

# Genetically-modified trees: starting points for dialogue

Peter Kanowski


The Fenner School of Environment & Society

[fennerschool.anu.edu.au](http://fennerschool.anu.edu.au)

[peter.kanowski@anu.edu.au](mailto:peter.kanowski@anu.edu.au)

# Context 1: TFD Scoping Dialogue

## The Forests Dialogue



The Forests Dialogue

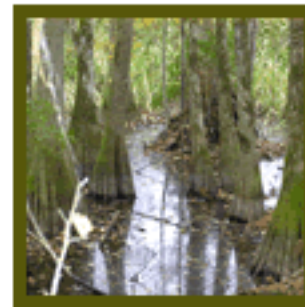
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**Upcoming Events**

*Full Calendar*

**Priority Issues**



### Latest News

10 – 11 November 2011 – **TFD's Genetically Modified (GM) Trees Scoping Dialogue**, New Haven, CT, USA

“TFD stimulates ... collaborative solutions to difficult issues facing forests & people”

TFD Strategic Plan 2011-2015

[www.theforestdialogue.org](http://www.theforestdialogue.org)



# Context 1a: other dialogues



Food and Agriculture  
Organization of the  
United Nations

*for a world without hunger*

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FAO's Activities

## Agricultural Biotechnologies

in crops, forestry, livestock,  
fisheries and agro-industry



### GMOs in the pipeline – FAO e-mail conference

From 5 November to 2 December 2012 the FAO Biotechnology Forum is hosting its next e-mail conference, which has the provisional title "GMOs in the pipeline: Looking to the next five years in the crop, forestry, livestock, aquaculture and agro-industry sectors in developing countries". Its goal is to inform the debate about genetically modified organisms (GMOs) in the pipeline, considering the specific kind of GMOs that are likely to be commercialised in developing countries over the next five years and to discuss their potential implications. The conference is open to everyone, is free and will be moderated. To subscribe to the conference, send an e-mail to [listserv@listserv.fao.org](mailto:listserv@listserv.fao.org) with the following one line in the body of the message (leave the subject line blank):

