

# "Nature Capital Germany" Example for a national TEEB - approach

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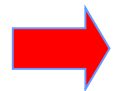
## Conservation needs money



Natural vegetation of Germany is predominantly woodlands; Agricultural use has fundamentally changed wild species composition



Today nearly 50% of the biodiversity of Germany depends on **traditionally or less intensively used farmland**, which is **not economically competitive** on the world market



Nearly **30%** of the overall expenditure for nature conservation in Germany (overall expenditure is about 1 Bio. € per year) is dedicated to farmers to apply farming practices that help to conserve species rich farming areas

# Financial needs and real expenditures for nature conservation

	Bil. € in 2000	Per household and year <sup>4)</sup>	% of GDP
Costs / need for resources to stop the loss of biodiversity in Germany	1.7 – 2.3	43 - 59 €	0,1
Nature Conservation expenditures <sup>3)</sup> (fed. state, countries, communities = 0,07% of overall public spending)	0.67	17 €	0,03

**Saving biodiversity needs economic resources!!!**

**Are we willing to pay or are we willing to forego for additional income resp. market goods in favour of more nature conservation???**

**= Is nature conservation beneficial from the point of view of welfare economics?**

# Political steps towards economic arguments for nature conservation

## European Commission

Worrying that the EU-member states are going to miss the Göteborg objective to halt the loss of biodiversity until 2010 the European Commission set off a study with the aim of giving **additional economic arguments** to conserve biodiversity



### VALUE OF BIODIVERSITY

Documenting EU examples where biodiversity loss has led to the loss of ecosystem services

ENV.G.1/FRA/2004/0081

.....

