

Biofuels: ethical issues



Dr Alena Buyx

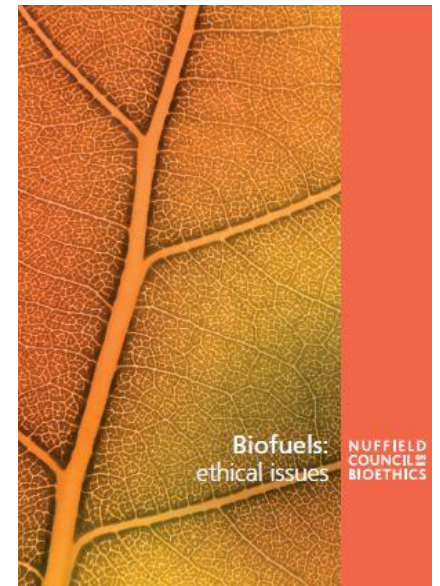
Nuffield Council on Bioethics

- Established in 1991
- Independent body – examines ethical questions raised by advances in biology and medicine
- Contributes to policy making and stimulates debate



Background to the report

- 12 person working party
- 10 meetings over 18 months
- 3-month public consultation
- Various kinds of evidence gathering sessions
- Peer review



The problem

- Fossil fuels increasingly unsustainable
- Efforts to reduce consumption are essential, but short and mid term need for liquid transport fuel will remain
- Biofuels are one of the few alternatives for energy for transport





Biofuels

- Currently only a small proportion of world energy use

Drivers

- Energy security
- Economic development
- Mitigation of climate change

Current policies

- The European Commission *Renewable Energy Directive* (2009)
- The European *Fuel Quality Directive* (2009)
- The UK *Renewable Transport Fuel Obligation (Amendment) Order* (2009)



Current biofuels

- Bioethanol: sugar/starch from crops such as sugar cane, or wheat
- Biodiesel: oils of crops such as palm, soybean, or sunflower
- 3 case studies illustrate **problems** of current biofuel production

Case study 1: US

- Food security: **'tortilla riots'** in Mexico
- GHG savings: **indirect land-use change**
- Water security: **high water demand**



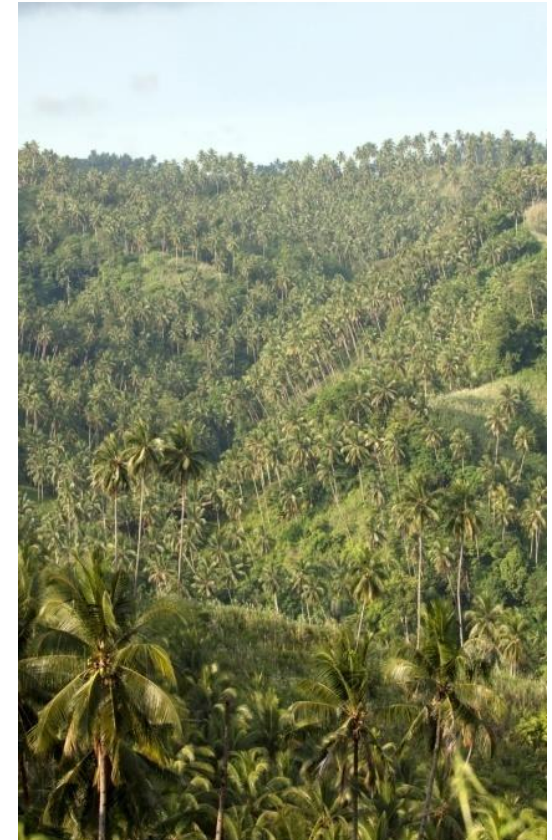
Case study 2: Brazil

- Environmental sustainability: **deforestation**
- Workers' rights: **'slave labour', unhealthy working conditions; informal child labour**



Case study 3: Malaysia

- Environmental sustainability: **deforestation** and **biodiversity losses**
- Human rights: **'land grabs'**, **disruption of subsistence economies**
- Food security: **rising price of palm oil** and foods that use palm oil





The story so far...

Production of current biofuels is largely unsustainable. We need to:

- Improve current production methods
- Continue to develop alternatives for the future

This report offers an ethical framework for policy making to enable more ethical production of biofuels.



Moral values

- Rights and global justice
- Solidarity and the common good
- Stewardship
- Sustainability
- Intergenerational equity



Ethical Principles

1. Biofuels development should not be at the expense of people's essential rights
2. Biofuels should be environmentally sustainable
3. Biofuels should contribute to a net reduction of total greenhouse gas emissions
4. Biofuels should adhere to fair trade principles.
5. Costs and benefits of biofuels should be distributed in an equitable way
6. If the first five principles are respected, depending on certain key considerations, there is a duty to develop such biofuels

1. Human rights

Key recommendations

- Biofuels targets should set out to avoid incentivising human rights abuses.
- The European Commission should set up effective monitoring systems for human rights.
- Compulsory certification of human rights standards for EU



2. Environmental sustainability

Key recommendation

- An international environmental sustainability standard for biofuels production should be developed, for example by the United Nations Environment Programme.



