



# Grassservice



Alternative use of biomass for maintenance of grassland biodiversity and ecosystem services



LIFE12 BIO/LV/001130

## After-LIFE Conservation and Communication Plan



2018 – 2022



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Administration of  
Latvian Environmental  
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# Introduction

Grasslands in Latvia have developed as the result of human economic activity with the aim to provide fodder for livestock. At the same time, grasslands significantly contribute to the maintenance of biodiversity - meadows and pastures host more than 520 vascular plant species, which is one third of the local flora of Latvia, and is the most important habitat for very many rare plant species. Grasslands also serve as home to various animal species - about 50 nesting bird species and 4500 invertebrate species. Grasslands also provide significant ecosystem services to the society - in addition to traditional animal products, honey and teas, they maintain soil fertility, reduce erosion and flood risks, trap nutrients, thus reducing pollution of water bodies, as well as offer various intangible benefits, including countryside landscape, recreational possibilities, cultural traditions, etc.

However, grassland areas in Latvia have significantly decreased since the 19<sup>th</sup> century to the present - in the 19<sup>th</sup> century, natural grasslands occupied up to 30% of the territory of Latvia, yet in the middle of the 20<sup>th</sup> century, their area reached about 13% of the territory of the country; in 2016, it was only around 0.7% or 10% of the total grassland area in Latvia. The main reasons for the decrease in the area were the over-intensive farming - building, humidity regulation, ploughing, fertilisation, seeding of *Graminea* grasses, overgrazing, too frequent mowing, as well as abandonment of management practices leading to afforestation and paludification, and annual burning as a grassland maintenance measure. Research also proves that grassland practices widespread over the past decade (a late mowing, shredding and leaving grass on the field) and rather focused on grassland maintenance, not the use of biomass, have greatly impaired grassland quality and species diversity. Additionally, the valuable resource of grass biomass is also being wasted.

Consequently, the aim of the LIFE GRASSSERVICE Project was to contribute to the maintenance of natural and biologically valuable grasslands by:

- enhancing alternative, economically sustainable approaches to the use of grass biomass;
- establishing co-operation models between farmers, entrepreneurs and local authorities.

Project activities took place in Sigulda and Ludza municipalities. The total planned budget of the Project was about 1.3 million euros and was co-financed by the European Commission LIFE Program and the Administration of Latvian Environmental Protection Fund. The Project was implemented by 6 partner organizations. It was launched on October 1, 2013 and finished on December 31, 2017.

The goal of the *After-LIFE Conservation and Communication Plan* is to ensure the succession of Project results by transferring the obtained knowledge, developed solutions and methods, as well as facilitating their application, thus enhancing the significance of the obtained results for the society; also, by promoting the implementation of the long-term goals set by the Project. Consequently, we have gathered the main results of the LIFE GRASSSERVICE Project in the document, which must be maintained or continuously distributed after the end of the Project and provided insights or recommendations for future activities.

# Summary of project activities and results

The main results of the LIFE GRASSSERVICE Project:

- Grassland quality, distribution and grass biomass resources have been assessed in Sigulda and Ludza municipalities;
- Economic assessment of grass biomass resources and developed alternative technological solutions have been performed;
- Knowledge has been acquired and technological solutions for obtaining bioenergy from grass biomass developed;
- Principles of the establishment of a grassland ecological network were developed and tested in Sigulda and Ludza municipalities;
- 122 ha of grasslands have been restored where habitats of European Union significance can be found: 6120\* *Xeric and calcareous grasslands*, 6210 *Semi-natural dry grasslands and scrubland facies on calcareous soils*, 6270\* *Fennoscandian lowland species rich-dry to mesic grasslands*, 6450 *Northern boreal alluvial meadows*, 6510 *Lowland hay meadows* and 6530\* *Fennoscandian wooded meadows*;
- Several grassland restoration methods have been tested for the first time in Latvia, and significant experience in the organization of restoration work has been obtained;
- Registers of owners of grassland and other agricultural land and providers of agricultural services, as well as interactive, cooperation facilitating internet platforms have been established;
- Options for alternative use of grass biomass and corresponding technological solutions have been demonstrated to 565 interested people;
- Importance of grasslands and provided public benefits has been promoted to the public; more than 5000 people informed during the Project.

## After LIFE aims

The following aims are set in the *After-LIFE Conservation and Communication Plan* to ensure the continuity of Project activities and sustainability of achievements:

- Promotion and using the data obtained in the Project and the methods developed for assessing the quality, distribution, productivity and energy potential of grasslands, as well as for the restoration of biologically valuable grasslands in further research;
- Continuation of the management of the grasslands restored within the Project, without deteriorating their quality, by promoting sustainable use of grass biomass resources;
- Spreading and applying the obtained knowledge and developed technological solutions for producing bioenergy from grass biomass in future research;
- Enhancing public awareness on the importance of grasslands for biodiversity conservation and human well-being.

# After LIFE Conservation Plan

## 1.1. Maintenance of the restored grasslands

After the end of the Project, the maintenance of the restored grasslands will be ensured by their managers. Within the Project, a grassland area of 25 ha has been restored in Ludza Municipality, which is owned by the municipality but will be rented. 17 grasslands in 12 properties owned by private landowners, the municipality and the state (managed by the Nature Conservation Agency) with an area of 97 ha have been restored in Sigulda Municipality. The grasslands will be further managed under the condition that the quality reached after the restoration works does not deteriorate by December 31, 2017, according to the agreements signed between the Project and landowners. At the end of the Project, grassland managers will be able to receive at least 25,545 EUR annually from the restored grassland area.

### Ludza Municipality

Name of the site/grassland location: Ludza town between 3 lakes – Lake Zvirgzdene, Lake Dunāklis and Lake Mazais Ludzas, properties “Jezupa Soikāna iela 22”, “J. Soikāna iela 37A”, “J. Soikāna iela 45”, “J. Soikāna iela 47” and “Zvirgzdenes ielā 23”.

Area of the restored grasslands: 25 ha.

Owner: Local government of Ludza Municipality.

Restored habitat(s): 6210; 6270; 6510; 6450.



Restoration activities within the Project: felling trees and shrubs (incl. dwarf serviceberry *Amelanchier spicata* and Japanese rose *Rosa rugosa*), removing roots, elimination of invasive and expansive species (Canadian goldenrod *Solidago canadensis*, Himalayan balsam *Impatiens glandulifera* and bushgrass *Calamagrostis epigeios*), primary grassland mowing, gathering hay, and improvement of species composition.

Planned use and importance: maintenance of the grassland for preserving landscape quality, biodiversity and agricultural resources.

Recommendations for further management of the grasslands and improvement of the nature conservation value: on the steeper slopes of the hills (ca 3 hectares), to ensure regular grassland maintenance by grass mowing once a season and removal of the grass, or by organising grazing. In the rest of the restored grassland (ca 22 ha), intensive grassland grazing or mowing with grass/hay gathering or mowing once a season with grazing in the aftergrass is required for the next 2-3 years. The first-time mowing must preferably be performed from mid-June to mid-July, but in the sites places with vast distribution of the Canadian goldenrod and Himalayan balsam – shortly before the blooming of these plants. Such management is essential to facilitate the improvement of the quality of grassland habitats and continue to eliminate invasive and expansive species. For the following years, regular maintenance of the grasslands - mowing with hay gathering once a season,



grazing or mowing and grazing in the aftergrass - should be ensured. Management practices can be diversified over the years.

