

Introductory Glimpses at Biodiversity and People

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Universität Göttingen

The biodiversity discourse
carries a historical burden

Colonialists collected cultural and natural heritage and showed them off at home

Even if these collections are nowadays maintained with impeccable scientific expertise, they still represent an unresolved scandal for many developing countries,

**It is neither automatically wiped off the agenda
nor remedied simply by the passing of time.**

The UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, 1970, implements the repatriation of cultural heritage.

Repatriation of natural heritage including Traditional Knowledge associated with Genetic Resources is an unresolved issue.

The Vavilov Dilemma: Advocating the importance of „centers of origin“ by stressing their contribution to the „needs of civilized man and the development of industry“

In the 1920's and 1930's agronomist and geneticist Soviet Academician Nikolai Ivanovich Vavilov, later to become one of Stalin's victims, pointed at the importance of genetic diversity in plant breeding. He collected accessions from the „primary centres of origin“ of crop plants, later called „Vavilov centres“. They were characterized by „very ancient agriculture, great ecological diversity and great human diversity in the sense of culturally distinct tribes with complex interacting histories“.

N.I. Vavilov (1926) *Studies on the Origin of Cultivated Plants*, Leningrad, Institute For Applied Botany and Plant Breeding.

In 1932, during the 6th International Congress of Genetics held at Ithaca, USA, he pointed out that „the growing needs of civilized man and the development of industry make the introduction of new plants necessary. The vast resources of wild species, especially in the tropics, have been practically untouched by investigation“.

Quoted from M.S. Swaminathan (1987) *Genetic Conservation: microbes to man* at the 100th Anniversary of Academician N.I. Vavilov, Moscow, November 1987, (p.1 of the conference report)

Questions open to date:

Who has to grant access to the resources? Will the colonial bad habit persist? Can scientists simply take everything they want?

Who owns the knowledge? Whose knowledge counts?

Who protects the „centers of origin of diversity“ from the intrusion of „civilized man“ which may endanger the very source of continuous creation of diversity?

The inclusion of traditional knowledge under the Nagoya Protocol on Access and Benefit-Sharing is far from being mature for implementation.

Even in October this year special concern for the countries that are „centers of origin“ were kicked out of the texts of CBD COP decisions.

E.O. Wilson:

Introducing Biodiversity and Bioeconomy in one big stride

E.O. Wilson is the famous author of the ground-breaking books „Biodiversity“ (1988) and „The Diversity of Life“ (1992).

„...a complete survey of earth’s vast reserves of biological diversity may seem beyond reach. But compared with what has been dared and achieved in high-energy physics, molecular genetics, and other branches of big science, the magnitude of its challenge is not all that great....I have based these estimates on what is the least efficient procedure imaginable, in order to **establish the plausibility of a total inventory of global biodiversity.**“

„*Create biological wealth. As species inventories expand, they open the way to **bioeconomic analysis**, the broad assessment of the economic potential of entire ecosystems. Every community of organisms contains species with potential commodity value.....*“

E.O.Wilson (1992) *The Diversity of Life*, chapter „Resolution“, pp 318 and 319.

Does the increase in the number of taxonomists and systematic biologists really stop biodiversity loss?

Is there a positive correlation? Statistics do not corroborate such an assumption.

In my Strategy Paper on Biodiversity for the NGOs at the Earth Summit in Rio, 1992, I had written: „...I do not primarily want a proper scientific accompaniment to the funeral procession of species, I want species up and about. If "the Louvre of biodiversity is burning" as Edward O. Wilson puts it, and if obviously all museums of biodiversity are burning world-wide, doing a steady job at inventories and genetically engineered patchwork with parts of the former masterpieces of nature will not be of primary importance. I admire those who carry pictures out of the flames. I hope the firemen will do more good than damage. I want an immediate technology assessment of the fire-prone structure of the museums. And I want the persons identified and stopped who keep committing arson.“

Christine von Weizsäcker: The Use and Abuse of Biodiversity. In: Ecology and Farming. No.5, August 1993, p. 28.

(This Feature was first published by NGONET in Rio (Environment and Development Information for Non-Governmental Organisations), Montevideo 11000, Uruguay: NGONET, 1992

Is it really lack of knowledge or lack of political will?

The **Millennium Ecosystem Assessment**, 2005, a synthesis by over 1000 biological scientists around the world, analyzed the state of the earth's ecosystems and provided guidelines for decision-makers. We had a substantive warning but failed in achieving the 2010 Target. How long will scientific inventories, gap analyses, indicators and baselines be the only answer? Do scientists cooperate into creating a bubble?

What does create political will? The political will of whom? The political will to do what? These are questions for the science-policy interface of the IPBES meeting in January next year and they are crucial for overcoming the doubts of developing countries.

Ministries of Environment are in charge of halting biodiversity loss. Decisions on the drivers of biodiversity loss are taken in other ministries: e.g. Ministry of Agriculture, Forestry and Fisheries, and all the other ministries in charge of land-use, transport, economy, finance, trade, science and technology etc.

Perverse subsidies mean: a heavy foot on the accelerator of biodiversity loss and a meagre attempt by the environment ministry to put the other foot on the brake. Perverse subsidies have not been stopped, so far.

COP 3 of CBD in Buenos Aires, 1996, identified pollinators and soil ecosystems as most vulnerable parts of agricultural biodiversity. Nothing much happened in 16 years.

TEEB tells us more precisely how much agricultural pollination would cost us if insects were not here to do it for us? Insect pollinators contribute US\$ 190 billion/year to global agricultural output.

The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations,
January 2011, Earthscan, London

What will happen with the knowledge? What will turn it into political will for real change also involving agricultural methods?

Open questions, continued:

Economic potential for whom?

- Should we continue to trust in „business as usual economics“, i.e. attract investors and hope for the trickle down effect? (A „business as usual“ Green Economy received a lot of criticism at Rio+20.)
- Or can we learn from recent Nobel Prizes in Economics?

Amartya Sen, 1998, for his contribution for welfare economics

Joseph E. Stiglitz, 2001, for his contribution to analyses of markets with asymmetries of information

Elinor Ostrøm, 2009, for her analysis of economic governance, especially of the commons.

