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BIOFUELS AND BIODIVERSITY: INFORMATION ON RELEVANT DEFINITIONS OF RELEVANT KEY TERMS TO ENABLE PARTIES TO IMPLEMENT DECISIONS IX/2 AND X/37

Note by the Executive Secretary

INTRODUCTION

1. In paragraph 10 of decision XI/27, the Conference of the Parties requested the Executive Secretary, as part of his ongoing work with regard to decision X/37, in collaboration with Parties, other Governments and relevant organizations, and considering ongoing work, to compile information on relevant definitions of relevant key terms to enable Parties to implement decisions IX/2 and X/37 (both referring to biofuels and biodiversity) and to report on progress to a meeting of the Subsidiary Body on Scientific, Technical and Technological Advice prior to the twelfth meeting of the Conference of the Parties. Accordingly, the Executive Secretary has prepared this note for consideration by the eighteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice.

RELEVANT DEFINITIONS OF KEY TERMS IN DECISIONS IX/2 AND X/37

General conclusions

2. Although international definitions of terms can be useful, definition and/or interpretation of terms is most relevant at national level. Variation in national interpretations might be expected for some terms but this is not known to be a significant constraint to implementation. A known exception is with respect to definitions relevant to internationally agreed standards and certification schemes, notably those related to biofuel trade, where mechanisms are already in place to address consensus on terminology.

3. Partly due to its work on certification standards and criteria, the Roundtable on Sustainable Biomaterials (RSB) (formerly the Roundtable on Sustainable Biofuels) has an advanced glossary for terms related to biofuels (biomaterials) (http://rsb.org/sustainability/rsb-sustainability-standards/). It also undertakes ongoing relevant work on standards and criteria for many relevant terms. The Intergovernmental Panel on Climate Change (IPCC) is another useful source of definitions of relevant terms and has produced a number of glossaries to support its deliberations.[1] Definitions in use by RSB or

* UNEP/CBD/SBSTTA/18/1.

[1] For example of particular relevant to biofuels is http://www.ipcc.ch/pdf/special-reports/srren/SRREN_Annex_Glossary.pdf

IPCC for terms explicitly mentioned in decisions IX/2 and X/37 are included in the discussion below for information purposes. However, these sources, or any other, are not necessarily the agreed sources of definitions regarding the Convention on Biological Diversity.

4. Many key terms used throughout decisions of the Conference of the Parties do not have universally accepted definitions. In practice, difficulties often lie more in the identification of, and agreement regarding, criteria for application of the term in question, including the setting of thresholds (numerical limits) that determine the boundaries of the definition. For example, "sustainable" is a term in widespread use and there is a relatively common understanding of its meaning, (although there are variable official definitions of the term) but difficulties can be encountered when trying to operationalize the term in practice.

Key terms in decisions IX/2 and X/37

5. The Executive Secretary has limited this assessment to those key terms in decisions IX/2 and X/37 that are relatively specific to biofuels, and has included some related terms in common use where helpful. The following terms are relevant in this context, and notes on definitions/interpretations are provided for each.

Biofuel (and bioenergy)

6. Biofuel is commonly considered to be fuel derived from, or by, living matter or "biomass". The energy content of such a fuel comes from natural plant photosynthesis and is usually stored in carbon-based compounds. In many uses the term applies irrespective of the modality or scale of production. They have been in use for millennia and include, for example, wood and charcoal, animal dung and combustible gases from biomass decomposition. Biofuels can be produced from virtually any form of biomass, including purpose-grown energy crops, crop and timber residues, and wastes. However, in recent decades the term has tended to be associated with fuel produced at the large-scale (at global level, including corn, sugarcane, soybeans, rape, wheat, palm, beets, switchgrass, miscanthus, pine and willow) and in particular the large-scale production of liquid transportation fuels. The European Union legislation, for example, uses "biofuels" only for transportation fuels made out of biomass and uses "bioliquid" for liquid fuels used in the heat and electricity sector, whilst also referring to solid biomass and biogas. However, it is not universally accepted that the term is limited to a particular production system. There is a very diverse range of "biofuels" and methods and scales of production and an equally diverse range of both positive and negative impacts among these. Lack of differentiation between these, and generalization based on specific examples, has been a major factor promoting confusion in biofuels debates.