Planned management expenses: 100–200 €/ha a season.

Source of finances: The internal budget of the local municipality or private financing by the land tenant. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 83 to 206 € per ha.

### **Sigulda Municipality**



Name of the site/grassland location: meadow at the Velnala bridge at Sigulda town, Gauja National Park, cadastre no 80150023904.

Area: 0.5 ha (the restored area), grassland area – 1.3 ha.

Owner: state property; administrated by the Nature Conservation Agency of Latvia.

Restored habitat(s): 6120\*, 6210, 6510.

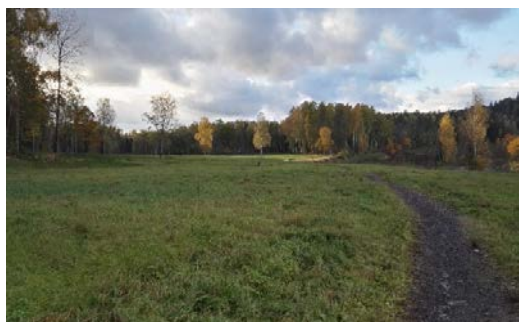
Restoration activities within the Project: felling trees and shrubs, milling roots, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality, biodiversity and tourism resources.

Recommendations for further management of the grasslands and improvement of the nature conservation value: In order to improve the quality of the restored grassland habitats and continue combating expansive species, grass mowing with grass/hay gathering 2 times a season, intensive grazing or mowing once a season with grazing in the aftergrass is required for the next 2-3 years. The first mowing in the grassland should take place from mid-June to mid-July. In the coming years, it is desirable to mow the grassland with hay gathering once a season, grazing or mowing and grazing in the aftergrass. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: The internal budget of the Nature Conservation Agency or private financing by the land tenant. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 83 to 206 € per ha.



Name of the site/grassland location: meadow at “Melnie krasti”, Sigulda town, Gauja Nacional Park, cadastre no 80150023904.

Area: 0.3 ha (the restored area), grassland area – 4.6 ha.

Owner: state property; administrated by the Nature Conservation Agency of Latvia.

Restored habitat(s): 6270, 6510.

Restoration activities within the Project: felling trees and shrubs, milling roots, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality, biodiversity, tourism resources and agriculture.

Recommendations for further management of the grasslands and improvement of the nature conservation value: grass mowing with grass/hay gathering 2 times a season, or intensive grazing, or mowing once a season with grazing in the aftergrass is required for the next 2-3 years. The first mowing in the grassland should take place from mid-June to mid-July. In the coming years, it is desirable to mow the grassland with hay gathering once a season, or grazing, or mowing and grazing in the aftergrass. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: The internal budget of the Nature Conservation Agency or private financing by the land tenant. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 83 to 155 € per ha.



Name of the site/grassland location: meadow opposite to the Bobsleigh and luge track at Sigulda town, Gauja National Park, cadastre no 80150023904.

Area: 0.5 ha.

Owner: state property; administrated by the Nature Conservation Agency of Latvia.

Restored habitat(s): 6210, 6530\*.

Restoration activities within the Project: felling trees and shrubs, milling roots, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality and biodiversity.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, it is desirable to graze in the grassland taking into account the size of the grassland and the density of growing trees. Mowing with grass/hay gathering once a season with grazing in the aftergrass is acceptable. Mowing in the grassland should take place from mid-June to mid-July.

Planned management expenses: 110–220 €/ha a season.

Source of finances: The internal budget of the Nature Conservation Agency or private financing by the land tenant. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 206 to 330 € per ha.



Name of the site/grassland location: meadow under the electric line at Sigulda town, Gauja National Park, cadastre no 80150023904.

Area: 0.4 ha.

Owner: state property; administrated by the Nature Conservation Agency of Latvia.

Restored habitat(s): 6210.

Restoration activities within the Project: felling trees and shrubs, milling roots, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality and tourism resources.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, it is desirable to graze in the grassland taking into account the size and shape of the grassland. Mowing with grass/hay gathering once a season with grazing in the aftergrass is acceptable. Mowing in the grassland should take place from mid-June to mid-July. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: The internal budget of the Nature Conservation Agency or private financing by the land tenant. Possibility to receive a Rural support payment for biological valuable grassland maintenance 206 € per ha.

Name of the site/grassland location: meadow behind the Gauja River bridge at the Serpentine road at Sigulda town, Gauja National Park, cadastre no 80150011001.

Area: 0.5 ha (the restored area), grassland area – 2.6 ha.

Owner: state property; administrated by the Nature Conservation Agency of Latvia.

Restored habitat(s): 6120\*, 6210.



Restoration activities within the Project: felling trees and shrubs, milling roots, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality, biodiversity and tourism resources.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, it is desirable to graze in the grassland, or mow with



grass/hay gathering once a season and possible grazing in the aftergrass. Mowing in the grassland should take place from mid-June to mid-July. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: The internal budget of the Nature Conservation Agency or private financing by the land tenant. Possibility to receive a Rural support payment for biological valuable grassland maintenance 206 € per ha.

Name of the site/grassland location: forest glade in the vicinity of the Baloni meadow at Sigulda town, Gauja National Park, cadastre no 80150011001.



Area: 0.2 ha.

Owner: state property; administrated by the Nature Conservation Agency of Latvia.

Restored habitat(s): potential 6510.

Restoration activities within the Project: felling trees and shrubs, milling roots, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality and biodiversity.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the next 3 years, it is desirable to graze in the grassland, or mow with grass/hay gathering twice a season. The first mowing should take place from mid-June to mid-July. In the coming years, the grassland should be grazed or mown with grass/hay gathering once a season, if the aftergrass has not much grown.

Planned management expenses: 110–220 €/ha a season.

Source of finances: The internal budget of the Nature Conservation Agency or private financing by the land tenant.



Name of the site/grassland location: Baloni meadow at Sigulda town, Gauja National Park, cadastre no 80150011001.

Area: 13.6 ha.

Owner: state property; administrated by the Nature Conservation Agency of Latvia.

Restored habitat(s): 6510, 6210, 6120\*.

Restoration activities within the Project: felling trees and shrubs, milling roots, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality, biodiversity, tourism and agricultural resources.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the next 2-3 years, the grassland should be mown with grass/hay gathering twice a season, or grazed, or mown with grass/hay gathering and grazed in the aftergrass. The first mowing in the grassland should take place from mid-June to mid-July; in the locations with a high abundance of the cow parsley *Anthriscus sylvestris* – shortly before blooming of the species. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: The internal budget of the Nature Conservation Agency or private financing by the land tenant. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 83 to 206 € per ha.



Name of the site/grassland location: Līcīši meadow at Sigulda town, Gauja National Park, cadastre no 8010023901.

Area: 2.6 ha.

Owner: Māris Kesners.

Restored habitat(s): 6210, potential 6270\*.

Restoration activities within the Project: felling trees and shrubs, milling roots, elimination of invasive and expansive species (Canadian goldenrod *Solidago canadensis*, Japanese rose *Rosa rugosa*, and bushgrass *Calamagrostis epigeios*), removal of garbage, fencing, concrete pillars and slabs, levelling the micro-relief, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving landscape quality and biodiversity.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, the grassland should be grazed, or mown with grass/hay

gathering 1-2 times a season or mown with grass/hay gathering and grazed in the aftergrass. The first mowing in the grassland should take place from mid-June to mid-July; in the locations with a high abundance of the Canadian goldenrod *Solidago canadensis* – shortly before blooming of the species. Additionally, the expansion of the Japanese rose *Rosa rugosa* should be followed and elimination activities repeated, if necessary. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 155 to 330 € per ha.

