NORDIC DEVELOPMENT FUND

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Position Paper on Biofuels

1. Background and objective

NDF continues to receive proposals for biofuel projects under various financing instruments from its partner countries Africa, Asia and Latin America. This document serves as a position paper and initial guideline for what kind of biofuel projects NDF can support. It presents the key issues which are important for analyzing the climate impacts of biofuels, with a particular focus on liquid biofuels. It suggests NDF priorities when assessing the relevance of supporting specific biofuel projects, and indicates the type of activities, which could be supported under the different NDF instruments. This paper is supported by a more detailed analysis and guidance how to assess the sustainability of biofuel projects with reference to the work going on to define international sustainability criteria.

In this document, the term 'biofuels' is used to cover all forms of biomass, which can be used for energy purposes, either as solid fuels for direct combustion or indirectly as raw material for producing liquid or gaseous fuels.[1] The main focus of this paper is on liquid transport fuels, biodiesel and bioethanol, because the production of these biofuels can be controversial and raises a number of concerns about food security, adverse impacts on climate change etc.

2. Traditional and modern biofuels

Biofuels are combustible materials produced on basis of plants, animals, micro organisms and waste. The raw materials (or feedstocks) for production of modern biofuels typically originate from agriculture, forestry or municipal waste. They can be:

- Wood biomass from cultivated or natural forests,
- Crops which are normally produced for food, such as maize, sugarcane, wheat, cassava, sweet sorghum, sunflower, groundnuts, soybeans, rapeseed, oil palm and coconut palm,
- Non food dedicated energy crops such as jatropha, algae, energy grasses and fast growing trees, or uncultivated vegetation which can be harvested for energy purposes, such as encroaching bushes, typha or water hyacinth,
- Residues and waste from agriculture and forestry and related industries, such as e.g. straw, cotton stalks and seeds, manure, bagasse, wood and sawdust, waste from abattoirs,
- Municipal waste and slurry from sewage water treatment plants.

Traditionally, biofuels are used for cooking and process heat by simple combustion of wood, charcoal, animal dung and waste from agriculture and forestry[2]. The traditional biofuel cycle can have significant climate change impacts through release of greenhouse gases (mainly CO_2 and CH_4) from e.g. cutting of wood that is not replanted, from inefficient charcoal production, from bad management of organic waste and from end-use of wood and charcoal in inefficient stoves.

[1] See UNEP 2009, for more details on this definition. It should be noted that sometimes (including by the EU) the term 'biofuels' is understood only as liquid fuels, such as bioethanol, bio-diesel or pure plant oil.

[2] Globally, 2½ billion people rely on this use of biomass as their main source of energy. In least developed countries, traditional use of biomass often covers more than 90% of total energy consumption. The collection, production and use of these forms of solid biofuels are time consuming, impose serious health problems (mainly for women and children due to indoor air pollution) and can result in environmental degradation.

Modern biofuels are liquid such as bio-ethanol, pure plant oil or bio-diesel, gaseous such as biogas or producer gas, or solid such as bagasse, wood and straw. They are (mainly for liquid biofuels) categorized as first, second or third generation biofuels, where the main difference is the use of feedstocks and processing technologies. First generation liquid biofuels are produced with conventional and well known technologies, and on basis of feedstock, which most commonly are food crops, but also can be non-food crops, such as e.g. jatropha. Second generation liquid biofuels are produced on basis of more sophisticated technologies, implying e.g. breakdown of cellulosic lignin for subsequent fermentation into ethanol. They are produced from residues from agriculture and forestry. They will thus lead to fewer emissions of greenhouse gases[3] and will not directly compete with food production. Third generation liquid biofuels include the use of aquaculture, e.g. production of algae as feedstock for producing biodiesel. Second and third generation biofuels are currently at the pilot stage and are not expected to enter the commercial market before 2015.

3. Biofuels and climate change

The unstable and high oil prices, the increasing concerns about climate change and the need to expand access to energy services have mobilized a significant interest for alternatives to oil, coal and natural gas, also in developing countries. This includes production of modern forms of energy from different types of biomass, including liquid biofuels for transport. At the same time, the growing interest for biofuels, has triggered a number of concerns about their acceptability and sustainability, e.g. whether liquid biofuel production leads to rising food prices.

