Global Change and Ecosystem Services – A Challenge for Interdisciplinarity

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World Population

- 7 billion and counting...
- U.N. wants better life for world of 7 billion
- Population boom heralds global economic shifts
- World awaits 7 billionth baby
- Catholic condom ban not behind population boom
- Billions can be fed, but who will pay the tab?
- Water use rising faster than world population
- Curb soaring population? Keep girls in school
- The next challenge: too few people?
- Slideshow: A world of seven billion
- Video: Africa considers soaring birth rate

MORE REUTERS RESULTS FOR:
"billion"

U.N. wants better life for world of 7 billion

By **Avril Ormsby**

LONDON | Wed Oct 26, 2011 2:29pm EDT

(Reuters) - Instead of worrying about sheer numbers when the world's population hits 7 billion next week,

Related News

Crowded, stretched world awaits 7 billionth baby
Tue, Oct 25 2011

Analysis & Opinion

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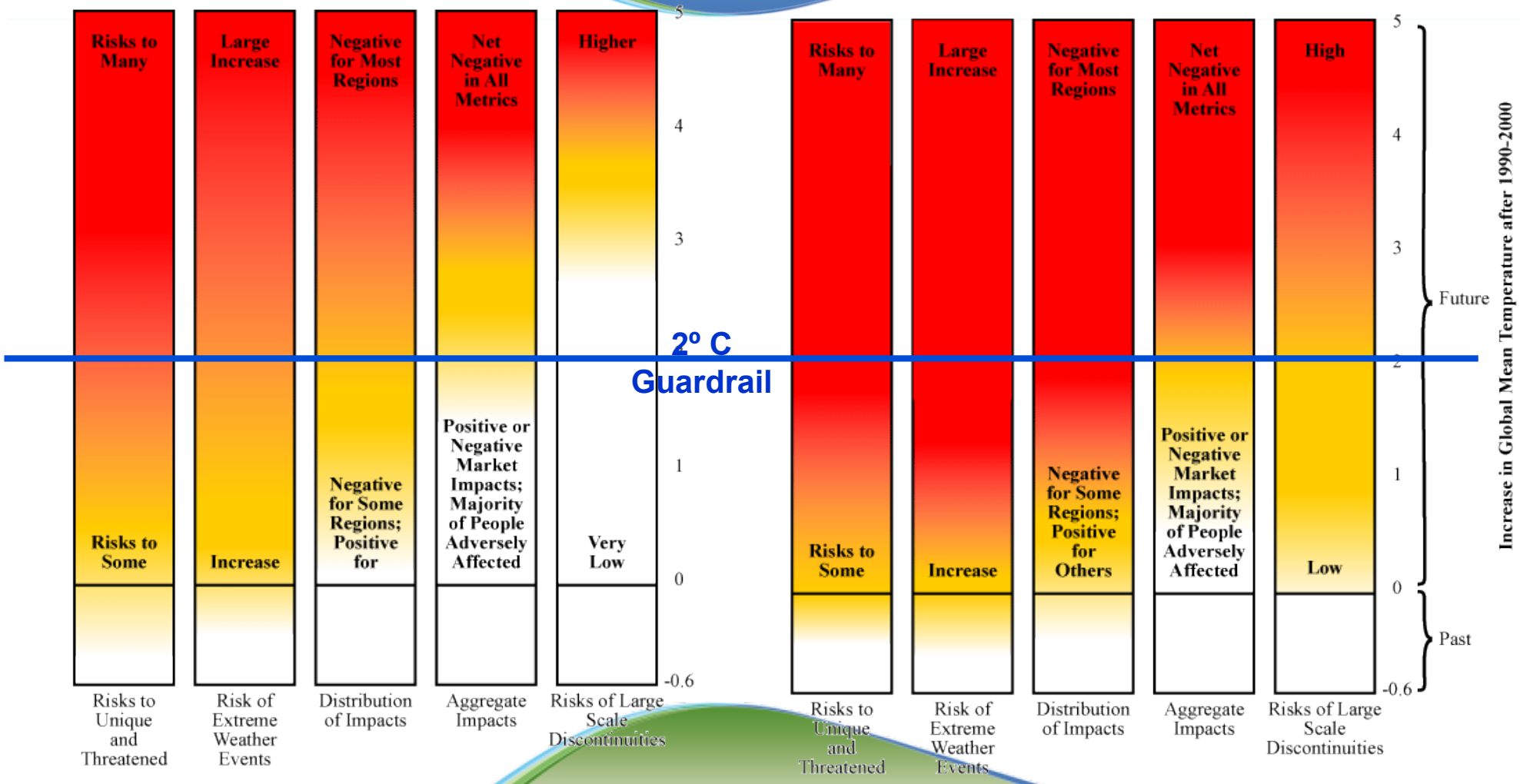
Lorraine, France, August 2003

