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Genetically modified trees – Chapter 4

By Chris Lang, published by WRM and FoEI, December 2004

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4. Legislation, regulation and market forces

In 1999, the International Union of Forest Research Organisations (IUFRO) produced a document titled “Position Statement on the Benefits and Risks of Transgenic Plantations”. In it they argued against excessive restrictions on the use of transgenic organisms on the grounds that this might stifle the realisation of the benefits.^[183] Oregon University’s Steven Strauss was one of the authors of IUFRO’s position statement. He told journalist Kristina Brenneman that “We deal with regulators all the time. With the level of regulation we have now, if it got any more onerous it would be society saying it would be dangerous”.^[184]

The reality is that in many countries the regulation of research into GM trees is far too weak. There is no international legislation specifically relating to GM trees. Instead, the international legislation relating to GM trees covers all GMOs (or living modified organisms as they are referred to in international law). Much of the legislation has been produced with GM food crops and seeds in mind, and does not necessarily cover the problems presented by long-lived GM plants such as trees.

One of the crucial aspects of the international law on GMOs is that GMOs are not like chemicals, which can in principle be withdrawn if they are found to be damaging. GMOs, once they are released into the environment, can self-replicate and cross with relatives, making withdrawal of a product all but impossible.^[185]

That this is not merely a theoretical problem was illustrated in April 2003, when Monsanto and The Scotts Company filed a request with regulatory authorities in the US for commercial approval of a GM grass to be used on golf courses.^[186] Among the comments received was one from the Union of Concerned Scientists, which pointed out that GM grass is unlike other GM crops in that it is not an annual crop and can establish itself in a wide range of habitats. GM grass can reproduce through seeds, pollen and by growing horizontal stems which produce roots. The US regulatory body has not yet reached its decision on whether to approve Monsanto’s GM grass or not. Although it has decided to produce an environmental impact assessment, it must reach its decision without the benefit of clear guidelines on how to deal with long-lived GM plants.^[187]

Since December 2003, GM trees are specifically referred to in the international climate change treaty, the Kyoto Protocol. Kyoto Protocol rules now state that countries on the receiving end of GM tree carbon dumps should “evaluate, in accordance with their national laws, potential risks associated with the use of genetically modified organisms by afforestation and reforestation project activities”.^[188]

The potential risks and problems of GM trees are rarely raised in international fora. In April 2004, for example, three United Nations Secretariats (of the conventions on Desertification, Biodiversity and Climate Change) held a workshop in Viterbo, Italy on forests and “Promoting Synergy in the Implementation of the three Rio Conventions”. Among the issues that the 200 delegates discussed were threats to forests, benefit sharing of forest resources, technology transfer, poverty reduction and carbon sequestration.^[189] Yet the final report of the workshop made no mention of GM trees. Neither is there any discussion about the threats that industrial tree plantations pose to people and forests. The word “plantations” was mentioned only twice in the report.

In May 2004, the fourth meeting of the UN Forum on Forests (UNFF-4) presented another opportunity to discuss the issues raised by GM trees.^[190] Yet in his presentation on the third day of the two week meeting UNFCCC’s Henning Wuester failed to mention UNFCCC’s decision to include GM tree plantations in the Clean Development Mechanism. In fact, there was no discussion of GM trees at UNFF-4, apart from in an NGO-organised side event.

Forestry scientists are clear that genetic pollution from GM tree plantations is inevitable. “Genes will eventually get out” as Oregon State University’s Steven Strauss puts it.^[191] This has potentially serious legal implications. In May 2004, the Canadian Supreme Court ruled that Monsanto had the right to prosecute farmers who have crops containing Monsanto patented genes on their land. Pat Mooney director of the Action Group on Erosion, Technology and Concentration explained the implications of this ruling: “They can now say that their rights extend to anything its genes get into, whether plant, animal or human. Under this ruling spreading GM pollution appears to be recognized as a viable corporate ownership strategy”.^[192]

The prospect of GM trees crossing with wild relatives resulting in feral GM trees containing patented genes growing outside plantations, raises a number of legal questions, including the following:

