



TALLINN UNIVERSITY



LIFE15 CCM/DE/000138

LIFE project «Reduction of CO₂ emissions by restoring degraded peatlands in
Northern European Lowland»

LIFE Peat Restore

Socio-economic impact assessment Estonia

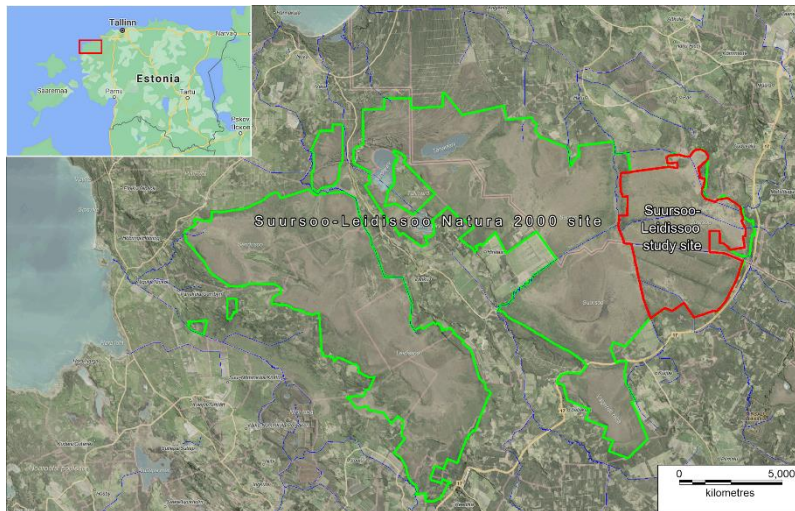
March 2022



1. Suursoo-Leidissoo peatland

1.1. Local socio-economy:

Läänemaa Suursoo and Leidissoo is the mire complex (22,628 ha), parts of which have different nature conservation status (Fig. below) and have different quality of natural status. The *Life Peat Restore* project area makes an eastern part of this mire complex (3,343 ha); namely **Suursoo-Leidissoo project area**. It is limited-conservation area for protecting plants (*Myrica gale*), migratory birds and breeding birds (*Circus pygargus*, *Grus grus*, *Tetrao tetrix*), and Natura 2000 habitats.



*Fig. Mire complex at Läänemaa Suursoo and Leidissoo (with green line), protected in different level – Leidissoo nature protection area, Läänemaa Suursoo landscape protection area, Suursoo-Leidissoo special protection area with a permanent habitat for *Tetrao urogallus*. The eastern part of mire complex (3,343 ha, with red line), is the project site of Life Peat Restore, named Suursoo-Leidissoo peatland). All sites together make the Suursoo-Leidissoo. Source: Map of the Estonian Landboard.*

The Suursoo-Leidissoo project area is Natura 2000 nature- and bird site (EE0040202). Part of the project area makes permanent habitat for *Tetrao urogallus* (Suursoo-Leidissoo hoiuala, 2015). All the area is a state property and managed by State Forest Management Centre.

Socio-economic assessment methods:

In general term, Social Impact Assessment (SIA) includes the processes of analysing, monitoring and managing the intended and unintended social sequences, both positive and negative, of project and any social change processes (Vanclay, 2003).

In current assessment, stakeholders were not questioned personally but their interests on the project site were taken into account by compilers of the assessment.

The stakeholders who are directly interested of project impacts, all connected to the nature conservation, and only one, hunters, are designated to resource use.

1.2. Local stakeholders:



TALLINN UNIVERSITY



- Neighbours – 12 cottages (households) and farms but altogether 21 landowners in the surroundings of the project area,
- Western Region of the Environmental Board, Ministry of Estonia,
- Padise hunting district,
- Lääne-Nigula Parish in Lääne County and Lääne-Harju Parish in Harju County.

1.3. Impacts of the project actions

The project impacts are generally low as the area lies on state land and its use is restricted according to different nature protection rules. The only land user other than those involved to nature conservation is the Padise Hunting Association whose activities are not affected by the project's actions.

