Joint International Workshop on High Nature Value Criteria and Potential for Sustainable Use of Degraded Lands, Paris, June 30-July 1, 2008:

Criteria and Indicators to Identify and Map High Nature Value Areas

– Issue Paper –

Darmstadt/Geneva/London/Washington DC, June 2008

Authors:

Klaus J. Hennenberg, Uwe R. Fritsche, Kirsten Wiegmann

Öko-Institut, Darmstadt Office

Sébastien Haye

Roundtable on Sustainable Biofuels (RSB)

Jenny Hewson, Christine Dragisic

Conservation International (CI)

Öko-Institut

Darmstadt Office

Rheinstr. 95

64295 Darmstadt. Germany

Phone +49 (0) 6151 - 81 91-0

Fax +49 (0) 6151 - 81 91-33

Freiburg Office

P.O. Box 50 02 40

79028 Freiburg. Germany

Street Address

Merzhauser Str. 173

79100 Freiburg. Germany

Phone +49 (0) 761 - 4 52 95-0

Fax +49 (0) 761 - 4 52 95-88

Berlin Office

Novalisstr. 10

10115 Berlin. Germany

Phone +49 (0) 30 - 28 04 86-80

Fax +49 (0) 30 - 28 04 86-88

www.oeko.de

Content

1 Introduction and Overview

The use of biomass for energy production is rising globally in parallel to increasing oil prices, concerns on energy security, and climate change. Many countries recognize biomass as a domestic energy resource, and some see opportunities for exports of liquid biofuels (Best 2008).

There is little doubt that biomass use for liquid transport fuels, as well as for electricity and heat production, will continue to rise in the future, and that global trade with bioenergy will rise in parallel. This will be driven, inter alia, by political goals of the EU to increase the use of biofuels in the transport sector from a current rate of 2% up to 10% in 2020, and domestic biofuel quota systems being introduced in many other countries as well (GBEP 2007). This development will pose both **opportunities and risks** for sustainable development for regions, countries, and the world as a whole.

With the CBD-COP 9 decision[1] it is internationally agreed "that biofuel production and use should be sustainable in relation to biological diversity". The parties also stressed that **risk mitigation** is needed "to promote the positive and minimize the negative impacts of biofuel production and its use on biodiversity and the livelihoods of indigenous and local communities" where the CBD should give guidance to processes and activities (CBD-COP 9 decision).

World-wide, many approaches and activities are underway that address the sustainability of bioenergy. Prominent examples are non-governmental initiatives such as the Roundtable on Sustainable Biofuels (RSB) and Round Table on Sustainable Palm Oil (RSPO), as well as national action from the European Union, Germany, United Kingdom and the Netherlands. These activities are accompanied by international agreements from the G8+5 (GBEP) and CBD as well as projects from international organizations such as EEA, FAO, and UNEP and several non-governmental organizations (CI, CURES, IUCN, WWF, among others).

Though the development of criteria for sustainable bioenergy showed strong progress during the last years, a set of internationally accepted criteria as well as derived indicators is still missing. Furthermore, although many standards (e.g., FSC, RSPO and RSB) require the protection of areas of biological conservation (HCVs, HNVs, KBAs, etc), much work is still needed regarding the concrete implementation of such requirements.

What are the concrete means needed to conduct the identification and mapping of areas of high conservation and what is the state-of-the-art in this topic?

In this context, the Federal Environment Agency (UBA), on behalf of the German Ministry for Environment (BMU), is funding a research project on sustainable global biomass trade, carried out by Oeko-Institut and IFEU until end of 2009.

---

1 UNEP/CBD/COP/9/L.35; see http://www.cbd.int/doc/?meeting=COP-09.

A key element in that research is to consider and elaborate on opportunities for sustainable biomass feedstock provision which have no negative or even positive environmental, biodiversity, climate, and social trade-offs.

Initiated from this project, Oeko-Institut, RSB and UNEP organize the "**Joint International Workshop on High Nature Value Criteria and Potential for Sustainable Use of Degraded Lands**" in collaboration with CI, FAO, IUCN and WWF, to be held at the premises of UNEP-DTIE in Paris, France from June 30 to July 1, 2008.

This workshop is the second of a series dealing with issues of sustainable bioenergy[2].

The Paris workshop will address three topics: protection and sustainable use of biodiversity, degraded land as potential priority area for producing biomass feedstocks, and the respective social context.

The present Issue Paper gives background information on biodiversity-related aspects. In this context, biodiversity is defined in a wider sense following the CBD definition:

> "Biological diversity (=biodiversity) means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." [3]

Section 2 of the paper addresses existing and potential negative impacts of bioenergy production on biodiversity. Section 3 shortly gives an overview on which key issues a risk mitigation strategy regarding biodiversity should focus on. In Section 4, a brief summary of existing criteria for sustainable bioenergy production is given, that is completed by available tools and processes that can be used for the identification, mapping and implementation of sustainable bioenergy production in Section 5. In Section 6, needs and further steps are reflected in light of requirements and information of the former Sections that end up in questions that should be dealt with during the workshop.

---

2 The 1st workshop was held in Brussels in January 2008, dealing with sustainability requirements for biofuels from a European perspective, and focused on GHG accounting, and biodiversity in general (see www.oeko.de/service/bio/en/brussels.htm)

3 CBD, article 2: http://www.cbd.int/convention/articles.shtml?a=cbd-02

2 Biodiversity Risks from Bioenergy Production

Bioenergy has seen a huge boom within the last decade due to various strategies set by governments to reduce greenhouse-gas emissions, or enhance energy security through biofuels, with similar interest from the private sector. However, this potentially promising solution raised new concerns regarding conservation and biodiversity. It appears that, in parallel to ongoing unsustainable agriculture and forestry, an uncontrolled and widespread development of bioenergy production is likely to be responsible for additional losses of high biodiversity or other conservation values.

Assuming that for reasons of food security, bioenergy feedstocks should not come from lands currently used for food production, and further assuming that demands for feed and fibre are unlikely to decline in the next decades, a limited area remains which might be available for bioenergy feedstock production unless productivity would increase massively. This is particularly relevant for 1st generation biofuels which are produced as any other agricultural commodity and hence require arable land of quality[4], whereas land-use implied by so-called 2nd generation biofuels is yet uncertain due to the early stage of their development.

The ambitious production targets adopted by some countries or the European Union make the equation fairly simple, though: more arable land is needed and – in absence of abandoned farmland and wasted or unused degraded lands – natural or moderately modified ecosystems might be converted to cropland, often justified by national development needs. To some extent, an increase in productivity may compensate this, but at a resulting risk of unsustainable intensification of agriculture.

Not only are habitats and species at threat. The degradation of natural areas, including those without high biodiversity, but important in terms of ecosystem functions[5] and services[6] is foreseen as a major ecological risk. Any disturbance in ecosystem functions or services may ultimately show consequences for ecosystems sustainability, and people's subsistence. In addition to habitats, ecological corridors seem to be threatened by fragmentation of ecosystems impairing the natural movements of wildlife, whereas pristine ecosystems, whether of high biodiversity or not, may also be fragmented. Since long, primary forests in South America, South-East Asia and West Africa received attention and consequently, protection measures were proposed, with more or less success. It has since become evident that many other types of ecosystems, such as savannahs or peat swamps deserve the same level of management and protection, since they may include important biodiversity resources or have ecosystem functions such as carbon fixation.

---

4 *Jatropha sp.* might be an exception but this is still under debate

5 as defined by the FSC criterion 6.3 http://www.fsc.org/fileadmin/web-data/public/document_center/international_FSC_policies/standards/FSC_STD_01_001_V4_0_EN_FSC_Principles_and_Criteria.pdf

6 as defined by the Millennium Ecosystem Assessment – p6 see http://www.millenniumassessment.org/documents/document.429.aspx.pdf

3 Risk Mitigation Strategy

It is well known that biomass production for bioenergy can have both positive and negative impacts on biodiversity (CBD 2008), and the challenge is to promote the positive and minimize the negative once (CBD-COP 9 decision).

A risk mitigation strategy should consider the main risk biodiversity is facing, separated for origin and production of bioenergy. Key issues listed in Table 3-1 and specified in the following subsections can be helpful to decide on the design of criteria for sustainable bioenergy production used to implement frameworks for biodiversity-compatible bioenergy (e.g., Appendix 1).

Table 3-1 Key issues of the risk mitigation strategy to protect biodiversity

Key issues	**Risk mitigation effects to protect biodiversity**
Protection of natural habitats (PA, HCV, KBA, etc.)	▪ Avoidance direct negative effects on biodiversity in sensitive areas
Sustainable cultivation of biomass	▪ Reduction of direct negative effects and promotion of positive once in cultivation areas. ▪ BUT: risk of negative effects on natural habitats, in the form of *leakage,* by indirect land-use change.
Areas for preferential biomass production (unused degraded land and abandoned farmland)	▪ Low direct negative effects and promotion of positive once. ▪ Reducing the risk of negative effects by indirect land-use change
Sustainable use of organic residuals and wastes	▪ No or low direct negative effects. ▪ Reducing the risk of negative effects by indirect land-use change

Source: Öko-Institut

3.1 Protection of Natural Habitats

Protection Areas (PA) – defined through their legal status – are cornerstones of regional conservation strategies (Margules/Pressey 2000). They are dedicated to the protection of biodiversity, agrobiodiversity, and natural and associated cultural resources. These areas should represent the biodiversity of each region, and they should separate this biodiversity from processes like habitat loss, habitat fragmentation and isolation, land-use intensification and overexploitation as well as species invasions threatening its persistence, e.g., by enforcement of land-use restrictions.

However, existing PA throughout the world contain only a limited, biased sample of biodiversity, usually that of remote places and other areas unsuitable for commercial activities. Thus, they do not – as yet – come near to fulfilling global biodiversity commitments, nor the needs of species and ecosystems, given that a large number of

these species, ecosystems and ecological processes are not adequately protected by the current PA network (Dudley/Phillips 2006).

To mitigate risks from bioenergy on biodiversity, areas need to be evaluated that are of importance for the protection of biodiversity, but that are currently not protected (e.g., gap analysis, PoWPA). Both PA and currently unprotected biodiversity-relevant areas need the same strict protection status in order to withstand additional land-use pressure occurring from biomass production.

3.2 Cultivation Practice for Biomass Production

Today, it is widely accepted that the implementation of conservation goals for the protection of biodiversity requires systematic planning strategies for managing landscapes, including areas allocated to both production and protection (Benedict/McMahon 2006, Groom et al. 2006). The CBD recognizes the limitations of PA as the sole tools for conservation, and promotes an Ecosystem Approach which seeks to mainstream biodiversity conservation into broader land- and seascape management (Smith/Maltby 2003, Dudley/Phillips 2006).

Also IAASTD (2008) stressed in its recent Synthesis Report that for successfully meeting development and sustainability goals, a fundamental shift in agriculture is needed that protect the natural resource base and the ecological provisioning of agricultural systems.

Cultivation practices which respect biodiversity and agrobiodiversity require broad varieties of plants, adequate rotation schemes, low-erosion land-use methods (e.g. no-till systems), and minimal agrochemical application. Furthermore, the inclusion of specific landscape elements (e.g., stepping stones, corridors, buffer zones etc.) in the cultivation area must be considered. In the EU, e.g., approaches for environmentally "compatible" biomass production systems which include biodiversity concerns have been suggested (EEA 2006+2007), but are still far from implementation.

Sustainable cultivation practices for bioenergy can only reduce risks occurring from direct land-use change. However, cultivation on land that is already in use bears the risk of negative impacts on natural habitats, in the form of leakage, by indirect land-use change. Safeguarding these risks is one of the most essential challenge of sustainable bioenergy production.

3.3 Cultivation on Unused Degraded Land and Abandoned Farmland

The cultivation of biomass on unused degraded land[7] or abandoned farmland (for economic, political or social reasons) has the potential to safeguard against negative indirect land-use change effects from bioenergy development (OEKO 2006; Searchinger et al. 2008). The main advantage of these areas is that the risk of displacement of previous cultivation occurs, which can result in *leakage* into other areas is relatively low. Therefore, biomass production on these areas will not increase

[7] More details on degraded land and its definition is given in the Input Paper on degraded land also prepared for the workshop.

pressure on PA and unprotected biodiversity-relevant areas by indirect effects. In addition, cultivation of perennial crops can result in enhancing soil carbon.

However, at least some of these areas do harbor high biodiversity and could belong either to PA or other biodiversity-relevant areas. The regeneration of these areas of degraded land toward natural habitats may be more beneficial in terms of carbon sequestration and biodiversity conservation that biofuel crop cultivation, or the areas may be too sensitive for planned cultivation. In addition, on a first few some degraded land and abandoned farmland appear unused but the areas still contribute to food supply and the well-being of local people.

Thus, unused degraded land or abandoned farmland shall be prior biomass production areas due to potential positive and avoiding negative impacts. But before cultivation, the status of these areas needs to be evaluated carefully to mitigate negative trade-offs for biodiversity, environment and local people.

3.4 Residues and Wastes

Biomass residues (e.g., manure, forest thinnings, rice husks, straw) and wastes (e.g., organic fractions in residential and industrial wastes) are another option for bioenergy feedstocks that can amount up to half of the bioenergy potentials in a country (e.g., OEKO 2004, EEA 2007). The use of residuals and wastes has a low risk of causing indirect effects, and could present opportunities of positive impacts, e.g., avoided nitrogen leaching, reduced fire risks, revenue from land management organic surplus material. While the use of waste products is currently of limited viability, this will likely increase with second generation biofuels.

However, the change of natural decay chains in e.g., forests by extracting previously unused organic material such as thinnings could cause negative impacts for local biodiversity, and – in extreme cases – negatively affect soil quality, enhance erosion, and deplete nutrient levels.

Furthermore, a majority of the rural population in emerging countries already use a significant amount of agricultural residues (straws, stems, stalks, cobs, etc.), mainly for use as cattle feed, compost, free energy for cooking or building material. The actual availability of agricultural residues is hence to be further assessed, as well as the potential social and environmental impacts of diverting a significant amount of residues.

Thus, national strategies for bioenergy should strongly focus on opening up bioenergy resources from residuals and wastes, incorporating adequate management rules to safeguard against negative potentials.

4 Overview on Existing Criteria

A number of initiatives related to the sustainable production of commodities have developed principles and criteria designed to promote the preservation of biological diversity and maintenance of ecologically-sensitive areas. This paper includes a summary of the relevant principles and criteria developed by seven separate initiatives focused on biofuels, agriculture, forestry, and fishing (Table 4-1). These are, in no particular order: the Roundtable on Sustainable Biofuels (RSB), Roundtable on Sustainable Palm Oil (RSPO), Round Table on Responsible Soy (RTRS), Forest Stewardship Council (FSC), Rainforest Action and Sustainable Agriculture Network (SAN), Common Code for the Coffee Community (CCCC), and Marine Stewardship Council (MSC).

These seven initiatives are in different stages of development, making a direct comparison of intent, content, and implementation difficult. However, each initiative includes a set of social and environmental principles which orient the actions of its participating members in seeking sustainability at relevant stages of the supply chain. A set of criteria further detail how compliance with these principles should be evaluated. Most standards further detail these criteria in technical guidance, recommendations, or indicators.

The table below includes a brief summary of the biodiversity and High Conservation Value Area-related criteria included in each of the eight initiatives. Full text of the principles, criteria, and related guidance is included in Annex 1. It should be noted that most initiatives also included other principles on subjects such as soil, water, or waste that might have an indirect impact on biodiversity or environmentally-sensitive areas. While these principles have not been included in this analysis, they have been noted in Annex 1.

The diversity of approaches towards biodiversity conservation and protection of sensitive areas is striking. Most initiatives have included criteria on the protection and/ or restoration of native ecosystems, and many have adopted language related to High Conservation Value Areas. Several include criteria directly related to endangered or vulnerable species, though others opt for the more general term “wildlife.” About half of the initiatives require some type of environmental assessment. The recognition of landscape-scale elements such as buffer zones and ecological or biodiversity corridors as tools for conservation and maintenance of ecosystems is weaker, as is the recognition of the need to maintain ecosystem services and functions. Perhaps most surprising this is also true for exotic species, creation/ restoration of ecological corridors, prevention of conversion of natural habitats, and prioritization of degraded lands for production.

