

- **Synthetic Biology**
- **Monetisation of Nature**
- **Mainstreaming of Biodiversity**
- **Women's Award**

Synthetic Biology

Digital DNA is Biopiracy's Latest Frontier

Third World Network

Yesterday's biopirate hid seeds in her boots, but tomorrow's may steal genetic sequence data. Faster and cheaper gene sequencing is creating massive new digital databases of biodiversity. Some of them contain the DNA sequences of thousands, even tens of thousands, of varieties of crops, crop wild relatives, medicinal plants, and microbes. Almost none of these databases currently apply *access and benefit sharing* (ABS) rules of the CBD and Nagoya Protocol.

The technology for this "digital DNA" to be downloaded and then introduced into new organisms is becoming a reality, meaning that biodiversity can be moved across the planet electronically and possibly without the *material transfer agreement* (MTA) that many countries use to implement ABS rules.

For example, European scientists might use an internet database to obtain gene sequences from South American tomatoes and tomato wild relatives. If they identify valuable diversity, instead of going to South America to negotiate an ABS agreement, they might instead use CRISPR/Cas9 gene editing to reproduce that diversity in European tomatoes - without an agreement with the country of origin.

And for a number of pathogens, which are important sources of vaccines, it is possible to synthesize an entire organism starting from just a DNA sequence. The sequence of an influenza virus can be sent across the globe

electronically and then synthesized and turned into living virus in under 72 hours. That's faster than a courier such DHL or FedEx can carry a physical sample across oceans.

If genetic sequence data is placed in free-for-all database and irresponsibly shared without benefit sharing obligations, then countries that provide genetic resources stand to lose out.

With a wave of projects underway to sequence biodiversity, some developed countries seek to delay COP action, obfuscating while their scientists rush to sequence more biodiversity with "no strings attached."

But COP13 has the opportunity to expedite its response to the threat of digital DNA biopiracy. COP should ask the Synthetic Biology AHTEG to prepare advice on the implications of digital genetic sequence data and provide it to the Nagoya Protocol, so that the Protocol can take action. This can be done by lifting the last two sets of brackets in the draft decision on Synthetic Biology, which will give the Synthetic Biology AHTEG a mandate to prepare its advice for the Protocol.

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Submissions are welcome from all civil society groups.
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Valuation and monetisation of nature – No thanks!

Barbara Unmüßig, Heinrich-Böll Foundation

We don't need any "reconciliation of the economy and ecology". Instead, we should be saying no to destructive and exploitative projects and policies - and yes to a repoliticisation of environmental debate.

A growing number of scientific projects and political initiatives are springing up everywhere and practical tools are being developed with one specific aim in mind: to quantify ecosystem services and nature and assign a market value to them.

There is no doubt about it: ecosystems provide vital services for society as a whole and for us as individuals. Nature endows us with food, water and energy. Ecosystems regulate the climate and store water. Bees pollinate our crops. Reefs and mangroves serve as nurseries for fish and other marine life. And ecosystems are also spaces where we recharge our batteries and find spiritual renewal. Valuing all that they provide is important and gives us a powerful motive for preserving nature and its rich biodiversity.

The most effective approach, of course, is to apply the brakes to the drivers of destruction. First and foremost, however, that requires the political will to prioritise nature over economic interests – the very interests that lead to the ploughing up of savannas for soya growing and cattle grazing, the clearance of tropical forests for palm oil plantations and timber, the overfishing of our seas and the pollution of our water resources.

But instead, the monetisation of ecosystem services has become the new beacon of hope in biodiversity and nature conservation. It involves assigning a market price to all that nature produces and provides by way of services to humankind. As a rough estimate, ecosystem services from the world's forests are worth 16 trillion euros annually, according to scientists and research institutions, with a further 8.6 trillion euros "invested" in the world's coral reefs.

The underlying assumption is that nature would be better protected if only we finally made this value visible – and what better way to do it than by including natural capital in our gross domestic product? This, it is argued, would also help politicians to make the right decisions on nature

conservation. And that means attaching a monetary value to individual natural services.

