Draft Environmental Standards for Biofuels

A Report Commissioned by the LowCVP

By:
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Preface

The context for this work is the rapid growth in demand for biofuels for transport, driven by the European Biofuels Directive and, specifically within the UK, the forthcoming Renewable Transport Fuel Obligation (RTFO). Concerns about the possible environmental impacts of rapid increases in the supply of biofuels have led various organisations to call for the development of environmental standards in this area.

The Low Carbon Vehicle Partnership is a multi-stakeholder organisation with 210 members from the automotive and fuels industries, operators of major vehicle fleets, academics and consultants, NGOs and Government Departments. The Partnership provides a forum through which members can work together towards the shared goal of a lower carbon road transport sector.

A team, consisting of consultants and researchers from ECCM, ADAS, Themba Technology, Imperial College and IIED, was commissioned by LowCVP to prepare: *"a draft biofuels environmental standard that can form the basis for considerations within the Partnership on the final scope and content of the Standard*.". LowCVP members agreed the following principles and priorities to be considered in the development of the draft standards:

The (draft) standard should:

- Be appropriate for all biofuel feedstocks and production chains;
- Be practical to apply – companies are unlikely to adopt systems that cannot be easily applied at a reasonable cost;
- Be applicable to UK operations and provide appropriate equivalent criteria that should apply for imported fuels;
- Cover the full life-cycle from farm to forecourt – but prioritise criteria most likely to cause the greatest environmental harm;
- Be appropriate for use either as a voluntary or mandatory scheme;
- Define an "acceptable" level of environmental performance for fuels. This should be established at a level which is not unduly onerous for companies to attain but avoids operations leading to significant environmental harm;
- Define a "higher" level of environmental performance. This should be set at an aspirational level at which production of the fuel leads to some environmental benefit and no detriment. Companies complying with this level of environmental performance would usefully do so in order to market their product as environmentally beneficial;
- Be relevant to the operations of farmers, biofuel suppliers and oil companies (the latter two cascading responsibility for meeting the standard through their supply chains);
- Be independently verifiable through auditing of records and procedures;
- As far as practicable complement and not duplicate existing schemes;
- Be capable of evolving internationally. LowCVP hope that once a UK standard has been defined it will attract the interest of other countries and international organisations to develop the scheme more widely.

This work was undertaken in parallel with separate studies defining appropriate social criteria for inclusion in the biofuels sustainability standard and on-going work on greenhouse gas certification. These topics are therefore outside of the remit of this study.

The work was undertaken by a team of consultants and researchers, co-ordinated by ECCM:

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The development of the draft standards was overseen by a steering group, Chaired by the Secretariat of the LowCVP, that provided guidance on the priorities to be addressed, the scope of activities to be covered, and the emphasis to be placed on various points. The steering group included representatives of:

- BP
- Biofuels Corporation
- English Nature
- Friends of the Earth
- Greenergy
- Home Grown Cereals Authority
- Royal Society for the Protection of Birds
- Department for Transport (HM Gov't)
- Department for Environment, Food and Rural Affairs (HM Gov't)
- Neste Oil
- Renewable Energy Association
- Shell International Ltd
- UK Petroleum Industry Association

While the LowCVP sought to develop a consensus position on draft environmental standards for biofuels, and while the authors have sought to reflect the overall position, the draft standards and recommendations put forward in this report do not necessarily reflect the views or policies of any individual organisation or institution represented in the steering group.

EXECUTIVE SUMMARY

Demand for biofuels derived from oilseeds and starch/sugar crops is expected to grow rapidly over the next 10-20 years as a result of a combination of high fossil fuel prices and concerted policies promoting biofuels to address global warming and security of supply concerns. Within the UK, the key legislation leading to increased demand is the Renewable Transport Fuel Obligation (RTFO). The RTFO requires suppliers of transport fossil fuels to supply 5%v/v from renewable sources by 2010/11. Companies are also required to report on the sustainability and greenhouse gas savings of the fuel they supply.

There are concerns that rapid expansion of biofuels supply could lead to serious negative local environmental impacts including:

- Loss of biodiversity and ecosystem functions as a result of land use conversion from forest or other natural ecosystems to biofuel crops or plantations;
- Emissions of CO2 resulting from land use change, both from aboveground vegetation or soils (particularly peat or other high organic matter soils);
- Unsustainable use of water resources leading to water scarcity or reduced water quality and land degradation;
- Soil degradation or erosion, if biofuel crops are grown on unsuitable soils.

While existing agricultural practices and legal requirements may prevent or limit negative environmental impacts in many countries it is recognised by many stakeholders in the biofuels industry that an additional level of international assurance is required to secure industry credibility and maintain stable policy support. This is particularly important for the biofuel industry given the global nature of the transport fuel trade.

Environmental assurance schemes can be effective at ensuring products are sourced from landholdings where responsible agricultural or forest management practices are employed, thereby reducing the risk of harm to ecosystems and natural resources.

Experience of environmental assurance in forestry has shown that assurance schemes have limited impacts on land use decisions (e.g. deforestation processes) outside the certified areas. Environmental assurance schemes are not, therefore, an effective substitute for good governance and regulation of natural resources but can complement these systems. The forestry and agricultural sectors also demonstrate a trade-off between:

- The perceived credibility of schemes (by major NGOs), that is increased by the degree of participation and consultation in standard development, testing and promotion
- The speed of roll-out and take-up of the standard that is possible.

There are already several existing environmental assurance schemes in the agricultural and forestry sectors that are highly relevant to biofuels. However, the major (non-organic) agricultural assurance schemes are focused on food safety rather than environmental impacts.

On the whole, assurance schemes tend work to the advantage of larger landowners and agri-businesses. However, “group assurance schemes” can be used to facilitate entry of small producers. Environmental assurance schemes should not be thought of as offering protection to smallholder / specialist producers from the deflationary trends of global commodity markets.

This report describes the framework and draft standards that could operate for environmental assurance of biofuels. Before these can be finalised a governance structure would need to be put in place to complete and then operationalise the standards. The draft standard addresses both the production of crops used for biofuel; and, storage, transportation and processing of biofuel feedstocks and biofuels prior to the fuel duty point or blending with fossil fuels, whichever is first.

The draft standards for production of **biofuel crops** comprise the following "Principles", "Criteria.":

- Conservation of carbon stocks
  - Protection of above-ground carbon
  - Protection of soil carbon
- Conservation of biodiversity
  - Conservation of important ecosystems & species
  - Basic good biodiversity practices
- Sustainable use of water resources
  - Efficient water use in water critical areas
  - Avoidance of diffuse water pollution
- Maintenance of soil fertility
  - Protection of soil structure and avoidance of erosion
  - Maintain nutrient status
  - Good fertiliser practice
- Good agricultural practice
  - Use of inputs complies with relevant legislation
  - Use of inputs justified by documented problem
  - Safe handling of materials
- Waste management
  - Waste management complies with relevant legislation
  - Safe storage and segregation of waste

These are complemented by specific indicators that are identified as either "Basic Criteria" that are required for compliance with the standard; or, "Enhanced Criteria" that could be used as a basis for a higher level "green label" biofuel product.

Draft Standards for Storage, Transportation and Processing are also provided, covering issues of waste management and safety.

The study provides a number of recommendations for the further development and rollout of the environmental standard for biofuels.

1. The recommended structure for the scheme (that complies with the good practice guidelines agreed in the Uruguay Round of WTO[1]) is to develop a "**Meta-Standard"** building upon existing assurance schemes in the UK and internationally (notably, the ACCS and LEAF, EurepGAP, RSPO and other round-table initiatives). The meta-standard would work through a benchmarking (cross-compliance) framework which compares the requirement of the draft standard with the requirements of existing agri-environmental assurance schemes. Criteria not covered by these schemes could be encompassed within the proposed scheme through the development of "Supplementary Checks".

2. The most relevant schemes for benchmarking are:

[1] See Appendix 2.

- The Assured Combinable Crops Scheme
- EurepGAP
- LEAF Assurance Scheme
- Rainforest Alliance / Sustainable Agricultural Network Standard farm assurance standard
- The Roundtable on Responsible Palm Oil standard
- The Basel Criteria (draft standards for soybean cultivation)

3. A governance organisation and formal framework for decision making needs to be established before significant further development of the environmental standard for biofuels can be undertaken. The nature of the governing body and its supporting "critical mass" will influence the strategic approach to development (the degree to which it is led by buyers, producers or multiple stakeholders).

4. Whichever approach is taken to defining the standards, it will be important to involve a wide range of international stakeholders to reduce the risk of legal challenges or breakaway schemes.

5. Environmental reporting under the RTFO can proceed independently but in parallel with the new standard. It is recommended that a framework for reporting is put in place prior to the full development of the biofuel standard.

6. It should be recognised by all stakeholders that delivering against a new set of standards will take time to rollout. There is a danger that unrealistic expectations of instant adoption could have adverse impacts on the development of the industry. It is therefore suggested that a phased implementation plan is agreed by the industry and, if possible, key stakeholders.

7. Given that assurance schemes do not provide a complete solution to environmental issues around biofuel crops a number of additional "Multilateral Actions" to protect vulnerable ecosystems and safeguard long-term sustainability of biofuel production are needed. These could include:

    - The development of area-wide monitoring schemes for bioenergy crop ecosystems;
    - The establishment / strengthening of checks and balances on the investment process (note that many of the environmental impacts are set at the investment stage rather than production stage);
    - The establishment of a "Critical Ecosystem Fund" to protect key species and habitats.

CONTENTS

Section 1. Demand for Biofuels and Potential Impacts

Key Points

- Demand for biofuels derived from oilseeds and starch/sugar crops is likely to grow rapidly over the next 10-20 years.
- Rapid expansion of supply could have serious negative local environmental impacts, particularly on loss of biodiversity.
- The establishment of good practice and standards for biofuel production is important to secure industry credibility and stable public policy support.

1.1 Growth in Global and European Demand for Biofuels

Interest in biofuels is gathering pace around the world, stimulated by recent high oil prices, wider energy security worries and the spectre of climate change. Biofuels, e.g. bioethanol, biodiesel and biogas, appear to offer a mature alternative to oil-based transport fuels, which can at the same time substantially reduce GHG emissions at reasonable cost.

Within Europe a raft of policy initiatives are underway to increase the proportion of biofuels used in transport over the next decade:

- The *Biofuels Directive* (Directive 2003/30/EC) came into force in May 2003, and is specifically aimed at promoting biofuels in the transport sector. It provided indicative non-compulsory targets of 2% by 2005 to 5.75% by 2010 (by energy content). A 10% target has been proposed for 2015 (DTI, 2006) subject to certain criteria being met.
- The *Fuel Quality Directive* (98/70/EC), amended 2003, currently limits biofuels to a maximum of 5% by volume (significantly less than the Biofuels Directive target of 5.75% by energy). As a result, changes to the Fuel Quality Directive are being considered to allow greater proportions of biofuels in blends with gasoline or diesel.
- The very recent *Biofuels Strategy* (COM 2006:34) aims to further promote biofuels in the EU and developing countries, and prepare the EU for the large-scale use of biofuels in an environmentally sustainable manner, though little detail has been provided as to the methods for ensuring sustainability.
- *Biomass Action Plan* (COM 2005:628), commits the EU to bring forward a report in 2006 in view of a possible revision of the Biofuels Directive. This will propose that Member States: i) give favourable treatment to second generation biofuels in biofuels obligations; and ii) bring forward legislation promoting public procurement of clean and efficient vehicles, including high blends of biofuels.

In the UK, as in the EU as a whole, road transport emissions are responsible for about one quarter of total GHG emissions. According to the UK Energy Research Centre the UK's road transport CO_2 emissions are expected to rise by 9% between 2000 and 2010 (UKERC, 2004). Biofuels, even in small proportions, can play a significant role in firstly stabilising and eventually reducing transport CO_2 emissions, e.g. a $5\%_{vol}$ biofuel blend in petrol and diesel could cut emissions by about 1Mt C (DfT 2004). A 20p tax break awarded to biofuels in 2003 failed to stimulate the desired level of investment in biofuels. Subsequently the Renewable Transport Fuels Obligation (RTFO) scheme has been devised. The RTFO is a

market-based instrument, designed to work in conjunction with the tax break to increase the value of biofuels and decrease the commercial risk of establishing production capacity.

