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

BIKE BRIEFING NOTE #5

BIKE is a Horizon 2020 project whose objective is to support uptake of the low ILUC-risk concept for bio-fuel 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.

Management of invasive alien species in low ILUC-risk production models

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Invasive alien species (IAS) are organisms introduced into a natural environment outside their native ranges, which threaten or adversely impact biodiversity, ecosystem services and agriculture[i]. This may have severe economic consequences – by one estimate, IAS costs the EU more than EUR 12bn annually[ii]. The EU's IAS Regulation establishes a legal requirement on Member States to recover IAS-degraded lands[iii] (where not unduly expensive), and provides a legislative cornerstone for monitoring, eradication, management, and reversal. This goal resonates with Target 12 of the EU's Biodiversity Strategy for 2030[iv], which commits to developing a dedicated legislative instrument for mapping IAS in the name of ecosystem restoration.

This Briefing Note explores how EU policy on invasive species management intersects with biofuel production models. First, we highlight how IAS-risk crops are currently promoted as biofuel feedstocks with limited sustainability oversight. Second, we identify an opportunity for low ILUC-risk certification on unused and abandoned land to support farmers in controlling the spread of IAS while contributing to the bioeconomy and creating more options for biofuel feedstock production.

Feedstock invasiveness risks

Non-food cellulosic biomass crops have been identified as promising candidates for sustainable biofuel feedstocks, and have received strong policy support. "Non-food cellulosic material" is listed as an advanced biofuel feedstock in the Renewable Energy Directive (RED II)[v] Annex IX Part A, and its definition explicitly includes "grassy energy crops with a low starch content, such as ryegrass, switchgrass, miscanthus, giant cane"[vi].

However, promoting cultivation of such hardy and fast-growing perennials is not without risks. Crops which 'escape' the field may out-compete native species, or host for pathogens with negative consequences for agriculture and biodiversity. For example, giant cane (Arundo donax) – explicitly listed in the RED II – is an appealing cellulosic biofuel feedstock due to its fast growth and high yield[vii]. However, it has also been identified as a hard-to-eradicate IAS in Europe and beyond[viii]; scientific investigation into how giant cane's impacts on soil and environment balance against its advantages as a bioenergy crop is ongoing[ix], but there is a clear need to establish systems for monitoring its spread in sensitive environments.

This necessitates a discussion of how to balance large-scale biofuel production and IAS management, including for crops which have not already been included in the IAS Regulation. Doing so would add value to the RED II, which, as it stands, omits recognition of the issue. The European Commission could address this by explicitly coupling its bioenergy sustainability criteria to provisions related to IAS mitigation – for instance in the RED II's Article 29 biofuel sustainability criteria; or in the Commission's implementing regulation on sustainability schemes[x], which covers low ILUC-risk certification. Auditors engaged in assessing projects which introduce new crops onto agricultural land could then perform a standard assessment of IAS risks[xi], and check that farm management plans feature the requisite precautions and controls.

For example, establishing grassy perennial crops solely for biofuel production may be acceptable under a closed-loop system (large-scale production models where the spread of propagules is strictly controlled); or for anaerobic digestion of biomass to reduce the viability of propagules and seeds; or developing / adopting varieties with higher above-ground yields and more regulated root and seed production. Any farm-level costs incurred in the name of IAS risk management should be reflected in the viability assessment – at present this factor is often neglected.

Opportunities for managing abandoned land

While biofuel feedstock production comes with some risks, it also offers genuine opportunities for biodiversity and nature restoration. This is particularly apparent when considering low ILUC-risk projects which introduce crop production embedded in a sustainable agricultural model to unused land or abandoned agricultural land, in order to harvest additional biomass for energy without competing with food and feed production. This type of low ILUC-risk project may be implemented on:

- land which is unused / has been abandoned due to encroachment of IAS[xii], or
- land which is unused / has been abandoned and is hence vulnerable to encroachment of IAS[xiii].