There is value to each of the approaches taken by these initiatives to addressing the protection of biodiversity and environmentally-sensitive areas within their specific sectors. Yet no one set of principles or criteria is complete. Most are short on specifics on how to achieve the principles, with guidance provided only in general lines. The indirect impacts of production – those which are not related directly to production, but to the chain of changes caused by this production – are missing entirely.

Beyond this, and perhaps because of this, no set of principles and criteria has become an international standard for biodiversity or habitat conservation, and none has garnered widespread acceptance across sectors. (The RSB has perhaps come closest to drawing on accepted criteria used in different sectors.) This generates confusion, especially in an area such as biofuels that crosses traditional commodity and industry lines, and for some may reduce incentives to adopt and implement best practices.

The inclusion of these principles and criteria in this analysis is intended to facilitate discussions on what it means to minimize and compensate the risk biofuel or biomass production present to biodiversity and sensitive habitats and how potential positive aspects can be promoted. In short, what is sustainability as it relates to biofuels, and how can it be assessed? The outcome of this debate during the workshop and after will undoubtedly provide valuable input to this ongoing debate.

Table 4-1 Summary of the relevant principles and criteria developed by seven separate initiatives focused on biofuels, agriculture, forestry, and fishing.

CRITERIA	INITIATIVE						
	RSB	**RSPO**	**RTRS**	**FSC**	**SAN**	**CCCC**	**MSC**
Environmental assessment	2.a	5.1	11.1, 11.3	6.1			
Native species							
Endangered/ vulnerable species	7a (through HCVs)	5.2		6.2		Yes	2.2
Illegal hunting and fishing	7.f	5.2			3.3		
Wildlife (general)					3.1, 3.2	Yes	
Population stocks							1.1, 1.2, 1.3, 2.3
Exotic species	7b			6.9			
Biodiversity relevant areas							
Protected areas	7.a	5.2			2.3	Yes	
High Conservation Value areas	7.b	5.2	9.2, 11.5	9.1	3.2		
Native ecosystems	7.b		9.1, 9.3	6.4	2.1, 2.2	Yes	2.1
Biological conservation areas	7.b		9.2, 11.5	6.2	3.1, 3.2		
Landscape elements							
Buffer zones	7.d		9.1		2.4		
Ecological corridors	7.e						
Forest/ natural habitat conversion				6.1			
Use of degraded lands	In good practices		11.2				
Ecosystem Functions	7.c		6.3				
Ecosystem Services	7.c						
Mitigation of negative environmental impacts (general)		5.1		6.5, 9.3			

RSB = Roundtable on Sustainable Biofuels, RSPO = Roundtable on Sustainable Palm Oil, RTRS = Round Table on Responsible Soy, FSC = Forest Stewardship Council, SAN = Sustainable Agriculture Network (Rainforest Action), CCCC = Common Code for the Coffee Community, MSC = Marine Stewardship Council.

5 Process for Identifying and Mapping Biodiversity-Compatible Bioenergy Land with available Data Sources and Tools

The aim of the process to identify and map land biodiversity-compatible for bioenergy feedstock production (see Figure 1) is to **mitigate risks**. Land is categorized into areas of no bioenergy production characterized as being high biodiversity-relevant[8], and areas of potential biodiversity-friendly production where associated negative impacts can be minimized or avoided, or even positive impacts seem possible (e.g. reduced erosion, increased agrobiodiversity).

The process of identifying and mapping these two areas could include methodological steps that focus on:

(1) acquisition of relevant data sets and input based multiple-scale data-layers as well as national or sub-national data-layers and knowledge of local experts,

(2) evaluation of these data, to assess their utility as well as identify gaps, along with a concurrent development of the criteria and indicators that will support the identification of no-bioenergy production areas and potential biodiversity-friendly bioenergy production areas,

(3) selection of relevant parameters to direct the refinement of data as well as assess the feasibility of additional analyses/research to minimize data gaps,

(4) incorporation of biodiversity-relevant areas,

(5) physical and biophysical refinement of remaining areas as a basis to develop biodiversity-friendly bioenergy production systems,

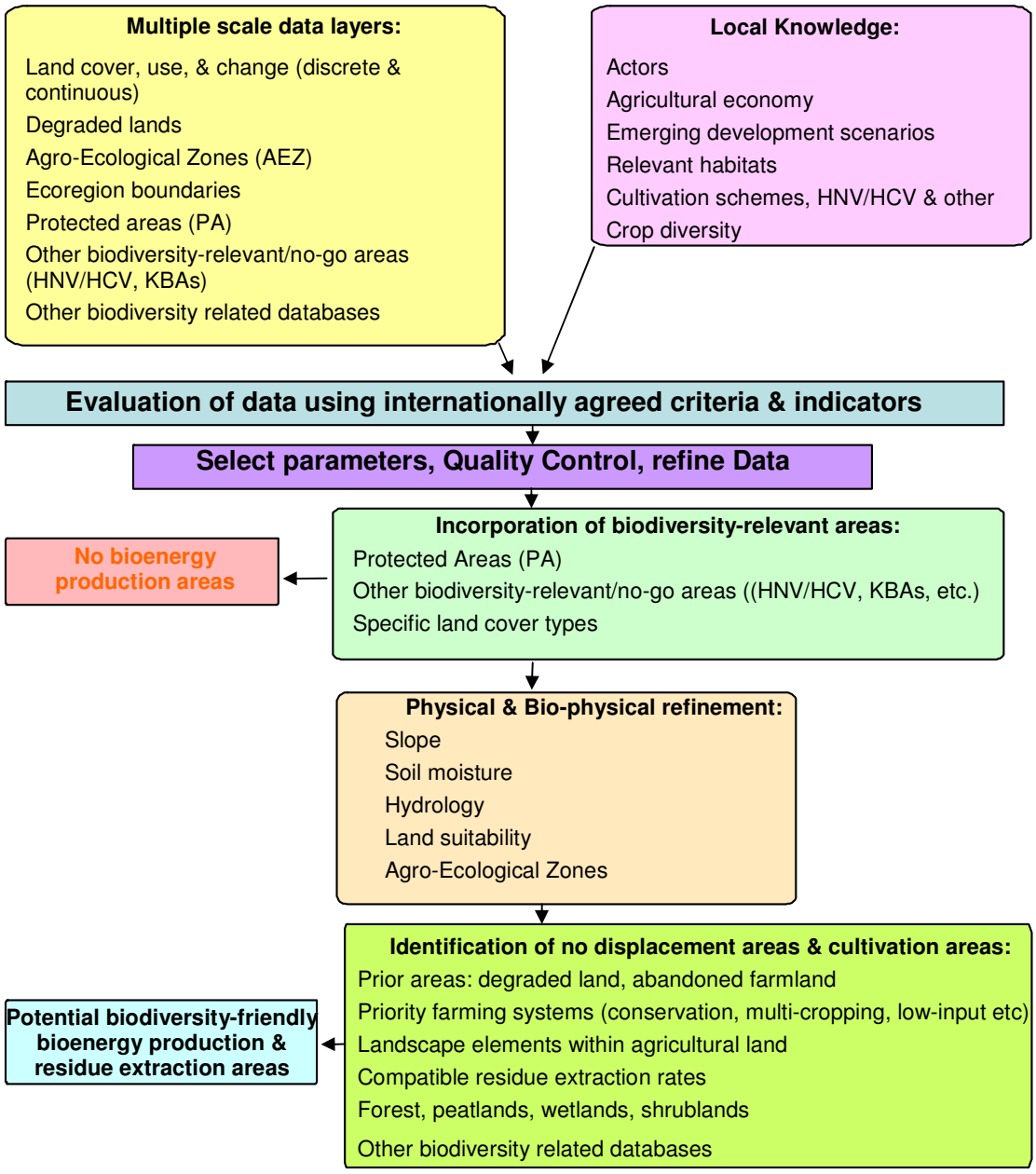
(6) identification and inclusion of areas of **no displacement** (i.e. unused degraded land or abandoned farmland), and

(7) areas of residual extraction.

Acquisition of relevant data sets – multiple data layers exist that may prove useful for the process. Sample products are briefly described in the following, and a further list of sources/access sites is given in Appendix 2.

8 It would also be reasonable to include ecosystem function and service components in the concept, as outlined in Section 2

Figure 1 Illustration of the process for Identification and Mapping of "No-Go" Areas and Biodiversity-Compatible Bioenergy Areas



Source: adapted from FAO (2008)

Such data layers, at a variety of scales covering global, regional and local, will include land cover and use information in the form of both discreet category products[9] as well as continuous fields data[10], ecoregion products[11], and specific land cover products that identify, for example, the distribution of wetlands, mangroves, or peatlands areas[12].

Further data layers exist which identify biodiversity-relevant areas, such as protected area information[13] and biodiversity-rich sites/zones[14].

Other data layers include agro-ecological zones, land suitability information, crop location information, and degraded and abandoned farmland information.

The focus should be on a set of data layers that characterize areas relevant for the protection of biodiversity as well as on environmentally "compatible" practices for biomass production.

This information would be stored in a comprehensive GIS-database. A further set of inputs relate to local knowledge regarding stakeholders, agricultural economy, relevant habitats, cultivation schemes, and crop diversity information.

Evaluation and screening of existing data sets with respect to indicators – an overview of 'where we are' with respect to data sets, especially remote sensing data, and relevant indicators of biodiversity is important. Selected *headline indicators* include habitat type, trends in the extent of habitats and biomes, as well as the connectivity/fragmentation of ecosystems, and in the distribution of species[15].

Non-species based indicators, such as habitat extent and fragmentation, are particularly important as direct measures of species abundance and loss are largely unavailable. An evaluation of the many data sets that exist should be performed to ascertain whether they are suitable for this process; some data sets may have an inappropriate spatial or temporal resolution, or their intended purposes do not lend to this process. In the last several years multiple products have become available as a result of new sensors and data availability. These include a suite of global and regional products generated using, for example, MODIS and SPOT-VEGETATION data.

---

9 Examples include the Global Land Cover 2000 (GLC2000), Land cover MOD12, Terra Land Cover, Global Forest Resources Assessment, Global Forest Watch, Global Forest Fragmentation Data

10 Vegetation Continuous Fields MOD44B

11 WWF Ecoregions

12 The Global Lakes and Wetlands Database, The World's Mangroves

13 World Database on Protected Areas (WDPA)

14 Key Biodiversity areas (KBAs), Biodiversity Hotspots, Global 200, Important Plant Areas (IPAs), Important Bird Areas (IBAs), Alliance for Zero Extinction (AZEs)

15 Headline indicators for assessing progress towards the 2010 Biodiversity Target

These products provide a general assessment of indicators such as habitat type, and change in extent of, habitat and biomes at the global and regional scale. However, other indicators, such as fine scale change, degradation, fragmentation, and connectivity, require more precise and more frequent monitoring. Mapping and monitoring of these indicators, especially in biodiversity-relevant areas (PA etc), is more achievable with the use of high-resolution data[16] to generate baseline products and enable monitoring updates.

Concurrent development of the criteria and indicators – It is recognized that currently an internationally accepted suite of criteria and indicators is missing (see previous section) and thus the data evaluation should be performed with a concurrent development of the criteria and indicators. The sound preparation and international acceptance of these criteria and indicators is the basis for the implementation of sustainability. This will be the largest challenge and priority work for the further development of the framework that should be embedded in existing international processes, especially CBD (see CBD 2008 and CBD-COP 9 decision[17]).

Tools: Integrated Biodiversity Assessment Tool (IBAT) and High Conservation Value Areas (HCV) as examples – A good example of a tool which will contribute to the definition of criteria and identification of the level of risk associated with potential production areas is the *Integrated Biodiversity Assessment Tool (IBAT)*. Developed by BirdLife International, Conservation International, and UNEP's World Conservation Monitoring Center, with IUCN as an observer and the participation of several private sector donors, IBAT is a response to the need identified by companies to have available fine-scale biodiversity data to incorporate into decision-making processes and management strategies. This information is directly relevant to a number of other stakeholders as well, for example in the creation of national development and conservation strategies.

IBAT provides information on high-priority areas for conservation, whether formally protected or not. The site-scale information available includes information on KBAs, IBAs, and AZE sites in at least 173 countries, as well as information on protected areas from the World Database on Protected Areas. IBAT provides a concrete, practical tool for the identification of the biodiversity-related characteristics of potential production sites. This, in turn, can feed into the identification of High Conservation Value Areas. By identifying sites with high known biodiversity risk, as well as those with no identified occurrences of IUCN Redlist species, IBAT can help companies and governments make location-related decisions. (It should be noted that the absence of an identified KBA, IBA, or AZE site does not mean there is no biodiversity value to an area; further ground testing should be done in all cases.) It can also help stakeholders take actions to help conserve species of known risk affected by biomass production

[16] Includes fine resolution data sources such as Landsat, ASTER, ALOS, CBERS

[17] UNEP/CBD/COP/9/L.35; according to the CBD-Secretary the final report of CBD-COP 9 will be available on the CBD-website before the end of June 2008 at the URL: http://www.cbd.int/doc/?meeting=COP-09.

sites. IBAT has been beta-tested by a series of diverse users, and will be formally launched in October 2008. It will be free and available to the public.

High Conservation Value (HCV) concept aims to safeguard areas of high conservation value, i. e. areas harboring biological, ecological, social or cultural value of outstanding significance or critical importance at the national, regional or global scale (see details in the Appendix 1). Within the HCV-concept six criteria (HCV 1 – HCV 6) are used to identify critical areas in a landscape which need to be appropriately managed in order to maintain or enhance High Conservation Values. These criteria cover biodiversity (HCV 1), landscapes (HCV 2), ecosystems (HCV 3), ecosystem services (HCV 4), basic human needs (HCV 5) and cultural identity (HCV 6). It is important to recognize that a separate application of single HCV-criteria is not in line with the HCV-concept but all criteria need to be considered in an HCV-assessment. The identification process is then followed by a managing and monitoring process of identified HCV areas.

IBAT, and the biodiversity prioritizations which underlie it, can be critical tools in identifying High Conservation Value Areas. Rather, KBAs, IBAs, and AZEs contain the site-level information which meets the HCV criteria on biodiversity (HCV 1), specifically HCV 1.2 (threatened species), HCV. 1.3 (endemic species = restricted range species), and HCV 1.4 (significant congregations).

KBAs could also indirectly inform a number of other criteria such as areas of high biodiversity value. The KBA criterion on biome representation would inform general discussion on representative habitats. The underlying KBAs, IBAs and AZE sites also offer the advantage of having field-tested practical ideas on defining sites (e.g. using management units) whereas HCV is a bit less clear on the topic.

IBAT, and with it KBAs, IBAs, and AZE sites, thus offers a concrete way to inform part of the broad HCV definition of biodiversity value that could add a science-based quantitative approach to defining HCVAs.

Tools like IBAT, which respond to identified needs and offer specific, pragmatic processes for identifying areas of risk and opportunity, will be critical as the debate on how, and where, biofuels can be produced sustainably.

Data refinement and supplementation based on parameter needs – the above evaluation and concurrent development of criteria and indicators will establish the feasibility of additional analyses/research necessary to minimize the data gaps and improve the quality of available data. This process should be performed while considering parameter needs that should direct the data refinement. Parameter needs, in terms of products, may include products capable of (1) identifying more specific agricultural types or (2) improved land use dynamics over time, or (3) improved information on productivity variation over time.

Incorporation of biodiversity-relevant areas – based on the products refined/generated above and the criteria and indicators developed, the next step is to incorporate biodiversity-relevant areas to omit these areas as no-bioenergy production areas. These include PA, KBAs, AZEs, IBAs, etc. Additional biodiversity- or ecosystem function-relevant areas that should be incorporated as no-bioenergy

production areas may include, but would be revised based on the criteria and indicators developed above, specific land cover types such as forest, wetlands, mangroves, and peatlands.