7. Technically, the energy content of fossil fuel is derived from exactly the same process (photosynthesis). In common usage, however, "biofuel" refers to fuel where the carbon in question has been recently fixed, in order to distinguish it from fossil fuels.

8. "Bioenergy" (a term not used in decisions IX/2 and X/37) is usually considered to be actual energy made available from materials derived from biological sources. That is, bioenergy is the immediately available energy (e.g., as heat or electricity) derived from a biofuel, whereby the biofuel itself is the storage mechanism for the energy (when using a broader interpretation of "biofuel").

9. The RSB defines biofuel as "Solid, liquid or gaseous fuel obtained from recently living material. This is contrasted with fossil fuels, which are derived from long dead biological material".

10. According to IPCC, biofuel is "Any liquid, gaseous or solid fuel produced from biomass, for example, soybean oil, alcohol from fermented sugar, black liquor from the paper manufacturing process, wood as fuel, etc. Traditional biofuels include wood, dung, grass and agricultural residues. *First-generation manufactured biofuel* is derived from grains, oilseeds, animal fats and waste vegetable oils with mature conversion technologies. *Second-generation biofuel* uses non-traditional biochemical and thermochemical conversion processes and feedstock mostly derived from the lignocellulosic fractions of, for example, agricultural and forestry residues, municipal solid waste, etc. *Third-generation biofuel* would be derived from feedstocks like algae and energy crops by advanced processes still under development.

These second- and third-generation biofuels produced through new processes are also referred to as next-generation or advanced biofuels or advanced biofuel technologies."

Biomass

11. Scientifically, "biomass" usually refers to the total mass (or weight) of organic material (usually organisms) in a given area or volume. With regard to biofuels, the term is commonly used to refer to the biological material (above or below ground, live or dead) derived directly or indirectly from plant photosynthesis that can be converted into available energy. In this context it can be synonymous with "feedstock". According to IPCC, biomass is "Material of biological origin (plants or animal matter), excluding material embedded in geological formations and transformed to fossil fuels or peat".

Feedstock

12. Feedstock is the raw material required for a process. In the case of biofuels it is essentially the raw material upon which the energy production system is based.

Full life cycle

13. "Life cycle" is a term with origins in biology, where it refers to the series of stages through which a living thing passes from the beginning of its life until its death. For biofuels the term refers to the range of stages of original feedstock/biomass production, its transportation and processing, fuel production and transportation and eventual fuel combustion. This includes all relevant intermediate stages. Full life cycles are normally considered so that the true overall benefits and costs throughout the entire production and use system can be determined and compared to the benefits and costs of alternatives (e.g., various fossil fuels).

14. According to IPCC: "*Lifecycle analysis (LCA)* aims to compare the full range of environmental damages of any given product, technology, or service. LCA usually includes raw material input, energy requirements, and waste and emissions production. This includes operation of the technology/facility/product as well as all upstream processes (i.e., those occurring prior to when the technology/facility/product commences operation) and downstream processes (i.e., those occurring after the useful lifetime of the technology/facility/product), as in the 'cradle to grave' approach.

15. There can be differences between users in what is included in a "full" life-cycle analysis and notably, for example, whether environmental impacts and changes in carbon stocks are included. Also, non-overlapping boundaries between life-cycle methodologies are required in order to avoid double-counting of impacts across different uses or sectors. Whether a stated "full" life-cycle analysis is adequately comprehensive requires consideration of the parameters that are, or should be, included. Determining the parameters to be included in a "full" life cycle, and methodologies for calculating relevant metrics and values, is a complex and specialized area. Various processes (including the sustainable biofuels forums) continue detailed technical work on this topic.

Direct and indirect land-use change

16. Land use is the type of activity being carried out on a unit of land. In the current context, land-use change refers to a change in the use of land brought about by the production of biofuel. This includes a change in the state of a natural area brought about by a use.

17. In this context, direct land-use change refers to the conversion of land from some other land-use category to the production of crops destined for bioenergy uses. Direct land-use change can provide environmental costs or benefits. For example, a natural area might be cleared in order to plant a biofuel crop, resulting in biodiversity loss, or replacing row-crops with perennial grasses might increase soil carbon sequestration, reduce nutrient and pesticide run-off and improve biodiversity.