It's not just that the methodology is fundamentally flawed: ecosystems are complex, not static, and depend on numerous interactions. How, then, should nature's value be determined, and how can we put a price on it? Can the diversity and complexities of ecosystems ever be accurately captured in metrics and money? But there is a democratic and equity deficit as well: who determines what should be priced and how high that price should be? And who do the revenues belong to?

Nonetheless, the economic valuation of ecosystem services found its way into climate and nature conservation policy long ago. The evaluation and pricing of carbon dioxide (CO₂) led the way and typifies the implementation of the natural capital concept. Individual ecological functions such as carbon storage in forests, soils and wetlands are measured, quantified, priced and – with the introduction of carbon credits – turned into a tradable commodity.

What this means, in practice, is that through carbon calculation and pricing, compensation systems for destroying the environment – in this instance, through emissions – can be established. In other words, if I produce emissions or cause damage here, I can offset it – through tree-planting projects, for example – somewhere else. The environmentally harmful production impacts of a cement factory in Germany, let's say, could potentially be offset and traded against the forest-conserving lifestyle of an indigenous community in the Amazon.

This system of offsetting and compensation has rightly come in for criticism. Ecosystems are local, site-specific and often endemic. They are not comparable but unique, yet through the system of CO₂ equivalents, they are equated and compared. This is a worrying trend, not a positive one, in nature conservation policy.

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Ecosystem services – nature – belong to everyone. They are public goods and are regarded as commons by many local communities. Now, in the name of nature conservation, many of these assets are being transformed into marketable commodities and transferred into private ownership. In the process, the social and political conflicts arising from our economic activity are often ignored. Nature is trimmed down and turned into capital for the sake of the economy and big business – and that’s as far as conservation goes. As early as 2004, environmental economist Morgan Robertson talked about “the nature that capital can see” and criticised this approach for taking us in quite the wrong direction.

Instead of valuating specific ecosystem services, we should be genuinely valuing nature. We don’t need any “reconciliation of the economy and ecology”. Instead, we should be saying no to destructive and exploitative projects and policies. We also need a repoliticisation of environmental debate. The complex ecosystems of which we ourselves form part and which provide the vital natural resources on which our lives depend must be protected by policies and regulations that are firmly focused on the common good.

Reprint of <http://www.boell.de/en/2016/11/29/valuation-and-monetisation-nature-no-thanks>

Women will award Governments who recognize them with a flower!

The Gender Action Plan of the CBD includes a commitment to mainstream gender in all the work of the CBD.

But sadly, the Ministerial Declaration that was adopted yesterday completely ignored the gender dimension of biodiversity conservation, and the draft decision document includes only 13 references to gender, and 13 references to women.

We need more recognition for the role, and rights, of women in biodiversity conservation!

That is why the Women's Caucus of this CBD meeting, which will meet every morning from 8 to 9 am in the Marie Khan room, will award

a beautiful artisanal flower

to every Government delegation that recognizes the role and rights of women in their interventions during this COP!

COP 13 – item 10

Mainstreaming biodiversity or leaving biodiversity to other agendas?

Friedrich Wulf, Pro Natura – Friends of the Earth Switzerland

Welcome to COP 13! The theme is “mainstreaming biodiversity for well-being” and finally - after being rather silent on these issues for a number of years - the CBD gets back to the crucial issues of agriculture, forestry and fisheries. Great!

Here are a few facts: 38% of Earth’s ice-free land surface are under crop production and permanent pasture, and another 31% are forested.¹ Traditional agricultural ecosystems like meadows and pastures are home to a multitude of species such as flowers and butterflies. Agricultural diversity is the basis of the food we eat. Forests are the most diverse ecosystems on land, they hold more the 80% of the world's terrestrial species. One billion people are estimated to depend on fish for all or part of

their incomes.² **So, Agriculture, forestry and fisheries are really important for biodiversity and for us.**

But industrialization of these activities puts our ecosystems under threat. 75% of crop diversity have already been lost since 1900. Out of thousands of crops only 30(!) account for 90% of calories consumed by people. Industrialization, pollution and other drivers linked to agriculture account for 70% of the projected loss of terrestrial biodiversity.³ Natural, biodiversity-rich forests are still declining at a rate of 6.5 million ha per year⁴ annually, while species-poor planted forests and monocultures are increasing by 3.3 million ha. 76% of global fish stocks are fully or already overexploited or depleted.⁵ ./..

