



CAU
Christian-Albrechts-Universität zu Kiel

ESP iale

Ecosystem Service Workshop

Concept and Challenges of ecosystem service identification at national level

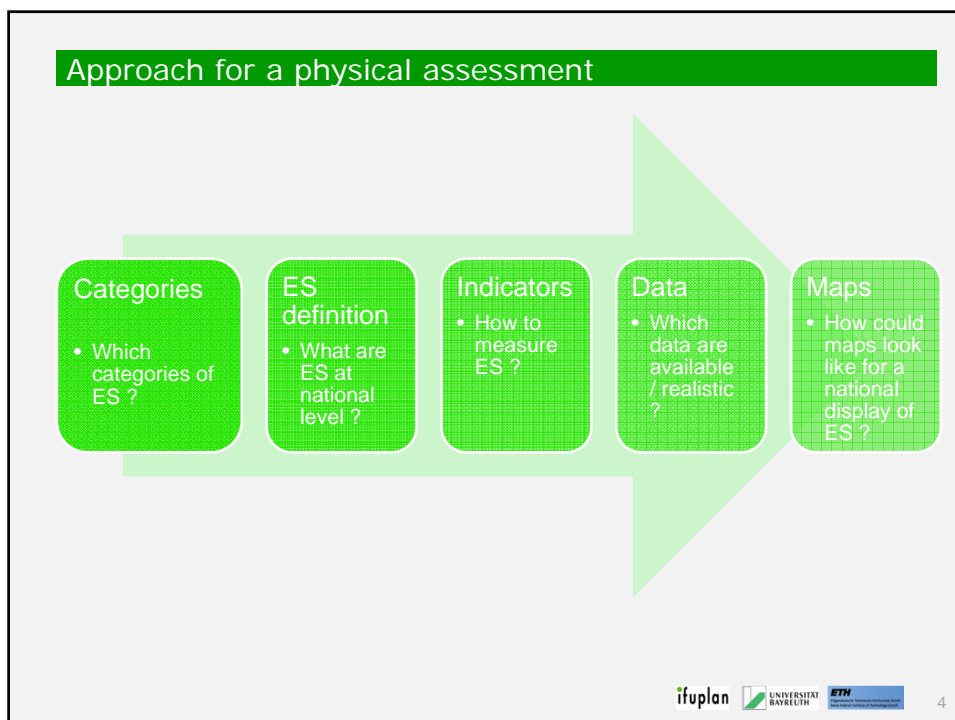
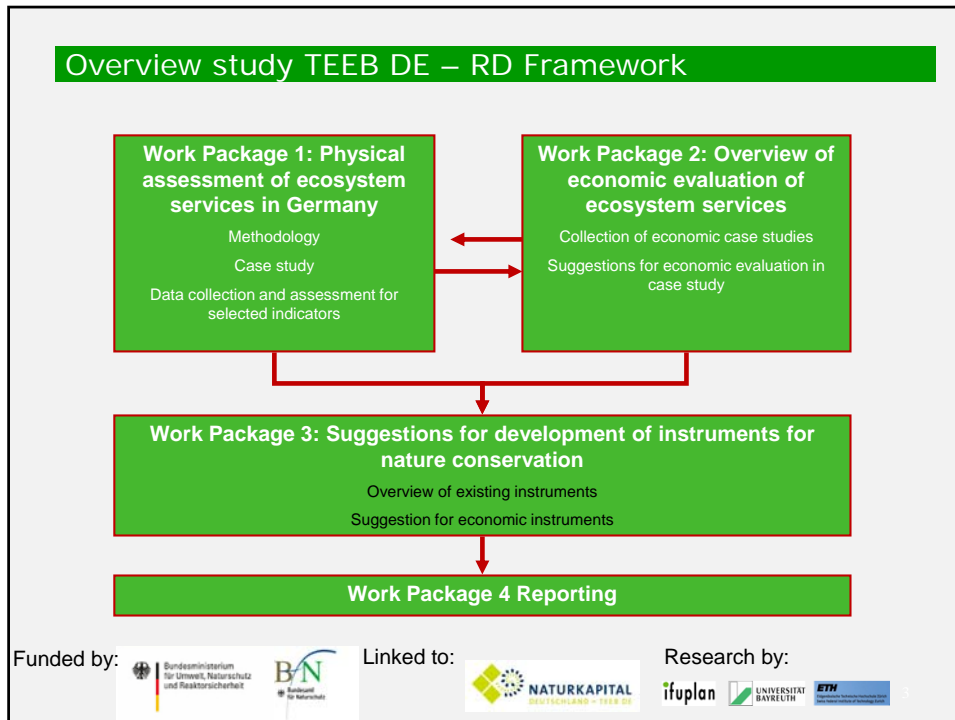
Kiel
Kiel 8. May 2013

