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Civil society concerns and aspirations for SBSTTA

The CBD Alliance recalls how in 2012 we welcomed the new Executive's Secretary and his priority: implementation, implementation, implementation. We greatly welcomed this and we continue to call on Parties, here at SBSTTA 18, to bear this in mind.

We, as civil society, are a vast and diverse group, comprising different peoples, cultures, generations, livelihoods, and knowledge systems. But we are united and uncompromising in our desire to be full participants at the table, as many of our members nurture, and depend on biodiversity and our future depends on it. We therefore ask for full and meaningful participation in determining the solutions that will work for the CBD community.

Today, we would like to convey both our concerns on issues that could undermine the implementation of the Convention and our aspirations for this meeting to Parties.

Our Concerns

Synthetic biology

This form of extreme genetic engineering is creating an avalanche of new developments and impacts we do not know how to handle. Their potential impact on the conservation and sustainable use of biological diversity cannot be assessed. We need a profound socio-economic risk analysis of synthetic biology for the biodiversity-based economies of developing countries; some could lose up to 50% of their agricultural exports due to synthetic biology. Precaution and common sense should prevail, starting with a clear moratorium on environmental release of synthetically modified organisms.

Addressing underwater noise and marine debris

If nothing substantive is done to halt marine biodiversity

loss, humanity will have no fish to eat beyond 2050. Ecologically or biologically significant marine areas inside and outside national jurisdiction are essential not only for biodiversity but also for human wellbeing. The threats include marine invasive species, ocean acidification, underwater noise and marine debris. Many economic activities are still managed in a way that destroys marine ecosystems and a vital component of human nutrition. Disasters have to be stopped. Wordy descriptions are not enough, we need to take real action, far beyond the actual text proposals.

Invasive alien species

Invasive alien species are a major driver of biodiversity loss. We have known this for many years now. Yet before us we have a text that merely asks Parties to identify and assess the problem. We need to see more ambition to address the issue. Countries with many endemic species and unique ecosystems are already experiencing devastating impacts from invasive species. However, the *Global Invasive Species Program*, which helped countries with this threat, was closed down. Today more than ever, we need an operational program to combat invasive species.

Furthermore synthetic biology could easily produce invasive alien species of a new order of intensity, for example algae, which are impossible to confine. Proposed geo-engineering applications could do likewise.

Ecosystem restoration

Restoring ecosystems is an important objective, if done in a responsible and sustainable way, involving local communities. However, if ecosystem restoration becomes an excuse for the destruction of ecosystems elsewhere, or if it includes the use of synthetic biology, then the proposal becomes highly problematic.

IPBES

Parties should ensure that newly established science-policy interfaces, such as IPBES, do not undermine the well established and experienced science-policy work of the SBSTTA, nor marginalise the role of developing countries' voices, nor those of indigenous people and civil society.

Our aspirations

Implementation and resources

Civil society is here with high aspirations to keep advancing on implementation. Our challenges are daunting, but we can overcome them with courage and imagination, and by re-orienting our priorities and values.

We must not allow ourselves to believe the reasons often given for failing to implement the Aichi Targets. For ex-

ample, we do not accept the argument that biodiversity conservation cannot be financed. If we were to re-orient the subsidies currently provided to fossil fuel development, or to agrofuels and other perverse incentives, we would find that plenty of money would become available for addressing biodiversity loss. We should review the strategic plan to generate bold policy action and significant new financial resources to address new and existing threats.

Socio-Economic aspects

We further highlight the importance of integrating biodiversity conservation into poverty eradication strategies, doing justice to the socio-economic aspects of biodiversity policy. Promoting conservation by all rightsholders, such as Indigenous Peoples, local communities, women, small farmers, pastoralists, fisherfolk, is the only way to sustainably ensure biodiversity conservation.

Agenda Item 6 – Synthetic Biology & Item 9.5 - Biofuels

Synthetic and GE algae for biofuels?

Harmful incentives fund a new and emerging threat to marine - and other - ecosystems

Rachel Smolker, Biofuelwatch

As we consider the new and emerging threats of synthetic biology, discuss how to protect marine and coastal ecosystems, prevent the onslaught of invasive species, and prevent harms from perverse incentives, a look at the current trends in using synthetic biology to develop algae biofuels (and more) provides a thread that runs throughout our agenda.

