EU LIFE Programme project
"Demonstration of climate change mitigation potential
of nutrients rich organic soils in Baltic States and Finland"

REPORT

ON IMPLEMENTATION OF THE PROJECT

DEMONSTRATION OF CLIMATE CHANGE MITIGATION MEASURES IN NUTRIENTS RICH DRAINED ORGANIC SOILS IN BALTIC STATES AND FINLAND

WORK PACKAGE

DEVELOPMENT OF PROJECT FRAMEWORK (A.1)

ACTIONS

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SUMMARY

The deliverable Project work plan including monitoring guidelines consists of two sections: in first part project work plan has been described and in second part monitoring guidelines has been described.

Project work plan provides insight into the planned work process to successfully implement project and to avoid any risks and possible mistakes. Within the project work plan project activities, responsibilities and time table has been given.

Within the second part of the deliverable, monitoring guidelines for all project monitoring actions has been given:

- Monitoring of the implementation of project activities (D1);
- Socio-economic monitoring (D2);
- Monitoring and measuring the LIFE key performance indicators (D3).

To plan monitoring actions that could measure the successes of project implementation monitoring methods for each monitoring action has been described and indicators and criteria has been set.

To monitor successes of implemented project activities (Action D1):

1. GHG fluxes will be monitored;
2. carbon fluxes mediated by vegetation will analysed;
3. current carbon stock in litter and dead wood will be analysed;
4. soil microbial communities will be analysed;
5. soil screening with infrared spectroscopy will be carried out;
6. soil and water samples will be analysed.

To monitor socio-economic impact of the project activities (Action D2) detailed analysis of demo sites will be carried out. Several criteria have been identified to analyse direct Project socio-economic impacts: income of different land management type; costs of territory establishment; maintenance costs; employment indicators; effects of the Project outcomes in policy planning; stakeholder and society involvement.

To monitor and measure the LIFE key performance indicators (D3) indicators has been set in the project proposals and they are: reduction of GHG; areas of reforested land under sustainable management; Areas of agricultural land under sustainable management; jobs created; organisations/institutions to be involved in the further implementation of the Project results; number of entities/individuals reached/ made aware; number of website visits; number of entities/individuals changing behaviour; raising awareness of the general public.

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1. PROJECT WORK PLAN

1.1 Introduction

Project "Demonstration of climate change mitigation potential of nutrient rich organic soils in Baltic States and Finland" (LIFE OrgBalt, LIFE18 CCM/LV/001158) (hereinafter - Project) is LIFE Climate Action sub-programme Project under Climate Change Mitigation priority area and it has been launched in Baltic States, Finland and Germany.

The aim of the Project is implementation of innovative Climate Change Mitigation (CCM) measures in nutrient-rich organic soils in Temperate Cool & Moist (TCM) climate region to contribute to the United Nations Framework Convention of Climate Change (UNFCCC) Paris agreement, EU policies (e.g. Regulation (EU) 2018/841, LULUCF regulation) and national climate policy targets in post-2020 period by reduction of greenhouse gas (GHG) emissions from croplands, grasslands and forest lands on nutrient-rich organic soils.

The project is implemented by eight partners from five EU Member States - Latvia, Lithuania, Estonia, Finland and Germany. The Leading partner Latvian State Forest Research Institute "Silava" implements the Project in cooperation with the Ministry of Agriculture of the Republic of Latvia, Latvia University of Life Sciences and Technologies, University of Tartu (Estonia), Natural Resources Institute Finland LUKE, Lithuanian Research Centre for Agriculture and Forestry, Michael Succow Foundation (Germany) and Association "Baltic Coasts" (Latvia).

Figure 1: Organigramme with project involved partners – their tasks and responsibilities.

The Project unites public administration institutions, scientific and non-governmental organisations and each partner has its own role in the Project.

