




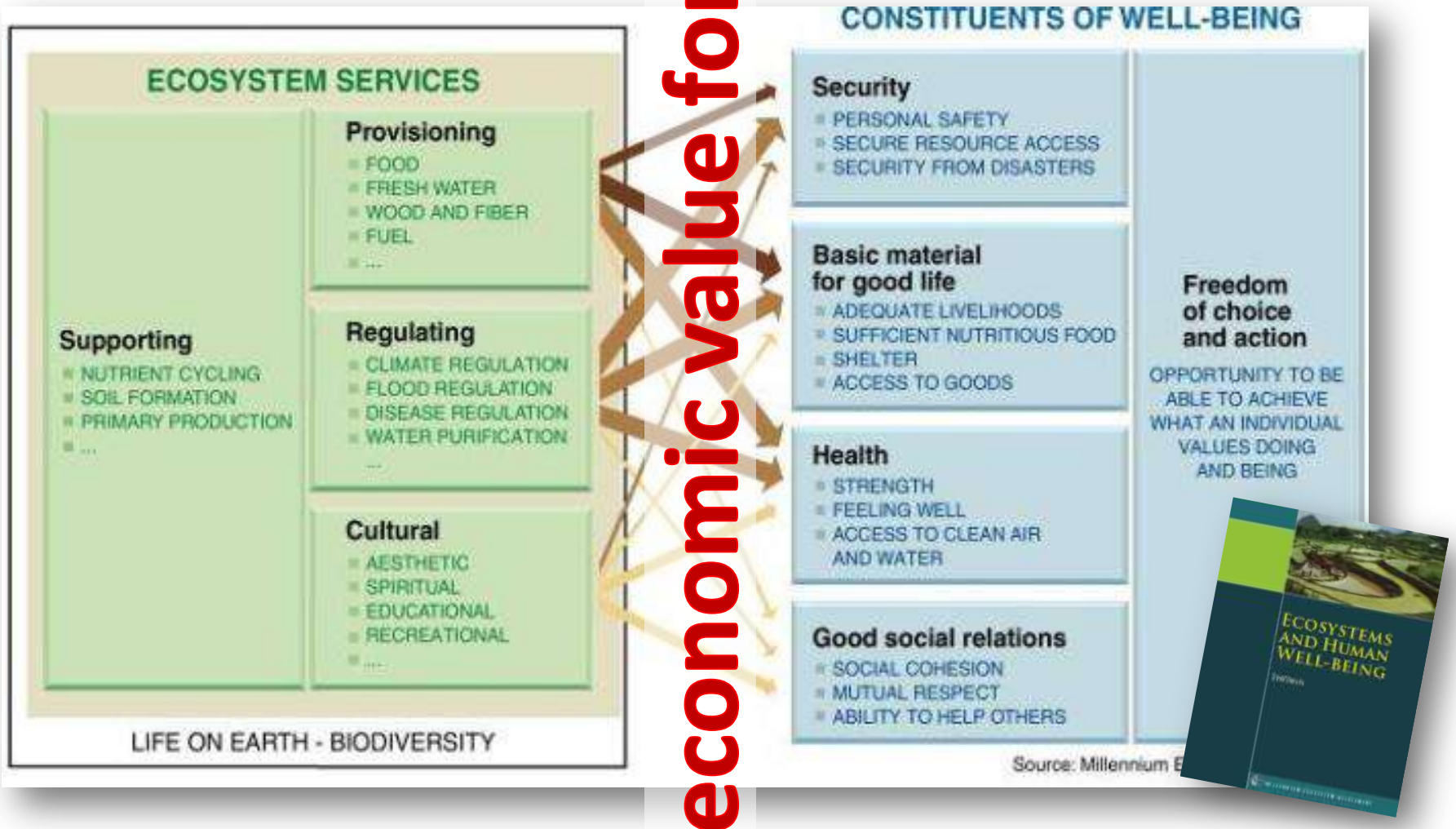
introduction to ecosystem valuation

Lucy Emerton

The image is a composite. On the left, there is a photograph of a lush, green forest with a stream flowing through it. In the bottom-left corner, a portion of a grey Casio calculator is visible, showing its keypad and a digital display with the numbers 1 through 8. The right half of the image is a white gradient that contains the text 'ecosystem valuation and under-valuation' in a dark grey, sans-serif font.