IPCC "Reasons for concern"

IPCC TAR

Smith et al. 2009 (PNAS)



Vulnerability…

…is the degree to which
a system is **sensitive** to global change

plus

the degree to which the people that rely on this system are **unable to cope with** the changes

Global Change and Ecosystem Services – A Challenge for Interdisciplinarity

1. Ecosystem service assessment, an established paradigm?
2. Interdisciplinarity for policymakers

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Vulnerability…

…is the degree to which an ecosystem service is **sensitive** to global change

plus

the degree to which the people that rely on this service are **unable to cope with** the changes

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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The services of ecological systems and the natural capital stocks that produce them are critical to the functioning of the Earth's life-support system. They contribute to human welfare, both directly and indirectly, and therefore represent part of the total economic value of the planet. We have estimated the current economic value of 17 ecosystem services for 16 biomes, based on published studies and a few original calculations. 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 ($10^{12}$) per year, with an average of US$33 trillion per year. Because of the nature of the uncertainties, this must be considered a minimum estimate. Global gross national product total is around US$18 trillion per year.

Because ecosystem services are not fully 'captured' in commercial markets or adequately quantified in terms comparable with economic services and manufactured capital, they are often given too

estimate represents a minimum value, which would probably increase: (1) with additional effort in studying and valuing a broader range of ecosystem services; (2) with the incorporation of

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Ecosystem Service Supply and Vulnerability to Global Change in Europe

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Global change will alter the supply of ecosystem services that are vital for human well-being. To investigate ecosystem service supply du… century, we used a range of ecosystem models and scenarios o… land-use change to conduct a Europe-wide assessment. Large char… and land use typically resulted in large changes in ecosystem service supply. Some of these trends may be positive (for example, increases in forest area and productivity) or offer opportunities (for example, "surplus land" for agricultural extensification and bioenergy production). However, many changes increase vulnerability as a result of a decreasing supply of ecosystem services (for example, declining soil fertility, declining water availability, increasing risk of forest fires), especially in the Mediterranean and mountain regions.

To sustain a future in which the Earth's life-support systems are maintained and human needs are met, human activities must first be recognized as an integral component of ecosystems (*1*, *2*). Scenarios of global change raise concern about alterations in ecosystem services

models. A dialogue with stakeholders from relevant sectors was conducted throughout the study (*4*).

Our assessment was based on multiple scenarios for major global change drivers (socioeconomic factors, atmospheric green-

2080, relative to baseline conditions in 1990 (*5*). Socioeconomic trends were developed from the global Intergovernmental Panel on Climate Change Special Report on Emission Scenarios (IPCC SRES) storylines B1, B2, A1FI, and A2 for EU15+ (*4*, *6*, *7*) (table S1). With this common starting point, socioeconomic changes relate directly to climatic changes through greenhouse gas concentrations and to land-use changes through climatic and socioeconomic drivers, such as demand for food. Four general circulation models (GCMs)—the Hadley Centre Coupled Model Version 3 (HadCM3), the National Center for Atmospheric Research–Parallel Climate Model (NCAR-PCM), the Second Generation