Algae play a key role in the regulation of systems that support life on earth. Their voracious “appetite” for CO₂ played a significant role in reducing atmospheric CO₂ levels in a previous spike around 55 million years ago. They are a primary source of oxygen, the base of the marine food chain and are responsible for the oceanic “carbon pump”. The term “algae” refers to organisms as diverse as cyanobacteria, diatoms, seaweed and giant kelp. Algae are incredibly diverse, little understood, adaptable, ubiquitous and essential.

They are also under siege from biotechnologists who seek to engineer and synthesize their genomes to produce “useful” compounds.

Algae are a focus of interest because of their high productivity and capacity to produce large amounts of lipids and carbohydrates. In spite of many years of research funding via subsidies and grants, a 2012 National Research Council review concluded:

“Based on a review of literature published until the authoring of this report, the committee concluded that the scale-up of algal biofuel production sufficient to meet at least 5% of US demand for transportation fuels would place unsustainable demands on energy, water, and nutrients with current technologies and knowledge.”

Nonetheless, algae biofuel enthusiasts continue to claim their products are “almost ready” and that they are “carbon negative” so that “the more you use the more you

contribute to solving climate change.” Lifecycle analyses do not concur. Energy demands for water management and nutrients for micro-algae cultivation are found to be around seven times greater than energy provided from the fuels produced.¹

Attention has shifted to producing compounds that are more immediately profitable, further extending the range of manipulation of algae genetics. These include chemical precursors, plastics, dyes, adhesives, surfactants, pharmaceuticals, nutraceuticals, cosmetics, drilling lubricants, human and animal feeds and much much more. Algae are being put into service for carbon capture from industrial facilities, wastewater treatment toxic remediation, and, potentially, climate geo-engineering.

What are the risks?

In the case of macroalgae (seaweeds and kelp) the large scale commercial cultivation in open waters of desirable species to provide biomass (to be converted to fuels by synthetic microbes) raises concerns about coastal ecosystem impacts.

For micro-algae, cultivated in open ponds or enclosed reactors:

Escape is inevitable: Micro-algae can easily escape labs and facilities via aerosolization, spills and accidents. Some can remain dormant for long periods. How they fare in the wild is impossible to predict.²

Invasiveness: Large scale cultivation of non-native species raises risks.

Algae are being engineered with traits that could allow them out-compete native species, including: prolific growth rates, resistance to competitors, grazers and pathogens that may normally hold wild populations in check.

High rates of productivity means “mistakes spread quickly”. Rapid growth is considered an advantage, but can also represent a greater risk.³

Toxins: Some algae can proliferate and cause harmful algae blooms, secreting hepatotoxins and neurotoxins that can be lethal to fish, birds, mammals and even humans. Some are linked to Alzheimer’s and Parkinson’s disease.⁴ Blooms cause anoxia (as in oceanic “dead zones”). The incidence of harmful algae blooms has risen sharply in recent years with increasing pollution and warming waters.

Horizontal gene transfer: Algae are famous for horizontal gene transfer. With large scale cultivation, HGT is inevitable and would result in the transmission of traits to unrelated individuals, even other groups of unrelated organisms.

Algae are fundamental to biogeochemical cycles, hence there is potential for far-reaching and serious harms.

Given their fundamental role in earth systems, and how poorly understood their biology and given what we know about their potential to become invasive and toxic; is it wise to be engaging in large scale cultivation and to subsidize ongoing R&D of synthetic and engineered algae? Have we thought this through? Have we been adequately consulted about the risks? Are adequate regulations in place?

1 Murphy, C.F. and Allen, D.T. (2011) Energy-Water Nexus for Mass Cultivation of Algae. *Environmental Science & Technology*. 45: 5861-5868

2 Gressel, J., vander Vlugt, C.J.B. and Bergmans, H.E. N. 2013. Cultivated microalgae spills: hard to predict/easier to mitigate. *Trends in Biotechnology* 1127

3 Henley et al 2013

4 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2968748/>

Synthetic Biology and the CBD: Risks and Benefits *A Panel Discussion*

A robust debate between scientists, civil society and representatives of synthetic biology institutions.