ecosystem
valuation and
under-valuation

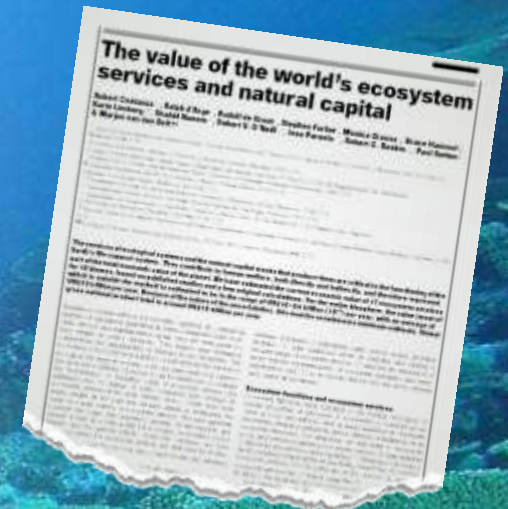
ecosystem values and human well-being



the value of the world's ecosystem services

	Area (million ha)	Value (\$ trillion/yr)
Open ocean	33,200	8.381
Coastal	3,102	12.568
Tropical forest	1,900	3.813
Temperate forest	2,955	0.894
Grass/rangelands	3,898	0.906
Tidal marsh/mangroves	165	1.648
Swamps/floodplains	165	3.231
Lakes/rivers	200	1.700
Cropland	1,400	0.128
Total	51,625	33.268

Costanza, R., d'Arge, R. de Groot, R. Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P. and M. van den Belt 1997. "The value of the world's ecosystem services and natural capital". Nature 387: 253-260.



the costs of failing to halt terrestrial biodiversity loss

	Loss to 2050 (€ billion)
Food, fibre, fuel	192
Air quality maintenance	-2,019
Soil quality maintenance	-1,856
Climate regulation	-9,093
Water regulation, purification & waste management	-782
Cultural diversity, heritage, recreation	-303
Total	-13,938

L. Braat & P. ten Brink, (eds.) 2008. The Cost of Policy Inaction: The case of not meeting the 2010 biodiversity target. Alterra, Wageningen UR and Institute for European Environmental Policy, Brussels.



why under-valuation is a problem

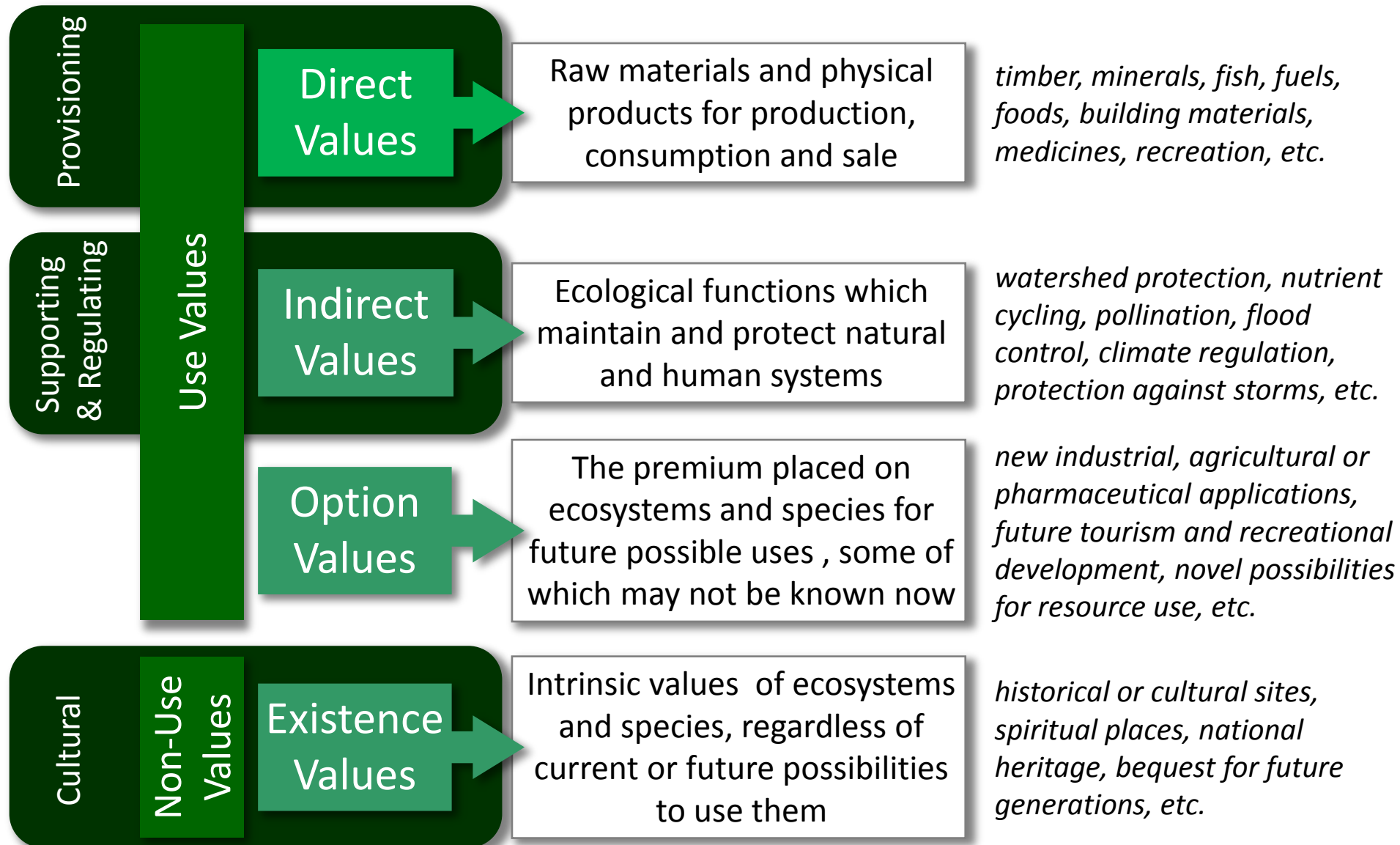
- traditionally, economists focus on the value of **extractive or commercial** land and resource uses
- this **ignores** some of the most important biodiversity and ecosystem values
- meaning that decisions are made based on **incomplete, and flawed**, information
- this results in **missed economic opportunities** and has incurred **huge costs and losses** to economic growth and development