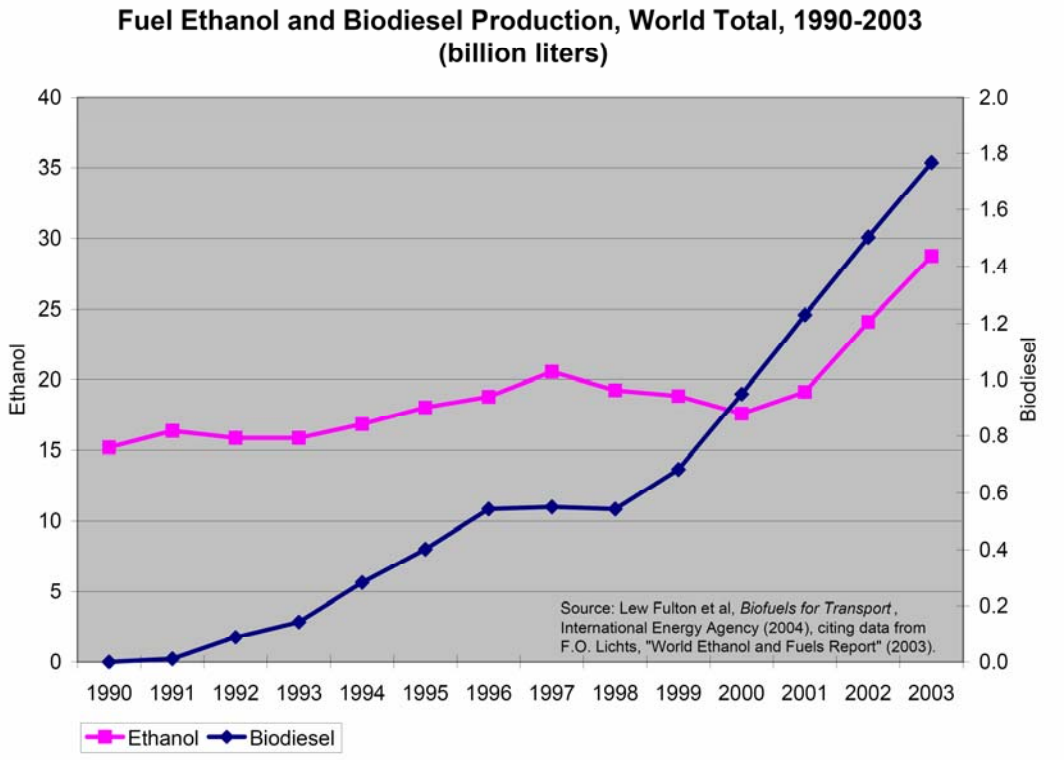
The RTFO will come into force in April 2008 and will set a 15p per litre buy-out price and an obligation on fuel suppliers to meet a 2.5% (2008), 3.75% (2009) and 5%$_{vol}$ (2010) inclusion of biofuels. It will include a reporting requirement on the GHG emissions reductions achieved by inclusion of biofuels and the sustainability of their production. The RTFO mechanism is being closely monitored by the EU and could provide a template for similar policies in other member countries.

1.2 Major Biofuel Markets by Fuel

Bioethanol: World ethanol production has increased significantly in recent years with production capacity increasing by over 10% per year (Martinot, 2005). More than 30 countries have already introduced, or are actively pursuing, fuel ethanol programmes. World production and consumption at the end of 2005 reached 45 Bl. Berg (2004) estimates that fuel ethanol consumption may reach 75 Bl in 2010 or 4% of gasoline use. In a separate study by the International Energy Agency, Fulton (2004) predicts rapidly increasing global ethanol consumption of between 86 Bl (5% gasoline demand) and 286 Bl (13% demand) by 2015 (Figure 1).

Two new markets stand out for their future potential impacts on fuel ethanol - EU and China. The EU-15 market alone for fuel ethanol is likely to be between 8 and 14 Bl per year by 2010. China's could be much larger, much of it needing to be imported.

Figure 1.



Biodiesel: Globally, biodiesel production is the third fastest growing renewable energy sector, after grid-connected PV and wind, recording an annual average growth rate in production capacity of around 25% (Martinot, 2005). However, total biodiesel production

remains significantly lower than bioethanol with global production likely to have been around 5Bl in 2005 (Figure 1).

With strongly supportive fiscal policies in a number of European countries, in particular Germany, biodiesel production is increasing rapidly. Under current plans, German capacity is expected to reach about 3.4 Bl by 2008, taking the share of biodiesel to 9% of the conventional diesel market. When combined with an estimated ethanol fuel market of 0.6 Bl, Germany's share of biofuels in the transport sector will reach 5.75% by the end of 2006, four years ahead of the date recommended by the EU Biofuels Directive (Bockey 2005)**.**

The USA is also potentially a very large market for biodiesel, where there has been a threefold increase in production from 0.1 Bl in 2004 to 0.28 Bl in 2005. Some experts predict that within 20 years biodiesel could supply 25% of USA diesel needs (Tickell, 2006). Globally, current trends indicate that a major shift is under way in the investment in new production capacity, which could transform this sector.

Biogas: Biogas has been used as a transport fuel for decades, mainly in captive markets e.g. buses, refuse vehicles, etc, mostly in urban centres. Its main advantages are that it can be integrated within the infrastructure designed for natural gas, LPG and LNG and that it has a uniquely good performance with respect to GHG emissions. However, its use is likely to be limited to niche markets such as buses, and refuse vehicles, mostly in urban centres.

1.3 Environmental Impacts of Biofuel Production

The prospect of rapid growth of the biofuel industry has generated a mixed response among organisations concerned with the environment. The broad areas for concern are briefly discussed below.

Variable Climate Benefits: The International Panel on Climate Change (IPCC, 2001) states that large-scale use of alternative fuels from non-fossil energy sources, such as ethanol and biodiesel, is one of the main strategies for the reduction of GHG emissions. More recently, it has become clear that the GHG emission reduction benefits of biofuels are highly dependent on the feedstock used and the mode of production. This sensitivity is particularly acute in temperate climates where wheat and rape are the main candidates for bioethanol and biodiesel production, respectively (Concawe, 2006; LCVP, 2005).

Land use: At the global scale, the question of competition between land to be used for dedicated biofuel production and land for food production has been raised by a number of observers, for example, Monbiot, 2005, and Cameron, 2006. A number of authoritative studies have shown that in theory, it is possible to produce substantial amounts of biofuels without affecting food production (e.g. Smeets et al., 2004). However, some competition for resources, such as investment, cannot be ruled out.

Large areas of land would undoubtedly be required for meaningful scales of biofuel production. For example, a recent EU study estimated that under European conditions 5.6 Mha would be required to produce sufficient ethanol to replace 5.75%$_{en}$ of gasoline and 100 Mha to replace it all. Land requirements for biodiesel will be greater since feedstock productivity is lower. (This study does not address global or regional issues of competition between land for energy and food). Notwithstanding direct competition for land, broader issues such as public acceptability and amenity due to landscape-level changes and the maintenance of soil carbon / organic matter levels need to be accounted for.

Water: All forms of biomass production (food, fibre, fuel and chemicals) require water. Typically, 100mm of rainfall can sustain the production of roughly 1 tonne of above ground production (1000t water per tonne). However, large differences in water requirements exist

between different crop types (wheat, sugarcane, sweet sorghum, etc) and sectors (agriculture or forestry) with substantial gains to be made through careful crop selection and development. Within many countries water use for crops is regulated, for example European farmers must observe legislation relating to the EU Water Framework Directive. In addition, some biofuel production processes require significant water inputs and the room for improvement is often large.

Table 1. Significant environmental impacts that have been associated with selected biofuel crops (from Clay et al, 2005).

Crop	Environmental Impacts
Palm Oil	• Forest conversion and species loss • Fire damage to natural forest resulting from uncontrolled fires • Soil erosion and loss of fertility • Pollution / contamination from agro-chemical and palm oil mill effluent
Soya	• Natural habitat conversion and species loss • Fire damage resulting from uncontrolled fires • Soil erosion and loss of fertility • Use of agro-chemicals
Sugar	• Natural habitat conversion (wetlands and cerrado in particular) • Water abstraction • Loss of soil fertility • Water pollution • Pollution from burning cane fields. • Air pollution and solid waste from processing cane

Biodiversity and monoculture: As with food crop production, the trend of increasing field size, with associated removal of hedges, and more intensive weed suppression results in the gradual loss of biodiversity at the landscape level. The potential requirement for large expanses of new land for biofuel production, if unchecked, could also threaten protected areas, primary forests and biodiversity hotspots. Managing biofuel production to minimise the impacts on biodiversity will require the development of locally-adapted management guidelines and practices which should be an important force for the development of environmental assurance backed up by meaningful certification.

1.4 Market Potential and Impacts of Crops and Locations

Sugarcane and maize (corn) are currently responsible for approximately 95% of global ethanol fuel production[2]. In the future, a wider range of feedstocks could be used e.g. cassava, sweet sorghum (as supplement to sugarcane), sugar beet, and some cereals, such as wheat. But in the mid to long-term, 2015-2050, ethanol production from cellulosic material is probably the most promising alternative. Such, advanced, so-called '2nd generation' ligno-cellulosic conversion technologies are also being developed for biodiesel production, again potentially dramatically broadening the range of feedstocks available for biofuel production and increasing land-use productivity.

The market dynamics for biodiesel and bioethanol are likely to differ, with biodiesel being more regionalised for various reasons including: i) biodiesel production lends itself to smaller scale production units which are less energy and capital intense than ethanol plants, and ii) perceived greater negative environmental impacts of biodiesel feedstock production e.g. palm oil from Malaysia and Indonesia, or soybean oil from Argentina and Brazil. However,

[2] Industrial ethanol is obtained mostly from synthetic fuels (natural gas and coal), wine and cereals

biodiesel has lower integrating costs into the conventional fuel supply industry. In theory, biodiesel has sufficiently similar chemical and physical characteristics to mineral diesel to allow direct substitution or blending with no modifications to the fuel delivery or vehicle infrastructure. Ethanol has problems, primarily with vapour pressure and corrosivity requiring minor modifications to both the fuel delivery and vehicle infrastructures at blends of over $10\%_{vol}$. Biogas poses few environmental problems as it is mostly produced from a by-product or waste. In the longer term, a more diverse global mix of alternative fuels may emerge for the transportation market.

It is clear that the biofuel industry is in a rapid growth phase from a relatively small production base and minimal resource requirements. During this early stage in the development of the biofuel sector it is important to establish the principles of a framework to ensure sustainable production and use.

Section 2. Benefits and Limitations of Environmental Assurance Schemes

Key points

- Environmental assurance schemes can be effective at ensuring products are sourced from landholdings where good agricultural or forest management practices are employed, thereby reducing the risk of harm to ecosystems and natural resources.

- The major (non-organic) agricultural assurance schemes are currently focused on food safety rather than environmental impacts and have been driven by large food retailers.

- Experience of environmental assurance in forestry has shown that assurance schemes have limited impacts on land use decisions (e.g. deforestation processes) outside the certified areas.

- On the whole, assurance schemes tend work to the advantage of larger landowners and agri-businesses. However, “group assurance schemes” can be used to facilitate entry of small producers. Environmental assurance schemes should not be thought of as offering protection to smallholder / specialist producers from the deflationary trends of global commodity markets.

- The credibility of environmental assurance schemes, as perceived by major NGOs, depends to a large extent on the degree of participation and consultation in standard development, testing and promotion. “Good practice” in the development of environmental standards has been set out by ISEAL.

- Environmental assurance schemes are not an effective substitute for good governance and regulation of natural resources. The best outcomes are achieved where good governance and environmental assurance go hand in hand.

2.1 Introduction

This review of environmental assurance in agriculture and forestry summarises current knowledge about the effectiveness of assurance schemes at mitigating environmental impacts of land use, and sets out wider lessons learned in applying assurance schemes. The intention is to learn from the experiences of previous initiatives to develop a biofuel scheme with appropriate expectations in mind.

The emphasis is on credible sector-wide schemes, codes, and standards rather than proprietary initiatives and requirements of individual companies which have less relevance for a globally applicable and respected biofuels standard. Certainly for forestry, it was the lack of credibility in the company-specific standards that originally stimulated the establishment of environmental assurance schemes. The emphasis is on bulk commodity sectors, which have greater relevance to future biofuel markets, rather than high value niche products or organics.

2.2 How Environmental Assurance Developed in Agrifood and Forestry

In **agriculture**, environmental assurance has its roots in the organic movement, which began a transition from a movement to a management system in the 1970s.

Outside of organics, the big pan-industry farm assurance schemes have food safety rather than the environment at the fore, and have been driven by the retail sector. In the food sector, there is a growing influence of buyer-driven standards, which regulate market access. Agrifood certification has been a response to (1) perceived shortcomings in statutory food safety requirements following problems with pesticides, pathogens, and alien genes; and, (2) privatisation of responsibility for food safety, with the government shift to an oversight role and responsibility passed to private sector via legal instruments.[3] Retailers have used assurance schemes as a business "firewall" for a due diligence defence. Environmental and social aspects are largely separate. With the exception of 'fair trade' labels, 'social' applies mainly to labour standards in plantation-scale food production rather than livelihood-scale issues of family and peasant farmers.

Two key terms have emerged in assurance schemes for agriculture: Good Agricultural Practice (**GAP**), and Best (or Better) Management Practices (**BMPs**). **GAP** is concerned with a preventative food supply chain approach up to the farm gate, applying the principles of Hazard Analysis and Critical Control Point (HACCP), and focuses on the management of farm activities with farm assurance at the centre, and generally includes the '4 pillars' of food safety: quality, productivity, social responsibility, and environmental compatibility (Hoffman, 2005). They provide business-to-business guarantees of the safety and quality of production processes. **BMPs** focus on field-level management of natural resources, such as crop rotation, variety selection, cultivation techniques, plant nutrition, crop protection and wildlife management.

Of GAP standards, EurepGAP is currently the nearest approximation to a 'global pre-farm gate standard', and is becoming a minimum market entry requirement for fresh produce destined for European supermarkets (Tallontire and Greenhalgh, 2005). EurepGAP began developing standards in 1996 and early governance was almost entirely retail led, to the exclusion of actors outside of the supply chain.

EurepGAP standards initially developed codes for fruit and vegetables, and then for flower and ornamentals, green coffee, integrated farm assurance, and aquaculture. EurepGAP is now governed by an elected group of equal numbers of suppliers and retailers drawn from retailers and producers worldwide. EurepGAP is a mix of process and performance standards, with audits and certification by accredited verifiers to measure compliance.