subscribe biotech-room2-L firstname lastname

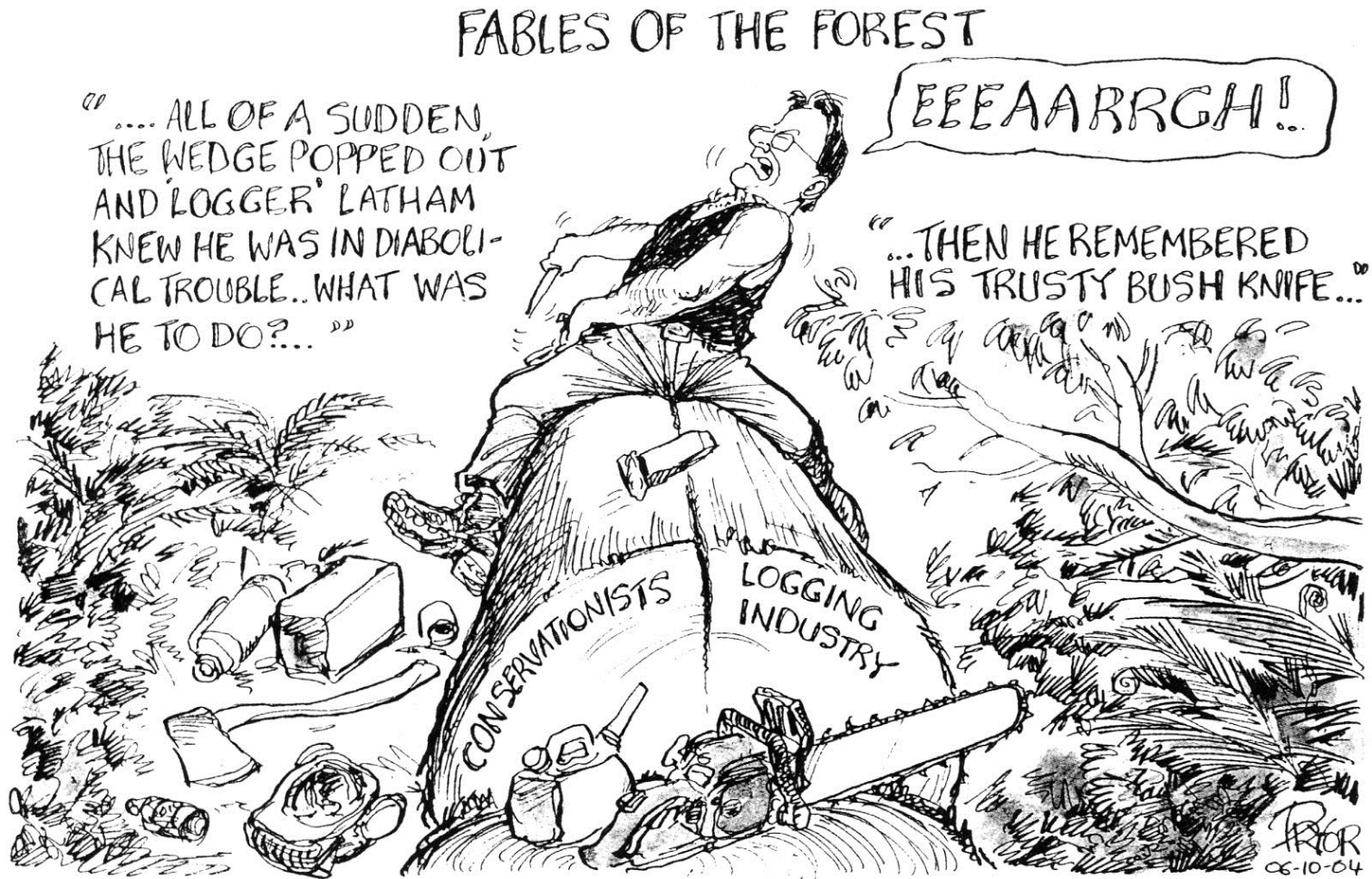
Where firstname and lastname refer to the person's first and last name. For example, if the subscriber's name is John Smith, then the line should be:

subscribe biotech-room2-L John Smith

A background document is being prepared and will be sent to Forum members before the conference begins and placed on the Forum website, at <http://www.fao.org/biotech/biotech-forum/en/>. For more information, contact [biotech-mod2@fao.org](mailto:biotech-mod2@fao.org).

28/09/2012

## Context 2: a(nother) wicked problem





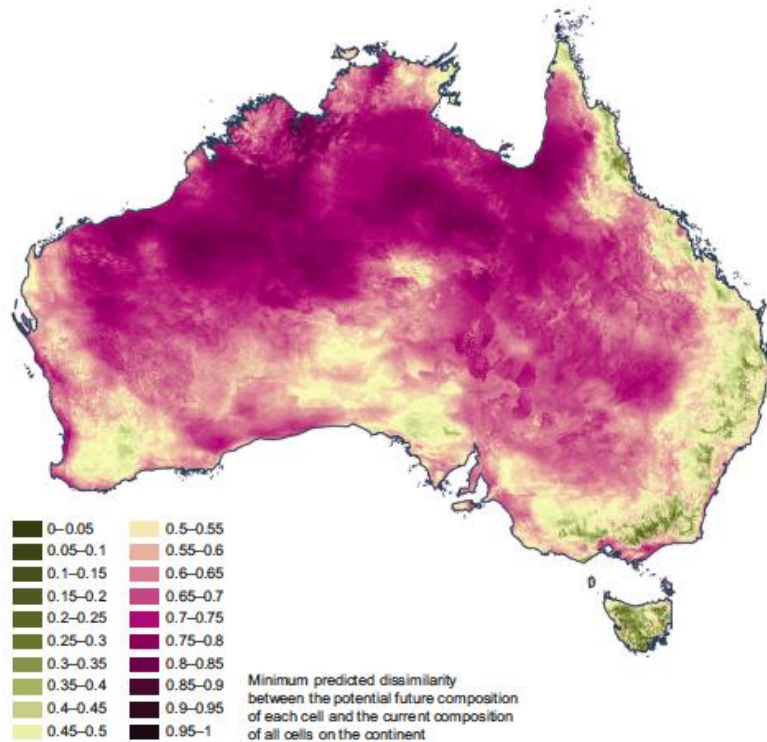
# Context 3: genetically-modified trees



- One biotechnology, amongst others
- “GM trees are those that have been modified using recombinant DNA & asexual gene transfer” Brunner et al 2007
- syn. ‘transgenic’ or ‘GE’ – see IUFRO/FAO 2010