- Will the company that owns the patent on the gene have ownership rights (or any other rights) over any trees which contain this gene? Might forest owners find that the trees on their land in fact belong to International Paper or Meadwestvaco because they contain the company’s patented genes?
- Who will be liable, if gene pollution proves to have damaged trees in natural forests? Will it be the plantation manager, the company that sold the GM tree seedlings, the company that developed the GM tree using the patented gene, or will it be the owner of the patent on the gene?
- How is “damage” to trees in natural forests to be determined? Who will decide what constitutes damage? Trees and forests are sacred in some cultures and although superficially there may appear to be no harm done, changing the genetic makeup of wild trees could, in some cultures, be considered in itself to be damage.
- Seeds can be (and are) easily smuggled across borders. No legislation in the world will prevent this from happening. If GM trees were to become weedy and start invading forest ecosystems as a result of smuggled seeds, who (if anyone) would be liable?

International law covering GMOs is at present focussed on issues relating to trade. There are two institutions which currently provide rulings covering international trade in GMOs, the Convention on Biological Diversity and the World Trade Organisation.

Convention on Biological Diversity (Cartagena Protocol)

The member governments of the Convention on Biological Diversity adopted the Cartagena Protocol on Biosafety in January 2000 and it came into force in September 2003.^[193] The Cartagena Protocol is the only source of international law specifically relating to GMOs. The Protocol provides regulations for transboundary movements of GMOs. When Guatemala ratified the Protocol in October 2004, the total number of Parties reached 110.^[194]

The Cartagena Protocol was drawn up in accordance with the precautionary principle and therefore recognises a government's right to ban imports of GMOs when insufficient information is available to carry out an assessment of the risks. The burden of proof of safety is pushed back to the country or company exporting the GMOs.

The Cartagena Protocol covers three important areas:^[195]

- **Liability:** Who will be responsible for escape of GMOs and who will pay for any damage? A Working Group has been set up under the Protocol with a four-year mandate to produce international rules and procedures for liability and redress.
- **Compliance:** Who will check countries against the Protocol and how? A Compliance Committee has been created under the Protocol. The Protocol does not rely on self reporting of compliance and third parties can report non compliance.
- **Identification:** How should shipments of GMOs be labelled? Under the Protocol, all shipments of GMOs are to be labelled as “may contain GMOs”. Countries can refuse a shipment if clear information is not provided. Issues to be resolved include the percentage of GMO that a shipment can contain and still be considered GMO-free. This is to be considered in 2005, at the next meeting of the Parties to the Protocol.

The US, Canada and Argentina, three major exporters of GMOs, have not ratified the Cartagena Protocol. Environmental lawyer Mariam Mayet points out that the Cartagena Protocol skips the issue of whether it takes precedence over WTO rules, by stating that the two should be “mutually supportive”.^[196]

World Trade Organisation (SPS Agreement)

Under the World Trade Organisation (WTO) governments can be penalised for putting in place legislation, such as banning GMOs, if the WTO rules that this is an unnecessary barrier to international trade.

The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) entered into force in January 1995, when the WTO was established. The SPS Agreement covers food safety and animal and plant health regulations. As such, it also applies to GMOs. According to the WTO, the purpose of the agreement is to prevent governments from restricting trade (and therefore protecting their own food producers) by applying restrictions on food imports which “go beyond what is needed for health protection”.^[197] In setting their laws, to comply with the SPS Agreement, governments must assess the risks involved, rather than use the precautionary principle. The WTO explains that “Countries must establish SPS measures on the basis of an appropriate assessment of the actual risks involved, and, if requested, make known what factors they took into consideration, the assessment procedures they used and the level of risk they determined to be acceptable.”

In May 2003, the US, Canada, Argentina and Egypt filed a complaint with the WTO against the EU's legislation on GM foods. (Egypt withdrew two weeks later.) A year later, in its first submission to the WTO in response to the

complaint, the EU argued that “The Biosafety Protocol is the international agreement which is most directly relevant to the matters raised by the present proceedings.”