Direct interests

The project site is designated for nature conservation. Site is not directly used for any economic purposes besides hunting and does not provide any direct economic benefits besides hunting products. Besides hunting, picking berries and mushrooms is also allowed on the project area. Any other economic activities are prohibited.

As the only landowner on the site is the State, the most stakeholders work for implementation of nature protection goals. Changes related to project implementation (rising water level, termination of afforestation) only support the improvement of the quality of the habitats, especially for rare plant and bird species. Considering that protected areas nearby are rich in rare species, especially rare plants and birds, the improving of site conditions on the Life Peat Restore project area is the prerequisite for increase of species richness on the project area.

From 01.07.2017 the Regulation No. 73 of the Ministry of Environment came into force. It means that Kaldamäe and the Piirsalu River on the project area and Kõrtsi streams on the border of the Project area are as the migratory corridors for the salmon and trout. It requires us to take fish protection into account when adjusting the water level.

The forests bordering the project area in north and east will not have any negative effect by our activities (rising water level) because of considerable surface height differences in most cases. Thus, there are no negative effects on the owners of adjacent lands.

Climate regulation

Estonia has endorsed the EU policy to reduce greenhouse gas emission. Peatlands play a crucial role in the global carbon budget. The main aim of the project *Life Peat Restore* is to improve the regulation of carbon dioxide and methane cycles, in other words, change peatlands that are influenced by drainage and are sources of GHG to the carbon sink ecosystems.

Estonian long-term policy guidelines for shifting to a low-carbon economy, which means gradually transforming the economy and energy system in accordance with the intended purpose and making it more resource-efficient, productive, and environmentally friendly. By 2050, the aim is to reduce greenhouse gas emissions in Estonia by almost 80% compared to 1990 levels.



2. Socio-economy of the project region

2.1. Regional socio-economy

The project area belongs to the municipalities of Lääne-Harju Parish (646 km²) and Lääne-Nigula Parish (1449 km²) of Harju and Lääne Counties. Both municipalities are covered with extensive mires and forests and are scarcely populated – the population density in Lääne-Harju Parish is 19.9 people/km² and that of Lääne-Nigula Parish is 4.9 people/km². This is the most sparsely populated area in Estonia.

Large section is covered by the nature conservation areas. Natura 2000 sites make 213.2 km² (6.1%) in Lääne-Nigula and 87.7 km² in Lääne-Harju Parish (13.6% of the area of the Parish). Forest industry, agriculture, accommodation and tourism services (Rehe tourist cottage) are the main industries in the Lääne-Nigula Parish. Industrial enterprises (Linnamäe meat industry, Taebla betoon) locate in small towns.

Enterprises in Lääne-Harju Parish are related to industrial port locating in Paldiski city – transportation and storage but also wood industry and tourism services like accommodation and catering are functional. Largest companies - Alexela Group, Paldiski Lõunasadam, Paldiski Põhjasadam, Esteve, Kuusakoski are located in Paldiski. Enterprises in the vicinity of the project site, one food industry (MS Wool) and several accommodations (Hotel Pedas, Vihterpalu minor, Puuna Invest, etc.) locate.

3. Estonian national economy

3.1. National socio-economy

Macroeconomic data for Estonia

The macroeconomic data are given after Economic review (2021).

In 2017, jobs by sectors were distributed: Service – 76,8%; Industry – 20,5%; Agriculture – 2.7%. The largest share of industry in Estonia is in the wood industry (19%), the appliance industry (16%) and the food industry (14%).

Employment

Employment has generally been high in Estonia, the unemployment rate decreased permanently from 2012 to 2019. The labor force participation rate was 71.1%, the employment rate was 66.7% and the unemployment rate was 6.2% (data for 2021). Employment rate decreased in 2020 due to the Covid-19 pandemic. The number of employed decreased by 2.2% and unemployment rose to 6.8% (mainly in the tourism and service industries).