# Context 4: the changing world (... of forests)



Source: Dunlop et al.<sup>21</sup>

Figure 5.22 Novel biotically scaled environments under the 2070 medium-impact scenario, based on vascular plant generalised dissimilarity modelling

Map: Dunlop et al 2011. CSIRO  
Photo: Stora Enso/ Veracel



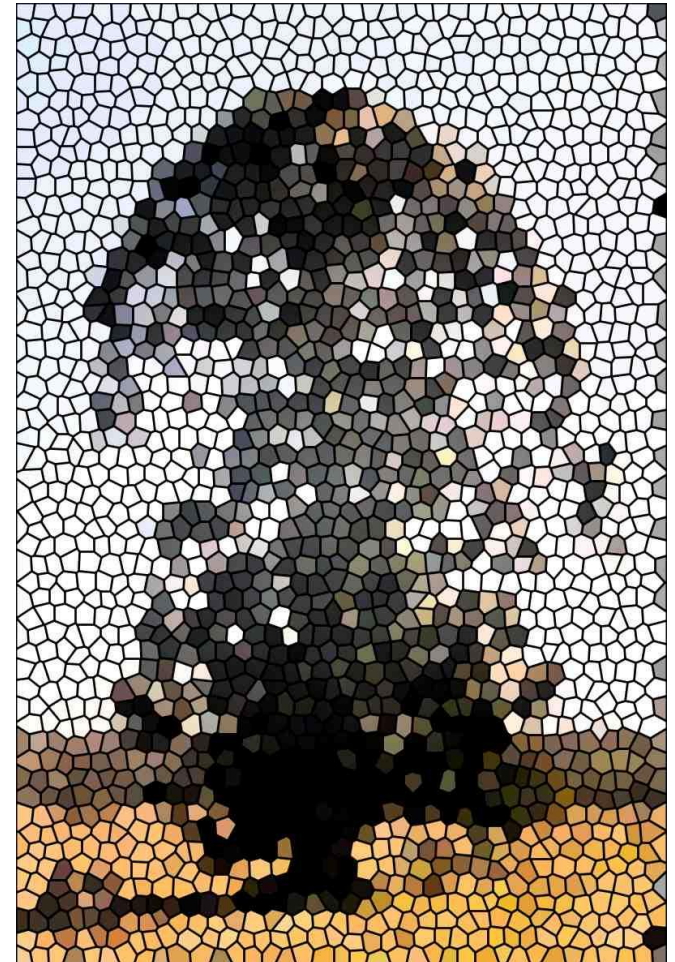
Changing climate  
& changing ecosystems ...

Changing production systems  
& changing products ...



## Context 5: a window of opportunity

- Rapid scientific advances  
“what is appropriate?”  
cf “what is possible?”
- Little GMt deployment
  - 450 ha poplar in China
  - 700 field trials globally
- Strong debate;  
but also reflection & learning?