## G8 Environment Ministers Meeting

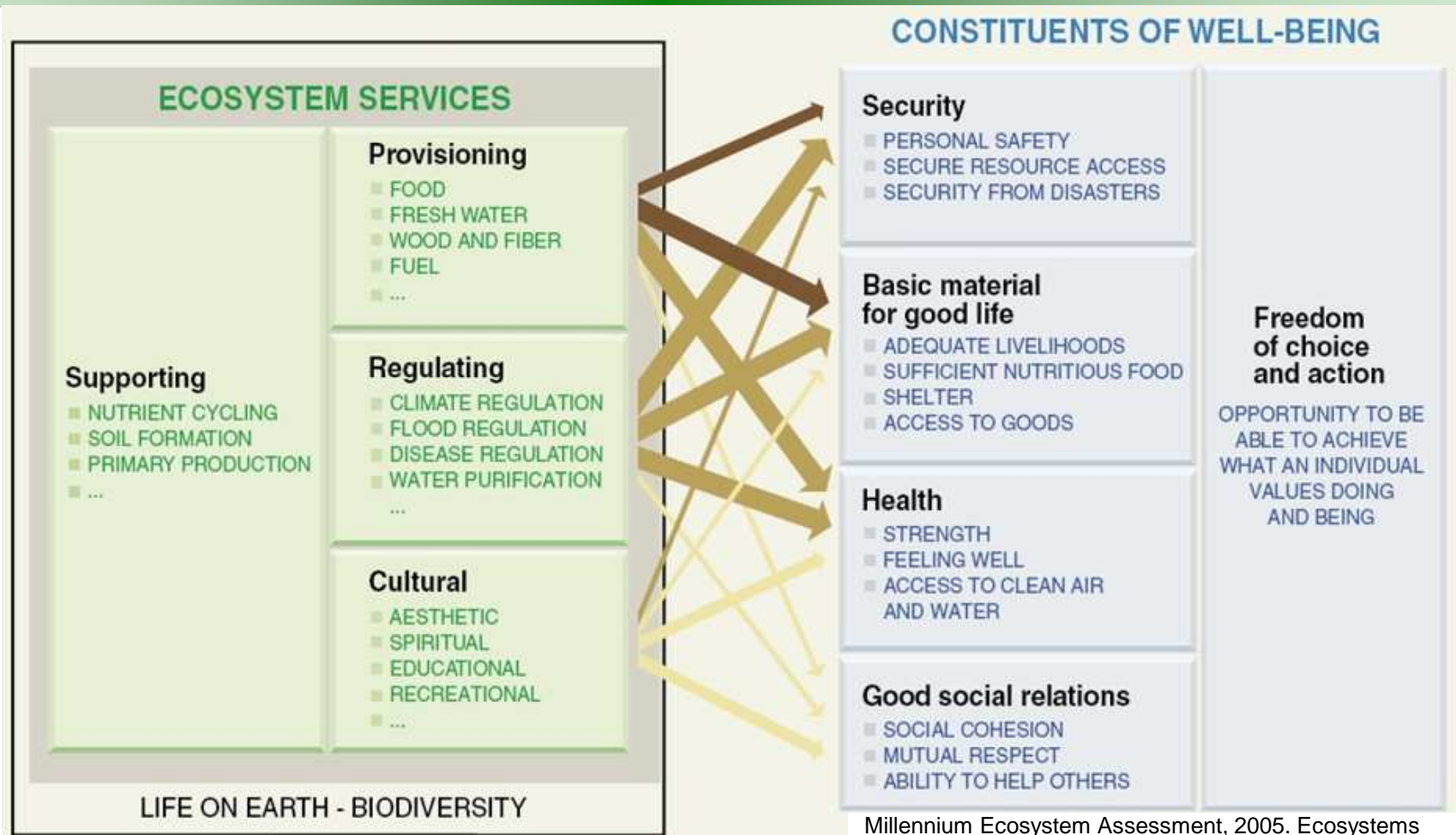
Potsdam, 15-17 March 2007

“Potsdam Initiative – Biological Diversity 2010”

(Initiated by Germany and the EU)

“In a global study we will initiate the process of analysing the **global economic benefit of biological diversity**, the costs of the loss of biodiversity and the failure to take protective measures versus the costs of effective conservation.”