Governance of Biological Diversity is based on a confusing medley of underlying concepts

- Intrinsic value of biological diversity?
- Commons guarded by customary rules of communities?
- Common heritage of humankind?
- Sovereign rights of States over their own biological resources?
- Public domain for science?
- Market Commodities?
- Intellectual Property Rights with process and product patents?

Intrinsic value of biological diversity

First preambular paragraph of the Convention on Biological Diversity:

„Conscious of the intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components,...“

Commons guarded by customary rules of communities

Preambular paragraph 12 of CBD:

Recognizing the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components,

Also in Article 8 (j)

Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities

The Declaration on the Rights of Indigenous Peoples

Adopted by the General Assembly of the United Nations, September 2007

establishes the rights to land, resources and knowledge as human rights.

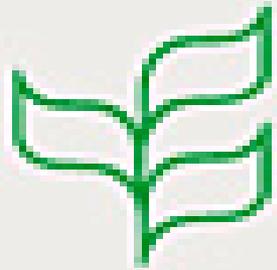
Common heritage of humankind or sovereign rights of States over their own biological resources?

From Stockholm 1972 to Rio 1992

The UN Conference on Man and his Environment, 1972 in Stockholm declared biological and genetic resources to be „the common heritage of humankind“.

Tragically, the common heritage model did not work for those siblings in the international community which were weak in terms of financial means and in terms of expertise of the university-trained Western knowledge system, called Science.

A different approach was chosen at the Earth Summit, Rio 1992.



Convention on Biological Diversity

Countries own and are responsible for biodiversity on their territory at the moment of ratification.

This does not resolve, however, the problem of old collections and of access by countries that do not ratify. Do they become countries of origin, the very moment a resource enters their territory? Is there a comparative market advantage for non-ratification?

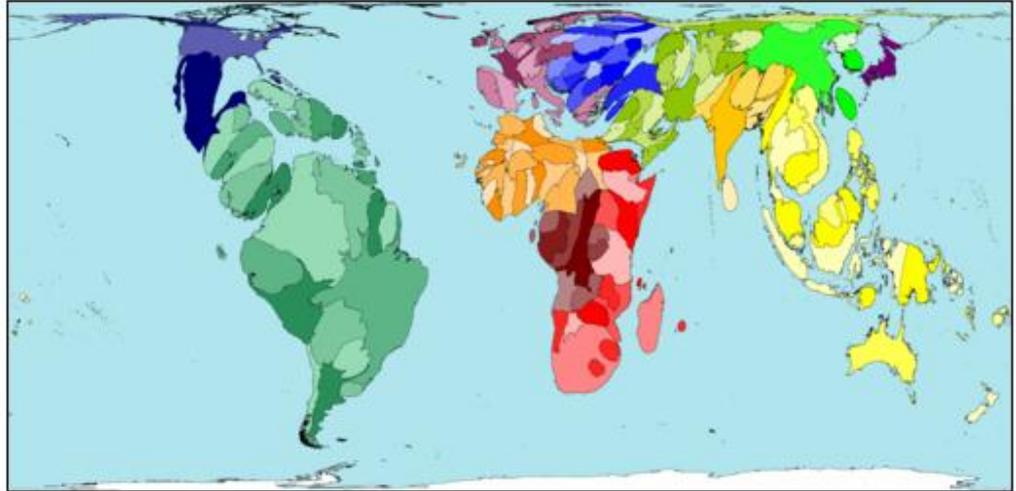
The big Non-Party is a major accessor, also under the umbrella of the Global Taxonomy Initiative of the CBD.

Public domain for science

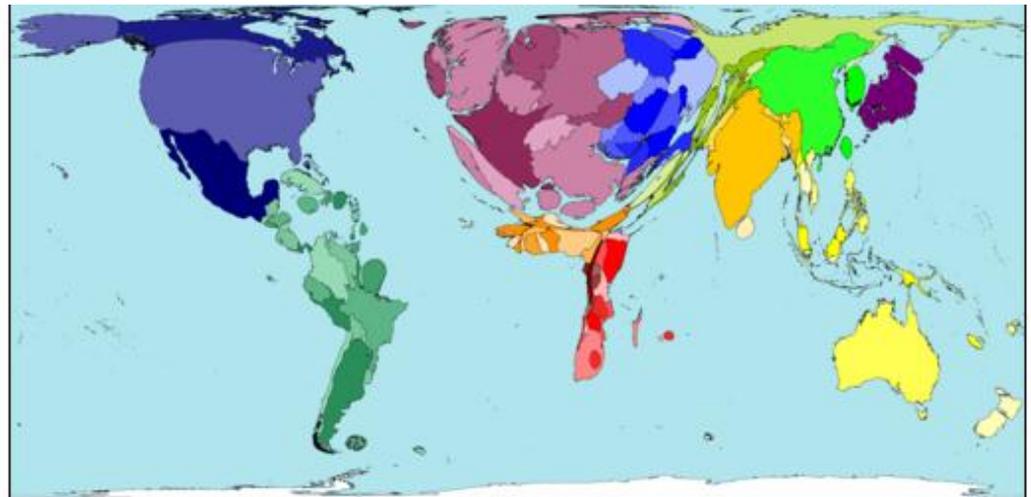
There is a marked imbalance between developing countries and industrialized countries regarding ownership of ex-situ collections but also in the frequency of accessing these collections, using the accessions scientifically and/or commercially. This is true for

- Botanical gardens
- Zoological gardens, zoological sperm banks,
- International Gene banks, including those of the CGIAR system
- State Owned Collections such as GRIN (Germplasm Resources Information Network of the US Department of Agriculture
- Collections of the Consortium for Oceanographic Research and Education, CORE, with the first comprehensive census on marine life
- Collections of the Consortium for the Barcode of Life, Smithsonian Institutes, Washington DC, which planned to finalize an inventory of animals by 2010.
- Industrial collections, such as the Tomato-Collection of Campbell
- Plant Broker Companies such as Phytera
- Microbial collections
- And many others