As it can be seen in Figure 1, the Leading partner – Latvian State Forest Research Institute "Silava" (hereinafter – Silava) – is responsible for the Project management activities (Action F1); Development of the Project framework (Action A1) and Monitoring and measuring the LIFE key performance indicators (Action D3). Ministry of Agriculture of the Republic of Latvia (MA) is responsible for Action C4 – Strategic and action plans. Latvian University of Life Sciences and Technologies (LLU) is responsible for development of Replicability tools (Action C5). Lithuanian Research Centre of Agriculture (LRCAF) is responsible for the implementation of Action C2 – Tools for modelling of impact of climate change on GHG emissions. University of Tartu (UT) is responsible for Monitoring of the implementation of project activities (Action D1). Michael Succow Foundation (MSF) is responsible for Action C3 – Implementation of climate change mitigation measures in selected demo sites. Natural Resources Institute Finland (LUKE) is responsible for two Actions – Action C1 Filling knowledge gaps on GHG emissions from organic soils and Action E3 – Networking. Association “Baltic Coasts” (BaltCoasts) is responsible for implementation of Actions A2 – Elaboration of the Project communication platform, D2 – Monitoring of the socio-economic impact of the Project actions, E1 – Information and dissemination and E2 – Dissemination and training events.

Although each partner has its own responsibility in the Project, all Project partners are involved in and closely cooperates within all Actions to achieve aim of the Project.

To provide quick and close cooperation, the primary communication channels are e-mail and telecommunication. According to the Project proposal, several face-to-face meetings will be held, as well as online meetings.

The Project has been launched on 1st of August 2019 and the expected end date is 31st August 2023.

1.2 Activities and Project deliverables

According to the LIFE programme specifics all Project Actions are divided into five blocks (Figure 2). First block is Preparatory Actions, designed to identify all stakeholders, to develop a communication plan, a work plan and a monitoring plan. The second block is Implementation Actions – by implementing the provisioned activities within, the Project aim will be achieved.

To analyse successes of the Project and prevent any unexpected risks, monitoring of the impact of Project Actions will be carried out. Within this (third) block three Monitoring Actions will be performed – D1 – Monitoring of the impact of the implementation of Project activities, D2 – Monitoring of socio-economic impact of the Project Actions and D3 Monitoring and measuring the LIFE key performance indicators.

