Setting global standards for sustainable biofuels development

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Biofuels Ablaze
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Climate change and society: the policy context
Innovation
Non-CO2 emissions
Indoor air pollution

Access to affordable energy
Economic development
Carbon substitution

Watershed management
Carbon sequestration
Employment
Innovation

Industry Administration
Industry
SME
Energy transmission, transportation & sale
Households

Farmers associations
Land-use administration

Farms, Landless
Agriculture/Forestry Administration

Development costs
Transaction costs
Transaction costs

Land Competition
Pesticide & Nutrient Leaching
Soil Degradation

SME

Juergens, FAO, 2004
Overview of Conversion Pathways
(biomass and waste)

Resources
- Solid Biomass *
  - Includes: Municipal waste
- Sugar-rich crops
  - e.g. Wheat, Maize, Sugar Beet
- Oil crops
  - e.g. Rape, Canola
- Wet Biomass *
  - Also waste fats and oils

Conversion Technologies
- Thermochromal
  - Gasification
  - Pyrolysis
- Biological
  - Fermentation
  - Extraction
- Mechanical
  - Anaerobic Digestion

Conversion Pathways

Fuels
- DME Dimethyl Ether
- Methanol
- F-Tropsch
- Ethanol
- Diesel
- Biodiesel
- Biogas
- CH4

Markets

Sources: DG TREN (Maniatis)

Notes:
- Combustion not shown
- * Includes Municipal waste
- Synthesis gas requires catalysts for upgrading
  - Indicates requirement of reformer

Source: DG TREN (Maniatis)
ATMOSPHERIC CO₂

**CO₂-Capture** by Photosynthesis
- crop growth -

**Ethanol**

**CO₂-Release** by End Use
- combustion in vehicles -

**GHGs**
- [N₂O+CH₄]

**Role of AD!**

**Carbon Capture & Sequestration**

**Leakage?**

**Fossil Energy**

**Other Inputs**
- e.g. water

**Co-products**

**ATMOSPHERIC CO₂**

**GHGs**
- [CO₂, N₂O, CH₄]

**Gas Markets**
UK- RTFO implications for E85 use in Somerset

‘Worst case’ GHG savings between 53% to -25%

Using ‘country level (conservative) default factors’ as defined by the UK-Renewable Transport Fuel’s Obligation Reporting Requirements (RTFO, 2007)

In practice UK Wheat-ethanol is likely to be closer to Brazil’s

120gCO₂/km tailpipe = c. 132 gCO₂eq/km LCA
What are the components of a credible [sustainability] scheme?

- **Standards** or set of criteria which defines ‘sustainable’
- Independent **certification** or verification to confirm standard is implemented
- **Accreditation** to control certification bodies
- **Product traceability** / supply chain control

See Nusbaum, Pro-forests, 2007: [www.ProForest.net](http://www.ProForest.net)
Standards → Principles → Criteria → Indicators

- **Principles**
  ‘general tenets of sustainable production’

- **Criteria**
  ‘Conditions to be met to achieve these tenets’

- **Indicators**
  How a farm, producer or company could prove that a particular criterion is met

Need to distinguish between ‘direct’ and ‘in-direct’ impacts
## Principles and Criteria for Biofuel Crops

Environmental standards for **biofuel crops** comprise the following 7 “Principles”, “Criteria.”:

<table>
<thead>
<tr>
<th>Principle</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation of carbon stocks</td>
<td>- Protection of above-ground carbon</td>
</tr>
<tr>
<td></td>
<td>- Protection of soil carbon</td>
</tr>
<tr>
<td>Conservation of biodiversity</td>
<td>- Conservation of important ecosystems &amp; species</td>
</tr>
<tr>
<td></td>
<td>- Basic good biodiversity practices</td>
</tr>
<tr>
<td>Sustainable use of water resources</td>
<td>- Efficient water use in water critical areas</td>
</tr>
<tr>
<td></td>
<td>- Avoidance of diffuse water pollution</td>
</tr>
<tr>
<td>Maintenance of soil fertility</td>
<td>- Protection of soil structure and avoidance of erosion</td>
</tr>
<tr>
<td></td>
<td>- Maintain nutrient status</td>
</tr>
<tr>
<td></td>
<td>- Good fertiliser practice</td>
</tr>
<tr>
<td>Good agricultural practice</td>
<td>- Use of inputs complies with relevant legislation</td>
</tr>
<tr>
<td></td>
<td>- Use of inputs justified by documented problem</td>
</tr>
<tr>
<td></td>
<td>- Safe handling of materials</td>
</tr>
<tr>
<td>Waste management</td>
<td>- Waste management complies with relevant legislation</td>
</tr>
<tr>
<td></td>
<td>- Safe storage and segregation of wastes</td>
</tr>
<tr>
<td>[GHG emissions from biofuels- not discussed here]</td>
<td></td>
</tr>
</tbody>
</table>
Draft(ing) A Meta-Standard

- Development of Meta-standard scheme
  - ACCS (UK)
  - EUREP GAP
  - RSPO - Palm
  - RTRS - Soy
  - BSI - Sugarcane
  - RFA – Small farmers

- Reporting Framework

- Multilateral actions
  - Area-wide monitoring
  - Sustainable investment planning
  - Critical ecosystem fund

SC = supplementary criteria

After Tipper et al, 2006
Some Principles and criteria require BOTH direct and indirect indicators, for example:

- Conservation of carbon stocks (Principle)
  - Protection of above-ground carbon (Criteria)
    - No exploitation of protected land (indicator)
      - Reference date is very important here!
    - Crop type/ residue retention / yield as proxy
    - Good land management or agricultural practice…
  - Protection of soil carbon (Criterion)
    - Crop type (indicator)
    - Harvesting of residues?
    - Soil type
    - Good land management or agricultural practice…
    - Previous land-use type
      - Reference date/system is very important here!
Assurance Pyramid
– credibility and complexity -

Adapted from: Jim Smith, BSI Professional Standards Services (his presentation to LCVP on 18Feb05)
Auditing, verification and accreditation

- Tracking chain-of-custody:
  - Track and Trace
  - Book and Claim (equivalence)
  - Mass Balance

- Accreditation of certifiers

- Acceptability of the relationship between indicators / criteria and principles…
Including GHG-certif^n & sustainability assurance national policy

- Initial reporting requirements assess the scale of sustainability issues and quantify GHG savings
  - Reporting encourages corporate social & environmental responsibility from fuel suppliers
- Robust sustainability reporting & assurance systems are needed to manage adverse social / environmental impacts
  - Mandatory requirements may breach trade rules
- A future incentive scheme would link award of RTFO certificates to the biofuels C-intensity
- Reporting of GHG saving is appropriate for testing new systems, but without incentives:
  - The market will source predominately low cost fuels - with a low GHG balance
  - £ / t C saved will be higher
  - Higher GHG saving processes are not encouraged
  - No incentives for new (including advanced conversion / 2nd Generation) technologies

Incentive scheme would link award of certificates to GHG saving

- 1 certificate for 1l fuel with 50% GHG saving
Rationale for certification

• Biofuel supply chains can be very complex
  – Geographically long and dispersed – almost all countries will be self-producers and importers e.g. Brazil
  – Very diverse and increasingly diverse
• For most indicators biofuels range from significantly better than the fossil fuel being replaced to worse than them
  – These indicators cover a very broad range of potential impacts – and they can be both direct and indirect
• International trade rules do not allow direct discrimination against imported products e.g. can’t simply say Malaysian palm oil biodiesel is bad and so won’t allow it (fuel or feedstock) to be imported.
• Biofuels are becoming cost-competitive – doing nothing is not an option
• Volumetric or production-based policy support may result in a race to the bottom
• Assurance and certification could act as the basis for a carbon-tax or other performance based reward systems.
  – It requires robust and practical methodologies
  – The continued involvement of the main stakeholders including scientists, industry – leading to public acceptability?
Assurance – what it can and can’t do

• Existing examples of EA capture most (if not all) of the indicators necessary, including; PEFC and FSC in the forestry sector

BUT:

• EA in forestry has not led to tangible reductions in deforestation or improvements to management outside the certified areas
• EA is unlikely to solve socio-environmental problems such as conflict over resources
Assurance – what it can and can’t do

- EA is not an effective substitute for good governance and regulation of natural resources. The best outcomes are achieved where good governance and EA go hand-in-hand.
- Does not protect smallholders from the deflation of global commodity markets. Assurance schemes tend to advantage larger players,
  - “group assurance schemes” can facilitate small producer entry.
- The credibility of EA schemes, as perceived by major NGOs, is largely dependent on the degree of participation and consultation in standard development.
- “Good practice” in the development of environmental standards has been set out by ISEAL.
On Trade:
‘Free trade would not be feasible in a world having both sustainable and unsustainable economies, because the former would necessarily count many costs to the environment and future that would be ignored in the growth economies. Unsustainable economies could then underprice their sustainable rivals, not by being more efficient but simply because they had not paid the cost of sustainability. Regulated trade under rules that compensated for these differences could exist, as could free trade among nations that were equally committed to sustainability. Many people regard such restrictions on trade as onerous, but in fact trade is currently heavily regulated in ways that are detrimental to the environment.’
Mitigating Climate Change

• Economics (Stern, 2007)
  – Capital costs
  – Operation & Maintenance costs
  – Land ‘rental’ costs / social costs

• Understanding ‘Direct’ & ‘Indirect Effects’
  – Read (2007)
  – Galbraith (2005)
# UK RTFO policy targets

<table>
<thead>
<tr>
<th>Annual RTFO Supplier Target</th>
<th>2008 – 09</th>
<th>2009 – 10</th>
<th>2010 –11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of feedstock meeting a Qualifying Environmental Standard</td>
<td>30%</td>
<td>50%</td>
<td>80%</td>
</tr>
<tr>
<td>Annual GHG saving of fuel supplied</td>
<td>40%</td>
<td>45%</td>
<td>50%</td>
</tr>
<tr>
<td>Data reporting of fuel characteristics</td>
<td>50%</td>
<td>70%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Main National / Global Programmes

- **UK**
  - Renewable Transport Fuels Obligation (April 2008)

- **Netherlands**
  - Cramer Commission (May07)

- **Global Round Table on Sustainable Biofuels**
  - Steering Board request for feedback and comments on draft principles from stakeholders around the world (05jun07)
    [http://www.bioenergywiki.net/index.php/Roundtable_on_Sustainable_Biofuels](http://www.bioenergywiki.net/index.php/Roundtable_on_Sustainable_Biofuels)

- **UN-FAO’s Global Bioenergy Platform**
  - Key input into the widely miss-quoted UN-Energy (2007) report

- **G8+5 Global Bioenergy Partnership**
  - GBEP-Secretariat@fao.org and coming soon:
    - [www.globalbioenergy.org](http://www.globalbioenergy.org)

- **Porter Alliance (UK)**
  - [http://www.porteralliance.org.uk](http://www.porteralliance.org.uk)
  - Major UK research network dedicated to the sustainable exploitation of biomass
The END