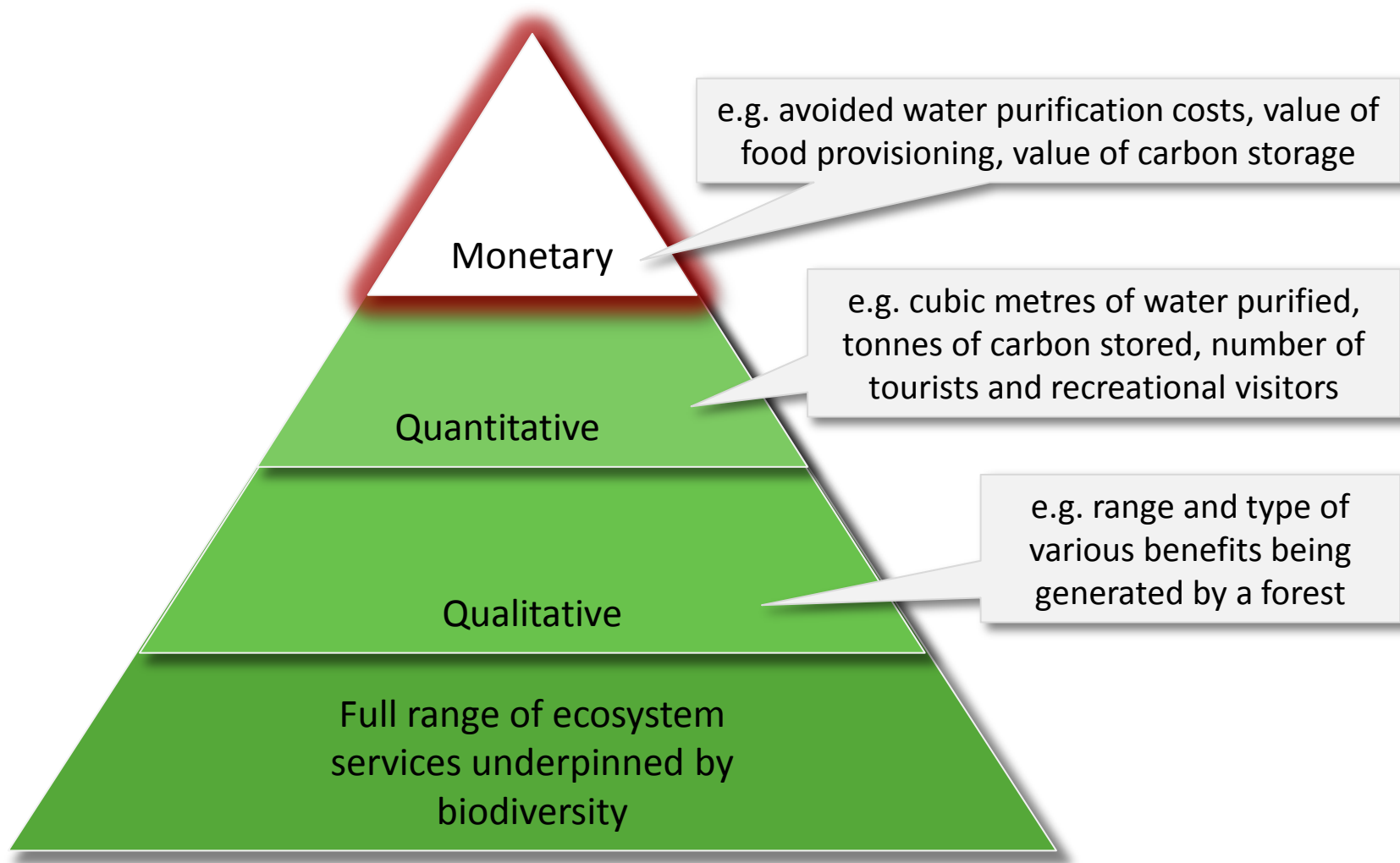


total
economic
value

Total Economic Value (TEV)



different levels of ecosystem valuation



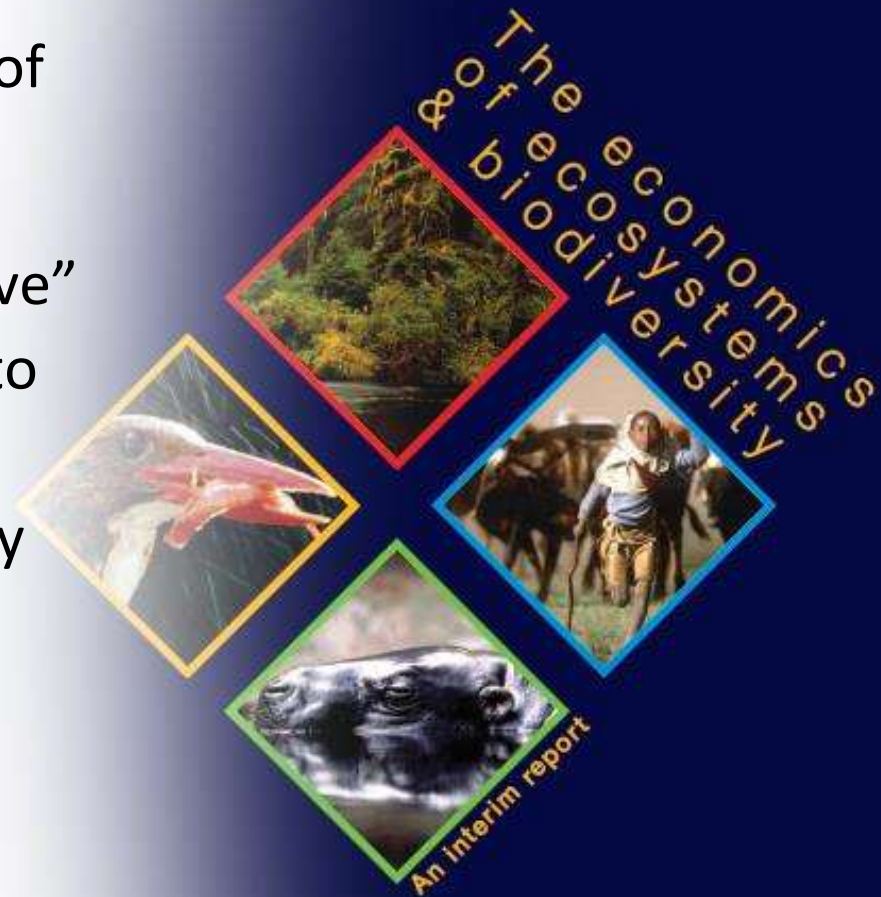
ecosystem value distribution

- seeing who gains and who loses from a particular course of action
- calculating how much these net gains or losses are worth
- identifying where there are need or opportunities to reallocate or redistribute costs and benefits so as to encourage equitable and sustainable solutions