Name of the site/grassland location: “Jaunlejnieki”, Allaži Parish, cadastre no 80420040023.

Area: 9.3 ha.

Owner: the authorized by the owner person Romualds Ostrovskis.

Restored habitat(s): potential 6270\*.

Restoration activities within the Project: felling trees and shrubs, milling roots, removal of garbage and fencing, levelling the micro-relief, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for preserving agricultural resources and biodiversity.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming 2-3 years, the grassland should be grazed, or mown with grass/hay gathering twice a season or mown with grass/hay gathering once a season and grazed in the aftergrass. In future, the grassland should be grazed, or mown with hay/grass gathering once a season, if the aftergrass has not much grown. The first mowing in the grassland should take place from mid-June to mid-July. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 83 to 330 € per ha.

Name of the site/grassland location: “Kalnabeites”, Sigulda Parish, cadastre no 80940030066.

Area: 2.5 ha.

Owner: Sandra Jēkabsone.

Restored habitat(s): potential 6270\*.





Restoration activities within the Project: milling the roots of trees and shrubs, primary mowing, hay gathering, improvement in the composition of species.

Planned use and importance: maintenance of the grassland for agriculture – horse keeping.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming 2-3 years, the grassland should be grazed, or mown with grass/hay gathering twice a season or mown with grass/hay gathering once a season and grazed in the aftergrass. The first mowing in the grassland should take place from mid-June to mid-July. In future, the grassland should be grazed, or mown with hay/grass gathering once a season, if the aftergrass has not much grown. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 83 to 330 € per ha.

Name of the site/grassland location: “Kalna Klaukas”, Sigulda Parish, cadastre no 80940020168.

Area: 4.2 ha.

Owner: Inese Bērziņa.

Restored habitat(s): 6210, 6270\*, 6450.

Restoration activities within the Project: felling trees and shrubs, milling roots, controlled burning, elimination of invasive and expansive species (Canadian goldenrod *Solidago canadensis*, Japanese rose *Rosa rugosa*, European dewberry *Rubus caesius*, and bushgrass *Calamagrostis epigeios*), levelling of the micro-relief, primary mowing, hay gathering, improvement in the composition of species.



Planned use and importance: maintenance of the grassland for landscape quality, biodiversity, tourism and agricultural resources.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming 2-3 years, the grassland should be grazed, or mown with grass/hay gathering twice a season or mown with grass/hay gathering once a season and grazed in the aftergrass. The first mowing in the grassland should take place from mid-June to mid-July. In future, the grassland should be grazed, or mown with hay/grass gathering once a season, if the aftergrass has not much grown. Management practices can be diversified over the years.

Planned management expenses: 110–220 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive a Rural support payment for biological valuable grassland maintenance from 83 to 206 € per ha.





Name of the site/grassland location: "Purlauki", More Parish, cadastre no 4266050047.

Area: 7.9 ha.

Owner: local government of Sigulda Municipality / Ingus Āboliņš (tenant).

Restored habitat(s): perennial grassland (preferred habitat 6270\*).

Restoration activities within the Project: milling the roots of trees and shrubs, removal of stones, levelling the soil by disking and cultivating, reseeding with species-rich seed material for improving botanical composition.

Planned use and importance: maintenance of the grassland for agriculture.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, the grassland should be grazed, or mown with grass/hay gathering once a season and possibly grazed in the aftergrass. Management practices can be diversified over the years.

Planned management expenses: 110 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive an annual Rural support direct payment for grassland maintenance from 65 € per ha.



Name of the site/grassland location: "Lācīši", More Parish, cadastre no 42660050014.

Area: 10.0 ha.

Owner: Baiba Lapiņa.

Restored habitat(s): perennial grassland (preferred habitat 6270\*).

Restoration activities within the Project: milling the roots of trees and shrubs, levelling the soil by disking and cultivating, reseeding with species-rich seed material for improving botanical composition.

Planned use and importance: maintenance of the grassland for agriculture.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, the grassland should be grazed, or mown with grass/hay gathering once a season and possibly grazed in the aftergrass. Management practices can be diversified over the years.

Planned management expenses: 110 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive an annual Rural support direct payment for grassland maintenance from 65 € per ha.



Name of the site/grassland location: “Annītes”,  
More Parish, cadastre no 42660050026.

Area: 10.9 ha.

Owner: local government of Sigulda Municipality/  
Ingus Āboliņš (tenant – land purchaser).

Restored habitat(s): perennial grassland (preferred  
habitat 6270\*).

Restoration activities within the Project: milling the roots of trees and shrubs, levelling the soil by disking and cultivating, reseeding with species-rich seed material for improving botanical composition.

Planned use and importance: maintenance of the grassland for agriculture.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, the grassland should be grazed, or mown with grass/hay gathering once a season and possibly grazed in the aftergrass. Management practices can be diversified over the years.

Planned management expenses: 110 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive an annual Rural support direct payment for grassland maintenance from 65 € per ha.



Name of the site/grassland location: “Annītes”,  
More Parish, cadastre no 42660050027.

Area: 4.7 ha.

Owner: local government of Sigulda Municipality/  
Ingus Āboliņš (tenant – land purchaser).

Restored habitat(s): perennial grassland (preferred  
habitat 6270\*).

Restoration activities within the Project: milling the roots of trees and shrubs, removal of stones, levelling the soil by disking and cultivating, reseeding with species-rich seed material for improving botanical composition.

Planned use and importance: maintenance of the grassland for agriculture.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, the grassland should be mown with grass/hay gathering 1-2 times a season and/or grazed in the aftergrass in order to facilitate improvement of the grassland quality. Management practices can be diversified over the years.

Planned management expenses: 110-220 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive an annual Rural support direct payment for grassland maintenance from 65 € per ha.

Name of the site/grassland location: "Lauka Annītes", More Parish, cadastre no 42660050028.

Area: 4.7 ha.

Owner: local government of Sigulda Municipality/ Ingus Āboliņš (tenant).

Restored habitat(s): perennial grassland (preferred habitat 6270\*/6410).



Restoration activities within the Project: milling the roots of trees and shrubs, levelling the soil by disking and cultivating, reseeding with species-rich seed material for improving botanical composition.

Planned use and importance: maintenance of the grassland for agriculture.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, the grassland should be mown with grass/hay gathering 1-2 times a season or grazed in the aftergrass in order to facilitate improvement of the grassland quality. The first mowing is recommended around mid-July. Management practices can be diversified over the years.

Planned management expenses: 110-220 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive an annual Rural support direct payment for grassland maintenance from 65 € per ha.

Name of the site/grassland location: "Jātnieki", More Parish, cadastre no 42660050010.

Area: 20.8 ha.

Owner: Valentīna Krūmiņa.

Restored habitat(s): perennial grassland (preferred habitat 6270\*/6410).



Restoration activities within the Project: milling the roots of trees and shrubs, removal of stones, levelling the soil by disking and cultivating, reseeding with species-rich seed material for improving botanical composition.

Planned use and importance: maintenance of the grassland for agriculture.