Stefan Marzelli, Adrienne Grêt-Regamey, Thomas Köllner, Christoph Moning, Sven-Erik Rabe and Sabrina Daube

ifuplan UNIVERSITÄT BAYREUTH ETH
Eidgenössische Technische Hochschule Zürich
Federal Institute of Technology Zurich

Agenda

1. Approach for physical assessment of ecosystem services
2. Categories of ecosystem services
3. Ecosystem service definition
4. Indicators
5. Data and Maps
6. Further developments




Challenges of multiple objectives

Contribution to national green accounting ?

Role of economic evaluation ?

Raising awareness for services of nature?






Who is leading the discussion on objectives and contents?

Enforcement of an integrative view for decision making?

Support for established instruments of nature conservation?

Scale of ecosystem services?




5

Ecosystem Service Categories – different concepts

MEA

Provisioning Services	Regulating Services	Cultural Services
<ul style="list-style-type: none"> Food Fresh water Fiberwood Other Biochemicals Genetic resources 	<ul style="list-style-type: none"> Climate regulation Water regulation Water purification Pollination 	<ul style="list-style-type: none"> Spiritual and religious Recreation and education Aesthetics Recreational Historical Science of nature Cultural heritage
Supporting Services Services necessary for the production of other ecosystem services <ul style="list-style-type: none"> Soil formation Nutrient cycling Primary Production 		

TEEB

Provisioning Services	Regulating Services	Cultural Services
1. Food and fiber 2. Water for drinking, irrigation, and other uses 3. Raw materials for the construction of buildings, furniture, and other products 4. Genetic resources for the development of new products 5. Medicinal resources for the treatment of diseases 6. Recreational resources for leisure and tourism	7. Climate regulation 8. Water regulation 9. Air quality regulation 10. Soil formation 11. Nutrient cycling 12. Pollination 13. Ecosystem stability and resilience 14. Ecosystem health and vitality 15. Ecosystem services for the well-being of society	16. Recreation and tourism 17. Cultural heritage 18. Aesthetics 19. Spiritual and religious 20. Education and research 21. Scientific and technological

CICES

CICES Ecosystem Service Group	CICES Code and Broad Service Class	Correspondence to MEA (2005) "Functional" of natural capital
Food & Beverages	Provisioning 1	Resource Function
Materials	Provisioning 2	Resource Function
Energy	Provisioning 3	Resource Function
Regulation of water accumulation processes	Regulating 1	Sink Function
Regulation against floods	Regulating 2	Service Function (environmental quality)
Regulation of biophysical conditions	Regulating 3	Service Function (environmental quality)
Regulation of biotic environment	Regulating 4	Service Function (environmental quality)
Recreation	Cultural 1	Service Function (amenity)
Spiritual	Cultural 2	Service Function (amenity)
Experiential	Cultural 3	Service Function (amenity)