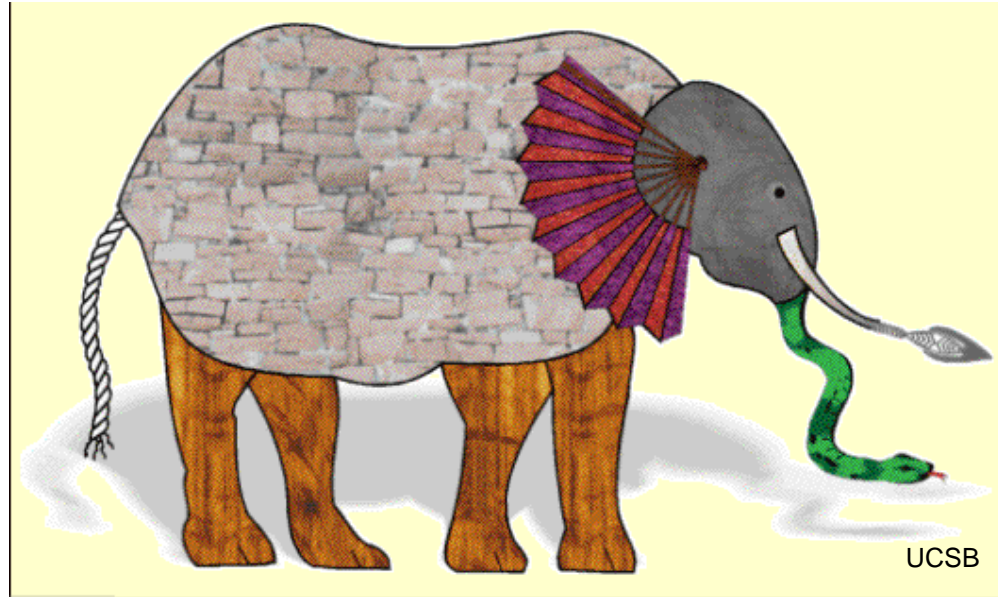


# GM trees: framing the issues





# GM trees – the agbiotech legacy



“Crudely put, the agricultural GM experience represents a warning, a cautionary tale of how not to assess an emerging technology and allay public concern.” Kearnes et al 2006: 291

# Not the agbiotech legacy?

## – trees are different ...

Compared to agricultural crops, forest trees are:

- part of diverse & extensive ecosystems
- long-lived & ‘natural’
- of strong cultural significance
- little domesticated
- not a major human food source
- more strongly regulated

# GM trees narratives

## Category

## Core position

### ‘Strong’ proponents

- GM technologies offer important benefits (eg productivity, adaptation, lesser impacts) that are impossible, or harder, to realise conventionally.
- Risks vary, & can be assessed & managed.
- Risk assessment should focus on product not process.

### ‘Conditional’ proponents or opponents

- GM technologies may offer benefits, but principally in ‘public-good’ applications.
- Levels of precaution & complementary action should be higher than for crops.

### ‘Strong’ opponents

- Industrial IMPF is (generally) unacceptable.
- Use of GM technologies will further disadvantage those already disadvantaged.
- The risks and costs of GM trees are unacceptable, & demand a very strong precautionary approach.

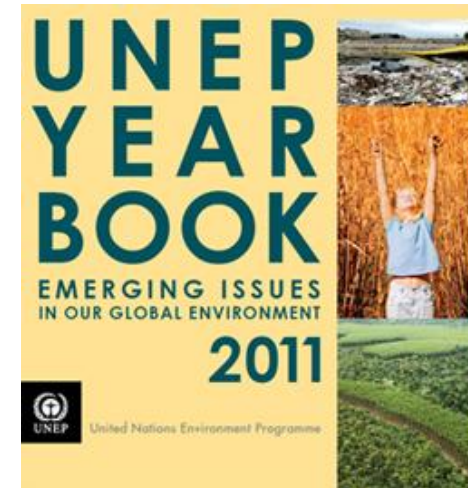
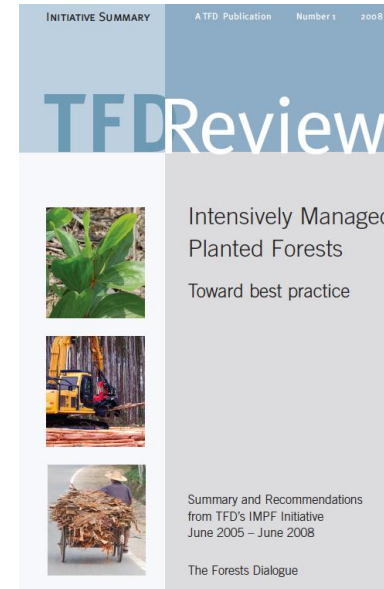