The EU stated:

“As far as scientific complexity is concerned, the arguments put forward by the Complainants are simplistic and largely ignore the scientific and regulatory issues which have dominated debate on GMOs over the past five years. They argue, for example, that there is no difference between GMOs and their conventional counterparts, in terms of risks to human health and the environment. The international Community has clearly rejected that view: between 1996 and 2000 a specialised international convention – the Cartagena Protocol on Biosafety (“Biosafety Protocol”) – was negotiated, which is premised on a clear understanding that the inherent characteristics of GMOs require them to be subject to rigorous scrutiny so as to ensure that they do not cause harm to the environment or human health, or cause socio-economic disruptions.”[\[198\]](#)

Greenpeace made the point more concisely: “The WTO does not have the legitimacy to decide what Europeans should eat. Neither should it enact decisions that interfere with environmental laws enshrined in multilateral environmental agreements, such as the Cartagena Protocol on Biosafety”.[\[199\]](#)

Dr Tewolde Egziabher, Director General of the Environmental Protection Authority in Ethiopia, was one of the architects of the Cartagena Protocol. Regarding the US complaint to the WTO he wrote,

“We in African countries, who have fought long and hard for the agreement and ratification of the Biosafety Protocol, feel that US actions are intended to send a strong and aggressive message to us: that should we choose to implement the Protocol and reject the import of GM foods, we may also face the possibility of a WTO challenge. We cannot help but perceive that US actions are a pre-emptive strike on the Biosafety Protocol and developing country interests.”[\[200\]](#)

Kristin Dawkins, author of a book titled *Gene Wars*, commented: “Fundamentally, this battle is also about the rights of nations to set up their own regulatory systems to protect human health and the environment.”[\[201\]](#)

Some GMO legislation from around the world

There are two ways of regulating GMOs. The first approach is to adopt the precautionary principle. This puts the burden of proof on the institutions or companies developing GMOs and requires that they prove that the product is safe. The most extreme application of the precautionary principle is to ban GMOs. Several countries have placed outright bans or moratoria on GMOs, including Algeria, New Zealand, Peru, El Salvador and Australia (except Queensland and the Northern Territory). In addition, several regions in Europe and one county in the US have voted in bans on GMOs. Thailand has banned 49 GM plants.[\[202\]](#)

A second approach to regulating GMOs accepts that some level of risk is inevitable and acceptable. In the US, where most of the world’s research into GMOs is taking place, the government has adopted the second approach and GM plants are regulated to determine that they present “no significant or unreasonable adverse risks”, according to Roger Sedjo of Resources for the Future.[\[203\]](#)

For several years, the US and Argentinean government have been putting pressure on other countries to water down their legislation and accept imports of GMOs. In December 2001, Friends of the Earth International (FoEI) released

leaked documents revealing that the US and Argentinean governments were threatening WTO action against countries with strict legislation against GMOs. FoEI pointed out that countries like Bolivia and Croatia faced “overwhelming pressure”. Bolivia was forced to retract a GMO ban after pressure from Argentina and its biotech industry.[204]

The US Agency for International Development (USAID) is spearheading a campaign to introduce GM crops and food in the South, especially Africa. For example, USAID is funding the African Agricultural Technology Foundation (AATF), which is also supported by biotech firms Monsanto, Dow Chemicals, DuPont and Syngenta. Environmental lawyer Mariam Mayet is concerned that “AATF may be a vehicle to use poverty and the urgent need for food security strategies in Africa to push for the opening of markets by sharing patents and seeds and taking control of African agricultural research.”[205] In Nigeria, USAID will provide US\$2.1 million over three years to fund an initiative titled the Nigeria Agriculture Biotechnology Project. The US embassy’s Rick Roberts told the *Daily Times* that “Nigeria stands to benefit greatly from biotechnology” and he “charged Nigeria to embrace biotechnology as a means of improving agricultural productivity, reducing the use of pesticides and improving nutritional quality of food products”.[206] USAID is also funding various projects aimed at producing biosafety regulation in African countries. USAID’s Agricultural Biotechnology Support Project has set up a partnership with seven countries in southern Africa to provide training in biosafety regulatory implementation. USAID is explicitly promoting WTO rules as a basis for regulation rather than the Cartagena Protocol. USAID has awarded US\$14.8 million to the Program for Biosafety Systems to assist countries in the South improve their Biosafety policy and research. The Program for Biosafety Systems aims to help government regulate and carry out GM field trials.[207]