**Distribution of
plant species**

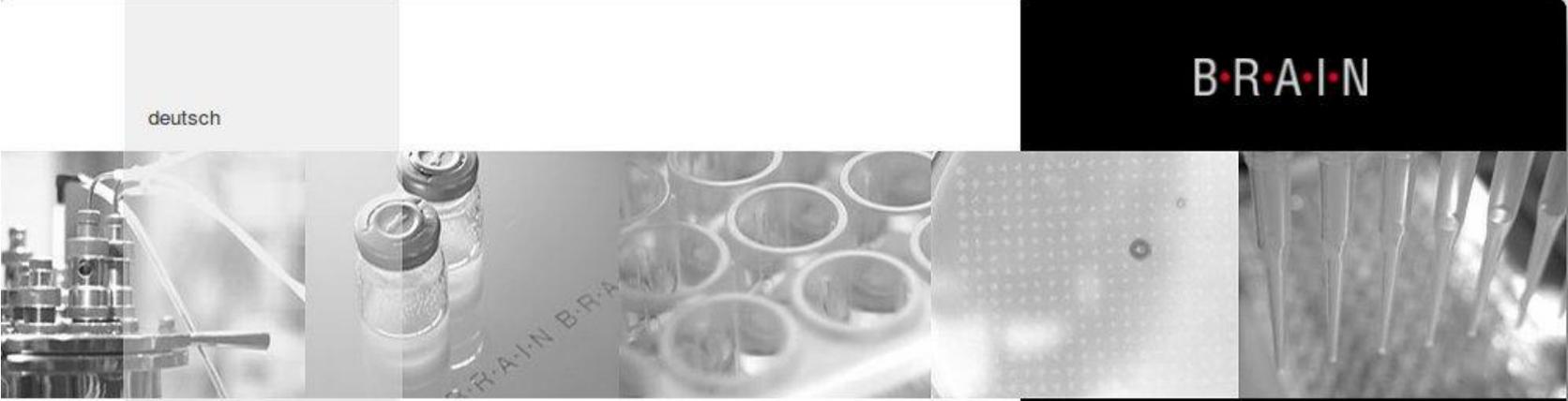


**... and of
Botanical
Gardens !**



Source:
www.worldmappers.org

New type of hightech BioArchive companies: an example



deutsch

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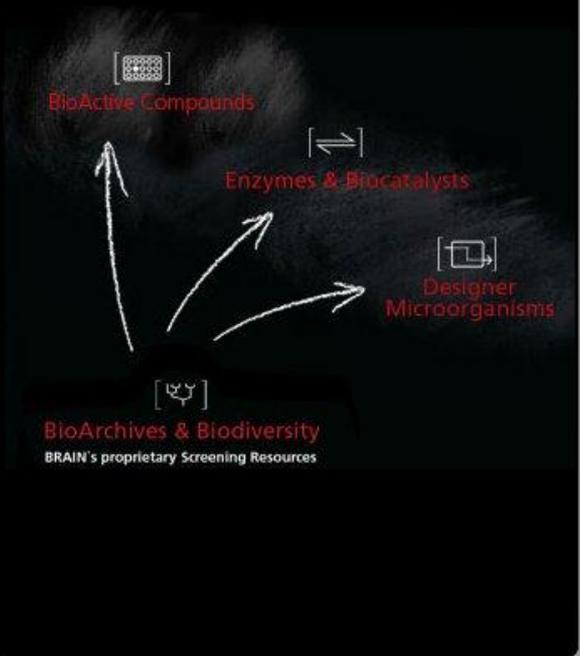
Technologies & Products

BRAIN's EvoSolution® discovery platform turns BioDiversity into an easily accessible source of biomolecules for the development of BioActives and enzymes.

This powerful platform combines a proprietary BioArchive – strains of pure microorganisms and recombinant gene libraries derived from uncultivable microbial biodiversity (metagenome) – with molecular biology, sophisticated screening strategies and application-oriented assay systems.

This BioArchive encodes a wealth of novel bioactive molecules, enzymes, and entire metabolic pathways engineering, “designer-bugs”, chemicals from renewable resources, and strain development.

-  BioArchive & BioDiversity ▶
-  BioActive Compounds ▶
-  Enzymes & Biocatalysts ▶
-  Designer Microorganisms ▶



BioArchives & Biodiversity
BRAIN's proprietary Screening Resources

BioActive Compounds

Enzymes & Biocatalysts

Designer Microorganisms

Technologies & Products

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- [] BioArchive & BioDiversity ▶
 - [] BioActive Compounds ▶
 - [] Enzymes & Biocatalysts ▶
 - [] Designer Microorganisms ▶
-

With a technology offer validated in more than 70 industrial cooperations and partnerships with market leaders like BASF, Ciba, Clariant, Evonik Degussa, DSM, Genencor, Henkel, Nutrinova, RWE, Sandoz, Schering, Südzucker, Symrise and further undisclosed partners. This facilitates proprietary applications and IP for its customers and adds to the strategic value of their product lines.

Market Commodities

The politics of biodiversity are very close to the politics of land-use. The investors rush for fertile land with natural rain-fall has become in recent years perhaps the most serious problem for biodiversity and local people. Commodification of land is seen by many as a synonym for „Land-Grabbing“.

Major Changes in Intellectual Property Rights

- The Trade-related Intellectual Property Rights Agreement, TRIPs, was signed at the end of the Uruguay Round of the GATT, 1994, in a package with the World Trade Organisation. It has cross-retaliation within the package. It introduced a drastic change in international regulation: the patentability of innovations from biological material and of microbes and microbial processes (see Article 27.3 (b))
- The Union for the Protection of New Plant Varieties, UPOV, moved its protective standards and rules in the direction of patents.
- The EU Directive 98/44/EC, in 1998, established the legal protection of biotechnological inventions in line with these new international rules.

All these favour industrialized countries and newly industrializing countries with their emerging economies. They disfavour developing countries, especially least developed countries, but also informal innovation and Farmers' Rights.

