Value of Ecosystem Services

- Putting the 'green' into green economy -

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Institute for European Environmental Policy

UNEP · Federal Ministry for the Environment, Nature Conservation and Nuclear Safety · Norwegian Ministry of Foreign Affairs · defra · UKaid · Rijkswaterstaat · Sida

What are ecosystem services?

Ecosystem services

- as according to Millennium Ecosystem Assessment 2005 -

Supporting
- NUTRIENT CYCLING
- SOIL FORMATION
- PRIMARY PRODUCTION
- ...

Provisioning
- FOOD
- FRESHWATER
- WOOD AND FIBER
- FUEL
- ...

Regulating
- CLIMATE REGULATION
- FLOOD REGULATION
- DISEASE REGULATION
- WATER PURIFICATION
- ...

Cultural
- AESTHETIC
- SPIRITUAL
- EDUCATIONAL
- RECREATIONAL
- ...

Underpinned by biodiversity (direct & indirect benefits, resilience)

Ecosystem services

- as according to Millennium Ecosystem Assessment 2005 -

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Trade-offs

Interactions

Interdependencies

Underpinned by biodiversity (direct & indirect benefits, resilience)

Ecosystem services

- as according to Millennium Ecosystem Assessment 2005 -

Provisioning

- FOOD
- FRESHWATER
- WOOD AND FIBER
- FUEL
- ...

Appreciated by economy
(Apart from non-traded resources used for subsistence!)

Regulating

- CLIMATE REGULATION
- FLOOD REGULATION
- DISEASE REGULATION
- WATER PURIFICATION
- ...

Not appreciated by economy !

Supporting

- NUTRIENT CYCLING
- SOIL FORMATION
- PRIMARY PRODUCTION
- ...

Not appreciated by economy !

Cultural

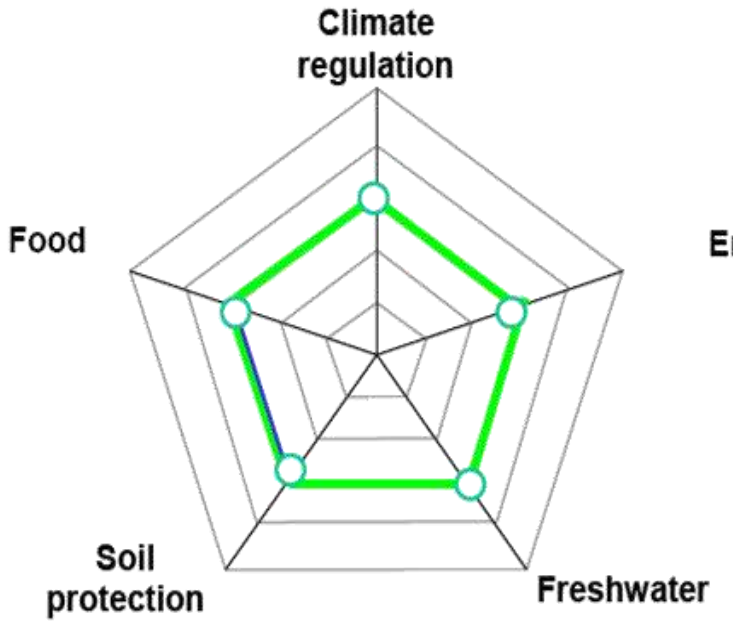
- AESTHETIC
- SPIRITUAL
- EDUCATIONAL
- RECREATIONAL
- ...