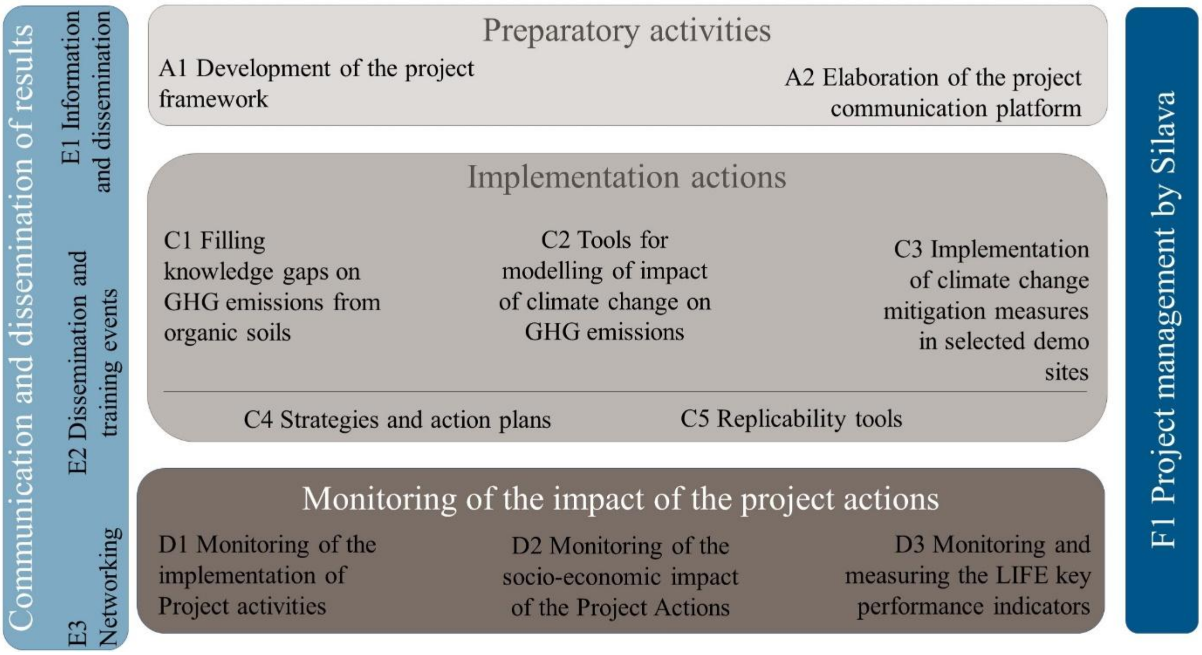

Figure 2: Organigramme of actions and their relations.

The fourth block of activities is designated to communication and dissemination of the Project results. These Actions will be organised during all Project period not only to disseminate the results, but also to inform society and stakeholders about the progress of the Project and activities carried out therein.

The last block is Project Management – this Action will allow a successful implementation of the Project by steering the overall course of the Project, organising meetings, communication with Project partners and EC, as well as the preparation of the progress and other relevant reports.

1.3 Project timetable

All Project activities, tasks, responsibilities of the partners, deliverables and milestones are reflected in Annex 1 – Project work Plan and Annex 1 – Deadline of Project deliverables and milestones.

According to LIFE programme application guidelines all Preparatory Actions have to produce practical recommendations and/or information that can be implemented (either during the or after the Project) and be used without requiring further preparatory work. Preparatory Actions should primarily remain restricted to the preparation of the actual implementation phase of the Project (technical planning, permit procedures, stakeholder consultations, etc.). The Preparatory Actions cover all that has to be completed in order to allow to start the actual implementation of other Project Actions. Within the Project two Preparatory Actions are defined: A1 – Development of the Project framework and A2 – Elaboration of the Project communication platform.

Implementation Actions are the core actions of the proposal. The output of all Implementation Actions has to be concrete, measurable and with a clear benefit for the climate actions concerned. Within the Project five implementation actions are defined: C1 – Filling knowledge gaps on GHG emissions from organic soils; C2 – Tools for modelling of impact of climate change on GHG emissions; C3 – Implementation of climate change mitigation measures in selected demo sites; C4 – Strategies and action plans; C5 – Replicability tools.

Monitoring Actions will give clear report on the outputs and impact of the Project. According to the LIFE programme application guidelines an assessment of LIFE key performance indicators is obligatory and the socio-economic impact of the Project actions on the local economy and population is also obligatory. Within the Project three monitoring actions are defined: D1 – Monitoring of the implementation of Project Actions; D2 – Monitoring of the socio-economic impact of the Project Actions; D3 – Monitoring and measuring of the LIFE key performance indicators.

Dissemination and management actions. According to LIFE programme application guidelines LIFE Climate Action projects must include a significant set of activities to disseminate the results of the project. Within the Project three communication and dissemination actions are set: E1 – Information and dissemination; E2 – Dissemination and training events; E3 – Networking.

Project management will be provided by one activity: F1 – Project management by Silava.

1.4 Quality assurance and quality control

The purpose of the quality assurance system is to ensure effective Project implementation and monitoring, resource protection, control system design and maintenance, and to ensure timely and effective information exchange between Project partners and stakeholders.

The tasks of the quality assurance system are to ensure:

- accurate and timely execution of Project activities;
- effective and efficient operation of the parties involved in Project implementation;
- compliance of the Project work quality and documents with the planned;
- the accuracy of the submitted documentation and compliance with the Project and regulatory requirements;
- obtaining, compiling and circulating objective information for evaluation of Project implementation;
- transparency of Project implementation processes.