Physical and Biophysical refinement – For the remaining areas physical and biophysical characteristics are used to develop biodiversity-friendly bioenergy production systems. Refining also aims to eliminate areas that will not be suitable for bioenergy production. Considerations would include slope, hydrology, soil moisture, etc.

Identification of no displacement areas – biomass production will be a priority on those unused degraded lands or abandoned farmland that will not result in increased pressure on PA and unprotected biodiversity-relevant areas. Thus an evaluation of existing degraded lands data, including intended purpose and spatial and temporal relevance, should be performed. Several datasets exist[18], though the spatial and temporal resolution of these data ranges may severely limit their utility for this application. An evaluation would provide an understanding of the data gaps and an assessment of the effort required to supplement these data. Additional analyses using remote sensing and ancillary spatial data layers could be feasible to refine, update, or supplement these data. A similar analysis to identify prior areas of cultivation, in the form of abandoned farmland, should be performed. Other information includes data specifying areas suitable for cultivation[19] as well as agro-ecological zone information.

Residual extraction areas – Residuals like manure, forest thinnings, rice husks, straw can be an important source for sustainable bioenergy production. However, in many cases the extraction of residuals needs to be limited to avoid negative impacts on ecosystem services (especially soils) but also on biodiversity. The identification of residual extraction areas can be linked to spatial databases from agriculture and forestry (e.g., OEKO 2004, EEA 2007). If such data are available, the challenge is still to decide about the question of which amount of residual extraction has no negative impacts.

The above process aims to identify and map biodiversity-compatible bioenergy areas while **mitigating risks.** The next steps would be to iteratively apply the process to specific countries to identify what is possible with existing data and what is not, followed by the collection of additional required data.

---

[18] Land Degradation Assessment in Dryland (LADA) project, Global Assessment of Human-induced Soil Degradation (GLASOD), Soil Degradation in South and Southeast Asia (ASSOD), Soil Degradation Assessment for Central and Eastern Europe (SOVEUR) , Global Assessment of Land Degradation and Improvement (GLADA), History Database of the Global Environment (HYDE)

[19] Examples include Agro-MAPS (Ramankutty et al. 2002)

But, even if agreed criteria and indicators and all relevant spatial data exist to “screen” land with regard to its biodiversity relevance, a further limitation needs to be considered:

Local “hot spots” of biodiversity might easily be overlooked during the analysis, and the **social situation** regarding land-**use** is also of importance for sustainability.

Therefore, stakeholder involvement and “bottom-up” knowledge from the ground are required to create a robust process and sound results on sustainability.

6 Questions to be Addressed During the Workshop

On the first day of the workshop on bioenergy and biodiversity in Paris, 2008 at UNEP, two parallel working groups will deal with “harmonizing criteria and approaches” (Group A), and with “operational requirements for mapping/screening” (Group B).

Information from this Issue Paper hopefully will enrich the work, especially by drawing up questions and open discussions on specific aspects.

6.1 Harmonizing Criteria and Approaches

The overview of criteria and approaches addressing a sustainable bioenergy production given in Sections 4 shows that several important fields required from a biodiversity perspective are already well covered; in particular the protection and/ or restoration of native ecosystems and endangered or vulnerable species.

The reviewed approaches partly use similar schemes and wordings (e.g., referring to HCV) though they origin from very different fields (forestry, agriculture). Most differences are related to specific aspects such as landscape elements (buffer zones, corridors), exotic species, and prioritization of unused degraded lands for production. Thus, it appears promising, but also challenging, to combine existing approaches and criteria to one meta-“standard” that could – if needed – be detailed for specific situations.

However, there are still open points that should be tackled in the workshop:

1. Which institution could act as a platform to enhance harmonisation of criteria for bioenergy production, which human resources and budget is needed?
2. Reflecting existing criteria in the light of risk mitigation, do existing criteria “enhance” the use of bioenergy resources with low risks (i. e., wastes and residues, cultivation on abandoned farmland and unused degraded land)?
3. Negative impacts from indirect effects, especially from indirect land-use change, are difficult to address and insufficiently covered by existing criteria. How can this be improved?
4. Natural land that has currently a low relevance for the protection of biodiversity may become a major recourse for bioenergy production. In consequence, biodiversity harboured at these sites may become endangered in near future due to bioenergy production. How can such developments be avoided?
5. Some criteria are currently underrepresented in existing approaches, e.g., buffer zones, ecological or biodiversity corridors, exotic species, creation/restoration of ecological corridors, prevention of conversion of natural habitats, maintain ecosystem services and functions, and prioritization of unused degraded lands for production. Which of these points need to be included, e.g., in a meta-standard?
6. Are potential negative impacts on biodiversity due to the intensification of land use sufficiently covered by criteria?
7. Can biodiversity-friendly cultivation be strengthened within criteria?

8. Risk mitigation measures or certification must include a time dimension. What are reasonable cut-off dates for conversion or degradation?

6.2 Operational Requirements for Mapping/Screening

Technologies for mapping, especially remote sensing, have strongly improved during the last decades.

Many approaches and methodologies exist that cover spatial information which is directly or indirectly related to biodiversity, and biomass production (agriculture, forestry, bioenergy).

For sustainable bioenergy production, a main challenge is to develop a comprehensive GIS database that makes use of existing products and offers the possibilities to up-date data and to enter local data. However, the respective use of some products is limited, e.g., due to low spatial resolution, and few parameters.

In this context, open points that should be discussed during the workshop are:

1. Which institution could act as a platform for an international GIS-database needed as a basis to guarantee the sustainable development of bioenergy?
2. Which institutional and human resources as well as which budget is needed?
3. What are the most informative databases that should be focused on?
4. To apply criteria – do these databases match up with existing criteria and approaches?
5. Where are gaps in existing databases, and how to close those gaps?

References

Bai, ZG et al. 2008: Global assessment of land degradation and improvement 1: identification by remote sensing. Report 2008/01, ISRIC - World Soil Information, Wageningen.

Bartholomé E/Belward, AS 2005: GLC2000: A new approach to global land cover mapping from Earth observation data. International Journal of Remote Sensing 26:1959-1977

Benedict, M.A./McMahon, E.T. 2006: Green Infrastructure: Linking landscape and communities; Washington DC (Island Press)

Bergsma, E. et al. 1996: Terminology for Soil Erosion and Conservation; International Society of Soil Science; Vienna

Best, Gustavo et al. 2008: A Sustainable Biofuels Consensus; outcome of a meeting hosted by the Rockefeller Foundation Bellagio Study and Conference Center; Lago di Como, Italy http://www.bioenergywebshore.org/205.html?no_cache=1

CBD (Secretariat of the Convention on Biological Diversity) 2008: The potential impacts of biofuels on biodiversity - matters arising from SBSTTA recommendation XII/7; Note by the Executive Secretary; UNEP/CBD/COP/9/26

Dudley, N/Phillips, A. 2006: Forests and Protected Areas: Guidance on the use of the IUCN protected area management categories; IUCN; Gland and Cambridge

EEA (European Environmental Agency) 2004: High nature value farmland Characteristics, trends and policy challenges. EEA Report No 1/2004; Copenhagen

EEA (European Environmental Agency) 2006: How much bioenergy can Europe produce without harming the environment? EEA Report No 7/2006; Copenhagen http://reports.eea.europa.eu/eea_report_2006_7/en/eea_report_7_2006.pdf

EEA (European Environmental Agency) 2007: Estimating the environmentally compatible bio-energy potential from agriculture; EEA Technical Report, Copenhagen http://reports.eea.europa.eu/technical_report_2007_12/en/Estimating_the_environmentally_compatible_bio-energy_potential_from_agriculture.pdf

Eken, G. et al. 2004: Key biodiversity areas as site conservation targets; in: BioScience vol. 54, p. 1110-1118

FAO (Food and Agriculture Organisation) 2006: Global Forest Resources Assessment 2005 – Progress towards sustainable forest management. FAO Forestry Paper 147, FAO, Rome

FAO (Food and Agriculture Organization of the United Nations) 2008: Bioenergy Environmental Impact Analysis (BIAS); draft report prepared by Oeko-Institut, IFEU, and Copernicus Institute for FAO; Darmstadt/Heidelberg/Utrecht (forthcoming)

Fishpool, LDC 2004: From endemic bird areas to important bird areas and conservation action sites across Africa. Pp. 158-161 in Burgess, ND et al. (eds.): Terrestrial ecoregions of Africa and Madagascar: A conservation assessment.

Island Press, Washington

GBEP (Global Bio-Energy Partnership) 2007: A Review of the Current State of Bioenergy Development in G8 + 5 countries; GBEP Secretariat; Rome http://www.globalbioenergy.org/fileadmin/user_upload/gbep/docs/2007_events/wecrome2007/MASTER_GBEP_Report_final_16.11.2007_01.pdf

Groom, MJ et al. 2006: Principles of Conservation Biology; Sunderland, Massachusetts (3rd ed.)

IAASTD (International Assessment of Agricultural Knowledge, Science and Technology for Development) 2008: Synthesis Report of the IAASTD; Johannesburg

Kniivila, M. 2004: Land degradation and land use/cover data sources; working paper, Department of economic and social affairs

Langhammer, PF et al. 2007: Identification and gap analysis of key biodiversity areas: Targets for comprehensive protected area systems; IUCN; Gland (Switzerland)

Lehner, B/Döll, P. 2004: Development and validation of a global database of lakes, reservoirs and wetlands; in: Journal of Hydrology vol. 296, p.1–22

Margules, CR/Pressey, RL. 2000: Systematic conservation planning; in: Nature vol. 405, p. 243-253

Mittermeier, RA et al. 2003: Wilderness and biodiversity conservation; in: Proceedings of the National Academy of Sciences of the United States of America vol. 100 p. 10309-10313

Mittermeier, RA et al. 2004: Hotspots: Revisited. CEMEX, Mexico

Myers, N et al. 2000: Biodiversity hotspots for conservation priorities; in: Nature vol. 403, p. 853–858

OEKO (Oeko-Institut) 2004: Stoffstromanalyse zur nachhaltigen energetischen Nutzung von Biomasse. Öko-Institut e.V. – Institut für angewandte Ökologie, Freiburg

OEKO (Oeko-Institut) 2006: Sustainability Standards for Bioenergy; prepared for WWF Germany; Darmstadt/Berlin/Frankfurt http://www.oeko.de/service/bio/dateien/wwf.pdf

Olson DM/Dinerstein E 2002: The global 200: priority ecoregions for global conservation; in: Ann. Missouri Bot. Gard. vol. 89, p. 199–224

Oldeman, L/Van Lynden, G 2001: Linking methodologies for assessing land resources, their problems and possible solutions at small scales; in: Bridges, M et al. (eds.) Responses to Land Degradation. Proc. 2nd. International Conference on Land Degradation and Desertification. Oxford Press, Khon Kaen, New Delhi

Oldeman, L et al. 1991: World map of the status of human-induced soil degradation: an explanatory note. International Soil Reference and Information Centre, Wageningen. UNEP, Nairobi. Global Assessment of Soil Degradation GLASOD. 2nd. Edition. Publ. in cooperation with Winand Staring Centre, International Society of Soil Science, FAO, International Institute for Aerospace Survey and Earth Sciences. ISRIC, UNEP, Wageningen, Nairobi

Ramankutty N, et al. 2002: The global distribution of cultivable lands: current patterns

and sensitivity to possible climate change; in: Global Ecology and Biogeography vol. 11, p. 377-392

Ricketts, TH 2005: Pinpointing and preventing imminent extinctions; in: Proceedings of the National Academy of Sciences of the United States of America vol. 102, p. 18497-18501

Sanderson, EW et al. 2002: The human footprint and the last of the wild; in: Bioscience vol. 52, p. 891–904

Searchinger, T, et al. 2008: Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land Use Change; in: Science (published online 7 February 2008) www.sciencexpress.org;10.1126/science.1151861

Smith, RD/Maltby E. 2003: Using the Ecosystem Approach to Implement the Convention on Biological Diversity: Key Issues and Case Studies; IUCN; Gland, Cambridge http://data.iucn.org/dbtw-wpd/edocs/CEM-002.pdf

Stattersfield, 1998: Endemic bird areas of the world. Priorities for biodiversity conservation. Bird Life International, Cambridge

Strand, H. et al. (eds.) 2007: Sourcebook on Remote Sensing and Biodiversity Indicators; Secretariat of the Convention on Biological Diversity, Technical Series no. 32; Montreal http://www.cbd.int/doc/publications/cbd-ts-32.pdf

Strittholt, J et al. 2007: Coveradge of protected areas. Pp. 131-141 in Strand, H et al. (eds.) 2007: Sourcebook on Remote Sensing and Biodiversity Indicators. Secretariat of the Convention on Biological Diversity, Technical Series no. 32; Montreal

Sudfeld, C 2002: Important Bird Areas in Deutschland; in: Ber. Vogelschutz vol. 38 p. 17-109

UNEP 2007: Global Environment Outlook 4. Environment for Development. United Nations Environment Programme (UNEP), Nairobi, Kenya

van Velthuizen, H et al. 2007: Mapping biophysical factors that influence agricultural production and rural vulnerability; FAO, Rome

Appendix 1 – Criteria and Concepts

A number of existing initiatives have developed biodiversity-related criteria which have been incorporated into their principles, policies, and certification systems. Listed below are some of the most widely-accepted international initiatives with biodiversity criteria that may be relevant to biofuel feedstock production. Several of these criteria are still in draft form; this has been noted where appropriate.

Roundtable on Sustainable Biofuels (RSB)

The Roundtable on Sustainable Biofuels (RSB) is a multi-stakeholder initiative to develop standards for the sustainability[20] of biofuels. The Roundtable is an initiative of the Swiss EPFL (École Polytechnique Fédérale de Lausanne) Energy Center.[21] In June 2008, the RSB Steering Board[22] has validated a simplified version of the Principles and Criteria for sustainable biofuel production. Later in 2008, it aims to continue developing draft standards in conjunction with non-governmental organizations, companies, governments and inter-governmental groups from all over the world. The objective is to create a tool that consumers, policy-makers, companies, banks, and other actors can use to ensure that biofuels deliver on their promise of sustainability.

Within the catalogue of principles and criteria from RSB, biodiversity is addressed under Principle 7.[23] Additional Principles, including those on Water (8), Soil (9), Air (10) and Technologies – including GMOs- (11), may also indirectly affect biodiversity. The principle and criteria referenced here are from the May 6 working draft, which has not been formally approved by the Steering Board, and will likely undergo additional revisions.

Note: after recent discussions, criterion 7.a (environmental assessment) has been moved to a general principle which includes the need to perform an environmental and social impact assessment before any new biofuel project, as well as a continuous monitoring of environmental aspects, including conservation.

