FORUM POUR L'INVESTISSEMENT RESPONSABLE

Iceberg Data Lab
Enabling Sustainable Goals

Webinar: Finance and Biodiversity: Understand and Act, Sept. 20, 2021

Investing in Natural Capital and Ecosystem Services

Papers mentioned in this presentation can be downloaded from: www.robertcostanza.com

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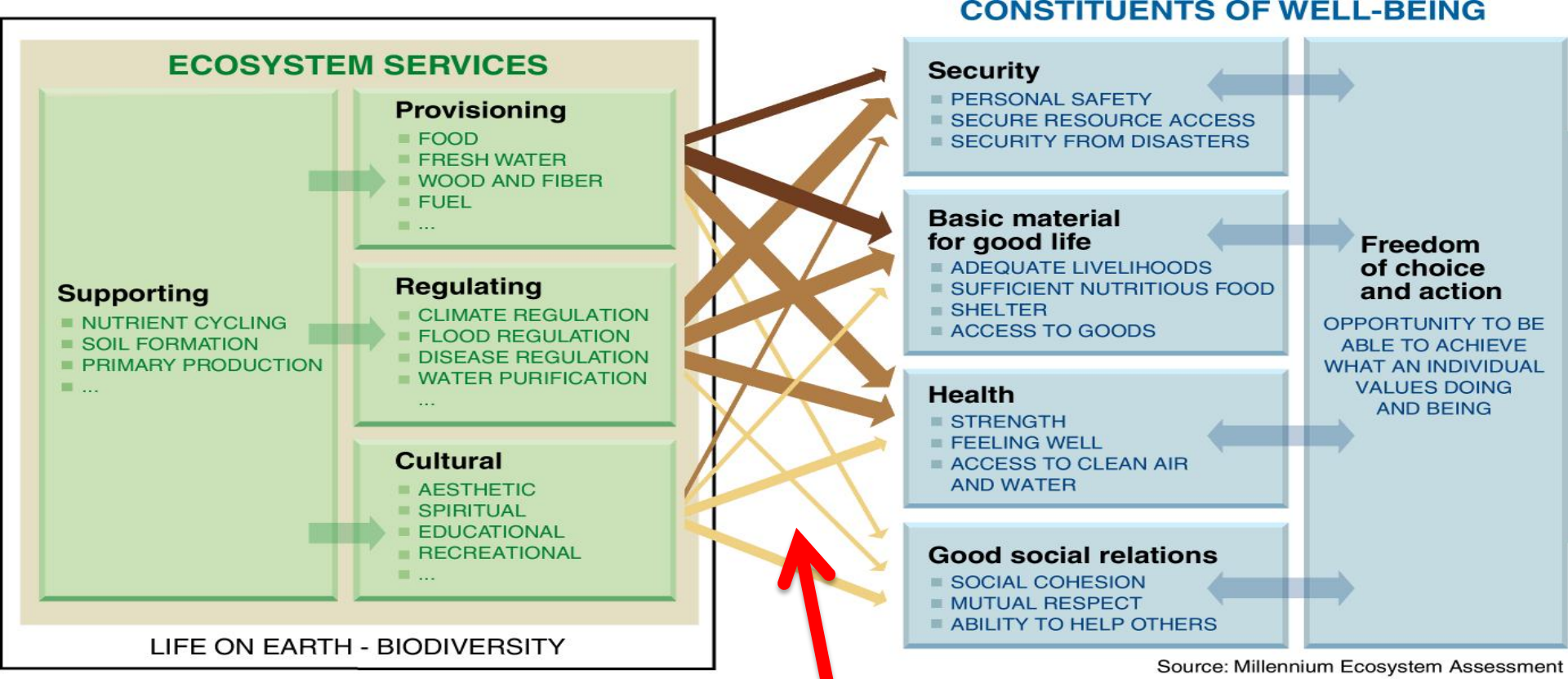
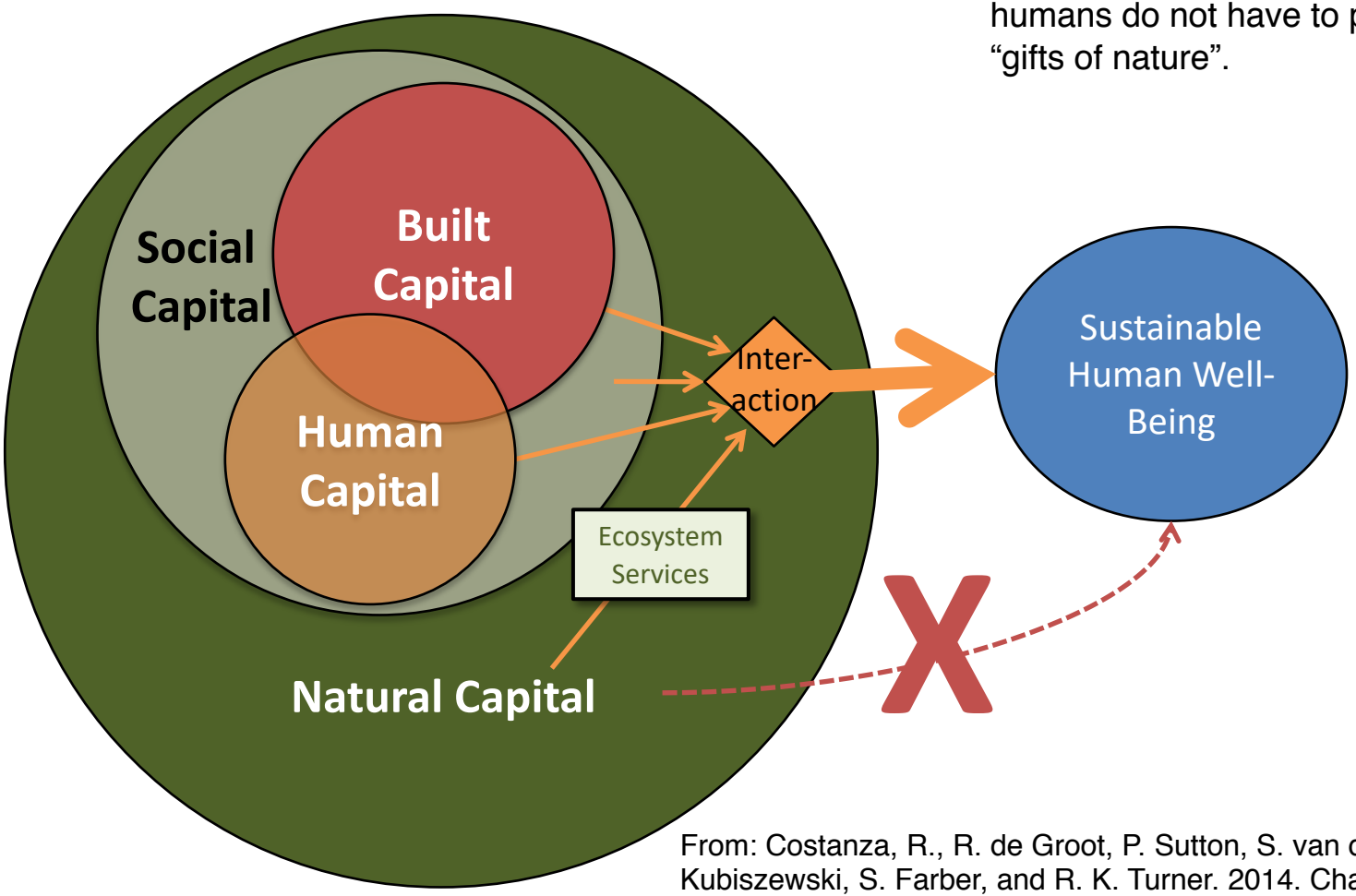