In theory, projects which are not viable on their own may become viable once IAS control incentives are coupled with revenues from biofuel feedstock production – especially if that production has high sustainability value from low ILUC-risk certification. Such extra financial support for IAS management is available from:

- CAP subsidies from agri-environmental schemes;
- The Nature and Biodiversity sub-programme of the LIFE Programme;
- Horizon Europe 2021-2027, the EU Research and Innovation Programme;
- The European Agricultural Fund for Rural Development (EAFRD);
- Climate / green bonds[xiv]

Castor bean cultivation.

Recommendations

Policy incentives for reclaiming abandoned land from IAS could create a strong case for low ILUC-risk projects in these areas. Recognition of the role that low ILUC-risk certification could play in IAS management would send a clear signal to land managers and biomass producers.

We recommend that the EU institutions consider:

1. Adding IAS-risk safeguards to RED II sustainability criteria. A new paragraph could be added to Article 29 of the RED II, along the lines of: 'Biofuels, bioliquids and biomass fuels produced from agricultural biomass taken into account for the purposes referred to in points (a), (b) and (c) of the first subparagraph of paragraph 1 shall not be made from crops which pose significant risk of invasive spread, unless due management precautions are taken', with further detail and guidance for certification bodies supplied through an amendment to the Implementing Regulation.

2. Stacking incentives for eliminating IAS with incentives for low ILUC-risk production on unused and abandoned land, where the land status results from / is at risk of IAS spread. This opportunity could be recognised in:

a. The Implementing Regulation's Article 26, which provides a list of eligible reasons for land abandonment. Adding a list item such as 'spread of invasive alien species' would provide a clearer signal to land managers.

b. The CAP, for instance in a recital which acknowledges that 'The spread of invasive alien species can lead to abandonment of agricultural land, or obstruct the use of otherwise unproductive land. This risk may be mitigated in conjunction with other policy instruments which are aimed at reversing land abandonment, such as low ILUC-risk certification.'.

3. Sharing knowledge among EU agencies which deal with IAS management, including the creation of tools to aid control and reporting of IAS, and fostering greater awareness of potential support pathways. This would facilitate participation by farmers and other biofuel value chain actors.

I. IPEBS, "Global Assessment Report on Biodiversity and Ecosystem Services", https://ipbes.net/global-assessment.
II. Haubrock et al.; "Economic costs of invasive alien species across Europe"; NeoBiota; 2021; https://doi.org/10.3897/neobiota.67.58196.
III. Regulation (EU) 1143/2014 (henceforth 'IAS Regulation'), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN; Article 20.
IV. https://ec.europa.eu/environment/nature/biodiversity/strategy/target5/index_en.htm
V. Directive (EU) 2018/2001, (henceforth 'RED II').
VI. RED II, Article 2, Paragraph 42.
VII. E.g., Sánchez et al., 2015, https://doi.org/10.1111/gcbb.12329.
VIII. http://www.iucngisd.org/gisd/species.php?sc=112.
IX. E.g. Sciuto et al., 2022, https://doi.org/10.1016/j.ecolind.2022.109548.
X. Commission Implementing Regulation (EU) 2022/996 (henceforth 'Implementing Regulation').
XI. Commission Delegated Regulation (EU) 2018/968, http://data.europa.eu/eli/reg_del/2018/968/oj, lays out the assessment for new additions to the IAS Regulation's proscribed list. This is likely to be too detailed for the standard assessment considered here. See, e.g., Bartz & Kowarik, 2019, https://doi.org/10.3897/NEOBIOTA.43.30122, for a review of other assessment methods.
XII. An example from the literature: Schneider & Geoghegan, 2016, https://doi.org/10.1017/S1068280500010133.
XIII. Examples from the literature include: Gazoulis et al., 2022, https://doi.org/10.3390/d14050387; and Sitzia et al., 2018, https://doi.org/10.1038/s41598-018-26493-3.
XIV. See, for example, https://www.climatebonds.net/standard/bioenergy.

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