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Geoengineering

Rachel Smolker, Biofuelwatch

At COP 11, the Parties requested a peer reviewed update on climate geoengineering and biodiversity in decision XI/20, para 16a. Meanwhile an “interim update” report (SBSTTA/18/INF/5) has been provided for this year’s SBSTTA. This report is not peer reviewed and reflects the lead authorship of P. Williamson (UK).

The interim report provides a select list of publications that have appeared since publication of the CBD 2012 *Technical Series 66*, and focuses considerable attention on the mounting evidence of severe consequences from global warming. From this however, the conclusion is then drawn in the closing paragraph that

“geoengineering research - to continue to investigate whether or not some techniques might provide an environmentally and politically viable future policy option - may now be a higher priority than it was two years ago.”

This conclusion is open to challenge. For example, research already has demonstrated that the impacts of injecting aerosols into the stratosphere (a key geoengineering proposal) are expected to have very serious hydrological impacts, causing severe droughts in the tropics and significantly reduced monsoon cycles. Another geoengineering technology, *bioenergy with carbon capture and storage* (BECCS) can already be identified as a serious threat to biodiversity because it depends on access to massive quantities of biomass for use in bioenergy processes (which continue to be falsely considered “carbon neutral”). The CBD has already rightfully acknowledged serious concerns associated with large-scale demands for biomass for biofuels.

Further, concerns about the governance of climate geoengineering, and even governance of research on climate geoengineering remain unresolved and troubling. For example, during COP 11 the story broke regarding Planktos’ engagement in rogue “research” under the guise of “salmon restoration” in Haida, considered to be a breach of the CBD’s decision from COP 10.

Given that climate geoengineering technologies appear most likely to worsen climate and biodiversity crises and to contribute further to uncertainty rather than providing any sort of “fix”, is further research really “a priority”?

New and emerging industry roadblocks to discussion

Dru Jay, ETC Group

Asbestos, lead in petrol, tobacco, radiation, DDT: these are a few of the technologies featured in the European Environmental Agency's 2013 report *Late Lessons from Early Warnings*. The risks of these technologies were widely known, but it took decades to get past resistance from established industries and to establish proper regulations. In that gap, deaths, illness and other undesirable effects continued unabated.

At the CBD, some countries are helping industry do the same thing - again. The first roadblock is to prevent synthetic biology from being considered a new and emerging issue.

The UK's Science Minister recently declared that “the UK can be world-leading in this emerging technology” while declaring a £60 million investment in synthetic biology. But at the CBD, the UK delegation (along with Brazil, Belgium, Australia and Argentina) attempts to prevent discussion of synthetic biology by arguing it is not new, not emerging and not an issue.

Ecologists warn that we don't know enough to understand the unintended effects of releasing synthetic organisms into the wild. Synthetic organisms grown in labs already affect the livelihoods of 100,000 farmers – a conservative estimate.

If synthetic algae escape and pollute waterways with oil or exotic flavouring, or if the algae that produce 70-80% of the world's oxygen are disrupted: how will we think of the people who tried to prevent discussion from taking place, or tried to prevent precautionary measures from being implemented?

Synthetic biology isn't new and emerging at the CBD. The CBD has taken several decisions about synthetic biology since 2010. In that sense, it is established - as a new and emerging issue.

Billions of GM mosquitoes released without proper scrutiny

Helen Wallace, GeneWatch UK

Billions of genetically modified (GM) *Aedes aegypti* mosquitoes - produced by UK company Oxitec - continue to be released in experiments in Brazil, and the Brazilian regulator CTNBio has given **approval for commercial use**. However, no results of any of the experiments have been published and there has been **no monitoring of the impact on dengue fever** - the tropical disease the mosquitoes are supposed to help eradicate.

In Panama, open experiments have recently begun in populated areas without a full environmental risk assessment. When the GM mosquito eggs were exported for the trials, the required risk assessment was omitted from the transboundary notification documents. Oxitec argued that meeting this legal requirement was unnecessary because the regulators and local partner the *Gorgas Institute* had produced their own risk assessment. But the local document covers only "contained use" of the insects and omits any consideration of the major risks.

Plans for experimental releases of GM *Mediterranean Fruit flies* have also been approved by CTNBio in Brazil. These experiments are expected to leave large numbers of dead GM maggots - and some live ones - in the fruit. The implications for consumers, export markets, and the global spread of GM insects are profound. However, neither Brazil nor Panama has provided any information to the *Biosafety Clearing House* of the CBD's Cartagena Protocol.

Oxitec's GM mosquitoes are genetically modified to die before adulthood unless they get an antidote - in this case the common antibiotic tetracycline. Large numbers of males are repeatedly released to outnumber the wild population by a factor of ten to one or more. The GM males mate with wild females and when the offspring die as larvae, this is intended to suppress the numbers in the adult population. GM fruit flies have a similar killing mechanism, but here only the female offspring are programmed to die at the larval stage, when they are normally inside the fruit.

Results from the Cayman Islands suggest Oxitec's technology is very ineffective at reducing wild mosquito population numbers. Published computer modelling of the data suggests 2.8 million GM adult male mosquitoes would need to be released per week to suppress a wild population of only 20,000 mosquitoes. Monitoring of populations has in any case been insufficient to establish whether wild males

are simply moving to the areas surrounding the releases.

There has been no monitoring of the impacts on dengue fever of GM mosquito releases in any country - despite a scientific consensus that assessing impacts on disease is essential to assess the efficacy of new technologies. **At the same time, there are a number of mechanisms through which releasing GM mosquitoes could even make the impacts of the dengue virus worse**, including:

1. increasing the incidence of the more serious and often fatal form of the disease (dengue haemorrhagic fever) in areas of high mosquito abundance by reducing cross-immunity to the four different serotypes of the dengue virus, or increasing the incidence of dengue fever due to delaying its age of onset;
2. enabling an increase or expansion in territory occupied by the competitor species *Aedes albopictus*, an important vector for dengue, which may be harder to eradicate than *Aedes aegypti*.

Despite the genetic killing mechanism, Oxitec's GM mosquitoes can survive and spread, for example by feeding in areas contaminated with the antibiotic tetracycline, which is widely used in medicine and agriculture. It is also inevitable that some biting female GM mosquitoes will be released and others will survive and breed, as the genetic killing mechanism is not 100% effective and resistance is likely to develop over time.

Oxitec has a poor track record of meeting regulatory requirements. In particular, under European Union law it should provide a publicly available environmental risk assessment which meets European standards before exporting GM mosquito eggs to foreign countries, yet it has repeatedly failed to do so. Oxitec has been criticised by independent scientists for the poor quality of its risk assessments for the Cayman Islands and Malaysia - where experiments have ceased - and for lack of transparency and public consultation.

Exporters should be required to produce risk assessments which meet the necessary standards, and publish them for open scrutiny and public comment before GM mosquitoes are released. Local people can only give fully informed consent if they know the risks, and international oversight is impossible without public information.