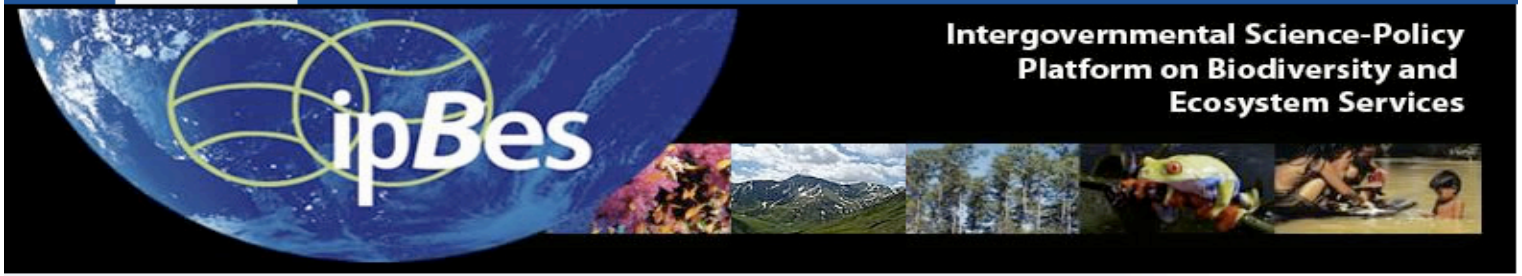
Source: Millennium Ecosystem Assessment

Missing: Interaction with other forms of capital

Natural Capital is everything in the world that humans do not have to produce or maintain – the "gifts of nature".



From: Costanza, R., R. de Groot, P. Sutton, S. van der Ploeg, S. Anderson, I. Kubiszewski, S. Farber, and R. K. Turner. 2014. Changes in the global value of ecosystem services. *Global Environmental Change* 26:152-158.



Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)

What is IPBES?

The "Intergovernmental Platform on Biodiversity and Ecosystem Services" is a mechanism proposed to further strengthen the science-policy interface on biodiversity and ecosystem services, and add to the contribution of existing processes that aim at ensuring that decisions are made on the basis of the best available scientific information on conservation and sustainable use of biodiversity and ecosystem services. IPBES is proposed as a broadly similar mechanism to the Intergovernmental Panel on Climate Change (IPCC).

What is the science-policy interface?

Science-policy interfaces are social processes which encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision-making at different scales. This includes 2 main requirements:

a) that scientific information is relevant to policy demands and is formulated in a way that is accessible to policy and decision makers; and

b) that policy and decision makers take into account available scientific information in their deliberations and that they formulate their demands or questions in a way that are accessible for scientists to provide the relevant information. Click here for a graphic showing the cycle of

www.es-partnership.org

ESP The Ecosystem Services Partnership

Worldwide Network to enhance the Science and practical Application of ecosystem services assessment

- Home
- About the Partnership
- Become a member
- ESP Services
- ESP Working groups
- ESP Conferences 2012
- Journals
- News
- Upcoming events
- Vacancies
- Links
- Contact

> Homepage

Welcome to the new ESP website

Several pages and functionalities are still under construction or are being updated. If you have any suggestions please contact ESP Support Team.

ESP Services

- Networking & Outreach
- Case studies & Showcases
- Data & Knowledge sharing
- Training and Education
- Guidelines & Toolkits
- Funding/Cooperation calls

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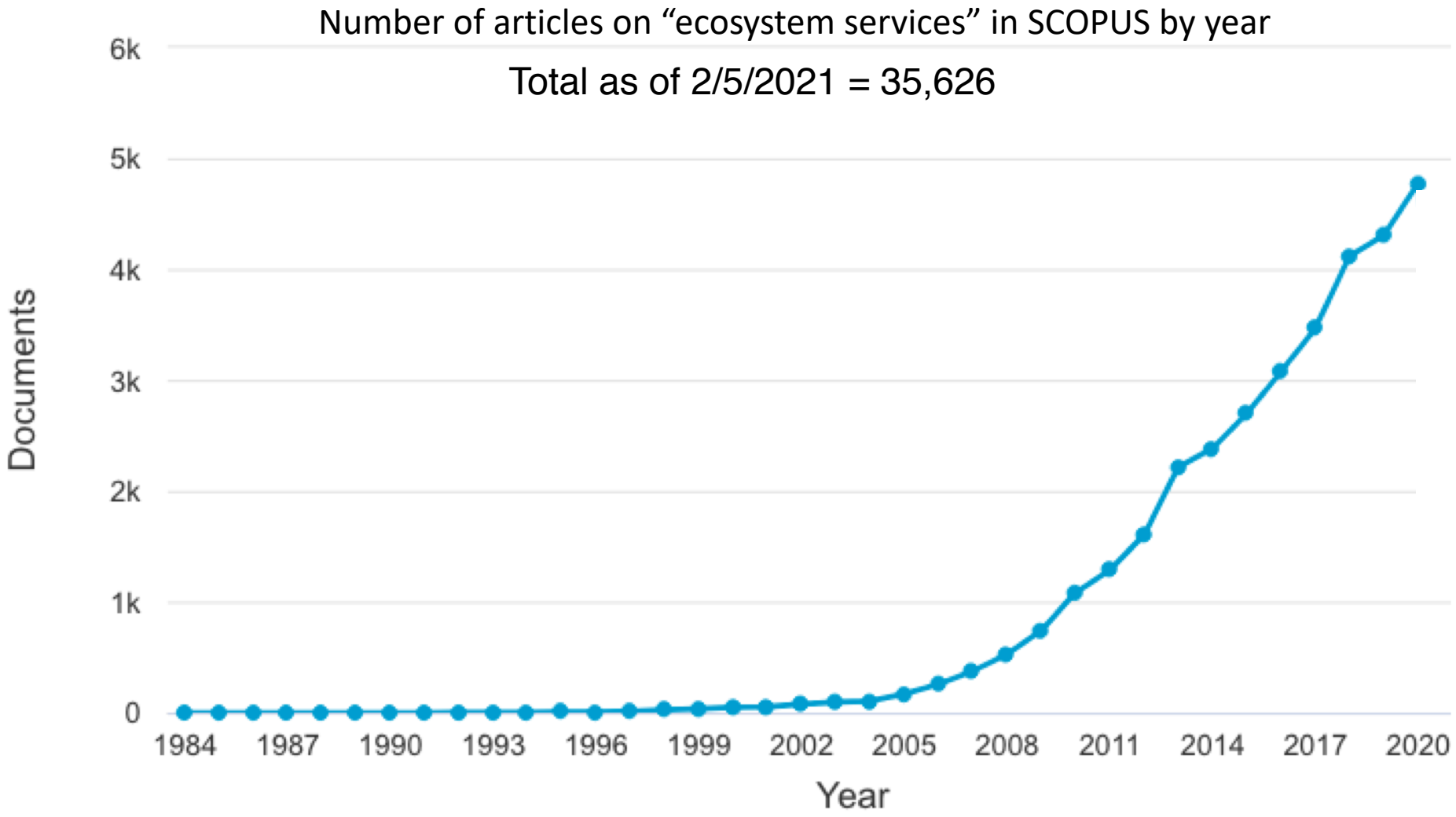
Become a Member