Meanwhile, the UN Environment Programme is carrying out a programme involving more than 120 countries to prepare “National Biosafety Frameworks in accordance with the relevant provisions of the Biosafety Protocol”.[208] Rather than encouraging bans on GMOs, UNEP’s advice encourages these countries to draft flexible rules to allow GMOs into their territories.

At the national level, various countries have attempted to put in place controls on imports and use of GMOs on their territories.

In June 2004, the German parliament passed a new law regulating GMOs.[209] The law limits the area on which GMOs can be grown and calls for a national register of GMOs. The law also makes farmers liable for damages if their GM crops contaminate crops in other farms. After the law was announced, Georg Foltmann, a spokesperson for Germany’s largest seed supplier KWS Saat told the *Tagesspiegel* that because of the government’s strict liability regulations “nobody will plant genetically modified plants in Germany”.[210]

For two years, up to 31 October 2003, the New Zealand government imposed a moratorium on all field trials or releases of GMOs.[211] The moratorium allowed the government to implement the recommendations of a 2001 Royal Commission on Genetic Modification. The Royal Commission concluded that “New Zealand should keep its options open.” The commissioners stated that “It would be unwise to turn our back on the potential advantages on offer, but we should proceed carefully, minimising and managing risks”.[212] However, a poll carried out for the *New Zealand Herald* in August 2003 revealed that more than two-thirds of the people surveyed opposed lifting the moratorium on GM releases.[213]

Applications for importing, development or field testing of GMOs in New Zealand must be filed with the Environmental Risk Management Authority (ERMA). New Zealand-based GM company Forest Research describes ERMA’s regulations as “the strictest in the world”.[214] In 2004, ERMA introduced new rules which according to a

report in the *New Zealand Herald* are strict on safety, give more weight to Maori views on GMOs and give consideration to “the lost opportunity to do other more valuable research”.^[215] Between the end of the moratorium on GMOs in October 2003 and May 2004, ERMA received no applications for commercial releases of GMOs.^[216]

In March 2004, at a biotechnology forum in Auckland, Rubicon’s vice-president Bruce Burton said, “ArborGen is looking to start developing GE radiata [pine], and one of the questions it has is that the regulatory environment here is too tough.” Rubicon is part of the ArborGen joint venture, with US firms International Paper and Meadwestvaco. “Our US partners say the costs and the potential threats of the greenies are too high, so we’ll carry on doing tests in the US and Brazil,” Burton added.^[217]

In Brazil, President Luiz Inacio Lula da Silva has made a series of decrees allowing the marketing of illegally grown GM soya, despite a moratorium on GMOs in the country.^[218] Lula’s administration has also produced a Biosafety Bill to replace a 1995 law. The Senate passed the Bill in October 2004. Meanwhile Brazil’s National Committee on Biosafety has issued several permits for research into GM trees in Brazil, including to pulp firms Aracruz and Suzano.^[219]

Chile’s regulation of GMOs amounts to little more than a green light for the biotech industry. Chile’s draft policy on biotechnology is titled, “Biotechnology as a tool for development and wellbeing”.^[220] The policy includes plans to increase the use of biotech processes in forestry.

China’s regulatory system depends on risk assessment. According to Roger Sedjo of Resources for the Future, new plants (including GM plants) are assessed against a risk scale: no risk, low risk, medium risk and high risk. Regulations cover only those plants considered to be medium or high risk. Plants considered to be no risk or low risk are not covered by any regulation.^[221]