It is often assumed that the use of biofuels as a replacement for fossil fuels will have important climate benefits. This is likely to be the case when residues and waste are used as fuel or feedstock. For liquid biofuels it can be different. A closer evaluation of the entire liquid biofuels production and supply chain, including feedstock, land use, processing, transport and end-use, show that the earlier steps in the production chain can involve significant emissions, which have to be taken into account when evaluating the climate benefits.

Emissions of greenhouse gases happen both in the case of *direct* land use change, i.e. when a piece of land, currently not farmed, is cleared specifically for the purpose of growing feedstock, and *indirect* land use change, when a biofuel feedstock crop displaces other crops (e.g. food or fodder crops) which may again lead to production of these crops elsewhere, e.g. on more sensitive lands. The methodologies for assessing the greenhouse gas emissions from land-use change are not yet fully developed. Assessing the impacts of indirect land use change can be complicated because they occur outside the boundaries of the individual project.

Uncultivated land, in particular wetlands, forests, savannah or open grasslands, can contain a large stock of carbon, stored in plants, soil and dead plant matter. Converting this land to production of feedstock for biofuels can result in loss of carbon stock and lead to significant emissions of greenhouse gases.

Emissions due to land-use change (direct and indirect) occur over several years and with changing intensity. Converting land-use for production of biofuels feedstock can thus result in a significant 'carbon debt', which may take many years to repay.

[3] Where first generation liquid biofuels may lead to greenhouse gas reductions of 30-70%, compared to fossil fuels, second generation liquid biofuels can lead to reductions of more than 90%. FAO 2008

Feedstocks can be cultivated in ways that are more climate-friendly, such as combining the production of food and biofuel feedstock on the same land, e.g. through multiple-cropping systems, no-tilling or mixing annual and perennial crop (grasses or trees) e.g. in agro-forestry systems, because perennial crops store more carbon in the soil than annual crops.

4. Assessment tools and thresholds

Currently there are no internationally agreed sustainability criteria for biofuels, but several initiatives are active in this area. The most important are the Round Table for Sustainable Biofuels (RSB) and the Global Bioenergy Partnership (GBEP). The Sustainable Bioenergy Decision Support Tool (DST) by UNEP and FAO under the umbrella of UN Energy, will provide guidance e.g. to governments. In addition, there are a number of sector specific initiatives, such as on biofuels from oil palm, soya, sugar cane and forests.

The EU has included a set of sustainability criteria in the Renewable Energy Directive (RED), coming into effect in December 2010, and which are applicable for EU produced liquid biofuels and for liquid biofuels imported from third countries. The RED includes specific threshold values for greenhouse gas emissions from liquid biofuels, compared to the emissions from petrol and diesel, and sustainability requirements for the land used for production of feedstocks.

Until this work is further advanced or completed, these initiatives, and the comprehensive background analysis they have commissioned, can serve as a general guidance for NDF. The RSB criteria are suggested to be used at the project level, along with the EU threshold values and requirements for land-use. Where relevant, the sector specific initiatives mentioned should be consulted.

The NDF will apply its guidance on screening of climate change projects for assessing the climate impacts of the entire biofuels production and supply chain. The current NDF tools will be supplemented by biofuel specific tools, such as the carbon intensities and pathway analysis, developed by the EU, the RSB criteria and background documents, CDM methodologies[4] etc.

5. Biofuel frameworks and strategies in NDF countries

Most NDF partner countries or regions have introduced policies, regulatory frameworks, targets, strategies and action plans for promoting biofuels, or are in the process of doing so. Some are specifically designed for biofuels; others deal with biofuels in other policy areas and sectors, such as e.g. environment, forestry, agriculture and energy. Some cover a range of liquid, gaseous and solid biofuels, some only liquid biofuels. For most, production of bioethanol or biodiesel is at the center of attention.