Within the Project implementation all necessary quality control procedures will be respected. Procedures of quality control are based on as minimum the following principles:

- observing the respective deadlines and deliverables;

- review of developed materials;
- use of tested methodologies and work tools;
- work in accordance with Grant Agreement rules;
- check and test of the results;
- assurance of the preventive assessment of work process and risks.;
- assurance of detailed documentation check;
- assurance of environmental protection requirements;
- establishment of close collaboration with stakeholders and demo site landowners.

Quality Assurance is a continuous process that includes careful monitoring and accounting of all construction activities, including:

- preparation of a work plan;
- selection of materials and territories according to the approved Project;
- proper use and maintenance of technical equipment.

1.5 Assessment of potential risks and actions to prevent the risks

Implementation of the Project can be affected by several risks, which are described in Table 1.

Table 1: Identified risk and proposed preventive measures.

No.	Risks	Possible solutions to the identified risks
1.	Prolongation of the Project due to unforeseen circumstances	In this case, the necessary actions will be taken in close cooperation with all parties involved to ensure timely completion of the activities, thus contributing to the Project timeline. At this time, we assume that all activities will be completed according to the schedule. If a risk of prolongation of separate activities or overall Project will be identified, communication with the external supervisor on necessary actions will be organised immediately.
2.	Performing poor quality work that delays completion of the activities	Preventive actions will be provided to ensure that the work is accomplished in high quality. In order to achieve the aims, there will be meetings organised (if necessary) to improve the delivery of the particular activities as well as to ensure that the deliverables are in compliance with the Project proposal.
3.	Poor preparation, which prevents that activities will be completed in expected time	To avoid any risks of poor preparation for planned activities, highly qualified experts are involved in the implementation of the Project. Within the Project preparation phase, it is assumed that researches and literature will be studied to eliminate any risk of lack of knowledge and to successfully prepare for all planned activities.
4.	Unexpected costs or price increases may adversely affect the Project budget	The Project budget has been planned according to the current economic situation and it is expected that no changes of the costs will occur within the course and timeline of the Project, therefore the risk identified is considered to be low. However, despite the low probability of risk, each partner will keep track its own budget and will submit progress report to the lead partner quarterly, in order to gather information about the overall

No.	Risks	Possible solutions to the identified risks
		Project financial flow. Would such a situation occur that financial changes to the Project are required, those will be made in accordance with the Project Grant Agreement
5.	Collaboration with landowners could be threatened, necessitating changes of demo sites	To minimise the risk, demo site landowners will be carefully selected. If insurmountable disagreement with landowners will occur, requiring to change demo sites, immediate solutions will be sought. By changing the demo site all requirements related to the research objectives will be taken into account.
6.	Force majeure or other exceptional circumstances may affect Project implementation	We assume that no extraordinary circumstances are expected during the implementation of the Project. If any such obstacles will occur, we shall immediately connect with the external monitor or EC about solutions to continue Project implementation as initially planned.

The Leading partner in close cooperation with all Project partners will take all necessary measures to prevent or reduce all risks to ensure successful implementation of the Project. Potential risks and assumptions were also taken into account within the Project proposal development. The Project will carry out risk management procedures aimed to identify potential risks that could affect Project implementation and achievement of objectives, as well as to identify appropriate countermeasures.

Risk management applies to all activities carried out during the Project.

2. MONITORING GUIDELINES

The monitoring activities are significant to timely identify threats or problems that could impact the Project implementation and to look for solutions and opportunities. Monitoring results will be used to demonstrate the importance and value of innovative Climate Change Mitigation measures. Monitoring will provide necessary information to the general public, stakeholders groups and decision-makers, to support necessary improvements to National LULUCF action plans.

Socioeconomic information will be used to guide the incorporation of stakeholder group participation, concerns and interests into successful Climate Change Mitigation process. It can also be used to plan and direct education and awareness activities.