Supporting Services




Provisioning Services

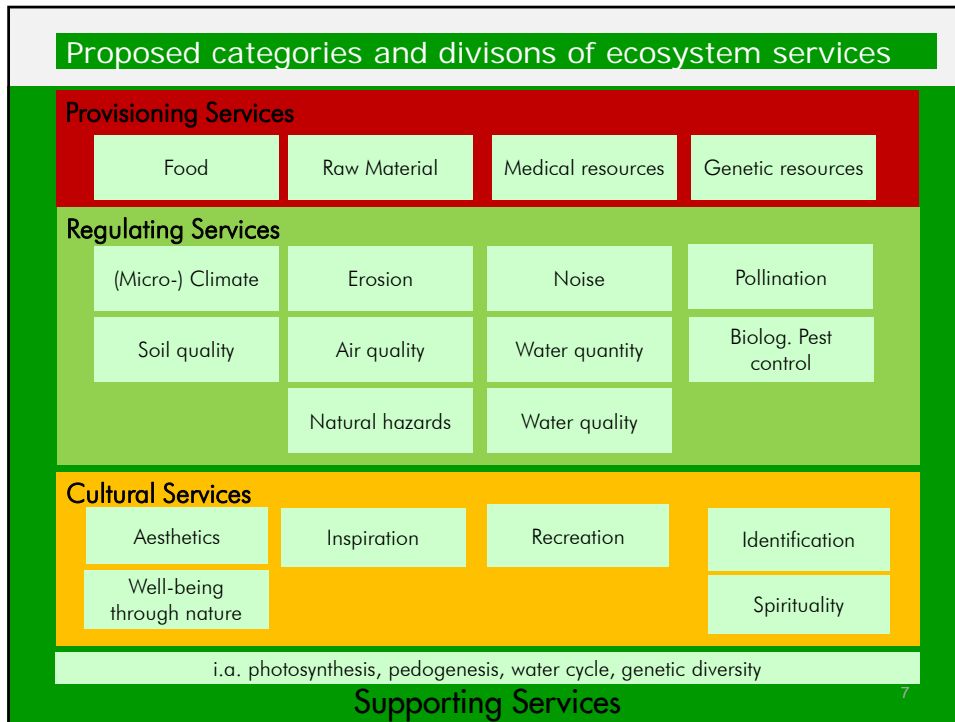
Regulating Services

Cultural Services

Habitat Services

Resource function
Sink function
Service function




6



Ecosystem service categories – CICES compatibility

Section	Division	Group
Provisioning	Nutrition	Biomass
		Water
	Materials	Biomass, Fibre
		Water
Energy	Biomass-based energy sources	
		Mechanical energy
Regulation & Maintenance	Mediation of waste, toxics and other nuisances	Mediation by biota
		Mediation by ecosystems
	Mediation of flows	Mass flows
		Liquid flows
		Gaseous / air flows
	Maintenance of physical, chemical, biological conditions	Lifecycle maintenance, habitat and gene pool protection
		Pest and disease control
		Soil formation and composition
	Water conditions	
	Atmospheric composition and climate regulation	
Cultural	Physical and intellectual interactions with ecosystems and land-/seascapes	Physical and experiential interactions
		Intellectual and representative interactions
	Spiritual, symbolic and other interactions with ecosystems and land-/seascapes	Spiritual and/or emblematic
		Other cultural outputs

Provision of crop products

regulation of wind and water erosion

Recreation in private / public urban areas

8

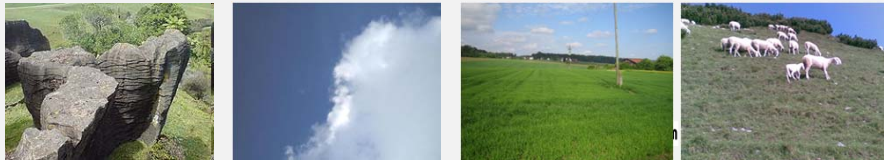
Ecosystem service definition - challenges

What are ecosystem services?

- To which extent is it useful to keep a strict distinction between biotic and abiotic environmental compartments (environmental services)?
- For which objectives is it necessary to distinct between intermediate and final ecosystem services – for which not ?
- To which extent is human capital considered in ecosystem services?
- How are supporting services integrated into a national concept?

