Searching for low ILUC risk switchgrass in Ukraine

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Using the Low Indirect Impact Biofuels (LIIB) methodology

Colophon

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This study was carried out in the framework of the Netherlands Programmes Sustainable Biomass by

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Although this report has been put together with the greatest possible care, NL Agency does not accept liability for possible errors.
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1 Introduction

The Dutch government finances multiple projects that aim to create solutions for sustainable production and supply of biomass for energy through the Sustainable Import Programme and Global Sustainable Biomass programmes. One of these projects is the ‘Pellets for Power’ project which is funded by the Dutch Ministry of Economic Affairs. In this project, a consortium led by Food & Biobased Research (part of Wageningen UR) of the Netherlands develops a business model for the production of certified sustainable pellets in Ukraine for export markets. As part of this project two pilot cultivation sites for switchgrass have been identified in Ukraine, one of them located on abandoned farmland.

NL Agency has asked Ecofys to assess whether the Ukrainian switchgrass test site can be classified as an ‘unused land’ area on which bioenergy with a low risk of Indirect Land Use Change can be produced. Ecofys performed this assessment with the Low Indirect Impact Biofuels (LIIB) methodology that can be used to identify and certify biofuel production with a low ILUC risk. The LIIB methodology has been developed by Ecofys, WWF International and EPFL, the former host of the Round Table of Sustainable Biofuels, with funding from NL Agency.

1.1 Indirect Land Use Change and biomass production

Biofuels and bioenergy are considered to be an important instrument to combat climate change and play an important role in decarbonising the transport and energy sectors towards 2020 and beyond. In recent years however, the sustainability of biofuels and later also solid bioenergy has increasingly been questioned. The debate on biofuel sustainability in the EU resulted in the inclusion of the first binding sustainability criteria for biofuels globally in the EU Renewable Energy Directive (RED) and Fuel Quality Directive (FQD), both adopted in 2009.

An important element in the overall discussion on biofuel sustainability is Indirect Land Use Change, which has been widely discussed among EU stakeholders since early 2008. Indirect Land Use Change (ILUC) is the effect that when existing agricultural land is used for biofuel production, reduced agricultural production for food and animal feed is compensated by the conversion of new land into agricultural land somewhere else. This can lead to biodiversity losses and additional GHG emissions. Recent research\(^1\) shows that indirect GHG emissions from EU biofuels could amount to 500 million tonnes between 2008 and 2020 (equalling the annual GHG emissions of Slovakia), although biofuels would still save emissions compared to fossil fuels. Currently, a European Commission

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1 International Food Policy Institute, Assessing the Land Use Change Consequences of European Biofuel Policies (Washington 2011).
legislative proposal aiming to address ILUC in EU biofuels policy\(^2\) is being discussed in Brussels.

The discussion on ILUC is not confined to biofuels. Possible ILUC effects related to solid biomass for electricity and heat production have also become a topic of discussion. With the expected introduction of binding EU sustainability criteria for solid and gaseous bioenergy, this discussion is likely to continue and intensify.

Several options exist to mitigate ILUC, all focusing on increasing biomass production without requiring the use of additional agricultural land. Producing biomass for energy on unused land is one of the low ILUC risk options available. Ecofys', EPFL (RSB secretariat) and WWF International have developed a methodology to identify and certify low ILUC risk bioenergy production. This report describes if and how this Low Indirect Impact Biofuels (LIIB) methodology could be used for unused land projects such as the ‘Pellets for Power’ project in Ukraine, which is funded by NL Agency.

1.2 The Low Indirect Impact Biofuels (LIIB) methodology

The Low Indirect Impact Biofuels (LIIB) methodology\(^3\) has been developed, with funding from the Dutch government, by Ecofys, EPFL (RSB secretariat) and WWF International. The aim is to enable the identification and cost-effective independent certification of biofuels with a low ILUC risk. The methodology can equally be applied for solid bioenergy feedstocks.

The LIIB methodology comprises of four ILUC mitigation solutions:
1. Feedstock production on "unused" land;
2. Yield increases above a business-as-usual scenario (BAU);
3. Integration in existing plantations;
4. Wastes and residues.