In order to successfully implement the Project and to monitor the implementation of the activities and the achievement of the set objectives, 3 types of Monitoring Actions will be implemented:

1. Monitoring of the implementation of Project Actions;
2. Monitoring of the socio-economic impact of the Project Actions;
3. Monitoring and measuring of the LIFE key performance indicators.

Each Monitoring Action has its own goal and tasks. The aim of monitoring of implementation activities is to evaluate impact of implemented measures on GHG emissions in demo sites and to compare identified impacts against the target indicators. The aim of socio-economic monitoring of the Project actions is to analyse the impact of Project Actions' on the socio-economic processes to assess the successes of the overall Project implementation. The aim of monitoring and measuring of the LIFE key performance indicators is to analyse Project progress against the initially set indicators.

2.1 Monitoring of the implementation of project activities (D1)

The scope of the monitoring of implementation of project activities is evaluation of impact of implemented measures on GHG emissions in demo sites to be established in the Action C3, and to compare identified impacts against the target indicators set out in the monitoring guidelines. Each Action will be monitored against the set indicators end objectives of the actions considering the identified risks and assumptions that may be of influence to the results.

One of the main tasks of the LIFE OrgBalt is improvement of methodologies for accounting (Action C1) and projections (Actions C2 and C5) of GHG emissions from grassland, cropland, forest land and managed wetlands, thus contributing to the National GHG inventory systems and implementation of the national and global CCM targets. The main indicators of the success of Actions C1, C2 and C5 will be that key sources of GHG emissions and CO_2 removals on organic soils, as well as impact of CCM measures implemented in managed cropland, grassland and forest land on organic soil is reported according to tier 2 or tier 3 methodology as requested by the IPCC guidelines.

The reduction of GHG emissions in demo sites will be monitored using GHG measurement methodologies applied in Task C1, including supplementary data on biomass production, weather conditions, soil and water properties. Long-term impact will be modelled using the scenario analysis tool elaborated within the scope of Action C2 and C5. Monitoring data will be used to update the scenario analysis tool for short-term actions like changes in crop rotation, application of wood ash.

The monitoring action D1 consists of 2 Tasks:

- Task 1: Monitoring of GHG emissions in the demo sites;
- Task 2: Validation of the CCM measures and reporting of monitoring results.

Task 1: Monitoring of GHG emissions in the demo sites is one of the key activities in the Project aimed at verification of impact of the implemented measures. Within the scope of this action GHG emissions from demo sites will be monitored for 24 months following to the methodology adopted in Action C1. Where necessary GHG measurements will be implemented in demo and control plots characterising “business as usual” conditions. The same institutions will implement gas, water, soil and biomass sampling and analyses and field teams employed in Action C1. Internal resources will be employed for gas, soil, water and biomass analyses.

The Action has bidirectional connection with Actions C1 and C2. Results of C1 and C2 (EFs, assessment of the climate change effect) will be used to elaborate long-term impact projections, and monitoring results obtained in Action D1 will be used to validate data obtained in the reference sites. The full list of sites is comprised in a Table C5.1 and attached Annex D5.1 in the Attachments Section of this Proposal.

Task 2: Validation of the CCM measures and reporting of monitoring results is aimed on elaboration of GHG emission reduction estimates in the demo sites, monitoring of project implementation and elaboration of reporting documentation. Short-term effect of the applied measures will be evaluated using results of Task D.1.1; long-term effect of the measures will be projected using results of Action C1 and C2 implemented in the scenario analysis model, which will be elaborated within the scope of Action C5.

The benefits, results and effectiveness of the LIFE OrgBalt Project Actions are measurable and should be evaluated and documented under the Monitoring Actions, as comparison to the initial situation, objectives and expected results. Specific indicators (measurements of CO_2, CH_4 and N_2O fluxes or emissions, Tier 2 level methodology for emission from relevant sources calculation under National GHG reporting, content of national reports related to international environment policy agreements) to detect impact of the Project activities at local (demonstration site level) and national level are selected and regular monitoring is foreseen.