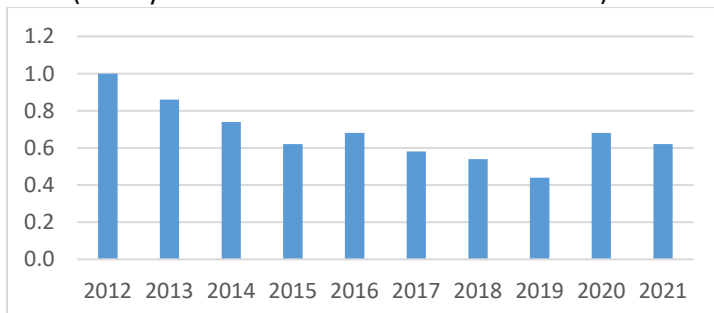


Fig. Unemployment (%) in last ten years in Estonia. 15-74 year-old people counted. Scale in % x 10¹.



3.2. CO₂ emissions from Estonia

In Estonia, the energy sector is by far the largest emitter of greenhouse gases (GHG) in Estonia (<https://envir.ee/kliima/kliima/rahvusvaheline-aruanne#kasvuhooonegaaside-in>). In 2019, the sector accounted for 83.5% of Estonia's total GHG emissions. The most part of it (99.8%) originated from burning of fuels. Transport is the second place (19.5% in energy sector and 16.3% of the total GHG emission).

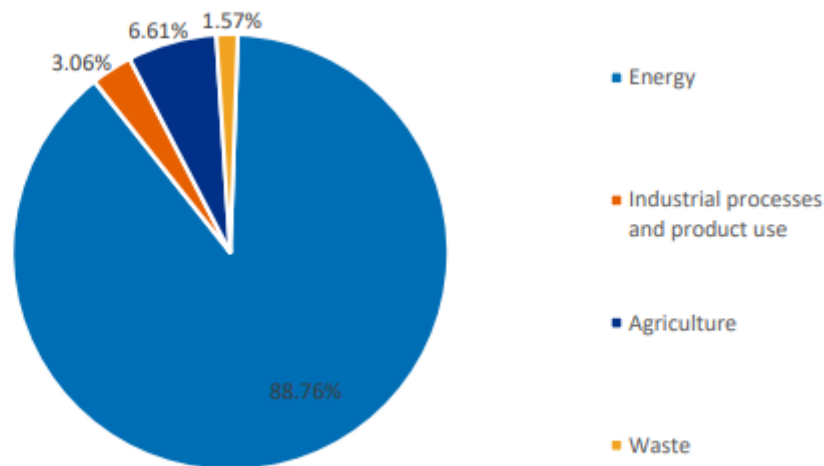


Fig. GHG emission in Estonia by economy sectors in 2017. After Estonian Fourth Biannual Report.

The second largest GHG emitting sector is agriculture, which accounted for 10.2% of the total emissions in 2019. It includes emissions from fertilising of fields and from cattle breeding. LULUCF sector is only sector which is considered to be carbon sequestering. From 1990 to 2017 emissions without LULUCF decreased by 48.36%. This decrease was mainly caused by the transition from a planned economy to a market economy and the successful implementation of the necessary reforms.

The LULUCF sector budget consists mainly on the share of mature forests, management practices in forestry and agriculture, the use of peat soils and horticultural peat, and the sequestration of carbon in wood products. In 2017, the LULUCF sector was counted as a CO₂ sink, with a total uptake of 1,792.74 kt MT CO₂ eq. Uptake of CO₂ has increased by 20.36% compared to the base year (1990), see Fig. Estonia's fourth biennial report Under the United Nations Framework Convention on Climate Change. 2019 (Rahvusvaheline aruanne. Keskkonnaministeerium).