This report focuses on unused land. Farmers or other parties can seek certification for low ILUC risk production (using the LIIB methodology) on a specific area of unused land if fulfilment of the following requirements can be demonstrated:
1. The land has to be unused by applying the Responsible Cultivation Area methodology or the Unused Land Guidance (see below);
2. The area of unused land must have been unused for at least the last three years;
3. The area of unused land must be part of a wider area of unused land of at least three times the project area.


\(^3\) www.LIIBmethodology.org
The LIIB methodology contains an exemption for land on which limited provisioning services take place ('underused land'). This conditional exception is meant to allow for the use of land that already provides limited provisioning services as long as sustainable alternatives for these provisioning services are implemented. An example of where this would be allowed is the collection of reed for roof thatching in areas where ample reed is available, also after the implementation of the bioenergy project. It is up to the scheme owner to decide whether the exemption applies.

The LIIB methodology is envisaged to be incorporated by existing certification systems for sustainable biomass production (e.g. RSB, ISCC or NTA 8080).

1.2.1 Responsible Cultivation Area methodology

In order to identify potentially unused land and assess whether identified land is currently unused, i.e. that biofuel production would not displace existing provisioning services, the Responsible Cultivation Area (RCA) methodology can be used. This methodology has been developed by Ecofys, WWF International and Conservation International for BP, Neste Oil and Shell Global Solutions. RCA plays an important role when using the LIIB methodology for unused land and integration projects.

1.2.2 Unused Land Guidance

To assess whether land has been unused in the past, the unused land guidance can be used. The guidance has been developed by Ecofys for NL Agency and helps individual bioenergy feedstock producers to assess, in a consistent and structured manner, whether a specific plot of land (e.g. that has been selected as a biomass production location or where biomass production is already taking place) was unused before project implementation. The aim of this is to prevent indirect impacts resulting from displacement of any previous land uses.

To be eligible to make a LIIB claim, producers in the “unused land” category, need to demonstrate that the site has not been used for its provisioning services in the last three years. The guidance offers a practical solution for an ex-post assessment in ongoing projects (that are already implemented and/or that have selected operation sites) to be able to demonstrate the land was unused. The figure below shows the way the Unused Land Guidance interacts with the RCA and LIIB methodologies.
1.3 **Switchgrass cultivation on unused land in Ukraine**

In the 'Pellets for Power' project, a consortium led by Food & Biobased Research (FBR), which is part of Wageningen UR, aims to develop a business model for the production of certified sustainable pellets in Ukraine for export markets. As part of this project, two pilot cultivation sites for switchgrass have been identified in Ukraine by a team of Wageningen UR, Poltava State Agrarian Academy of Ukraine and PhytoFuels, a Ukrainian biofuel investment company. At these sites, the research team aims to test switchgrass cultivation and its possible use for pellet production. On both sites, switchgrass test fields have been established.

At one of the test sites, Veselyi Podil in the province of Poltava in the eastern part of Ukraine, switchgrass cultivation would take place on arable land, with an assumed relatively high yield. The other test site, called Yaltushkiv in the province of Vinnytsia in the south-western part of Ukraine, is said to be situated on abandoned land with a lower soil quality leading to lower yields, estimated to be 7 tonnes per hectare.\(^4\) Locations of both sites are shown on map 1 below.

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Wageningen UR would like to know whether the Yaltushkiv test site could be classified with the LIIB methodology as having low ILUC risk since production apparently takes place on abandoned land and no additional agricultural land would have been taken into use for the switchgrass cultivation. The Veselyi Podil site is situated on existing agricultural land and cannot therefore be classified as unused land. This report aims to assess whether the Yaltushkiv test site can be classified as unused land following the LIIB methodology.

Map 1 – Identified switchgrass project locations in Ukraine

5 Map taken from the presentation ‘The financial and GHG costs of avoiding ILUC in biomass sourcing. A comparison between switchgrass produced with and without ILUC in Ukraine’ by: Lesschen et al. (2012) at the European Biomass Conference in Milan in June 2012.
2 Using LIIB in Ukraine

2.1 Potential of unused land in Ukraine

Ukraine has a long agricultural tradition and was nicknamed ‘Europe’s bread basket’ during the 20th century because of its large grain production and exports to the rest of Europe. After the collapse of the Soviet Union in 1991 many farms have been dissolved and according to the FAO some 23 million hectares of agricultural land have been abandoned in Russia, Ukraine and Kazakhstan, 90% of which was used to produce cereal crops. This abandonment was caused by the liberalisation of prices for agricultural products and fertilisers, disappearance of guaranteed markets within the Soviet Union and the entire eastern European communist area, increased foreign competition, and the privatisation of land and capital. During communist times, agricultural production took place on large collectivised farms which were privatised after 1991.