We don' t know ...

No homogenous definition available



Ecosystem service definition

Definition for the project

Ecosystem services are direct or indirect contributions of ecosystem functions to human well-being, which means services and goods providing directly or indirectly economic, material, health or mental benefits for humans.

Ecosystem services correspond to an ecosystem understanding which comprises direct or indirect interactions between biotic and abiotic compartments of the environment.

List of Ecosystem Services of high priority

Identification of 36 ecosystem services

↓

Setting of priorities for ecosystem services in terms of

- Spatial relevance
- Relevance for population
- Position in the ecosystem concept
- Clearness of ecosystem services
- Source of ecosystem services

Selection of ES of high priority

Ecosystem service	Nr.	Sub-type
Provisioning Services		
Food	1	Vegetable agricultural products
	2	Wild deer
	3	Wild products gathering (mushroom, herbs, wild fruits)
Raw materials	4	Wood
	5	Energy
Regulating Services		
Pollination	6	Pollination
Erosion control	7	Regulating of wind erosion
	8	Regulating of water erosion
Climate regulation	9	CO2 sequestration
Natural regulation	10	Flood control
	11	Storm protection
Water regulation	12	Self-purification of surface water
Water regulation	13	Buffer of soil and vegetation
Water regulation	14	Water quantity regulation – ground water replenishment
Air quality regulation	15	Air quality regulation through vegetation and micro climate regulation
Cultural Services		
Recreation	16	Recreation in private areas
	17	Recreation in public urban areas
	18	Recreation in open landscapes
Supporting Services		
Pedogenesis	19	Pedogenesis, Maintenance of soil fertility / good shape

11

Ecosystem service indicators - challenges

Final and intermediate ecosystem service indicators

Water quality

- Drinking water
- Pre-requisite for fish stock
- Pre-requisite for bathing as a recreation activity

Stock and potential of services and demand indicators

- Landscape used for recreation
- Landscape suitable for but not used for recreation
- Number of users for recreation in a specific landscape

Compatibility of indicators with existing indicator systems

- Nature conservation data
- National sustainability indicators
- LIKI-indicators
- EEA-indicators
- Eurostat-indicators
- Spatial monitoring (INKAR)
- Environmental indicators of the Federal Environment Agency (GISU-data)

2

Ecosystem service indicators - concept

Expert driven approach

Data driven approach

Focus on stock / potential of domestic ES

Documentation in fact sheets

Indikatorenkennblatt

Ökosystemleistung – Operationalisierung (Subtyp)
Regulation von Wassererosion

Definition der Ökosystemleistung
Ländnutzung, Relief, Bodenbedingungen und Klimaeinflüsse wie Wasser stellen die bestimmenden Einflüsse für den Abtrag von Boden dar. Die Vegetation, allen voran Waldfischen, trägt wesentlich zur Erhaltung des Bodens und zur Vermeidung von Sedimentationseintrag im Gewässer sowie von Erdnut-

Indikatorenvorschläge und Einstufung

- Aufteilung der oben genannten Indikatoren, die sich aus verschiedenen Indikatoren ableiten lassen (Maes et al. 2011a, Maes et al. 2011b, UNEP 2009), z. B. Datenquellen:
- Flächen an Wald / Vegetationsbedeckten Flächen in potenziell wassererosionsgefährdeten Gebieten (Angebotsindikator)
- Bodenverlust: Langjähriger, mittlerer Bodenabtrag durch Wassererosion im t/ha/Jahr (Nachfrageindikator)
- Flächen an tatsächlich wassererosionsgefährdeten Gebieten (Nachfrageindikator)

Datenquellen

Bundesweite Ebene
Kartographische Darstellung der mittleren standortbedingten Erosionsgefährdung auf landwirtschaftlichen Flächen für Deutschland: UBA – Umweltbundesamt (2009): Daten zur Umwelt, http://www.umwelt.bundesanstalt.de/nachrichten/public_thema.de?nodeId=3147