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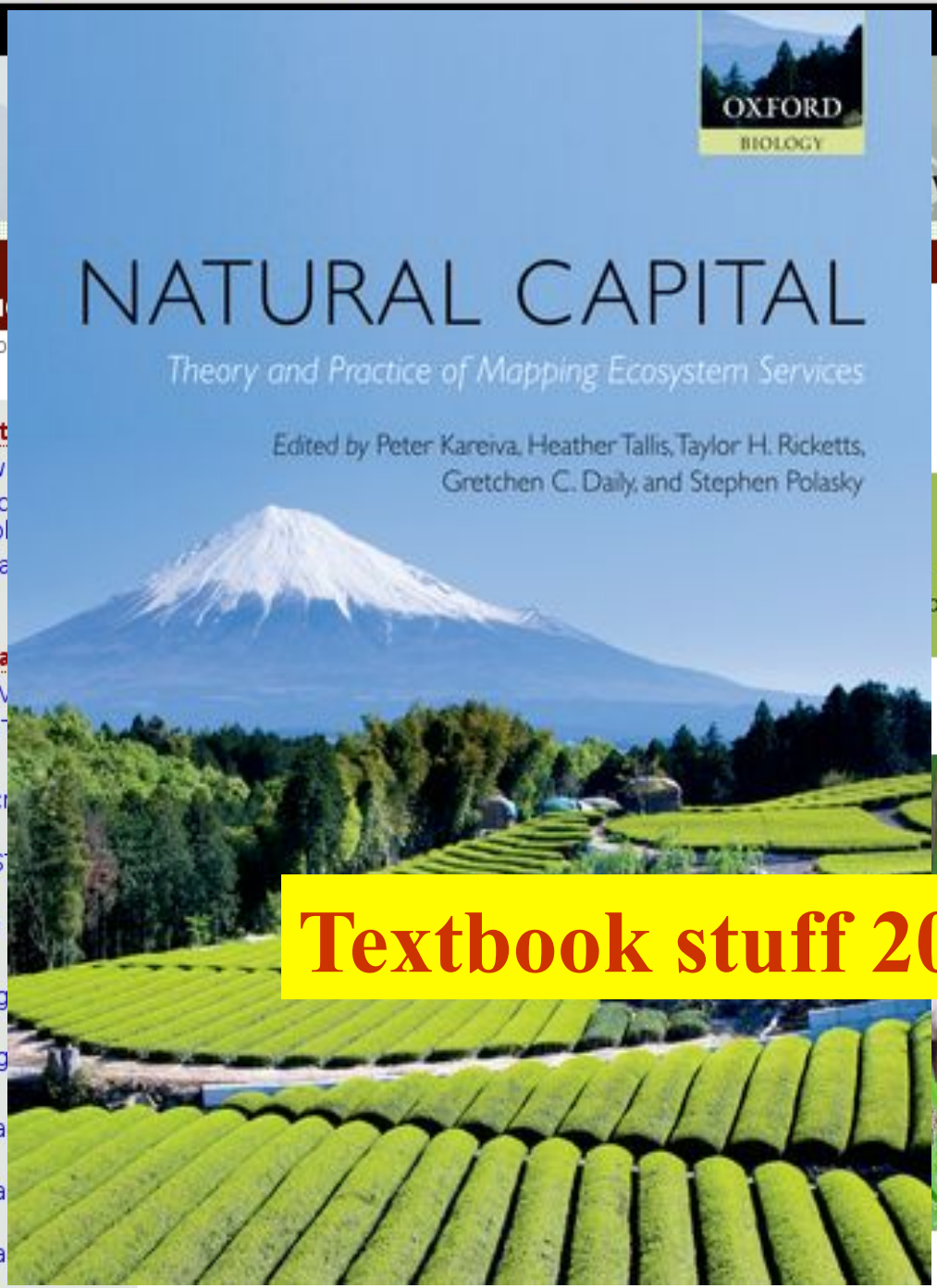