Despite EurepGAP's slogan "the global partnership for a safe and sustainable food system' the focus is heavily on safety (for the consumer). In the EurepGAP checklist, control points are divided into Major Musts (100% compliance is compulsory), Minor Musts (95% compliance compulsory) and Recommendations (no minimum percentage of compliance is set). For example: the in Fruit and Vegetables Standard (Version 2.1), out of a total of 210 control points and 50 'major musts,' only nine control points and no major musts relate to 'environmental issues'. It is nevertheless the only international, pan-industry standard to

[3] Such as the EC's General Product Safety Directive (EC Directive 92/59) Article 2, which gives specific responsibility to retailers for safety of private label products; the UK Food Safety Act 1990 which introduced the *due diligence* defence; and EC Regulation 852/2004 Hygiene of Foodstuffs which gives final responsibility of food safety to food business operators, i.e. retailers are seen as the producer by law (this was made very clear recently with Sudan 1 crisis in UK).

address environmental issues. The other private sector food standards (Global Food Safety Initiative GFSI, SQF 2000, and the new ISO 22000) are focused entirely on safety.

Within the UK, the Assured Food Standards (AFS, the 'Little Red Tractor'), covering a large proportion of UK crops (80% in the case of the Assured Combinable Crops Scheme - Gilbert and Bruszik, 2005), are also focused on GAP and farm assurance from a food safety perspective. The Assured Standards and environmental criteria[4] have been described by the Sustainable Development Commission (2005) and the RSPB as weak.[5] However, there has been resistance from the farming community to strengthen environmental aspects of the standards, as they are seen as forcing costs and time burdens on to farm businesses, thereby reducing international competitiveness. Indeed, some farmers have registered a complaint with the Competition Commission that the AFS scheme is anti-competitive because it places burdens on producers that would not ordinarily exist. Even though AFS has a narrow approach to the environment, focused on the management of inputs, the scheme does appear to sensitize producers about environmental protection issues.

More comprehensive standards specifically aimed at promoting environmentally friendly farming practices such as LEAF (Linking Environment And Farming, which promotes an integrated approach to farming including energy efficiency, wastes, wildlife and countryside management) have succeeded from a demonstration perspective and is now being widely promoted within the UK. According to the LEAF scheme administrator there are now almost 1000 certified farms within the UK and there are plans to roll the scheme out to 40 countries over the next 5 years. Equivalent integrated farm management approaches in North America are the Ontario Environmental Farm Plan; and the Farm*A*Syst Programme.

In **forestry**, environmental assurance schemes date from 1941 with the establishment of the American Tree Farm Systems (ATFS) scheme. However, it was not until the 1980s that NGO concerns over tropical deforestation, biodiversity loss and indigenous rights led to the concerted pressure for global forest certification schemes. At that time codes of conduct were widespread and sustainable management plans were often required by law. But evidence gathered by NGOs suggested that many such codes and management plans lacked credibility and were ineffective as a means of environmental assurance. In 1985 Friends of the Earth launched the first of a series of consumer boycotts of forest companies.

The central forestry emphasis on 'credibility' across the globe (in the face of widespread but ineffective and untrusted alternatives) prompted lengthy inclusive discussions to try and agree principles and criteria satisfactory to all parties. Timber users, traders, social and environmental NGOs all saw the sense in having one credible global assurance scheme. (Nussbaum and Simula, 2005).

This culminated in the development of 9 principles and criteria for the sustainable management of natural forests in 1994 (and added to in 1996 with Principle 10 on plantations). These principles were initially developed under the banner of the Forest Stewardship Council (FSC) which was the only global scheme in existence at that time. FSC members insisted on the inclusion of strong social principles and criteria within what is primarily an environmental assurance scheme, precisely because the effectiveness of environmental management so often depends on the resolution of social conflicts over land use. These principles and criteria are not themselves the basis for certification – but form the framework within which national working groups (with mandatory economic, social and environmental chambers) develop their own national standards.

[4] AFS has five environmental standards, three of which were based on existing environmental legislation and two that were based on good farming practice.
[5] 'Little red herring'. *Fieldfare* 29 May 2005.

With broad agreement over the principles in place – progress was much more rapid. By 1996, the first certification bodies[6] were accredited for worldwide sustainable forest management and chain-of-custody certification and in the same year the first FSC certified products were introduced into the UK market. By 2004, 183 million hectares had been certified (3.5% of the global forest area). In mid-2004 it was estimated that these forests had the potential to supply up to 17% of the global roundwood production – but that only a fraction was being labelled and sold as certified.

Since 1993, a number of other schemes have been established[7] – many as government / industry reaction to having forestry standards imposed by an external alliance of NGOs. Many of these have been able to develop much more rapidly on account of preceding work on principles and criteria by FSC. In the case of primarily European (PEFC) or North American schemes (SFI) strong national criteria for sustainability have translated into rapid agreement over the national standard – but this would be less easy to achieve in developing countries.

According to Kanowski et al (2000), the proliferation of forest schemes has had several advantages and disadvantages. Advantages include:

- price competition making certification cheaper
- bigger body of comparative experience on which to draw
- niche schemes to suit particular actors

Disadvantages include:

- confusion in the marketplace
- indecision amongst forest producers
- inefficiency and redundancy
- inertia in the development of national schemes where several processes are required for different schemes

The proliferation of certification schemes does not appear to have led to tougher environmental standards (Ozinga, 2004a; and Nussbaum and Simula, 2005). Rather, new schemes have made certification more accessible to regional blocks of forest industry (Raunetsalo et al., 2002 cited in Phillips, 2004). However, this has also had the effect of confusing consumers and indirectly reducing the demand for certified products.

2.3 New Initiatives on Sustainable Commodity Production

Over the past five years a number of NGOs and producer organisations have focused attention on the environmental and social issues associated with the large-scale production of agricultural commodities. The most relevant initiatives for biofuels are The Roundtable on Sustainable **Palm Oil** (RSPO)[8], the Round Table on Responsible **Soy** (RTRS)[9], WWF's

[6] (Scientific Certification Systems (SCS); SGS Forestry Qualifor Programme; the Rainforest Alliance Smartwood Programme; and the Soil Association)

[7] By founding date, Canadian Standards Association – CSA; Lembaga Ecolabel Indonesia – LEI; Sustainable Forestry Initiative – SFI; Keurhout – Dutch National Scheme; Programme for the Endorsement of Forest Certification - PEFC; Malaysian Timber Certification Council - MTCC; and CertforChile, the Chile National Scheme; the Australian Forestry Standard – AFS; Cerflor, the Brazilian National Scheme)

[8] www.sustainable-palmoil.org

[9] http://www.responsiblesoy.org/eng/index.htm

Better **Sugarcane** Initiative (BSI)[10], and the Sustainable Agriculture Network/Rainforest Alliance Certification (SAN/RA). [11]

These initiatives are highly relevant to the development of environmental standards for biofuel crops because of the need to (a) cover different feedstocks and (b) get broad multi-stakeholder buy-in. However, it is important to note that these initiatives are at different stages of development (and are essentially unproven in terms of *effectiveness*) and operate with slightly different dynamics and priorities according to the stakeholders. There is an urgent need conduct a comparative review of the practicalities of implementing these schemes.

RSPO: formally established in April 2004, with a governance structure that ensures representation of all stakeholders throughout the entire supply chain. Current membership is approximately 80 organisations. It has developed a set of environmental standards (Principles, Criteria and Objectives) and is also working on the development and application of practical best management practices.

RTRS: still in the early stages of development. A core group of organizations committed to the responsible production of soy has agreed to set up an Organizing Committee (OC) and lead the RTRS Initiative through the first stages until a formal institutional framework is in place. This group includes WWF, Unilever, ABN-Amro and Co-op Switzerland. The overall objectives are similar to those of the RSPO. An initial set of standards (the Basel Criteria for Responsible Soy[12]) have been written and submitted for consideration.

BSI: also in the early stages of development. An inaugural meeting in 2005 agreed objectives (similar to those for the RSPO and RTRS) and a steering committee was established in January 2006 to oversee technical work on the development of standards and best management practices.

The SAN/RA Rainforest Alliance Certification. The Rainforest Alliance and the Sustainable Agriculture Network (SAN) - a coalition of independent, non-profit conservation groups - created Rainforest Alliance certification, whose first version of the standard was published in 2002. The standards cover several crops including bananas, oranges, coffee, cocoa and cut flowers and have been successfully applied in several farms and cooperatives in countries such as Brazil, Costa Rica, Colombia, Ecuador, Guatemala, Honduras, Nicaragua, the Philippines, Mexico and El Salvador. In 2005, after an extensive public consultation process, a new version of the standard was published. A key feature of the SAN/RA scheme is that it has been shown to be practical to implement by smallholder farmers, particularly in the coffee and cocoa sectors. Furthermore, the scheme has already been adopted by a number of large commercial citrus and banana growers.

The LEAF ("Linking Environment and Farming" assurance scheme, is a significant new development in environmental assurance for food crops. It was initially conceived in response to interest, particularly from food retailers who detected a demand for more consumer interest in the environmental impacts of farming. The standards for the scheme were developed through a multi-stakeholder process overseen by an advisory board involving some thirty members representing national government departments, farmers, supermarkets, conservation, environmental and consumer groups, educational

[10] http://assets.panda.org/downloads/sugarmeetingreport.doc
[11] http://www.rainforest-alliance.org/programs/agriculture/certification/index.html
[12] http://www.responsiblesoy.org/downloads/documentos/14_basel%20criteria%20engl.zip

establishments and industry. The LEAF scheme appears to be developing rapidly within the UK and has plans to expand its assurance scheme overseas.

In section 5, we emphasise the importance of working with these initiatives rather than duplicating their efforts.

2.4 The Credibility of Environmental Standards

Third party verification of the effectiveness of any environmental standards enhances their credibility. Without *credibility* the widespread operation of any social or environmental standard is virtually worthless. Greenpeace (2004), notes that unverified environmental information produced by many companies can be regarded as non-credible "greenwash". The key value of a standard from an industry perspective is that it brings credibility.

But here defining 'credibility' is important. "Credibility" is at least a partially subjective term relating to the perceptions that different stakeholders have about different schemes. Many of these perceptions are generated as a result of informal communications, media stories, etc. Nevertheless there are objective foundations that can be summarised as follows:

- The way in which environmental standards are developed, governed and administered, in particular the extent to which the standard-setting agency makes efforts to address the concerns of different groups of stakeholders through meaningful dialogue, consensus building and learning from practical experience.

- The way in which the application of the standards is seen to make a real difference to the way in which resources are managed / decisions are taken, rather than a box-ticking exercise.

- The rigour with which standards are applied through independent verification and certification.

- The transparency of environmental claims made by users of the standard.

- The extent to which the standard is developed and refined over time in response to monitoring of impacts.

Several of the leading social and environmental standard-setting organisations have formed an association called the ISEAL Alliance to define good practice on how standards should be developed and co-ordinated.

The cases of the FSC and PEFC (Pan European Forest Council) provide an interesting illustration of how two schemes have sought to develop credibility with different stakeholder groups in different ways (Box 1).

Box 1.

FSC is a 'performance' based scheme in which biodiversity conservation, respect for local people's rights, use of pesticides and GMOs etc must all fall in line with a national standard drawing on FSC's global principles and criteria. For each country where FSC is adopted, national standards have to be developed through multi-stakeholder consensus-based working groups. The requirement for consensus can slow the process down. Three chambers – economic, social and environmental have equal weight (Nussbaum and Simula, 2005). There was a five year lead time between FSC starting, as a 'certification working group' established in 1991, and the first certified products were introduced into the market in 1996. The time was required to launch FSC, establish a definitive set of ten principles, and accredit certification bodies. The FSC chain-of-custody certification policy was drafted in 2001 – with ongoing discussions over social standards along the market chain receiving new attention in 2005. The result of such participation and consensus is seen in a standard that is both the only truly global forest scheme and that commands the respect of almost all social and environmental groups.

PEFC, initiated partly as a response to FSC by small forest owners in Europe (not wishing to be told how to sustainably manage forests by Anglo-US NGOs), had initial problems with credibility – particularly due to some aggressive campaigning by "supporters" of the FSC process. With strongly enforced legislation on sustainability in most European countries, producers wished to have their sustainability rapidly acknowledged without a costly process of proven compliance with yet more standards. These producers were strongly involved in the development of national certification schemes. The PEFC Council was established in June 1999 by 11 national organizations developing national certification schemes. The national working groups of what became PEFC documented the concerns of different interest groups (but crucially did not have to reach consensus). Within a year the schemes from Finland, Norway and Sweden had been approved. By the end of 2000 the area certified by PEFC was 23.5 million hectares. In 2006 it now involves 27 countries, including Australia, Brazil, Canada, Chile, Malaysia and the US. The increasingly strong NGO consultation processes have enhanced credibility and PEFC has gained approval from many (but by no means all) national procurement agencies alongside FSC. At the same time the lack of consensus over some national standards has led to fierce campaigning against PEFC in some countries.

2.5 Environmental Benefits of Assurance Schemes

This section summarises the evidence on three critical questions:

1. Do schemes provide reasonable assurance that certified products come from "well managed" farms / forests?

2. Do schemes encourage / foster improved management outside the certified areas?

3. Can assurance schemes replace environmental regulation / governance?

Impact on Certified Areas: The studies that have looked at impacts of certification in forestry find some positive signs of benefits in certified areas (Nussbaum and Simula, 2004). For example, where certification has been within the reach of particular businesses it has generally pushed up standards of forest management, labour relations and business administration (Garforth, 2002). One of the beneficial impacts of certification is that in many cases greater business transparency and credibility has made it easier for some producers to attract investment. In some cases, certification has also improved market access and price premiums for those involved (Bass et al. 2001; Molnar, 2003). It has also led to a raised awareness of what it takes to make forest business responsible through multi-stakeholder processes (Segura, 2004).