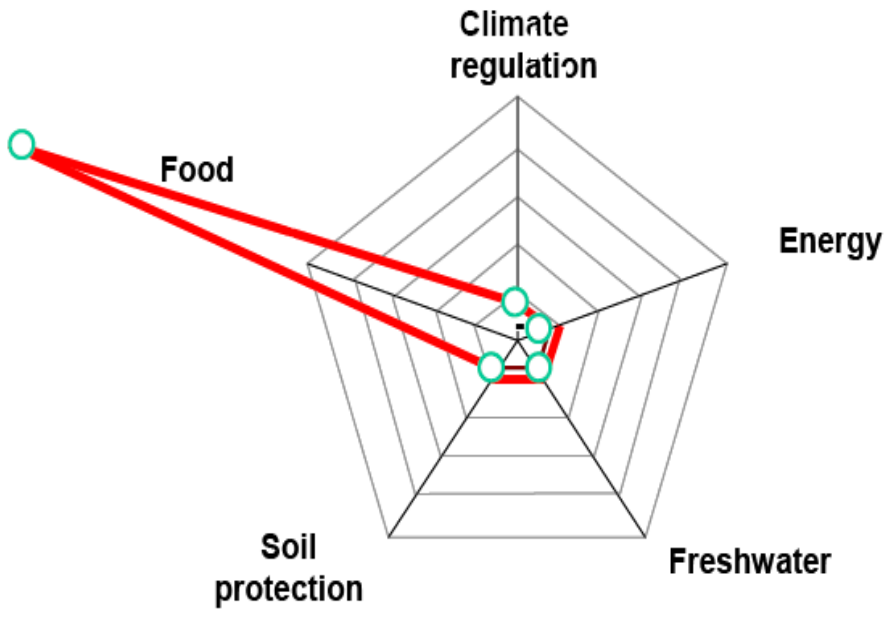
Only partly appreciated by economy !

Not appreciated by economy !

Underpinned by biodiversity (direct & indirect benefits, resilience)

The Economics of Ecosystems & Biodiversity





Missing full value of nature leads to …

- Adopted from TEEB Policy-makers 2009 / 2011, based on a presentation by Ben ten Brink -

Economic significance of ecosystem services?

TEEB initiative (2007 - ongoing): assessing the value of biodiversity & ecosystem services

- Demonstrate biodiversity, ecosystems & their services have multiple values – to economy, society, business & individuals
- Highlight the benefits (vs. costs) of protecting nature & natural capital
- Show how to assess the value of bd and ES – and how it can be used
- Show how / help to integrate these values into everyday decision-making

G8 2007
Environment Ministers Meeting
Potsdam, 15-17 March 2007

Ecosystem services: direct economic values

Global fisheries underperform by US$ 50 billion annually – due to overfishing (World Bank& FAO 2009).

Global market for eco-labelled fish products grew by over 50% in 2008-2009 (MSC 2009).

Global sales of organic food and drink are increasing by over US$ 5 billion / year (Organic monitor 2006).

Ecotourism is the fastest growing area of tourism, with estimated increase of global spending 20% annually (TIES 2006).

Conserving forests avoids greenhouse gas emmissions worth US$ 3.7 trillion (Eliasch 2008).

Ecosystem services: direct & indirect economic values

Economic importance of pollination

- Over 75 % of the world's crop plants rely on pollination by animals
- 30 % of fruits, 7 % of vegetables and 48 % of nuts produced in the EU depend on pollinators
- **The annual economic value of insect-pollinated crops in the <u>EU is about EUR 15 billion</u>**
- UK: economic value of biotic pollination as a contribution to crop market value in 2007 at EUR 629 million, 2011)
- Loss of pollinators (domesticated & wild) reduces crop yield through reduced and unreliable pollination

Domesticated pollinator (honey bee)

Wild pollinator (hover fly)

Building on presentation by Dr Anne Franklin (2010), various references in "EU 2010 Biodiversity Baseline" (EEA, 2010) + UK NEA, 2011, Ricketts et al, 2004)

Ecosystem services: direct & indirect economic values

The total economic value of 63 million hectares of wetland around the world was estimated at $3.4 billion per year. Wetlands in Asia have the highest economic value at $1.8 billion per year. This figure may even be higher if we take the estimate cited by Ramsar of global wetland area to be 12.8 million km square. In this case, the total economic value of the world's wetlands (based on the functions examined in this report) can be estimated at $70 billion per year.