ESP Activities and Networks

Thematic Working Groups

Biome Expert Groups

National ESP Networks


Number of articles on “ecosystem services” in SCOPUS by year
Total as of 2/5/2021 = 35,626
6k
5k
4k
3k
2k
1k
0
Documents
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
Year

NATURE VOL 387 15 MAY 1997

The value of the world's ecosystem services and natural capital

Robert Costanza, Ralph d' Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V. O' Neill, Jose Paruelo, Robert G. Raskin, Paul Sutton & Marjan van den Belt

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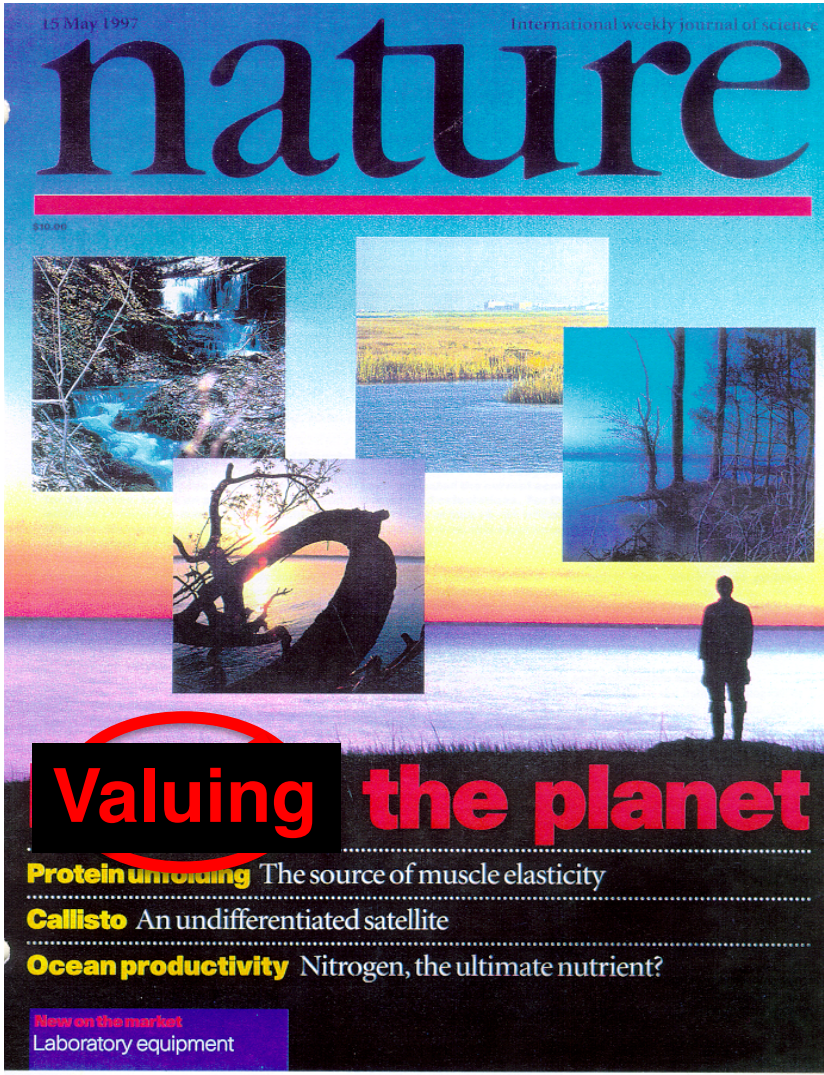
For the entire biosphere, the value (most of which is outside the market) is estimated to be in the range of US$16–54 trillion per year, with an average of US$33 trillion per year.

2nd most cited article in the Ecology/Environment area according to the ISI Web of Science with more than 10,000 citations – which puts it in the top 0.01% of all papers ever published.



Ecosystem Services 1 (2012) 50–61

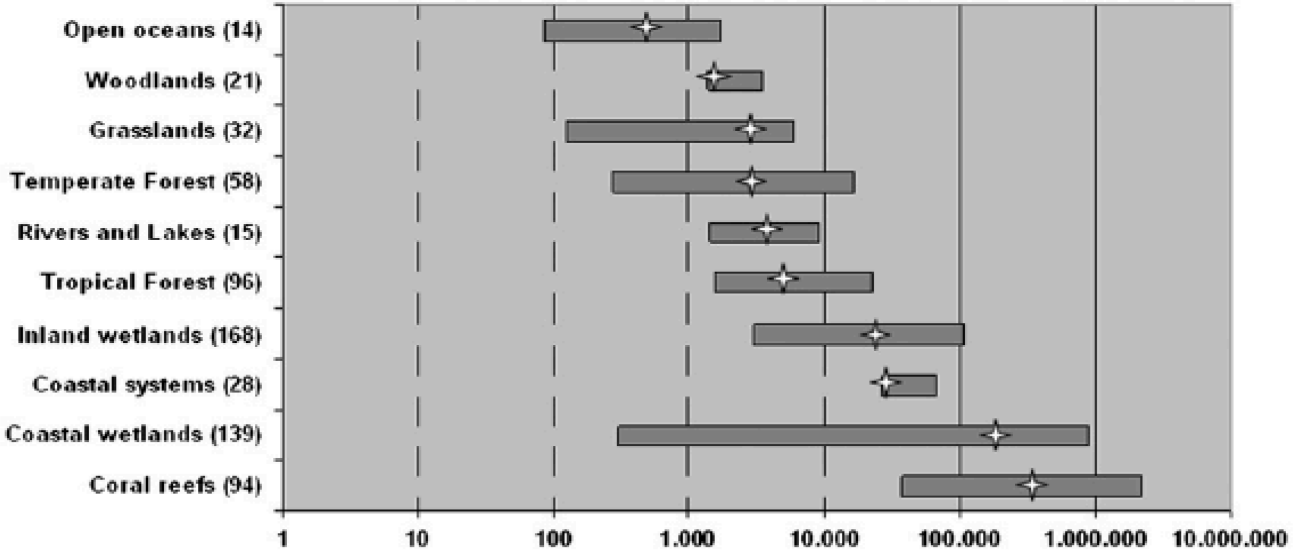
Contents lists available at SciVerse ScienceDirect

Ecosystem Services

journal homepage: www.elsevier.com/locate/ecoser

Global estimates of the value of ecosystems and their services in monetary units

Rudolf de Groot [a,*], Luke Brander [b,1], Sander van der Ploeg [a], Robert Costanza [c], Florence Bernard [d], Leon Braat [e], Mike Christie [f], Neville Crossman [g,h], Andrea Ghermandi [i], Lars Hein [a], Salman Hussain [j], Pushpam Kumar [k], Alistair McVittie [j], Rosimeiry Portela [l], Luis C. Rodriguez [g,h], Patrick ten Brink [m], Pieter van Beukering [b]