20 See also http://www.bioenergywiki.net/index.php/Sustainability_standards

21 http://cgse.epfl.ch/page65660-en.html

22 http://cgse.epfl.ch/page67476.html

23 http://www.bioenergywiki.net/index.php/RSB_principle_on_Conservation

7. Biofuel production shall avoid net negative direct and indirect impacts on biodiversity and areas of High Conservation Values		
Requirements	*Responsibilities*	*Guidance for Implementation*
7a) An environmental assessment must occur before the production starts.		
• HCV areas, native ecosystems, ecological corridors and other public and private biological conservation areas shall be adequately identified and mapped through a participative and multi-stakeholder consultation process. This identification must be performed prior to any exploitation of the area of concern. No exploitation can occur before the formal identification of the area. • Ecosystem functions and services shall be locally evaluated.	• The producer is responsible for collecting the necessary elements of information about a potential production area through an environmental impact assessment and land management plan appropriate to the scale and intensity of the production. • Maps of HCV areas, native ecosystems, ecological corridors and other public/private biological conservation areas, as well as information about local ecosystem functions and services may be provided by competent authorities and/or producers, appropriate to the scale and intensity of the production.	• Producers or cooperatives unable to perform an environmental impact assessment and/or a land management plan will need support. • Governments and conservation organisations should support and coordinate national identification of High Conservation Values (HCV) Areas, native ecosystems, ecological corridors and other biological conservation areas to provide producers with maps and other relevant data. • Environmental Impact Assessments must involve local and/or indigenous communities, and be performed in accordance with national and international guidelines.
7b) HCV areas, native ecosystems, ecological corridors and other biological conservation areas must be protected.		
• **No direct conversion** of HCV areas, native ecosystems and other public and private biological conservation areas	• The producer is responsible for not converting HCV areas, native ecosystems and other biological conservation areas and not degrading any of the High	• Limited exploitation, consistent with appropriate management plan can occur so long as HCVs are maintained. • *[Conversion of areas having irreversibly been degraded after the 1st of January 2008 is allowed.]*[*]

[*] Cut-off date to be defined by the Implementation Working Group, in consultation with local communities and experts.

into plantation or production site after the 1st of January 2008. • **No net loss** of any High Conservation Value. • Indirect conversion and loss must be assessed and mitigated. • No use of exotic invasive species.	Conservation Values. • Government, inter-governmental agencies, NGOs, producers, and the private sector to monitor and mitigate indirect impacts on HCV areas, native ecosystems and public and private biological conservation areas.	• Indirect effects are less likely to occur if the biomass comes from waste products, degraded land, or from a significant improvement in yield compared to the regional average. • The RSB work with government, inter-governmental agencies, NGOs, producers, and the private sector to monitor and mitigate indirect impacts on HCV areas, native ecosystems and public and private biological conservation areas.
7c) Ecosystem Functions (EF) and Services (ES) must be preserved.		
Requirements	*Responsibilities*	*Guidance for Implementation*
• Avoid, minimise or mitigate negative direct and indirect effects on EF and ES.	• The producer is responsible for the preservation of EF and ES.	• Impacts on local EF and ES and potential changes due to the production must be evaluated in accordance with the Millennium Ecosystem Assessment.
7d) Buffer Zones (BZ) must be protected or created.		
• The production site must not damage any existing BZ. • BZ to be set between production site and HCV areas, native ecosystems, ecological corridors or other public and private biological conservation areas. • Surrounding zones, including riparian areas and slopes, to be kept in their original state or restored if previously degraded.	• The producer is responsible for collecting the information on the existing Buffer Zones and to avoid damaging them. • The producer is responsible for setting BZ between the production site and surrounding areas, as well as keeping surrounding buffer zones in their original state or restore these whenever possible.	• Where necessary, BZ must be created on the production site, not outside. • Appropriate BZ must be set according to national requirements, the type of area that requests specific protection and/or the characteristics of the crop under cultivation (e.g. pesticide spray characteristics). • Clusters of individually-owned small agricultural parcels can be considered as a single production site.
7e) Ecological Corridors (EC) must be protected or restored.		
• No disruption of existing Ecological Corridors. • When possible, restoration of previously degraded Ecological Corridors. • On production site, habitat	• The producer is responsible for collecting information about Ecological Corridors in the potential area of production • Governments may provide necessary information and support/guide producers through a national ecological	• If an EC is identified in the production site, it must be maintained in its original state. • If habitat connectivity or wildlife movement is reduced on the production site, a significant area of the production site must be set aside to restore an equivalent connectivity. • A part of the production site may be dedicated to restore

connectivity and wildlife movement shall be enhanced.	corridors management plan. • The producer is responsible for avoiding the disruption of ECs, restore previously degraded ECs when possible and enhance habitat connectivity and wildlife movement on production site.	habitat connectivity and wildlife movement on a voluntary basis.
7f) Illegal hunting and fishing must not occur on the production site.		
Requirements	*Responsibilities*	*Guidance for Implementation*
• Hunting, fishing, ensnaring, poisoning and exploitation of endangered and protected species are prohibited on the production site. • The traditional access to flora and fauna of indigenous people is tolerated in accordance with the UN Declaration on the Rights of Indigenous People.	• The producer is responsible for ensuring that no hunting, fishing, ensnaring, poisoning and exploitation of endangered and protected species happen on the production site.	• Hunting, fishing and use of flora can be tolerated for local communities on the production site, if not of endangered or protected species, as per national laws and IUCN classification. • No endangered or protected species can be killed, damaged or harvested on the production site. • Traditional uses of fauna and flora by indigenous people are allowed in accordance with the UN declaration on the Rights of Indigenous People and/or national law.

Round Table on Sustainable Palm Oil (RSPO)

The "Roundtable on Sustainable Palm Oil" (RSPO) is a global multi-stakeholder initiative on sustainable palm oil that was formally established under Article 60 of the Swiss Civil Code on 8 April 2004 as. The principal objective of RSPO is "to promote the growth and use of sustainable palm oil through co-operation within the supply chain and open dialogue between its stakeholders". The not-for-profit association has members representing major players along the palm oil supply chain, namely the oil palm growers, palm oil processors and traders, consumer goods manufacturers, retailers, banks and investors, environmental/nature conservation NGOs and social/development NGOs. The RSPO is a unique platform for pragmatic co-operation to contribute to the expansion of sustainably produced palm oil and its uses. [24]

The RSPO finalized its principles and criteria in 2007, and as of 2008, has begun the process of certification of producers that comply with these criteria.

Principle 5, which is related to the conservation of natural resources and biodiversity, and its associated criteria and related indicators and guidance are listed in the following table.

Other principles, such as Principle 4, Use of Best Practices by Growers and Millers, and Principle 7, Responsible Development of New Plantings, may also affect biodiversity.

[24] http://www.rspo.org/resource_centre/RSPO%20Principles%20&%20Criteria%20Document.pdf

Principle 5: Environmental responsibility and conservation of natural resources and biodiversity

Criterion	Indicators and Guidance
Criterion 5.1 Aspects of plantation and mill management that have environmental impacts are identified, and plans to mitigate the negative impacts and promote the positive ones are made, implemented and monitored, to demonstrate continuous improvement.	Indicators: • Documented impact assessment. • Appropriate management planning and operational procedures. • Where the identification of impacts requires changes in current practices, in order to mitigate negative effects, a timetable for change should be developed. Guidance: Environmental impact assessment may cover the following activities: • Building new roads, processing mills or other infrastructure. • Putting in drainage or irrigation systems. • Replanting or expansion of planting area. • Disposal of mill effluents (see criterion 4.4); • Clearing of remaining natural vegetation. Environmental impacts may be identified on soil and water resources, air quality (see criterion 5.6), biodiversity and ecosystems, and people's amenity (see criterion 6.1 for social impacts), both on and off-site. Stakeholder consultation has a key role in identifying environmental impacts. The inclusion of consultation should result in improved processes to identify impacts and to develop any required mitigation measures. It is important that where activities, techniques or operations change over time, identifications of impacts, and any required mitigation, are updated as necessary. For smallholder schemes, the scheme management has the responsibility to undertake impact assessment and to plan and operate in accordance with the results. Individual smallholders would not be expected to undertake formal impact assessments (unless there is a legal requirement) but should have a good understanding of the potential negative impacts of their activities and appropriate mitigation techniques.

Criterion 5.2 The status of rare, threatened or endangered species and high conservation value habitats, if any, that exist in the plantation or that could be affected by plantation or mill management, shall be identified and their conservation taken into account in management plans and operations.	Indicators: Information should be collated that includes both the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors). This information should cover: • Presence of protected areas that could be significantly affected by the grower or miller. • Conservation status (e.g. IUCN status), legal protection, population status and habitat requirements of rare, threatened, or endangered species, that could be significantly affected by the grower or miller. • Identification of high conservation value habitats, such as rare and threatened ecosystems, that could be significantly affected by the grower or miller. If rare, threatened or endangered species, or high conservation value habitats, are present, appropriate measures for management planning and operations will include: • Ensuring that any legal requirements relating to the protection of the species or habitat are met. • Avoiding damage to and deterioration of applicable habitats. • Controlling any illegal or inappropriate hunting, fishing or collecting activities; and developing responsible measures to resolve human-wildlife conflicts (e.g., incursions by elephants). Guidance: This information gathering should include checking available biological records, and consultation with relevant government departments, research institutes and interested NGOs if appropriate. Depending on the biodiversity values that are present, and the level of available information, some additional field survey work may be required. For individual smallholders, a basic understanding of any applicable species or habitats, together with their conservation needs, will be sufficient.

Criterion 5.3 Waste is reduced, recycled, re-used and disposed of in an environmentally and socially responsible manner.	Indicators: • Waste management and disposal plan. • Safe disposal of pesticide containers. Guidance: The waste management and disposal plan should include measures for: • Identifying and monitoring sources of waste and pollution. • Improving the efficiency of resource utilisation and recycling potential wastes as nutrients or converting them into value-added products (e.g. through animal feeding programmes). • Appropriate disposal of hazardous chemicals and their containers. Surplus chemical containers should be disposed of or cleaned in an environmentally and socially responsible way (e.g. returned to the vendor or cleaned using a triple rinse method), such that there is no risk of contamination of water sources or to human health. The disposal instructions on manufacturer's labels should be adhered to. Smallholders should adopt appropriate measures to dispose of hazardous chemicals and their containers.
Criterion 5.4 Efficiency of energy use and use of renewable energy is maximised.	Indicators: • Monitoring of renewable energy use per tonne of CPO/FFB. • Monitoring of fossil fuel use per ton of CPO (or FFB where the grower has no mill). Guidance: Growers and mills should assess the energy use of their operations and energy efficiency of their operations. The feasibility of collecting and using biogas should be studied if possible.

Criterion 5.5 Use of fire for waste disposal and for preparing land for replanting is avoided except in specific situations, as identified in the ASEAN guidelines or other regional best practice.	Indicators: • Documented assessment where fire has been used for preparing land for replanting. Guidance: Fire should be used **only** where an assessment has demonstrated that it is the most effective and least environmentally damaging option for minimising the risk of severe pest and disease outbreaks, and with evidence that fire-use is carefully controlled. Use of fire on peat soils should be avoided. Extension/training programmes for smallholders may be necessary.
Criterion 5.6 Plans to reduce pollution and emissions, including greenhouse gases, are developed, implemented and monitored.	Indicators: • An assessment of all polluting activities must be conducted, including gaseous emissions, particulate/soot emissions and effluent (see also criterion 4.4). Significant pollutants and emissions must be identified and plans to reduce them implemented. • A monitoring system must be in place for these significant pollutants which goes beyond national compliance. • Monitoring of methane from effluent digestion and smoke particles. This may require the use of proxy measures.

Round Table on Responsible Soy (RTRS)

The goal of the Global Roundtable on Responsible Soy Association (RTRS) is to set up a multi-stakeholder and participatory process that promotes economically viable, socially equitable and environmentally sustainable production, processing and trading of soy. At a technical workshop held by the RTRS in April 2006 a group of experts and stakeholders worked out on a preliminary base (common basis) the main impacts of soy production.[25] At a second Roundtable Conference later that year the participants agreed to recognize them as the basis for further discussion of what will become the principles of the RTRS standard for responsible soy production.[26] In November 2006 the Organizing Committee decided to establish RTRS as a civil association under Swiss Law, open to membership for stakeholders and parties willing to promote the goals of the Roundtable. The First General Assembly of RTRS was in 2007.

The RTRS recently closed a period of public comments on its draft principles and criteria as well as implementation and verification models, and feedback is being reviewed by its Development Group. The information below is included in the March

[25] Common basis for RTRS: http://www.responsiblesoy.org/eng/documents/CommonBasis_eng.pdf

[26] Principles of the RTRS standard: http://www.responsiblesoy.org/eng/documents/final_principles.pdf

2008 version of the draft principles and criteria.[27] The principles and criteria will likely change in the coming months. The Round Table on Responsible Soy addresses the protection of biodiversity and areas of high conservation vale under Principles 9 and 11, respectively. Principles 6, Environmental Responsibility; 7, Responsible Water Management; and 8, Responsible Soil Management, could also affect biodiversity and HCV areas.[28]

Principle 9: Protection of biodiversity

9.1. Native vegetation

9.1.1Option a: [Maintain areas of native vegetation in buffer zones along natural watercourses.]

9.1.1 Option b: [Maintain areas of native vegetation and buffer zones along natural watercourses]

Note of clarification: This is not supposed to suggest that all natural vegetation must be preserved, but rather a representative proportion. The exact amount will probably need to be identified at a national level (and may be delivered by legal requirements in many countries)

9.2. Areas of High Conservation Value

9.2.1 Identify, *maintain, safeguard and monitor any High Conservation Values and habitats for rare, threatened or endangered native or endemic species* within the area of impact (need to consider area over which there is influence).

Notes and Possible Guidance or Indicators:

- Need to consider who will undertake the identification,
- Need to clearly define what is meant by 'area of impact'
- Family farmers are not expected to identify these areas themselves, but if they are identified by others then they must be adequately managed
- Consider development of economic instruments to compensate farmers for protecting high conservation value areas.

9.3. *Restoration of natural ecosystems*

9.3.1 Due to shortage of time this was not discussed, but will be discussed at the next meet. Comments are welcome on this topic.

Principle 11: Responsible establishment of infrastructure and new areas of cultivation

11.1 Assessment of social and environmental impacts prior to establishment of new major infrastructure

[27] Text on which there is disagreement presented in italics, and that for which there are multiple options proposed is in brackets.

[28] Draft RTRS Principles and Criteria: Second Public Consultation Document from 27 March, 2008 (http://www.responsiblesoy.org/documents/3conference/eng_principles_and_criteria.pdf)

11.1.1 *Soy enterprises that undertake major new private infrastructure related to production, transport, processing or trading of soy, undertake comprehensive, participatory and documented assessments of potential direct and indirect, on-site and off-site, social and environmental impacts prior to expansion or establishment of, and plan and carry out their activities so as to enhance positive impacts and minimize and mitigate negative impacts.*

Notes and Possible Guidance or Indicators:

- Need more precise language
- Need to define major infrastructure
- Follow local licensing regulations

Note of Clarification: Criteria 11.2 – 11.5 apply only to contexts where soy cultivation expands into new areas. Producers seeking voluntary market-based certification according to the RTRS P&C would need to comply with these requirements for any expansion undertaken. For producers supporting the RTRS but not involved with certification the intention is that these criteria provide guidance for execution of programs (and associated means of financing) to support progress towards implementation of the RTRS P&C. Thus, full compliance with criteria 11.2-11.5 is not envisioned to be a mandatory requirement for becoming part of the RTRS initiative.

11.2. Prioritization of degraded and already-cleared lands as areas for expansion soy cultivation

11.2.1 Direct soy expansion onto suitable degraded and already cleared and open lands agricultural lands.

Notes and Possible Guidance or Indicators:

- Need to define degraded and already cleared and open lands
- Financial incentives are required to intensify the use of degraded land as a means to reduce pressure for clearing new land
- Consider role for existing zoning
- Need more elaboration to be operational

11.3 Assessment of social and environmental impacts prior to expansion of soy cultivation onto [non degraded land][native vegetation]

11.3.1 *Undertake comprehensive, participatory and documented assessments of direct and indirect, on-site and off-site, social and environmental impacts prior to expansion or establishment of new areas of cultivation, and plan and carry out their activities so as to enhance positive impacts and minimize and mitigate negative impacts.*

11.3.2 [*Indicator] [criteria]: Assess the feasibility of using other means than burning prior to any, carefully controlled, use of fire to prepare new areas for soy cultivation.*

Notes and Possible Guidance or Indicators:

- Need more precise language
- Follow local licensing regulations where they exists

- Need to define the minimum size of expansion to which this criteria (11.3.1) applies

11.4. Consent and compensation prior to expansion of soy cultivation on traditional and indigenous communities lands

11.4.1 No expansion or establishment of new areas of cultivation on traditional and indigenous communities' lands without their free, prior, informed and documented consent, expressed through their own representative institutions, and ensure that local people are compensated for any agreed land acquisitions or relinquishment of rights in accordance with fairly negotiated agreements.

Notes and Possible Guidance or Indicators:

- Better definition of local: traditional, indigenous and small holders communities
- Needs to be harmonized with Principle 3
- Merge with Principle 3 is necessary
- Need clarification on who qualifies as rightful land holder

11.5. High Conservation Value Areas

11.5.1 Identify, *maintain, safeguard and monitor any High Conservation Value areas and habitats for rare, threatened or endangered native or endemic species* within the area of expansion (need to consider area over which there is influence).