Methodologies which will be applied to evaluate project results are described in further chapters. Due to the rapid development in this field the methodologies may be updated according to the best practices.

2.1.1 GHG flux monitoring methods

GHG fluxes will be monitored by two common closed chamber methods. ‘Method-1’ includes on-site gas sampling using opaque and transparent closed static chambers (e.g., Hutchinson & Livingston, 1993; Ojanen et al., 2010). Collars (Ø 50 cm) in 5 replicates will be pre-installed to soil to form permanent bases for chambers. Vegetation within the collar enclosed soil surfaces is not disturbed. Collars in cropland- and grassland sites will be temporarily removed during field management operations. In grasslands and croplands transparent closed dynamic chamber on these collars will be used to assess net ecosystem exchange (the same chambers are used for infra-red gas analyser, see 'Method-2'). During 40-60 minutes (depending on the volume of the chambers) long deployment period, four air samples will be drawn from the cylindrical chamber headspace into pre-evacuated glass bottles. CH_4 and N_2O concentration will be analysed in the lab using gas chromatography for subsequent analysis of soil net gas exchange determination for these gases.

'Method-2' will be used for in-situ CO_2 flux monitoring by using closed dynamic chambers (Järveoja et al., 2016; Ojanen et al., 2012). Concentration change and flux will be determined using infra-red gas analyser (IRGA). On each site, 15-25 permanent flux monitoring spots will be established for heterotrophic soil CO_2 emissions monitoring. To prevent autotrophic root respiration contributions into CO_2 fluxes, flux monitoring enclosed surfaces will be trenched and root-ingrowth preventing cloth will be installed beforehand (belowground litter deposition and carbon loss as CO_2 will be determined separately). All monitoring surfaces will be kept free from litter during monitoring (litter deposition and emissions from litter decomposition will be determined separately, see chapter 'DDE field'). Soil respiration chamber will be set gas-tightly on the soil surface and during each flux measurement, CO_2 concentration and temperature inside the chamber will be recorded over a deployment period up to 3 min using 'method-2'. Higher number of spots reserved for CO_2 monitoring is based on high importance of this particular greenhouse gas from organic soils (IPCC 2014). This approach yields to sufficient amount of observed data of CO_2 emissions, keeping in mind that several different processes both spatially and temporarily are contributing to the emission (Hiraishi et al., 2013), and monitoring by IRGA allows relatively fast CO_2 flux data collection.

Fluxes of CO_2, CH_4 and N_2O will be calculated from change in gas concentration in the chamber headspace over time, adjusted by the ground area enclosed by the collar, volume of chamber headspace, air density and molar mass of gas at measured chamber. Flux monitoring at each site will be continued on monthly basis for 24 months.

As the final outcome, gaseous flux monitoring data will provide directly soil net balance for CH_4 and N_2O fluxes over monitoring period. For estimating soil net CO_2 flux at all monitoring sites, heterotrophic CO_2 fluxes estimated by the 'method-2' will be combined with relevant biomass-based C-flux flows for providing complete soil net CO_2 flux. In addition, soil net CO_2 balance in non-forested sites will be estimated from modelled net ecosystem CO_2 exchange based on in-situ collected data.

2.1.2 Biomass-related measurements quantifying annual production

Carbon fluxes mediated by vegetation will be estimated by measurements of plant biomass and production (Ojanen et al., 2013; Uri et al., 2017). Tree stand above-ground and below-ground biomass (coarse root) estimation will be based on measuring the tree stand diameter distribution (breast height diameter) of all trees on the sample plot, and further parameters (e.g. tree height and length of the live crown) for sample trees.