# Ecosystem Services as a new argument for healthy nature



Thicker line = Intensity of linkage between ES and human well-being

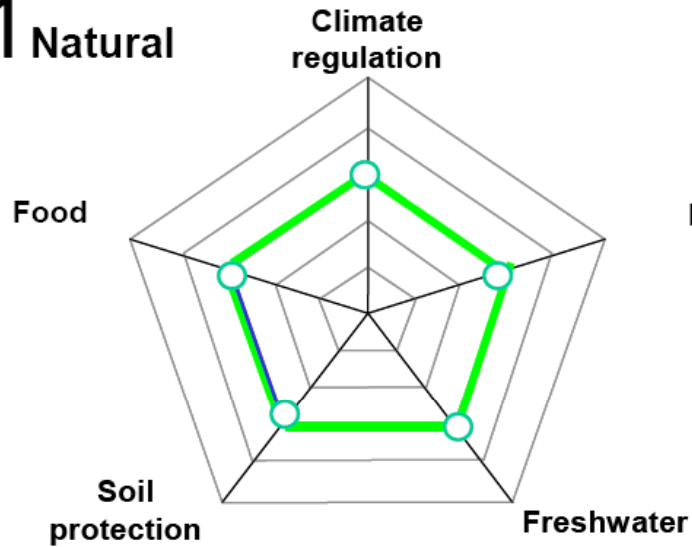
Darker line = Increasing potential for socio-economic mediation

Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC., Copyright © 2005 World Resources Institute, <http://www.millenniumassessment.org/en/Synthesis.aspx>

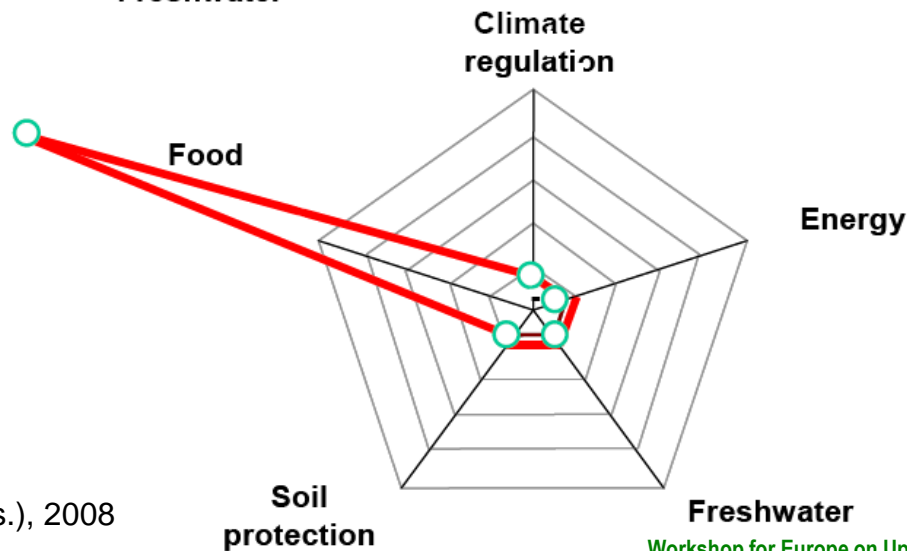
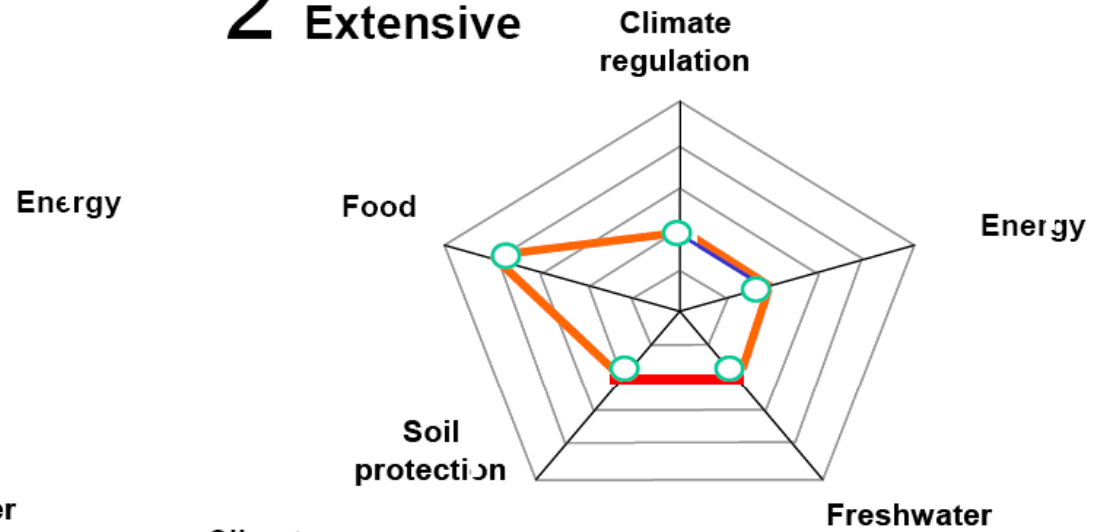
Workshop for Europe on Updating NBSAPs, Vilm, Germany, 15 - 19 April 2011