18. Indirect land-use change is brought about when biofuel production displaces an activity (or pressure) to somewhere else. It is the conversion of land from one land-use category to another, induced by the expansion of biofuel production elsewhere. For example, a crop from an existing area, without

change in production system, shifts from being used as food to being used for energy. In this case there is no direct land-use change since the area in question continues its existing use. But the previous use of the crop (as food) needs to be replaced; for example, by expanding the area of crops used for food elsewhere, which could be in a nearby area or another country. Such changes are considered indirect because they are not due to the crop use as biofuel directly but are brought about by the crop use displacing land-use requirements elsewhere. Indirect land-use changes are in practice the same as "displacement effects". Indirect land-use change is a market-mediated phenomenon. The effects are transmitted through global markets linked by commodity substitutability and the competition for land.

19. According to IPCC: "Land use (change; direct and indirect) is the total of arrangements, activities and inputs undertaken in a certain land cover type. The social and economic purposes for which land is managed (e.g., grazing, timber extraction and conservation). Land-use change occurs whenever land is transformed from one use to another, for example, from forest to agricultural land or to urban areas. Indirect land-use change refers to market-mediated or policy driven shifts in land use that cannot be directly attributed to land-use management decisions of individuals or groups. For example, if agricultural land is diverted to fuel production, forest clearance may occur elsewhere to replace the former agricultural production."

20. Indirect land-use change should not be assumed to necessarily be equivalent to a simplistic direct transfer of quantitative impact; for example, by assuming one hectare of food crop diverted to energy requires another hectare somewhere else to replace the food. The actual impacts depend, among other factors, on associated changes in productivity. For example, it is possible to mitigate indirect land-use change through improvements in crop productivity; for example, achieving sustainable efficiency gains that enable producing more crop to cater for combined food and energy purposes on the same land.

21. In theory, direct land-use change is easier to observe and manage; for example, by prohibiting growing biofuel crops in specified areas, such as natural areas. Monitoring and managing indirect land-use changes is, however, considerably more difficult and complex. The management of indirect land-use change (displacement effects) is a key issue regarding the sustainability of biofuels production and use with regard to biodiversity. Indirect land-use change makes it impossible to define, and difficult to identify comprehensive criteria for, "sustainable" biofuels production and use based only on site-specific factors. The major fora for sustainable biofuels are paying significant attention to this topic, including developing criteria and monitoring systems for indirect change, including as relevant to biodiversity. These, by necessity, consider what is happening beyond the site of biofuel production. Estimating indirect land-use change, therefore, requires the use of models. Because the main linkages are economic, economic models have generally been used. However, economic effects are only one of the several interacting drivers of land conversion. Other drivers include social processes, such as human population growth and migration, and national policies affecting agriculture, other land uses, and economic development, as well as cultural, technological and institutional issues, all interacting in complex relationships.

22. The issues regarding direct and indirect impacts of biofuels production and use are not necessarily different from those for other crops or uses of crops. This reasoning is, in part, why RSB, formerly the Roundtable on Sustainable Biofuels, broadened its scope in 2013 to cover biomaterials. The RSB considers biomaterials to be products derived from biomass, which, in addition to biofuels, also include a range of biochemicals such as bioplastics and lubricants. But similar logic might apply to other crop uses, including, for example, food crops, cosmetics and fibres. For this reason, many governments and agencies consider biofuels/biomaterials production and use as a subset of the broader issue of defining and articulating management of land for productive purposes and difficulties in defining and achieving sustainability in this broader context. However, many argue that biofuels production and use deserve particular attention because demand is heavily influenced by government policy and notably through subsidies and incentives (as detailed further in document UNEP/CBD/SBSTTA/16/14).

23. A summary of progress towards, and voluntary tools for, addressing direct and indirect land-use change, including identification of criteria, was provided to the sixteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice by the Executive Secretary in documents UNEP/CBD/SBSTTA/16/14 and UNEP/CBD/SBSTTA/16/INF/32. A review of relevant topics is also provided in CBD Technical Series No. 65 (http://www.cbd.int/doc/publications/cbd-ts-65-en.pdf).