Notes and Possible Guidance or Indicators:

- Need to consider who will undertake the identification,
- Need to clearly define what is meant by 'area of impact'
- Family growers are not expected to identify these areas themselves, but if they are identified by others then they must be adequately managed
- Consider development of economic instruments to compensate farmers for protecting high conservation value areas
- Carbon-balance related issues?
- Topic of baseline dates within voluntary certification will be discussed at next DG meeting

The Forest Stewardship Council (FSC)

The Forest Stewardship Council (FSC) is an independent, non-governmental, not for profit organization established to promote the responsible management of the world's forests. More information about the movie 'Buyer be fair: the promise of product certification. FSC has offices in more than 46 countries. It provides standard setting, trademark assurance and accreditation services for companies and organizations interested in responsible forestry. Products carrying the FSC label are independently certified to assure consumers that they come from forests that are managed to meet the social, economic and ecological needs of present and future generations.

FSC Principles 6 and 9[29], with their associated criteria, are directly relevant to biodiversity and HCVAs. Principle 5, Benefits from the Forest, could have some impact on these areas as well.

Principle 6: Environmental Impact

Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.

Criteria:

6.1 Assessment of environmental impacts shall be completed -- appropriate to the scale, intensity of forest management and the uniqueness of the affected resources -- and adequately integrated into management systems. Assessments shall include landscape level considerations as well as the impacts of on-site processing facilities. Environmental impacts shall be assessed prior to commencement of site-disturbing operations.

6.2 Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g., nesting and feeding areas). Conservation zones and protection areas shall be established, appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Inappropriate hunting, fishing, trapping and collecting shall be controlled.

6.3 Ecological functions and values shall be maintained intact, enhanced, or restored, including: a) Forest regeneration and succession. b) Genetic, species, and ecosystem diversity. c) Natural cycles that affect the productivity of the forest ecosystem.

6.4 Representative samples of existing ecosystems within the landscape shall be protected in their natural state and recorded on maps, appropriate to the scale and intensity of operations and the uniqueness of the affected resources.

6.5 Written guidelines shall be prepared and implemented to: control erosion; minimize forest damage during harvesting, road construction, and all other mechanical disturbances; and protect water resources.

6.6 Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides. World Health Organization Type 1A and 1B and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited. If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.

[29] http://www.fsc.org/fileadmin/web-data/public/document_center/international_FSC_policies/standards/FSC_STD_01_001_V4_0_EN_FSC_Principles_and_Criteria.pdf

6.7 Chemicals, containers, liquid and solid non-organic wastes including fuel and oil shall be disposed of in an environmentally appropriate manner at off-site locations.

6.8 Use of biological control agents shall be documented, minimized, monitored and strictly controlled in accordance with national laws and internationally accepted scientific protocols. Use of genetically modified organisms shall be prohibited.

6.9 The use of exotic species shall be carefully controlled and actively monitored to avoid adverse ecological impacts.

6.10 Forest conversion to plantations or non-forest land uses shall not occur, except in circumstances where conversion: a) entails a very limited portion of the forest management unit; and b) does not occur on high conservation value forest areas; and c) will enable clear, substantial, additional, secure, long term conservation benefits across the forest management unit.

Principle 9: Maintenance of high conservation value forests

Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.

Criteria:

9.1 Assessment to determine the presence of the attributes consistent with High Conservation Value Forests will be completed, appropriate to scale and intensity of forest management.

9.2 The consultative portion of the certification process must place emphasis on the identified conservation attributes, and options for the maintenance thereof.

9.3 The management plan shall include and implement specific measures that ensure the maintenance and/or enhancement of the applicable conservation attributes consistent with the precautionary approach. These measures shall be specifically included in the publicly available management plan summary.

9.4 Annual monitoring shall be conducted to assess the effectiveness of the measures employed to maintain or enhance the applicable conservation attributes.

Rainforest Alliance / Sustainable Agriculture Network

The Rainforest Alliance supports the Sustainable Agriculture Network (SAN)[30], a coalition of conservation groups that links responsible farmers with conscientious consumers by means of the Rainforest Alliance Certified seal of approval. The vision is based on the concept of sustainability, recognizing that the well-being of societies and ecosystems is intertwined and dependent on development that is environmentally sound, socially equitable and economically viable. The SAN is made up of environmental groups several developing countries, with a watchdog group in

[30] See also: http://www.rainforest-alliance.org/programs/agriculture/pdfs/san-description.pdf

Denmark and many associated academic, agriculture and social responsibility groups around the world.

Rainforest Alliance, in coordination with several other institutions, is promoting Sustainable Agriculture Standard certification.[31] This proposed standard includes a number of principles which indirectly relate to biodiversity and HCVAs, including 1, Social and Environmental Management Systems; 4, Water Conservation; 8, Integrated Crop Management; and 9, Soil Management and Conservation. Principles 2 and 3 directly relate to these topics.

Principle 2. Ecosystem Conservation

Natural ecosystems are integral components of the agricultural and rural countryside. Carbon capture, crops pollination, pest control, biodiversity and soil and water conservation are just some of the services provided by natural ecosystems on farms. Certified farms protect these natural ecosystems and conduct activities to restore degraded ecosystems. Emphasis is placed on restoring natural ecosystems in areas unsuitable for agriculture, for example by reestablishing the riparian forests that are critical to the protection of water channels. The Sustainable Agricultural Network recognizes that forests and plantations are potent sources of timber and non-timber forest products that help to diversify farm incomes when they are managed in a sustainable manner.

2.1 *Critical Criterion.* All existing natural ecosystems, both aquatic and terrestrial, must be identified, protected, conserved and restored through a conservation program. The program must include the restoration of natural ecosystems or the reforestation of areas within the farm that are unsuitable for agriculture. The program must include the establishment and maintenance of shade trees for those crops traditionally grown with shade, in areas where the agricultural, climatic and ecological conditions permit.

2.2 *Critical Criterion.* The farm must maintain the integrity of aquatic or terrestrial ecosystems inside and outside of the farm, and must not permit their destruction or alteration as a result of management or production activities on the farm. The wood used for pallets or for posts to support greenhouses, cableways or similar infrastructure must come from legally approved sustainable sources, from the moment of the first contact made for the certification process.

2.3 Production areas must not be located in places that could provoke negative effects on national parks, wildlife refuges, biological corridors, forestry reserves, buffer zones or other public or private biological conservation areas.

2.4 Cutting, extracting or harvesting trees, plants and other non-timber forest products is only allowed in instances when the farm implements a sustainable management plan that has been approved by the relevant authorities, and has the all the permits required by law. If no applicable laws exist, the plan must have been developed by a competent professional. The harvesting of threatened or endangered plants or species is not

[31] Sustainable Agriculture Standard, feb 2008 (Rainforest Alliance): http://www.rainforest-alliance.org/agriculture/documents/SAN_Sustainable_Agriculture_Standard_%20February2008.pdf

permitted. The certification of farms that have areas that have deforested within the two years prior to the first moment of contact regarding certification is not permitted.

2.5 There must be a minimum separation of production areas from natural ecosystems where chemical products are not used. A vegetated protection zone must be established by planting or by natural regeneration between different permanent or semi-permanent crop production areas or systems. The separation between production areas and ecosystems is defined in Annex 1.

2.6 Natural water channels must be protected by establishing protected zones on the banks of rivers, streams, creeks, lakes, wetlands and around the edges of other natural water bodies, as indicated in the matrix in Annex 1 of this standard. Farms must not alter natural water channels to create new drainage or irrigation canals. Previously converted water channels must maintain their natural vegetative cover or, in its absence, this cover must be restored. The farm must use and expand vegetative ground covers on the banks and bottoms of drainage canals to reduce erosion and agrochemical drift and runoff towards water bodies.

2.7 As part of the conservation program, the farm must establish and maintain vegetation zones between the crop and areas of human activity, as well as between production areas and on the edges of public or frequently traveled roads passing through or around the farm. These zones must consist of permanent native vegetation with trees, bushes or other types of plants, in order to promote biodiversity, minimize any negative visual impacts and reduce the drift of agrochemicals, dust and other substances coming from agricultural or processing activities. The width of the vegetation zone is defined in Annex 1 of this standard.

2.8 Farms with Agroforestry Crops located in areas where the original natural vegetative cover is forest must establish and maintain, as part of the conservation program, permanent shade distributed homogenously throughout the plantations; the shade must meet the following requirements:

a. A minimum of 70 individual trees per hectare that must include at least 12 native species per hectare.

b. A shade density of at least 40% at all times.

c. The tree crowns must comprise at least two strata or stories.

A farm without shade can be certified once it has a shade establishment or expansion plan and shade established in at least 25% of the production area. Shade must be established in the remaining 75% of the production area within five years.

Farms in areas where the original natural vegetation is not forest must dedicate at least 30% of the farm area for conservation or recovery of the area's typical ecosystems. These farms can be certified once they have a plan to establishment or recover natural vegetation within ten years. Vegetation must be re-established or recovered in an equivalent of 10% of the total farm area (one-third of the 30%) during the first three years of the plan.

Principle 3. Wildlife Protection

The farms certified under this standard are refuges for resident and migratory wildlife, especially species that are threatened or endangered. Certified farms protect natural areas that contain food for wild animals or habitats for reproduction and raising offspring. These farms also carry out special programs and activities for regenerating and restoring ecosystems important to wildlife. At the same time, the farms, their owners and employees take measures to reduce and eventually eliminate the number of animals in captivity, despite traditional practices keeping wildlife as pets in many regions of the world.

3.1 An inventory of wildlife and wildlife habitats found on the farm must be created and maintained.

3.2 Ecosystems that provide habitats for wildlife living on the farm, or that pass through the farm during migration, must be protected and restored. The farm takes special measures to protect threatened or endangered species.

3.3 *Critical Criterion.* Hunting, capturing, extracting and trafficking wild animals must be prohibited on the farm. Cultural or ethnic groups can hunt or collect fauna in a controlled manner and in areas designated for those purposes under the following conditions:

a. The activities do not involve species in danger of or threatened with extinction.
b. There are established laws that recognize the rights of these groups to hunt or collect wildlife.
c. Hunting and collection activities do not have negative impacts on the ecological processes or functions important for agricultural and local ecosystem sustainability.
d. The long-term viability of the species' populations is not affected.
e. These activities are not for commercial purposes.

3.4 The farmer must keep an inventory of the wild animals held in captivity on the farm, and implement policies and procedures to regulate and reduce their tenancy. Endangered or threatened species must not be held in captivity.

3.5 The farm is allowed to breed wild animals in captivity when the farm has the required conditions and the permits stipulated law. These activities must be supervised by a competent professional.

3.6 Farms that reintroduce wildlife into natural habitats must have the appropriate permit from the relevant authorities and comply with the conditions established by law, or reintroduce the animals via duly authorized and established programs. A competent professional must advise the farm on release practices. Exotic wildlife must not be introduced into the farm.

Common Code for the Coffee Community (CCCC)

The 4C Association is based on a voluntary Code of Conduct comprising basic social, environmental and economic practices in coffee production, processing and trading. The 4C Code is designed to trigger a process of continuous improvement towards increasing sustainability. 4C aims at improving producers' income and living conditions through cost reductions, quality improvements, optimization of the supply chain, improved marketing conditions and better access to markets and credits. It also promotes environmental sustainability. An independent third party verification will

check the process on an aggregated level, emphasizing the responsibility of actors along the chain. In order to achieve its objectives, 4C offers support services to coffee producers. A support network provides access to training programmes, promotes good agricultural and management practices, facilitates information exchange, and strengthens the self-organisation of farmers.

The Common Code for the Coffee Community (CCCC) has adopted a stoplight system outlining unacceptable practices, those that need to be improved, and desirable practices. A Draft version of this matrix with egeneric indicators.[32] Referring biodiversity, the CCCC refers to one unacceptable practice and two Principles. Categories 3 (Soil Fertility), 4 (Water), and 6 (Energy) may also affect sensitive areas.

Unacceptable practice: Cutting of primary forest or destruction of other forms of natural resources that are designated as protected areas by national and/or international legislation.

Environmental Dimension			Criteria			Level of Monitoring
Category	**No.**	**Principle**	**Green**	**Yellow**	**Red**	
Biodiversity Comments: this category can only be evaluated at the minimum level of a 4C Unit if the unit was a property bigger than 100 ha. If groups of producers form a 4C Unit, this category has to be evaluated at a regional level (eg. Municipality), using the aggregated data from individual self-assessment at level of the coffee properties and comparing the information	1a	Conservation of wildlife and endangered species is facilitated and supported	Conservation of wildlife is practiced and endangered species are protected by demarcation and signage on coffee farms.	No hunting, ensnaring, poisoning and exploitation of endangered and protected species is practiced and actors along the chain cooperate to develop a communication strategy for the conservation of wildlife.	Hunting, ensnaring, poisoning and exploitation of endangered and protected species is partly practiced.	4C Unit and below (for self assessment and inprovement) 4C Unit and above/ along the chain: regional level r
		Indicators Comment: Also on small farms there should be nest facilities for endangered birds, specially migrating species. Proposal for actitivities on district level: Gathering of baseline information about diversity / flora and fauna density in the region. Compare with the results of individual self assessments on an aggregated level, and specify protective or corrective measures. Actors could cooperate to develop a communication strategy and statements to be signed by farmers (community agreement) which ensure the implementation of protection strategies on individual farms over time.	**Indicators for green Criteria** Farmers know about species of wildlife present on farm/surrounding (common names) and actively protect endangered species. Farm manager controls effectively unauthorized hunting / collection of flora/ fauna; simple signage or demarcation in place) Verification: Inspection, interviews, Existence of a basic ground plan of the farm(s)	**Indicators for yellow criteria** Farmers know about species of wildlife present on farm/surrounding (common names). Effective controlling of unauthorized hunting / collection of flora/ fauna evident. Planning to elaborate a ground plan of the farm (simple map) exists Verification: Interviews, inspection	**Indicators for red criteria** Lack of awareness / knowledge about endangered animals or plants no measures to protect them. Verification: inspection, interviews	

32 Common Code for the Coffee Community, feb 2008: http://www.sustainable-coffee.net/download/2008/4C_001_CodeDocument-2008_v1.1_en.pdf ;
see also: http://www.sustainable-coffee.net/download/2008/4C_020_Generic-Indicators_v1.0_en.pdf

Environmental Dimension			Criteria			Level of Monitoring
Category	No.	Principle	Green	Yellow	Red	
with earlier generated baseline information to determine protective /corrective actions, which could then be tackled by the members of this region.	1b	Native flora is protected and enhanced.	Native flora including watersheds and biodiversity habitats are protected and enhanced.	According to national legislation, no exploitation of native flora or watersheds on the farm is evident and a strategy to protect and enhance native flora is developed.	Irreversible, destructive exploitation of native flora.	4C Unit and below: for self assessment; monitoring at district/regional level (recomm.)
		Indicators Comment: Local/regional level: enhance common activities to identify and legally protect conservation areas (written plan with maps), monitoring.	**Indicators for green Criteria** Knowledge and awareness amongst farmer and workers evident. Activities for protection evident. (protection of forest, protection zones along rivers) Verification: inspection and interviews.	**Indicators for yellow criteria** No actions that destroy native flora and watersheds. Awareness amoung farmers and workers evident. Measures are being developed to protect the native flora. Verification: inspection and interviews.	**Indicators for red criteria** Exploitation of native flora is taking place visibly on the farm, no awareness amongst farmer /and workers to change behaviour or planned measures and activities to protect native flora and watersheds.	

Marine Stewardship Council

The Marine Stewardship Council (MSC) is an independent, global, non-profit organization. In a bid to reverse the continued decline in the world's fisheries, the MSC is seeking to harness consumer purchasing power to generate change and promote environmentally responsible stewardship of the world's most important renewable food source. The MSC has developed an environmental standard for sustainable and well-managed fisheries. It uses a product label to reward environmentally responsible fishery management and practices. Though operating independently since 1999, the MSC was first established by Unilever and WWF in 1997. As of September 2007 there are 857 MSC-labelled seafood products sold in 34 countries worldwide.