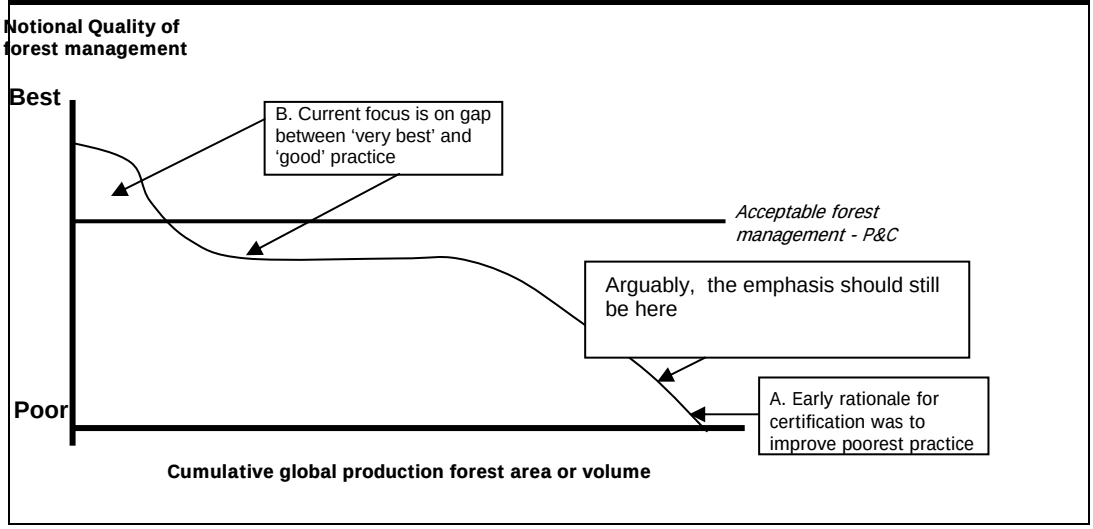
Research by Dankers (Dankers, 2003) found that Agrifood standards have had the effect of 'professionalising' smallholder agriculture. Standards such as EurepGAP have reduced pesticide misuse, produced positive food safety spill-overs into domestic markets, and increased the 'professionalisation' of agriculture.

Wider benefits of Environmental Assurance Schemes (beyond the certified areas):
Evidence of the wider environmental benefits achieved by certification is limited. Despite some tangible benefits, forest certification schemes have barely scratched the surface of mainstream forest production – and have crucially failed to change practice in natural tropical forests (which many were set up to address). Recent estimates of the total area of forest certified by third parties show a slow rate of annual increase (Atyi and Simula, 2002). Yet, the figures confirm that only a tiny fraction of the world's forests (183 million hectares, or 3.5%) are certified as sustainably managed (Nussbaum and Simula, 2004). Certification has largely happened in the Northern plantations or semi-natural forests. In 2004, only 7% of the total area of certified forests was from tropical forests and only 19% from natural forests. In 2006, the tropical country with largest area of FSC certified forest is Brazil with 3.53 million hectares – but the expansion in this area since 1993 has not appreciably affected the rate of deforestation. PEFC has not yet made serious inroads into tropical forest certification despite endorsing the Brazilian standard CERFLOR.

Studies of the interaction between regulatory governance of land use and agricultural / forestry practices and assurance scheme have found that, in most cases, certification works best when used as a complementary instrument to induce compliance with national regulations. The greatest successes have been achieved when good enforcement incentives have been introduced into the legislation already (Segura, 2004). Certification is therefore no substitute for good governance of natural resources.

Schemes have expanded fastest where strong existing governance structures and ecosystem simplicity reduce the 'jump' to third party certification. In areas with weak governance and complex ecosystems, uptake has been very low (see Figure 2.1). Unfortunately these often coincide with the areas of greatest need. This illustrates the importance of promoting assurance in areas where environmental problems are greatest.

Figure 2.1 Illustration of how FSC certification has developed (Vorley et al., 2002)



NB The curve is illustrative only, as there is little empirical basis on which to construct a precise one. (*Adapted from Kanowski, Sinclair, Freeman and Bass 2000)*

This figure also illustrates a key dilemma for environmental assurance schemes - whether to provide a means of differentiating the "greenest" products or to screen out the poorest performers, as highlighted by Steven Bass of IIED:

> "If certification is to improve forest management all-round (as opposed to supporting an elite) some system is required for 'reaching down' to those producers who practice poorer forest management – even, perhaps, including the asset stripping loggers" (Bass et al. 2001).

2.6 Access for Small-Scale Producers

Most standard-setters (and other stakeholders) recognise that small producers risk being excluded from export markets due to procurement practices that can favour larger producers. This has led to some attempts to provide solutions to this, e.g. EurepGAP's Quality Management System manual for farmers' groups.

In group certification, the external certification body certifies the entire group rather than each individual group member, thus reducing the costs of certification. Substantial savings from group certification have been reported from Costa Rica with costs difference of several hundred dollars for a small farm, though there are many indirect costs involved in management of the internal control system (Rungren, 2006). The result of these constraints is that by 2003 only 50 community groups worldwide had been certified in forestry (Molnar, 2003). EurepGAP allows group certification under 'Option 2', and GTZ and EurepGAP have developed a Smallholder Manual to guide the process.

Despite some progress in this area, standards, and particularly the indicators used to measure them, may not be appropriate to small producer situations. Large investments in training and materials may be needed to meet standards and more significantly to demonstrate compliance. For example, FSC standards assume a western, scientific approach to forestry – the standards are long – 10 principles and 52 criteria, elaborated by national requirements which may add up to 30-40 pages. Their language assumes formal forestry training. Interpretation is left deliberately open (they are not prescriptive) again requiring skills and experience. EurepGAP requires growers to have an annual farm audit. for example an audit costs about €450; for a grower in Ghana, this will absorb approximately 70% of their profit.

SFI and PEFC have had more direct impact on smallholders – either though work with tree farmers, or through cooperative group or regional certification of Northern European smallholders. Yet reviewers conclude:

"Without modification, forest certification will become a regressive instrument, which bars the majority of communities from participating. Even more problematic, it may undermine local organizing dynamics that make it more likely that their communal forests will become sustainably managed" (Molnar, 2003).

2.7 Cost-Price Squeeze

The imposition of environmental (or social/ethical) standards continues to be largely justified by ('poor?') practices of Southern country suppliers (Bendell, 2004). However, there is a concern among many developing country producers that the costs, risks and benefits of compliance are not equitably shared along the supply chain, between the 'standards

makers' and 'standards takers'. The experience of business-to-business standards from horticulture is that the costs of private standards are borne by the producer whereas the benefits accrue to the retailer. All farm assurance initiatives have skirted issues of declining price, market structure (Vorley and Tallontire, 2005). These issues are partly rooted in power disparities in food system, which allow standards to be part of the cost-price squeeze on producers worldwide.

In other words, the experience indicates that assurance schemes provide limited / no protection to producers against deflationary price pressures found in global commodity markets.

Section 3. Draft Environmental Standards for Biofuels

3.1 Governance

The standards set out in this section constitute draft material to provide a basis for structured discussion by stakeholders / participants within a **formal standard setting context**. A formal standard setting context means that discussion takes place within a framework that has an agreed constitution for deciding, adopting and operationalising standards. This constitution must, at minimum, define:

- Who is eligible to participate;
- What form of participation is allowed / required (e.g. attendance at meetings; submission in writing);
- How inputs from participants will be considered (e.g. open to discussion; put to expert groups, etc);
- How decisions will be taken (e.g. voting rules);
- How decisions will be adopted (formal adoption process / appeals)
- How adopted decisions will be operationalised (publication of standards, certification and accreditation processes[13])
- How the effectiveness of the standards will be reviewed and improved, over time.

Section 5 discusses some specific options for the governance and further development of the LowCVP draft environmental standards.

3.2 Scope of Standards

It is proposed that the standards will cover the following processes:

1. The production of crops used for biofuel (sub-section 3.8 & 3.9)

2. Storage, transportation and processing of biofuel feedstocks and biofuels prior to the fuel duty point or blending with fossil fuels, whichever is first. (sub-section 3.10)

It is recommended that the following processes are considered **outside** the scope of the standard and do not require certification:

- The production and primary use processes of bio-materials prior to the point of separation for biofuel production, where biofuels are manufactured from waste or co-products such as used cooking oil, tallow, tall oil, forestry residues or municipal refuse.

- The production of crops grown primarily for non-fuel purposes, where biofuels are manufactured from components constituting less than [10%][14] of farm gate value (e.g. wheat straw).

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[13] Definition of Accreditation: Third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks (UKAS).

[14] A threshold value will need to be set by the operator of the standard.

- The production of materials of non-biological material used in the manufacture of biofuels (e.g. fossil methanol).

3.3 Structure of the Draft Standards

The draft standards for production of **biofuel crops** comprise "Principles", "Criteria" and "Indicators" (PCIs) covering the following 6 headings (Tables in Section 3.7):

1. Conservation of carbon stocks
2. Conservation of biodiversity
3. Sustainable use of water resources
4. Maintenance of soil fertility
5. Good agricultural practice
6. Waste management

As agreed in the terms of reference for this work, the standards comprise "Basic Criteria" that are required for compliance with the standard and "Enhanced Criteria" that could be used as a basis for a higher level "green label" biofuel product.

- Examples of crop-specific guidance notes are shown on page 25.
- Draft Standards for Storage, Transportation and Processing are shown on page 26.

3.4 Inspection / Verification Procedures

Existing operational assurance schemes such as ACCS, EurepGAP and LEAF all use third-party inspection and verification by "accredited" organisations registered with national agencies (such as UKAS[15] in the UK and INMETRO[16] in Brazil). A similar process will be required in order to operationalise certification against the environmental standards for biofuels.

However, in order to enable a rapid rollout of the scheme and to minimise costs for producers, it is strongly recommended that the environmental standard for biofuels is implemented using **accredited verifiers for existing schemes** to allow a **single inspection** for producers. More details are given on how this could work in practice in Section 4.

While existing verification agencies are likely to be the most effective means of rolling out a scheme it should be recognised that there may be some additional verification skills required (particularly on biodiversity issues). A training programme for verifiers / inspectors may therefore be required.

[15] UKAS = United Kingdom Accreditation Service

[16] General Coordination for Accreditation - National Institute of Metrology, Standardization and Industrial Quality (INMETRO)

3.5 Inspection and Certification Process

It is important to note that while the Environmental Standards apply to production units (farms and plantations), whereas the biofuel industry requires **certified products**. It is proposed that the system for product certification should work as follows:

1. Production unit registers intent to produce according to the Environmental Standards
2. Production unit puts in place necessary documentation and management systems
3. Production unit arranges for accredited verifier to inspect premises, land and operations
4. Verifier approves operations and awards certified status (assuming minimum threshold achieved and corrective actions agreed)
5. Producer applies "certified" status to farm output from unit for that year.
6. Certified products pass into supply chain
7. Inspection and certification process repeated annually.

It is recommended that the certification process should involve an improvement process that provides producers with time to implement corrective actions, for example:

- Major non-compliance issues should be resolved within [3 months][17].
- Minor non-compliance issues should be resolved within [12 months].

Failure to address a non-compliance issue within an agreed timeframe would normally result in withdrawal of certified status.

3.6 Product Tracking

Most agricultural products, particularly those that require traceability for health and safety purposes, have product tracking systems that enable products to be traced back to origin through a chain of custody. There are two main options that could be applied to ensure that supplies of certified fuel have come from valid sources:

- *A system that requires physical segregation and tracking of individual loads.* Under a physical segregation regime, materials from certified and non-certified sources must be kept physically separate throughout the supply chain. Documents indicating the certified nature of the product are passed from one stage of the supply chain to the next. Contamination of certified product with more than a specified % of non-certified product will render the product "uncertified".

- *An inventory control and accounting system* that works, either on and input/output basis (%in / %out), or on a minimum average percentage basis. An inventory control system is appropriate where it is not necessary to keep certified and non-certified product physically separate, but where the % of certified material leaving a process (mill, biofuel plant) depends on the % of certified material entering the process. Again, this process requires documentation to occur at each stage of the supply chain.

Through the application of either of the above systems, a fuel could be certified if at least [90%][18] (by volume) of its constituents are of certified origin.

[17] The precise timescale and conditions for demonstrating resolution of non-compliance issues must be determined by the operator of the standard.
[18] The threshold proportion of non-certified products allowable within a certified product needs to be determined by the operator of the standard.

As biofuel supply chains may be complex, involving blending and offtake to/from co-mingled tanks, it is recommended that (as in the case of the PEFC forestry standards[19]) businesses should be permitted to use either a physical separation or an accounting approach, depending upon their situation, so long as each part of the supply chain is adequately audited.

A third approach to the tracking problem has been proposed by members of RSPO; it involves the production of "certificates of sustainable origin". This would work as follows: instead of tracking "certified product" products through each stage of the supply chain, the production unit would receive a "sustainable product certificate" for each unit of product leaving the farm / plantation during that year. These certificates could be then be submitted (possibly through a financial transaction) to importers of finished biofuel product at the duty point (or whatever control point is deemed necessary). Once submitted, each certificate would be retired so that it could not be double-counted.

One advantage of such a system is that it could lead to a recognised market value for certified material (and hence good environmental practices would be financially rewarded).

However, a possible danger of this scheme is that it might be seen as a green light for blatantly non-sustainable practices, so long as a producer could afford to purchase "sustainability certificates" from 3rd party sources.

It would also be necessary to develop a series of rules governing the application of sustainability certificates from un-processed products to finished biofuels and from one type of fuel (e.g. POME) to another (e.g. SME).

At present, the feasibility of this approach is untested, while the first two methods are widely used in the supply chain for certified products.