Recommendations for further management of the grasslands and improvement of the nature conservation value: in the coming years, the grassland should be mown with grass/hay gathering 1-2 times a season or grazed in the aftergrass in order to facilitate improvement of the grassland quality. The first mowing is recommended around mid-July. Management practices can be diversified over the years.

Planned management expenses: 110-220 €/ha a season.

Source of finances: Private financing by the land owner. Possibility to receive an annual Rural support direct payment for grassland maintenance from 65 € per ha.

## 1.2. The monitoring of the quality of the restored grasslands

### Results achieved during the Project and evaluation of their application:

In order to assess the success of the restoration of grassland habitats, an inventory form of the EU significance habitat prepared by the Nature Conservation Agency was filled for each restored grassland before and after restoration work, as well as an overgrowth map was prepared. Vegetation monitoring plots were set up after the restoration works in restored grasslands, giving the possibility for a long-term evaluation of the restoration success.

The assessment of the restoration success performed within the Project shows that the continuity of the area of the restored grasslands has significantly increased due to habitat restoration activities (from 3 ha in 2015 to 4 ha in 2017). The overgrown with trees and shrubs have significantly decreased (from 27 % to 4%), no continuous thatch (old grass) layer is observed anymore that interferes with seed germination and reduces the occurrence of less-competitive species (0% instead of the original 70%), as well the management of the grasslands has significantly improved. If 36 ha or 28% of the restored grasslands were managed in 2014, then the management of all restored grassland was ensured in 2018 and the management needed for the grasslands will be ensured also in the coming years. In addition, if all maintained grasslands were managed with methods degrading the botanical quality of the habitat in 2014 - a late mowing and grass shredding, in the following years at least 31 ha or 25% of the restored grassland will be grazed, but at least 63 ha or 52% will be mown at the end of June - beginning of July and used for haymaking. Further management methods for the other restored grasslands with an area of 28 ha are yet to be specified, however they will be maintained in a good condition.

### Planned activities/a follow-up plan after the end of the Project:

Three of the restored grasslands are included in the areas where the Natura 2000 site species and habitat monitoring is conducted every six years. Consequently, analyses of the data of the National Monitoring Programme will provide a possibility to evaluate the success of the restoration of these grasslands. The vegetation monitoring plots set up at grassland restoration sites will allow the evaluation of the effectiveness of the restoration methods by scientific or non-governmental organizations within scientific projects, public monitoring or other initiatives. The filled monitoring forms will be available to any interested person in the GRASSSERVICE Project archive of the Latvian Fund for Nature.

Activity implementers: Latvian Fund for Nature, Nature Conservation Agency, other projects

Possible users of the results: Scientific and non-governmental organizations, landowners, Nature Conservation Agency

Source of finances: The State Monitoring Programme and public monitoring within other projects, no need for additional financial expenses.

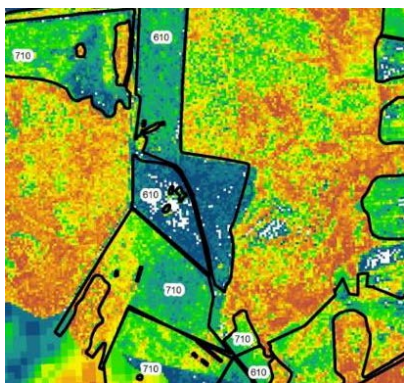


# After LIFE Communication Plan

## 2.1. Methods for assessing the biomass resources and quality of grasslands

### Results achieved during the Project and evaluation of their application:

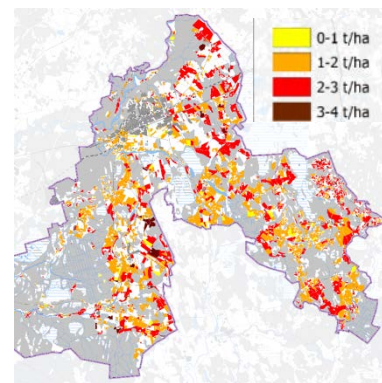
Spatial data on the extent, quality and management of sown, perennial and biologically valuable grasslands in Sigulda and Ludza municipalities have been obtained within the framework of the Project. The productivity, extent and intensity of the use of different grassland types were evaluated using remote sensing research methods and field studies; the conservation status of biologically valuable grasslands - botanical quality, the compliance of the structure and functions with the quality requirements of specially protected grassland habitats – was identified during field studies. The obtained information was compared with the available research and statistical data. Both the obtained data and developed methodology can be used to assess the amount of grassland biomass in other territories of Latvia.



Data used for determining grassland productivity with visualisation of the calculated vegetation index (NDVI)



A field sampling site for assessing grass biomass



The amount of grass biomass in Sigulda Municipality

### Planned activities/a follow-up plan after the end of the Project:

#### 2.1.1. Data of grassland extent and biomass amount

The Project provided information on grassland extent in Sigulda and Ludza municipalities using data from multispectral remote sensing, laser scanning and radar data, as well as the information obtained from the Rural Support Service of Latvia and the Forest Register maintained by the State Forest Service. Since the data of the State Land Service, the Central Statistical Bureau and the Rural Support Service do not provide full information on grasslands in the Project areas, the Project data can be further used for the development of local planning documents, analyses of the situation in agriculture in the municipalities, as well as during the daily work of rural consultants. The prepared data layer is available at Sigulda and Ludza municipalities. Other interested parties could obtain it by sending a request to the representatives of the LIFE GRASSSERVICE Project from the Latvian Fund for Nature and the Baltic Environmental Forum. Already during the implementation of the Project, the method was improved and applied in Project LIFE13ENV/LT/000189 LIFE Viva Grass, which is coordinated in Latvia by the Baltic Environmental Forum - Latvia, and the European Space

Agency (ESA) Project SentiGrass, nationally implemented by the Institute for Environmental Solutions. The methodology polished during the SentiGrass Project is planned to be also used in Project LIFE16NAT/LV/000262 GrassLIFE implemented by the Latvian Fund for Nature, thus obtaining the grassland distribution data necessary for the development of a connectivity model for biologically valuable grasslands of Latvia.

Time of implementation: 2018 - 2020

Activity implementers: Latvian Fund for Nature in cooperation with the Institute for Environmental Solutions

Costs and possible sources of funding: The data obtained in the LIFE GRASSSERVICE project is available to anyone free of charge.

The further use of the methodology of grassland extent to other projects costs approximately EUR 45 000, based on the experience of the LIFE GRASSSERVICE project, when conducting assessments for large areas. The cost of aerial photography for new territories in order to obtain raw data costs an average of 2-4 EUR / ha depending on the size of the territory. Possible sources of finance are other LIFE or European Space Agency projects.

Possible users of the results: Sigulda and Ludza municipalities, scientific institutions (the University of Latvia and the Institute for Environmental Solutions), non-governmental organizations, landowners and managers.

### **2.1.2. Future use of the data of extent and quality of biologically valuable grasslands**

The data on biologically valuable grasslands and their conservation status in the Sigulda and Ludza municipalities obtained during the Project were submitted to the Nature Conservation Agency (habitat inventory forms filled by a certified habitat expert and geospatial data of the distribution of biologically valuable grasslands) for updating the nature database "Ozols". This information has been transferred to the Rural Support Service to determine the amount of support payments for the areas within the agro-environmental measure "The maintenance of biodiversity in grasslands", and the corresponding landowners will have opportunity to apply for the support.