TEEB

- Potsdam, March 2007: meeting of G8+5 Environment Ministers
- resulted in the “Potsdam Initiative” on biodiversity, including study to draw attention to the global economic benefits of biodiversity
- TEEB Phases I & II (2008-2010) built up evidence base and approach
- Phase III now rolling out national, regional and sector TEEBs



TEEB steps

1. IDENTIFY and ASSESS the full range of ecosystem services and people affected

2. ESTIMATE and DEMONSTRATE the value of ecosystem services

3. CAPTURE the value of ecosystem services and seek SOLUTIONS



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using ecosystem
valuation for
decision-making

how valuation is commonly used

- **justifying** the economic importance of nature to decision-makers
- identifying opportunities for “capturing” **funding and income**
- calculating **prices, charges and fees** for land and resource uses
- costing ecosystem **damage, penalties and fines**
- modifying national income and other **economic/growth measures**



demonstrating reforestation benefits in Croatia

County, site	Visible landscape	Regional landscape	Hunting	Wood production	Erosion protection	Total
Lika-Senj						
Jasenje-Bisernjakovica	112,699	27,320	22,457	427	97,639	260,542
Zadar-Knin						
Musapstan-Zemunik	708,355	346,673	471,707	35,063	0	1,561,799
Novigrad	760,997	74,288	101,057	7,481	0	943,823
Split-Dalmatia						
Peruca	0	8,798	11,966	709	0	21,473
Trogir	346,904	39,871	32,773	19,031	142,492	581,072
Dubrovnik & Neretva r.						
Slano	183,704	14,183	4,025	724	0	202,636
Podimoc	0	58,938	80,184	3,699	0	142,820
Rudine Ostrikovac	0	36,160	49,184	2,062	0	87,406
Brsecine	190,516	15,020	4,262	1,107	0	210,905
Petrinji	161,988	13,728	3,895	676	0	180,286
Srdj	1,458,259	44,394	52,886	2,804	0	1,558,343

16%

justifying investments in biodiversity in Lao PDR



generating revenue in Finnish National Parks



National Parks currently financed directly from the government budget, and provided to citizens free of charge.

Valuation used to see whether there was the potential to introduce user fees, and how much people would be willing to pay.

Found that more than 70% of users would pay for a recreation pass, on average €8 each, potentially generating earnings of €32 million.

This exceeds the current budget for running the Parks of around €13 million.