3.7 Basic Requirements and Conditions of Entry for the Production Unit.

To enable verification to take place, biofuel crop producers will need to keep adequate records and plans against which their compliance with the standards can be assessed. The key sets of records and plans that will be required for assessment are as follows:

1. Maps of the production area, showing crops, vegetation types and local soil types.

2. A land management plan (LMP) indicating current and proposed land use in terms of crops, varieties and rotations. The LMP should contain information about relevant non-crop vegetation (in particular conservation land, relevant to Principles 1 & 2).

3. A soil management plan (SMP), indicating how any risks of erosion or soil degradation are to be monitored and addressed.

4. A nutrient plan, indicating how fertilisers will be used to maintain or improve soil fertility based on assessment of crop requirements and soil nutrient status.

5. Records of checks made on status of vegetation, soil and crops as part of the implementation of these plans.

[19] http://www.pefc.org/internet/html/glossary/4_1097_72.htm

6. Records of all fertilisers, pesticides and water used as inputs.

7. Records of waste production, disposal and recycling.

8. Records of maintenance and servicing of equipment used for spraying and application of pesticides and fertilisers.

9. Any other legal documentary requirements such as water abstraction permits, health and safety permits, waste disposal permits that may be required by local or national regulatory bodies.

10. Records of the results of inspection for verification purposes and corrective actions undertaken to achieve compliance or improve performance.

It should be possible to allow smallholder farmers to maintain simplified versions or reduced levels of documentation to reduce barriers to their entry to the scheme.

The following basic requirements on producers are also proposed as part of this scheme:

- Growers and biofuel producers must be in compliance with all relevant local, national and EU laws and any international laws which the producer country has ratified.
- Producers should notify the relevant entity specified by the Assurance Scheme of any prosecutions brought or likely to be brought against them by any relevant regulatory authority regarding their compliance with relevant legislation.
- Producers should notify the relevant entity specified by the Assurance Scheme of any matters involving the growing or production of biofuels which could bring the Assurance Scheme into disrepute.

Note on consensus within the LowCVP Steering Group
It should be noted that the following standards have been developed through a process involving inputs from members of the LowCVP steering group on environmental standards for biofuels. The authors have sought to draft workable Principles, Criteria and Indicators (PCIs) based on the priorities and concerns of this group. However, it should be recognised that these draft standards do not necessarily represent the views of individual stakeholders in terms of what is acceptable or desirable. It should not be assumed that there is consensus upon, nor endorsement of the standards presented here.

3.8 Draft Environmental Standards for the Production of Biofuel Crops

Draft Principle 1. Conservation of Carbon: Carbon stocks on lands used for biofuel feedstock production will be protected and enhanced.		
Criteria:	Indicators:	Indicator Conditions, Comments and Guidance Notes
Basic Criterion 1.1 *Protection of above ground carbon stocks:* high carbon-density vegetation to be identified and retained	• Map of vegetation types in production area, with estimates of above-ground carbon stocks. • Retention, from 31 December 2005, of all above ground vegetation with carbon density [40] t C /ha greater than the average carbon density of the crop. • Retention of large/veteran trees of [>80] cm d.b.h. • Appropriate measures for fire control	Good practice methods for vegetation mapping are readily available from other schemes (these are straightforward but training may be required). Definition of the production area should include areas within landholding up to [10] metres of biofuel crops, and all areas within the landholding bounded by biofuel crops. Maps are to be dated. Standard average carbon density figures should be developed for biofuel crops. Recommend categories of vegetation carbon density based on IPCC (2005) for ease of monitoring: [0–20], [20–80], [>80] t C /ha
Basic Criterion 1.2 *Protection of soil carbon:* appropriate management to ensure protection of Soil Organic Matter	• Identify soils with high organic matter content and adopt appropriate measures to conserve organic matter • No (deep) ploughing [>30] cm depth or soil drainage of peat or other high organic matter content soils • No conversion to crop production on soils where there is a high risk of significant soil carbon loss; such as certain permanent grasslands, wetlands, mangrove, or peat from 31 December 2005.	Definition of “High” organic matter soils will need to be developed on a regional or national basis. In the UK, soil protection measures would include all GAEC[20] measures

[20] GAEC = Good Agricultural and Environmental Condition

Draft Principle 2. Conservation of Biodiversity: Biodiversity on lands used for biofuel feedstock production will be protected and enhanced**.**		
Criteria:	Indicators:	Indicator Conditions, Comments and Guidance Notes

Basic Criterion 2.1
Conservation of designated ecosystems: rare, threatened or endangered species and habitats of high conservation value are identified and protected.
	• The presence of important habitats and species is periodically assessed and the status of rare, threatened or endangered species or habitats of high conservation value is noted in the Land Management Plan
	
	• Appropriate conservation measures are included in the land management plan to protect rare, threatened or endangered species and habitats of high conservation value within production area to include:
	  • retention of riparian and wetland habitats
	  • retention protection of veteran trees
	  • no-spray and no-burn areas within 10 m of areas of high conservation value
		Species list from IUCN and national list
		Habitat list from IUCN/WCMC and national or regional lists Maps must be dated.

Basic Criterion 2.2 *Basic good biodiversity practices:* appropriate management of production area to protect rare, threatened, endangered or important species.	Evidence of implementation of appropriate crop management practices to assist conservation of rare, threatened, endangered or important species, where present. To include: • Appropriate timing of field operations to avoid harm to listed species • Use of pesticides, herbicides and fungicides considers impact on listed species • Limited and appropriate use of burning of crop residues	Species list from IUCN and national list Habitat list from IUCN/WCMC and national or regional lists Maps must be dated. E.g. field operations timed to avoid disturbance to nesting and fledging birds More detailed good practice to be provided for specific types of crops and ecosystems.
Enhanced Criterion 2.1 *Advanced biodiversity practices:*	Evidence of additional conservation measures to encourage wildlife and restore degraded natural ecosystems. To include: • Restoration of degraded natural habitats within 50 m of production areas • Use of biological controls in crop management	

Principle 3. Sustainable Use of Water Resources: Water resources are managed in a non-exploitative way, complying with any local regulations and best practice generally		
Criteria:	Indicators:	Indicator Conditions, Comments and Guidance Notes
Basic Criterion 3.1 *Appropriate plans for efficient water use are developed and implemented*. *[A Basic Requirement in "water critical areas, enhanced in other areas"]*	• Evidence of planning to demonstrate an assessment of available water resources. • Valid abstraction licences or permits are obtained wherever required. • Compliance with official Catchment Abstraction Management Strategies (CAMS) or similar requirements, wherever these apply. • Evidence of appropriate water management and conservation measures including: irrigation scheduling and soil tillage methods for retaining water (where applicable).	Water resource assessment should be based on the crop, geographical area and past meteorological data. In England, the EA develops Catchment Abstraction Management Strategies (CAMS), which affect the amount of water that farmers will be able to use. Capacity:Use ratio could be used to restrict crop types [high use] where capacity is low.
Basic Criterion 3.2 *Avoidance of diffuse water pollution: Minimise effects on diffuse pollution losses.*	• Show compliance with prevailing legislation and Codes of Practice relating to diffuse water pollution. • Show compliance with regulations when using irrigation, fertilisers and/or pesticides.	In the UK these entail: compliance with "Codes of Good Agricultural Practice for the Protection of Water ('The Water Code') and Soil ('The Soil Code') should show absence of damage or losses caused by transgression. If in an NVZ, follow the NVZ requirements – fertiliser and manure planning, keep farm records of amounts and timing.

Principle 4. Soil Fertility: Soil fertility is maintained or improved with due regard for soil structure and stability, organic matter and nutrient content.		
Criteria:	Indicators:	Indicator Conditions, Comments and Guidance Notes
Basic Criterion 4.1 *Protection of soil structure and avoidance of erosion.*	• Evidence of a soil management plan, which reviews erosion risk and sets out a strategy for protecting high-risk areas, and which assesses soil structure to identify impediments to rooting and crop water use.	Soil inspections should use test digs, soil cores or pits at appropriate points in the rotation to investigate soil structure* (e.g. plough pans) that might limit rooting and crop water use and/or evidence of soil erosion (for example, using the Peerlkamp* scoring system). In England & Wales the Entry Level Scheme might be a driver for a soil management plan. In Europe, the basic Cross Compliance requirements from Annex IV Reg EC 1782/2003 apply across the EU. **Peerlkamp PK (1967) Visual estimation of soil structure. In 'West European methods for soil structure determination II'. (Eds M DeBoodt, H Frese, AJ Low, PK Peerlkamp) pp. 11-12. State Faculty of Agricultural Science: Ghent, Belgium*
Basic Criterion 4.2 *Maintain nutrient status and pH, following good fertiliser practice.*	• Analysis of topsoil nutrient status at 5 yearly intervals following recommended sampling and analysis methods. Should include P, K, N and pH status. • Use of a farm nutrient management plan, which details fertiliser and manure management principles – including no spread zones (to protect water bodies). • Evidence of checks on fertiliser spreaders to ensure evenness of spread, within acceptable limits.	Different analytical methods will be used in different countries. There is much debate about 'acceptable' levels of organic matter, but there are currently no set standards, which makes setting measurable objectives for this parameter impossible. Farm nutrient plan should take account of soil nutrient status, crop requirements and inputs of nutrients in manure. This is as much about avoiding over-application and losses to water as it is about applying the correct amounts for the crop; for example, no need to supply P fertiliser on soils with high P status – increased risk of losses to water.

Principle 5. Good Agricultural Practice: Crops are produced using good agricultural practice that is sustainable over the medium and long term.		
Criteria:	Indicators:	Indicator Conditions, Comments and Guidance Notes
Basic Criterion 5.1 *Use of inputs must comply with the prevailing legislation.*	• Pesticide applications must only be of approved products. • Where inadequate national regulation exists, product use must fall within good practice: limiting the use of WHO Class 1 products and those listed in the Stockholm or Rotterdam Convention[21]. • Fertiliser inputs must follow recommended good practice to avoid high environmental loading or ecological harm, and potential water course or aquifer contamination.	National pesticide use regulations within EU Member States must meet the requirements laid out in Regulation EC 91/414. (This is due for revision). Application should follow manufacturers label recommendations. Pesticide good practice should limit the use of WHO Class 1 products and those listed in the Stockholm or Rotterdam Convention[22]. Regulations are often complex and can include carrying out appropriate auditable risk assessments (e.g. LERAPS[23]), observing buffer zone clearance, and may include requirements to notify neighbours (See Bystanders - Principle 7). E.g., in UK fertiliser use is not a legal issue unless environmental regulations are breached (e.g. Nitrogen Vulnerable Zones)
Basic Criterion 5.2 *Use of inputs justified by the presence of a documented problem.*	• Pesticides use must be supported by records of the presence of appropriate target pests, diseases or weeds.	The records justifying use can also be used to justify or limit the use of compounds included under Criterion 1, Indicator 2.
Basic Criteria 5.3 *Hazards associated with inputs must be minimised at storage and handling.*	• All materials used to produce the biofuel crops, and harvested materials must be handled and stored safely. • Significant spillage and contamination events must be recorded and dealt with as prescribed in Safety data sheets, and by local Emergency Services.	Safe handling must be consistent with national regulations and product data. Statutory Hazard data is provided for all pesticides and fertilisers as are instructions for dealing with spillages.

[21] The Stockholm Convention on Persistent Organic Pollutants aims to protect human health and the environment by banning the production and use of some of the most toxic chemicals known to humankind. The Convention became international law in May 2004.
[22] Reference
[23] LERAPS = Local Environmental Risk Assessment from Pesticides (http://www.pesticides.gov.uk/safe_use.asp?id=207)

Enhanced Criterion 5.1 Crop variety selection based on both productivity and pest and disease resistance:	• Variety listings showing agronomic performance and resistance ratings to disease and/or pests. • Variety shown to be good performer in local field trials. • Varieties and any seed dressings should be approved for use in country of planting (seed certification).	- Use best available varieties that resist problems normally treated with pesticides is the foundation of ICM. - Where comparative lists are not available to justify choice details of variety strengths and weaknesses from breeder/supplier must be provided. - Local field trials of approved varieties can provide evidence of good field performance. - As the biofuel market grows, breeders in UPOV[24] signatory countries will become keen to ensure royalties are paid on farm saved propagative material. .
Enhanced Criterion ICM 5.2 Pest, weed and disease control measures are based on forecasts, crop inspection and thresholds:	• Where forecasting services are available records must be kept to show the guidance given to crop inspections. • Where thresholds exist to justify treatment they should be cited in the recommendations used.	- Forecasts and field inspections give optimum performance by allowing early targeted use, whilst avoiding prophylactic use. Audit process to include identification of forecasts. - Thresholds exist for certain weeds, pests and diseases below which treatment is deemed uneconomic. Threshold will not be universally available, and will vary for the same pest in different environments. - *Mixing a.i.'s with different actions and the avoidance of sequential treatments with the same mode of action all help to maintain the efficacy of the agrochemical portfolio available to growers. Showing efficacy of product selection, which is contributory to effective ICM needs auditor expertise.

[24] UPOV = Union for the Protection Of new Varieties of plants.