Regulation of GMOs in China is covered by the Biosafety Act for GMOs in Agriculture, adopted by the State Council in May 2001. Before GM trees can be planted an expert panel organised by the State Forestry Administration carries out a technical assessment. The National Committee for Biosafety of GMOs in Agriculture bases its decision whether to approve the GM trees for release on the panel’s report.^[222] A lack of coordination between the Ministry of Agriculture and the State Forestry Administration has resulted in bureaucratic confusion. Even worse, the State Forestry Administration has no specific regulations covering GM trees.^[223] “Special regulations are in the pipeline,” according to Huoran Wang of the Chinese Academy of Forestry in Beijing^[224]. In July 2004, at a meeting on GMO safety in Beijing, Chinese scientists called for stricter regulations of GMOs in China.^[225]

The country with the most research into GM trees, the US, has a woefully inadequate regulatory system. Three regulatory bodies are responsible for regulating biotechnology: the US Department of Agriculture (USDA), Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA).^[226] Within USDA, the Animal and Plant Health Inspection Service (APHIS) is responsible for regulating importation, movement between states or field testing of GMOs. The three institutions sometimes have overlapping authority. GM trees with reduced lignin only need approval from APHIS, whereas insect resistant or herbicide tolerant GM trees need approval from EPA as well as APHIS.^[227]

Once they have carried out field trials, companies can petition APHIS to request nonregulated status. If granted, nonregulated status means that GMOs can then be planted just like any other crop.^[228] APHIS has no mechanism for regulating commercial GM tree plantations once it has approved them. Faith Campbell of the US NGO American Lands Alliance asks, “It is widely recognized that any plantations of GE trees allowed to be planted must be managed

according to strict criteria to minimize the risks – but who will develop the standards and ensure that they are met?”.

[229]

US-based ArborGen is the world’s biggest forestry biotechnology company. The company currently has 51 field trials of GM poplar, eucalyptus, pine, sweetgum and cottonwood trees in the US.[230]

ArborGen is a joint venture of timber giants International Paper, Meadwestvaco, Rubicon and New Zealand-based biotechnology company Genesis Research and Development. ArborGen aims “to position itself to market new advances in forestry biotechnology to the world’s tree growers in the shortest possible time”, according to a 1999 press release.[231]

If ever there was a company that needed to be carefully regulated, ArborGen is it. Yet the USDA has only turned down one of ArborGen’s applications for GM tree field trials and that was on a technicality. ArborGen has not had to submit an environmental impact assessment for any of its GM tree field trials.

It gets worse. The regulators face a conflict of interest, in that the “experts” that they turn to for advice are the very scientists who are doing the research into GM trees. For example, when US regulator Environmental Protection Agency wanted a study of the risks associated with GM trees, it turned to the Tree Genetic Engineering Research Cooperative (TGERC) to carry out the study.[232]

TGERC is a consortium of timber and pulp companies conducting research into GM trees at Oregon State University. [233] Companies involved include Potlatch Corporation, Weyerhaeuser, International Paper, Alberta Pacific and Aracruz. Since 1997, TGERC has conducted more than 60 field trials of GM trees in the US.

Forestry certification and GM trees

Given the failure of many governments to provide adequate legislation on the development of GM trees and the lack of discussion of GM trees at international fora such as the UN Forum on Forests, the idea of using market mechanisms to promote non-GM forestry might appear to be an attractive proposition.

Consumers could vote with their dollars by refusing to buy paper, for example, that comes from GM tree plantations. [234] Instead of hoping for governments to produce adequate international and national legislation, consumers could send a message to the pulp and paper industry that this technology is something that they do not want.

An independent certification system which guarantees that products carrying its label are from forestry operations which exclude GM trees would (in theory at least) reward companies that do not plant GM trees and provide consumers with the information they need to avoid products made from GM trees. At present, the Forest Stewardship Council is the only certification organisation that excludes the use of GMOs in its certified forestry operations. Among the criteria by which FSC judges whether a forest or plantation operation is well managed is the statement: “Use of genetically modified organisms shall be prohibited.”[235] FSC’s supporters argue that this is an incentive for companies who want to get certified not to use GM trees.