Not all of the 23 million hectares of abandoned farmland could be easily brought back into agricultural production. According to the FAO, much of this land was of marginal quality, meaning high fertiliser input was necessary to achieve only relatively modest yields. This marginal land is not likely to be brought back into production, at least not to produce cereals. But, again according to the FAO, out of the total area of abandoned land, a share of 11 to 13 million hectares is good quality arable land which could be brought back into production of, for example, grains and oilseeds. It is unclear how much of this land is situated in Ukraine and whether some of this land has been reclaimed for agricultural production during and after the global rise in food prices in 2007 and 2008 as claimed by a FAO specialist. It may require substantial investments to resume agricultural production on currently available abandoned farmland.

2.2 Using the LIIB methodology in Ukraine

In order for biomass production to become LIIB certified, it is not sufficient that biomass production does not lead to negative indirect effects, in the sense that currently no provisioning services take place and no current agricultural production is displaced to other areas. Also the direct sustainability has to be ensured. For this reason LIIB always has to be used together with credible, recognised voluntary certification schemes which ensure that unused land is converted to

8 Mr. Yarmak, A FAO economist specialised in Ukraine, believes not much unused land may be available in Ukraine which could be brought back into agricultural use at economical cost at current prices. If food prices would rise back to 2007/08 levels, conversion of abandoned farmland may become economically viable again. Personal communication with the author, February 2013.
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agricultural land (direct land use change) without substantial biodiversity or carbon stock losses. It could be the case, for example, that on part of the abandoned farmland, afforestation has taken place. In that situation, conversion back (direct land use change) to agricultural land would cause a loss in carbon stock. Research in western Ukraine found that re- or afforestation between 1994 and 2000 occurred at an annual rate of 2100 hectares, increasing to 8600 hectares between 2000 and 2007. This is a low rate of afforestation or reforestation compared to the large scale abandonment of agricultural land, which means large quantities of abandoned land could potentially be classified as unused land which could be used for sustainable biofuel production without ILUC.

Under the LIIB-methodology, land is ‘unused’ if no provisioning services take place on the land currently and during the past three years. As a starting point, it needs to be ensured that no negative direct sustainability effects occur due to the project development, meaning that the biomass production will be certified by a credible, recognised voluntary scheme (e.g. RSB, NTA 8080, etc.).

The LIIB methodology focuses specifically on ensuring that no provisioning services of the land are displaced when establishing a bioenergy project. The relevant elements that need to be assessed are the system boundary of the project location, the project acceptance criteria for unused land projects, and if land is not entirely unused, whether a special exemption might apply.

2.3 Pilot area and LIIB project acceptance requirements

One of the first things to consider when assessing whether a project can be certified under the LIIB methodology is the total project area or system boundary. The box below contains the definition of the system boundary for projects submitted for LIIB certification as unused land projects.

<table>
<thead>
<tr>
<th>Box 1 – System boundary for unused land projects</th>
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<tbody>
<tr>
<td>The system boundary is the total area associated with the biofuel feedstock production that is no longer available for other provisioning services. This includes the area used for plantation(s), infrastructure, corridors, processing facilities, etc.</td>
</tr>
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</table>

In the Plan of Operation which a project developer seeking LIIB certification prepares, the system boundary needs to be described both in geographical location terms (through GIS coordinates or maps) and in terms of the project size in hectares.

The Yaltushkiv pilot location is located in the south-west of Ukraine near Vinnytsia, as can be seen on map 1. The detailed location and project size are not known, as only an experimental switchgrass site of approximately 0.5 hectares is established and no real biomass project has been realised. When information on the size of

9 Kuemmerle et al., Post-Soviet farmland abandonment, p. 7.
the location including infrastructure and processing facilities etc. becomes available, the system boundary could be established.

In order to be eligible for LIIB certification as an unused land project, three project acceptance requirements have to be met, as stated in Box 2 below.