calculating oil spill liabilities in the USA

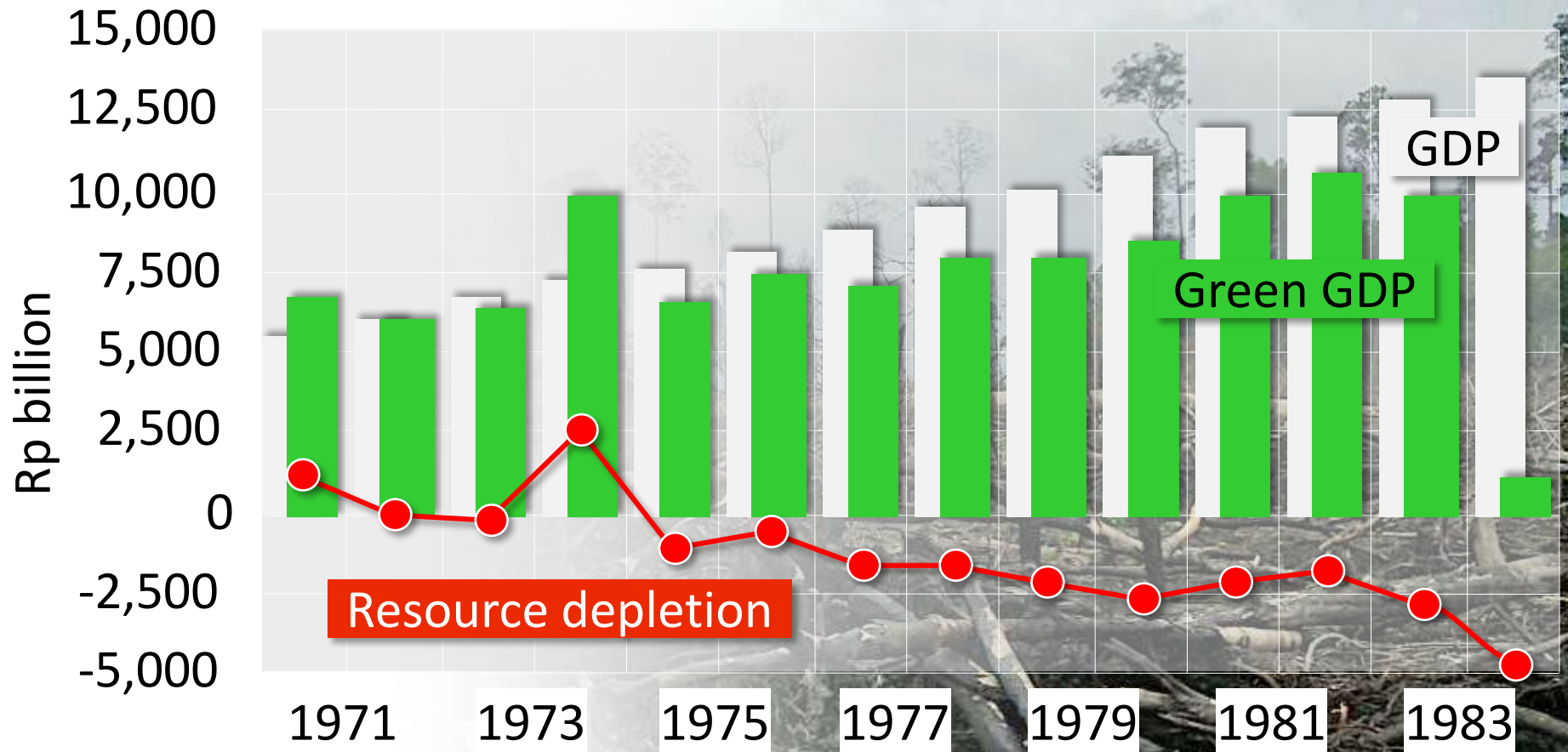
An aerial photograph of a coastal area. A large body of water, possibly a bay or estuary, is the central focus. A pipeline runs along the shore, and a small structure or platform is visible in the water. The surrounding land is green and hilly.

Pipeline rupture resulted in the oiling of salt marsh and mudflats, killing wetland vegetation and fauna.

Valuation used by NOAA and the oil company to calculate environmental losses and compensation amount. Based on interrupted or lost services in fishing and boating access, near-water recreation, and wetlands services.

Parties were thereby able to reach a negotiated settlement, and damages of just over US\$ 11 million were awarded.