Direct and indirect water and other resource use change

24. The meaning of direct or indirect change in the use of water or other resources is as for land-use. For example, a biofuel crop with a different water requirement to that previously grown in an area (e.g., requiring more or less irrigation water) would cause a direct water use change in that area (including the area from which the water is taken). Changing the use of a crop (e.g., from food to energy) grown in an area without changing immediate water use would result in an indirect water use change because the food crop would have to be replaced by growing more of it elsewhere and therefore using more water elsewhere. Similar principles apply for direct and indirect use changes for other resources used in biofuel feedstock production, such as pesticides, herbicides and fertilizer.

Critical ecosystems, areas of high biodiversity value, cultural, religious and heritage interest and important to indigenous and local communities

25. There are many other terms in widespread use that have similar or related intent or meaning, although not mentioned in decisions IX/2 and X/37. At the international level, these include “rare, threatened or endangered ecosystems”, “sensitive sites”, “key biodiversity areas”, “important bird areas”, “important plant areas”, “high conservation value areas”, “biodiversity hotspots”, “biological conservation areas”, “cultural heritage sites” (as distinct from “World Heritage Sites” as designated under the Convention Concerning the Protection of the World Cultural and Natural Heritage, UNESCO, 1972), Natura 2000 sites (re. the European Union area), among many others. Very likely there is an even greater variety of terms in use at national and subnational levels, such as “sites of special scientific interest”, “areas of outstanding natural beauty”, or other descriptors for the uniqueness or specialness of an area. In addition, there is a very broad range of categories and descriptors for the full range of sites designated in the various categories of protected areas together with guidance for the use of these categories (see http://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_pacategories/ for further information). Definitions of these and related terms is largely a matter for national interpretation, including the choice to adopt definitions/interpretations in use elsewhere. There is no formally and universally agreed definition for the majority of these terms, although the International Union for Conservation of Nature (IUCN) is currently generating guidance on the topic which might be useful to Parties (see further below). Some terms have definitions that are formulated by particular stakeholder groups. However, for most of these, and related, terms the pertinent issue is not the definitions *per se* but the criteria used to determine whether a place qualifies as being such an area. There is currently also limited agreement or standardization for such criteria, meaning that the terms are not necessarily compatible or interchangeable.

26. The main reason for reference to such areas in decisions IX/2 and X/37 is the need to consider areas where the impacts of biofuels production and use should be avoided or minimized, with regard to the objectives of the Convention. Examples of such areas are provided here, including further information on criteria, but these are not necessarily the only relevant categories. The criteria for identifying “important areas”, and appropriate terminology, should be used at the national, and where appropriate local, level depending on their relevance for the location or region in question and as determined through case specific assessments.

27. Definition of, or criteria for assessing, areas with cultural, religious and heritage interest and/or important to indigenous and local communities would be subject in particular to national or as appropriate subnational oversight and guidance and undertaken or interpreted in line with Article 8(j) and related provisions of the Convention. Some existing guidelines and approaches to identifying such areas are already mentioned in decision IX/2 as being relevant to biofuels assessments and policies, including, for

example, the Akwé: Kon voluntary guidelines for the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities (decision VII/16 F).

28. The European Renewable Energy Directive sustainability criteria include reference to areas recognized by international agreements or included in lists drawn up by intergovernmental organizations or IUCN. In 2009, an IUCN World Commission on Protected Areas and IUCN Species Survival Commission joint task force was established to convene a consultation process to consolidate scientific criteria and methodology to identify sites of global significance for biodiversity (also known as "Key Biodiversity Areas"). These criteria are developed to support national and regional processes in identifying important sites within their jurisdiction and intend to help government agencies, decision makers, resource managers, local communities, the private sector, donor agencies, and others to target the implementation of site conservation safeguards. They will also contribute to the fulfilment of Aichi Biodiversity Target 11, which involves the identification of "areas of particular importance for biodiversity and ecosystem services".

29. Parties will determine how to apply the eventual IUCN proposals nationally, noting that the criteria and thresholds might differ for some national purposes. But for current purposes, the process undertaken to standardize approaches may have immediate utility for some Parties with regard to their implementation of decisions IX/2 and X/37.