However, FSC has certified millions of hectares of large-scale industrial non-GM tree plantations. FSC does not differentiate between industrial tree plantations and forests: “Plantations are included in the FSC definition of forests,” according to an FSC leaflet published in November 2003.[236] An FSC label on photocopy paper, for example, does not explain whether the company that produced the paper grew its raw material on thousands of hectares of monoculture of exotic eucalyptus trees or whether it bought the wood from thousands of small-scale

farmers growing trees in mixed native woodlands on their own lands. Consumers know through buying paper with an FSC label that no GM trees were involved in the production of the paper, but this is little consolation for farmers in the South who have seen their lands and livelihoods devastated by massive industrial tree plantations.

In addition, FSC does not rule that certified companies should not carry out GM tree research, simply that no GMOs should be used in the certified forestry operations. Potlatch Corporation, for example, has received an FSC certification for its 7,000 hectares of poplar plantations in Oregon. In 2000, when Potlatch made the decision to seek FSC certification, the company had a 1.2 hectare field trial of GM trees, in a partnership with Oregon State University.^[237]

Before the certificate was issued, FSC's assessors, Scientific Certification Systems insisted that the GM trees were removed. SCS's public summary of their August 2001 assessment states: "As part of Potlatch's commitment to FSC they severed their long-term relationship with Oregon State to research genetically modified hybrid poplars on the . . . plantation".^[238] However, Potlatch continued to support GM tree research at Oregon State University. In 2002, Potlatch research manager Jake Eaton told Science magazine: "We just can't do it on our farm".^[239]

Scientific Certification Systems also carried out an assessment for FSC of Fletcher Challenge Forests in New Zealand.^[240] At the time that the certificate was awarded in October 2000, Fletcher Challenge Forests had worked for five years in partnership with Genesis Research and Development Corporation on research into GM trees. The year before the certificate was awarded, Fletcher Challenge Forests joined the US\$60 million ArborGen GM tree research joint venture.

SCS's assessment team also had links with GM trees as well as with the company they were assessing, calling into question the independence of the assessment. SCS hired four assessors to conduct the assessment of Fletcher Challenge Forests' plantations. Three of them worked for the New Zealand company Forest Research which at the time ran projects funded by Fletcher Challenge Forests and has its own research programme into GM trees. Forest Research established New Zealand's first GM tree field trials in 2003. Perhaps not surprisingly, the assessors dismissed any concerns about Fletcher Challenge Forests' GM tree research. "All materials are classed as low risk and the laboratory is fully compliant with regulatory requirements," stated SCS's public statement.

But the most serious problem with any certification system as a potential means to control the use of GM trees is the fact that certification is voluntary. In addition to FSC, several other certification systems are available, none of which object to the use of GM trees. If a company, such as International Paper, decides it does not want to bother with the hassle of getting certified it can plant as many GM trees as it wants. FSC, in common with all other forest certification systems, contains no mechanism for penalising a company that breaks its rules.

[5. Resistance is fertile: Protests against GM trees »](#)

Footnotes

[183] IUFRO's Position Statement on Benefits and Risks of Transgenetic Plantations is available [here](#).

[184] Quoted in Kristina Brenneman, [Genetic tree farmers slammed by activists](#), *Business Journal* (Portland), 26 November 1999.

[185] [Measures Affecting the Approval and Marketing of Biotech Products](#), First Written Submission by the European Communities to the World Trade Organisation, Geneva 17 May 2004.

[186] Phillip Jones, [Turf wars and other conflicts in the US regulation of GM plants](#), ISB News Report, USA, June 2004.

Eli Kintisch, [Biotechnology now offers a new golf course grass](#), *St. Louis Post – Dispatch*, USA, 5 May 2004.

Monsanto-Scotts' 432-page petition is available [here](#).

[187] Andrew Pollack, [Genes from engineered grass spread for miles, study finds](#), *New York Times*, 21 September 2004.

[188] UN Framework Convention on Climate Change, [Report of the conference of the parties on its ninth session, held at Milan from 1 to 12 December 2003, Addendum Part Two: Action taken by the conference of the parties at its ninth session](#).

[189] [Final Report](#), Workshop on Forests and Forest Ecosystems: Promoting synergy in the implementation of the three Rio conventions, organised by the UNCCD and CBD secretariats, in cooperation with the UNFCCC Secretariat, 5-7 April 2004, Viterbo, Italy.

