BIKE BIOFUELS PRODUCTION AT LOW - ILUC RISK FOR EUROPEAN SUSTAINABLE BIOECONOMY

BIKE BRIEFING NOTE #11

BIKE is a Horizon 2020 project whose objective is to support uptake of the low ILUC-risk concept for biofuel feedstocks. This series of Briefing Notes seeks to explore issues in the EU policy sphere which may impact low ILUC-risk value chains, and identify opportunities for fostering an enabling policy environment.

Sustainability indicators for food and biofuel production

A field in southern Italy restored with the use of digestate.

Sustainability indicators are a critical tool for monitoring progress towards policy goals: be it the EU's Green Deal, the UN's Sustainable Development Goals, or any other local, national, regional, or global compendium of targets. For example, the EU's CAP regulations stipulate that Member States must define their ambitions in relation to the objectives of the aforementioned Green Deal[i], in part through a common indicator system which includes economic, environmental, and social dimensions.

This Briefing Note introduces agriculture-focussed sustainability indicators, and discusses how a unified system of indicators could encompass different management practices at the farm level, as well as different end uses (e.g. crops for food or for biofuel) along with their associated value chains. The BIKE project has developed an indicator set tailored to capture the specifics of low ILUC-risk biofuel feedstock production, and this may provide some guidance in the development of a comprehensive indicator set for a range of agricultural land uses.

Low ILUC-risk and sustainable land use

The production of crop-based biofuels relies on the same constrained resources as the production of other agricultural commodities – food, feed, and fibre. The essence of the low ILUC-risk concept is that, through additionality, growing biofuel feedstock on agricultural land can avoid negative impacts on food and feed production, and may in fact enhance it through the introduction of improved management practices.

Certifiable low ILUC-risk projects include those that lead to higher overall productivity through:

(i) improving the yields of existing crop cycles through more efficient or targeted management;

(ii) improving land productivity by adopting new cultural practices (like intercropping or better seed varieties); or

(iii) bringing unused land into production while minimising any associated environmental impacts (see also BIKE Briefing Note #10[ii]).

As an example, consider an initiative on a field where a productive secondary (or 'intermediate') crop is introduced into a rotation of annual crops. As envisaged by the CAP's standards for maintaining the agricultural and environmental condition of land[iii], year-round coverage of soil improves the condition of the soil by reducing erosion and increasing its moisture and organic matter content. This effect can be further boosted by turning crop residues into the soil at least once during the crop rotation period. The new rotation initiative introduced above can then result in a yield boost for the main crop as well as extra production from the secondary, and these surpluses can be claimed as low ILUC-risk[iv].

The main and the secondary crop, being produced on the same land, are subject to similar management measures and environmental pressures. An integrated perspective of the entire rotation system and its outputs gives more sustainability insight than considering each piece on its own; critically, it can help in the targeting of measures to boost resource efficiency and productivity of food, feed, fibre, and/or fuel crops.

Environmental indicators for agricultural production

Methods for evaluating ecological outputs at the farm level have been widely studied in Europe. Mature systems of indicators include Dialecte (developed by the French company Solagro[v]) and the Austrian government's Ökopunkt system[vi]. The Result-based Payment Network[vii] has tracked a growing number of such composite indicators which assess progress against a range of environmental goals (soil protection, water use efficiency, protection of biodiversity, carbon sequestration, the avoidance of land use change, etc.). Many of these indicators are designed to account for multi-year rotations, and enable those researching agricultural sustainability to uniformly compare the strengths of different farms and production systems against each other.

The CAP has moved towards increasing the role of indicator scores by allowing Member States to adopt results-based approaches "to encourage farmers or other beneficiaries to deliver a significant enhancement of the quality of the environment at a larger scale or in a measurable way"[viii]. Such a monitoring effort requires national, regional and, in some cases, individual farm level data to be collected. This need is addressed in the European Commission's Farm to Fork Strategy, with its intention to convert the Farm Accountancy Data Network (FADN) into a Farm Sustainability Data Network (FSDN) by 2025[ix].

The FSDN will cover agricultural, economic, environmental, and social dimensions of farming, and which may also be useful for improving complex sustainability indicator sets in the future.

