

Government of the Federative Republic of Brazil  
International Energy Agency  
United Nations Foundation

**Assessing the Biofuels Option**  
**The Brazilian Experience:**  
**Environmental Dimension**

Paris, France, 20-21 June 2005

**Luiz Gylvan Meira Filho**

Visiting Professor  
Institute for Advanced Studies  
University of São Paulo  
São Paulo - Brazil

Aspects of the environmental  
dimension:

**Avoiding local environmental  
damage at production**

Brazil has solved by means of strict  
licensing and monitoring  
procedures

Aspects of the environmental  
dimension:

**Contributing to improving air  
quality at consumption**

Clear benefit to the air quality in  
cities

Aspects of the environmental  
dimension:

**Avoiding pressure on land-use  
change**

Increase in productivity  
Production area far away from  
fragile biomes

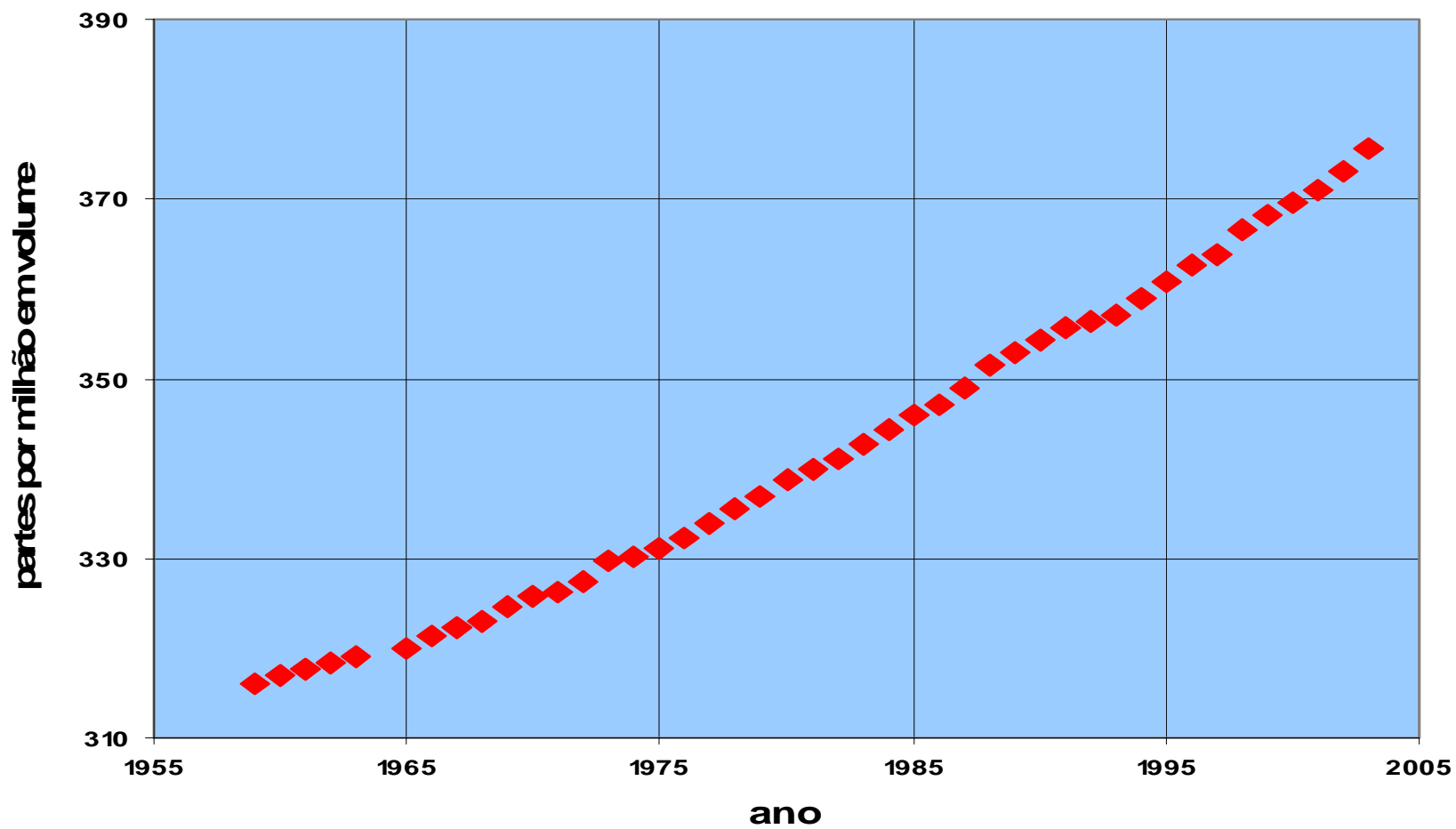
Aspects of the environmental  
dimension:

**Contributing to mitigation of  
climate change**

The main topic of this  
presentation

# concentração de gás carbônico na atmosfera terrestre

"Oak Ridge National Laboratory", Mauna Loa, Havaí



Every time we double the atmospheric concentration of carbon dioxide (or equivalent), we commit to an increase of the global mean surface temperature of 3 degree Celsius (the climate sensitivity).

# United Nations Framework Convention on Climate Change

[www.unfccc.int](http://www.unfccc.int)

Article 2: The long-term objective of the Convention is to stabilize the atmospheric concentration of greenhouse gases at levels that prevent dangerous anthropogenic interference with the climate system...