# Trade-off between ecosystem services and increasing intensity of land use

**1** Natural



**2** Extensive

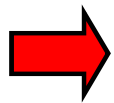


**3** intensive

Source: Braat & P. ten Brink (eds.), 2008

# The idea of „Nature Capital Germany “

Encouraged by the TEEB-Study



**the aim of "Nature Capital Germany" is to**

- ⇒ **show the benefits (ecosystem services) of nature and nature conservation**
- ⇒ **not only in qualitative and physical terms**
- ⇒ **but also – where possible and meaningful – in monetary terms**

**for the specific situation of Germany**

# Focus on direct and indirect use values

	Categories	Examples, explanations	Valuation methods (examples)
ecosystem services in a narrow sense	<b>direct use values</b>	agricultural and forest products, recreation, hunting, fishing	<b>Market gains, production costs, travel cost method, hedonic pricing</b>
	<b>indirect use values</b>	improvement of water quality, carbon sequestration, flood prevention, pollination	<b>reduced damage costs, reduced avoidance costs, reduced (alternative) water purification costs</b>
ecosystem services a broader sense	<b>option value</b>	benefit from ensuring the option for a future use	<b>Different stated preference methods (contingent valuation, choice analysis, ...)</b>
	<b>existence value</b>	benefit without direct or indirect use, ethical obligation to preserve	
	<b>bequest value</b>	benefit from preserving for future generations	