Global Environmental Change 26 (2014) 152–158

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

Changes in the global value of ecosystem services

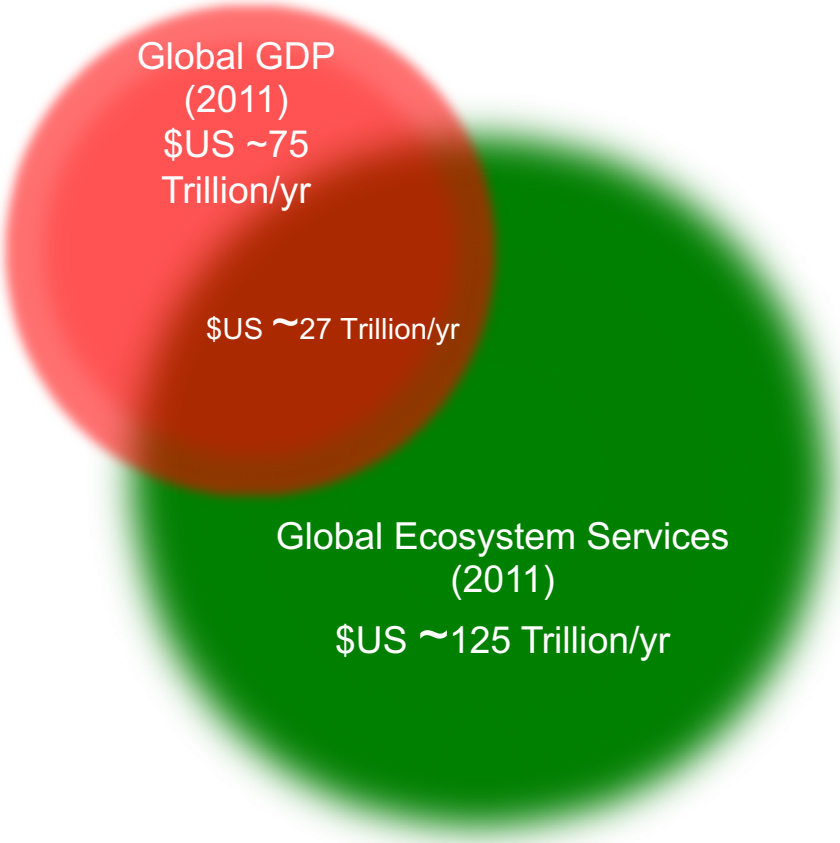
Robert Costanza [a,*], Rudolf de Groot [b], Paul Sutton [c,d], Sander van der Ploeg [b], Sharolyn J. Anderson [d], Ida Kubiszewski [a], Stephen Farber [e], R. Kerry Turner [f]

[a] Crawford School of Public Policy, Australian National University, Canberra, Australia
[b] Environmental Systems Analysis Group, Wageningen University, Wageningen, The Netherlands
[c] Department of Geography, University of Denver, United States
[d] Barbara Hardy Institute and School of the Natural and Built Environments, University of South Australia, Australia
[e] University of Pittsburgh, United States
[f] University of East Anglia, Norwich, UK

Global Environmental Change 26 (2014) 152–158

Contents lists available at ScienceDirect

…we estimated the loss of ecosystem services from 1997 to 2011 due to land use change at **$4.3–20.2 trillion/yr.**



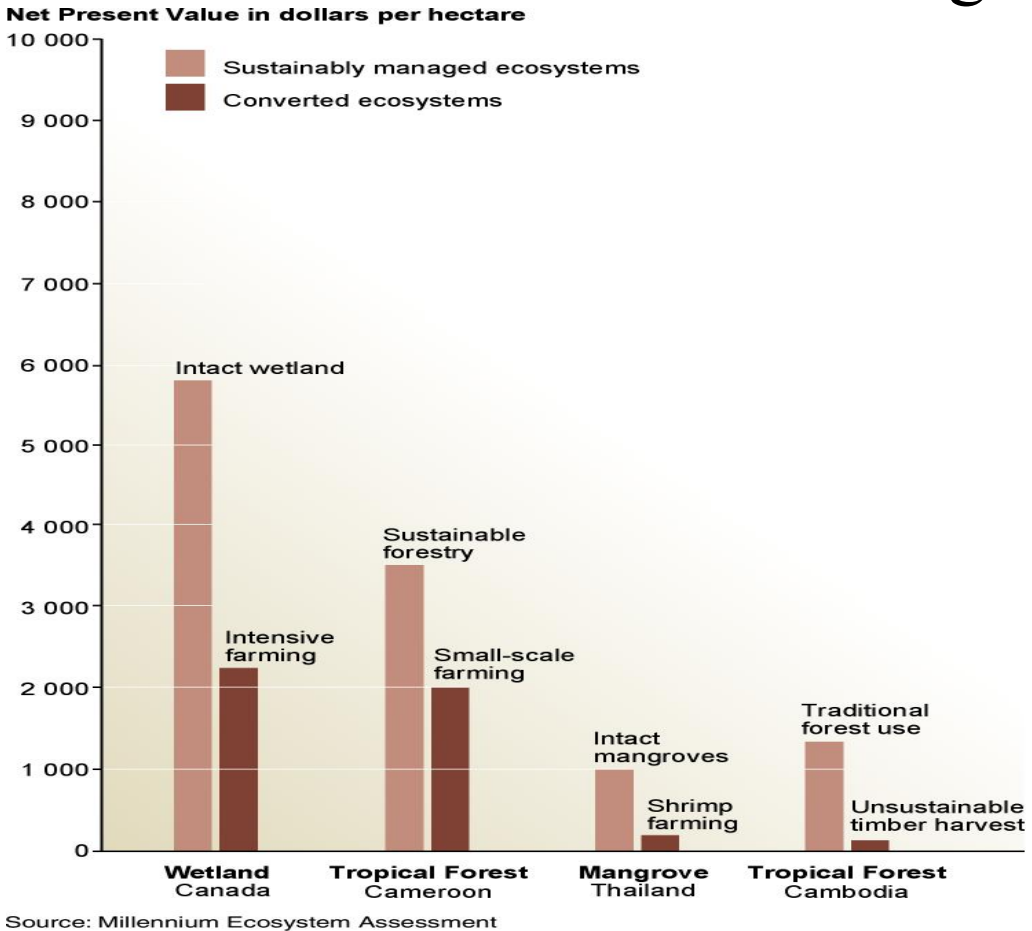
$27/$75 Trillion/yr. = 36%

Latest estimate: "$44 trillion/yr. of economic value generation – over half the world's total GDP – is moderately or highly dependent on nature
http://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf

Relative sizes of global GDP vs. global ecosystem services in 2011 and an estimate of the overlap. Values from Costanza et al. (2014). Ecosystem services directly included in GDP estimated as food, raw materials and ½ of recreation.

Degradation of ecosystem services often causes significant harm to human well-being

- The total economic value associated with managing ecosystems more sustainably is often higher than the value associated with conversion
  - Conversion may still occur because private economic benefits are often greater for the converted system