Total emissions of the greenhouse gases in Estonia (without LULUCF) decreased steadily from 40,431.5 kilotons CO₂-eq. in 1990 to 20,879.9 kilotons CO₂-eq. in 2017 (Fig). From 1990 to 2017 emissions without LULUCF decreased by 48.36%. This decrease was mainly caused by the transition from a planned economy to a market economy and the successful implementation of the necessary reforms. Estonia has made significant progress in improving its environmental performance by decoupling economic growth from the primary environmental pressures 1 Annex I to UNFCCC decision 2/CP.17. 8 (Figure 2.2). The final energy intensity has decreased, due in part to energy efficiency measures put in place pursuant to the EU Directive on Energy End-Use Efficiency and Energy Services 2. Also, the share of renewable energy in final consumption in Estonia has been increasing continuously since 2006. In



2006, the share was 16.1%³, in 2010, it was 24.6%, and in 2017, it was as high as 29.2% (Estonia's fourth biennial report – UNFCCC. 2019).

The energy sector is by far the largest emitter of GHG emissions in Estonia. In 2017, the sector accounted for 88.76% of Estonia's total GHG emissions (Figure). The second largest sector is agriculture, which accounted for 6.61% of total emissions in 2017. Emissions from the industrial processes and product use as well as waste sectors made smaller part of total emissions. The LULUCF sector, acting as the only possible sink of GHG emissions in Estonia, plays an important role in the national carbon cycle. In 2017, the LULUCF sector acted as a CO₂ sink, with a total uptake of 1,792.74 Kt CO₂ eq. Uptake of CO₂ has increased by 20.36% compared to the base year (1990). Estonia's fourth biennial report Under the United Nations Framework Convention on Climate Change. 2019. Ministry of Environment, Republic of Estonia.

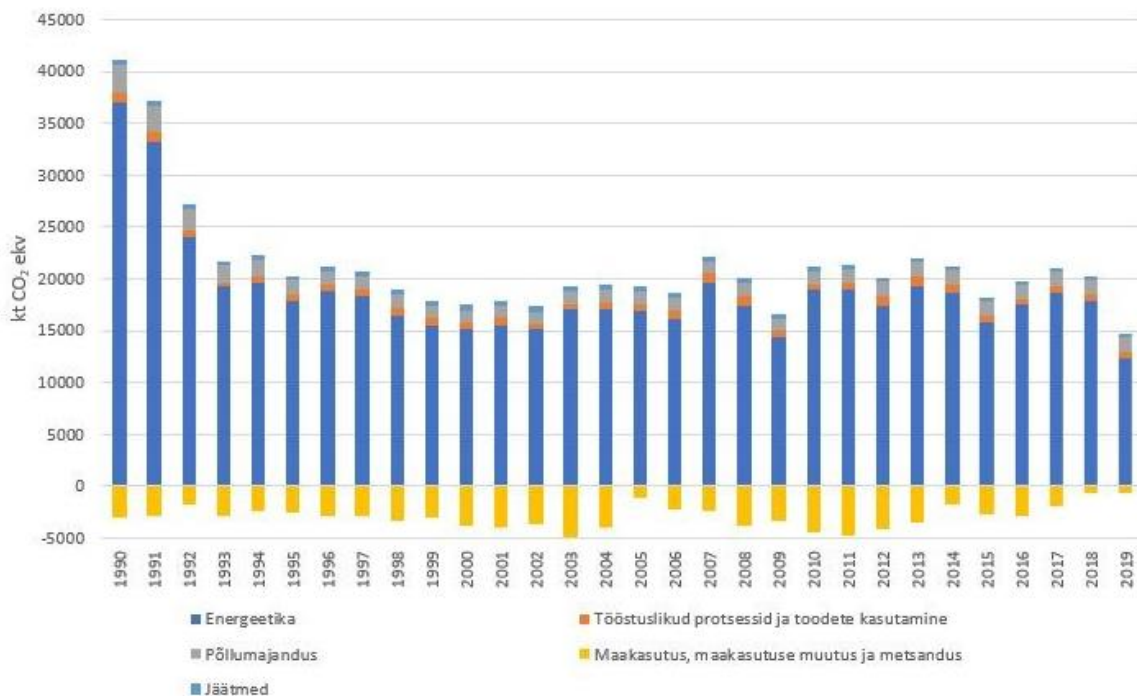


Fig. GHG emissions of industry sectors in Estonia in 1990-2019. After 'Estonia's fourth biennial report – UNFCCC (2019).