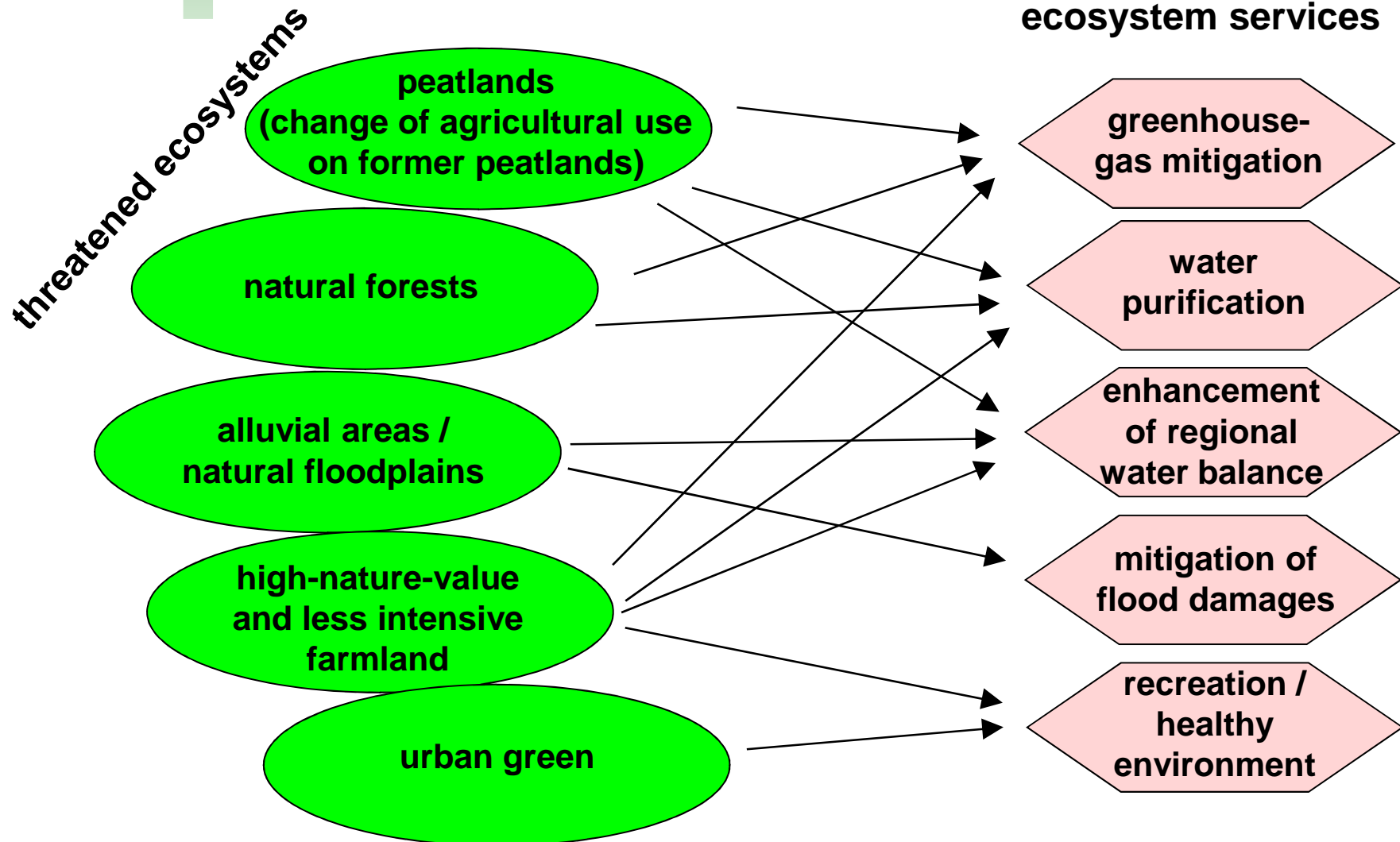


# “Total Economic Value” or/and Ecosystem Services as a basis for CBA

	Categories	Examples, explanations	Valuation methods (examples)
<p><b>economic arguments additional to ethical arguments</b></p> <p><b>full range of welfare effects including willingness to pay for conservation without direct or indirect use</b></p>	<b>direct use values</b>	agricultural and forest products, recreation, hunting, fishing	<b>Market gains, production costs, travel cost method, hedonic pricing</b>
	<b>indirect use values</b>	improvement of water quality, carbon sequestration, flood prevention, pollination	<b>reduced damage costs, reduced avoidance costs, reduced (alternative) water purification costs</b>
	<b>option value</b>	benefit from ensuring the option for a future use	<b>Different stated preference methods (contingent valuation, choice analysis, ...)</b>
	<b>existence value</b>	benefit without direct or indirect use, ethical obligation to preserve	
	<b>bequest value</b>	benefit from preserving for future generations	
	<b>increasing economic relevance</b>	<b>decreasing reliability / acceptance</b>	