Source: TEEB case by L. Brander & K. Schyut (2010) The economic value of world's wetlands (benefit transfer) www.teebweb.org

Continued work on ecosystem services …

- **National ecosystem assessments / TEEB initiatives:** Brazil, India, Germany, the Netherlands, Belgium, Norway …

- **Thematic initiatives / synthesis:** TEEB for Cities, TEEB paper on natural capital & green economy (to be published in Rio), World Bank work on natural capital accounting (WAVES), EEA work on ecosystem accounts …

- **For information & cooperation:** please contact **Benjamin Simmons** UNEP Green Economy **/** TEEB coordination (benjamin.simmons@unep.org)

- **Nordic Council of Ministers activities, e.g.**
  - Scoping assessment on the status and value of ecosystem services in the Nordic Countries – TEEB Nordic (May 2011- May 2012)
  - TEEB for municipalities (autumn 2011 – spring 2012)
  - Valuing ecosystem services from Nordic watersheds (summer 2011 – Dec 2012)
  - Planned outreach activities with UNEP / TEEB in Rio (June 2012)

norden

"A country could cut down all its forest and deplete its natural resources and this would show only as a positive gain to GDP despite of the loss of [natural] capital."

-Robert Repetto (1987) in Millennium Ecosystem Assessment 2005 –

Ecosystem services & Green Economy

Ecosystem services & truly 'green' green economy

Building green economy on ecosystem services:

1. **Understanding the value** of nature & natural capital – even where the values are not market based.
2. **Integrating the value** of nature & natural capital into the foundations of decision-making (strategies, plans & regulations, accounting systems, indicators, impacts assessments, tools for landuse planning …).
3. **Providing the right economic signals** – removing harmful subsidies and creating incentives to sustainable use of natural capital
4. → **Investing green** (eg. green infrastructure) & creating green jobs

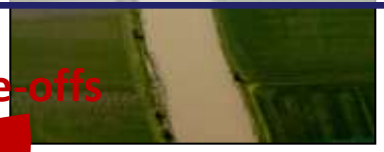
Understanding & assessing ES stocks, flow & value

Ecosystem service stock
(status & trends)

- Forest & water … but also:
- Carbon stock
- Stock of pollinators
- Genetic resources
- Stock of natural heritage
- Etc.

Ecosystem service flow
(status & trends)

- Benefits 'flow' between scales (local / national / global) in time (sustainability) and from managers to beneficiaries
- Also, several benefits are processes and cannot be expressed as 'stock' only



Ecosystem service value
(current & potential)

- Qualitative
- Quantitative
- Monetary

Trade-offs

Trade-offs

Trade-offs

Biodiversity(status & trends)
Indication of resilience !

Integrating ES into accounting systems & indicators

ES Stock – Flow – Value
Biodiversity

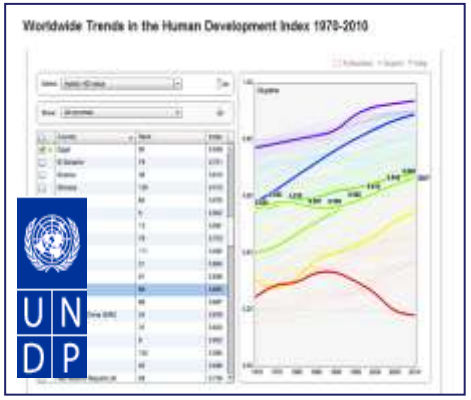
European Environment Agency

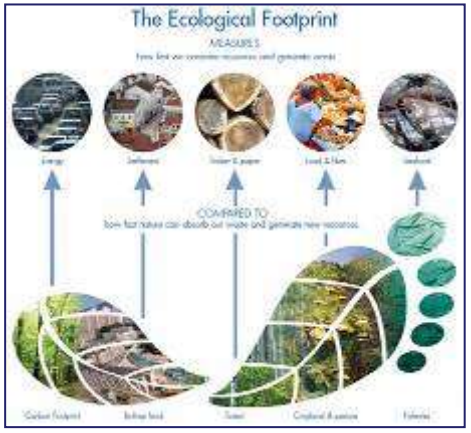
UNEP

OECD

Ecosystem accounts (EA) & System of Integrated Environmental and Economic Accounting (SEEA)