Many so-called „inventions“ in this field were successfully challenged at the patent offices. The intransparent flow of genetic material, the mere number of patent applications in this field and the duration and costs of such challenges make the overall task of fighting illegal patents forbidding. In addition there is a grey zone between process and product patents thus covering wide areas of innovation, e.g. „whole metabolic pathways“. Patents on life tend to give advantage to the oligopoly of the big and powerful players via cross-licensing agreements.

**Some favorite genetic resources
for collection,
patent application
and commodification:**



Medicinal and cosmetic plants



Drought-resistant plants



Soil microorganism (variety of metabolic products; it is possible to pretend to have found them on the lawn of the Company)



Hot spring organisms (contained use under high temperature)



Deep sea organisms (rare metabolic properties, fermenters under high pressure for containment)



Fish (e.g. FISH-BOL) (we are running out of fish)



Old landraces of animals (disease resistance etc.)



Frogs and toads



and slugs (antibacterial and antiviral properties)

What can we learn from all these glimpses?

Biological diversity had to face the harsh political realities of social conflicts, cultural differences and crude power relationships.

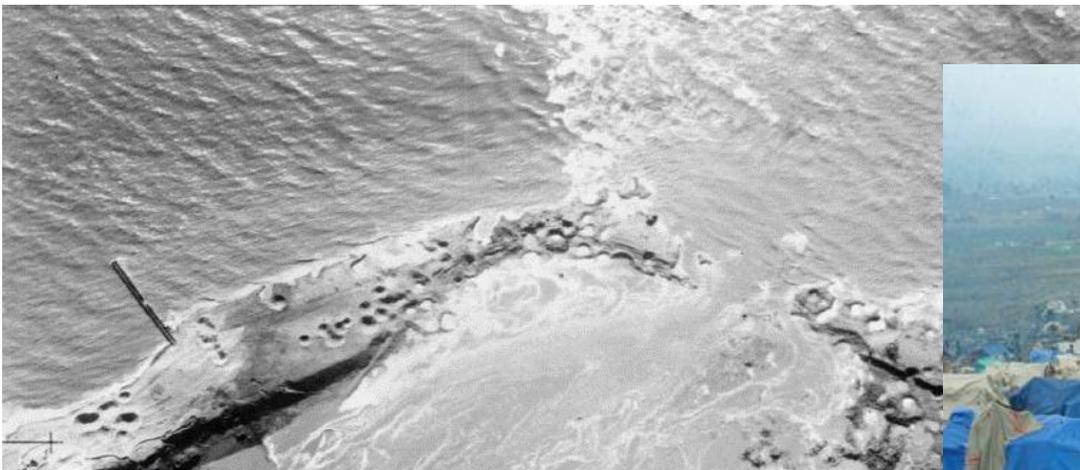
Simply the overall title is new.

Addressing an overdue topic: Biodiversity and People under attack from Disasters and Conflicts

COP 11, Decision 2, para 27:

Requests the Executive Secretary to undertake, subject to the availability of financial resources, **a review of the impacts of disasters and conflicts on biodiversity** and ways and means to take actions for implementing the Strategic Plan for Biodiversity 2011-2020 and achieving the Aichi Biodiversity Targets under such conditions, and invites the Executive Director of the UNEP to integrate as far as feasible the Strategic Plan for Biodiversity 2011-2020 in the initiatives of the **UNEP programme of work on conflicts and disasters**, and to submit a report to the next meeting of SBSTTA in accordance with the rules of procedure highlighted in decision IX/29.

The following 6 power-points have been provided by Antje Lorch from her presentation at an Ecoropa/Econexus side-event at COP 11.



Since the start of the new millennium,
over 35 major conflicts
and some 2,500 disasters
have affected billions of people around the world.

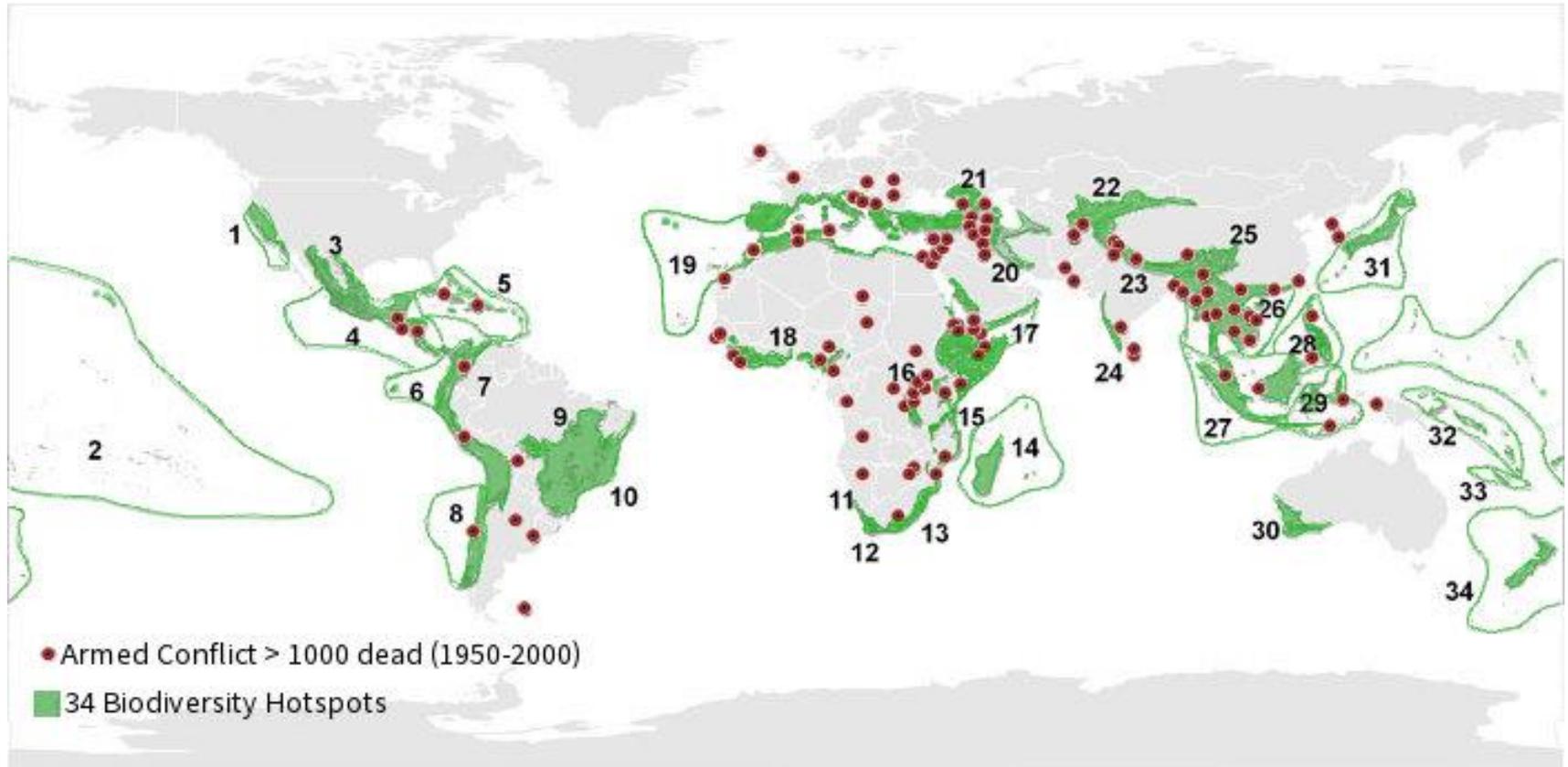
These crises destroy infrastructure,
displace entire populations
and threaten ecosystems
and the people who rely on them to survive.