For each project the national framework in place for biofuels has to be reviewed. This includes how the Governments deal with the possible threats and conflicting interest related to biofuels (land allocation, food security etc), and to what extent they are actually enforced by the Governments. Where relevant, NDF may consider the need to provide technical assistance to the Government, in

[4] http://cdm.unfccc.int/methodologies/index.html

particular to promote a more climate friendly development of the biofuels production and supply chain.

6. NDF's approach to biofuel projects

The overall NDF objective is to promote economic and social development. This is reflected in NDF's new mandate, which focuses on supporting projects contributing to climate and development objectives in low income countries. NDF projects must reduce or limit greenhouse gas emissions or enhance greenhouse gas sequestration, or help the countries to adapt to climate change, and at the same time contribute to development objectives, in particular poverty reduction.

Within the general NDF objectives and framework, NDF will take the following specific approach towards proposals on biofuel projects:

- They must meet NDF's **climate change screening** criteria and address cross-cutting issues such as gender, health, biodiversity, water, etc.

- The production and use of **traditional biofuels** (e.g. charcoal) can be supported to enhance sustainability and efficiency, but in such cases the whole supply chain shall be considered.

- They must document **economic, social and environmental sustainability**, e.g. by adhering to internationally accepted certification schemes or sustainability criteria such as those being developed by RSB and GBEP. The draft versions of these criteria can be used as a reference on an interim basis. This includes addressing threats such as violation of land rights, food security, overconsumption of scarce water resources and soil degradation. Environmental sustainability should be evidenced by Environmental Impact Assessments (EIA) or in case of larger projects by Strategic Environmental Assessments (SEA).

- They should include a calculation of the **climate benefits in the entire production and supply chain**, describe the methodology and baseline used, and describe the mechanism for monitoring, reporting and verifying greenhouse gas emissions. For liquid biofuels special attention should be given to the greenhouse balance of direct and indirect land-use change, cultivation and processing of feedstock.

- In assessing the climate benefits of liquid biofuel projects, NDF will for the time being apply the **EU targets as a minimum threshold**, i.e. 35% reductions compared to fossil fuels, increasing to 50% in 2016 and 60% in 2017. These thresholds will be adjusted as the international work on criteria is developing, including for emissions from land use change.

- They shall take the appropriate **national frameworks** into account, whether they are specifically focused on biofuels alone, or whether they are included in other sectoral frameworks, e.g. in agriculture, forestry, energy or environment. It should be noted that such national frameworks may not always be sufficient and may not always be enforced by the Government.

- The demand for documentation of the climate and development benefits will be less rigorous for smaller community based projects than for larger projects, in order not to be prohibitive. Smaller projects must address all NDF requirements, but will be allowed to do this with less detail and to some extent in qualitative terms.

- Although not of specific importance to NDF, they can benefit from CDM specified under the Kyoto Protocol,

- Among important criteria for NDF support to biofuels projects are that they:

    - Provide clear and measurable climate benefits and contribute to economic growth and social improvements, including poverty reduction,

    - Produce biofuels in the first place for the domestic market, which is used to substitute imported fossil fuels and to expand energy access,

    - Maximize local and national participation in the entire value chain. This means that local participation in cultivating, processing and end-use should lead to more (and decent) jobs and incomes for the involved communities,

    - Where indigenous peoples are affected, principle of Free, Prior and Informed Consent shall apply,

    - Are based on the use of residues or waste for direct combustion or as feedstock, on non-food feedstock grown on marginal or degraded lands with a low carbon stock, and on food or other energy crops which can be cultivated with the lowest emissions of greenhouse gases and without compromising food security,

    - Apply so far underutilized feedstocks or innovative feedstock cultivation methods, which are more climate-friendly, e.g. by contributing to carbon sequestration, such as intercropping, agro-forestry and perennial crops.

- NDF will **not** support biofuel projects if they are:

    - Based on feedstock grown on land with high carbon content or biodiversity value, such as rainforests, wetlands, peatlands and grasslands, in reserves or on protected lands, or on lands with a high conservation value,

    - Large scale projects focusing only on export of feedstocks or biofuels. Such projects should in any case be commercially viable without concessional financing,

    - Using a feedstock for production of liquid biofuels, where the overall climate and development benefits would be higher by using the same feedstock unprocessed for e.g. direct combustion in a co-generation plant.