state	NGO's, private companies, state, farmers	Urban population/ farmers	Deforestation	Conservation techniques	1/2	+-	+	++	++
C 6. Pangani River Basin II	Tanzania	River basin	Colonial gov. / national government	Rural/urban population	Rural/urban population	Watershed degradation	hydropower plant/dam	3	-	-	-	-
C 6 Pangani River Basin I	Tanzania	River basin	national government/ JICA	Farmers		Low irrigation efficiency	Irrigation Project	2	-	-	+-	+-
C 8. Ruvu watershed	Tanzania	Watershed	NGO's	Upstream communities, private companies industry, urban /rural population	Local communities , companies, urban population and industry	River sedimentation	Restoration of rivers through adoption of agro-ecological practices.	2	++	--	-	++
C 9. Lempa River	El Salvador	Watershed	FAO and GEF	Local communities and government staff in selected municipalities	Local communities and selected officials in municipality	Soil degradation	Integrated natural resources management/ rainwater collection	2	++	-	++	++



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21 case studies

- * Success related to:
 - * full stakeholder involvement (inter- and transdisciplinary platforms)
 - * restoration activities that cover large areas
 - * implementation of ad hoc funding and payment schemes
 - * endurance of stakeholders; long time lapses are needed
- ... we also found that
 - * tedious exercises of natural resource valuation are omitted



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A road map for NBS interventions

- * The aim of a road map for NBS interventions is to create a productive stakeholder engagement that balances interests of resource users against quality and sustainability of the ecosystem.



A road map for NBS interventions

- * Stakeholder/Actor identification
- * Inter- and transdisciplinary participatory platforms
- * Development of Decision Support Tools:
 - * Detail monetary and ecological costs and benefits
 - * Explicitly map and analyze conflict of interests
 - * System (non-modular) model structure
- * Retention of subsidiarity principle
- * Rewarding good custodianships/penalize neglect
- * Implementation of conflict resolutions mechanisms
- * Endurance: lasting positive effects of well-designed NBS interventions outweigh quick wins based on ignorance