UNEP Disasters & Conflicts, Fact sheet

www.unep.org/disastersandconflicts

Most conflicts take place in biodiversity hotspots,
and most hotspots experience conflicts.

Warfare & Biodiversity Hotspots



Source: Conservation International 2009,
<http://www.conservation.org/warfare/Pages/map.aspx>

“Refugees and internally displaced people (IDP) often have no choice but to rely on natural resources for their survival, particularly during an emergency.

Trees may be cut to build or support simple shelters, wood may be collected to cook meals or to keep warm, and wild game, fruit, herbs and other plants might be gathered as a source of food or medicine.

Unless controlled, these and related activities can quickly get out of hand and have a negative impact on the environment as well as the displaced and host populations.”

Voluntary Guidelines on Tenure

- 24. Systems for recording legitimate tenure rights should be resilient to natural disasters [incl. off-site storage of records] to allow right holders to prove their rights and relocate their parcels and other spatial units. [...] States and other parties should address tenure during the reconstruction phase.

- www.fao.org/nr/tenure



“Peacekeeping operations can no longer separate questions of peace and security from the way natural resources and the environment are managed in a post-conflict country.

Maintaining security, restoring the economy and providing basic services is often impossible without addressing questions of resource ownership, access, control and management.”

UNEP Conflicts & Disasters (2012): “Greening the Blue Helmets”

www.unep.org/disastersandconflicts

“...ultimately, the conservation and sustainable use of biological diversity will strengthen friendly relations among States and contribute to peace for humankind”

Preamble of the Convention

The Precautionary Principle and Technology Assessment under the CBD.

Preambular para 9: Noting also that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat.

Article 14 on Impact Assessment and Minimizing Adverse Impacts, especially para 1 (a)

There is a wide range of new technologies which were addressed at COPs of the CBD.

One could even say that the CBD has a rather systematic Risk Assessment of new technologies impacting on biodiversity. The inclusion of socio-economic impacts, however, has been highly controversial over many years.

Cartagena Protocol on Biosafety (CPB)

Signed in January 2000 after 6 years of negotiations

Came into force in September 2003

157 countries are Parties to this Protocol to the Convention on Biological Diversity

The Protocol turns the „soft“ provisions of Article 19.3 of the Convention into an international legally-binding agreement.

- 1. Basing itself on the Precautionary Approach**
- 2. Addressing transfer, handling and use of genetically modified organisms (for historical reasons called „living modified organisms“ in the context of the Convention)**
- 3. Protecting against adverse effects on the conservation and sustainable use of biodiversity, taking also into account risks to human health**
- 4. Risk Assessment (Art. 15 plus Annex III)**
- 5. International rules on liability and redress to be elaborated (Art.27)**
- 6. Socio-economic considerations may be taken into account (Art.26)**

Nagoya-Kuala Lumpur Supplementary Protocol On Liability and Redress to the Cartagena Protocol on Biosafety

adopted in October 2010, so far 53 signatures and 6 ratifications

Comes into force after deposit of the 40th instrument of ratification

The precautionary principle and the polluter-pays-principle go hand in hand. Only if there is early risk-pricing will the operator apply precaution and think twice.

Victims always pay. It takes legal rules to make the one pay who is responsible for damage.

The insurance sector can play a major role in providing realistic risk assessments. It is in their own business interest.

COP decisions on other technologies:

COP 5: GURTS (Genetic Use Restriction Technologies (Terminator Technologies))

Recommends that, in the current absence of reliable data on genetic use restriction technologies, without which there is an inadequate basis on which to assess their potential risks, and in accordance with the precautionary approach, products incorporating such technologies should not be approved by Parties for field testing until appropriate scientific data can justify such testing, and for commercial use

COP 9: GE-trees

Authorize the release of genetically modified trees only after completion of studies in containment, including in greenhouse and confined field trials, in accordance with national legislation where existent, addressing long-term effects as well as **thorough, comprehensive, science-based and transparent risk assessments to avoid possible negative environmental impacts on forest biological diversity**; [\[1\]](#)/

- (t) Also **consider the potential socio-economic impacts of genetically modified trees** as well as their potential impact on the livelihoods of indigenous and local communities;

COP 9 and COP 10: Biofuels

Urges Parties and other Governments, with the full and effective participation of indigenous and local communities and in collaboration with other relevant stakeholders and relevant organizations, when carrying out scientific assessments of the impacts of biofuel production and use, to ensure that the sustainable agricultural practices and food and energy security of indigenous and local communities are addressed and respected, subject to national legislation, taking into account the customary laws of indigenous and local communities, where applicable;