# In the larger context ...

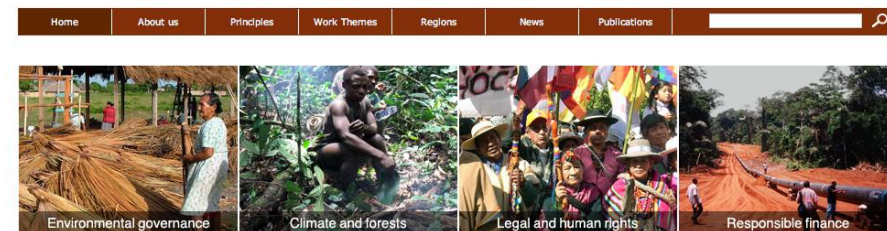


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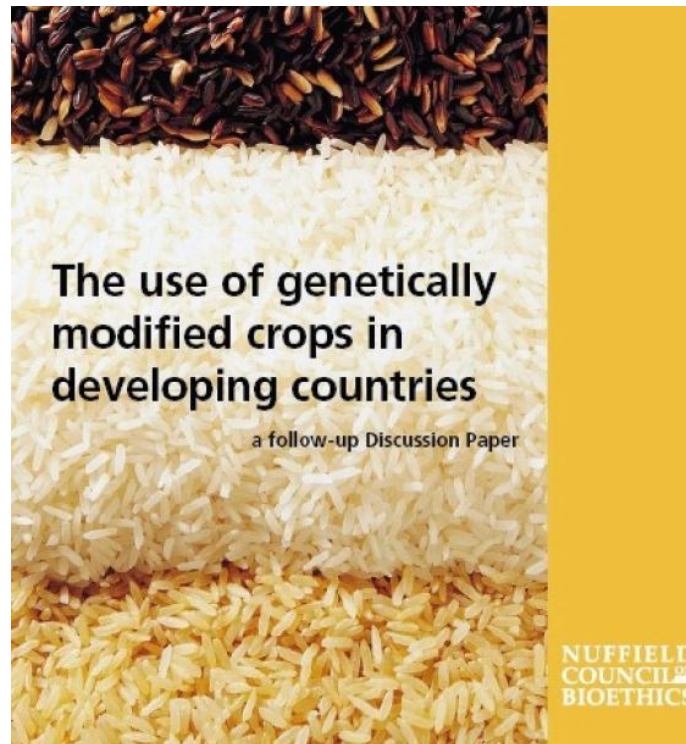
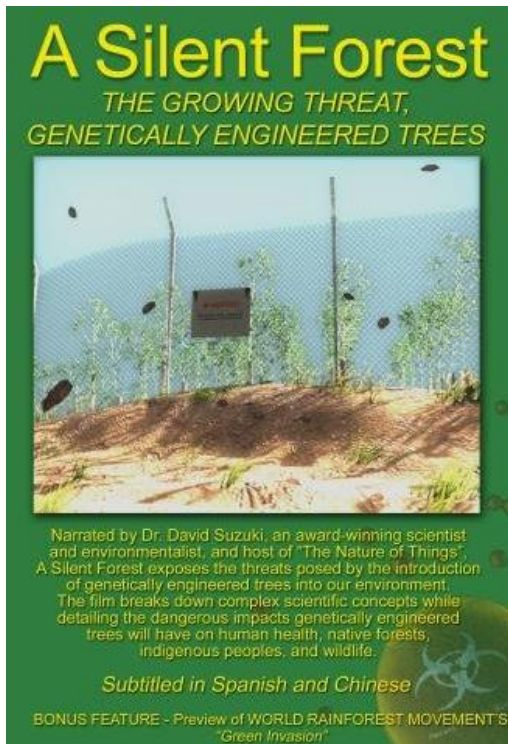
Español Français English