Beyond GDP

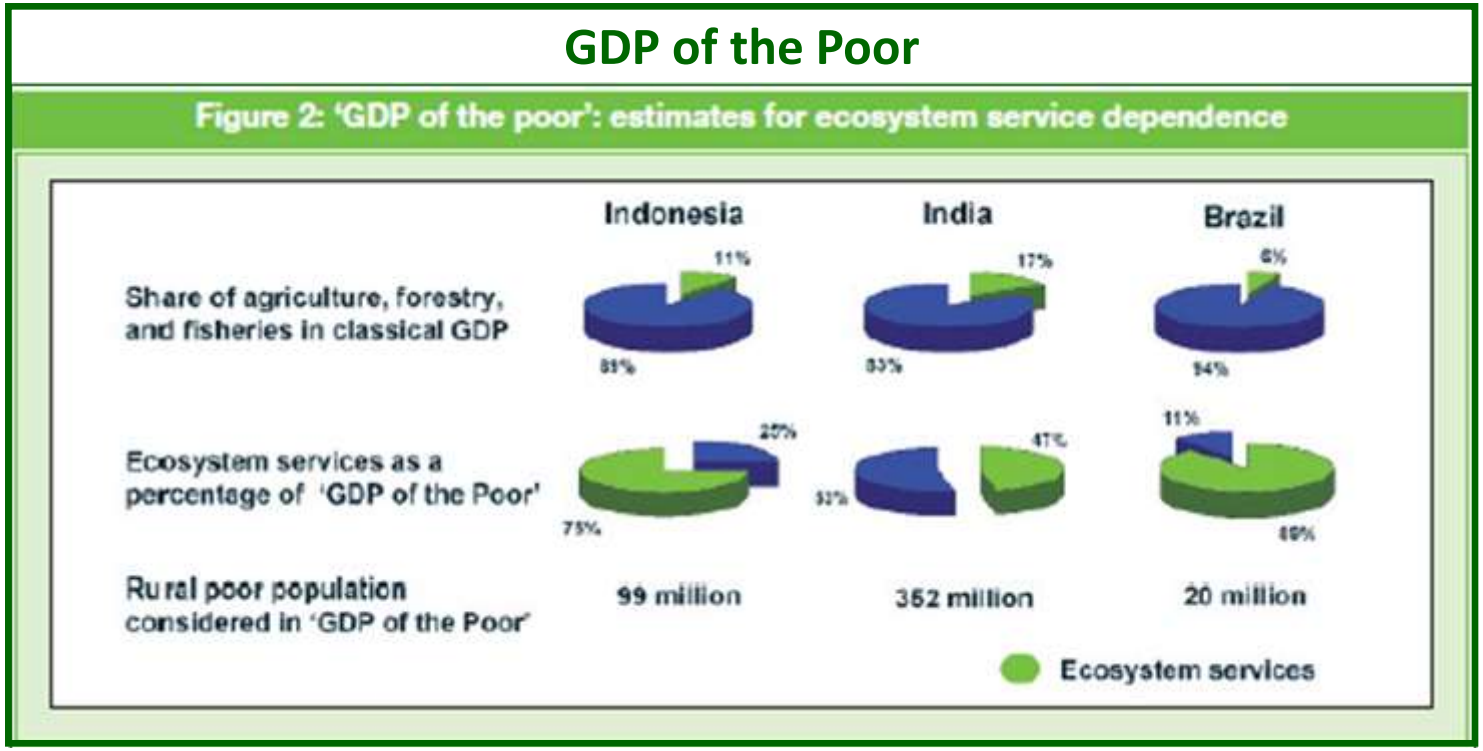




A bundle of greener macroeconomic & societal indicators

Greener economy & sustainable societies

GDP of the Poor



- Adopted from TEEB Policy-makers 2009 / 2011 -

Providing right economic signals: subsidy reform

Subsidies:
Over $1trillion/year: a mix of 'the good, the bad & the ugly'