[190] For my report on the side event on GM trees at UNFF-4, see [GM trees cause memory loss](#), published in WRM Bulletin 82, May 2004.

[191] Steven Strauss, Regulating Biotechnology as though Gene Function Mattered, *BioScience*, Vol. 53, No. 5, May 2003.

[192] Canadian Supreme Court Tramples Farmers' Rights – Affirms Corporate Monopoly On Higher Life Forms, [Action Group on Erosion, Technology and Concentration Group \(ETC\)](#) press release, 21 May 2004.

[193] Cartagena Protocol on Biosafety takes effect, Secretariat of the Convention on Biological Diversity Press Release, 9 September 2003.

[194] [Cartagena Protocol on Biosafety](#), Secretariat of the Convention on Biological Diversity.

[195] [FoEI press release on Cartagena Protocol meeting](#), Friends of the Earth International, 27 February 2004.

[UN announces new measures to boost safety in trade of genetically modified organisms](#), United Nations Environment Programme, Kenya, 27 February 2004.

[196] Mariam Mayet, [The Cartagena Protocol on Biosafety – a first step towards safety](#), Biowatch, South Africa.

[197] [Understanding the WTO Agreement on Sanitary and Phytosanitary Measures](#), World Trade Organisation, May 1998.

- [198] [Measures Affecting the Approval and Marketing of Biotech Products](#), First Written Submission by the European Communities to the World Trade Organisation, Geneva 17 May 2004.
- [199] Global coalition submits anti-GMO case to WTO, Greenpeace International, press release, 27 May 2004.
- [200] Tewolde Egziabher, Statement on Cartagena Protocol on Biosafety, 4 September 2003.
- [201] Kristin Dawkins, [Behind US Challenge of Europe on GMOs](#), Institute for Agriculture and Trade Policy, USA, 9 September 2003.
- [202] [Measures Affecting the Approval and Marketing of Biotech Products](#), First Written Submission by the European Communities to the World Trade Organisation, Geneva 17 May 2004.
- [203] . Roger Sedjo, [Transgenic Trees: Implementation and Outcomes of the Plant Protection Act](#), Resources for the Future discussion paper 04–10, April 2004.
- [204] [US and biotech corporations impose genetically modified organisms worldwide under WTO threats](#), Friends of the Earth International press release, 17 December 2001.
- [205] Mariam Mayet, Africa-the new frontier for the GE industry, African Centre for Biosafety, South Africa, January 2004.
- [206] Quoted in [Nigeria poised for biotech take-off, Daily Times, 11 May 2004](#).
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- [207](#)] Mariam Mayet, Africa-the new frontier for the GE industry, African Centre for Biosafety, South Africa, January 2004.
- [208] [Measures Affecting the Approval and Marketing of Biotech Products](#), First Written Submission by the European Communities to the World Trade Organisation, Geneva 17 May 2004.
- [209] [Bundestag Passes Stringent Law on Genetically Modified Crops](#), *Deutsche Welle*, Germany, 18 June 2004.
- [210] Quoted in [Green Biotechnology Possibly Facing an End](#), *Tagesspiegel*, Germany, 3 July 2004.
- [211] [Voluntary GM moratorium extended](#), Environmental Risk Management Authority New Zealand Press Release, 27 August 2001.
- Claire Gibson and Neil Ericksen, [Moratorium on Genetic Modification](#), in 2003 Top News on Environment in Asia, Institute for Global Environmental Strategies, Japan, 2003.
- [212] [How is genetic engineering regulated in New Zealand?](#) Forest Research, New Zealand.
- [213] Simon Collins, [Buried treasures: Stink surrounds GM onions](#), *New Zealand Herald*, 20 January 2004.
- [214] [How is genetic engineering regulated in New Zealand?](#) Forest Research, New Zealand.
- [215] Simon Collins, [Buried treasures: Stink surrounds GM onions](#), *New Zealand Herald*, 20 January 2004.