30. The process has identified the following criteria for the identification of Key Biodiversity Areas (KBAs).[2] The use of these terms by Parties is, of course, voluntary. To qualify as a KBA, a site must contribute significantly to the global persistence of one of the following:

A. Threatened biodiversity: identifies sites contributing significantly to the persistence of taxa that are formally assessed as globally threatened or expected to be classified as globally threatened once their risk of extinction is formally assessed; or nationally/regionally endemic taxa that have not been formally globally assessed but have been nationally/regionally assessed as threatened; or ecosystems that are formally assessed as globally threatened or expected to be classified as globally threatened once their risk of collapse is formally assessed;

B. Geographically restricted biodiversity: identifies sites contributing significantly to the persistence of species that are geographically restricted by having highly clumped populations or by occurring at few sites; or assemblages of species with geographically restricted ranges in centres of endemism or genetic distinctness; or ecosystems with geographically restricted distributions or which occur at few sites;

C. Outstanding ecological integrity: identifies sites contributing significantly to the global persistence of biodiversity because they are exceptional examples of ecological integrity and naturalness, as represented by intact species assemblages, comprising the composition and abundance of native species and their interactions, within the bounds of natural ranges of variation; or the most outstanding places, within biogeographic regions, of relatively intact regionally distinct, contiguous areas of ecosystem and habitat diversity that contain regionally distinct species assemblages with high contextual species richness;

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[2] https://cmsdata.iucn.org/downloads/criteria_and_delineation_workshop_report_final_28january2014.pdf with modifications proposed in https://cmsdata.iucn.org/downloads/thresholds_workshop_report_final_28january2014.pdf. Community and public consultations are being undertaken on the current proposals and a definite set of criteria and thresholds is expected to be agreed at the IUCN World Parks Congress in Sydney Australia in November 2014.

D. Outstanding biological processes: identifies sites that, because of the evolutionary processes of exceptional importance that occur within them, contribute significantly to the persistence or rapid diversification of biodiversity; or that support species at key stages in their life-cycles, in which they occur in geographic and/or demographic aggregations; or that, because of the ecological processes of exceptional importance that occur within them, contribute significantly to the long-term persistence of biodiversity;

E. Biodiversity as identified through a comprehensive quantitative analysis of irreplaceability: sites of exceptional irreplaceability, as identified through complementarity-based approaches.

All sites should be assessed against all the criteria, but meeting any one of the criteria is enough to qualify a site as a KBA.

31. The currently proposed specific thresholds that quantify globally "significant" for each of these criteria were developed through a technical workshop held in December 2013.[3]

32. So far the work of the task force has focused largely on natural science based criteria and thresholds. There has been less progress with sociocultural criteria for identification of key areas (for example important sites regarding cultural/religious biodiversity values) or to socioeconomic criteria (for example, sites of particular importance for ecosystem services).

33. It is intended that the task force will launch the proposed KBA standard at the World Parks Congress (Sydney, Australia, November 2014).

Sustainable and unsustainable production and use of biofuels

34. A core purpose of decisions IX/2 and X/37 is to consider biofuels production and use that is sustainable with regard to biodiversity; the terms "sustainable" and "unsustainable" are used in the decision text. The Convention text itself defines "sustainable use" as "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". However, in a complex field such as agriculture, where multiple interactions and potential trade-offs are in play, this definition has limited use in practice when trying to identify actions that are "sustainable" (although the extremes of "unsustainable" can often be more easily identified). This difficulty is not limited to biofuels, or indeed to agriculture, and is particularly problematic across all productive land-use sectors.

35. Many discussions of this topic have concluded that defining the full suite of parameters for the end point of sustainability, particularly in such a diverse sector as agriculture, is not feasible. There will usually be at least some trade-off considerations to be made. It is, however, often more feasible to define the criteria for the appropriate direction in which agriculture should be heading if it is to move towards sustainability, if not yet achieving it. For this reason, the emphasis on promoting sustainable biofuels has centred on identifying criteria and standards for sustainability that would be similar for other agricultural products and their uses. Further information on this topic for biofuels was reported to the sixteenth meeting of Subsidiary Body on Scientific, Technical and Technological Advice (in documents UNEP/CBD/SBSTTA/16/14 and UNEP/CBD/SBSTTA/16/INF/32) and is provided in CBD Technical Series No. 65.[4]

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[3] https://cmsdata.iucn.org/downloads/thresholds_workshop_report_final_28january2014.pdf.

[4] http://www.cbd.int/doc/publications/cbd-ts-65-en.pdf.