ETC Group Briefing
UNFCCC, COP 17
Durban, South Africa
November/December 2011

Can the New Technology Mechanism Work for New Technologies?

The Case for Technology Assessment

Context

International efforts to address the food, energy and climate crises give technology a central role to play. While some technologies may offer potential solutions to specific problems, decades of accelerating technological development and deployment have done little to mitigate climate change, and, in many cases, have made problems worse.

Now, new high-risk technologies, ranging from the very small (synthetic biology, genomics, nanotechnology) to the very large (geoengineering), are rapidly developing. Their promoters promise that these technologies are key to solving climate change, world hunger, energy shortages and biodiversity loss. The precautionary principle and social and economic impacts are often ignored in the rush to deploy the latest technofix, marketed as socially useful and cutting edge, such as "climate-smart agriculture" or "next-generation biofuels." Without the strict application of the precautionary principle, and a transparent and participatory form of technology assessment, new technologies could wreak even more havoc on a fragile planet that is already under immense strain due to reckless and unsustainable forms of production that serve the few at the expense of the many.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

Technofixes Trump Talks?

Geoengineering the climate – the large-scale technological plans to intentionally modify the Earth's systems by manipulating oceans, land and the atmosphere – is moving up on the international agenda. The US and German governments for example have recently issued detailed reports on the topic; public funds are flowing to research and development, and a controversial experiment in the UK on stratospheric aerosols has been postponed following public protest.[1] In June, the Executive Secretary of the UNFCCC publicly raised the prospect of using geoengineering if no climate agreement was reached. In September, the European Parliament expressed its opposition to geoengineering. The Convention on Biological Diversity (CBD), the Intergovernmental Panel on Climate Change (IPCC) and the London Convention and Protocol have also become involved in the issue.[2] And the recent public admission of rich nations that a new climate agreement won't be reached before 2020[3] further emboldens those who would prefer to bet on speculative climate technofixes than engage in serious multilateral negotiations. Any modification of our oceans and atmosphere to manipulate the climate will ultimately affect all countries, and thus all countries must be involved in decision-making – despite the resistance of some wealthy countries to bring these decisions to a UN forum.

The UNFCCC has not had any formal discussion on geoengineering or on many of the emerging technologies for climate change mitigation or adaptation. Some recent decisions however could have implications for their future development, transfer and deployment.

Four crucial issues *must be resolved if the newly established Technology Mechanism of the UNFCCC is to play a useful role in the fight against climate change:*

1. *Criteria must be established for the* ***precautionary and participatory assessment*** *of different "environmentally sound" technologies, including examining their ownership and control.*
2. *The* ***definition of "environmentally sound technologies****" must be clarified, updated and expanded to include a social and human rights dimension.*
3. ***Intellectual property rights*** *on climate technologies must be challenged.*
4. ***Geoengineering technologies*** *must be explicitly excluded.*

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

Getting the Technology Mechanism Right

The UNFCCC's COP 16 in Cancun established a Technology Mechanism composed of a Technology Executive Committee (TEC) and a Climate Technology Center and Network (CTCN). Intended to enhance the global research, development, and diffusion of "environmentally sound technologies," these new institutions should provide increased funding and deployment capabilities to developing countries in order to assist them in both mitigation and adaptation. The general functions of the TEC and CTCN have been agreed upon and the TEC had its first meeting in Bonn in early September 2011. The precise modalities of how these new institutions will function remain to be agreed upon in Durban and there is therefore an opportunity to improve them, especially by including technology assessment.