Source: Millennium Ecosystem Assessment

Economic Reasons for Conserving Wild Nature

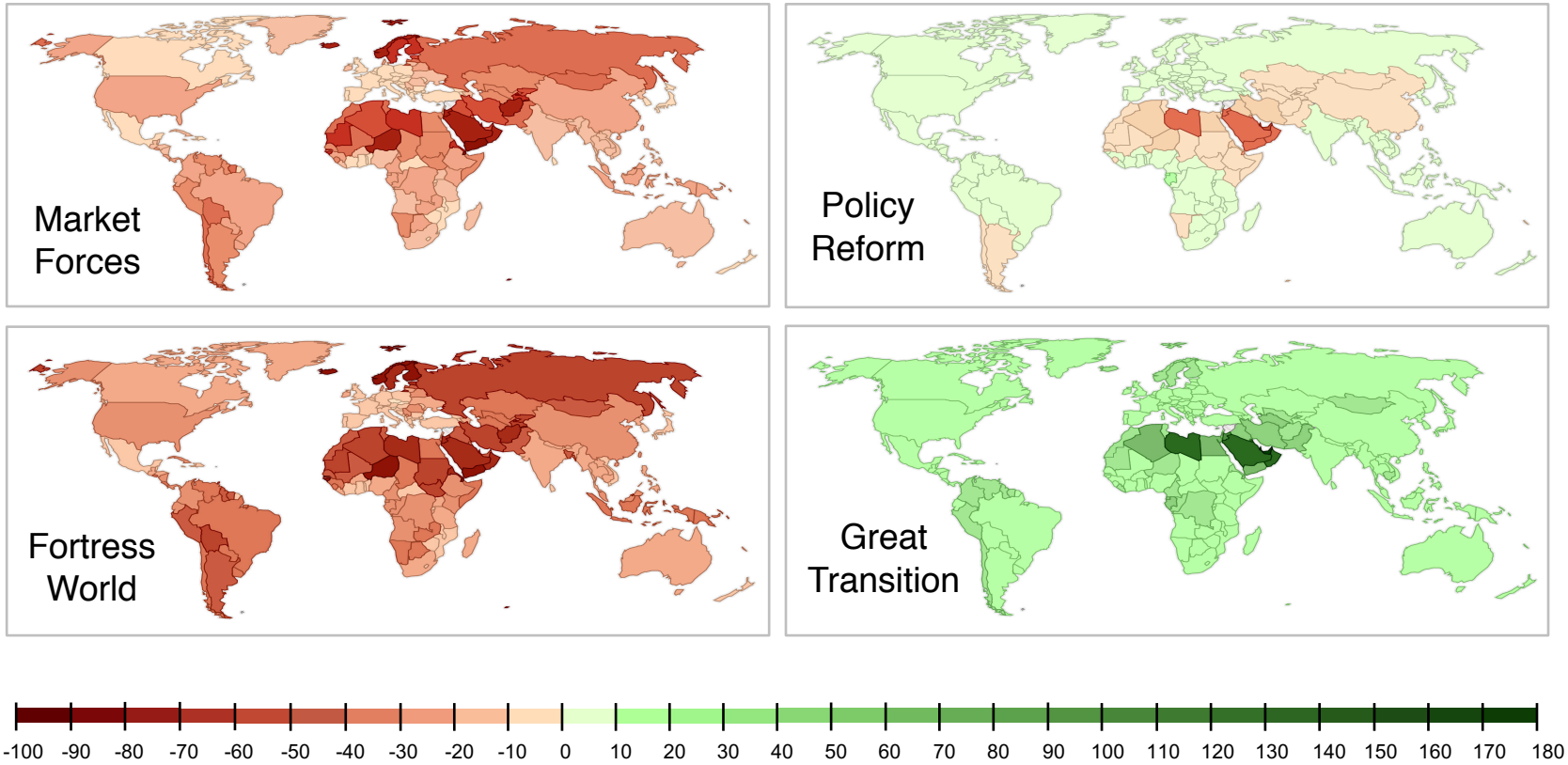
Costs **of expanding and maintaining the current global reserve network to one covering 15% of the terrestrial biosphere and 30% of the marine biosphere** = **$US 45 Billion/yr**

Benefits **(Net value* of ecosystem services from the global reserve network)** = **$US 4,400-5,200 Billion/yr**

***Net value is the difference between the value of services in a "wild" state and the value in the most likely human-dominated alternative**

Benefit/Cost Ratio = 100:1

(**From:** Balmford, A., A. Bruner, P. Cooper, R. Costanza, S. Farber, R. E. Green, M. Jenkins, P. Jefferiss, V. Jessamy, J. Madden, K. Munro, N. Myers, S. Naeem, J. Paavola, M. Rayment, S. Rosendo, J. Roughgarden, K. Trumper, and R. K. Turner 2002. Economic reasons for conserving wild nature. *Science* 297: 950-953)

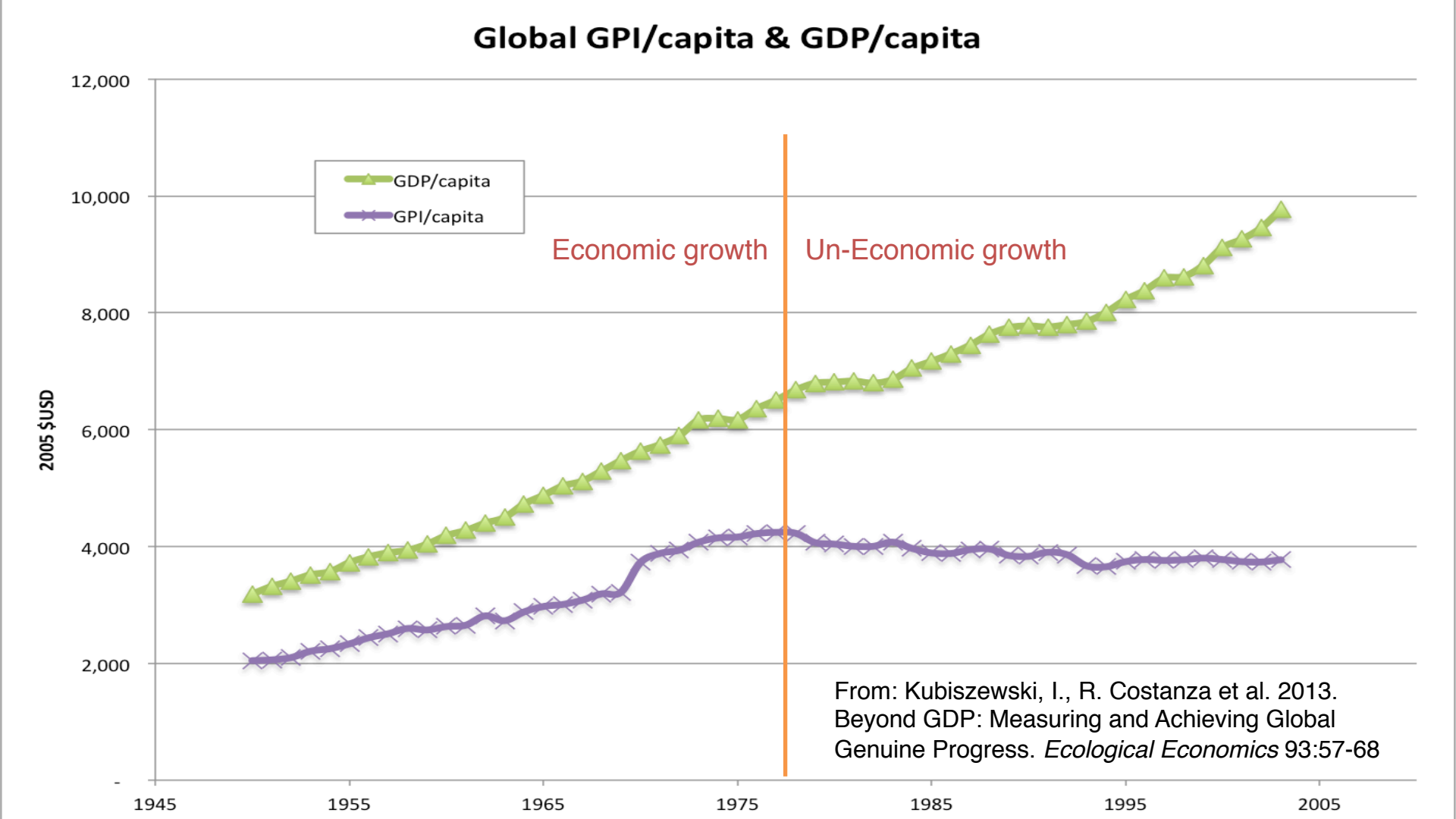


From: Kubiszewski, Costanza, Anderson, and Sutton. (2017). The Future of Ecosystem Services: Global Scenarios and National Implications. *Ecosystem Services.* 26:289-301.