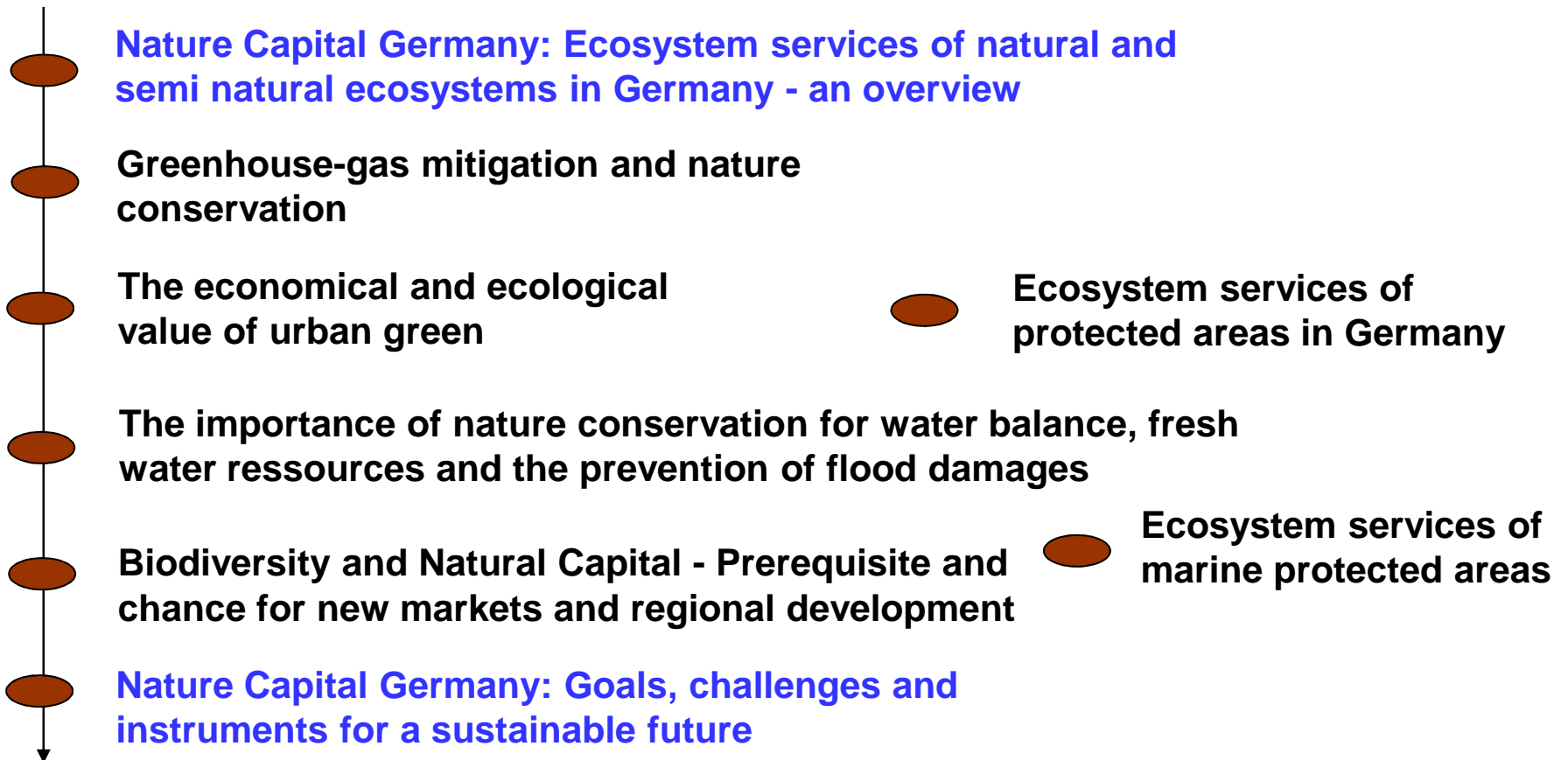
vgl.: Jürgen Meyerhoff Mitteilung 5 Ökonomische Bewertung ökologischer Leistungen (Elbe Ökologie) (Mitteilungen der BfG/Projektgruppe Elbe-Ökologie), nach Barbier 1994 fußend auf Pearce 1993, <http://elise.bafg.de/?2103>

# Ecosystems and ecosystem services with strategic importance for nature conservation in Germany



# Products of "Nature Capital Germany" (first proposal / preliminary)

2012



2014 / 2015

## What do we already know?

# Ecosystem services and nature conservation - findings from Germany

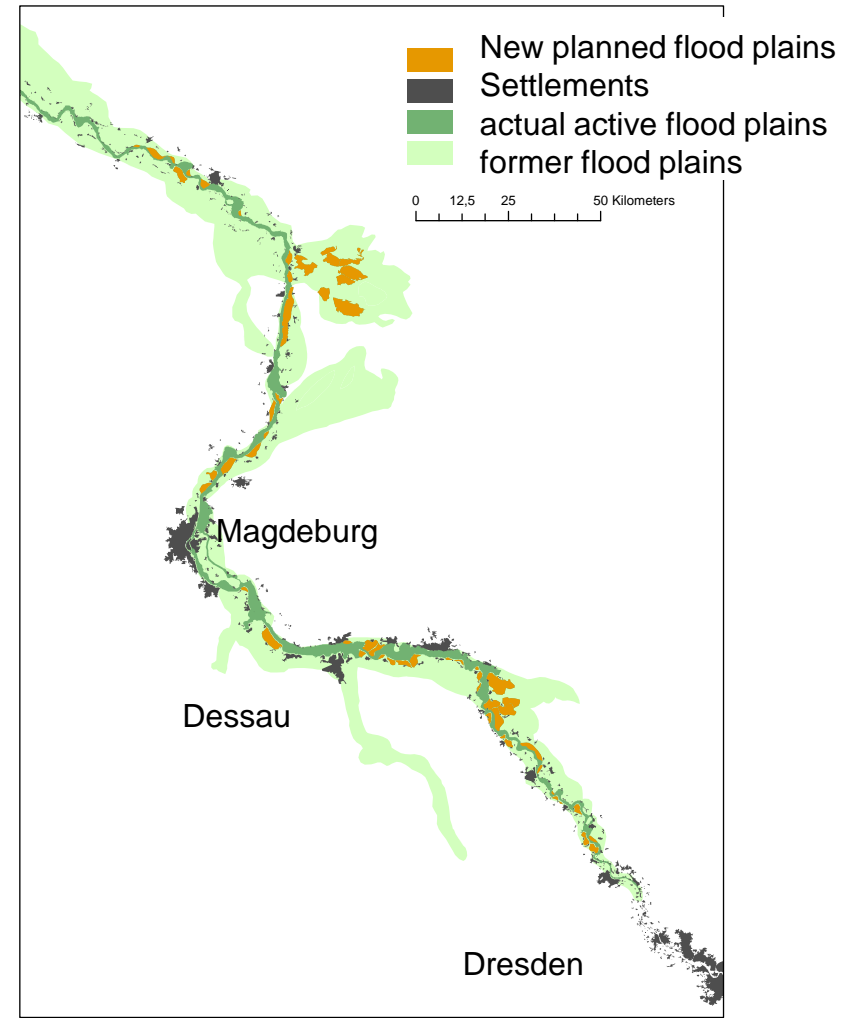
# Case-Study: Regaining 35.000 ha natural flood plains by dike shifting along the river Elbe