1. Why is Technology Assessment so urgent?

The UNFCCC's new Technology Mechanism must not simply rubber stamp every new technology that claims to be "environmentally sound." We need to learn from DDT and CFCs, mad cow disease and swine flu, Chernobyl and Fukushima, Bhopal's ongoing distress and BP's more recent disaster. The TEC should have clear criteria in order to weigh the costs and consequences of the various technological options, with full consideration given to their potential impacts in different economic and cultural contexts. It should be attentive to the foreseeable and unexpected health, social, economic and environmental impacts of the different technologies that will be competing for enhanced action. That includes looking at who controls these technologies, who profits from them, and the legacy they will leave behind. As biofuels have already shown, public subsidies for a technology that claims to reduce greenhouse gas emissions in a few countries can have devastating impacts on food security and access to land around the globe.[4]

Technological convergence has made assessment even more urgent; emerging technologies become more powerful when they work in concert. Nanotechnology, synthetic biology, genomics, and geoengineering are technology platforms that demand entire production and/or processing systems that can have vast economic implications for developing countries. They are also untested and their applicability to national needs is speculative. And yet, industrial and financial interests posit them as fundamental components of our response to climate change and many governments continue to have faith in industry's ability to manage these newer, faster and more profitable technologies. Meanwhile, proper social and environmental risk evaluation, with few exceptions (mostly in some countries in Europe), receives scant attention.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

Billions of dollars at stake; oversight non-existent

A small number of large corporations in industrialized countries are gaining control of greater and greater portions of the natural world. This concentration of scientific know-how in private enterprises can undermine the ability of countries and peoples to decide what technologies are appropriate for their own circumstances, not to mention making them less accessible or affordable.

⇒ While over $50 billion in 60 countries has already been invested in **nanotechnology** over the past 10 years, and over 2000 products are on the market, research on health and safety of these new materials is in its infancy, despite known toxicities.

⇒ The **new biomass economy** (bolstered by speculative **synthetic biology** techniques) is expected to be worth $300 billion by 2020 but no attention is being paid to its impact on land, food and human rights in the global South, where 86% of biomass that remains to be commercialized is located. Major players in the new "biomass economy" include BP, Shell, BASF, DuPont, Syngenta and the industry as a whole has received over $15 billion in subsidies from OECD governments.

⇒ In the past two years, the largest biotech and chemical corporations in the world – Monsanto, Syngenta, BASF, DuPont, Bayer, Dow, and their partners – have filed **hundreds of multigenome patents** seeking exclusive monopoly control over so-called "climate-ready" gene sequences which could have vast implications for how countries are able to adapt to climate change.

⇒ In 1995, the world's top ten seed companies controlled 37% of global commercial seed trade. Today, the top ten control 73%.

Sources: *ETC Group, The Big Downturn: Nanogeopolitics 2010; The New Biomassters: Synthetic Biology and the Next Attack on Biodiversity and Livelihoods (2010); Who will Control the Green Economy? (2011), forthcoming, all available at www.etcgroup.org.*

Precaution – and common sense – demands the careful assessment of technologies before, not after, governments and inter-governmental bodies start funding their development and aiding their deployment around the globe. National and international public consultations, with the participation of the people who are directly affected, are critical. This is not a simple technical assessment conducted exclusively by experts: people must have the ability to decide which technologies they want, and to reject technologies that are neither environmentally sound nor socially equitable. While "Technology Needs Assessments" are institutionalized at the UNFCCC, there is no body or process at the multilateral level that provides a reliable, accessible and transparent source of information on the risks and advantages of different technological options. This fundamental flaw must be corrected if the new Technology Mechanism is to be more than an elaborate marketing arm for proprietary technologies from the North.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

Support for Technology Assessment

Several Parties and organizations have raised the issue of technology assessment during recent climate negotiations. For instance, the Climate Action Network (CAN) has stated that the whole technology initiative is put at risk by the failure to establish a mechanism for evaluating whether or not proposed technologies are 'environmentally sound' and are worthy of support. CAN also emphasized the importance of full and authentic participation of civil society in any technology evaluation. Organizations with the Climate Justice Network (CJN) have also supported calls for technology assessment and denounced "false climate solutions" such as geoengineering and monoculture tree plantations. Over 200 organizations signed on to a declaration "Let's Look Before We Leap" which called for technology assessment in the lead-up to COP 15. The International Council of Scientific Unions (ICSU) has also supported technology assessment in its submission to the Rio+20 zero draft.