ILLUSTRATION BY PETE ELLIS/DRAWGOOD.COM

Time to leave GDP behind

Gross domestic product is a misleading measure of national success. Countries should act now to embrace new metrics, urge **Robert Costanza** and colleagues.


Global GPI/capita & GDP/capita
12,000
10,000
8,000
6,000
4,000
2,000
-
2005 $USD
GDP/capita
GPI/capita
Economic growth
Un-Economic growth
1945
1955
1965
1975
1985
1995
2005
From: Kubiszewski, I., R. Costanza et al. 2013. Beyond GDP: Measuring and Achieving Global Genuine Progress. *Ecological Economics* 93:57-68

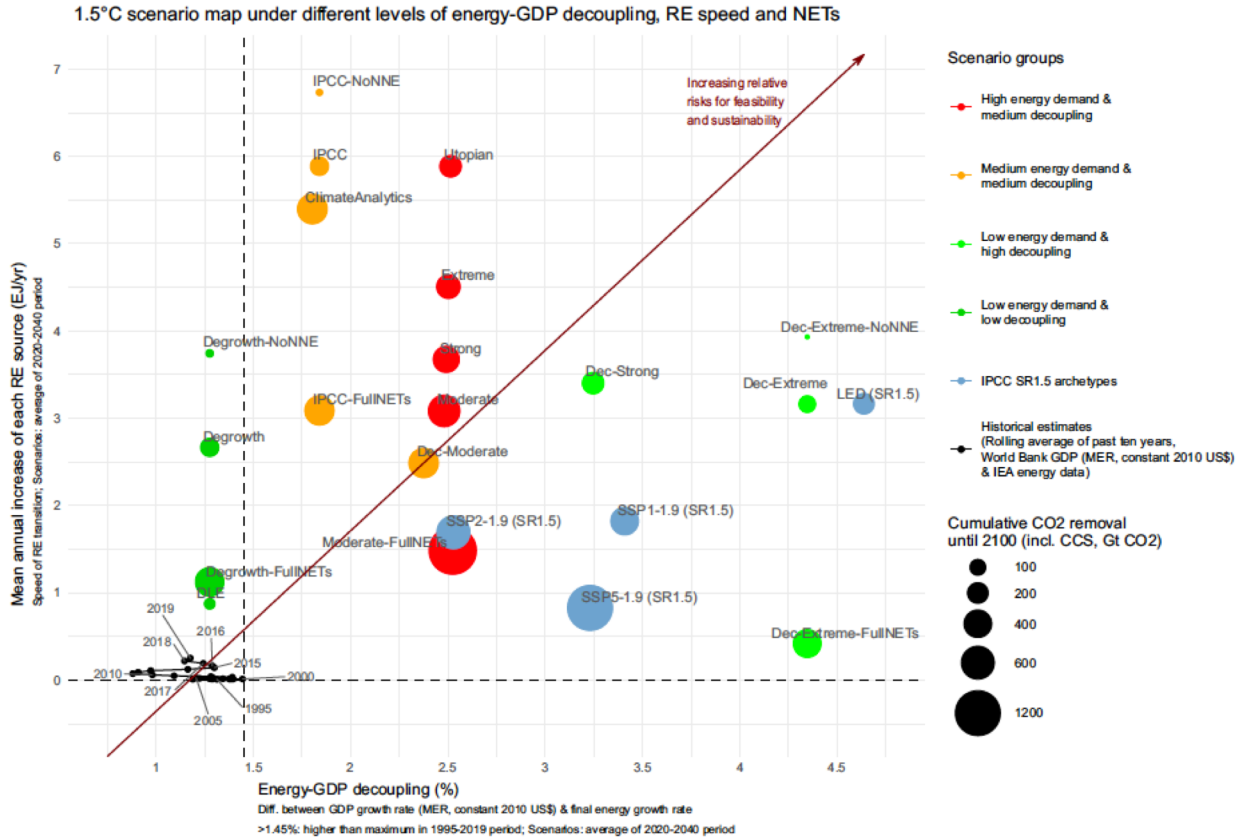


Fig. 5 1.5 °C scenario map under different levels of energy-GDP decoupling, RE speed and NETs. The dimensions are 'speed of renewable energy transition' (for the scenarios the 2020–2040 annual average growth in solar, wind and other renewables, in EJ/yr), 'energy-GDP decoupling' (for the scenarios the 2020–2040 average difference between GDP growth rate and final energy growth rate, in %) and cumulative CO_2 removal until 2100, including CCS ($GtCO_2$). Historical data points are the rolling averages of the past ten years (e.g., for the 1995 point the period 1986–1995) of the respective indicators. This averaging was chosen (1) because GDP and final energy data are noisy and (2) to emphasise longer-term trends. While historically four years were above a decoupling of 2% since 1986, these are outlieres around a lower, almost constant trend[8]. Historical GDP data (MER, constant 2010 US $) is taken from the World Bank. The conceptually equivalent graph for 2 °C can be found in Supplementary Fig. 4.

All of these scenarios can achieve 1.5 C, but vary in their dependence on Energy-GDP decoupling (%) and annual increase in renewable energy (%)

From: Keyßer, L.T. and Lenzen, M., 2021. **1.5 C degrowth scenarios suggest the need for new mitigation pathways.** *Nature communications*, 12: 1-16.

Ecological Economics 130 (2016) 350–355

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Modelling and measuring sustainable wellbeing in connection with the UN Sustainable Development Goals

Robert Costanza [a,*], Lew Daly [b], Lorenzo Fioramonti [c], Enrico Giovannini [d], Ida Kubiszewski [a], Lars Fogh Mortensen [e], Kate E. Pickett [f], Kristin Vala Ragnarsdottir [g], Roberto De Vogli [h], Richard Wilkinson [i]