Bodenübersichtskarten der Bundesrepublik Deutschland – BGR – Bundesanstalt für Geowissenschaften und Rohstoffe (Nutzung: bodenkundliche Karten als Web Map Service (WMS): <http://www.bgr.de/Service/Bodenkunde/>)

Cartos: Landcover Daten: 2006: Deutscher Zentrum für Luft- und Raumfahrt (DLR): http://www.cartos.dlr.de/data_de.html

Erosionsgefährdeten Gebieten auf EU-weiter Ebene: MESALES-Daten: verfügbar im JRC's European Soil Data Center (ESDAC): <http://esdac.jrc.ec.europa.eu/>

Landesweite Ebene
Informationen zur potenziellen Erosionsgefährdung auf Länderebene, z.B. Bayern:

Data & maps for ecosystem services - challenges


Data availability at federal level ?

Last update and maintenance of data in the future ?

Service providing units: ecosystems? Units related to specific ecosystem functions ?

Resolution of maps

What are the main objectives ?



CLC 2006 Germany

14

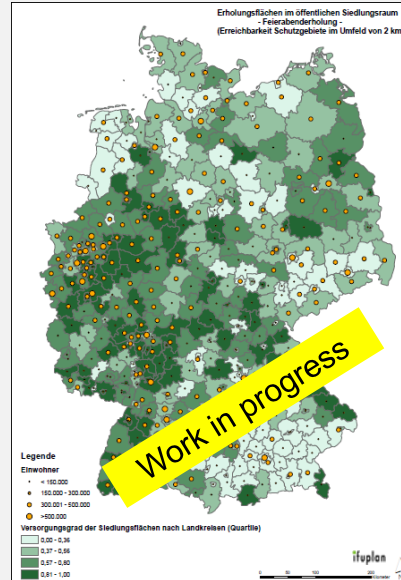
Data & maps for ecosystem services - concept

Data at federal level such as

- CLC Data 2006, digital landscape model, geological and soil data, nature conservation data, statistical data corresponding to administrative units
- Maps at district level for a federal approach

Complementarity to EU level

Coherence between different levels ?