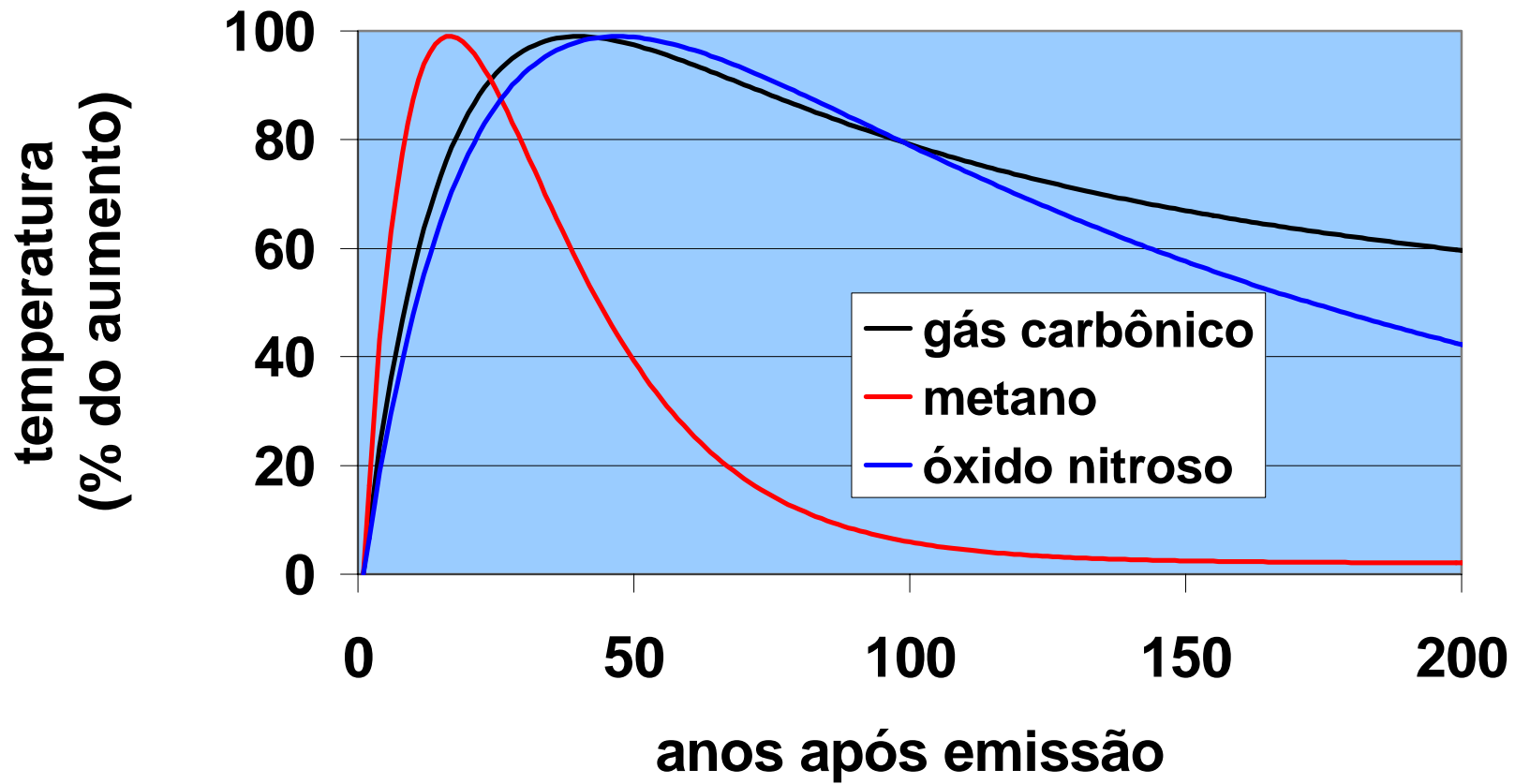
# Avoiding Dangerous Climate Change

[www.stabilisation2005.com](http://www.stabilisation2005.com)

Scientific Conference on the  
stabilization of atmospheric  
concentration of greenhouse gases

## máximo efeito sobre o clima ocorre décadas após a emissão

15% do gás carbônico permanece na atmosfera por mais de mil anos



In the long term, carbon dioxide is the main issue, because a fraction of all emissions remain in the atmosphere for a long time, over one thousand years, and the natural removal is compromised.

The only possibility of stabilizing the atmospheric concentration of carbon dioxide is so stabilize the emissions minus the removals.

Prof. Robert Socolow, at the Exeter Conference, argued that it is possible to do so by combining about a dozen different strategies – one of them is the use of renewables to generate energy.

For the sake of completeness, it must be remembered that renewable biomass beneficial to the mitigation of climate change also include the use of high-technology cloned eucalyptus to produce charcoal as an energy source and reducing agent in the production of iron and steel, as well as biodiesel.

The substitution of bagasse for fuel oil in the production of ethanol, combined with the substitution of ethanol for gasoline avoids the emission of 2.6 tons of carbon dioxide equivalent per cubic meter of ethanol fuel (anhydrous).

Under Brazilian production conditions, each unit of fossil energy used to produce ethanol from sugarcane results in 8.3 units of biomass energy.

In the U.S., using corn, each unit of fossil energy results in 1.34 units of biomass energy.

The lesson is that ethanol production in Brazil results in an exceptional contribution to the mitigation of climate change (global warming).

The replication to other tropical areas is contingent upon the study of soil conditions, appropriate plants and procedures.

Under the Kyoto Protocol, there may be incentives for the expansion of the ethanol program in developing countries.

Additional incentives would be needed to contemplate the case of ethanol production exported to industrialized countries, and in general to contemplate the extension of the international regime beyond the Kyoto Protocol.