According to state climate reporting (Estonia's fourth biennial report – UNFCCC. 2019) was over 40 Mtons. The total emission has been decreasing from 1990, mainly due to improved technologies in energy sector. Emission in 2019 was 14.7 Mtons CO₂-ekv. energy sector in the Estonian economy.

Estonia's total emissions in 2019 were about 14.7 Mtons CO₂-eq. without LULUCF. The largest share is accounted for by the energy sector: energy sector 18,532.35, industry and manufacturing 639.53, agriculture without LULUCF 1379.3, waste sector 328.7 Kt CO₂-eq.



TALLINN UNIVERSITY

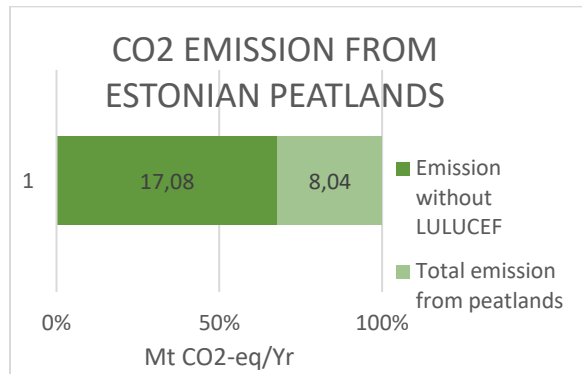


Fig. Total emissions without LULUCEF and Total emissions from peatlands in Estonia (Mt CO₂/Year). 1.5 Mt from bogs, 1.2 Mt from transitional mires (Joosten 2009).

3.3. National stakeholders

Environmental Board of Estonia,
Estonian State Forest Management Centre,
Estonian Agricultural Board,
Ministry of Environment of Estonia,
Estonian Investment Centre,
Environment Agency of Estonia.

Long fieldwork period during project implementation supports local accommodation providers in the Lääne County and the western part of the Harju County. For example, some 200 person-nights during 2017 to 2021 were paid for accommodation.

3.4. Impacts of project actions

LIFE Peat Restore Estonian team reached local, national as well International public, scientific and political audiences through various communication activities:

- During the implementation of the project, we significantly supported local employment. The project team spent a lot of time in local accommodation establishments (Rehe, Kallaste, Puuna, etc.) in period 2017 - 2021 - more than 200 nights and used locally produced food. Company Timberston Ehitus OÜ, which provided hydrological restoration, used on-site services. For nine months (July 2020 - March 2021), up to ten people stayed and ate at the on-site accommodations at one time.
- Through temporary employment contracts, we supported specialists in several disciplines (ornithologists, bryologist, language specialist, hydrologist) who produced professional data for our project.
- Disseminated notices on the websites of the municipalities, organised technical design disclosure meeting and had direct communication and coordination with local stakeholders and landowners about project solutions. We had coordination meetings about project actions and influence on nature values of the area with local authorities.