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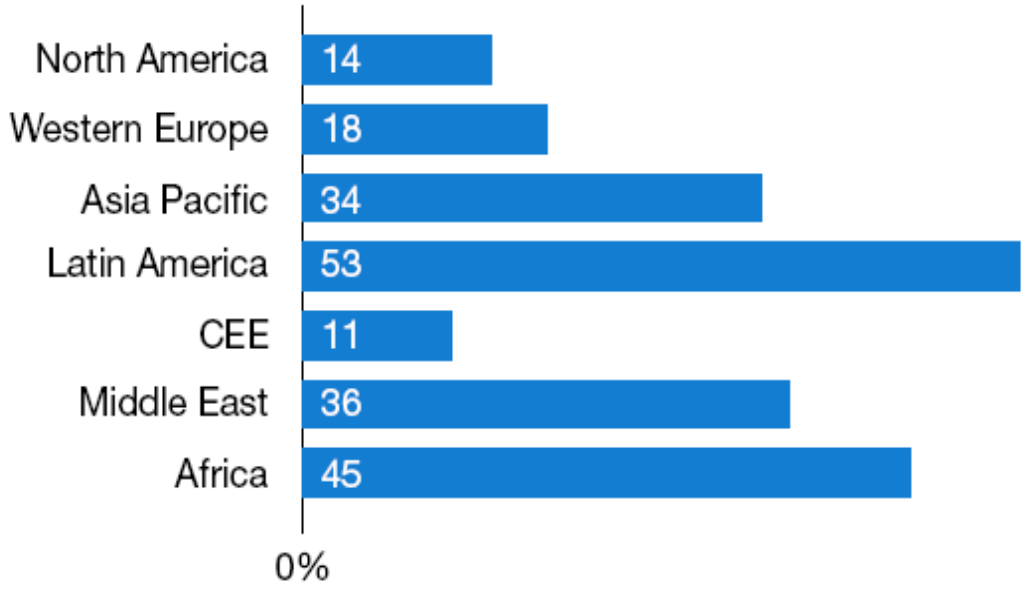
Growing business awareness of BES

Respondents who were 'extremely' or 'somewhat concerned' about biodiversity loss as a threat to their business growth prospects.



Q: How concerned are you about the following potential threats to your business growth prospects?
Base: All respondents (139, 442, 289, 167, 93, 28, 40) Please note small base for Middle East