Time of implementation: 2017 - 2018

Activity implementers: Latvian Fund for Nature (data preparation and submission)

Costs and possible sources of funding: Data preparation and submission took place within the framework of the project. The maintenance of databases is included in the institution's daily work.

Possible users of the results: Nature Conservation Agency, Rural Support Service, grassland managers.

### **2.1.3. Further use of the data on grass biomass amount and productivity, as well as assessment methods**

The Project provided information on the productivity of various grassland types in Sigulda and Ludza municipalities using remote sensing multispectral data and the results of field research. The obtained data can be further applied in the development of local planning documents and in the daily work of rural consultants, as well as Bio RE Ltd. and RTU will use the obtained grass productivity data in further studies and to ensure the operation of the pilot facilities. Several Latvian research institutions, such as the University of Latvia, the Latvian Rural Advisory and Training Centre, and the Institute of Agricultural Resources and Economics, have expressed interest in the data of the productivity of the biologically valuable grasslands. They could be used for the calculation of the rates of agro-environmental payments within the Rural Development Programme, as well as the studies carried out by the above-mentioned institutions. Other interested parties could obtain them by sending a request to the representatives of the LIFE GRASSSERVICE Project from the Latvian Fund for Nature and the Baltic Environmental Forum. Already during the Project implementation, they have been used in the European Space Agency SentiGrass Project nationally implemented by the Institute for Environmental Solutions. The method is also planned to be used in the LIFE-13 ENV / LT / 000189 Project LIFE Viva Grass implemented by BEF. The methodology is planned to use also in Project LIFE13 ENV/LT/000189 LIFE Viva Grass, which is nationally coordinated by the Baltic Environmental Forum – Latvia.

Information about the produced data and used methods is disseminated at several seminars and scientific conferences, for example:

- B. Strazdiņa (Latvian Fund for Nature), oral presentation “The productivity of biologically valuable grasslands” at the seminar “The management of biologically valuable grasslands today and in future” organised on 14.12.2015 within the Project “Promotion of sustainable development by integrating environmental and nature protection issues into policy documents” financed by the EEZ Financial Instrument.
- B. Strazdiņa (Latvian Fund for Nature), poster presentation “Productivity of semi-natural grasslands of Latvia” at the 14<sup>th</sup> Eurasian Grassland Conference organised by the Eurasian Dry Grassland Group on 4.-11.07.2017 (egc2017.namupro.de);
- D. Jakovels (Institute for Environmental Solutions), oral presentation "Assessment of green grass biomass from remote sensing data" at the seminar “Bioenergy technologies” within the 58<sup>th</sup> International Scientific Conference of Riga Technical University on 16.10.2017.

Time of implementation: 2018 - 2022

Activity implementers: Latvian Fund for Nature, Baltic Environmental Forum, Riga Technical University and Bio RE Ltd.

Costs and possible sources of funding: The amount and productivity data of grassland biomass obtained in the LIFE GRASSSERVICE project is available to anyone free of charge. The obtained data will also be used in the future projects of project partners.

The further use of the biomass amount methodology in other projects costs around EUR 55 000, following the experience of the LIFE GRASSSERVICE project, when conducting assessments for

large areas. The cost of aerial photography for new territories in order to obtain raw data costs an average of 2-4 EUR / ha depending on the size of the territory. Possible sources of finance are other LIFE or European Space Agency projects.

Possible users of the results: Ministry of Agriculture, Rural Support Service, Latvian Rural Advisory and Training Centre, scientific institutions (University of Latvia, Latvia University of Life Sciences and Technology, Institute of Environmental Solutions, Institute of Agricultural Resources and Economics), non-governmental organisations.

#### **2.1.4. Further use of the data on grassland management and assessment methods**

The Project provided information on the management of various grassland types in Sigulda and Ludza municipalities – management type, time and intensity - using remote sensing multispectral, optical, LiDAR and radar data and the results of field research, as well as information from the register of the Rural Support Service. The obtained data can be further applied in the development of local planning and management documents. Already during the Project implementation, they have been used in the European Space Agency SentiGrass Project nationally implemented by the Institute for Environmental Solutions. Several Latvian research institutions, such as the University of Latvia, the Latvian Rural Advisory and Training Centre, and the Institute of Agricultural Resources and Economics, have expressed interest in the assessment methodology. The methodology could be further used for the evaluation of the impact of the Rural Development Programme on grassland management, correspondence of the areas applied for support receiving, planning development of ecological networks and green infrastructure objects, performing surveillance of grassland management activities, as well as in other projects and investigations in relation to agricultural resources, nature protection measures and spatial planning solutions.

Information about the produced data and used methods is disseminated at several seminars and scientific conferences, for example:

- D. Jakovels (Institute for Environmental Solutions), oral presentation “Remote sensing observations for the surveillance of agricultural activities” at the seminar “The management of biologically valuable grasslands today and in future” organised on 14.12.2015 within the Project “Promotion of sustainable development by integrating environmental and nature protection issues into policy documents” financed by the EEZ Financial Instrument;
- D. Jakovels, A. Brauns, J. Filipovs et.al. (Institute for Environmental Solutions), poster presentation "Assessment and monitoring of grasslands in Latvia: exploring the capabilities of Sentinel-1 radar and Sentinel-2 optical data" at the seminar "ESA World Cover 2017" organised by the European Space Agency on 14-16.03.2017 ([worldcover2017.esa.int](http://worldcover2017.esa.int)).
- D. Jakovels, J. Filipovs, A. Brauns (Institute for Environmental Solutions), oral presentation "Airborne/spaceborne data for monitoring sensitive habitats – Grasslands" at the seminar "ESA World Cover 2017" organised by the European Space Agency on 29-31.03.2017. ([eo4baltic.info](http://eo4baltic.info)).

Time of implementation: 2018 - 2022



Activity implementers: Latvian Fund for Nature in cooperation with the Institute for Environmental Solutions.

Costs and possible sources of funding: The further application of the grassland management methodology to other projects costs around EUR 13 000, following the experience of the LIFE GRASSSERVICE project, when conducting assessments for large areas. Possible sources of finance are other LIFE or European Space Agency projects.

Possible users of the results: Ministry of Agriculture, Rural Support Service, Nature Conservation Agency, Ministry of Environmental Protection and Regional Development, scientific institutions (University of Latvia, Latvia University of Life Sciences and Technology, Institute of Environmental Solutions, Institute of Agricultural Resources and Economics), non-governmental organisations.

### **2.1.5. Continuation of the research on sugar yields in EU protected grassland habitats**

Sugar yields in the biomass samples from various grassland habitats was investigated at the laboratory of Riga Technical University, which is an important indicator in assessing the potential of grasslands in the both production of bioenergy and other chemical products. The results of the analysis showed that a higher sugar yield is in the grass biomass collected in June from habitats with a higher number of dicotyledons - *6120\* Xeric sand calcareous grasslands, 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates, and 6510 Lowland hay meadows*. The obtained results are disseminated at scientific conference:

- L. Mežules, B. Daļeckas, B. Strazdiņas, T. Juhnas (Riga Technical University) poster presentation "Effect of biotope type on fermentable sugar production yields" Elsevier 23. – 26.10.2016. in conference "Biorestec 2016".

All biomass material collected during the Project activities and used for sugar analysis was simultaneously preserved for long-term storage. Such an approach has been introduced to ensure the possibility of repeating the analyses in the case, if a new method of extracting sugars (pre-treatment / hydrolysis) will be developed and assess its efficiency. Already at present, the stored biomass is used in the study process for student laboratory works and the development of scientific research papers of pupils. New technologies are currently being developed in the INNO-INDIGO IPP3 Project B-LIQ (2017-2019). The results of the Project on the potential sugar yields will be included in a scientific publication, where they will be available to all interested parties.