- [216] Kevin Taylor, [100 staff await first GM application](#), *New Zealand Herald*, 30 April 2004.
- [217] Quoted in Simon Collins, [Rubicon retreats in face of GM cost](#), *New Zealand Herald*, 16 March 2004.
- [218] Marcelo Leite, [Why we need a new forum for the public debate on biotechnology](#), SciDev.Net, 12 July 2004.
- [219] E-mail from Gabriel Dehon Rezende, Forest Improvement Manager at Aracruz, 23 July 2004.
- Suzano Bahia Sul invests in biotechnology, Institute for Development of Eucalyptus Applications (IDEA), May 2002.
- [220] Claudia Orellana, [Chile launches policy to boost biotech](#), *Nature Biotechnology* Vol. 22, No. 1, January 2004, p. 7-8.
- [221] Roger Sedjo, [Transgenic Trees: Implementation and Outcomes of the Plant Protection Act](#), Resources for the Future discussion paper 04-10, April 2004.
- [222] Houran Wang, The State of Genetically Modified Forest Trees in China, unpublished manuscript.
- [223] [Stricter Rules Needed on GMOs](#), *China Daily*, 19 July 2004.
- [224] Houran Wang, The State of Genetically Modified Forest Trees in China, unpublished manuscript.
- [225] [Stricter Rules Needed on GMOs](#), *China Daily*, 19 July 2004.
- [226] David Heron and John Kough, [Regulation of Transgenic Plants in the United States](#), in Steven Strauss and H.D. Bradshaw (eds), *Proceeding of the First International Symposium on Ecological and Societal Aspects of Transgenic Plantations*, College of Forestry, Oregon State University, 2001.
- [227] Roger Sedjo, [Transgenic Trees: Implementation and Outcomes of the Plant Protection Act](#), Resources for the Future discussion paper 04-10, April 2004.
- [228] David Heron and John Kough, [Regulation of Transgenic Plants in the United States](#), in Strauss, Steven and H.D. Bradshaw (eds) *Proceeding of the First International Symposium on Ecological and Societal Aspects of Transgenic Plantations*, College of Forestry, Oregon State University, 2001.
- [229] Faith Campbell, [Genetically Engineered Trees: Questions Without Answers](#), American Lands Alliance, July 2000.
- [230] [APHIS database](#) downloaded 17 May 2004.
- [231] AAP Information Services, [Forestry Biotechnology Joint Venture Announced](#), 7 April 1999.
- [232] Faith Campbell, [Genetically Engineered Trees: Questions Without Answers](#), American Lands Alliance, July 2000.
- [233] [TGERC Profile History and Structure](#), Tree Genetic Engineering Research Cooperative, University of Oregon.

[234] The expression “voting with your dollars” comes from David Korten, *The post corporate world: Life after capitalism*, Berrett Koehler, San Francisco and Kumarian Press 2000, quoted in [George Monbiot](#), *The Age of Consent: A manifesto for a new world order*, Flamingo, UK, 2003.

Monbiot has an interesting commentary (page 55-62) on the limits of consumer democracy and fair trade systems, including a reference to FSC. He concludes: “This is not to say that voluntary fair trade is pointless – it has distributed wealth to impoverished people – simply that, while it encourages good practice, it does not discourage bad practice.”

[235] FSC [criteria 6.8](#).

[236] [Forest Plantations](#), Forest Stewardship Council International Centre leaflet, November 2003.

FSC is currently carrying out a [review](#) of its certification of plantations.

[237] Charles Mann and Mark Plummer, [Forest Biotech Edges Out of the Lab](#), *Science*, Vol. 295, No. 5560, 1 March 2002.

[238] [Public Summary of Forest Management Certification Evaluation on the Plantation Forests of Potlatch Hybrid Poplar Plantation Operations Boardman, Oregon](#), Scientific Certification Systems, June 2003.

[239] Quoted in Charles Mann and Mark Plummer, [Forest Biotech Edges Out of the Lab](#), *Science*, Vol. 295, No. 5560, 1 March 2002.

[240] See my article [The case of Aotearoa/New Zealand](#), published in WRM’s special bulletin on FSC certification of plantations, February 2001.

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