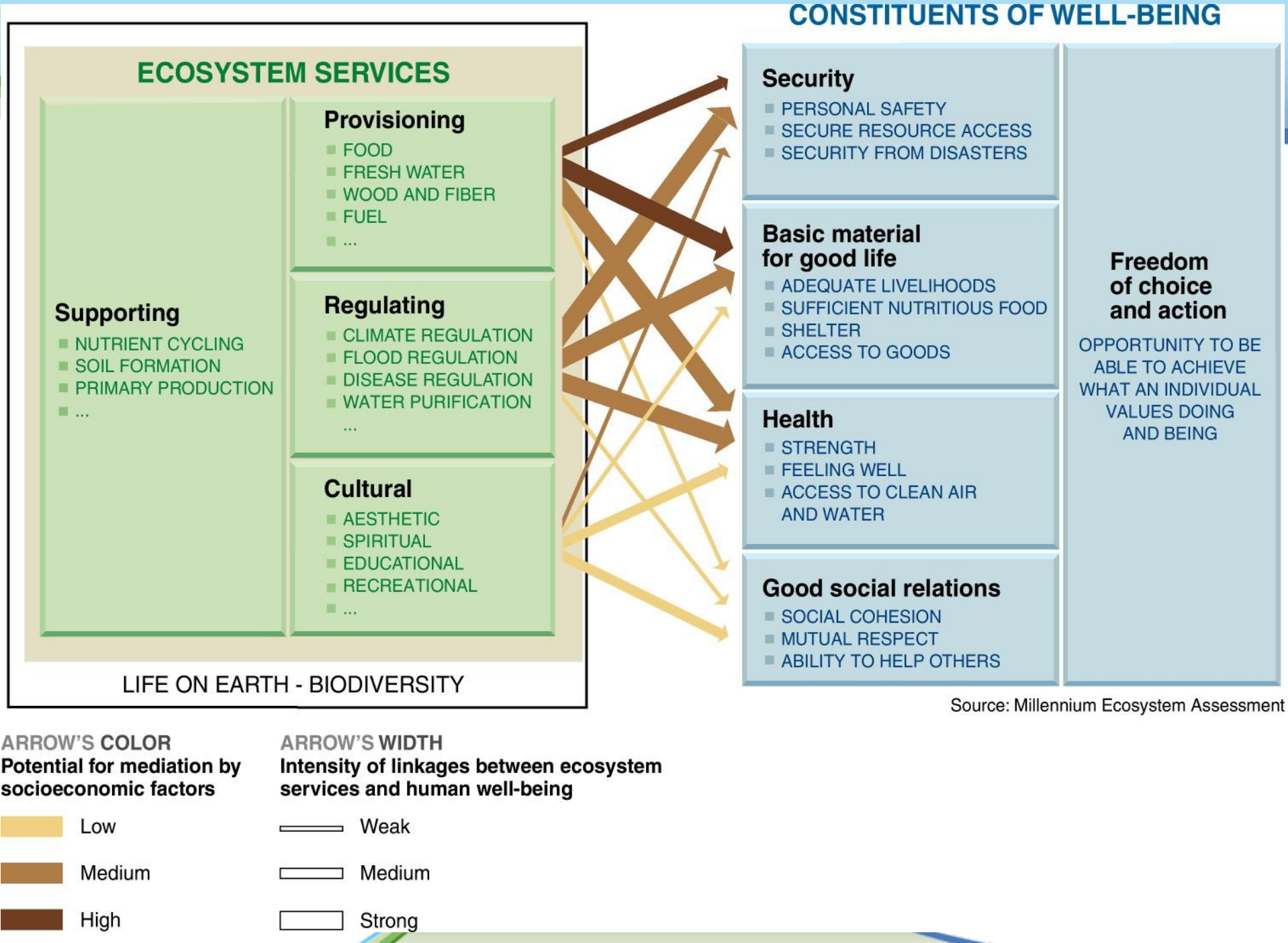
Source: PricewaterhouseCoopers 13th Annual Global CEO Survey 2010

Chap 4: Scaling down biodiversity & ecosystem risks to business

- **Integrated Biodiversity Assessment Tool**
  - http://www.biodiversityinfo.org/ibat/
  - GIS database for site-level risk assessment
  - Based on World Database of Protected Areas, World Biodiversity Database, IUCN Red List of Threatened Species

- **Business and Biodiversity Offsets Program**
  - http://www.forest-trends.org/biodiversityoffsetprogram/
  - Guidance on designing and implementing biodiversity offsets to ensure “no net loss”
  - Led by Forest Trends, Wildlife Conservation Society and Conservation International

- **Certification and labelling**
  - http://www.isealalliance.org/
  - Global hub for social and environmental standards
  - Members represent fair trade, forest stewardship, organic agriculture, fisheries, etc.