Time of implementation: 2017 - 2019

Activity implementers: Riga Technical University, Latvian Fund for Nature.

Costs and possible sources of funding: The development of new technologies has started with the support of the EU INNO-INDIGO program.

Possible users of the results: research institutions (scientific community), biofuel producers.

## **2.2. Methods of grassland restoration**

Results achieved during the Project and evaluation of their application:

Ecological network approach was applied for the restoration of grasslands first time in Latvia. The location of the grassland within the ecological network was one of the principles for choosing the

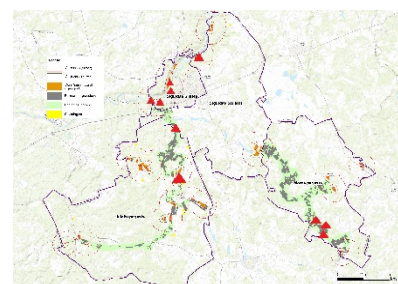
site for the restoration. In the LIFE GRASSSERVICE Project, altogether, 22 different methods (milling, disking, controlled burning, removal of stones, etc.) were used for the restoration. It is by far the largest complex of grassland regeneration methods tested in any project or any territory in Latvia. 20 different grassland restoration schemes were developed in 13 restored properties adopting them to each grassland type, the wishes of the landowner/manager and the weather conditions during the restoration works. Controlled burning for the elimination of the thatch layer accumulated over years with the aim to make preconditions for levelling the land surface and not enhancing further accumulation of nutrients in the soil, as well as the “dry hay” and “green hay” methods for improving the botanical quality of the grasslands were innovative methods on the Latvian scale used for the grassland restoration.



Controlled burning in a dry grassland



Application of the “green hay” method



The grassland ecological network in Sigulda Municipality

#### Planned activities/a follow-up plan after the end of the Project:

The approach of the Project of using the ecological network principles in grassland restoration can be applied for restoration works also in other territories, or for solving similar problematic issues. For example, the Council of Sigulda District Municipality plans to use this approach to implement hogweed elimination measures in the territory of the Municipality. The knowledge and experience obtained in technical nuances and organization of restoration works will be transferred to other projects and interested experts. The summary of grassland restoration methods is published on the website of the project.

Information about the methods used for the grassland restoration has been poster presented (“Testing of different grassland restoration approaches in LIFE GRASSSERVICE Project”) by D. Prižavoite, B. Strazdiņa, E. Bojārs and A. Ruskule at the 14th Eurasian Grassland Conference organised by the Eurasian Dry Grassland Group on 4.-11.07.2017 (egc2017.namupro.de).

Time of implementation: 2018 - 2022

Activity implementers: Baltic Environmental Forum, Latvian Fund for Nature. Council of Sigulda Municipality, Council of Ludza Municipality

Costs and possible sources of funding: The cost of using the ecological network method to restore grassland or to solve similar cases involves only staff remuneration if the source data to be used can be obtained free of charge. Additional funding is required only if the site survey and data verification is also necessary.

According to the experience of the LIFE GRASSSERVICE project, grassland restoration costs ranges from 500 to 1300 EUR per hectare, depending on the complexity of the area. At present, the

possible sources of finance are other LIFE projects and the financing of the Latvian Environmental protection Fund.

Possible users of the results: other projects, grassland owners and managers

### 2.3. Application of digestate for maintenance of semi-natural grasslands

Results achieved during the Project and evaluation of their application:

During the Project, the possibilities of applying digestate (the by-product of biogas production) for the maintenance of grassland fertility were assessed, as well as its impact on the diversity of natural grasslands was verified. Within the study, the solid fraction of digestate was dispersed at sampling plots in three biologically valuable grassland habitats (*6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates*, *6270\* Fennoscandian lowland species-rich dry to mesic grasslands*, *6510 Lowland hay meadows*) for two years, and its effect on vegetation and the species composition of invertebrate species has been evaluated over four years.

Although the study period was too short, the obtained results suggest that even relatively small doses of digestate (9-30 kg N/ha, in accordance with the calculations of the fertilizer doses necessary for the maintenance of grassland productivity used by farmers) increase grass productivity and reduce the diversity of plant species in a short term, but have little impact on the abundance of ground beetle (*Carabidae*) species. In all plots where the digestate was dispersed, an increase in the grass productivity by 2-13% was detected, while in all control plots the productivity dropped by 11-30%. Meanwhile, the concentration of plant species (the number of species per square meter of grassland) increased by 7 species, on average, in the control plots, while in the digestate application areas it increased or decreased by 1-2 species.

Information about the results of the investigation was poster presented (“Effect of low-dose fertilization on plant species composition of semi-natural grasslands”) by L. Auniņa (Latvian Fund for Nature) at the 26<sup>th</sup> Congress of the European Vegetation Survey ([www.ehu.eus/en/web/evs2017](http://www.ehu.eus/en/web/evs2017)).

Planned activities/a follow-up plan after the end of the Project:

The obtained results and applied methodology can be used for further research on the potential application of digestate as a resource in agriculture and energy sectors, as well as its impact on various environmental factors. The results of the research will be available on the Project website and the activity implementers to anyone interested for continuation of the research and further use. Bio RE Ltd. together with the Latvian Permaculture Association and Abulas rural partnership in the framework of LEADER projects will participate in informative seminars and publicity events raising awareness of the potential of use of digestate as organic fertilizer.

Time of implementation: 2019 - 2022

Activity implementers: Latvian Fund for Nature, Bio RE Ltd.

Costs and possible sources of funding: The publication of research results in the three LEADER projects will cost EUR 1800. Further studies on the use of digestate are possible under the ERDF, LIFE or other international and European Union funded projects and national research programs.

Possible users of the results: scientific institutions (University of Latvia, Latvia University of Life Sciences and Technology and its scientific institutes), non-governmental organisations

## **2.4. Technological solutions for producing biobutanol from grass biomass**

Results achieved during the Project and evaluation of their application:

Within the Project, experts from Riga Technical University performed investigations how to adapt the existing biobutanol production technologies to grass as a raw material. The most appropriate biomass fraction sizes were evaluated, the minimum thermal treatment regimen was determined not to reduce the concentration of the produced sugar under the influence of natural microorganisms. The developed approach was compared with the method of chemical pre-treatment/hydrolysis to determine its effectiveness. All improvements were made to reduce biomass processing time and energy consumption. The developed approach was tested by analysing biomass samples collected from various grassland habitats. The optimization of the recovery method for the produced biofuel (alcohol) was also performed to reduce the negative impact of the product on the viability of microorganisms.

The obtained results are included in an open access scientific publication (Strods M., Mezule L. Alcohol recovery from fermentation broth with gas disinfection: system experimental and optimization. *Agronomy Research*, 15 (3), pp 897-904).

Planned activities/a follow-up plan after the end of the Project:

Further technological development is planned to be partly based on research findings from the LIFE GRASSSERVICE Project. It is expected that after additional technological research (membrane concentration/purification processes, alcohol recovery) and optimization of technological processes, a new pilot facility, or a technological prototype, will be developed for processing of various feedstock and commercialization of the technology. In future projects, it is planned to carry out testing of different substrates with environmentally friendly zero-to-low waste technologies, optimization of fermentation and development of new technological solutions for transformation of lignocellulosic biomass into liquid fuel by testing the pilot facility for its improvement. In the framework of the projects, replacement and addition of individual equipment of pilot facility is also planned. Project results, including results from the LIFE GRASSSERVICE project, will be published in scientific publications.