**Box 2 – Project acceptance requirements for unused land projects**

To be eligible for LIIB certification, unused land projects need to meet the following requirements:

1. Projects must have been notified to the scheme owner (project application) before implementation on unused land and the project application must have been confirmed by the scheme owner;

2. The biomass project developer needs to demonstrate that the land is unused; i.e. the site has not been used for its provisioning services\(^{10}\) in the last three years;

3. The site is located in a region with an excess potential of unused arable\(^{11}\) land that 1) is equally or more suitable for the crop of the project than the project site, and 2) meets the land use requirements of the EU RED.

Requirement 1 can be met by the Project Developer by submitting a Project Application to the Scheme Owner who confirms the application. The application includes the application date, location and contact details, an indication that the ‘unused land’ solution type is applied for and a description of the proposed project. For the purpose of requirement 2, the Unused Land Guidance can be used. Box 3 shows the additional guidance provided on acceptance of requirement 2 as included in the LIIB methodology.

**Box 3 – Additional guidance to demonstrate unused land (to meet requirement 2)**

A biomass project developer must demonstrate that the land they intend to use is not used and was not used in the last three years for providing provisioning services (e.g. harvestable goods such as crops, timber, bush meat, etc.). This may be done in one of the following ways:

1. The project developer may apply the Responsible Cultivation Area (RCA) methodology (Ecofys, 2010, *Responsible Cultivation Areas - Identification and certification of feedstock production with a low risk of indirect impacts*) to identify areas that are unused and that can be used for environmentally and socially responsible energy crop production.

2. The 'Unused Land Guidance' (Ecofys, 2012) provides guidance to determine ex-post...
(after the event) whether the project area was unused.

3. Alternatively, ‘unused land’ can be demonstrated using, for instance, satellite images, government records, and/or land rights records.

Note that when a biomass project is already implemented and the project developer did not notify the scheme owner before project implementation (acceptance requirement 1), it would not meet the mandatory acceptance requirements to qualify for LIIB.

Requirement 3 can be met by demonstrating that the region is located in an area with a growing availability of unused land or that the area is located in a larger area of unused land as demonstrated by applying the RCA methodology. Box 4 shows the additional guidance provided on acceptance of requirement 3 as included in the LIIB methodology.

**Box 4 – Additional guidance to demonstrate excess potential of unused land (to meet requirement 3)**

The rationale for requiring that an ‘excess potential’ of similar unused arable land exists in the region is that this will provide an additional assurance that there is a low risk of future competition for land with other sectors (e.g. food).

Two options are provided to project developers to demonstrate the excess potential requirement:

1. The biomass project developer can demonstrate that the project is located in an area with a growing availability of unused arable land. Examples could include regions in the EU where the area of idle agricultural land is increasing;

2. The biomass project developer can demonstrate the site is located in a region with a large area of unused arable land that is a) equally or more suitable for the crop of the project, and b) meets the land use requirements of the EU RED.

   o The ‘region’ is defined as the administrative area (e.g. NUTS2 in Europe) in which the project site is located and adjacent administrative areas.

   o A ‘large area of unused arable land’ is deemed large enough if it equals at least three times the area of the project site.

   o To determine the availability of the excess potential, at least step 1 and 2 of the RCA land identification process (Ecofys 2010, Responsible Cultivation Areas - Identification and certification of feedstock production with a low risk of indirect impacts) should be performed. This can be done as part of the RCA process for demonstrating unused land status.

To assess the suitability of land for the project crop, existing studies by recognised institutions can be used or a specific inventory for the project can be made. Such an inventory would normally take into account at least the following characteristics: topography, soil quality and climatic conditions.
2.3.1 Assessment of the Yaltushkiv pilot

To meet acceptance requirement 1, the project developer in Yaltushkiv would have to file a Project Application, which would need to be accepted by the Scheme Owner.

To meet acceptance requirement 2, the Yaltushkiv developer would have to demonstrate that the location currently is and has been unused for the past three years. In theory, either the RCA methodology or the Unused Land Guidance could be used to demonstrate fulfilment of requirement 2, but in practice RCA is not well suited to this project since the project location is already identified. Therefore the Unused Land Guidance would be best to use for assessing whether the Yaltushkiv pilot area is unused and has been unused during the three years prior to the start of the pilot. Relevant information that needs to be available in this context is:

- Land use at the start of the project;
- Land use three years before the project started;
- Whether provisioning services were used on the Yaltushkiv pilot location during the past three years;
- Whether provisioning services have been displaced or disappeared from the area or whether sustainable alternatives have been implemented.