Source: Millennium Ecosystem Assessment

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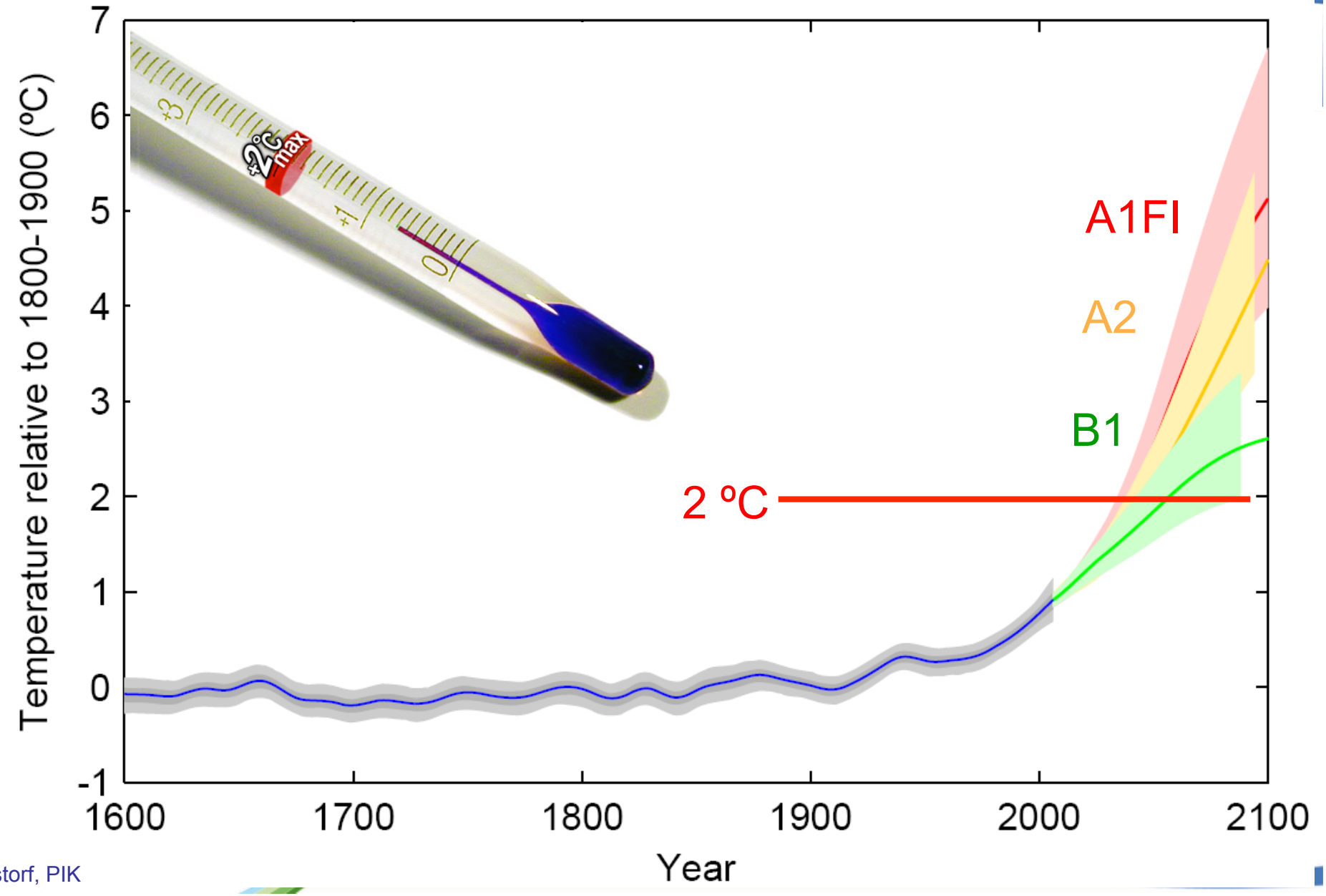
"Mr Steiner and I have been chatting. We agreed immediately: Conserving biological diversity has the same dimension and importance as climate change."

(Angela Merkel, 11 Jan 2010, Berlin, Germany)

The 2º “guard rail”



Strategic goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target 11: By 2020, at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes

Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives is maintained,

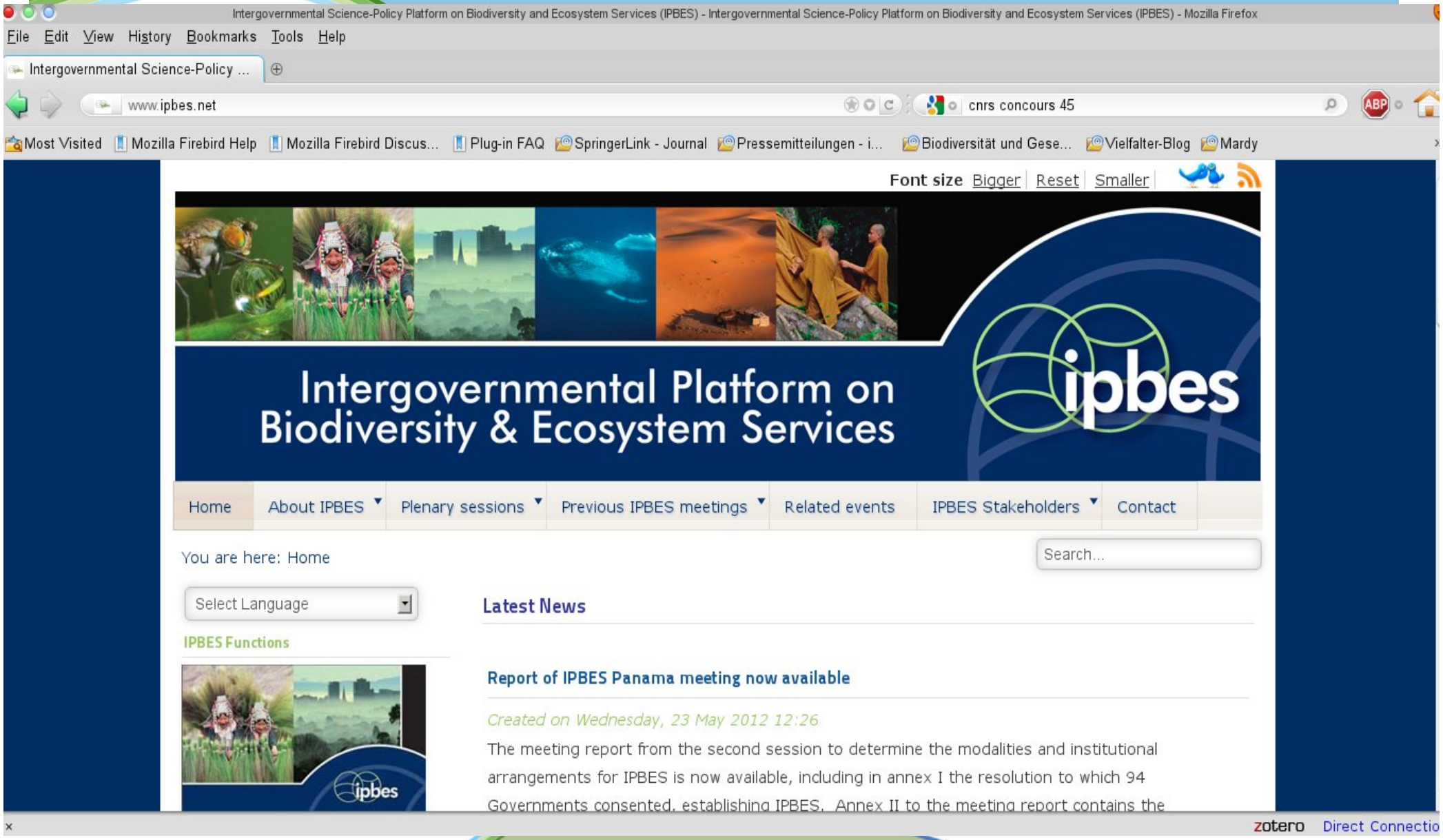
Strategic goal A. Address the underlying causes of biodiversity loss

Target 1: By 2020, … People are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2: By 2020, … biodiversity values are integrated into national and local development and poverty reduction strategies and planning processes and national accounts …

Target 3: By 2020, … incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, .

Target 4: By 2020, … Governments, business and stakeholders have plans for sustainable production and consumption and keep the impacts resource use within safe ecological limits.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Interdisciplinary knowledge for IPBES