Inundation 2002

## Project alternative with the maximum number of redevelopments by dyke shifting

- 60 dyke "shiftings" (= usually opening the first dyke and raising the second one)
- Redevelopment of 35.000 ha active flood plains
- De-intensification of agricultural use on new flood plains



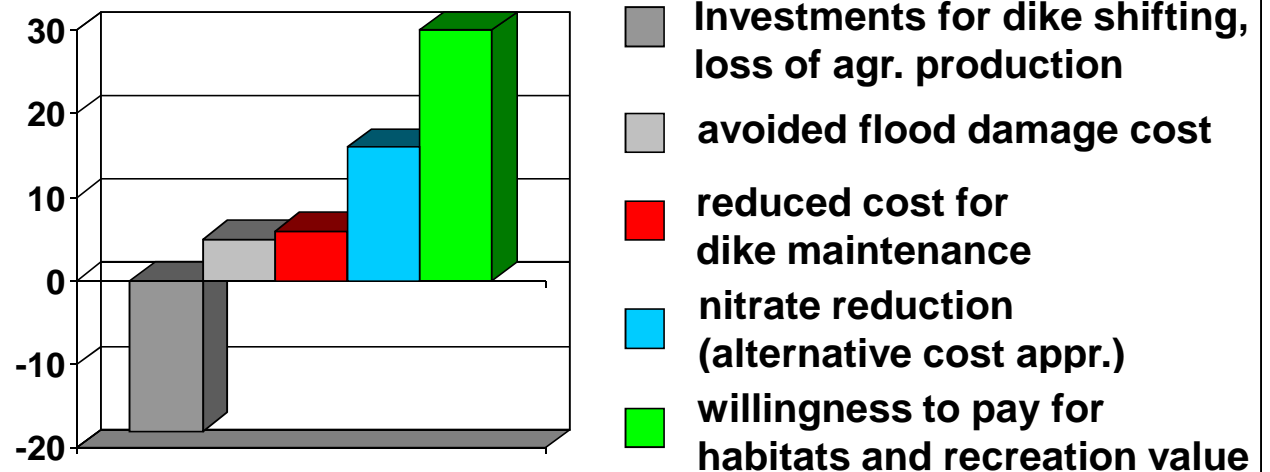
Quelle: Grossmann et al. 2010

Workshop for Europe on Updating NBSAPs, Vilm, Germany, 15 - 19 April 2011

# Results of the cost benefit analysis



Annual costs and benefits in Mio. €



## Cost-benefit-analysis of dyke-shifting and regaining natural flood plains at the river Elbe

Source: Grossmann et al. 2010

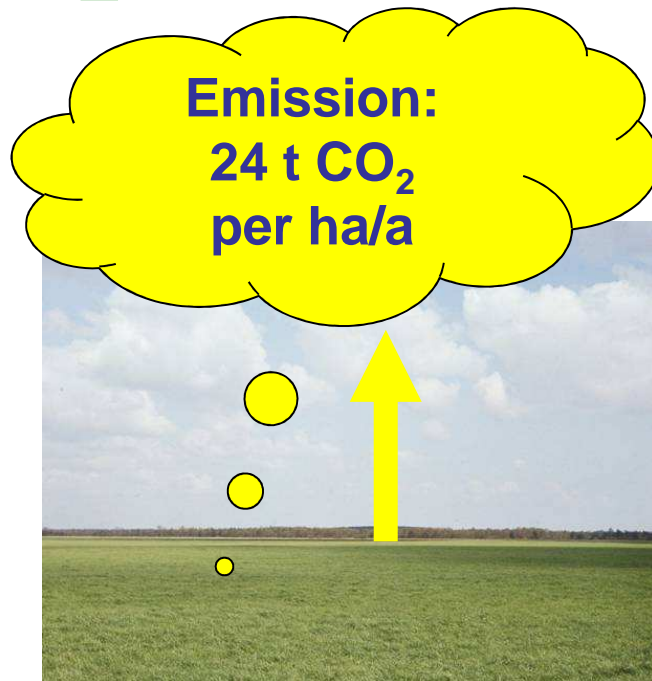
**Cost benefit ratio: 1:3**

incl.

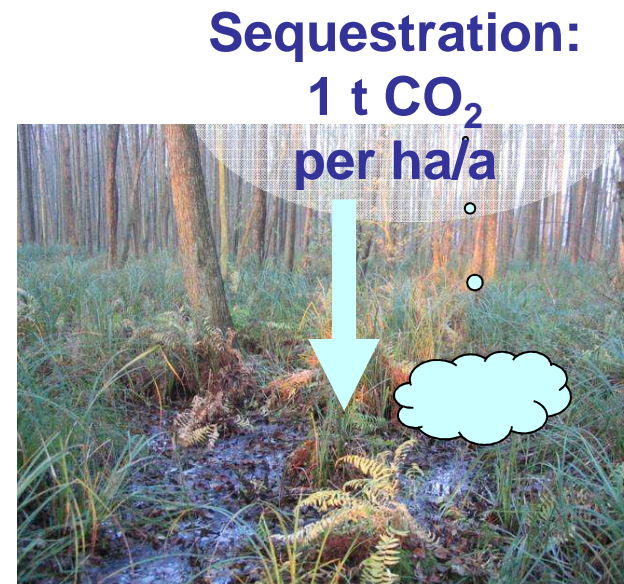
- regained ecosystem services,
- willingness to pay for biodiversity,
- lost provisioning services and
- project costs

# Example: Mitigation of climate gas emissions and carbon sequestration by peatland restoration

Source: Schäfer 2007, 2009

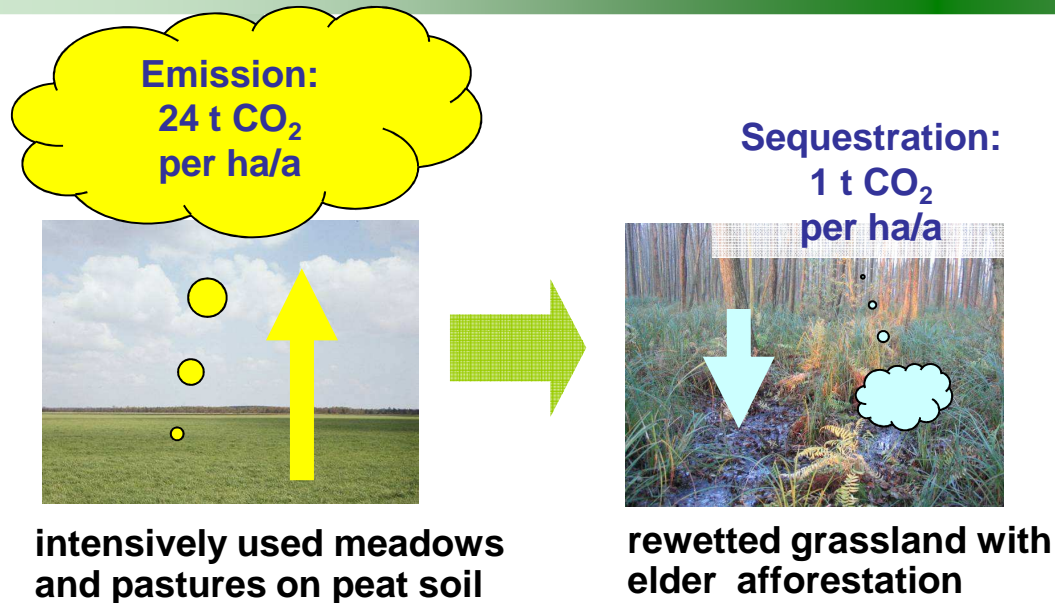


**intensively used  
meadows and pastures  
on peat soil**

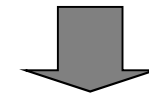


**rewetted grassland  
with elder afforestation**

# Results of cost benefit analysis



<b>net value of lost agricultural production</b>	
-	<b>net value of forest production</b>
-	<b>conversion cost</b>
<hr/>	
=	<b>0 – 100 € /ha</b>