Two of the MSC's three Principles and associated criteria[33] are relevant to the conservation of biodiversity and protection of sensitive ecosystems. While not directly relevant to current biofuel production, this information has been included both for its utility as an example and the potential for feedstock (algae or other) production in marine and costal areas.

Principle 1: A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.

Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent

[33] http://www.msc.org/assets/docs/fishery_certification/MSCPrinciples&Criteria.doc

with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.

3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

Principle 2: Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

High Conservation Value (HCV) Network

The High Conservation Value (HCV) concept was originally devised in the context of forest certification (High Conservation Value Forests or HCVF), but it is also applicable to all kinds of ecosystems and habitats. It has developed into a valuable and flexible toolkit for a variety of uses, including land-use planning, conservation advocacy, and designing responsible purchasing and investment policies.

The HCV Resource Network[34] has been established by a group of organisations who use the HCV approach, including environmental and social NGOs, international development agencies, timber and forest product certifiers, suppliers and buyers, and forest managers. The Network aims to encourage collaboration, provide information and support on the evolving usage of HCV, and ensure that a consistent approach to HCV is understood and applied throughout the world.

All natural habitats possess some inherent conservation values. These could include the presence of rare or endemic species, sacred sites, or resources harvested by local residents. High Conservation Value (HCV) areas are defined as natural habitats where these values are considered to be of **outstanding significance** or **critical importance**.

The key to using the HCV approach is the identification of the six High Conservation Values (HCVs), which cover the range of conservation priorities shared by a wide

[34] Information in this Subsection was copied from the web side of the HCV-network (http://hcvnetwork.org/).

range of stakeholder groups, and include social values as well as ecological values. It is these values that are important and need to be protected. A High Conservation Value area is simply the area (e.g. a forest, a grassland, a watershed, or a landscape-level ecosystem) where these values are found, or, more precisely, the area that needs to be appropriately managed in order to maintain or enhance the identified values. Identifying the areas where these values occur is therefore the essential first step in developing appropriate management for them.

- Identify which High Conservation Values are present: the presence or absence of each HCV is determined, by using existing data and collecting additional information as necessary.
- Identify the HCV area and how it must be managed: the HCV area is the area of habitat which must be appropriately managed in order to maintain or enhance the identified HCVs.
- Establish an appropriate monitoring regime: to ensure that the management practices are effective in their aim of maintaining or enhancing the HCVs.

6.2.1 The six types of High Conservation Value areas

High Conservation Value areas are critical areas in a landscape which need to be appropriately managed in order to maintain or enhance High Conservation Values. There are six main types of HCV areas, based on the definition originally developed by the Forest Stewardship Council for certification of forest ecosystems, but now increasingly expanded to apply to assessments of other ecosystems. The six types of HCV areas are listed below, with an example for each. The extended definition of HCV which has been developed specifically for the High Conservation Value Forests (HCVF) Global Toolkit is given below:

HCV1. Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia).

For example, the presence of several globally threatened bird species within a Kenyan montane forest.

HCV2. Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.

For example, a large tract of Mesoamerican flooded grasslands and gallery forests with healthy populations of Hyacinth Macaw, Jaguar, Maned Wolf, and Giant Otter, as well as most smaller species.

HCV3. Areas that are in or contain rare, threatened or endangered ecosystems.

For example, patches of a regionally rare type of freshwater swamp in an Australian coastal district.

HCV4. Areas that provide basic ecosystem services in critical situations (e.g. watershed protection, erosion control).

For example, forest on steep slopes with avalanche risk above a town in the European Alps.

HCV5. Areas fundamental to meeting basic needs of local communities (e.g. subsistence, health).

For example, key hunting or foraging areas for communities living at subsistence level in a Cambodian lowland forest mosaic.

HCV6. Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

For example, sacred burial grounds within a forest management area in Canada.

In summary, a High Conservation Value area is the area of natural habitat required to maintain or enhance a High Conservation Value. A HCV area may be part of a larger habitat, for example a riparian zone protecting a stream that is the sole supply of drinking water to a community or a patch of a rare limestone-loving forest within a larger forest area. Elsewhere, the HCV area may be the whole of a habitat, for example a large forest management unit, when that forest contains several threatened or endangered species that range throughout the forest. Any habitat type – boreal, temperate or tropical, natural or modified by humans, can potentially be designated an HCV area, because HCV designation relies solely on the presence of High Conservation Values within the habitat.

Extended definition of Criteria HCV1 – HCV6

The following detailed definition was developed specifically for forests areas, in the High Conservation Value Forest Toolkit (the "Global Toolkit"). The definition can readily be adapted to other types of habitat.

HCV1. Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia).

This value is intended to include areas with extraordinary concentrations of species, including threatened or endangered species, endemics, unusual assemblages of ecological or taxonomic groups and extraordinary seasonal concentrations.

Any forest that contains the species identified as HCVs, or which contains habitat critical to the continued survival of these species, will be a HCVF. This will include forests with many species that are threatened or endangered or many endemic species (e.g. "Biodiversity hotspots"). Exceptionally, it may even be that a single species is considered important enough to be an HCV on its own.

However, there will be many forests that contain rare or endemic species that are not HCVFs because there is not a globally, regionally or nationally significant concentration. These forests should still be managed appropriately, but they are not HCVFs.

Since there is a range of ways in which biodiversity values can be identified, this value has been sub-divided into four elements:

HCV1.1: Protected areas: Protected areas perform many functions, including conserving biodiversity. Protected area networks are a cornerstone of the biodiversity conservation policies of most governments and many NGOs and the importance of them is recognised in the Convention on Biological Diversity (CBD). Although the processes of selecting areas for protection have varied greatly in different countries and at different times, many are nonetheless vital for conserving regional and global biodiversity values.

HCV1.2: Threatened and endangered species: One of the most important aspects of biodiversity value is the presence of threatened or endangered species. Forests that contain populations of threatened or endangered species are clearly more important for maintaining biodiversity values than those than do not, simply because these species are more vulnerable to continued habitat loss, hunting, disease etc.

HCV1.3: Endemic species: Endemic species are ones that are confined to a particular geographic area. When this area is restricted, then a species has particular importance for conservation. This is because restricted range increases the vulnerability of species to further loss of habitat etc, and at the same time the presence of concentrations of endemic species is proof of extraordinary evolutionary processes.

HCV1.4: Critical temporal use: Many species use a variety of habitats at different times or at different stages in their life-history. These may be geographically distinct or may be different ecosystems or habitats within the same region. The use may be seasonal or the habitat may be used only in extreme years, when, nevertheless, it is critical to the survival of the population. This component includes critical breeding sites, migration sites, migration routes or corridors (latitudinal as well as altitudinal) or forests that contain globally important seasonal concentrations of species. In temporal and boreal regions, these critical concentrations will often occur seasonally (e.g., winter feeding grounds or summer breeding sites), whereas in the tropics, the time of greatest use may depend more on the particular ecology of the species concerned (e.g., riverine forests within tropical dry forests may be seasonally critical habitat for many vertebrate species). This element is included to ensure the maintenance of important concentrations of species that use the forest only occasionally.

HCV2. Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.

This part of the HCVF definition aims to identify those forests that contain viable populations of most if not all naturally occurring species. It often also includes forests that contain important sub-populations of very wide-ranging species (e.g. wolverine, tiger, elephant) even though the sub-populations may not in themselves be viable in the long term. It includes forests where ecological processes and ecosystem functioning (e.g. natural disturbance regimes, forest succession, species distributions

and abundance) are wholly or relatively unaffected by recent anthropogenic activities. Such forests are necessarily large and will be less affected by recent human activities than other forests within the region. Where forest ecosystems naturally form a landscape-level mosaic with other vegetation types and where many species use both forest and non-forest ecosystems, then it may be decided that this value relates to the mosaic of natural vegetation and not just the extent of forest.

Large landscape level forests are increasingly rare and continue to be threatened throughout the world, through processes such as deforestation, forest fragmentation and degradation. Nevertheless, the occurrence of large, natural forests differs greatly from country to country. In countries where there has been extensive forest conversion, there may be no forests that would be considered under this HCV. Alternatively, forests that are capable of maintaining most or all species may be so few that they are already well known. However, some countries retain a relatively large proportion of forest cover and in such cases the extent to which patterns of historical and current use as well as current threats have reduced the ability of forests to support the natural array of species will have to be assessed.

It is also worth emphasising that the forest considered under HCV2 is not necessarily confined to a particular administrative unit (e.g. forest management unit). This is because several contiguous administrative units of forest land may together form a significant large landscape level forest. An individual forest management unit can be a HCVF under HCV2 if it is whole or part of a significant large, landscape level forest.

For example, the Mosquitia region of eastern Nicaragua and Honduras is a natural mosaic of various vegetation types, including forests, grasslands and swamps. Many animal species utilise most or all of these vegetation types for different activities or at different times.

HCV3. Areas that are in or contain rare, threatened or endangered ecosystems.

Some ecosystems are naturally rare, where the climatic or geological conditions necessary for their development are limited in extent. Recent processes, such as land conversion, may have decreased their extent even further. Examples include montane forests in eastern Africa, cloud forests in Central America or riverine forests in semi-arid regions of Africa.

Other ecosystems have become rare through recent human activity, such as conversion of natural ecosystems into agricultural or other land use. It is often these ecosystems that are the most at risk in the future.

This value is designed to ensure that threatened or endangered forest ecosystems, communities or types are maintained. It includes forest types which were previously widespread or typical of large regions. They also include rare associations of species, even when the constituent species may be widespread and secure. These include:

- Associations (intact or not) that have always been rare (e.g. beach forests along the Philippine coast)

- Forests ecosystems, even if heavily disturbed or degraded, which are now rare or greatly reduced, and where intact examples are very rare (e.g. Atlantic forests (mata atlantica) of Brazil)

In these cases, the HCV is the rare ecosystem itself, which may be all or part of any particular forest. Native forest ecosystems or species assemblages that are characteristic of a region but are not rare or endangered should not be considered HCVFs under this part of the definition.

HCV4. Areas that provide basic ecosystem services in critical situations (e.g. watershed protection, erosion control).

All forests provide some services of nature, such as watershed protection, stream flow regulation or erosion control. These services should always be maintained under good management, a fact reflected in the requirements of most forest management standards. The value can be considered an HCV if the consequence of a breakdown in these services would have a serious catastrophic or cumulative impact. For example, a forest that forms a large proportion of the catchment area of a river that has a high risk of damaging and destructive flooding downstream may be critical in preventing flooding and would be considered an HCVF. It is this type of situation that HCV4 attempts to identify.

Since there is a range of separate ecosystem services, this value has been sub-divided into three elements:

HCV4.1: Forests critical to water catchments: Forests play an important role in preventing flooding, controlling stream flow regulation and water quality. Where a forest area constitutes a large proportion of a catchment, may be able to play a critical role in maintaining these functions. The greater the risk of flooding or drought or the greater the importance of water usage, the more likely it is that the forest is critical to maintaining these services and more likely that the forest is an HCVF.

HCV4.2: Forests critical to erosion control: A second basic service of nature that forests provide is terrain stability, including control of erosion, landslides, avalanches and downstream sedimentation. All areas can potentially suffer some degree of erosion, but often the extent or risk of these is very low or the consequences minor. In some cases, though, forests protect against erosion, landslides and avalanches in areas where the consequences, in terms of loss of productive land, damage to ecosystems, property or loss of human life, are severe. In these cases, the ecosystem service provided by the forest is critical, and it is these that should be designated HCVFs.

HCV4.3: Forests providing barriers to destructive fire: Fire is a part of the natural dynamics of many forest ecosystems, such as boreal forests in Canada or eucalypt forests in Australia. However, forest fires, whether started by natural causes or by humans, can sometimes develop into destructive, uncontrolled fire that can be a serious risk to human life and property, economic activity, or to threatened ecosystems or species. A HCV under this element includes forest that naturally acts

as a barrier to fire in areas that are prone to fire where the consequences are potentially severe.

HCV5. Areas fundamental to meeting basic needs of local communities (e.g. subsistence, health).

The definition of HCVFs recognises that some forests are essential to human well-being. This value is designed to protect the basic subsistence and security of local communities that are dependant on forests - not only for “forest-dwelling" communities, but also for any communities that get substantial and irreplaceable amounts of income, food or other benefits from the forest.

Employment, income and products are values that should be conserved if possible, without prejudice to other values and benefits. However, management of HCVFs does not imply excessive and unsustainable extraction of resources, even when communities are currently economically dependent on the forest. Nor do they include the excessive application of traditional practices, when these are degrading or destroying the forests and the other values present in the forest.

A forest may have HCV status if local communities obtain essential fuel, food, fodder, medicines, or building materials from the forest, without readily available alternatives. In such cases, the High Conservation Value is specifically identified as one or more of these basic needs.

The following would not be considered HCVFs:

- Forests providing resources that are useful but not fundamental to local communities.
- Forests that provide resources that could readily be obtained elsewhere or that could be replaced by substitutes.

HCV5 applies only to basic needs. For example, for a community that derives a large part its protein from hunting and fishing in forests where there is no alternative and acceptable source of meat or fish, the forests would constitute a HCVF. Another forest, where people hunted largely for recreational purposes (even if they did eat their catch) and where they were not dependent upon hunting, would not constitute a HCVF.

Over time, a value may grow or decline, with changing community needs and changes in land use. A forest, which was previously only one of many sources of supply, may become the only, or basic fundamental source of fuel wood or other needs. Conversely, needs may decline and disappear with time. For example, a forest that protected a stream that provided the only source of water for drinking and other daily needs to a community would cease to become a HCVF if a tube-well was constructed that provided water of sufficient quality and quantity for the community.

HCV5 is determined by actual reliance on the forest of communities (even when this reliance is only occasional, as in the case of forests providing food in times of famine), rather than a future or potential situation. For example, the government of a particular

country may have a scheme to generate employment and income for rural communities.

If this is not implemented for all communities, or if some members of certain communities are unable or unwilling to take advantage of this and are consequently still dependant on forests for some of their basic needs, then a forest can still be an HCVF.

HCV6. Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

As well as being essential for subsistence and survival, forests can be critical to societies and communities for their cultural identity. This value is designed to protect the traditional culture of local communities where the forest is critical to their identity, thereby helping to maintain the cultural integrity of the community.

A forest may be designated a HCVF if it contains or provides values without which a local community would suffer an unacceptable cultural change and for which the community has no alternative. Examples of HCVF under this part of the definition would include:

- Sacred groves in India, Borneo and Ghana
- Forests used to procure feathers of the Argus Pheasant used by Dayak communities in Borneo in headdresses for important ceremonies.
- Forests in the Brazilian Amazon that are used by extractivist communities (such as rubber tappers) as the sole or main source of economic activity.

This should include both people living inside forest areas and those living adjacent to it as well as any group that regularly visits the forest. For example, the Maasai people of East Africa are mainly involved in herding cattle on the plains. However, they use forest as an integral part of their initiation rites and so should be considered in any discussion of forest use.

Sustainability Criteria for Biofuels (EU)

In the EU currently deal with bioenergy in two directives:

- The fuel quality directive (FQ-D)[35]
- The renewable energy sources directive (RES-D)[36]

On 22 February, it was decided to establish an ad hoc working group with the task of drawing up a common sustainability scheme for biofuels for the purposes of the two above-mentioned directives.

The outcome of the ad hoc working group (as of May 7, 2008) on "Sustainability criteria for biofuels and other bioliquids" (Article 15)[37] is summarised in form of tables:

Directly addressing biodiversity Biofuels and other bioliquids shall not be made from raw material obtained from land with high biodiversity value, that is to say land that had one of the following statuses in or after January 2008, whether or not the land still has this status:	
Undisturbed forest	Forest undisturbed by significant human activity, that is to say, forest where there has been no known significant human intervention or where the last significant human intervention was sufficiently long ago to have allowed the natural species composition and processes to have become re-established, unless evidence is provided that any human intervention has been and will continue to be of an intensity and periodicity which allows the natural species composition and processes to become re-established during the planned rotation period following the intervention.
Protected areas	Areas designated by law or by the relevant competent authority for nature protection purposes. Areas for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental or international non-governmental organisations. BUT: If evidence is provided that the production of that raw material did not interfere with protection purposes, biomass can be extracted.
Highly biodiverse grassland	Highly biodiverse grassland, that is to say grassland that is species-rich, not fertilised and not degraded. The Commission shall establish the criteria and geographic ranges to determine which grassland shall be covered by this point.