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[d] Department of Economics and Finance, University of Rome Tor Vergata, Italy
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[g] Faculty of Earth Sciences, University of Iceland, Reykjavik, Iceland
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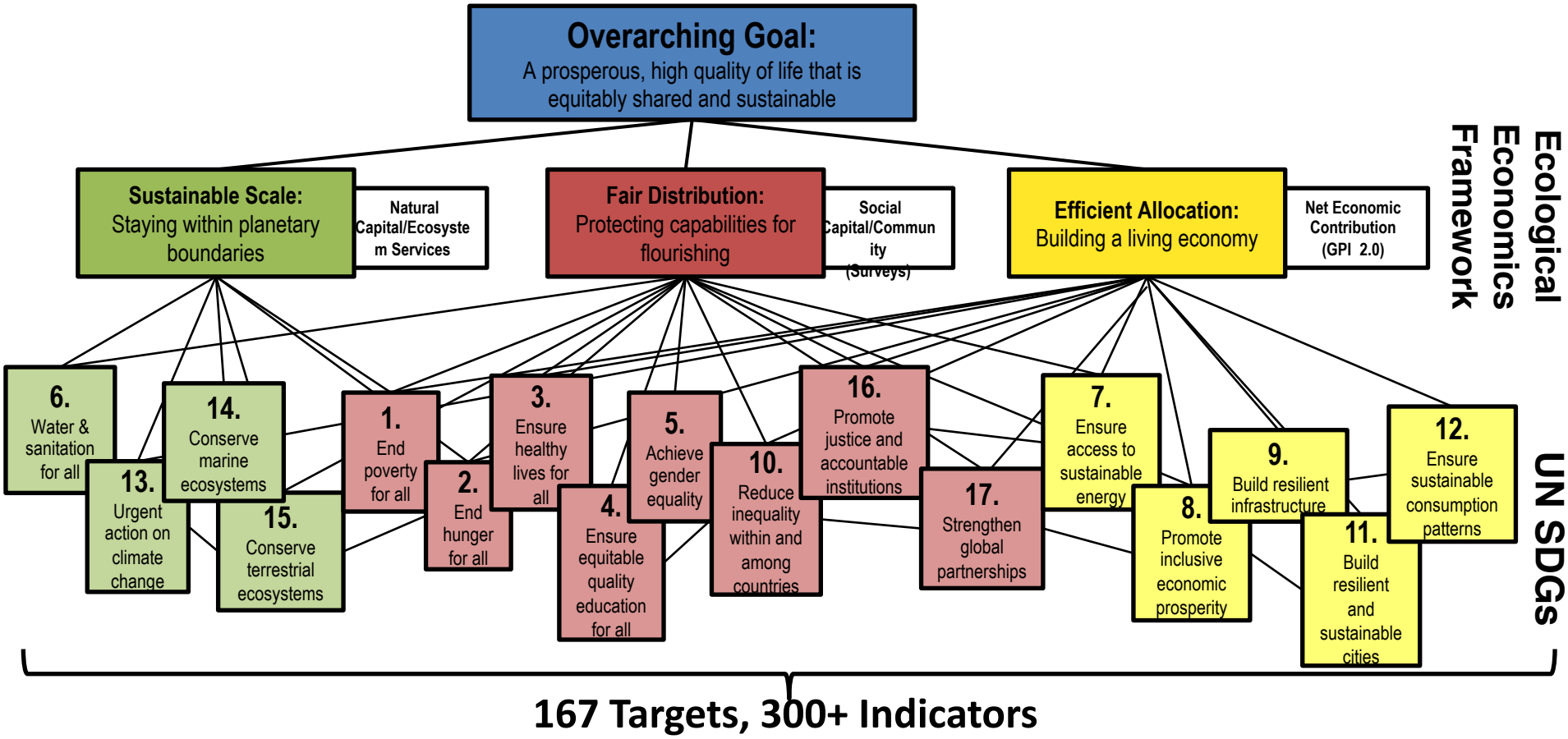
[i] Division of Epidemiology and Public Health, University of Nottingham, UK

ABSTRACT

The UN Sustainable Development Goals (SDGs) offer a detailed dashboard of goals, targets and indicators. In this paper we investigate alternative methods to relate the SDGs to overall measures of sustainable wellbeing that can motivate and guide the process of global societal change. We describe what a Sustainable Wellbeing Index (SWI) that connects with and complements the SDG dashboard might look like. We first investigate several options for how to construct such an index and then discuss what is needed to build consensus around it. Finally, we propose linking the SDGs and our SWI with a comprehensive systems dynamics model that can track stocks and flows and make projections into the future under different policy scenarios.

UN Sustainable Development Goals (SDGs)

TRANSFORMING OUR WORLD:
THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT



From: Costanza, R., L. Daly, L. Fioramonti, E. Giovannini, I. Kubiszewski, L. F. Mortensen, K. Pickett, K. V. Ragnarsdóttir, R. de Vogli, and R. Wilkinson. 2016. Modelling and measuring sustainable wellbeing in connection with the UN Sustainable Development Goals. *Ecological Economics*. 130:350–355.

GPI 2.0: Include the positive contributions of natural, human, and social capital

Economic Categories	*Environmental Categories*	*Social Categories*
Household Budget Expenditures	Services from natural capital	Services from human capital
Defensive Expenditures	Depletion of natural capital	Services from social capital
Household Investments	Costs of pollution	Social costs of economic activity
Income Inequality		
Public Provisioning		
Services from built capital		

EcoServices Classified According to Rivalness and Excludability

	Excludable	Non-Excludable
Rival	Market Goods and Services (some provisioning services)	Common Pool Resources (some provisioning services)
Non-rival	Congestable Services (some recreation services)	Public Goods and Services (most regulatory and cultural services)

From: Costanza, R., 2008. Ecosystem Services: Multiple classification systems are needed. *Biological Conservation* 141:350-352

Journal of Environmental Management 280 (2021) 111801

Contents lists available at ScienceDirect

Journal of Environmental Management

journal homepage: http://www.elsevier.com/locate/jenvman

Discussion

Common asset trusts to effectively steward natural capital and ecosystem services at multiple scales

Robert Costanza [a,*], Paul W.B. Atkins [b], Marcello Hernandez-Blanco [c], Ida Kubiszewski [a]

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[c] Environmental Consultant, San José, Costa Rica

ARTICLE INFO

Keywords
Common asset trusts
Property rights regimes
Public trust doctrine
Payment for ecosystem services
Natural capital

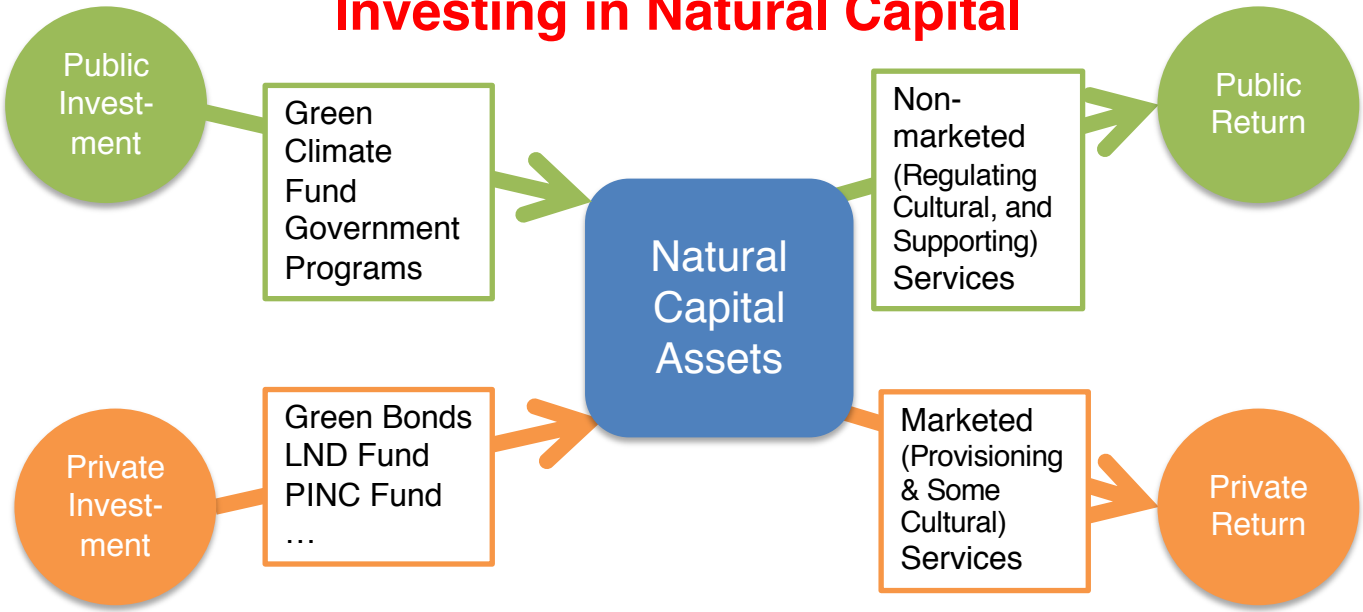
ABSTRACT

Ecosystems (natural capital) produce a range of benefits to humans. Natural capital is best thought of as common property since many of the ecosystem services it helps produce are non-rival and/or non-excludable. Private property regimes and markets alone are ineffective and inappropriate institutions to manage them sustainably. These systems can be better managed as commons, using more nuanced private and community property rights and Common Asset Trusts (CATs), with legal precedent in the Public Trust Doctrine. Effective CATs embody a generalized version of Elinore Ostrom's eight core design principles for sustainable commons management: (1) shared identity and purpose; (2) equitable distribution of contributions and benefits; (3) fair and inclusive decision-making; (4) monitoring agreed behaviours; (5) graduated responses; (6) fast and fair conflict resolution; (7) authority to self-govern; and (8) collaborative relations with other groups and spatial scales. Here, we describe a few existing and proposed systems that approximate effective CATs. We also suggest how Costa Rica can transform its existing payment for ecosystem services (PES) scheme into a national CAT. Finally, we describe how CATs can facilitate more fair and effective public/private partnerships (PPPs) to invest in natural capital and ecosystem services.