*Supporting forest peoples' rights*



# Key elements of GMt discourses #1

## Ethical considerations & moral imperatives

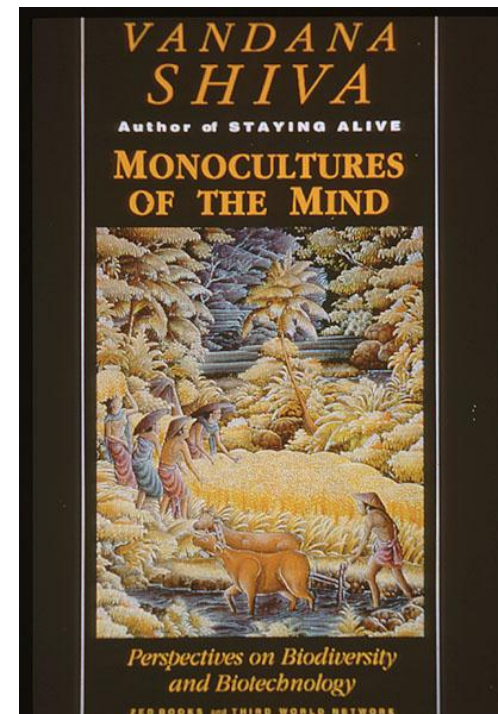


- (How) can ethics help us resolve these dilemmas?



# Key elements of GMt discourses #2

## Land & resource ownership & use



- How to achieve more equitable sharing: of benefits, costs & risks?



# Key elements of GMt discourses #3a

## Environmental benefits & risks

Benefits	Risks
<ul style="list-style-type: none"><li>▪ Adaptation: to new or altered environments</li><li>▪ Intensification of production: necessary to meet demands</li><li>▪ Increased returns along value chain</li><li>▪ Reduced environmental impacts associated with reduced inputs</li><li>▪ Recovery of doomed species</li></ul>	<ul style="list-style-type: none"><li>▪ Spread of transgenes: vertically, horizontally</li><li>▪ Potential ecosystem disruption: impacts on species &amp; processes</li><li>▪ Unstable gene expression</li><li>▪ Other unexpected effects</li></ul>

- General agreement that genetic confinement a prerequisite?

# Key elements of GMt discourses #3b

## Strategic benefits & risks



- Hard decisions, at many levels – ‘no regrets’?

# Governance & regulation: where world views collide ...

## Internationally



## Nationally

- Significant variation (approach, process, capacity)

## Non-state

- Significant consequence – eg FSC ban on GMt



# Dialogue about GM trees ...

## Opportunities & challenges

- learning from the genetic technologies/  
GM crop/ plant breeding debates
- learning from other forest(ry) experiences,  
including IMPF, LCF, 4Fs ...
- finding ways for the sciences (social & life)  
to inform, but not overwhelm
  - “in the absence of knowledge, precautionary approaches ... prevail”  
Boyd 2010
- generating knowledge at low risk

## In summary ...



- A ‘super-wicked’ (‘diabolical’) problem, but a window of opportunity
- Some instructive key learnings
  - “if modern biotechnology is to stand a chance, three main conditions ... utility, low risk, and an assurance that the biotechnology is used in a decent way” Gamborg & Sandoe 2010: 168-9
- Society needs scientific advance, but science needs legitimacy

## Dialogue about GM trees ...

### **3 interdependent but separable levels ...**

- Informing (real) dialogue
  - building shared understanding & trust
- Should we consider GM technologies in trees?  
eg what goals, which technologies?
  - what levels of public good/ public funding?
- For any GM technologies & products we may use,  
what are appropriate standards & governance?



# Key sources/ more information

Kanowski. 2011. *GM trees*. TFD background paper, + sources.  
[www.theforestdialogue.org](http://www.theforestdialogue.org)

El-Kassaby (ed). 2010. *Forests & GM trees*. IUFRO/FAO.  
[www.fao.org/docrep](http://www.fao.org/docrep) > ...

Global Justice Ecology Program. *Stop GM trees*.  
[www.globaljusticeecology.org](http://www.globaljusticeecology.org)

Institute of Forest Biotechnology. 2010. *Forest biotechnology ...*  
[www.forestbiotech.org](http://www.forestbiotech.org)

Murphy. 2007. *Plant breeding & biotechnology*. CUP.

Williams. 2010. Of forests and time ...  
*International Forestry Review* 12: 407

UNEP. 2007. *The potential ... impacts of GM trees*  
[www.cbd.int](http://www.cbd.int) > SBSTA > SBSTA13