35 Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions from the use of road transport fuels and amending Council Directive 1999/32/EC, as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC

36 Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

37 See original text in Council of the European Union, 8847/08.

Addressing indirectly biodiversity by GHG saving	
Biofuels and other bioliquids shall not be made from raw material obtained from land with high carbon stock, that is to say land that had one of the following statuses in January 2008 and that no longer has this status:	
Wetlands	Wetlands, that is to say land that is covered with or saturated by water permanently or for a significant part of the year, including pristine peatland.
Continuous forested areas	Continuously forested areas, that is to say land spanning more than 1 hectare with trees higher than 5 metres and a canopy cover of more than 30%, or trees able to reach these thresholds in situ

Further requirements	
Environmental standards, good agricultural practice	Agricultural raw materials cultivated in the Community and used for the production of biofuels and other bioliquids shall be obtained in accordance with the environmental requirements and standards and the minimum requirements for good agricultural and environmental condition.
Continuous forested areas	Continuously forested areas, that is to say land spanning more than 1 hectare with trees higher than 5 metres and a canopy cover of more than 30%, or trees able to reach these thresholds in situ
Environmental treaties	Biofuels and other bioliquids shall be taken into account only if the country in which they were cultivated has ratified and effectively implemented all of the following environmental treaties: - Convention on International Trade in Endangered Species of Wild Fauna and Flora,Convention on Biological Diversity, - Cartagena Protocol on Biosafety, - Kyoto Protocol to the United Nations Framework Convention on Climate Change. If a country has not ratified the listed treaties but the national authorities or the economic operator provides the Commission with reliable information giving evidence that, in that country, the standards of environment protection are equivalent to those contained in those treaties, the Commission may decide that biofuels and other bioliquids produced in that country can be taken into account.
Reporting on social impacts	The Commission shall report every two years to the European Parliament and the Council on the impact on social sustainability in the Community and in third countries of increased demand for biofuel, and on the impact of EU biofuel policy on the availability of foodstuffs in exporting countries, the ability of people in developing countries to afford these foodstuffs, and wider development issues. The first report shall be submitted in 2012. The report shall address the respect of land use rights. The report shall state, for each country that is a significant source of raw material for biofuel consumed in the EU, whether the country has ratified each of the following Conventions of the International Labour Organisation: see list in the original text.

Biofuels Sustainability Ordinance (Germany)

In Germany, the German Biofuel Quota Law (BioKraftQuG) put in force on January 1, 2007, draws up the legal framework not only for mandatory biofuel blending targets, but also for mandatory sustainability requirements for all biofuels to be eligible under the quota system. The law further empowers the German government to introduce a specific ordinance, the so-called Biofuels Sustainability Ordinance (BSO)[38], to detail the sustainability requirements and certification system for biofuels under the Biofuel Quota Law.

Following a process of coordination involving relevant governmental institutions and non-governmental organizations (NGO) the draft of the BSO has passed the Bundestag on 5. December, 2007, and was delivered to the EU for notification. The current state is that the BSO will not be notified but directly replaced by the outcome of the fuel quality directive and the renewable energy sources directive (see Section 10.7).

One focus of the BSO is set on the protection of biodiversity by addressing tow fields: (1) Sustainable cultivation of agricultural land and (2) Protection of natural areas. Biodiversity is also indirect addressed by GHG savings.

Protection of natural habitats	
The requirements pertaining to the protection of natural habitats shall be regarded as fulfilled if the biomass used is not grown in **nature reserves** or in areas which had been identified as of 1 January 2005 as **areas of high natural conservation value** or subsequently declared as such. **Areas of high natural conservation value** are areas which, as rare ecosystems, have significant nature conservation value or serve as habitats for particularly rare species of plants or animals. These areas are characterized by one or more of the following features:	
High level of biodiversity	areas which exhibit, in globally or regionally significant levels, accumulations of protectable resources of relevance to biodiversity (e.g. endemic or endangered species, refuges)
Important ecosystems	areas which lie in globally or regional rare, threatened or endangered ecosystems or which encompass such ecosystems
Ecosystem functions	areas which serve fundamental protective functions
Restricted extraction of biomass	Biomass can come from nature reserves and areas of high natural conservation value when cultivation of the biomass is in conformity with the protection objectives of the protected area in question or in which the nature conservation value of an area with a high nature conservation value is not impaired as a result of cultivation of the biomass.
Protection of forests	Biomass shall not come from forests areas converted to agricultural land or plantations.

38 The BSO is available under: http://www.bmu.de/files/pdfs/allgemein/application/pdf/bionachv_entwurf.pdf

Sustainable cultivation of agricultural land

Sustainability requirements shall be regarded as fulfilled only where the biomass was produced in accordance with the principles of good practice pursuant to the laws and regulations governing agriculture, forestry and fisheries or in conformity with the rules of cross-compliance (or comparable laws and regulations in other countries).

In countries outside the scope of application of regulation, the following requirements, in particular, with effect on global protectable natural resources are met in producing the biomass used in the production of the biofuels:

1. no significant increase in emissions of acidic, eutrophic, ozone-depleting or toxic substances;

2. no significant deterioration of soil function or soil fertility (e.g. preservation of organic substance, protection against erosion);

3. no significant deterioration of water quality and water supply;

4. **no significant deterioration of species and ecosystem diversity** and

5. environmentally safe use of fertilizers, pesticides and herbicides.

Netherlands biofuels sustainability standard[39]

With a considerable experience in Palm Oil industry and imports, the Netherlands were among the first countries to set sustainability criteria for biomass production in order to ensure that bioenergy imports would not be at the expense of ecosystems and livelihood. These criteria were developed by a panel of experts from governmental agencies, NGOs and corporate sectors, under the lead of Minister of Housing, Spatial Planning and the Environment Jacqueline Cramer and were publicly released in 2006.

Mrs Cramer indicated that “the Dutch government has expressed its intention to incorporate sustainability criteria for biomass in relevant policy instruments. In the short term this regards the arrangement Environmental Quality Electricity Production (MEP) (Milieukwaliteit ElectriciteitsProductie) and the obligation for biofuels for road transport. In the longer term a broader application of these sustainability criteria is envisaged.”

39 Testing Framework for sustainable biomass production (Neth), feb 2007: http://www.lowcvp.org.uk/assets/reports/070427-Cramer-FinalReport_EN.pdf

Principle 4: Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity.	
Criterion 4.1: No violation of national laws and regulations that are applicable to biomass production and the production area.	**Indicator 4.1.1 (minimum requirement)** Relevant national and local regulations must be complied with, with regard to: • Land ownership and land use rights; • Forest and plantation management and exploitation; • Protected areas; • Wildlife management; • Hunting; • Spatial planning; • National rules arising from the signing of international conventions CBD (Convention on Biological Diversity) and CITES (Convention on International Trade in Endangered Species).
Criterion 4.2: In new or recent developments, no deterioration of biodiversity by biomass production in protected areas.	**Indicator 4.2.1 (minimum requirement)** Biomass production must not take place in recently cultivated areas that have been recognized as 'gazetted protected areas' by the government, or in a 5 km zone around these areas. The reference date is 1 January 2007, with the exception of those biomass flows for which a reference date already applies from other certification systems (currently under development). If biomass production does take place in the above areas, then only if this is a part of the management to protect the biodiversity values.
Criterion 4.3: In new or recent developments, no deterioration of biodiversity in other areas with high biodiversity value, vulnerability or high agrarian, nature and/or cultural values.	**Indicator 4.3.1 (minimum requirement)** Biomass production must not take place in recently cultivated areas that have been recognized as 'High Conservation Value' (HCV) areas by the parties involved, or in a 5 km zone around these areas. The reference date is 1 January 2007, with the exception of those biomass flows for which a reference date already applies from other certification systems (currently under development). The following areas are considered HCV areas: • Areas with endangered or protected species or ecosystems, on the basis of the criteria of HCV categories 1, 2 and 3; • Areas with high vulnerability (e.g. slopes and wetlands), on the basis of the criteria of HCV category 4; • Areas with high nature and cultural values, on the basis of the criteria of HCV categories 5 and 6 and criteria for 'high nature value farmlands'. By means of a dialogue with the local parties involved it must be determined where the HCV areas are to be found. If biomass production does take place in the above areas, then only if this is a part of the management to protect the biodiversity values.

Criterion 4.4: In new or recent developments, maintenance or recovery of biodiversity within biomass production units	**Indicator 4.4.1 (minimum requirement)** If biomass production is taking place in recently cultivated areas (after 1 January 2007), room will be given to set-aside areas (at least 10%).
	Reporting 4.4.2 If biomass production is taking place in recently cultivated areas (after 1 January 2007), it has to be indicated: – In which land use zones the biomass production unit can be found; – How fragmentation is discouraged; – If ecological corridors are applied; – If the restoration of degraded areas is involved here.
Criterion 4.5: Strengthening of biodiversity where this is possible, during development and by the management of existing production units.	**Reporting 4.5.1** Good practices will be applied on and around the biomass production unit for the strengthening of biodiversity, to take into account ecological corridors and to prevent disintegration as much as possible.

UK Renewable Transport Fuel Obligation (RTFO)

The RTFO was launched in the UK in 2005, with the ultimate objective to diversify the sources of energy for transport.

It includes the mandate for 5% of renewable source of energy for transport in the UK in 2010, which includes a significant share of biofuels.

The RTFO was among the first initiatives to require sustainability **reporting** on the origin of biofuels; similarly to the Dutch criteria, the RTFO sustainability reporting criteria were developed by Ecofys and include elements of GHG balances, conservation requirements, and social aspects.[40]

Principle 2 is related to the conservation of biodiversity (see next table).

The RTFO came into force in April 2008.

40 Sustainability reporting within the RTFO (UK): framework record, May 2007: http://www.dft.gov.uk/consultations/closed/rtforeporting/sustainabilityreportingv2

Principle 2: BIODIVERSITY CONSERVATION	**Biomass production will not lead to the destruction or damage of high biodiversity areas**
Criterion	
2.1 Compliance with national laws and regulations relevant to biomass production and the area where biomass production takes place.	• Evidence of compliance with national and local laws and regulations with respect to: - Land ownership and land use rights - Forest and plantation management - Protected and gazetted areas - Nature and wild life conservation - Land use planning - National rules resulting from the adoption of CBD3 and CITES4. • The company should prove that: - It is familiar with relevant national and local legislation - It complies with these legislations - It remains informed on changes in legislation
2.2 No conversion of high biodiversity areas after November 30, 2005	• Evidence that production does not take place in gazetted areas. • Evidence that production does not take place in areas with one or more HCV areas5: - HCV 1, 2, 3 relating to important ecosystems and species - HCV 4, relating to important ecosystem services, especially in vulnerable areas - HCV 5, 6, relating to community livelihoods and cultural values. • Evidence that production does not take place in any areas of high biodiversity as listed below this table.
2.3 The status of rare, threatened or endangered species and high conservation value habitats, if any, that exist in the production site or that could be affected by it, shall be identified and their conservation taken into account in management plans and operations.	• Documentation of the status of rare, threatened or endangered species and high conservation value habitats in and around the production site. • Documented and implemented management plan on how to avoid damage to or disturbance of the above mentioned species and habitats.
Recommendation	
2.4 Preservation and/or improvement of biodiversity on production sites	• Evidence that a minimum of 10% of the production area is set aside and properly managed for nature conservation and ecological corridors. • Evidence of good agricultural practices with respect to the conservation and improvement of biodiversity on and around the production site.

Appendix 2 – Databases and Products on Biodiversity and Related Aspects

The collection of databases and products on biodiversity and related aspects comprises:

(1) Protected Areas
(2) High Conservation Value Forests/Areas
(3) Areas of High Biodiversity
(4) Areas of Undisturbed Wildlife
(5) Forests
(6) Wetlands
(7) Degraded Land
(8) Land Classification Systems
(9) Agricultural Production, Land Use and Environment

(1) Protected Areas

Database / Product	**Reference**
World Database on Protected Areas (WDPA)	Strittholt et al. 2007; http://www.unep-wcmc.org/wdpa/index.htm

(2) High Conservation Value Forests/Areas

Database / Product	**Reference**
National interpretations of the HCV toolkit (Bolivia, Brazil, Cambodia, Ecuador, Georgia, Ghana, Indonesia, Mexico, Papua New Guinea, Paraguay, Romania, Russia, Senegal, South Africa, Ukraine, USA, Vietnam).	HCV Network; http://www.hcvnetwork.org/practical-support/countrycontainer.2006-09-27.2436295488; http://www.hcvnetwork.org/practical-support/projects

(3) Areas of high biodiversity

Database / Product	**Reference**
Biodiversity Hotspots	Myers et al. (2000); Mittermeier et al. (2004)
Global 200 – priority ecoregions for global conservation	Olson & Dinerstein 2002; http://www.worldwildlife.org/science/ecoregions/g200.cfm
Important Bird Areas (IBAs)	Stattersfield et al. 1998; Fishpool 2004
Endemic Bird Areas	Birdlife International; http://www.birdlife.org/action/science/endemic_bird_areas/index.html
Important Bird Areas in Germany	Sudfeld et al. 2002
Important Plant Areas (IPAs)	PlantLife; www.plantlife.org.uk/international/plantlife-ipas.html
Centres of Plant Diversity (North, Middle and South America)	WWF & IUCN; http://www.nmnh.si.edu/botany/projects/cpd/
Key Biodiversity Areas	Eken et al. (2004); Langhammer et al. 2007; http://www.iucn.org/dbtw-wpd/edocs/PAG-015.pdf
Alliance for Zero Extinction (AZE)	Ricketts et al. 2005; http://www.zeroextinction.org/aze_map.pdf
Gap Analysis Program	http://www.gap.uidaho.edu/default.htm; see also Langhammer et al. 2007
WWF Wildefinder – Mapping the worlds species	http://www.wwfus.org/wildfinder/index.cfm
Millennium Ecosystem Assessment	http://www.maweb.org, http://wdc.nbii.gov/ma/
High Nature Value Farmland	EEA 2004; http://reports.eea.europa.eu/report_2004_1/en

(4) Areas of Undisturbed Wildlife

Database / Product	**Reference**
High Biodiversity Wilderness Areas	Mittermeier et al. (2003)
Global Cultivation Intensity Map (GCIM) from the NASA	http://data.giss.nasa.gov/landuse/cultint.html

(5) Forests

Database / Product	**Reference**
Global	
The Global Land Cover 2000 (GLC2000)	Bartholomé/Belward 2005; http://www-gvm.jrc.it/glc2000/interactive/glc2000_vgt_1280x1024.html
Terra Land Cover	http://edcdaac.usgs.gov/modis/mod12c1v4.asp
Global Forest Resources Assessment (FRA 2000 and FRA 2005)	FAO 2006; http://www.fao.org/forestry/en/; http://www.fao.org/forestry/site/fra/en/
Global Observation of Forest and Land Cover Dynamics	http://www.fao.org/gtos/gofc-gold/
Tropical Rain Forest Information Center	http://www.trfic.msu.edu/
Global Forest Watch	http://www.globalforestwatch.org/english/index.htm
Global Forest Fragmentation Data	http://www.srs.fs.usda.gov/4803/landscapes/global-index.html
The world's mangroves	http://www.fao.org/forestry/site/mangrove/en/