Bolivia has repeatedly stressed the need to undertake independent evaluation of technologies before they are deployed, stating that technological development must consider social, economic and cultural factors in different countries, as well as support traditional knowledge. The Philippines has called for multi-stakeholder involvement in assessing the potential impacts of new and emerging technologies. Technology evaluation was also raised by Jamaica, on behalf of the SIDS, at the first meeting of the TEC in Bonn in September. The inter-governmental South Centre has been vocal in its support of the evaluation of technologies in order to understand their impact not only on climate change but also on biodiversity, jobs, poverty and sustainable development.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

New Language on Technology Assessment under Agenda Item 3.5:

The draft negotiating text for COP 17 on Technology Development and Transfer under the Ad-hoc Working Group on Long-Term Cooperative Actions (AWG-LCA) contains bracketed language on technology assessment in paragraph 15 (f) and (g) which refers to the functions of the new Climate Technology Centre and Network. It proposes that the CTCN will:

(f) [Form multisectoral expert groups to conduct technology assessments and will look into the potential environmental, social and economic impacts and the appropriateness of new and emerging technologies on a needs basis]];

(g) [To undertake assessments in an independent manner, without conflict of interest, including existing, new and emerging technologies so as ascertain their appropriateness for adoption in or transfer to developing countries

RECOMMENDATION:

⇒ SUB-paragraphs (f) and (g) should be consolidated so that they read: *"Undertake assessments in an independent manner, without conflict of interest, including evaluation of potential environmental, social and economic impacts of new and emerging technologies, to ascertain their appropriateness for adoption in or transfer to developing countries."*

Technology assessment must not include private sector actors with a financial interest in the outcome of the discussions. Without a clearly independent and participatory process for technology assessment, the various other functions already identified for both the TEC and the CTCN will be compromised, while high-risk technologies with serious negative impacts on the global South could receive unwarranted support.

2. Redefining "Environmentally Sound Technologies" (EST)

Article 4.5 of the UNFCCC commits Annex 1 Parties to "take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention." Since 1994 when the Convention came into force, there has been an exponential increase in the portfolio of so-called "environmentally sound technologies" – everything from "clean coal" to nuclear energy and algae fuels.

What are environmentally sound technologies (ESTs)?

Environmentally sound technologies protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitute.

Earth Summit 1992, Agenda 21, Chapter 34.

The Earth Summit also recognized that ESTs exist in a context that also must be considered:

The human resource development and local capacity-building aspects of technology choices, including gender-relevant aspects, should also be addressed. Environmentally sound technologies should be compatible with nationally determined socio-economic, cultural and environmental priorities.

Oddly, the definition of ESTs has never been discussed in the UNFCCC technology negotiations despite the accelerating technological development that has rendered the Rio definition outdated and incomplete. Combined with the globalization of trade and investment and, in most countries, a shrinking public sector and the deregulation of health, safety and environmental standards, we have created a permanent high-risk global situation where we no longer control the technologies we have created. There are now many examples of supposed "green" or "low carbon" technologies – such as ethanol and nuclear power – that have had devastating social or environmental consequences.

Because they have been supported by short-sighted public "innovation" policies, inadequate attention has been paid to risks of new technologies and they have virtually no involvement from civil society. Furthermore, such technologies are usually proprietary (protected by intellectual property monopolies). Their deployment, therefore, often entails a transfer or resources from the South to the North (and frequently from the public to the private sector).

An updated definition of environmentally sound technologies must also include elements that:

- Look at social and cultural **contexts** and effects on community livelihoods.
- Help protect existing **ecosystems** and all life forms within them.
- Strictly adhere to the **Precautionary Principle** as defined in the Wingspread statement.[5]
- Employ a full **life-cycle analysis**, reducing the use of non-renewable resources and minimizing waste.
- Minimize obstacles to **access** for the communities the technologies are intended to serve, including payments such as royalties, inputs, software, maintenance etc.
- Respect international **human rights** norms, including social, economic and cultural rights, the rights of Indigenous peoples, and the right to self-determination.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

3. Challenging intellectual property rights

Intellectual property is a critical issue in all technology transfer negotiations. Many developing countries such as China, India, Ecuador, Kenya, Bolivia and the Philippines have articulated the need to address intellectual property rights as an obstacle to technology development and transfer. In contrast, JUSCANZ and some European countries have taken the position that IPRs do not hinder technology development and transfer and insist that intellectual property be excluded from the technology negotiations.