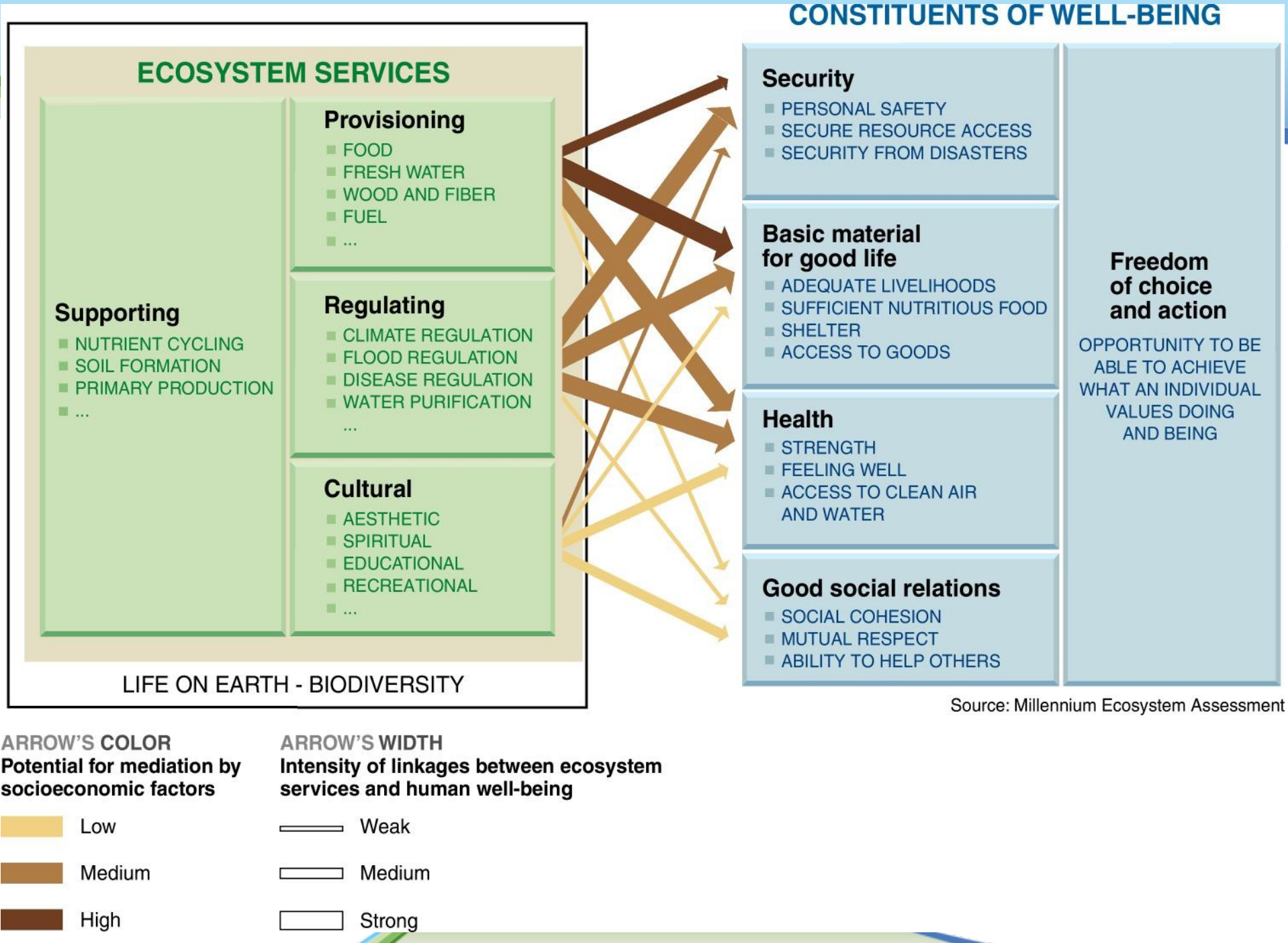
- Assessment of impacts of ecosystem change on society
  - monetary and non-monetary valuation of services
  - trade-offs, rebound effects
- Social-ecological feedbacks

Interdisciplinary knowledge for IPBES

- Outcome-oriented research, e.g.,
  - what societal action could generate a certain outcome for biodiversity and ecosystem function?
  - which win-win situations exist for biodiversity conservation and climate policy?
- Traditional knowledge and its use in environmental assessment

Interdisciplinary knowledge for IPBES

- Cultural, social and spiritual benefits of ecosystem function, characterized in ways that permit inclusion in trade-off analysis and priority-setting
- “Option values” – qualitative or quantitative characterization of possible future benefits from biodiversity



Source: Millennium Ecosystem Assessment


Merci pour votre attention