Sample tree data forms complementary set of variables for all trees. Biomass of different stand components (stems, branches, foliage, stump and coarse root systems) will be estimated with allometric functions that use breast height diameter, either alone or together with the complementary variables, as explanatory variables. Such functions are available for all our common forest tree species (e.g., Liepiņš et al., 2017; Zianis et al., 2005). Biomass production estimation will be based on annual diameter growth of measured sample trees. The growth data will be used to construct diameter distributions, and the complementary set of variables, for the stand in consecutive years. The allometric functions will be fitted into these data sets, and the annual biomass production will be estimated as the difference between biomass values of consecutive years. Values will be transformed per square meter using sample plot area.

The above-ground biomass of the ground vegetation will be measured by harvesting, drying and weighing the above-ground vegetation of small plots at the time of peak biomass in late summer. The samples will be separated into plant functional types (shrubs, graminoids, forbs, mosses, as applicable). For deciduous shrubs, the biomass will be separated into leaves and stems. For all shrubs, current-year shoots will be separated. Shrub stem radial growth will be estimated using literature data for plots with substantial shrub layer. Otherwise, deciduous leaves and current-year shoots will be considered as annual biomass production. For herbaceous plants, total biomass will be considered as annual above-ground production. Values will be transformed per square meter using sample plot area.

Fine root biomass (<2mm) will be estimated from volume-exact soil cores, analysed down to the rooting zone lower limit in 10-cm sections. End of live-root occurrence will be confirmed from the samples. Roots will be separated from soil by hand, washed free of soil, dried and weighed, and soil bulk density will be used to generalize root mass per sample volume to values per square meter. Fine-root production will be estimated by the ingrowth-core method modified for peat soils (Bhuiyan et al., 2017; Laiho et al., 2014), or the root mesh method (Uri et al., 2017) for annual plants. In the ingrowth-core method, mesh cores filled with peat free of live roots will be installed into the sites in late autumn, incubated for one (sites with annual crop plants) or two years (sites with perennial plants), harvested, and separated into ingrown roots and peat. The amount of ingrown roots represents fine-root production over the incubation period, which will be generalized into annual production per square meter using ingrowth-core dimension data and incubation time. Pilot studies suggest that two years incubation time is needed for sites with perennial vegetation (Bhuiyan et al., 2017 and unpublished data). In the root mesh method, 2-dimensional mesh strips inserted in soil will be used. Roots grown through the strips during incubation period and thereafter measured for a known volume both sides of the strip represent production. This simpler method is enough where branching and radial growth of existing root systems need not be considered. Fine-root turnover (litter input) will be estimated as production per biomass. Roots in both biomass and ingrowth core samples are separated into tree and ground vegetation roots to the extent possible; this task is labour intensive and requires expertise.

2.1.3 Carbon inputs with dead biomass and carbon loss rates

Estimates of current carbon stock in litter and dead wood will be obtained by the area-based sampling in each site. For forested sites, annual tree mortality estimates will be based on monitoring data from other projects, or tree mortality models (e.g., Jutras et al. 2003), where applicable. Carbon input with the annual above-ground litter from perennial plants will be based on a repeated collection of litter from litter traps of known area set at the sites (e.g., Ojanen et al., 2013; Uri et al., 2017), following the litter classification and analysis by methodology defined for ICP forest monitoring. For annual plants, the annual biomass production equals also the amount of litter input. Annual fine-root litter input rates will be based on the production/biomass ratio as described in previous chapters.

Decomposition of these C pools will be estimated using decomposition models, separately for the coarse woody debris of on conifer and deciduous trees (e.g., Pearson et al., 2017; Tuomi, Rasinmäki, et al., 2011Tuomi et al. 2011a, Pearson et al. 2017), and fine litter (e.g., Straková et al., 2012; Tuomi et al., 2011) in different climatic conditions. The litterbag method (Straková et al., 2012) may be used for estimating litter decomposition rates in cases where no applicable models exist. Briefly, a known mass of air-dried litter sampled from the site is placed in a mesh bag (mesh ca. 1 x 1 mm to prevent physical loss and allow entrance of soil mesofauna participating in decomposition). Sets of filled bags will be placed on site in conditions where litter decomposition takes place, incubated a set period, and harvested for analysis. Remaining litter mass in each bag will be weighed after careful cleaning of possible ingrown plant parts and other alien material. A time sequence of such data can be used to estimate mass and C loss dynamics.