In the specific context of bioenergy, the Global Bioenergy Partnership (GBEP, an international initiative of 50+ countries and 25+ international organisations, including the European Commission), published the GBEP Sustainability Indicators for Bioenergy in 2011. This indicator set is positioned as a tool for monitoring the environmental, social, and economic sustainability of bioenergy value chains, and is recognised as a reference instrument for informing decision-making in the bioenergy sector.

The value chain scope

Farm-level indicator sets tend to focus on farm activities, not on whole life-cycles, meaning that the activities of farm suppliers and purchasers are not included in the calculation. However, strong sustainability requires sustainability of the entire value chain, and integration of circular economy practices at small and large scales. In this context, it is important to consider in detail the roles and connections of individual economic actors along material and energy flows in the sector.

These principles are at the heart of the indicator set developed by BIKE[x] for assessing sustainable biofuel production. The approach is to identify value chain actors and perform a joint assessment of the sustainability of the entire value chain through a comprehensive indicator set stemming from the existing GBEP work. The indicators cover all stages of the value chain: agricultural inputs and water use; biomass harvesting; logistics and storage; biomass processing and fuel refining infrastructures, and analyses a range of impacts, from pollution and greenhouse gas emissions, to job creation and economic value addition. Data requirements are differentiated at the agricultural, fuel production, and transportation levels.

This indicator framework aims to assist the evaluation of sustainable biofuel production, both with ex-post and ex-ante approaches (meaning it can be used for either ongoing/routine monitoring or for impact prediction). It applies to low ILUC-risk projects and to biofuel production more generally, and is intended to inform EU policymaking about the performance of existing and proposed policies and related sustainability standards – including implementation bottlenecks and opportunities for targeted interventions.

Recommendations

1. Since the production of low ILUC-risk biofuels will in many cases be carried out in rotation with annual food, feed, and fibre crops, it is appropriate to use a common set of indicators for agricultural production at the farm level in order to evaluate the entire ecological footprint of the cropping system. This would include farm inputs, energy consumption, and transport; in the case of biofuel crops, it would also account for renewable energy production and land use / land use change.

2. If a standardised sustainability indicator set is adopted, the evolving FSDN could be adapted to meet many of the indicators' input data needs. This would facilitate direct comparison of the sustainability of farms.

3. The move in the CAP towards result-based approaches may allow some farm support streams to be tied to a common set of environmental indicators, with more support for farmers who achieve greater environmental performance.

4. The sustainability indices developed by BIKE for low ILUC-risk practices could make a valuable contribution to the low-ILUC risk certification process. In particular, EU regulations require economic operators to

show that the introduction of new measures does not lead to excessive use of chemicals or degradation of soil organic matter content, but the verification system method is not yet specified; these indicators could inform future developments.

5. A complex and holistic set of indicators, such as the one developed by BIKE, collectively assesses economic actors along the whole biofuel value chain. While this approach is more labour and data intensive, it could appropriately represent a 'gold standard' of sustainability evaluation in line with the concept of the circular economy.

I. Regulation (EU) 2021/2115 (henceforth simply 'the CAP'), Recital 125.

II. BIKE Briefing Note #10, "Ecologically appropriate crops and restoration of unused land"; available at www.bike-biofuels.eu/briefing-notes/.

III. See CAP Annex III, GAEC 7.

IV. Provided that introduction of the secondary crop was a demonstrably special measure and the initiative satisfied the 'additionality test'.

V. Pointereau et al., 2012, "DIALECTE, a comprehensive and quick tool to assess the agro-environmental performance of farms".

VI. https://info.bml.gv.at/themen/regionen-raumentwicklung/Online-Fachzeitschrift-Laendlicher-Raum/archiv/2013/Oekopunkte.html.

VII. https://www.rbpnetwork.eu/.

VIII. CAP, Article 70, Paragraph 5.

IX. European Commission Communication COM (2022) 296 final – proposal for converting the Farm Accountancy Data Network into a Farm Sustainability Data Network.

X. BIKE Deliverable D4.1, "Report on the Design of the Sustainability Indicators Set"; available at https://www.bike-biofuels.eu/resources/.

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