Principle 6. Waste Management: To minimise the amounts of waste produced, and to utilise or dispose of all waste efficiently in accordance with any local regulations and best practice.		
Criteria:	Indicators:	Indicator Conditions, Comments and Guidance Notes
Basic Criterion 6.1 *Waste management complies with relevant national legislation.*	• Waste management plans and waste disposal activity complies with local regulations. • Containers for pesticides are disposed of or recycled as recommended by the manufacturer.	Note that there are various local / regional guidelines and regulations for waste disposal. In case of disposal of crop residues from Palm Oil ASEAN guidelines limit use of combustion as a disposal route.
Basic Criterion 6.2 *Adequate facilities for safe storage and segregation.*	• Available storage volumes meet budgeted tonnages in waste management plan. • Absence of 'fly tipped' waste and no evidence of over flowing waste storage. • BOD of standing water bodies containing effluents should not exceed specified level.*	*In case of Palm Oil this would limit the Biological Oxygen Demand (BOD) allowed for discharges to mill effluent ponds to below (100 mg l^{-1}). This level is consistent with Malaysian regulations (1984).
Enhanced Criterion 6.1 Minimised production of waste.	• Waste management plans show how waste is minimised, recycled, re-used. • Crop management, harvesting and cultivation procedures seek wherever possible to recycle crop residues, (e.g. as livestock feed, bedding, straw board, fibre board, or as fuel to replace fossil fuel). • Processing plants seek wherever possible to recycle crop residues (e.g. as livestock feed, bedding, straw board, fibre board, or as fuel to replace fossil fuel).	

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3.9 Crop-Specific Schedules

Where more detailed indicators or guidance on interpretation for specific crops is required, (in addition to the general standards) these can be provided in the form of "crop-specific" schedules (see table 3.2 for example). It is recognised that in the short-term there may be insufficient information to prepare crop-specific schedules for some potentially important biofuel crops such as *Jatropha curicas,* coconut and sweet sorghum.

However, given the recommended approach on benchmarking to a Meta-Standard (see Section 4), it is anticipated that the need for crop-specific schedules within the general biofuels standard will be limited.

Table 3.2 Example of crop-specific schedule for wheat grown in Europe

LCVP Daft Principles and Criteria	**Draft Crop-Specific Interpretation Schedules for Wheat**
P1. Conservation of Carbon	
C1.1 *Protection of above-ground carbon.*	No conversion of woodland; retention of veteran trees.
C2. 1 *Protection of soil carbon.*	Evidence of no conversion of land use from permanent pasture. No deep ploughing on peaty-gley soils.
P2. Conservation of Biodiversity	
C2.1 *Conservation of important ecosystems & species.*	Retention of hedgerows; Retention of native vegetation within production areas.
C2.2 *Basic good biodiversity practices.*	No-spray areas within [x] metres of field margins. Timing of preparation and combining to protect ground-nesting birds.
P3. Sustainable Water Use	
C3.1 *Efficient water use in water critical areas.*	Plan for specified amount of water per tonne of anticipated production in low rainfall areas (e.g. Mediterranean).
C3.2 *Avoidance of diffuse water pollution.*	Restricted use of mobile herbicides (e.g isoproturon). Limit use to ensure no contamination of water courses via land drains or point source contamination. Follow guidelines where local restrictions on pesticide use provide higher 'default' protection for high conservation areas.
P4. Maintenance of soil fertility	
C4.1 *Protection of soil structure and avoidance of erosion.*	Maintain drains and plan field activities to prevent waterlogging and compaction. Ensure seedbed remains friable and non-compacted before crop is drilled. In the UK, soil protection measures would include all GAEC[25] measures.
C4.2 *Maintain nutrient status.*	As per general standard.
C4.3 *Good fertiliser practice.*	Growers should aim to get the lowest possible grain nitrogen content, aiming for values of <2% N in the grain dry matter.
P5. Good Agricultural Practice	
C5.1 *Use of inputs complies with relevant legislation.*	As per general standard (nitrogen only an issue in Nitrogen Vulnerable Zones.
C5.2 *Use of inputs justified by documented problem.*	In UK, evidence of implementation of LERAPs.
C5.3 *Safe handling of materials.*	As per general standard.
P6. Waste Management	
C6.1 *Waste management complies with relevant legislation.*	As per general standard.
C6.2 *Safe storage and segregation of waste.*	As per general standard.

[25] GAEC = Good Agricultural and Environmental Condition

3.10 Draft Environmental Standards for Storage, Transportation and Processing.

The following environmental standards are proposed for the storage, transportation and processing of biofuels. The basic requirements are compliance with relevant local, national and international regulations on pollution, waste disposal, safety and remediation.

The draft standards for these components of the biofuel supply chain consist of four key requirements and two additional recommendations.

Principle 1. Safe, Clean Storage, Production and Processing To minimise the amounts of waste produced, and to utilise or dispose of all waste efficiently in accordance with any local regulation and best practice.	
Criteria:	Indicators:
Requirement 1. *Waste management complies with relevant national legislation.*	Plans and records are available to show: • Emissions to air, water and land are controlled in a way that complies that all relevant local, national and international regulations. • Waste disposal from processing facilities complies with all relevant local, national and international waste management regulations. • Packaging and containers for chemicals are disposed of or recycled as recommended by the manufacturer.
Requirement 2. *Adequate facilities for safe storage and segregation.*	• Waste storage facilities are bunded where required by regulations, and are shown to be leak free at audit inspection. • Inspection shows absence of 'fly tipped' waste and no evidence of over flowing waste storage.
Requirement 3. *Safe, clean transportation.*	Goods vehicles and ships comply with relevant national health and safety legislation covering: • Vehicle emissions. • Prevention of leakage and contamination. • Vehicle Safety.
Requirement 4. *Remediation of accidental pollution.*	All accidental pollution incidents are recorded and remediated according to prevailing legislative requirements.
Recommendation 1. *Training, maintenance and upkeep of premises and equipment.*	• All facilities and equipment are properly maintained to ensure safe, clean operation within designed operating boundaries and statutory health and safety requirements. • Staff are trained in the relevant safety and waste handling methods.
Recommendation 2. *Minimised production of waste.*	• Waste management plans are available to show how waste production is: minimised, recycled, re-used and disposed of. • Processing plants seek wherever possible to recycle crop residues (e.g. as livestock feed, bedding, straw board, fibre board, or as fuel to replace fossil fuel). • Sale, transport, unloading and storage are planned to avoid wasting fuel, oil and other resources on unnecessary and unforeseen journeys.

It is anticipated that these standards would be reasonably straightforward to audit and should present very little or no additional burden beyond legal requirements and widely accepted good practice.

Section 4. Benchmarking to a Meta-Standard

This section examines the potential for implementing global environmental standards for biofuels through a process of benchmarking (or cross-compliance) with existing assurance schemes. Considerable effort has been invested in the technical development of assurance systems for combinable crops in Europe. Further organisational effort has been invested in building stakeholder consensus around standards for Palm Oil (RSPO). Similar efforts are developing for Soy (RTRS) and sugarcane (BSI).

There are strong arguments for building upon these existing systems and initiatives rather than starting from a "clean sheet":

- Starting afresh is would certainly be seen as a negative move by the large numbers of industries and NGOs involved in existing schemes (duplication of effort / negation of progress);
- Duplicating or overwriting existing schemes would be against the UK's commitment on standards with respect to international trade agreed in the Uruguay trade rounds;
- The organisational requirements for developing an overarching international agreement on environmental standards for biofuels would be very demanding;
- Cross-compliance is an accepted approach used by several other schemes including LEAF and EurepGAP.

A Meta-Standard (**MS**) based on benchmarking could be applied as follows:

- Each major environmental assurance scheme would be assessed for its compliance with the draft environmental standards for biofuels (the Meta-Standard). Each criterion of the MS would be cross-checked against relevant criteria and indicators of the other schemes to determine whether they were of equivalent or higher level of stringency. For any MS criteria that are either not (adequately) covered a "Supplementary Check" (SC) and corresponding inspection process would be developed.

- Supplementary Checks would then be provided to accredited verifiers of the relevant schemes to be included within the standard verification process (if agreed with producer).

- Verification would be carried out by the existing auditing mechanisms established for the schemes operating under the Meta Standard, to provide a single inspection process.

- Over time, it may be possible to reduce the number of SC's through gradual harmonisation between assurance schemes. This would require discussions between the governance bodies (and their respective stakeholders) and is likely to be long-term process.

To assess the feasibility of cross-compliance with the main relevant assurance schemes (and initiatives under development), we reviewed the Sustainable Agriculture Network (general farm), RSPO (Palm), the Basel Criteria (Soy), ACCS (combinable crops) and the EurepGAP IFA (combinable crops) against the draft basic level PCIs criteria and indicators.

It should be emphasised that while SAN, ACCS, EurepGAP and LEAF are operational assurance schemes, the RSPO has yet to operationalise its agreed standards and the Basel Criteria is still an initial draft that has yet to be formally discussed by the RTRS. Table 4.1 summarises the result of this review.

Table 4.1 Cross-Compliance Table

LCVP Daft Principles (Ps) and Criteria (Cs)		SAN/RA (farm)		RSPO (Palm)		Basel (Soy)		LEAF (farm)		ACCS (combinable crops)		EurepGAP IFA (combinable crops)	
P1. Conserve Carbon													
C1.1 *Protection of above-ground carbon*	✓	P2 (ecosystem conserv')	✓	7.3 (+protect 2y forest) 7.7 (+fire restriction)	✓	3.1.1, 3.1.2 (+protect 2y forest), 3.2.3	✓	1.2.1 Documented farm policy (C implicit)	P	1.0 Awareness of Defra COPs for soil, air and water	X	Carbon not mentioned
C2. 1 *Protection of soil carbon*	✓	P9: (soil mgt)	P	7.4 (+restrict high OM soils)	P	2.1.24 (+restrict planting on high OM soils)	✓	2.1.1 Soil management plan (C implicit)	P	As above	X	As above
P2. Conserve Biodiversity													
C2.1 *Conservation of important ecosystems & species*	✓	P2 (ecosystem conservation);	✓	5.2	✓	3.1.1	✓	7.1.1 –7.5.7 Extensive set of criteria	P	1.2 "take account of environmentally sensitive areas…."	✓	All Farm Base Module. Environment issues 1.6.1.2
C2.2 *Basic good biodiversity practices*	✓	P3 (wildlife conservation)	✓	5.2 (+on-farm practice)	✓	3.3	✓	7.5.1-7.5.7 Integrate farming and biodiversity management	P	Compliance with professional schemes to provide 'good practice'	✓	1.6.1.1 – needs mild rewording
P3. Sustainable Water Use													
C3.1 *Efficient water use in water critical areas*	✓	P4 (water conservation)	✓	4.4	✓	2.1.4	✓	2.7.1 –2.7.8 Irrigation and water storage	P	Covered by compliance with soil and water COPs [C.1.1 above]	✓ P	1.6.1.3 & 1.6.1.4 Crops Base Module 2.5.1.2 & 2.5.1.3
C3.2 *Avoidance of diffuse water pollution*	✓	P8 (ICM)	✓	4.4	✓	2.1.5	✓	3.7.4 4.2.1-4.2.6	✓	2.1.1, 2.1.5, 2.9, 5.1, 5.2, 5.5,	✓	1.5.2. No explicit mention of diffuse pollution 3.2.1.1 – Fertiliser
P4. Soil fertility													
C4.1 *Protection of soil structure and avoidance of erosion*	✓	P9: (soil mgt)	✓	4.3	✓	2.1.1, 2.1.3, 2.4.2	✓	2.2.1 –2.2.10 Soil erosion section	✓	5.10	✓	2.3.2.1 & 2.3.3.1
C4.2 *Maintain nutrient status*	✓	P9: (soil mgt)	✓	4.2 (+pH monitoring?)	✓	2.1.2 (+monitoring soil?), 2.4.2	✓	2.4.1 – 2.4.14 Crop nutrition	✓	5.8, 5.9 – Match crop requirements	✓	3.2.1.1
C4.3 *Good fertiliser practice*	✓	P9: (soil mgt)	✓	4.2, 3.1	✓	2.1.2		As above plus 2.5.1-2.5.9 Organic 2.6.1-2.6.9 Inorganic fertilisers	✓	5.0, 5.7(sludge as a fert not a waste) 5.9	✓	2.4 & 3.2

P5. Good Ag Practice												
C5.1 *Use of inputs complies with relevant legislation*	✓	P8 (ICM)	✓	2.1	✓	1.1 (-GMO restriction?), 2.2.2	✓	2.4.14 Fertiliser/NVZ 3.7.4 Chemicals	✓	1.0, 1.1 compliance with legislation is part of COP compliance 2.6, 2.7	✓	2.6.2 pesticides [?2.4.4. fertiliser]
C5.2 *Use of inputs justified by documented problem*	✓	P8 (ICM)	✓	4.5	✓	2.2.1, 2.2.2	✓	Yes, but presentation means problem documentation is not explicit	✓	2.10, 5.6, 6.9, 7.3	✓	2.4.2, 2.6.1
C5.3 *Safe handling of materials*	✓	P8 (ICM)	✓	2.1, 4.6, 4.7, 4.8	✓	2.2.2	✓	1.1.3 Implicit in 'comply with current requirements' 3.7.2 Pesticides	✓	2.2, 5.1, 5.2	✓	1.4, 2.6.2, 2.8.1
P6. Waste Management												
C6.1 *Waste management complies with relevant legislation*	✓	P10 (integrated waste mgt)	✓	2.1	✓	1.1	✓	1.1.3 - "Comply with" and 4.1.4 – "are aware of".	P	Waste not explicitly mentioned. Waste only a by-product of specified cleaning operations	P	1.5.2 No explicit mention of compliance with legislation
C6.2 *Safe storage and segregation of waste*	✓	P10 (integrated waste mgt)	✓	5.3 (+segregation?), 5.5	✓	3.4	✓	4.1.2 & 4.1.3	X	Pesticide container disposal follows COP recommendation	P	1.5.2 &1.5.3 storage and segregation not mentioned

Key: Checklist columns: ✓ = Compliant or exceeding requirements of Draft Standard. P = Partial compliance. X = Not compliant
Numbers refer to relevant sections, or criteria & indicators in respective schemes.