**Mitigation costs per t CO<sub>2</sub>:**  
**= 0 – 4 €**

**alternative costs per t CO<sub>2</sub> by wind power:**  
**= 40 €**

**A very cheap opportunity for climate gas mitigation**

Source: Schäfer 2007, 2009



# Example: Ecosystem services of high-nature-value grassland (meadows and pastures )

Data basis: Representative sample of high-nature-value (HNV) grassland;  
estimated area of HNV-grassland in Germany:  
1.062.322 ha = 2,8% of total land cover



## Value of ecosystem services of HNV-grassland compared with conversion to cropland

- **Production:**  
**reduced market returns minus production costs:** **0 – - 435 €/ha/a**
  - **Carbon sequestration, climate-gas-mitigation damage cost approach (70 € / t CO<sub>2</sub>, +- Stern-Report)** **+ 285 to + 1.541 €/ha/a**
  - **Groundwater purification**  
**compensation payments for reduced fertilizer input on cropland** **+ 40 to + 120 €/ha/a**  
(only in groundwater catchment areas relevant for fresh water supply)
  - **Nature conservation**  
**downscaling of germanwide willingness to pay for nature-conservation measures on a simple ha basis** **1.000 €/ha/a**
- 
- net value: 850 to 2.160 €/ha/a**

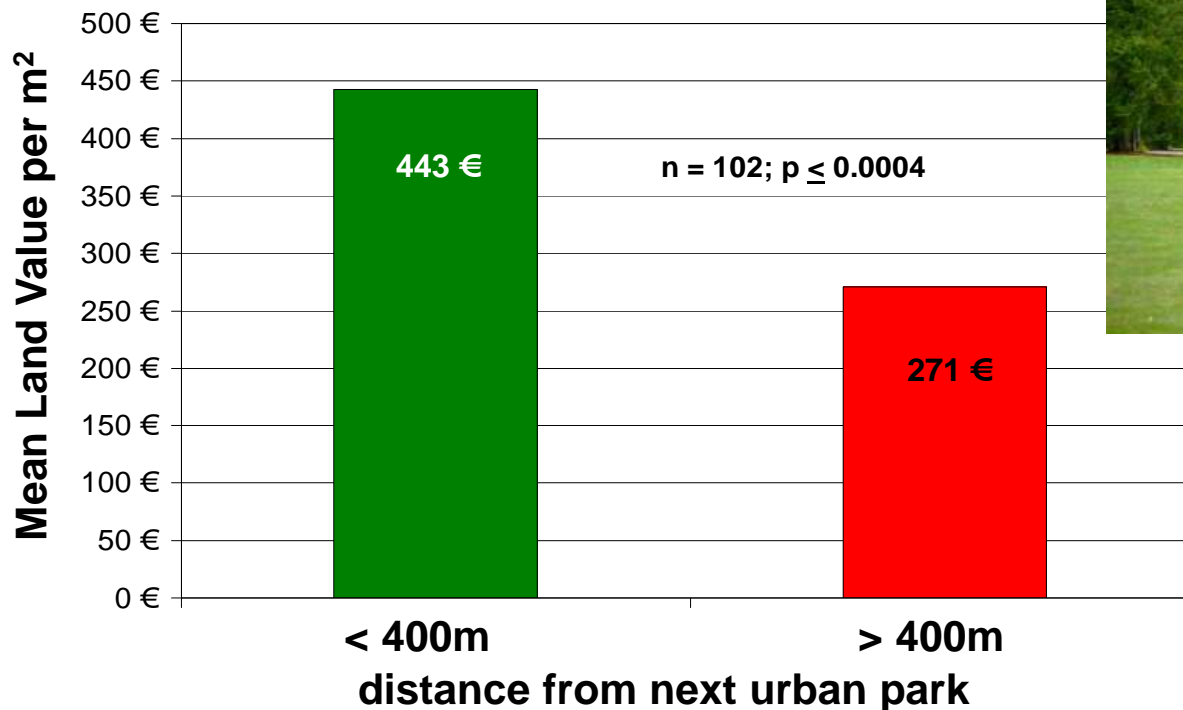
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# Example: Welfare effects of urban green

## Influence of urban green on land value



Research results from  
Berlin, Source: Gruehn 2006,  
Hoffmann, Gruehn 2010

Additional value through parks is very significant but slightly smaller than  $< 172 \text{ €} / \text{m}^2$  due to intercorrelations with other factors that have positive effects on land value.

All urban green factors contribute to 36,7 % of land value in densely populated urban areas