Sector	Region
Agriculture	OECD: US$261 billion/year (2006–2008) (OECD, 2009)
Biofuels	US, EU and Canada: US$11 billion in 2006 (GSI, 2007; OECD, 2008b)
Energy	World: US$557 billion/year in 2008 (IEA, 2010)
Fisheries	World: US$15–US$35 billion/year (UNEP, 2008a)
Transport	World: US$238–US$306 billion/year, of which EHS are estimated at US$173–US$233 billion/year (Kjellingbro and Skotte, 2005)
Water	World: US$67 billion/year, of which EHS are estimated at US$50 billion/year (Myers and Kent, 1998)

(TEEB 2011 Chapter 6: Lehman & ten Brink et al 2011)

Providing right economic signals: incentives

Payments for Ecosystem Services (PES)

Instrument growing in applications

- 300 PES programmes globally, range of ecosystem services (Blackman & Woodward, 2010)
- Global value ~ USD 8.2 billion (Ecosystem Marketplace, 2008; see also OECD 2010)
- Increasing by 10-20% per year (Karousakis, 2010)
- Target a range of objectives: water, deforestation, carbon storage, IAS, poverty…

Big & small - public & private

- eg. 496 ha being protected in an upper watershed in northern Ecuador
- eg. 4.9 million ha sloped land being reforested by paying landowners China
- Public (municipal, regional, national) & private (Vittel (Fr), Rochefort (B), Bionade (D) for quality water)
- Local (eg. New York, Quito), Regional (eg. Niedersachsen), national (eg. Costa Rica, Mexico and Ecuador and international (e.g. REDD+, ABS)

Slide by P. ten Brink, see also Chapter 5 TEEB for Policy Makers

Conclusions: ecosystem services & green economy

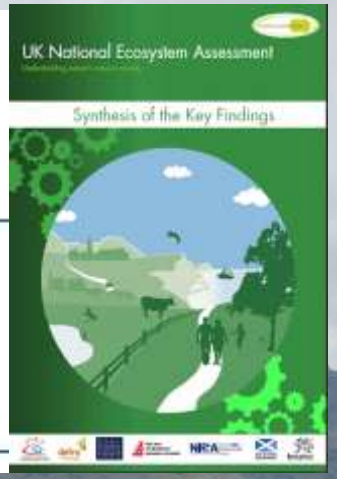
- **Getting the foundations right!** A 'truly green' green economy rests on sustainably managing natural capital → one key element is to green our accounting systems.

- **Getting the market signals right!** Removing harmful subsidies and providing the right kind of incentives → ecosystem services provide several opportunities for / support to green economy (eg. via PES schemes).

- **Encouraging to invest green!** Investment in natural capital can lead to significant cost savings, creates business opportunities and - if appropriately planned and implemented – can provide win-wins for both natural resources management and biodiversity conservation.

The true value of nature is not a number with a pound sign in front

George Monbiot
guardian.co.uk, Monday 6 June 2011 20.00 BST
Article history



Putting a price on nature can't be worse than giving it all away for free

The natural world gives us clean air and water, fertile soils and immense wellbeing. Putting a price tag on it might just stop us mistaking free for worthless