COP 9: Ocean Fertilization

requests Parties and *urges* other Governments, in accordance with the precautionary approach, to ensure that ocean fertilization activities do not take place until there is an adequate scientific basis on which to justify such activities, including assessing associated risks, and a global, transparent and effective control and regulatory mechanism is in place for these activities

COP 10: Geo-engineering

in the absence of science based, global, transparent and effective control and regulatory mechanisms for geo-engineering, and in accordance with the precautionary approach and Article 14 of the Convention, that no climate-related geo-engineering activities** that may affect biodiversity take place, until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts

COP 11:

Tropospheric Ozone

Noting the effects of tropospheric ozone as a greenhouse gas and the potential contribution of reducing it to mitigating climate change; *noting also* its impacts on human health and on biodiversity; and *noting further* relevant work on this issue undertaken under the auspices of regional processes, *decides* to include consideration of the impacts of tropospheric ozone in the programme of work on the links between biodiversity and climate change

Synthetic Biology

Recognizing the development of technologies associated with synthetic life, cells or genomes, and the scientific uncertainties of their potential impact on the conservation and sustainable use of biological diversity, [*urges*][*invites*][*encourages*] Parties and *invites* other Governments to take a precautionary approach, in accordance with the preamble of the Convention and with Article 14, when addressing threats of significant reduction or loss of biological diversity posed by organisms, components and products resulting from synthetic biology, in accordance with domestic legislation;

peek-a-boo...