4.1 Results of Initial Cross-compliance Reviews

Table 4.1 (above) summarises the results of the cross-compliance assessment. A narrative description of how the standards in these schemes compare with the draft biofuels standards is given below.

In interpreting these preliminary benchmarking results it is important to recognise the different legislative contexts in which assurance schemes operate. In countries where relatively strong environmental legislation exists assurance schemes tend not to prescribe environmental requirements that are already are enforced through government regulation. However, it is also important to note that international environmental standards must operate independently of national regulatory frameworks; otherwise they would almost certainly be interpreted as “barriers to trade”.

SAN / RA

The Sustainable Agriculture Network / Rainforest Alliance farm standard is the world’s largest agricultural scheme for the environmental and social assurance outside the organic sector. Certified crops include bananas, citrus, cocoa, coffee, flowers and ferns. It is relevant to the biofuel sector insofar as it covers plantation crops that have agronomic and ecological similarities to potential biofuel crops grown in the tropics. A number of major producers are listed as certified including Chiquita and Favorita (bananas). Plantations Arriba (cacao), and several thousands of coffee producers, from small to large-scale in Central and South America. (Brazil, Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru).

The SAN / RA farm standards appear to meet or exceed all the requirements of the basic level draft biofuel standards. Furthermore, the SAN / RA standards have been shown to be practical to implement by smallholder farmers in Latin America (particularly in the case of coffee and cocoa producers).

RSPO

The RSPO criteria and indicators for sustainable palm oil production are not yet a working standard but have been developed through a consultation process involving a range of stakeholders including some of the major producers and influential NGOs.

On most environmental aspects, the RSPO criteria and indicators appear to be meet or exceed those of the draft biofuel standards. The only significant gap appears to be on the issue of protection of soil carbon stocks (prevention of planting on peat or other high organic matter soils). To cover this gap a “supplementary check” to ensure that high organic matter soils and peat were not converted to plantations would be required.

Basel Criteria

The Basel Criteria are an initial technical draft for negotiation by RTRS members.

As with the RSPO criteria and indicators, the Basel Criteria appear to meet or exceed those of the draft MS. Again, the only significant gap appears to be on the issue of protection of soil carbon stocks. To cover this gap a “supplementary check” to ensure that high organic matter soils were not converted to plantations would be required.

LEAF
The LEAF scheme is a new scheme operating within the UK, specifically designed to provide a higher level of assurance on environmental impacts than the much more widespread ACCS. There are currently around 1000 certified farms within the scheme, with an aim to increase this to around 5000 within three years. LEAF also has ambitious plans to rollout its scheme in a number of other countries in response to demands from retailers.

The LEAF standards appear to meet or exceed all the requirements of the basic level draft biofuel standards. No supplementary checks would therefore be required.

ACCS
The ACCS scheme covers over 12,000 farms in the UK, and over 75% of marketed output.

Our assessment indicates that there are a number of areas where the ACCS standards are weaker than those of the draft biofuel standards. The main areas where supplementary checks would be needed relate to the protection of carbon stocks and on biodiversity.

EurepGAP
The EurepGAP Integrated Farm Assurance standards for Combinable Crops appear to be developing rapidly in Europe, notably Germany, through benchmarking in-turn with existing national schemes.

Our review indicates that there are similar levels of coverage and gaps as with the ACCS. Key areas where supplementary checks would be needed are on the protection of carbon stocks and on biodiversity. Aspects that are marginal relate to planning and continual improvement.

Other schemes, relevant for cross-compliance
A further scheme that is of relevance for the development of a cross-compliance framework for biofuels is the Better Sugarcane Initiative (BSI), currently led by WWF. However, the BSI is still at an early stage of development and draft standards are not expected to become available for review until the end of 2006 or early 2007.

Other considerations for operating a cross-compliance approach
While the fundamental consideration for assessing the feasibility of a cross-compliance approach is understanding the relative performance / stringency of the standards operating under the umbrella it will also be necessary to check that the verification and certification process for each scheme are satisfactory, in terms of providing assurance that approved producers comply with the standards.

This initial assessment indicates that it should be relatively straightforward to develop a cross-compliance framework for the major agricultural biofuel crops.

Section 5. Discussion and Recommendations

Key Points

- A governance organisation and formal framework for decision making needs to be established before significant further development of the environmental standard for biofuels can be undertaken.

- The nature of the governing body and its supporting "critical mass" will influence the strategic approach to development (the degree to which it is led by buyers, producers or multiple stakeholders).

- Whichever approach is taken to defining the standards, it will be important to involve a wide range of international stakeholders to reduce the risk of legal challenges or breakaway schemes.

- The **recommended structure for the scheme** (that complies with the good practice guidelines agreed in the Uruguay Round of WTO[26]) is to develop a "**Meta-Standard"** building upon existing assurance schemes in the UK and internationally (notably, the ACCS and LEAF, EurepGAP, RSPO and other round-table initiatives). The meta-standard would work through a cross-compliance framework (described in Section 4) involving the development of "Supplementary Checks" to address any gaps in existing schemes.

- Environmental reporting under the RTFO can proceed independently but in parallel with the new standard. It is recommended that a framework for reporting is put in place prior to the full development of the biofuel standard.

- It should be recognised by all stakeholders that delivering against a new set of standards will take time to rollout. There is a danger that unrealistic expectations of instant adoption could have adverse impacts on the development of the industry. It is therefore suggested that a phased implementation plan is agreed by the industry.

    - Given that assurance schemes do not provide a complete solution to environmental issues around biofuel crops a number of additional "Multilateral Actions" to protect vulnerable ecosystems and safeguard long-term sustainability of biofuel production are needed and will require the involvement and/or support of governments

- These could include:

    - The development of area-wide monitoring schemes for bioenergy crop ecosystems;
    - The establishment / strengthening of checks and balances on the investment process (note that many of the environmental impacts are set at the investment stage rather than production stage);
    - The establishment of a "Critical Ecosystem Fund" to protect key species and habitats.

[26] See Appendix 2.

5.1 Governance of Environmental Standards Development

As noted in Section 3, the most critical issue to be resolved before further substantive development of an environmental standard for biofuels can occur is that of its governance. There is limited value to additional work on the draft standards unless this is done within the context of a formal governance structure.

A formal governance structure should provide clear rules on: who is involved in the development of the standard; what their roles, rights and responsibilities are; how decisions are taken; and how the scheme will be implemented.

Clearly, the selection of a governing organisation is a fundamental decision in this process. Detailed examination of the options for governance is beyond the scope of this study. However, there are a few basic choices: this must either be an existing organisation or a new organisation; if an existing organisation it will be necessary to assess the following:

A) Willingness and capability to perform function:
- Legally constituted / mandated to perform a standards governance role;
- Technically qualified;
- Ability to undertake required functions within timescale and resources available.

B) Accepted by "critical mass"[27] of stakeholders as a suitable organisation for this purpose:
- Accepted as having sufficient skills and capabilities to perform function;
- Decision-making process accepted (voting rights or other mechanisms accepted by critical mass of stakeholders).
- Strategic approach to development accepted (See section 5.2, regarding options for strategic approach);

If a new organisation is established specifically for the purpose of governing the standard, then it will need to be constituted in a way that will make it both capable and accepted.

It is recommended that the next step in the process of development of these standards is to examine the options for governance in more detail and provide specific recommendations.

It is also recommended that in considering suitable governance organisations and strategic approaches to the development of the scheme that the LowCVP considers ways of including an appropriate number of international stakeholders. Securing support from producers and processors in major biofuel feedstock producer countries will certainly be a major factor in the long-term success of the scheme.

Further discussion on the legal and technical aspects of governance of the biofuels standards are outside the remit of this study. However, the next section examines alternative strategic approaches and provides broad recommendations for the development of a workable structure.

[27] The definition of what constitutes critical mass is obviously of key concern but is outside the terms of this study.

5.2 Organisational Approaches to Development of the Scheme

Drawing upon the experiences of the development of existing agricultural and forestry assurance schemes (Section 2), four possible broad organisational approaches or pathways to the development of an international biofuels standard are explored: (1) buyer-led; (2) producer-led, and (3) multi-stakeholder, and (4) NGO-led

The choice of pathway will, of course, be closely related to the nature of the governing body elected for the standard. Stakeholder organisations will need to deliberate upon what approach will best suit their objectives before deciding whether to support a specific pathway and governance body.

Any of these organisational pathways could (an in our view should) adopt a meta-standard approach (described in section 5.3) to developing and implementing the standard.

Buyer-led approach

Buyer-led standards such as EurepGAP are appropriate for buyer-driven chains such as horticulture (Geriffi, 1999), but are untested in bulk commodity markets. They have created something of a level playing field for exporters to Europe, and have worked for food safety and consumer assurance. They have worked to the benefit of retailers, providing them with a means of “due-diligence” on product quality.

The rapid growth of EurepGAP, combined with its lack of broad stakeholder buy-in has lead to several accusations of trade barriers. In June EurepGAP 2005 was the subject of a complaint at the Technical Barriers to Trade (TBT) Committee meeting of the Committee on Sanitary and Phytosanitary (SPS) Measures. EurepGAP has since worked to increase stakeholder dialogue through an UNCTAD-led process: the Consultative Task Force on Environmental Requirements and Market Access for Developing Countries.

Despite these criticisms the EurepGAP scheme continues to expand quite rapidly. One of the key advantages of a buyer-led approach in the biofuels sector would be the possibility of rapid development and rollout.

Producer-led approach

Standards and codes established by industry associations or a group of companies, to encourage good practice or to reassure other stakeholders such as PEFC, Farm Assured, the Tea Sourcing Partnership, the UK Banana Group Code, the Global Aquaculture Alliance, the Sustainable Agriculture Initiative platform (SAI), the World Cocoa Foundation’s Sustainable Cocoa Programme, and Utz Kapeh, have been criticised as lacking in credibility. However, several of the larger schemes are now gaining credibility through more inclusive stakeholder engagement processes.

As with buyer-led processes, producer-led standards can be developed relatively quickly. However, in the case of the biofuels market, with a diversity of crops and producer countries, a producer-led approach would not be straightforward. Furthermore, it is worth noting that most of the producer-led standards seem to have remained relatively niche in terms of geographic spread and numbers of producers participating.

Multi-stakeholder approach

The ISEAL Code of Good Practice for Setting Social and Environmental Standards[28] sets out "best practice" for the development of environmental and social standards though a multi-stakeholder approach. Examples of the schemes that adhere to these guidelines are Fairtrade, FSC, and organics.

The key advantage of the multi-stakeholder processes is that by consulting widely and responding in a structured way to specific suggestions, this can significantly reduce the risk of challenges by specific groups or competing assurance schemes over the longer term. There have been several cases where failure to adequately address the concerns of specific groups has led to conflict and damaging press (Harkki, 2004), or critique from social or environmental watchdogs (e.g. Fern 2001b; 2004; Hall, 2005). Multi-stakeholder approaches are also an insurance against future WTO complaints about technical barriers to trade.

One of the key problems with the ISEAL model of multi-stakeholder development is that it appears to require a significant amount of time to develop and rollout: for example, Guyana has been developing its FSC national standard over a period of more than 6 years, and Mozambique has been pursuing an FSC national standard for more than 3 years.

However, not all multi-stakeholder approaches have used the ISEAL model. The LEAF Marque scheme, for example, implemented its own consultative approach (with over 120 organisations consulted on the first draft of the standards). The development of the LEAF standards and rules for the assurance process took around 2 years to develop from the establishment of the organisation to initial certification of producers. LEAF anticipates a rollout of their scheme to approximately 40 countries over the next 3 years (through a process of cross-compliance).

As mentioned in Section 2, much of the innovation in developing best practice for procuring sustainable commodities is taking place in the multi-stakeholder processes such as the Round Table on Sustainable Palm Oil (The Round Table on Responsible Soy and the Better Sugarcane Initiative appear to be developing along similar lines). These processes are not only innovative but they are highly relevant to the biofuel market as they cover the some major biofuel crops. While not strictly adhering to the ISEAL model, these processes appear to have maintained coherence (no significant breakaway movements). However, it is important to stress that these have not yet developed working assurance schemes.

In summary, the approach taken in the development of standards will affect the timescale from initiation to a working scheme. Greater stakeholder engagement reduces the risk of claims against legitimacy and breakaway movements. However, there are time costs associated with these consultation processes.

5.3 The Meta-Standard Approach

A biofuels standard which attempts to override existing or developing certification schemes is likely to fail, both on legitimacy grounds (it would go against the good practice on Standards Development agreed at the WTO Uruguay Round, and on practical grounds – stakeholders already involved in other processes are unlikely to be willing to start again.

[28] http://www.isealalliance.org/documents/pdf/Implementation_Manual_PD1.pdf

It is strongly recommended that the biofuel standard is developed on the basis of a an overarching "Meta-Standard" that explicitly recognises and builds upon existing (and developing) assurance schemes. The Meta-Standard would be applied through a process of benchmarking (comparison of certification schemes to the Meta-Standard) and cross-compliance (development of cupplementary checks and inspections, only where required) approach, (as discussed in Section 4).