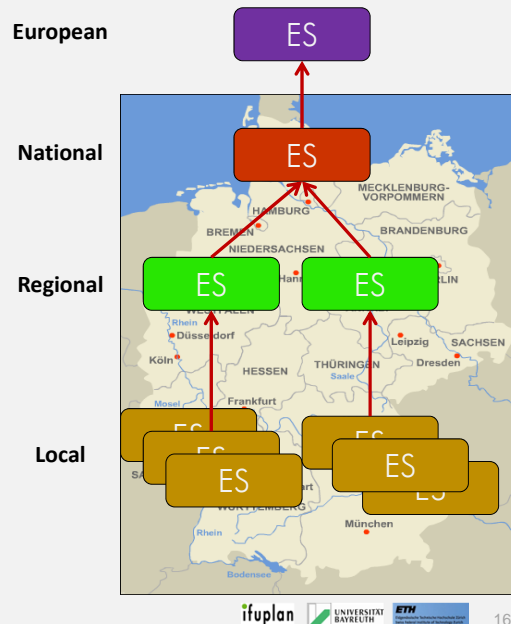


15

Further developments – General remarks

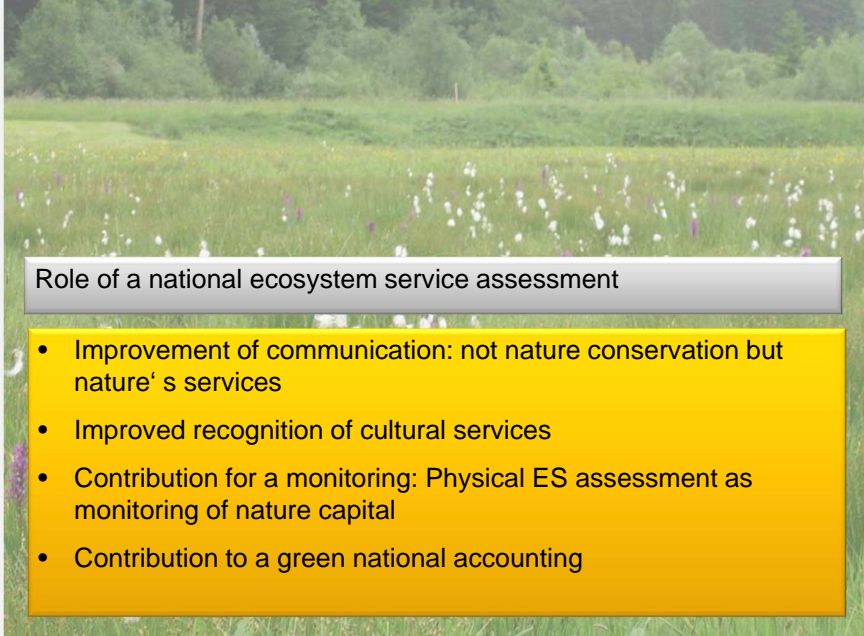
Long term national process in terms of

- Development, selection, inclusion, and exclusion of ES
- Requirements of different areas and tasks
- Requirements of different spatial levels such as federal, regional and local level



16

Further developments

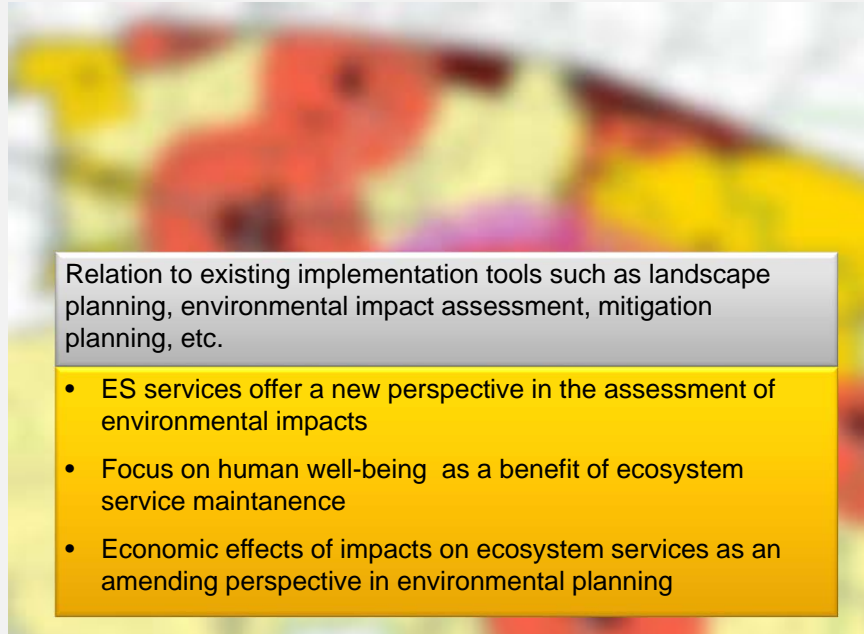


Role of a national ecosystem service assessment

- Improvement of communication: not nature conservation but nature's services
- Improved recognition of cultural services
- Contribution for a monitoring: Physical ES assessment as monitoring of nature capital
- Contribution to a green national accounting

17

Further developments



Relation to existing implementation tools such as landscape planning, environmental impact assessment, mitigation planning, etc.

- ES services offer a new perspective in the assessment of environmental impacts
- Focus on human well-being as a benefit of ecosystem service maintenance
- Economic effects of impacts on ecosystem services as an amending perspective in environmental planning

8



Many new perspectives ...

An area-wide assessment of ecosystem functions as a basis for sustainable development has been claimed by the National Environment Council – in 1987

Thank you for your attention !