DAMIAN CARRINGTON'S ENVIRONMENT BLOG

Posted by
Damian Carrington
Thursday 2 June 2011
10.02 BST
guardian.co.uk

Thank you

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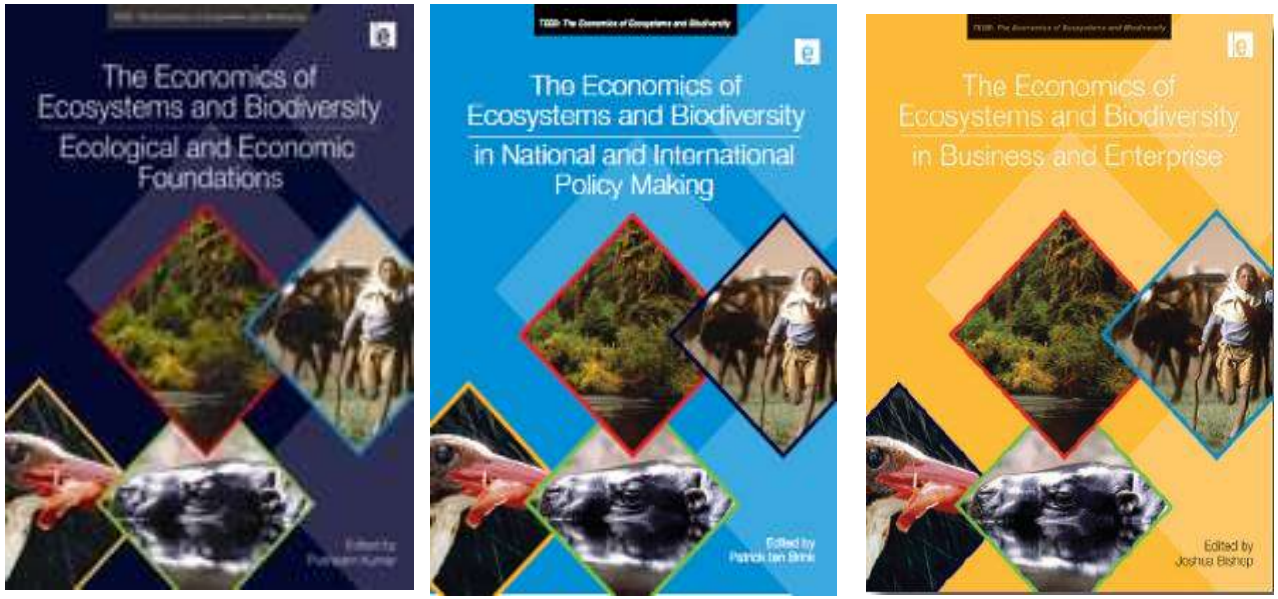
This presentation builds on the work carried out in the context of
TEEB for National and International Policy-makers (2011)

Institute for European Environmental Policy

IEEP is an independent, not-for-profit institute dedicated to the analysis, understanding and promotion of policies for a sustainable environment in Europe.

See IEEP Manual of European Environmental Policy: http://www.europeanenvironmentalpolicy.eu/

The Economics of Ecosystems & Biodiversity



TEEB books: http://www.routledge.com/sustainability/

TEEB reports & general info: http://www.teebweb.org/

TEEB coordination / UNEP: benjamin.simmons@unep.org

Examples: ecosystem service -based Green Economy

Business opportunities: payments for ecosystem services (PES)

- **Situation:** Vittel natural mineral water (FR) depends on high quality water from Vosges Mountains (no pre-treatment allowed by law).
- **Assessment:** Costs of managing upstream ecosystems in a manner that guarantees continued supply of clean water are lower than the costs of moving the sourcing of water elsewhere.
- **Outcome**: Farmers upstream are paid to adopt best low-impact farming practises.
- See CBD Technical Series Report 56 for further examples: http://www.cbd.int/doc/publications/cbd-ts-56-en.pdf