Between April 2012 and February 2013, Wageningen UR and its local partner have tried to obtain data on the land cover, land use, and land ownership situation in the Yaltushkiv project area, as well as the agricultural suitability of the land to produce switchgrass in a sustainable way. This quest did not result in obtaining the desired data. Relevant statistics turned out to be available only at the regional level, not at district, municipality or field level. Remote sensing (using satellites and/or aerial photography or radars) combined with ground truthing (site visits) could have delivered the results, but these data were not available in the ‘Pellets for Power’ project. This situation means that insufficient data are available to assess whether the land was unused before the switchgrass cultivation started and had been unused during the last 3 years. Also, the exact legal status of the land could not be clarified. In short, the main reasons for the lack of data are:

- The ‘Pellets for Power’ team did not get access to detailed statistics;
- No remote sensing or ground truthing took place in the ‘Pellets for Power’ project;
- Statistics were found to be unreliable and no clear patterns could be established in the available data;
- Suboptimal communication with local partners, partly as all communication went through interpreters.

Due to the lack of data it is impossible to assess whether the switchgrass produced on the Yaltushkiv test site could be certified as low ILUC risk through the LIIB methodology.
In order to fulfil project acceptance requirement 3 the Yaltushkiv developer would need to demonstrate whether an excess potential of available unused land exists in the immediate vicinity of the pilot location. Based on some available statistics, the Yaltushkiv pilot project team estimates that 25% of the total abandoned agricultural land near the Yaltushkiv project area is used for switchgrass production\textsuperscript{12}. This means that an area of unused land as large as three times the size of the pilot area does exist in the close vicinity of the pilot location. This would mean that sufficient excess potential exists and requirement 3 could be met. However, the estimate that an excess potential of 75% of unused land exists near the pilot site is not backed up by robust evidence due to lack of data.

\textsuperscript{12} Lesschen et. al., p.2.
Untapping the unused potential in Ukraine

Ukraine has a large potential for low ILUC risk biofuel production on unused land. Since 1991, millions of hectares of good quality agricultural land have been abandoned while only a small portion of this land has been afforested. This suggests that the largest share of abandoned farmland could still be fallow and might be able to be re-converted to farmland without large losses in biodiversity or carbon stocks. This means that bioenergy feedstock production would be possible in Ukraine without causing Indirect Land Use Change.

In the ‘Pellets for Power’ project, Wageningen UR and partners started switchgrass production in Ukraine on arable land and on abandoned land. The arable land project, Veselyi Podil, would not be able to classify as unused land since bioenergy feedstock production takes place on existing agricultural land. In the Yaltushkiv pilot, switchgrass production takes place on abandoned land and the site could therefore be eligible for Low Indirect Impact Biofuels (LIIB) certification, provided the three LIIB ‘project acceptance criteria’ can be fulfilled. These are:

1. Projects must have been notified to the scheme owner (project application) before implementation and the application must have been confirmed;
2. The land is unused and has been unused during the last three years;
3. The site is located in a region with an excess potential of unused arable land.

The assumption that the Yaltushkiv project area would only use 25% of a larger area of abandoned land is promising. However, insufficient data are available to assess whether the switchgrass area was unused at the time the switchgrass production started, had been unused for three years prior. Therefore it was not possible to demonstrate that the Yaltushkiv pilot area would be eligible for LIIB-certification.

In order to be able to successfully identify and LIIB-certify ILUC-free bioenergy feedstock production on unused land, local data on the project area and surrounding area are necessary. For specific reasons listed in the previous section, the ‘Pellets for Power’ team was unable to obtain the required data. This shows it can be challenging to apply the LIIB methodology in practice in Ukraine. Especially data regarding land use and specifically for abandoned or unused land will be difficult to obtain, as this is often not included in statistics. Only with detailed remote sensing data (aerial photographs) and site visits can a good impression about the potential unused land be obtained. This requires good local contacts and the right local partners. If these important prerequisites are taken into account, the LIIB methodology could be successfully used to untap the unused land potential in Ukraine and elsewhere. Only the use of the LIIB-methodology, which is applied at project (micro) level, it can be credibly ensured that bioenergy crop production on unused land is truly ILUC-free.