



The Contribution of Ecosystem Services to Human Resilience

Resilience Rapid Review

Dr Elizabeth Carabine



Approach

While contribution of ES to human *wellbeing* has been well-defined, very few linkages have been made to human *resilience*.

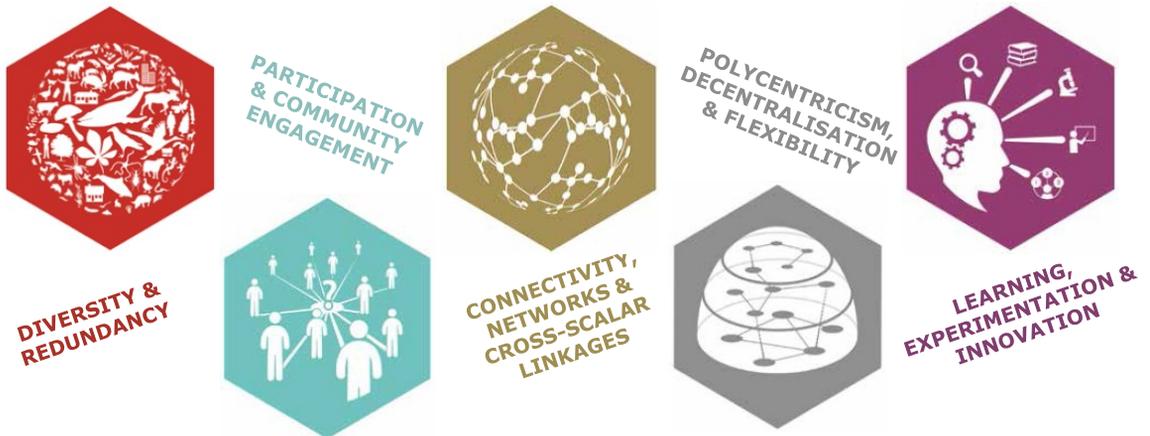
1. How do ecosystems contribute to human resilience?
 2. How do we measure the value of ecosystems in building resilience?
-



3



Resilience characteristics



4

How do ecosystems contribute to human resilience?



Outcome 1: Basic needs, health & wellbeing

Provisioning	Regulating	Cultural
 <p>Food, water, fuel & fibre, biochemical, genetic diversity</p>	 <p>Climate, water & soil regulation, biological control</p>	 <p>Identity & wellbeing, TEK, sense of place</p>
+++	+++	+



Outcome 2: Enabling livelihoods

Provisioning	Regulating	Cultural
		
Fisheries, agro-ecosystems, natural resource incomes	Sustainable benefits, pest control, bioindicators	Institutions & norms, status, aesthetic/tourism value
+++	+++	++

7



Outcome 3: Social capital, security & stability

Provisioning	Regulating	Cultural
		
Collective natural resource management	Climate change & security, social cohesion, disease	Recreational, spiritual, mental health, social relationships
++	+	~

8



Outcome 4: Reduced exposure & enhanced adaptive capacity

Provisioning	Regulating	Cultural
 <p>Sustainable livelihoods, diverse food production</p>	 <p>Ecosystems as buffers, regulating climate change</p>	 <p>Perceptions & responses mediated by culture, TEK</p>
++	+	+

9



Key messages

- Frameworks linking ecosystems services (ES) and human resilience are still new
 - Recent efforts to conceptualise ES as bundles rather than singular flows, addressing multiple objectives
 - Evidence is patchy, especially when considering building resilience of human systems as a process
-

10

How do we measure the value of ecosystems in building resilience?



Three sub-questions

- a) What is the value of x ES to x human resilience outcome?
- b) What is the cost of x ES to achieve x human resilience outcome as compared with other traditional services?
- c) If we do not invest in ES, what will happen to the value of existing development investments?



a) What is the value of x ES to x human resilience outcome?

- Literature is context specific, largely focused on case studies e.g. De Groot et al. (2013)
 - Suggest the majority of ES projects have benefits that outweigh the costs
 - Benefit-cost ratios ranged from about 0.05:1 (coral reefs and coastal systems, worst-case scenario) to as much as 35:1 (grasslands, best-case scenario)
 - Coastal wetlands and inland wetlands, followed by tropical forests, offered the most value for restoration investment
-

13

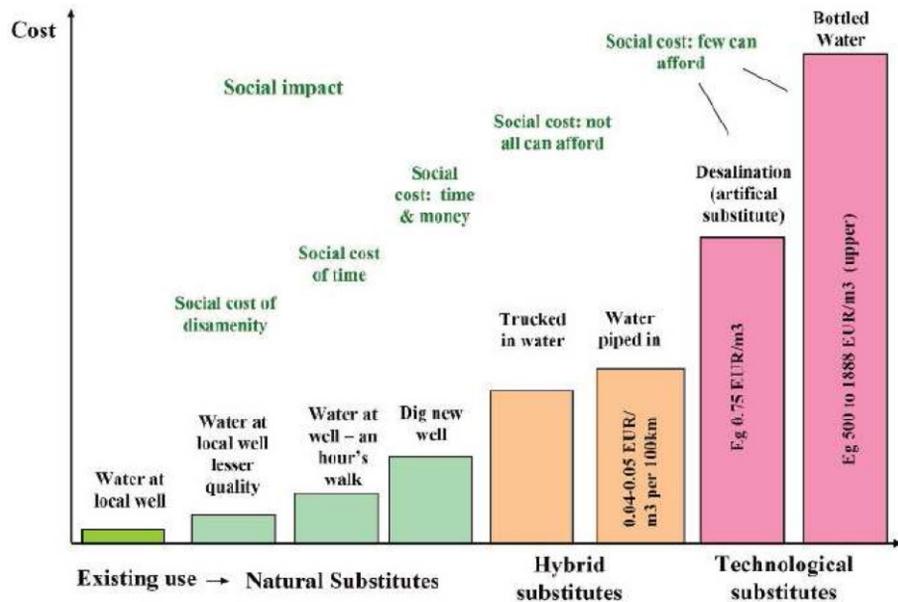


b) What is the cost of x ES to achieve x human resilience outcome as compared with other traditional services?

A number of case studies compare ecosystem-based approaches with more traditional measures, for:

- Freshwater systems
 - Coastal planning/protection
 - Food security
 - Hybrid measures
-

14



15

Source: TEEB, 2009 (after Brink et al., 2009)



c) If we do not invest in ES, what will happen to the value of existing development investments?

- Recognising many of world's poorest depend on natural resources for basic needs and livelihoods, rather than financial income
- Estimated that ES account for 47-89% 'GDP of the Poor'
- Effective GDP / total source of livelihood
- National GDP natural-resource based sectors only 6-17%

16



Limitations to ES valuation

- **Time:** benefits of ES may be realised over longer timeframe
 - **Uncertainty:** how ES will be affected by climate change
 - **Distribution:** even if net benefits, who are winners & losers
 - **Co-benefits:** CBA can capture these but not always systematic or comparable
 - **Hard infrastructure thresholds:** higher protection levels but when it fails, can be catastrophic
-

17



Key messages

- Strong case for investment in ES
 - ES shown to reduce exposure to natural hazards, supporting case for investment in disaster risk reduction and climate change adaptation
 - Relative contribution of ES to resilience outcomes much harder to assess
-

18



Shaping policy for development

odi.org.uk