Tuesday evening, June 24

6:15pm – 7:45pm

Room 3 (Level 1)

Food will be provided.

CBD Alliance would like to thank Swedbio for their continued and ongoing support

The opinions, commentaries, and articles printed in ECO are the sole opinion of the individual authors or organisations, unless otherwise expressed.

Submissions are welcome from all civil society groups.

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Synthetic Biology

“Extreme Genetic Engineering” threatens biodiversity and livelihoods

Kathy Jo Wetter, ETC Group

Delegates to SBSTTA 18 will tackle one New and Emerging Issue this week: Synthetic Biology (agenda item 6). In preparation, and to assist delegates in making recommendations to COP 12, the CBD Secretariat has produced two information documents (SBSTTA/18/INF/3 and SBSTTA/18/INF/4), as well as a synthesis document (SBSTTA/18/10).

Synthetic biology companies are partnering with the world’s largest grain, chemical, consumer products and oil companies to manipulate living organisms, commonly yeast or algae – creating “Synthetically Modified Organisms” (SMOs) – to produce flavorings, fuels, fragrances, pharmaceutical compounds and high value chemicals. Industry giants including Novartis, Unilever, BP and DuPont are investing in synthetic biology R&D. The industry forecasts an annual market worth USD 38.7 billion by 2020.

The commercial release of SMOs and products derived from them is under way, introducing new direct and indirect risks to biodiversity and human health, including threatening the livelihoods of millions of tropical farmers by displacing natural commodities. Companies have already commercialized or are on the cusp of commercializing a myriad of SMO derived commodities that mimic natural products, such as coconut oil, cocoa butter, vanilla, saffron, stevia, rubber, patchouli and vetiver.

Civil society has identified at least seven immediate concerns raised by synthetic biology; these concerns are also acknowledged in the Secretariat’s synthesis document:

1) New Biosafety Threats: Synthetic biology creates novel, living artificial organisms that could survive and reproduce in nature. There exists no guidance on how to assess and manage SMOs for biosafety. Synthetic biology companies now produce hundreds of thousands of different, novel SMO strains per day in the absence of liability and a capacity to monitor or recall them.

2) Threats to Livelihoods and Sustainable Use of Biodiversity: If SMO derived products are able to compete in the marketplace with botanical products grown by farmers (by gaining consumer acceptance and/or by a lack of labeling requirements), markets will be disrupted, with the potential to destroy rural livelihoods and threaten the sustainable use of biodiversity.

3) Increased Pressures Associated with the Bioeconomy: Currently, SMO derived products require sugar to feed their bio-production processes. Sourcing sugar on an industrial scale will drive extensive land use changes and an increased use of water, agrochemicals and fertilizer with concomitant negative social and environmental effects.

4) Digital Biopiracy: Synthetic biology makes it possible to move genetic resources across borders as digital information. Agreements such as the *Nagoya Protocol* that govern the “material transfer” of genetic resources may lack clarity to the point of becoming ineffective; it is yet unclear whether the components, organisms and products resulting from synthetic biology can be considered “genetic resources” under the Convention.

5) Bioweapons and Health Concerns: Synthetic biology allows for the construction of viruses and bacteria that could be infectious or otherwise harmful to humans and/or animals – either intentionally or by mistake.

6) Lack of Oversight and Governance: Existing regulations to govern genetic engineering were developed before the emergence of synthetic biology techniques and are not able to adequately address the risks associated with synthetic biology techniques.

7) Danger of False Solutions: Speculative proposals to use synthetic biology techniques in the service of ostensibly environmentally and socially beneficial goals (such as for conservation or recovering extinct species) should be critically assessed. It is also possible that *in situ* conservation will be considered less critically important if synthetic biology is accepted as a techno-fix for biodiversity loss.

The CBD is the first multilateral body to address the risks and uncertainties associated with synthetic biology and it has already urged governments to take a precautionary approach (Decision X1/11). SBSTTA may choose this week to make further recommendations for the COP to consider. Civil society organizations are urging delegates to preserve the integrity of Decision X1/11 by recommending, *inter alia*, that the field testing of organisms, components and products resulting from synthetic biology techniques not be authorized until a global, transparent and effective legal framework – one that includes addressing socio economic and cultural considerations – is in place.