with Article 26
of the Cartagena
Protocol on
Biosafety

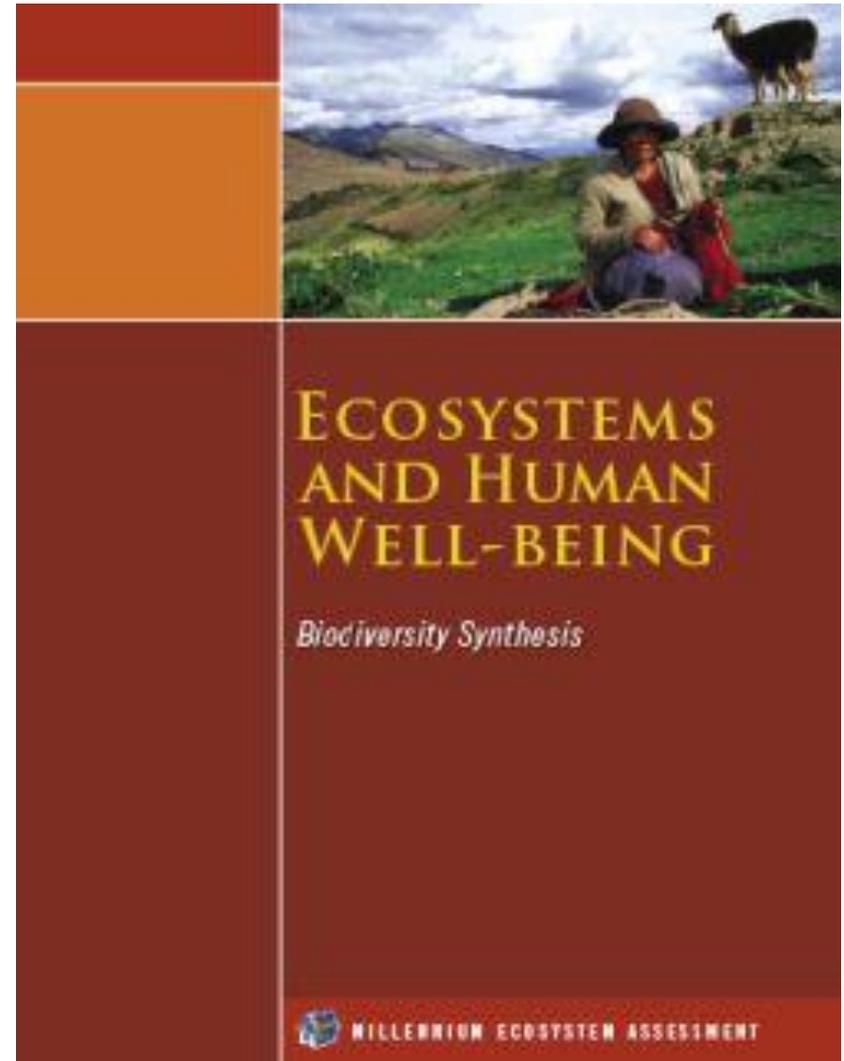
Socio-economic
Considerations



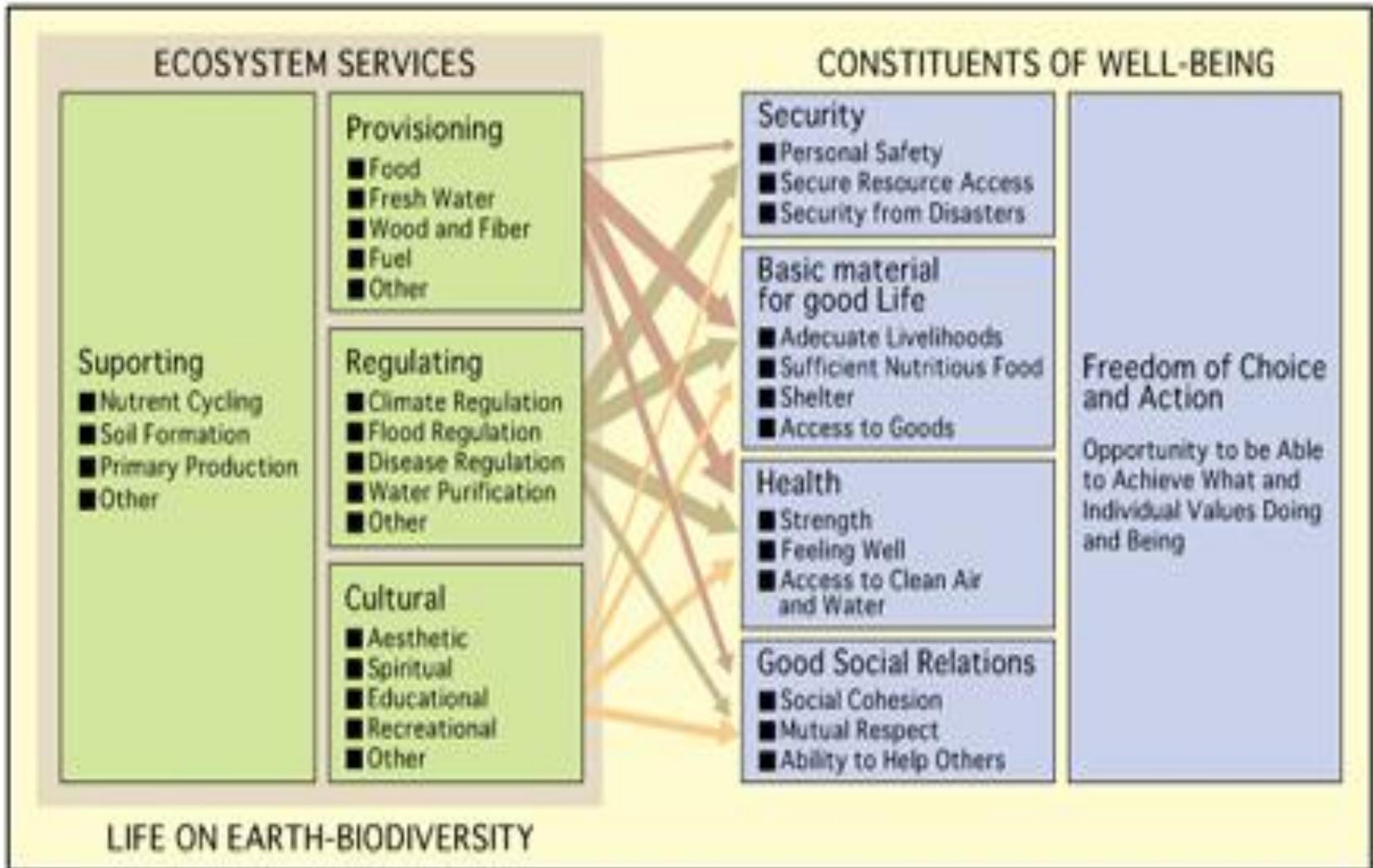
Major Steps in
addressing
Socio-Economic
Considerations
were taken
at COP-MOP 6

From the power to neglect to the power to learn

The link between biodiversity and socio-economics is well-established by now. It was overdue for risk assessment to address both.