In 2018, it is planned to attend the following international conferences and present the results obtained:

- International conference “2nd International Conference on Bioresource Technology”, 16-19.09.2018, Sitges, Spain.
- International conference “1st International Scientific Conference on Ecological and Environmental Engineering”, 26-29.06. 2018, Krakow, Poland.
- International conference „ASM Microbe 2018”, 7-12.06.2018, Atlanta, USA.
- International conference “Biosystems Engineering”, 9 11.05.2018, Tartu, Estonia.

Time of implementation: 2017 - 2025

Activity implementers: Riga Technical University



Costs and possible sources of funding: Further dissemination of results, operation and demonstration of equipment, testing and improvement of technologies and methods are planned within the framework of two ERDF and EU INNO-INDIGO projects.

Possible users of the results: biofuel producers, biomass processors



Preparation of a grass sample for analyses



Determination of most appropriate biomass fraction size for enzyme hydrolysis



Biobutanol production pilot facility

## 2.5. Technological solutions for producing biogas from grass biomass

Results achieved during the Project and evaluation of their application:

Within the Project, experts of Bio RE Ltd. estimated the biogas producing potential from of grass biomass when exposing raw grass, silage and hay to various physical-chemical processes (including mechanical shredding, steam explosion, chemical treatment) with the aim of developing the most efficient technology for its full use in biogas production.

Based on the results of the research, a biogas pilot facility - prototype was developed with an innovative biogas reactor design, allowing biogas production with methane concentrations 13-15% higher compared to the existing plants, which use agricultural biomass as feedstock. The biomass hydrolysis process in the facility is ensured by mechanical shredding of grass and enzyme additives. The anaerobic hydrolysis ensures least energy losses compared to the aerobic hydrolysis.

The developed prototype allows testing in practice the technological solutions developed at the laboratory and evaluating technical nuances that may appear when upscaling the facility. The mobile prototype of the pilot facility makes its use more operational. This virtue helps to address potential partners of future research projects, as well as interested entrepreneurs not only in Latvia. The demonstration of the biogas production process is an effective way to raise the interest on the options for the use of grassland biomass.

Planned activities/a follow-up plan after the end of the Project:

After the end of the Project, the demonstration of the pilot facility - prototype will continue in Latvia, as well as potential investors and partners in scientific projects in Latvia and the Baltic region will be searched for. The goals of further research are related to the optimisation of the hydrolysis process and the improvement of the biogas reactor with the aim of using also other feedstock. In the following activities, special emphasis will be placed on the testing of anaerobic fermentation co-fermentation models using grass biomass. In the framework of other projects, improvement of the prototype with the additional equipment necessary for the use of other

substrates is also planned. In the future, it is planned to develop technologies for the microbiological methane enrichment on the basis of the existing facility. In parallel, work will be done to use the results for development of an industrial scale biogas production facility. Results of projects, including results from the LIFE GRASSSERVICE project, will be published in scientific publications.

Time of implementation: 2018 - 2025

Activity implementers: Bio RE Ltd.

Costs and possible sources of funding: Further dissemination of results, operation and demonstration of equipment, testing and improvement of technologies and methods are planned in the framework of two ERDF and H2020 SME instruments as well as LEADER projects.

Possible users of the results: developers of biofuel technologies, scientific research organisations



Assessment of biogas production potential at the laboratory



Demonstration of the biogas production facility and process



The biogas production facility - prototype

## 2.6. Maintenance of cooperation networks in Sigulda and Ludza municipalities

Results achieved during the Project and evaluation of their application:

Interactive information platforms on the websites of local municipalities and registers for improving the work of local government specialists have been developed during the Project promoting cooperation between among landowners, farmers, entrepreneurs and local government in grassland management. The information platforms provide information on the areas available for rent, including agricultural land and grassland, agricultural service providers in the municipalities, and the demand/offer of grass biomass.

Also, a website with an interactive municipality map with biologically valuable grasslands, non-managed areas and the sites of hogweed invasion, drained areas, rental lands and other information has been developed in Sigulda Municipality. Another result - the registers of the municipalities - include information on the area of agricultural land and grassland in the municipalities and their owners, incl. biologically valuable grasslands and non-managed areas. The registers also contain information on agricultural machinery and grassland related service providers in the municipalities.

Planned activities/a follow-up plan after the end of the Project:

The municipalities will continue to maintain the internet platforms on their websites after the end of the Project and provide information to interested parties about possibilities of use them. The

municipalities will use and continue to update the aggregated information on farms, landowners, service providers, grassland areas, the areas invaded by the Sosnowsky's hogweed, non-managed and overgrown agricultural lands in the future routine work, as well as in the development of plans and programs, and will continue to update it.

Time of implementation: 2018 - 2022

Activity implementers: local government of Sigulda and Ludza municipalities

Costs and possible sources of funding: Information platforms maintenance costs are included in the daily work of local governments, those are integrated on municipal websites and no additional costs are required for maintenance of them.

Possible users of the results: local residents, entrepreneurs, planning experts



The information platform on the website of Sigulda Municipality



The interactive map on the website of Sigulda Municipality



The information platform on the website of Sigulda Municipality

## 2.7. Facilitation of public awareness on the natural value of grasslands and contribution to human well-being

Results achieved during the Project and evaluation of their application:

In order to increase knowledge about the diversity of the grassland ecosystem, biologically valuable grasslands, provided benefits and alternative uses of grass biomass, several awareness and information actions were implemented within the Project. Altogether, 565 people were introduced to alternative technological solutions during the Project, 2013 people took part in various Project activities, and 5405 people in total were informed about the Project. The following awareness actions were performed during the implementation of the Project:

- The Project website [grassservice.balticgrasslands.eu](http://grassservice.balticgrasslands.eu) (in Latvian and English) was developed, providing information about the Project, its aims, actions, and events;
- An informative booklet of the Project in the form of a notebook was prepared and printed – 1000 copies in Latvian; all notebooks were distributed to Project partners, the visitors of the informative and awareness events, cooperation partners, landowners and managers, representatives of LIFE projects and other interested parties;
- 3 information boards were developed with possibility to vote for one of 10 grassland ecosystem services; the boards were displayed in Project and other events, a total of 1684 respondents did voting and the respondents have acknowledged the purification of water by



grassland, a regulating process, as the most important service, while such products as honey and medical plants took the 2<sup>nd</sup> and 3<sup>rd</sup> place, accordingly;

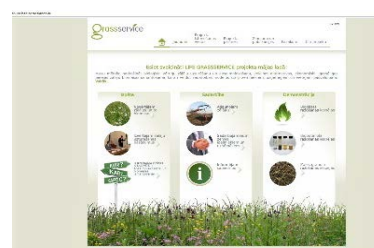
- 4 information boards were developed and installed: 2 in Sigulda and 2 in Ludza, with emphasis on the issues relevant for each place about the distribution of semi-natural grasslands, biomass resources, management and alternative uses;
- Altogether, 14 articles on actual Project activities were published in local newspapers of Sigulda and Ludza; Project partners have prepared 3 scientific articles;
- A Layman's (Project summary) Report was prepared and printed in 300 copies in Latvian and 100 copies in English; part of them was distributed to the participants of the final seminar, Project partners and other interested parties;
- 2 international seminars were organized: on sustainable grassland management and biomass use on 5-6 November, 2014; the final seminar "Grass for biodiversity and bioenergy: experience and future perspectives" on 29-30 November 2017, gathering Project partners, representatives of state and local government authorities, representatives of other LIFE projects, experts from universities and other stakeholders;
- 10 informative and demonstration events took place at the Project pilot areas in Sigulda and Ludza, informing altogether more than 300 local stakeholders;
- Project partners performed oral and poster presentations in more than 20 various seminars, forums, conferences and meetings in Latvia and abroad, as well as participated in an experience exchange trip to Germany;
- published 4 scientific articles in internationally cited editions;
- Successful co-operation with other LIFE projects was reached; the Project was promoted on social networks, the websites of the Project partners and cooperation partners, as well as in various events, such as the Nature Concert hall, the outdoor conversation festivals "Pārceltuve" and "Lampa", reaching a wide and varied audience outside the pilot areas.