©http://www.globalpackagegallery.com/main.php/v/bev/bottled+water/?g2_page=2

- See TEEB for national & international policy makers 2010 for references -

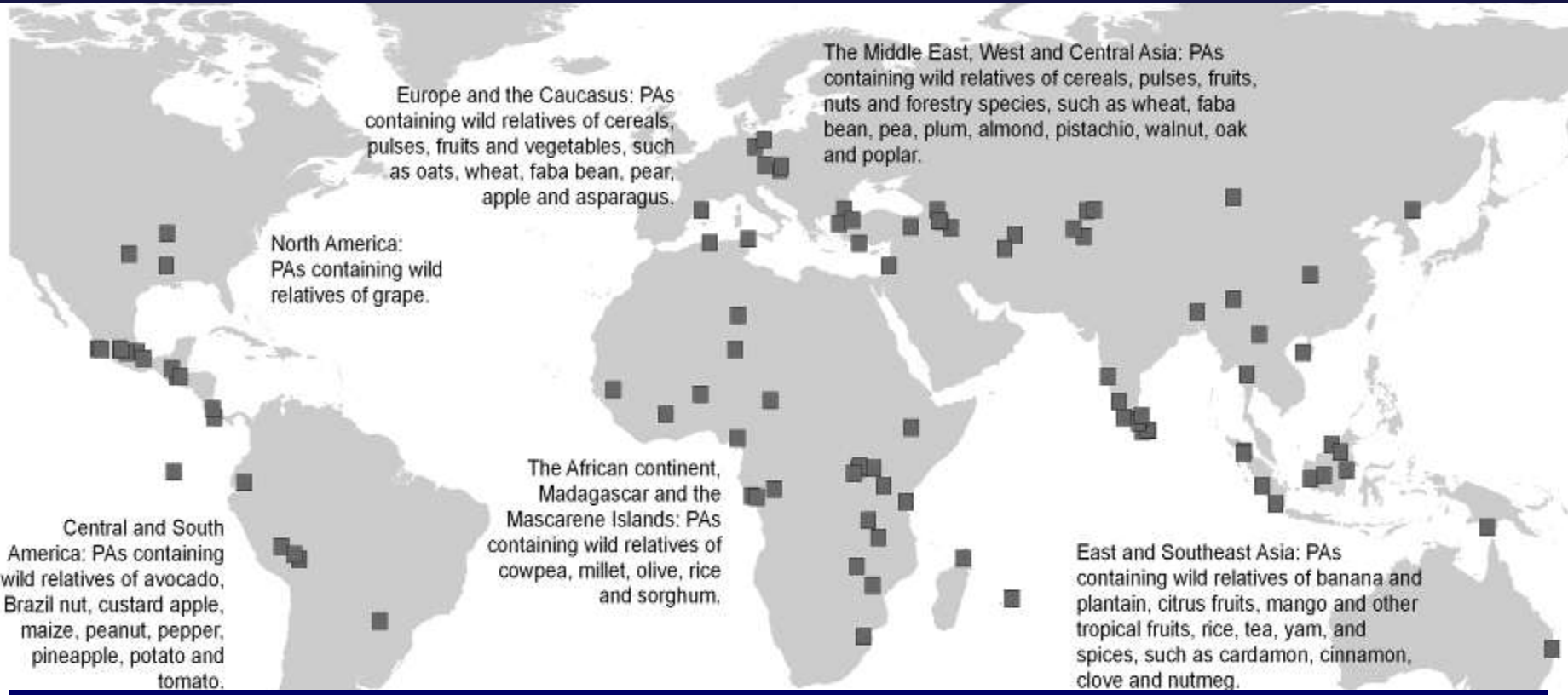
Examples: ecosystem service -based Green Economy

Cost savings: flood management (regional)

- **Situation**: The Napa River Basin (California) suffers from frequent flooding.
- **Assessment**: Levees & channel modification to prevent flooding were deemed unsustainable by the citizens (eg with several negative impacts to water quality)
- **Outcome**: A comprehensive flood control plan to restore river's original capacity to handle flood waters was adopted. Significant mitigation of damages and over US$ 1.6 billion savings in flood protection.

- See TEEB for local & regional policy makers 2010 for references -

Benefits from protected areas: food security



Protected areas are a 'live' gene bank for our cops, fruits and vegetables

© Map: Arguments for Protected Areas: Multiple Benefits for Conservation and Use", edited by Sue Stolton and Nigel Dudley. Pics: www.buyorganic.com.au, www.preparednesspro.wordpress.com/2009/04/, http://upload.wikimedia.org

Benefits from protected areas: food security

Marine Protected Areas (MPAs) can support the recovery of fish stocks.

A review of 112 studies in 80 MPAs: fish populations, size & biomass all dramatically increased inside reserves, allowing spill-over to nearby fishing grounds. (Halpern 2003)

Note: Need to address short-term costs of restricted access before long-term benefits arise