TALLINN UNIVERSITY



- Dissemination information materials - booklets 'Kümme põhjust taastada Eesti sood', 'Ten reasons to restore mires in Estonia', 'Sood kliima võtmes', 'Turba koht on soos'. We took an active part in the compilation of the best practice books of the project (Pakalne et al. 2021 and Jarašius et al. 2022). In these books, we show the variety of monitoring methods and restoration methods we have applied to different types of peatlands.
- With others project partners, we participated in the preparation of the photo exhibition. We disseminated the exhibition in different sites in Estonia. Distribution of the exhibition was hampered by Covid-19 pandemic but we found new places to exhibit it and finally we got more than 30.000 visitors to the exhibition. Additionally, we distributed the exhibition virtually because of non-fulfillment of real distribution plans. We introduced the project goals in local journals and newspapers & in *Peat Anthology* of international youth organisation *Re-Peat*. We also participated in the creation of the two project films.
- Publication papers in scientific magazines, participation in the production of books
- Organization of International Wetlands Day Conferences (in 2018 and 2020).
- Presenting scientific information international high-level conferences – Nature-Based Solutions in 2017 at Tallinn; 11th SERE Conference at Reykjavik in 2018; 12th SERE Conference (virtual) in 2021; 16th International Peatland Congress in 2021 (IPC2021), *Life Peat Restore's* Final Conference (online) and on many conferences and seminars with smaller audiences locally and internationally as well as at local conferences and different seminars. Altogether, there were 30 conferences and seminars where we actively participated. We participated in several political events such as the round-table discussion in Berlin in the Embassy of Estonia (15.01.2020). Project publication '*Ten reasons to restore Estonian Mires*' is available in COP26 Virtual Peatland Pavilion, Dome 3: <https://storage.net-fs.com/hosting/6147066/7/>.
- Estonian team of *Life Peat Restore* provided four year lasting GHG measurements (three years before and one year after water level regulation actions) in five peatland vegetation types at the project site which data and analysis presented in book Jarašius et al. (2022); see also reports in: <https://drive.google.com/drive/folders/1SByl0bKMru6IOOdIpzH10E1XocoVT9Iw>, making a significant contribution to the knowledge about to the greenhouse gas balance of peatlands.
- Water level studies and their analysis revealed important information on the relationship between peatland biota and water levels, especially the impact of the summer drought in the boreal climate zone (reports in: <https://drive.google.com/drive/folders/1lEtO2M-m71aORT1eRgy9VF1AdjRlx6pL?usp=sharing>).
- By rewetting, we improved ecosystems status on 3343 ha of drained peatland, restored habitats for valuable peatland birds and plant species.
- By rewetting, we created possibility for peatland ecosystems to restore the important peatland function – carbon sequestration. According to theoretical calculations we increased.

Reduction of GHG emission

The project area is drained peatland with remarkable large GHG emission. Measurements of GHG over three years in five different types of drained peatland are reliable to show the effect of drainage on GHG emissions in these types. Calculations show that potential GWP reduction



TALLINN UNIVERSITY



by rising water level in the Suursoo-Leidissoo restoration area is 5636.0 tons CO₂-eq/yr (Jarašius et al. 2022).

Protection of rare species and habitats

The Suursoo-Leidissoo project area is dedicated to protection of the rare plant and bird species and valuable peatland habitats. Before rewetting implementation the number of rare species was remarkable but most of them with very little abundance. By raising the water level and reducing its fluctuation, we improve peatland habitats and also improve the condition of many rare peatland species, both plants and birds.

Tourism

In the conservation management plan for whole mire complex (Suursoo- Leidissoo hoivuala ... 2016-2025) the walking paths, camping places, etc. are planned to be built in the neighbouring areas of the mire complex Läänemaa Suursoo and nothing is planned to be built in the project area. The project area is not dedicated for touristic arrangements, now specific tracks are not planned to construct as the accessibility to the site is too complicated. The popularization of the Suursoo project area and the restoration works there in connection with the project has made the area more attractive for nature tourism. Visits to the Suursoo site are already increased and will increase in the future as tourism recovers from Covid-19.

Literature cited:

Economic review, 2020. 2021. Ministry of Economic Affairs and Communication, Ministry of Finance. https://mkm.ee/sites/default/files/majandusulevaade_2020.pdf

Estonia's fourth biennial report – UNFCCC. 2019. https://unfccc.int/sites/default/files/resource/BRIV_EE_2019.pdf

Jarašius L., Etzold, J., Truus, L., Purre, A.-H., Sendžikaitė J., Strazdiņa, L., Zableckis, N., Pakalne, M., Bociąg, K., Ilomets, M., Herrmann, A., Kirschey, T., Pajula, R., Pawlaczyk, P., Chlost, I., Cieśliński, R., Gos, K., Libauers, K., Sinkevičius, Ž., Jurema, L. Handbook for assessment of greenhouse gas emissions from peatlands. Applications of direct and indirect methods by LIFE Peat Restore. Lithuanian Fund for Nature, Nature and Biodiversity Conservation Union, Vilnius, 193 p.

Joosten, H. 2009. The global peatland CO₂ picture. Peatland status and emissions in all countries of the world. Wetlands International, Ede.