3. Climate change

Key recommendations

- A single international standard for assessing greenhouse gas emissions across the life cycle of biofuels.
- Policies on land use change should be set within a global, co-ordinated response to climate change.



4. Just reward

Key recommendations

- Biofuels targets set by the EU and the UK Government should promote fair trade principles.
- The UK Intellectual Property Office should develop a licence scheme for biofuels.



5. Equitable distribution

Key recommendation

- Policies should ensure benefits are shared equitably, e.g. through public-private-partnerships
- Future sustainability initiatives should not discourage local, small-scale production, particularly in developing countries that are fuel poor.





6: A duty?

If the first five principles are respected, depending on certain key considerations, there is a duty to develop such biofuels.

Key considerations:

- Absolute cost
- Alternative energy technologies
- Other possible uses of biomass
- Areas of uncertainty
- Irreversibility



Bringing it all together

- **Sophisticated target-based strategy**
- **Comprehensive ethical standard**
- **Enforced through a certification scheme**
- **Investment in new biotechnologies**
- **Apply to all related fields and technologies**

The standard should include:

- protection of human rights
- protection of the environment
- full assessment of greenhouse gas emissions
- fair trade principles
- access and benefit-sharing schemes



New biofuels technologies

Aim is to improve **efficiency** of biofuels production at all points in the supply chain and to **use less natural resources** such as land, water and fertilisers

1. Advanced Breeding
2. Genetic Modification
3. Improvement in Biotechnology of Processing

Advanced plant breeding approaches

- Can be used to test plant hybrids and select the variety with a desired trait
- One example currently underway is identification of genetic markers for developing high biomass yield in willow





Genetic modification

Genetic modification of plants

- Altered connections within lignocellulose
- More accessible source of sugars, leading to increasing yields

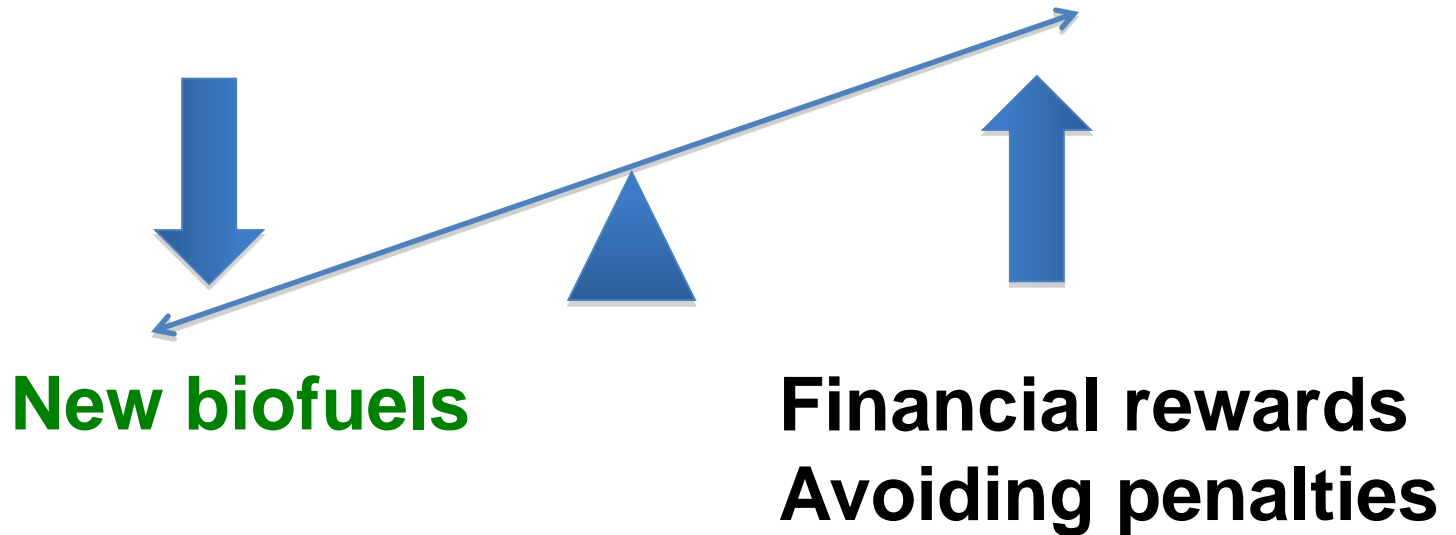
Genetically modified enzymes

- Enzyme for processing lignocellulose to ethanol or other biofuels
- Can use a variety of feedstocks
- Higher conversion yields, leading to lower processing costs

The problem with current targets

Lack of incentives

Established biofuels



Recommendation

In order to exploit the **full potential of biofuels, policies are needed** to investigate the application of new biotechnological approaches for **genetic improvement of crops**