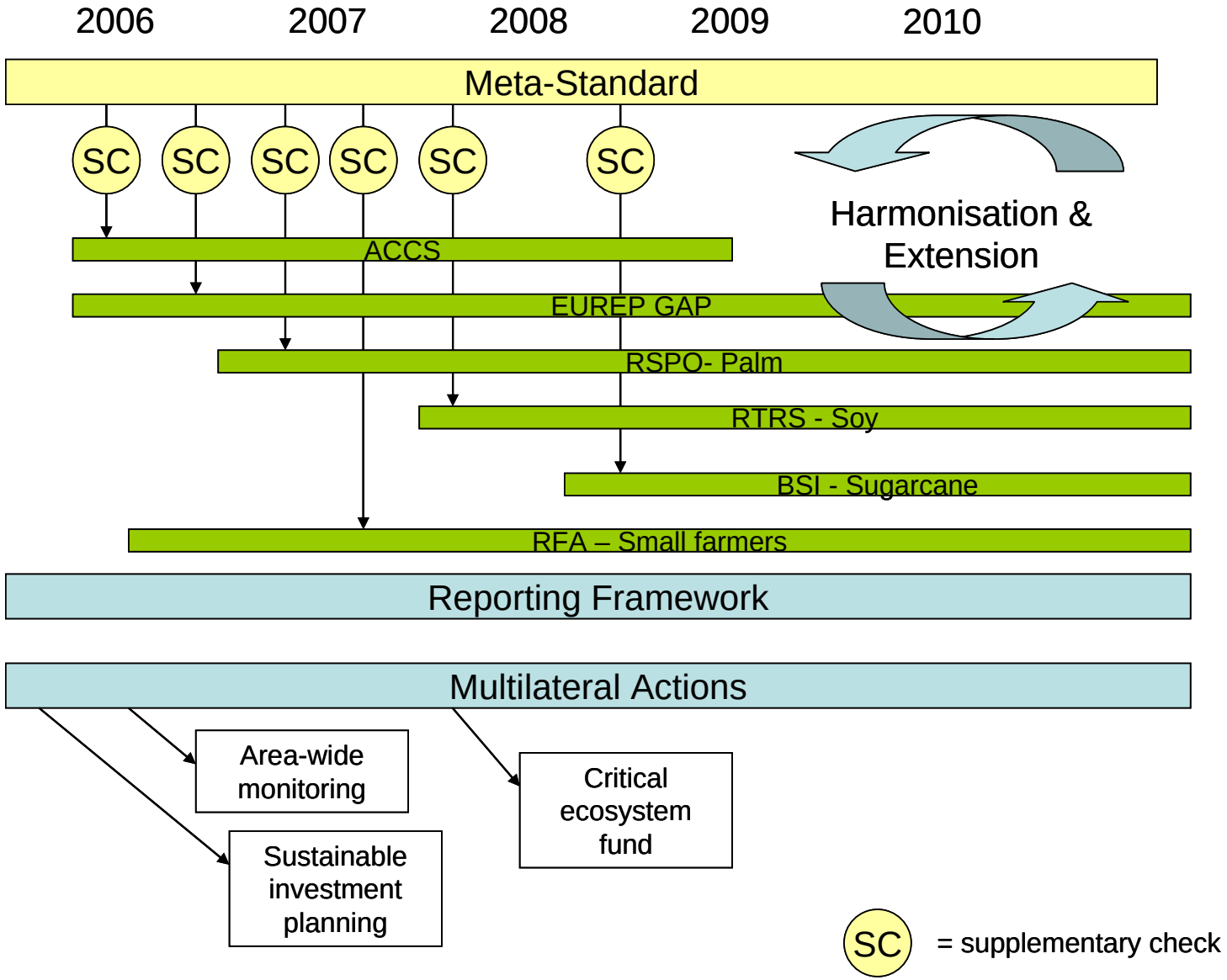
Figure 5.1 illustrates how an Environmental Meta-Standard for Biofuels could be developed over the next 5 years building upon the existing standards and certification structures for AFS, LEAF, EurepGAP, RSPO, RTRS, SAN/RA, BSI and any other national schemes that may be deemed appropriate.

There is a growing body of knowledge on how benchmarking can work in practice. Other schemes that use this approach include the Social Accountability in Sustainable Agriculture (SASA) project,[29] the LEAF scheme and the EurepGAP benchmarking, built around ISO Guide 65.

Over time it would be desirable to seek to reduce the number of supplementary checks within the cross-compliance framework, through a process of harmonisation between standards. However, it should be recognised that the process of harmonisation is likely to be a slow, process involving negotiation between stakeholder groups involved in different schemes. For example there may be to processes that are seen to either weaken environmental protection down to a lowest common denominator (e.g. NGOs) or increase compliance costs (e.g. producers).

[29] http://www.isealalliance.org/sasa/documents/SASA_Final_Convergence_Summary.pdf

Figure 5.1 Suggested development pathway for a Meta-Standard for Biofuels and complementary activities.



5.4 Other Considerations in the Process of Standards Development

In addition to the choice of governance model and developing the process of cross-compliance, we make the following recommendations for the development and internationalization of the standard.

Consider small enterprises right from the start. Standards and certification processes are a potential barrier for small-scale producers, who form the backbone of the rural economy in many developing countries. Given the importance of agriculture and in particular the participation of the small-scale producer for achievement of the Millennium Development Goals, then efforts must be taken to reduce the diseconomies faced by smaller scale producers and their organisations in meeting standards and proving compliance.

Get balanced north/south, economic/social/environmental balanced participation and voice right from start. As stated in Section 2, social concerns should preferably be approached with at least equal emphasis as environmental issues. While the exclusionary effects of standards can be overstated (standards can increase access by developing countries, or they can bar entry), they are usually an imposition. Developing countries, small producers and firms are invariably 'standards takers' and have tended to be excluded from the standard setting process (Vorley et al., 2002).

Pay attention to trade policy. While concerns about environmental standards acting as 'barriers to trade' are often over-stated, governments in developing countries (often in response to concerns of powerful domestic lobbies and concerns about sovereignty) are very critical of new standards, especially those standards driven by the private sector in the North. On the other hand, individual industries and exporters in the South may see standards as opportunities to penetrate and develop new markets.

Nevertheless, a key point regarding internationalization of standards is that they do not constitute barriers to trade. There are three possible steps to reduce the risk of damaging trade disputes:

- Follow codes of best practice, as set out in the ISO Guide 59 Code of Good Practice for Standardisation, the ISEAL Code of Good Practice for Setting Social and Environmental Standards, and the Uruguay Round Agreement on Technical Barriers to Trade, Code of Good Practice for the Preparation, Adoption and Application of Standards.
- Secure broad stakeholder agreement. The best way to insure against complaints at the WTO is broad stakeholder buy-in in the development and implementation of the standard.
- Bring in UNCTAD, which could play a role in harmonizing biofuel standards, e.g. through convening Regional Working Groups (as EurepGAP has sought to do).

Look for leverage from the public sector. The public sector can play a driving role in various ways. Firstly, it can endorse or create commodity-specific good practice guidelines or checklists for industry. A recent example is the UK Sustainable Development Commission (SDC) sugar checklist. The governments of both China and Mexico have moved to benchmark their Good Agricultural Practices (ChinaGAP and MexicoGAP) with EurepGAP (Garbutt and Coetzer, 2005).

Secondly, government can link sustainability to direct financial support for producers. The concept of cross-compliance (also known as 'eco-conditionality') is that farmers should comply with a basic standard of environmental responsibility in return for the public support they receive. In the Agenda 2000 reforms to the EU's Common Agricultural Policy, national authorities were given the jurisdiction to attach environmental conditions to all CAP subsidies. Cross-compliance is a natural ally of area-wide sourcing, presenting a whole country's production as in compliance with BMPs.

UK, and wider European endorsement of the environmental standards for biofuels would clearly be an important means of achieving rapid take-up by producers.

Look for leverage from the investment community. Investors can exert significant leverage on companies, and are under increasing pressure themselves to demonstrate responsibility in financing commodity production. The IFC, the private sector arm of the World Bank, is carrying out a project with WWF-US to explore whether Better Management Practices (BMPs) could be developed for a range of agricultural commodities. This is based on the assumption that for investors, companies that use BMPs represent fewer risks and potentially higher returns on investment. For many buyers, such companies represent good potential longer-term partners because there is greater assurance that environmental and social issues have been successfully addressed.

A prominent example of this approach is the group of Dutch banks that have adopted a set of basic social and environmental principles as a screen for investment in oil palm plantations. In order to prevent the bank being associated with poor management of oil palm plantations in Indonesia, Rabobank developed a set of criteria to determine the conditions under which it would finance palm oil plantations. Rabobank asks customers to provide periodic environmental and social impact reports. Where doubts exist about compliance, the bank can commission independent experts to assess compliance

Specialist Timber Investment Management Organisations (TIMOs) raise money from institutional investors to manage a portfolio of forest properties and are important players in the US. They act as an effective way for institutional investors to diversify and reduce risk. These organisations typically adopt a policy of sustainable forest management and several of them are looking beyond the US to investments in emerging markets. For example, the investment made by GMO in the company Gethal in the Amazon, Brazil, was conditional on a strategy to obtain forest certification.

Pay attention to comparative costs of compliance for different production systems. The sustainability of forest plantations or semi-natural monocultures is inevitably easier to certify than that of natural tropical forests. Plantations require simple replacement of one uniform crop after another. Natural forest management requires intimate knowledge of the reproductive ecology of at least a handful of commercial timbers – not to mention impacts on 2500 woody plant species and innumerable vertebrate and invertebrate species. It is no surprise that 93% of forest certification happens in simple plantation or semi-natural systems (Atyi and Simula, 2002).

5.5 Phased Rollout

Given the need for suppliers of biofuel to contract with producers in advance, one of the key questions that arises is the feasibility of contracting against the emerging biofuels standard in advance of the widespread availability of certification / assurance services within producer areas (both UK and internationally).

If obligated fuel suppliers have unrealistic expectations about the ability of the supply chain to deliver certification there is a danger that the industry will be perceived as underperforming, or will simply under-deliver.

It is therefore suggested that the industry should consider agreeing a set of targets for the gradual phasing-in of certified fuels over an agreed period.

5.6 Reporting for the RTFO

It is important to recognise the difference between the development and application of environmental standards for biofuels and reporting to the administrator of the RTFO.

Since, for most crops and areas, there are existing assurance schemes available or under development, the reporting framework for the RTFO does not require the biofuel standards to be fully operational. Box 5.1 provides an illustration of how obligated fuel suppliers could report against the range of standards that are currently available, plus the supplementary criteria for the biofuels standard.

Box 5.1 Draft Format for Reporting Environmental Sustainability of Biofuels

Company:
Period:

Biodiesel fuels supplied in period (litres):

Fuel / Component	litres
Biodiesel (Total)	
UCOME	
Tallow	
Palm Oil Methyl Ester	
Soy Methyl Ester	
Rapeseed Methyl Ester	
Other (specify type)	

Environmental Declaration: UCOME + Tallow	litres
Volume of feedstock declared compliant with relevant environmental regulations	

Environmental Declaration: Palm Oil Methyl Ester	litres
Volume of feedstock declared compliant with relevant environmental regulations	
Volume of feedstock from RSPO members	
Volume of feedstock certified to RSPO standard*	
Volume of feedstock certified to "the International Biofuel Standard"***	

Environmental Declaration: Soy Methyl Ester	litres
Volume of feedstock declared compliant with relevant environmental regulations	
Volume of feedstock from RTRS members*	
Volume of feedstock certified to RTRS standards**	
Volume of feedstock certified to "the International Biofuel Standard"***	

Environmental Declaration: Rapeseed Methyl Ester	litres
Volume of feedstock declared compliant with relevant environmental regulations	
Volume of feedstock certified to ACCS scheme	
Volume of feedstock certified to EurepGAP standards	
Volume of feedstock certified to "the International Biofuel Standard"***	

Environmental Declaration: other Combinable Oilseed Crop Methyl Ester	litres
Volume declared compliant with relevant environmental regulations	
Volume of feedstock certified to ACCS scheme	
Volume of feedstock certified to EurepGAP	
Volume of feedstock certified to "the International Biofuel Standard"***	

* = not possible until organisation formally established
** = not possible until assurance scheme operational
*** = not possible until assurance supplementary criteria for this scheme formally agreed
cells shaded where "not available"

5.7 Beyond Standards

While the development and application of environmental standards is a key tool in reducing the risk of environmental damage associated with rapid increases in the production of biofuel feedstocks, standards for production units on their own are unlikely to prevent certain types of impacts, most notably those occurring outside the areas that are certified.

It is therefore strongly recommended that the biofuel industry examines the case for broader multilateral actions that could be pursued to ensure the long-term sustainability of biofuel production.

The following mechanisms are suggested for further consideration:

- Establishment of a system of monitoring the key sustainability indicators in and around the major biofuel feedstock producer regions. In particular to assess the risks to natural ecosystems, water resources and soils that could undermine the longer term productivity of these areas. Such a system should identify regional scale effects such as land degradation or ecosystem loss before they became too critical. Corrective actions could be put in place through the Global Envrionment Fund (GEF) or World Bank. A similar system for food production in Africa – the Famine Early Warning System (www.fews.net) - is operated by NASA and USAID to detect crop failures that could lead to famine.

- Work with investors in the biofuel industry to ensure that sustainability issues are taken into consideration at the earliest stage of investment planning (rather than waiting until production is underway before applying standards). Many decisions relating to land use and infrastructure will be taken prior to the point of entry to an environmental assurance scheme, it therefore makes sense to introduce environmental protection measures at the earliest stages of project or institutional financing. This could be done by working with investors through schemes such as the “Equator Principles”[30].

- Development of a critical ecosystem fund to ensure stringent protection of the most important areas for conservation in the environs of biofuel production areas. Such a fund would certainly require governmental support.

It is suggested that these actions should be considered in parallel with the further development of the standard, as illustrated in Figure 5.

[30] http://www.equator-principles.com/

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