accounting for green national income in Indonesia



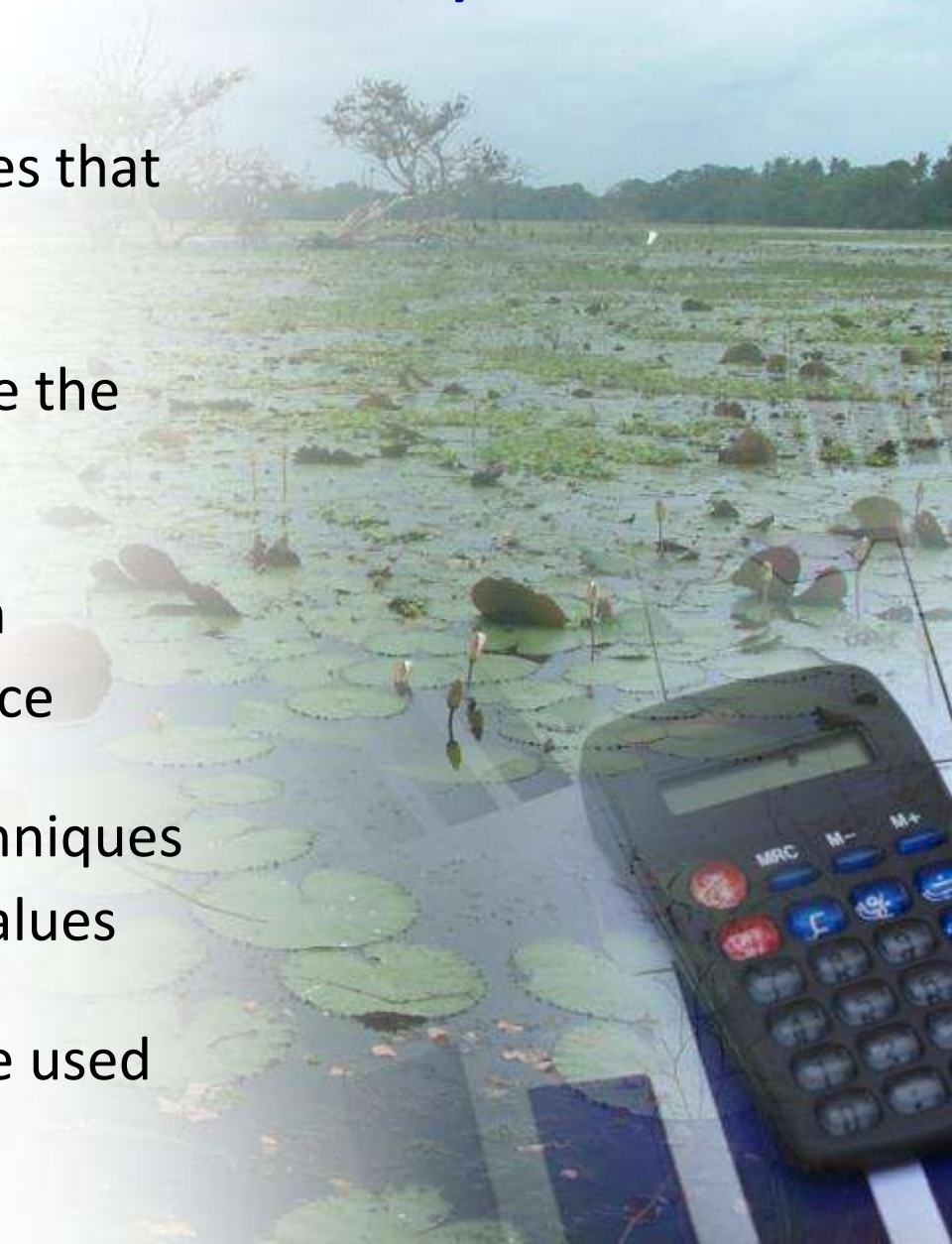


ecosystem valuation methods



how ecosystems are traditionally valued

- look at quantity of commodities that are consumed, bought or sold
- apply **market price** to calculate the value of the good or service
- ... however ... many ecosystem services have no market or price
- ... so ... using market price techniques would ignore many of these values
- ... **additional methods** must be used



ecosystem valuation methods

observing people's behaviour to impute their values

asking directly

Revealed Preference Methods

Market
Prices

Production
Function
Approaches

Surrogate
Market
Approaches

Cost-Based
Approaches

Market
Prices

Change in
Production

Travel
Costs

Replacement
Costs

Substitute
Prices

Damage Costs
Avoided

Stated Preference Methods

Contingent
Valuation

substitute prices

Used to value non-marketed wild edible plants along Thai-Myanmar border.

Found prices in local markets for similar or identical products to those collected, and applied these to wild-harvested fruits, leaves, stems, flowers, roots and medicines.

Showed that total value of non-timber forest products worth around US\$ 300 per household per year.