Some facts on Intellectual Property and Clean Energy Technologies (CETs)

- ⇒ *Since 1997, patenting activity has increased by 20% per annum.*
- ⇒ *Six OECD countries account for 80% of CET patent activity (Japan, US, Germany, UK, Korea, France).*
- ⇒ *Least developed countries account for a mere 0.1 % of patent activity*
- ⇒ *While there has been an increase in patent activity in China, India and Brazil, two-thirds of registered patents in emerging markets are controlled by foreigners (from Northern countries).*

Source: UNEP, EPO and ICTSD, *Patents and clean energy: bridging the gap between evidence and policy: Final report, 2010:* http://tinyurl.com/d7d2fp5

Proposals for IP flexibilities were put forward by the G77 and China in the negotiations leading up to COP 17 in Durban. However, given the overwhelmingly negative consequences of patenting life forms and the ominous possibility of protecting geoengineering and synthetic biology technologies with privately held patents, much more radical rethinking about the global intellectual property status quo is required. Poor countries should never have to pay licensing fees to Northern corporations to access the technologies they need to adapt to the effects of climate change that are largely caused by the global North. The urgency of the climate crisis demands a relaxation of intellectual property rights on ESTs in order to facilitate the transfer of appropriate technologies and know-how to developing countries. If the Technology Mechanism fails to take on this contentious issue, the stated goal of enhancing the transfer of ESTs to the global South will continuously fail.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

4. Exclude Geoengineering Technologies from the Technology Mechanism

Geoengineering is the intentional large-scale manipulation of the Earth's climate systems by artificially manipulating oceans, soils, and the atmosphere. Some geoengineering technologies include blasting sulphate particles into the stratosphere to reflect the sun's rays; removing carbon dioxide from the air through energy-intensive chemical procedures; dumping iron particles in the oceans to nurture CO_2-absorbing plankton; firing sea water into clouds to whiten them; genetically engineering crops so their foliage can better reflect sunlight; enhancing carbon sequestration in soils by burning biomass to create biochar, among others.[6]

At present, there is a *de facto* moratorium on geoengineering adopted by the CBD COP10's Decision X/33, which, in accordance with the precautionary approach, prohibits climate-related geoengineering activities (other than small-scale research studies in a controlled setting). No climate-related geoengineering experiments can be legitimately undertaken by any of the 193 Parties to the Convention.[7] The CBD secretariat is currently undertaking peer review on papers on the impacts of these technologies on biodiversity as well as exploring what gaps exist in international regulatory frameworks in order to further inform Parties on next steps.[8]

Geoengineering has never been formally discussed in the UNFCCC and the issue of the deployment of technologies with trans-boundary impacts has not yet surfaced in negotiations. Neither the TEC nor the CTCN has been given the mandate to evaluate the potential impacts of existing and emerging technologies, although there is now some proposed language. Logically, the TEC should provide policy guidance on technology assessment and oversee the operations of the CTCN in order to ensure that the risks of any adaptation or mitigation technology are carefully evaluated before they are considered for enhanced support. The UNFCCC should explicitly state that technologies that put the planet at grave risks such as geoengineering are excluded from any technology development, transfer and deployment support, and this mandate should be strictly adhered to by whichever institution or country will eventually host the CTCN.

Given the trans-boundary nature of geoengineering technologies and the range of their potential adverse effects on cultures, economies, biodiversity, water, agriculture, human health, sustainable development, and geo-political security, geoengineering could not be comprehensively addressed by the Technology Mechanism, or even by the UNFCCC alone. Rather, an issue of such breadth and importance must be taken up at the level of the UN General Assembly, and should be brought up in such cross-cutting forums as the upcoming UN Conference on Sustainable Development (UNCSD, or Rio+20) in June 2012.