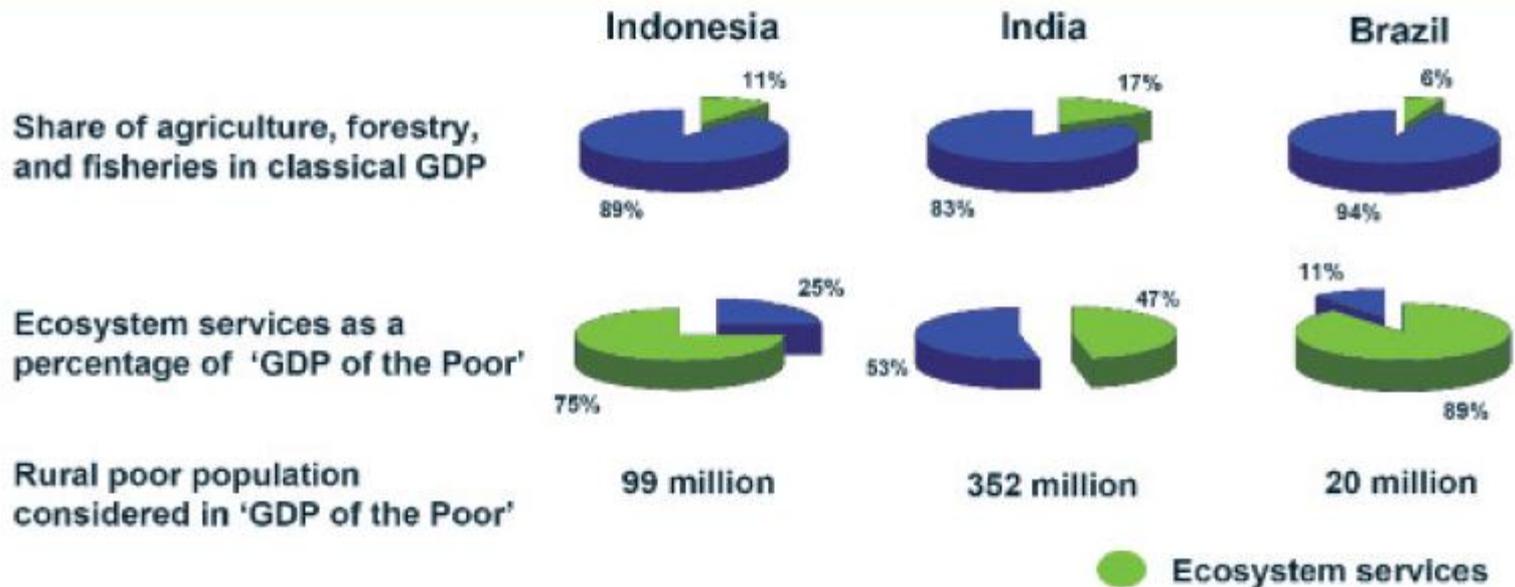


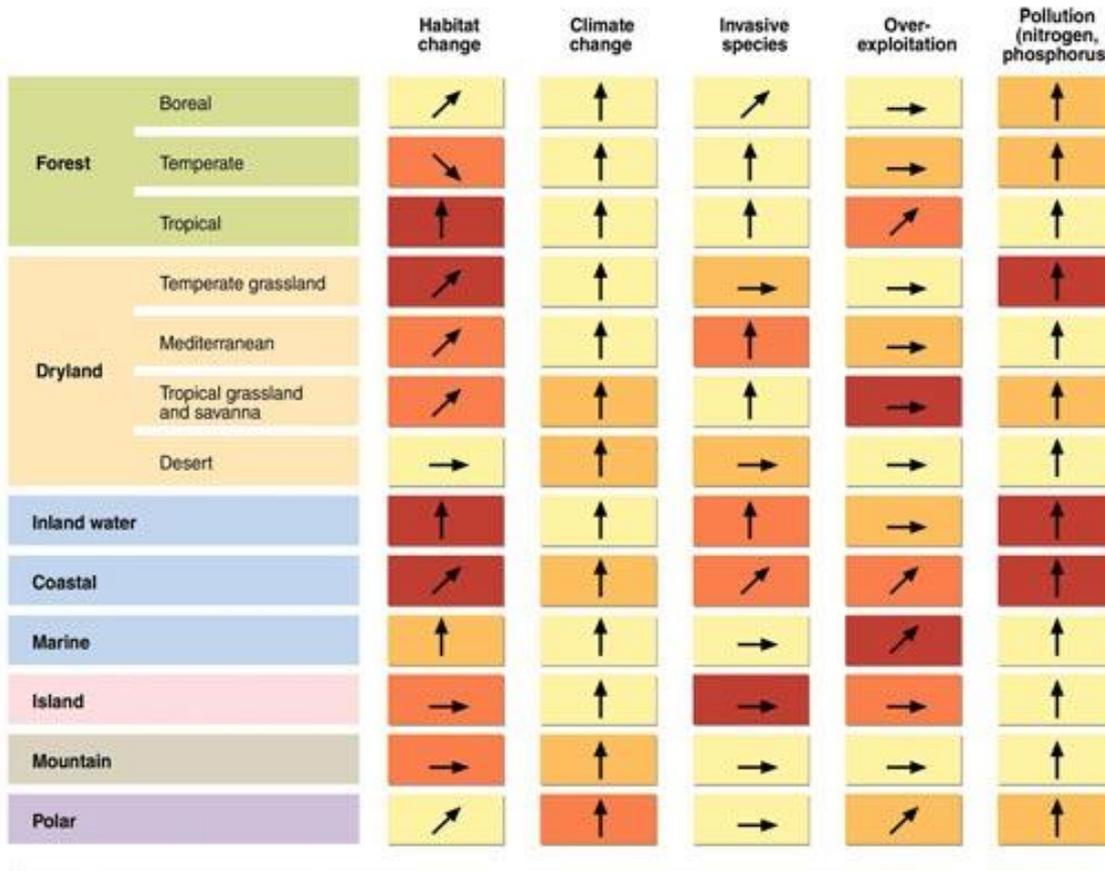
What services do ecosystems provide for human well-being? They are the basis for our lives and livelihoods.



Neither the State nor the formal Market but Ecosystems provide for the livelihoods of the Poor

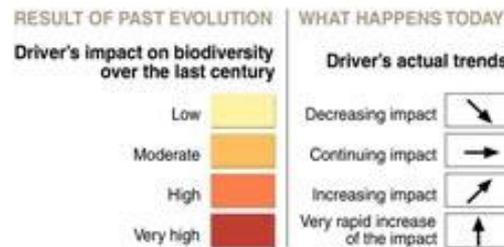
Figure 2: 'GDP of the poor': estimates for ecosystem service dependence





Drivers of biodiversity loss,
 Dangerous past is colored in red,
 dangerous future is marked with arrows pointing to an ncrease

**Habitat Change
 Invasive Species
 Overexploitation
 Pollution all link biodiversity and socio-economics**



Source: Millennium Ecosystem Assessment



Convention on Biological Diversity

Website of
CBD

www.cbd.int

Convention on Biological Diversity

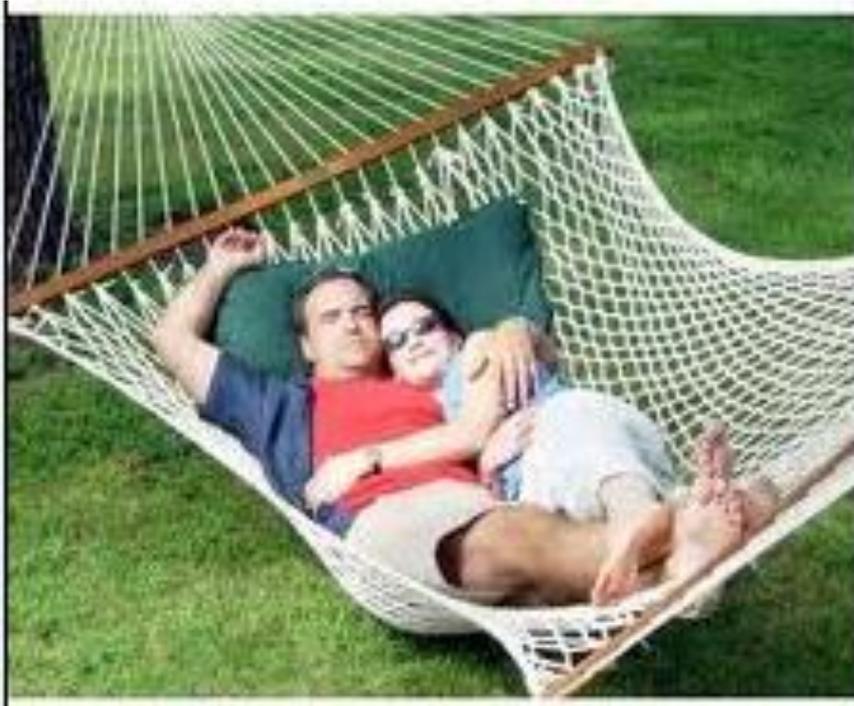
Cartagena Protocol on Biosafety

Nagoya-Kuala Lumpur Subsidiary Protocol on Liability and Redress

Nagoya Protocol on Access and Benefit-Sharing

Let us celebrate for a moment the wisdom of the Fathers and Mothers of the Convention on Biological Diversity regarding Conservation, Sustainable Use and Equity:

You will have to struggle for all three of them otherwise you will fail in all three.



Hammock versus Tight Rope

A complex network of many variables and concerns is more stable, more comfortable and allows for good company. He who is scared of complexity should not address biodiversity.