Mainstreaming biodiversity (continued...)

Agricultural intensification and logging are the key reasons for terrestrial biodiversity loss,⁶ as overfishing is for marine depletion. The situation will be exacerbated by an increased food demand for a projected population of more than 9 billion people in 2050. **There is a dire need to react to these pressures and to find ways to make sectors integrate biodiversity into their agenda.**

Will the Cancun declaration make this happen? That is unlikely because the declaration is weak and fails to address important issues. It doesn't challenge endless growth on a planet with finite resources; and its annexes - written by the very sectors that cause the problem - neither address the expansion of areas for agofuels and meat production nor land grabbing by those countries who already have exceeded their own biocapacity. Meanwhile the forestry sector avoids talking about natural forest, forest protected areas or guidelines for production forests.

Fortunately, there is still the **draft decision on Item 10** (CBD/COP/13/2/rev1: "Strategic actions to enhance the implementation of the Strategic plan...") which deals with the issue in detail. While it contains a number of helpful (re-)commitments, it also offers room for improvement, notably:

- The agriculture section does not mention **measures for reducing nutrient loading** or considerate use of pesticides – although XI/9, para 40, Aichi target 8 and the Cancun declaration ask for this.
- The forestry section **fails to recall its own expanded programme of work** (VI/6, annex). Instead, it confirms the mandate of a number of other fora such as FAO, UNFF, UNFCCC – all of whom have a different perception of what a forest actually is – and asks them to do the job.
- Draft para 25 calls for a "sustainable and ecological intensification of agriculture." While no one disputes the need for achieving SDG 2 and ending hunger and malnutrition, it is highly dangerous to coin a term that suggests intensification is possible in a sustainable way. It isn't. Experience from industrialised countries clearly shows that

intensification involves removal of small-scale structures, increased levels of pollutants and always leads to a depletion of biodiversity. **Dear CBD parties: please delete "intensification"**. It's not for the CBD to ask for this, and it would be entirely sufficient to ask for a sustainable and ecological **use or development of agriculture**. This term would also include existing agricultural practices and addressing the drivers of biodiversity loss, such as increased demand by unsustainable lifestyles, population growth and food waste and losses. There is no need to proactively call for something that will likely backfire. Once the buzzword is adopted, it will be assumed that intensification is okay, as long as you can claim it is sustainable.

What would be helpful instead, is to recommend a number of measures that do help, such as creating incentives for structures (e.g. hedgerows or rock piles), nutrient and pesticide-free buffer zones (notably next to rivers), as well as crop rotation and diversification (to stop nutrient loss and pest damage) and ways for pest control that reduce the use of pesticides. Recent assessments such as the IPES food report show that **organic farming can be more productive than conventional farming**, support biodiversity and produce healthier food, **creating win-win situations**. The decision should mention, and make use of this and other information presented at the 2016 Trondheim conference.⁷

Dear delegates, the draft offers opportunities for improvement.

Please use them. Biodiversity will thank you.

Notes

- 1 <http://data.worldbank.org/indicator/>
- 2 <http://smallplanet.org/content/one-billion-people-depend-seafood-their-primary-protein-source>
- 3 <http://www.miljodirektoratet.no/Global/English/Arrangements/TK8/Presentations/Session%2010.4%20Wilkie%20TCoB%202016.pdf>
- 4 FRA 2015, p.3
- 5 <http://www.fao.org/newsroom/common/ecg/1000505/en/stocks.pdf>
- 6 Baillie et al 2010
- 7 www.trondheimconference.org