The UNFCCC must further strengthen the CBD moratorium on geoengineering by ensuring that no geoengineering technologies, including solar radiation management, carbon dioxide removal and weather modification, receive any form of support or endorsement under the new Technology Mechanism. These technologies are unproven, untested, and carry enormous social, economic and ecological risks. As such, they should be explicitly excluded from enhanced support under the Technology Mechanism.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

ETC Group is… an international civil society organization (CSO), addressing the socioeconomic and ecological issues surrounding new technologies that could have an impact on the world's poorest and most vulnerable people.

We investigate ecological erosion (including the erosion of cultures and human rights); the development of new technologies (especially agricultural but also new technologies that work with genomics and matter); and we monitor global governance issues including corporate concentration and trade in technologies.

We operate at the global political level and have consultative status with several UN agencies. We work closely with partner civil society organizations and social movements, especially in Africa, Asia and Latin America.

Contacts for ETC Group in Durban:
Neth Daño (neth@etcgroup.org) and Silvia Ribeiro (silvia@etcgroup.org)

www.etcgroup.org

etc group
action group on erosion, technology and concentration

ENDNOTES

[1] See Open Letter on SPICE geoengineering test, 26 September 2011: http://www.etcgroup.org/en/node/5282. See also related press releases at www.etcgroup.org. The official announcement of the experiment's postponement is here: http://www.epsrc.ac.uk/newsevents/news/2011/Pages/spiceupdate.aspx.

[2] The CBD adopted a *de facto* moratorium on geoengineering at COP X and the Secretariat has been instructed to compile evidence on impacts on biological diversity and governance gaps. See ETC Group, "What does the UN Moratorium on Geoengineering Mean?" 11 November 2010: http://www.etcgroup.org/en/node/5236. The IPCC hosted an expert meeting in Lima, Peru in June 2011 to discuss the treatment of geoengineering in its Fifth Assessment Report. See ETC Group, "IPCC treads carefully on geoengineering," 22 June 2011 and IPCC, "Joint IPCC Expert Meeting of WG1, WGII and WGIII on Geoengineering" at http://www.ipcc-wg3.de/meetings/expert-meetings-and-workshops/em-geoengineering. The London Convention and Protocol has been involved in the regulation of ocean fertilization experiments. See International Maritime Organization, "Assessment Framework for scientific research involving ocean fertilization agreed," 20 October 2010, at http://www.ipcc-wg3.de/meetings/expert-meetings-and-workshops/em-geoengineering.

[3]Fiona Harvey, "Rich Nations 'Give Up' on New Climate Treaty until 2020," *The Guardian*, 20 November 2011: http://www.guardian.co.uk/environment/2011/nov/20/rich-nations-give-up-climate-treaty?newsfeed=true.

[4] See among others, Asjborn Eide, "The Right to Food and the Impact of Liquid Biofuels (Agrofuels)," FAO, 2008: http://www.fao.org/righttofood/publi08/Right_to_Food_and_Biofuels.pdf.

[5] Wingspread Consensus Statement on the Precautionary Principle, 1998: http://www.sehn.org/wing.html. The expert group stated, in part: "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically."

[6] For more detail, see ETC Group, *Geopiracy: The Case Against Geoengineering*, 2010: http://www.etcgroup.org/en/node/5217.

[7] ETC Group, "What does the UN Moratorium on Geoengineering Mean?," 10 November 2010: http://www.etcgroup.org/en/node/5236.

[8] See CBD Notification, "Draft study on Impacts of Climate-Related Geo-engineering on Biological Diversity," 11 November 2011: http://www.cbd.int/doc/notifications/2011/ntf-2011-215-climate-en.pdf.