Elinor Ostrom's 8 core design principles for sustainable commons management, with a generalized version (Atkins et al., 2019) and a description of the basic function of each principle in the context of Common Asset Trusts.

Ostrom's principle	Generalized version	Function
1. Clearly defined boundaries	Shared identity and purpose	Defines group and establishes property rights
2. Proportional equivalence between benefits and costs	Equitable distribution of contributions and benefits	Ensures effectiveness by balancing individual and collective interests
3. Collective choice arrangements	Fair and inclusive decision-making	"
4. Monitoring	Monitoring agreed behaviours	"
5. Graduated sanctions	Graduated responding to helpful or unhelpful behaviour	"
6. Conflict resolution mechanisms	Fast and fair conflict resolution	"
7. Minimal recognition of rights to organize	Authority to self-govern (according to principles 1-6)	Ensures effectiveness while supporting engagement
8. Polycentric governance	Collaborative relations with other groups (using principles 1-7)	Connects to other spatial and temporal scales

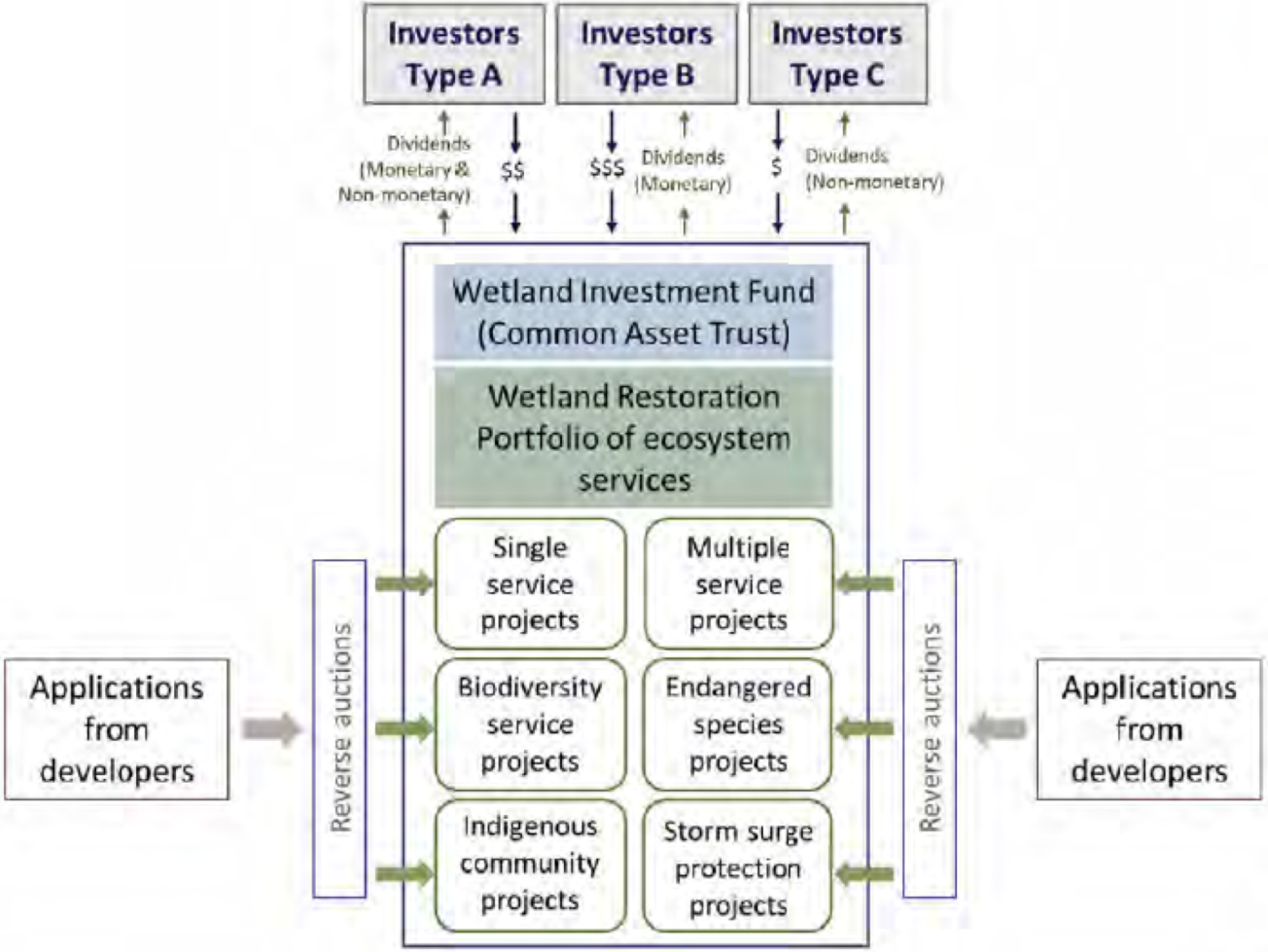
Public-Private Partnerships for Investing in Natural Capital



Issues:

1. How do we measure returns on public and private investments?
2. What institutions are needed to manage natural capital assets?

From: Costanza, R., P.W.B. Atkins, M. Hernandez-Blanco, and I. Kubiszewski. 2021. Common Asset Trusts to Effectively Steward Natural Capital and Ecosystem Services at Multiple Scales. *Journal of Environmental Management*. 280:111801



Monetary and non-monetary flows between private and public investors, developers, and a proposed wetland restoration common asset trust

From: Canning, A.D., D Jarvis, R. Costanza, S. Hasan, J.C.R. Smart, J. Finisdore, C. Lovelock, S. Greenhalgh, H. Marr, M. Beck, K. Stephenson, C. Gillies, P. Wilson, and N. Waltham. 2021. Financial incentives for wetland restoration: beyond markets to common asset trusts. *One Earth* 4:937-950

Business leaders no longer doubt the inherent value of nature or the importance of managing it sustainably. A recent Credit Suisse and Responsible Investor study found that 80% of surveyed investors are "very concerned" about biodiversity loss.

Five potential solutions

1. **Blended finance – de-risking investments with concessional capital**
2. **Enabling partnerships between private and public stakeholders**
3. **Creating and raising awareness of successful investments blueprints**
4. **Providing technical assistance to project developers**
5. **Sharing data on the benefits of conservation finance with the broader market**

To stimulate the necessary investment in natural capital and ecosystem services we need:

- Better measures of wellbeing that include both the damages to natural capital and it's positive contributions to wellbeing (e.g. GPI 2.0)
- New institutions (e.g. common asset trusts) to enable effective private/public partnerships and manage investments in natural capital sustainably and well

Thank You

Papers mentioned in this presentation can be downloaded from:
www.robertcostanza.com