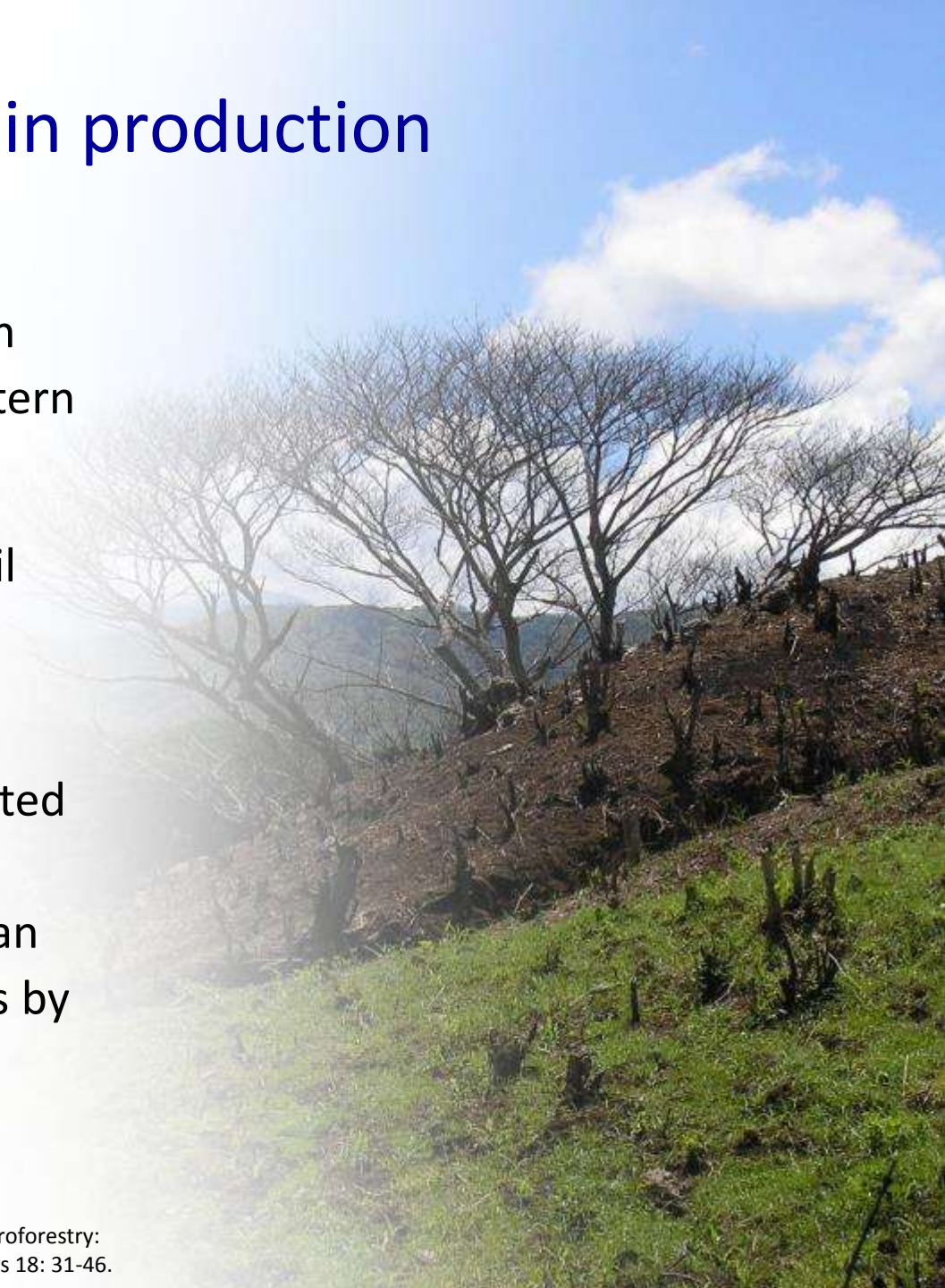


change in production

Used to value the soil conservation benefits of agroforestry in the Eastern Visayas in the Philippines.

Use production function to link soil quality to agricultural yields and profits.

Analysis of share of profits associated with change in soil quality showed that investments in agroforestry can increase annual agricultural profits by 6%, or US\$ 53/household/year.



travel costs

Applied to five Romanian National Parks.
Involved 325 questionnaires to visitors.

Asked about distance travelled,
frequency of visits, costs involved and
socio-economic characteristics (age,
education, preferences, etc.).

Found consumer surplus of €42.
Generally higher for tourists who
traveled longer distances and for older
people. Higher income earners less
interested in PAs than other types of
tourism.

replacement costs

Used to value the wastewater treatment services provided by Nakivubo Swamp, Kampala (Uganda).

Looked at the cost of replacing wetland wastewater processing services with artificial technologies.

Found that the infrastructure required to achieve a similar level of wastewater treatment to that provided by the wetland would incur costs of up to US\$3 million.



damage costs avoided

Used to value water regulation and flood control functions of forests in Aceh.

Looked at impacts of deforestation on downstream flood intensity and timing. Related this to the costs associated with damage to houses, roads, crops and human health.

Found an annual economic value for flood prevention under forest conservation scenario of US\$ 105 million.



contingent valuation



Surveys administered to tourists in Slovensky Raj National Park, Slovakia.

Survey offered the possibility of donating to species conservation fund through annual earmarked payments. Respondents asked to make bids, additional to their current travel costs.

Found that tourists willing to pay average of €23 towards financing National Park conservation.

what kind of valuation?

- Coverage, staffing and length of study depends on:
 - Purpose of the study
 - Time and budget available
 - Level of detail/complexity required
- If making a **general point/raising awareness**, can often be short
- If actually informing a **policy, price or intervention**, better to be more detailed
- Almost always require **economic, social and biophysical** inputs and expertise
- If you want to change something, you have to **communicate and target the findings** strategically





Thank You
for your attention