Information in Durban: Silvia Ribeiro, silvia@etcgroup.org or Neth Daño, neth@etcgroup.org
www.etcgroup.org

The Promise and Problems of Emerging Climate Change Technologies

	Nanotechnology	Synthetic Biology	Geoengineering
Background: *the basics*	Nanotechnology is the manipulation of matter at the scale of atoms and molecules. (One nanometer is one billionth of a meter.) Nano-sized particles are receiving increasing interest and investment because they exhibit novel properties (changes in colour, reactivity and conductivity) that can be harnessed for industrial purposes by controlling the shape and precise size of the particles. Nanotechnology is rapidly onverging with biotech and information technology to radically change food and agricultural systems especially in the face of the climate, food and energy crises.	A new field of extreme genetic engineering is providing techniques to radically 'reprogramme' the DNA of microbes such as yeast, algae and bacteria. Synthetic biologists working with energy and chemical companies are adding new strands of synthetic DNA (built mechanically in a lab from chemicals) hijacking the workings of living cells so that they can secrete industrially useful products such as transport fuels, high-value chemicals and plastics. The microbes are engineered to feed off sugars and plant materials that are then fermented into industrial raw materials.	Geoengineering the Earth's temperature by deploying sulphate aerosols in the stratosphere, thereby reflecting heat back to space and lowering the Earth's temperature, is known as Solar Radiation Management. With glacially slow progress on reducing greenhouse gas emissions, there is increasing interest in high-risk large-scale climate-cooling technologies, collectively referred to as geoengineering. The UK was recently forced to postpone an experiment (SPICE) designed to test a hose to deliver particles to the upper atmosphere.
Promise: *the hype*	Pesticides containing nano-scale active ingredients and new techniques that use nanoparticles for inserting foreign DNA into cells and atomically engineering plants, are developed to deal with worsening pests, diseases and agro-ecological stresses due to global warming.	Engineered synthetic bacteria will enable biomass to replace petroleum as the key feedstock for production of fuels and chemicals – reducing dependency on oil and greenhouse gas emissions.	Re-engineering the climate will allow society to stave off the worst effects of climate change, buying time for more long-term solutions. It is fast and relatively cheap and does not require difficult multilateral negotiations.
Problem: *risks and impacts*	Far from being inert and harmless, nanoparticles may be a new form of chemical pollution. Nanoparticles have demonstrated a greater propensity to exhibit toxic effects. They travel more quickly through the environment, enter organs and cross membranes that are usually impervious to outside contaminants. Unintentional nano-sized particles are already widely implicated in respiratory diseases such as mesethelioma and air pollution related mortality. The ecological impacts of engineered nanoparticles on other species, plants and wider ecosystems have yet to be studied. Experts suggest they require entirely new safety assessment methodologies that do not yet exist. The application of hi-tech patented technologies on water could impact biodiversity or crop growth and food production could also be harmed. The production of nanoparticles is also energy intensive.	Synthetic organisms are novel species whose ecological impacts are unknown and may be dangerous for biodiversity and human health. By designing entirely novel genetic sequences, synthetic biologists could be creating living pollution that could speed up biodiversity loss if they escape into the wild. Switching feedstocks for fuel and chemicals production to plant and sugar carries a heavy environmental burden. Human appropriation of biomass (plant life) is already regarded as beyond the natural carrying capacity of the planet. Appropriation of land, water and soils for industrial biomass has already led to displacement of poor and indigenous communities, threatening food security. The new application of synthetic microbes to transform biomass into industrial products is likely to worsen this trend.	Atmospheric temperatures have always been tightly coupled to greenhouse emissions and we have no historical precedent for decoupling temperature from atmospheric concentrations except for the occasional volcanic eruption. When large volcanoes eject particles into the stratosphere the effect is not merely to cool global temperatures but also to create artificial regional variations in weather, including suppression of monsoons in tropical zones leading to crop failures. Continual injection of aerosol particles in the sky will change the colour of the sky, alter the light reaching terrestrial plant life, and reduce the efficiency of solar power. Such particles may also worsen ozone destruction and exacerbate air pollution with adverse effects on human health. International disputes over control of geoengineering could even provoke wars.
More info	ETC Group, ***The Big Downturn? Nanogeopolitics***, 2010 at www.etcgroup.org/en/node/5245	ETC Group, ***The New Biomassters: Synthetic Biology and the Next Assault on Biodiversity and Livelihoods***, 2010 at www.etcgroup.org/en/node/5232	ETC Group, ***Geopiracy: The Case Against Geoengineering***, 2010 at www.etcgroup.org/en/node/5217

etc group