Kümme põhjust taastada Eesti sood <http://www.tlu.ee/public/sood/mobile/index.html>

Pakalne M., Etzold J., Ilomets M., Jarašius L., Pawlaczyk P., Bociąg K., Chlost I., Cieśliński R., Gos K., Libauers K., Pajula R., Purre A.-H., Sendžikaitė J., Strazdiņa L., Truus L., Zableckis N., Jurema L., Kirschey T., 2021. Best Practice Book for Peatland Restoration and Climate Change Mitigation. Experiences from LIFE Peat Restore Project. University of Latvia, Riga, 184 p. https://www.mediafire.com/file/ndlbg2jsy5sbkl0/22.11.21_WEB_SMALL_Peatland_restoration.pdf/file

Suursoo-Leidissoo hoivuala, Leidissoo looduskaitseala, Läänemaa Suursoo maastikukaitseala, Kiritse must-toonekure püsielupaikade ja Suursoo Metsise püsielupaiga kaitsekorralduskava



TALLINN UNIVERSITY



2016-2025. 2015. Estonian Environmental Agency.

<https://infoleht.keskkonnainfo.ee/GetFile.aspx?fail=-1783083990>

Ten reasons to restore mires in Estonia Sood kliima võtmes <https://life-peat-restore.eu/ee/wp-content/uploads/sites/8/2018/02/sood-kliima-votmes.pdf>

Turba koht on soos <https://life-peat-restore.eu/ee/wp-content/uploads/sites/8/2018/05/turba-koht-on-soos-2.pdf>

Vanclay F. 2003. International principles for social impact assessment. Impact Assessment and project Appraisal, 21:1, 5-12.



| ESTONIA | | | | | | | | | |
|---|-----------------------|--|-------------------|----------------------|----------------|-------------------------------|---------------------------------|-----------------------|-----------------------------|
| | INDICATORS | | | | | | | | |
| | DIRECT | | | | | INDIRECT | | | |
| Units | Economic contribution | Ecosystem regulating services (GHG emissions, water quality, biodiversity) | Awareness raising | Scientific knowledge | Social capital | Ecosystem supporting services | Ecosystem provisioning services | Fire/flood prevention | Ecosystem cultural services |
| Stakeholder and Duty holder involvement | | | 20 | | 20 | | | | |
| Information boards/panels | 2 | | 2 | 2 | 2 | | | | |
| Employment (Individuals/companies hired by the project) | 21 | | | | | | | | |
| Amount spent (€) ¹ | 450,820.96 | | | | | | | | |
| Number of jobs (FTE and PTE) | 7 | | | | | | | | |
| Number of events and conferences organised / participated | | | 27 | 27 | 27 | | | | |
| Number of participants in Events / Conferences | | | 4,480 | 4,480 | 4,480 | | | | |

¹ The sum of costs from external assistance, consumables, travels, other costs.



| | | | | | | | | | |
|---|--|-------|-------|-------|-------|-------|---|-------|---|
| Number of hectares restored | | 3,343 | | | | 3,343 | 0 | 3,343 | 0 |
| GWP reduction² (tons of GWP CO ₂ -eq/yr) | | 5,636 | | | | | | | |
| Website downloads³ (to Website in Estonian) 01/06/2017-28/02/2022 | | | 160 | 160 | 160 | | | | |
| Website visits⁴ (to Website in Estonian) 01/06/2017-28/02/2022 | | | 4,681 | 4,681 | 4,681 | | | | |
| Number of Print media | | | 9 | 9 | 9 | | | | |
| Number of Publications/Reports, promotional material produced | | | 25 | 25 | 25 | | | | |

² Reduction by tons CO₂-eq/ha/yr.

³ Due to the recent EU Data Protection Law (GDPR), which allows visitors the option to block statistical tracking of the website traffic; it is assumed the figures may be higher.

⁴ Due to the recent EU Data Protection Law (GDPR), which allows visitors the option to block statistical tracking of the website traffic; it is assumed the figures may be higher.