The information boards on grassland ecosystem services



The Project Layman's Report



The Project website

### Planned activities/a follow-up plan after the end of the Project:

#### **2.7.1. Economic assessment of grass resources and alternative technologies of grass processing**

Within the framework of the Project, the economic potential of the grasslands of Sigulda and Ludza municipalities was evaluated both for energy and fodder production. Such research on grass resources in Latvia has practically not been carried out, and this can be considered as the first major economic assessment of grass in Latvia, which provides an overview on the importance of



grasslands in human well-being. The obtained results were included in a scientific publication (Auzins, A. 2017. Evaluation of economic potential of grasslands. SGEM2017 Conference Proceedings. 17 (53), 361-368). The results of the assessment can be further applied in the preparation of local planning documents in the municipalities, as well as in other projects and studies. The obtained results are published in two scientific publications:

- Auzins, A. 2017. Evaluation of economic potential of grasslands. SGEM2017 Conference Proceedings. 17 (53), 361-368.
- Auzins, A. 2018. Cost-benefit analysis of technologies for alternative use of grass biomass from grasslands. 17<sup>th</sup> International Scientific Conference “Engineering for Rural development” proceedings. 17, 1795-1803.

Time of implementation: 2018 - 2022

Activity implementers: “VB Limited” Ltd., Latvian Fund for Nature, Baltic Environmental Forum

Costs and possible sources of funding: The results of the evaluation are publicly available to anyone interested and are free of charge. For funding similar studies, funding is available through the ERDF, LIFE or other international and European Union funded projects and national research programs.

Possible users of the results: Ministry of Agriculture, Ministry of Economy, Institute of Agricultural Resources and Economics, Latvia University of Life Sciences and Technology, local governments of Sigulda and Ludza municipalities

### **2.7.2. Assessment of ecosystem services provided by grasslands**

Within the Project, along with an informative booklet, which already included short information on ecosystem services provided by the grassland, 3 thematic boards were developed: Processes (clean water, stable soil, provision of pollination); Cultural services (recreation in nature, beautiful landscape, summer solstice flower crown); Products (hay, grass biomass for energy, honey, medical herbs). The boards were used in Project publicity events to raise public awareness about the benefits provided by grasslands to people and their natural assets. The thematic boards with the possibility to vote for one of the 10 grassland ecosystem services are planned to be further used in thematic environmental seminars, lectures and other events, explaining and presenting the concept of ecosystem services and the benefits provided by grasslands to various stakeholders, and the results obtained during voting will be promoted to the public.

Time of implementation: 2018 - 2022

Activity implementers: Baltic Environmental Forum, Latvian Fund for Nature

Costs and possible sources of funding: The thematic boards will be used in future for LIFE Viva Grass project stakeholders and locals on pilot sites. The funding for the activities is set out in the LIFE Viva Grass budget and is approximately EUR 250 per workshop.

Possible users of the results: non-governmental organisations, Ministry of Agriculture, Ministry of Environmental Protection and Regional Development, Nature Conservation Agency, other LIFE projects

### 2.7.3. Ensuring the overall publicity of the Project

The Project website [grassservice.balticgrasslands.eu](http://grassservice.balticgrasslands.eu) (in Latvian and English) will be maintained for 5 years after the end of the Project, providing a summary information about the Project. The information boards will continue to provide the opportunity to get acquainted with relevant issues on semi-natural grasslands, grassland biomass resources, management and alternative uses to local residents of Sigulda and Ludza municipalities, visitors and tourists. The Layman's Report is planned to be further disseminated among cooperation organisations, representatives of various institutions, representatives of LIFE projects implemented in Latvia and other stakeholders. The results obtained during the Project will enable representatives from the partner organisations of the Project to make oral or poster presentations at various thematic seminars, forums, conferences or meetings.

Time of implementation: 2018 - 2022

Activity implementers: Baltic Environmental Forum, Latvian Fund for Nature, Riga Technical University, Bio RE Ltd., local governments of Sigulda and Ludza municipalities

Costs and possible sources of funding: To disseminate the results of the project, participation in seminars, conferences or meetings will take place in the framework of other projects involving each partner organization, such as LIFE Networking events, the above-mentioned LEADER project activities, etc. During these events, project summary reports will be circulated to interested participants. The maintenance costs of the project website will be EUR 460 within five years period after the end of the project, which will be covered by the Baltic Environmental Forum from the organization's internal resources.

Possible users of the results: residents of Sigulda and Ludza municipalities, tourists, representatives of other LIFE projects, environmental experts, other experts and stakeholders.

## Information on the Project and its implementers

**Project title:** „Alternative use of biomass for maintenance of grassland biodiversity and ecosystem services” (acronym – LIFE GRASSSERVICE)

**Project number:** LIFE12 BIO/LV/001130

**Financial donors:** EU LIFE + Programme and the Administration of Latvian Environmental Protection Fund

**Budget:** 1 095 648 Euro

**Implementation time:** 1 October, 2013 – 31 December, 2017

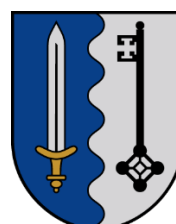
**Project manager:** Anda Ruskule, Baltic Environmental Forum

## Project implementation sites: Sigulda and Ludza municipalities



The Project involved organisations of various profiles:

- **NGO “Baltic Environmental Forum”** ([www.bef.lv](http://www.bef.lv)) led the Project and supervised the restoration activities in Sigulda Municipality;
- The **Latvian Fund for Nature** ([www.ldf.lv](http://www.ldf.lv)) assessed grassland habitats and grass biomass in the Project areas;
- **Bio RE Ltd.** ([www.biore.lv](http://www.biore.lv)) and **Riga Technical University** ([www.rtu.lv](http://www.rtu.lv)) investigated the potential of biofuel production from grass biomass and developed pilot facilities for the demonstration of production;
- **Local governments of Sigulda** ([www.sigulda.lv](http://www.sigulda.lv)) and **Ludza** ([www.ludza.lv](http://www.ludza.lv)) municipalities organised cooperation with local residents; in addition, **Ludza Municipality** also implemented grassland restoration activities in its territory;
- **Farm “Skujas”** planned demonstration of grass pellet production and restoration of grasslands in Sigulda Municipality; however, it withdrew from the Project on 23 November, 2015 due to financial reasons.



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