National and Regional	
Tropical Rain Forest Information Center (Brazilian Amazon)	http://www.trfic.msu.edu/products/amazon_products/amazonmaps.html
Amazon Forest Inventory Network (RAINFOR, Brazilian Amazon)	http://www.geog.leeds.ac.uk/projects/rainfor/
Natural Resources Canada (NRCAN, Canada)	http://www.nrcan.gc.ca/inter/products_e.html#data
Global Land Cover Facility (Central Africa)	http://glcf.umiacs.umd.edu/data/amazonafrica/
Global Forest Watch (Central Africa)	http://www.globalforestwatch.org/english/interactive.maps/cameroon.htm
Center for International Earth Science Information Network (CIESIN, Central America)	http://www.ciesin.columbia.edu/
The Mesoamerican Regional Visualization and Monitoring System (SERVIR, Central America)	http://servir.nsstc.nasa.gov/lcluc/index.html
European Forest Institute (Europe)	http://dataservice.eea.europa.eu/dataservice/provider.asp?id=1B7DF740-552B-4BFE-97F1-6FFC3B8482A2
European Forest Information Scenario Model (EFISCEN, Europe)	http://www.efi.int/projects/efiscen
European Nature Information System (EUNIS, Europe)	http://eunis.eea.europa.eu/index.jsp
Forest Survey of India (India)	http://www.fsiorg.net/forestcovermap.htm; http://envfor.nic.in/fsi/sfr99/sfr.html
Tropical Rain Forest Information Center (TFRIC, Southeast Asia)	http://www.trfic.msu.edu/products/seasia_products/seasiamaps.html

(6) Wetlands

Database / Product	**Reference**
Global Lakes and Wetlands Database GLWD	Lehner & Döll 2004; http://www.wwfus.org/science/data.cfm
Global Land Cover 2000 (GLC2000)	Bartholomé/Belward 2005; http://www-gvm.jrc.it/glc2000/interactive/glc2000_vgt_1280x1024.html
MODIS Land Cover	http://edcdaac.usgs.gov/modis/mod12c1v4.asp
Hydrological Data Basis	http://www.geo.uni-frankfurt.de/ipg/ag/dl/datensaetze/index.html

(7) Degraded and abandoned land

Database / Product	**Reference**
Global Assessment of Soil Degradation (GLASOD)	Oldeman et al. 1991, Oldeman and Van Lynden 2001; International Soil Reference and Information Centre (ISRIC), www.isric.org
South and Southeast Asian Soil Degradation Status Assessment (ASSOD)	www.isric.org
Soil Degradation Assessment in Central and Eastern Europe (SOVEUR)	www.isric.org
Land Degradation in Dry lands (LADA)	http://lada.virtualcentre.org/pagedisplay/display.asp
Global Assessment of Land Degradation and Improvement (GLADA)	www.isric.org
History Database of the Global Environment (HYDE)	http://www.mnp.nl/en/themasites/hyde/index.html

(8) Land Classification Systems

Product / Approaches	**Reference**
Global Land Cover 2000 (GLC2000)	Bartholomé/Belward 2005; http://www-gvm.jrc.it/glc2000/interactive/glc2000_vgt_1280x1024.html
MODIS Land Cover	http://edcdaac.usgs.gov/modis/mod12c1v4.asp
Human Influence Index (HII)	Sanderson et al. (2002); http://www.wcs.org/sw-high_tech_tools/landscapeecology/humanfootprint; http://www.wcs.org/humanfootprint
Global Cultivation Intensity Map (GCIM) from the NASA	http://data.giss.nasa.gov/landuse/cultint.html
EarthSat GeoCover Land-Cover	http://www.mdafederal.com/geocover/geocoverlc/gclcoverview
Land Cover Classification System (LCCS)	FAO; http://www.fao.org/DOCREP/003/X0596E/X0596E00.htm
Global Land Cover Characteristics (GLCC)	Olson (1994a, 1994b, cited in Kniivila 2004); http://edcdaac.usgs.gov/glcc/globdoc2_0.asp
Land-Cover and Land-Use Change (LCLUC) Program	NASA; http://lcluc.umd.edu/
Global Earth Observation System of Systems (GEOSS)	http://www.epa.gov/geoss/
CBERS programme	http://www.cbers.inpe.br/?hl=en

(9) Agricultural Production, Land Use and Environment

Database / Product	**Reference**
Land suitability maps	van Velthuizen et al. (2007) http://www.fao.org/docrep/010/a1075e/a1075e00.htm, http://www.fao.org/ag/agl/agll/cropsuit.asp
Agro-MAPS: Global Spatial Database of Agricultural Land-use Statistics	http://www.fao.org/landandwater/agll/agromaps/interactive/page.jspx
Global agro-ecological assessment	FAO
Land Use Systems database of the world	FAO-*Beta version* (on request available from Freddy Nachtergaele)
2005 Land use data	FAO, under development; http://faostat.fao.org/default.aspx
Soil and Hydrology	See Annex Water and Soil

Glossary

The Glossary gives a preliminary collection of definitions. Participants of the workshop are welcome to discuss these definitions and to send feedback, correction and definitions of additional terms to the authors of this paper.

Abandoned farmland refers to unused areas within a cultural landscape where former agricultural activities have been given up (Schäfer 1992).

Agriculture comprises every systematic cultivation form of soil by crop crowing or creating of grassland for animal production (Schäfer 1992).

Agricultural biodiversity, sometimes called '**agrobiodiversity**', encompasses the variety and variability of animals, plants and micro-organisms which are necessary to sustain key functions of the agro-ecosystem, its structure and processes for, and in support of, food production and food security (FAO/CBD, Workshop 1998[41]). The term agro-biodiversity encompasses within-species, species and ecosystem diversity.[42]

Alliance for Zero Extinction (AZE) aims to identify and conserve all sites worldwide holding the entire global population of one or more Critically Endangered or Endangered species.

Biodiversity Hotspots are areas of high species richness or of high endemism, which are of high priority for protection. CI defines these as areas that have lost 74% of original vegetation and have at least 1500 endemic plants threatened. The 34 regions currently defined, which cover 2.3% of the Earth's surface, contain an estimated 75% of the planet's most threatened mannals, birds, and amphibians. An estimated 50% of all vascular plants and 42% of terrestrial vertebratesexist only in the Hotspots.

Biological diversity (=biodiversity) means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (CBD, article 2).[43]

Corridor is a route that allows movement of individuals or taxa from one region or place to another. Designed to include all globally significant biodiversity of a given region as well as to maintain critical ecological and evolutionary processes.

Cultivated and Managed Terrestrial Areas refers to areas where the natural vegetation has been removed or modified and replaced by other types of vegetative cover of anthropogenic origin. This vegetation is artificial and requires human activities to maintain it in the long term. All vegetation that is planted or cultivated with an intent to harvest is included (e.g., wheat fields, orchards, rubber and teak plantations).[44]

---

[41] See http://iufro-archive.boku.ac.at/silvavoc/glossary/2_1en.html and further definitions on this web-site.

[42] EEA Glossary: http://glossary.eea.europa.eu/EEAGlossary/A/agrobiodiversity

[43] http://www.cbd.int/convention/articles.shtml?a=cbd-02

[44] http://www.fao.org/DOCREP/003/X0596E/x0596e01f.htm#p381_40252

Degraded land is characterized by a long-term decline in ecosystem function and productivity and measured in terms of net primary productivity (Bai et al. 2008; GLADA project). Land degradation has also be defined as a long-term loss of ecosystem function and services, caused by disturbances from which the system cannot recover unaided (UNEP 2007), or as the decline of natural land resources, commonly caused by improper use of the land (Bergsma et al. 1996). From an ecological perspective, strongly degraded lands can also be understood as areas having irreversibly lost their conservation values (species, habitats, ecosystem services, etc…).

Ecoregions are relative large units of land containing a distinct assemblage of natural communities and species, with boundaries that approximate the original extent of natural communities prior to major land-use change.

Ecosystem means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.[45]

Fallow within the agricultural sector describe the interruption cultivation for one or several vegetation periods to achieve a refreshment/improvement of soil fertility (Schäfer 1992, see also abandoned farmland and shifting cultivation).

Forestry is the art, science, and practice of studying and managing forests and plantations, and related natural resources. Modern forestry generally concerns itself with: assisting forests to provide timber as raw material for wood products; wildlife habitat; natural water quality regulation; recreation; landscape and community protection; employment; aesthetically appealing landscapes; biodiversity management; watershed management; and a 'sink' for atmospheric carbon dioxide.[46]

Grassland refers to vegetation types characterised by a dominant and continuous grass layer and no or a low cover of trees and shrubs. Grassland comprises steppes, some savanna types, arid grassland as well as meadow and pasture (Schäfer 1992).

Habitat is the particular environment in which a species or breeding population lives.

High-biodiversity wilderness areas are vast regions of relatively undisturbed land that are home to high numbers of species found nowhere else. Each area still claims 70 percent of original vegetation and has very low human population density. Currently there are five identified High-Biodiversity Wilderness Areas.

High nature value farmland (HNVF) comprises the core areas of biological diversity in agricultural landscapes. They are often characterised by extensive farming practices, associated with a high species and habitat diversity or the presence of species of conservation concern (EEA 2005).

High Conservation Value Areas/Forests (HCVA/HCVF) are those that possess one or more of the following attributes: (1) Forest/Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism,

---

[45] Article 2 of the Convention on Biological Diversity , see http://www.cbd.int/ecosystem/description.shtml

[46] http://en.wikipedia.org/wiki/Forestry

endangered species, refugia). (2) Forest/Areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance. (3) Forest/Areas that are in or contain rare, threatened or endangered ecosystems. (4) Forest/Areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control). (5) Forest/Areas fundamental to meeting basic needs of local communities (e.g.subsistence, health). (6) Forest/Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities) (FSC 2000). See also details on HCV in Appendix 1.

Key Biodiversity Areas (KBAs) are places of international importance for the conservation of biodiversity through protected areas and other governance mechanisms. They are identified nationally using simple, standard criteria, based on their importance in maintaining populations of species. As the building blocks for designing the ecosystem approach and maintaining effective ecological networks, key biodiversity areas are the starting point for landscape-level conservation planning. Governments, intergovernmental organizations, NGOs, the private sector, and other stakeholders can use key biodiversity areas as a tool to identify national networks of internationally important sites for conservation (see Langhammer et al. 2007).

Land use is series operation on land, carried out by humans, with the intention to obtain products and/or benefits through using land resources (de Bie 2002).

Landscape species are defined by the Wildlife Conservation Society as those that "use large, ecologically diverse areas and often have significant impacts on the structure and function of natural ecosystems". These are wide-ranging species that cannot be conserved solely at the site level and are essential for helping to define targets for achieving conservation outcomes at the landscape (or corridor) level.

Marginal land is defined as an area where a cost-effective production is not possible, under given side conditions (e.g. soil productivity), cultivation techniques, agriculture policies as well as macro economic and legal conditions (Schroers 2006).

Natural vegetation is defined as areas where the vegetative cover is in balance with the abiotic and biotic forces of its biotope.[47]

Protected areas are defined by the IUCN as "an area of land and/or sea especially dedicated to the protection and maintenance of biodiversity, and of natural and associated cultural resources, and managed through legal or other effective means". This definition is similar to the one adopted by the Convention on Biological Diversity (CBD), which defines a protected area as "a geographically defined area that is designated or regulated and managed to achieve specific conservation objectives" (Dudley and Phillips 2006).

[47] http://www.fao.org/DOCREP/003/X0596E/x0596e01f.htm#p381_40252

Restricted-range species are those with a small extent of occurrence. BirdLife International has defined restricted-range bird species as those with an extent of occurrence of 50,000 square kilometers or less. While research is underway for the distribution of the world's ~5,000 amphibian and ~5,000 mammal species, an interim threshold to consider any and all species with known global extents of occurrence is <20 km2 as targets for 'Extinctions Avoided' outcomes.

Shifting cultivation is an agricultural system in which plots of land are cultivated temporarily, and then abandoned. This system often involves clearing of a piece of land followed by several years of wood harvesting or farming until the soil loses fertility. Once the land becomes inadequate for crop production, it is left to be reclaimed by natural vegetation, or sometimes converted to a different long term cyclical farming practice.[48]

Semi-natural vegetation is defined as vegetation not planted by humans but influenced by human actions. It includes vegetation due to human influences but which has recovered to such an extent that species composition and environmental and ecological processes are indistinguishable from, or in a process of achieving, its undisturbed state. These may result from grazing; possibly overgrazing the natural phytocenoses, or else from practices such as selective logging in a natural forest whereby the floristic composition has been changed. Other examples are previously cultivated areas which have been abandoned and where vegetation is regenerating as well as secondary vegetation developing during the fallow period of shifting cultivation.[49]

Sustainable use means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (CBD, article 2).[50].

Used land and unused land refer more to a gradual change from intensely used land towards land that is not influenced by any land-use form. Agriculture and forestry (see definition above) as well as infrastructure can clearly be considered as **used land** to meet humans needs (food, fodder, fibre, and infrastructure), whereas for extensive land-use forms (e.g. collection of medicinal plants or sporadic hunting) it is difficult to decide up to which use-intensity land is still considered as unused land. The terms unused land and **idle land** can be used synonymously. **Unused land** comprises abandoned farmland, degraded, devastated and waste land as well as areas of undisturbed wildlife.

Wasteland refers to land without appreciable vegetative cover or agricultural potential (active dunes, salt flats, rock outcrops, deserts, ice caps, and arid mountain regions;

---

48 http://en.wikipedia.org/wiki/Shifting_cultivation

49 http://www.fao.org/DOCREP/003/X0596E/x0596e01f.htm#p381_40252

50 http://www.cbd.int/convention/articles.shtml?a=cbd-02

Oldeman et al. 1991). Due to its natural physical and biological conditions wastelands are per se unfavourable for agricultural activities.

Wilderness Areas are specially protected areas with little or no development or human activity, other than controlled recreation.

Abbreviations

AZE	Alliance for Zero Extinction
BioKraftQuG	German Biofuel Quota Law
BMU	German Ministry for Environment (Bundesministeriums für Umwelt, Naturschutz und Reaktorsicherheit)
BSO	Biofuels Sustainability Ordinance (Verordnung über Anforderungen an eine nachhaltige Erzeugung von Biomasse zur Verwendung als Biokraftstoff, BioNachV)
CBD	Convention on Biological Diversity
CCCC	Common Code for the Coffee Community
CI	Conservation International
CITES	Convention on International Trade of Endangered Species
COP	Conference of the Parties
CURES	Citizens United for Renewable Energy (NGO)
D	Germany (Deutschland)
EEA	European Environment Agency
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FSC	Forest Stewardship Council
GBEP	Global Bioenergy Partnership
GHG	Greenhouse Gases
GIS	Geographical information system (with digital spatial database)
GMO	Genetic manipulated organism
HCV	High Conservation Value
HCVA	High Conservation Value Areas
HCVF	High Conservation Value Forests
HNVC	Area of High Nature Conservation Value
HNVF	High nature value farmland
IBA	Important Bird Area
IBAT	Integrated Biodiversity Assessment Tool
IFEU	Institut für Energie- und Umweltforschung Heidelberg GmbH
IPA	Important Plant Area
IUCN	International Union for the Conservation of Nature and Natural Resources

KBA	Key Biodiversity Areas
MSC	Marine Stewardship Council
NGO	Non-governmental organization
NL	Netherlands
OEKO	Öko-Institut (Institute for applied Ecology)
PA	Protected Area
PoWPA	Programme of Work on Protected Areas
RES	Renewable energy sources directive
RSB	Roundtable on Sustainable Biofuels
RSPO	Roundtable on Sustainable Palm Oil
RTFO	Renewable Transport Fuel Obligation
RTRS	Roundtable for Sustainable Soy
SAN	Sustainable Agriculture Network
UBA	German Federal Environment Agency (Umweltbundesamt)
UK	United Kingdom
UNEP	United Nations Environment Programme
WCMC	UN World Conservation Monitoring Centre
WWF	World-Wide Fund for Nature

Acknowledgements

Results presented in this paper are embedded in the project “Sustainability Standards for Internationally Traded Biomass”, funded by the Federal Environment Agency (UBA, project ID: FKZ 3707 93 100) on behalf of German Ministry for Environment (BMU).

This material is also based upon work supported by the Department of Energy under Award Number DE-FG36-08GO18044.