2.1.4 Characterizing soil microbial communities

Soil and sediment sampling strategy in each trial will be adjusted according to the data on methane emissions. If emissions are similar across all chambers in a trial, it may be possible to collect a pooled soil sample from the entire trial, in order to make comparisons between trials. However, in some trials, substantial and stable differences in emissions have been observed between sites in a trial. In this case, the sampling strategy will be adjusted in order to compare sites within trials. Three plots with the highest heterogeneity of CH_4 measurements will be selected for 16s RNA analysis to evaluate activity of certain groups of bacteria in soil under different chambers. These samples will be processed separately from the samples collected for DNA extraction.

Given that methane oxidising and reducing processes may occur in different soil layers, it is planned to take samples for genetic analyses from two soil layers – the topsoil (upper 10 cm), as well as from deeper soil layers (approx. 50 cm depth, representing anaerobic conditions in the most of the sites). These samples will be processed separately.

Microbial diversity will be determined in all soil samples by HTS of 16s fragments amplified from total soil DNA. A subset of samples will be also analysed by HTS of 16s fragments amplified from extracted RNA, to compare active microbes with the DNA analyses. In addition, process-specific gene primers will be used to quantify these genes in the DNA and RNA samples analysed by 16s fragment sequencing.

DNA and RNA extraction from soil samples. DNA or RNA will be extracted from dried and sieved soils samples using PowerSoil extraction kits (Qiagen) or similar products. DNA quantity and quality will be checked prior to amplification or cDNA synthesis. The soil collection methods considers minimized exposure to air and instantaneous freezing of samples for RNA extraction. A soil sample, DNA and RNA collection will be developed and stored at -80°C, providing a resource for future research.

Amplification and sequencing of 16S ribosomal sequences (barcoding). A range of 16s PCR primers will be tested for amplification (Klindworth et al., 2013). The primers giving the best amplification results will be utilised for further analyses. IonTorrent platform sequencing libraries will be prepared using barcoding primers. Approximately 300 000-500 000 reads per sample will be targeted.

Amplification and sequencing of process-specific genes. Primers targeting a number of genes present in methanogenic and methanotrophic bacteria will be tested. Methanogenic bacterial primers targeting the mcrB, mcrG, mtaB and mtbA genes are available (Dziewit et al., 2015). Additionally, degenerate primers targeting the pmoC and pmoA genes and intergenic region are available (Ghashghavi et al., 2017). Quantification of these genes from soil total DNA and RNA (cDNA) will be done using quantitative real time PCR.

Identification of active bacterial species/processes (RNA analysis). RNA will be extracted from a subset of the samples taken for DNA extraction in order to identify active bacterial species and processes. After RNA extraction and cDNA synthesis, PCR amplification will be done using the same primers utilised for 16s bacterial DNA analysis.

Assessment/development of quantitative assays for rapid functional and comparative analysis of samples utilising qPCR or digital PCR of process-specific genes. The utility of the process-specific gene primers for use with quantitative real-time PCR or digital PCR will be assessed, in order to develop rapid diagnostic tests, quantifying the amount of these process-specific genes in soil or other samples. This will enable analysis of a larger amount of samples in comparison to HTS approaches, and will provide additional information on the connection of soil microbes with methane cycling.

One-time soil sampling will be done for characterizing the microbial communities that participate in CH_4 and N_2O fluxes. Regarding these gases, there is potential to use descriptions of the well-defined microbial groups involved to predict the level of emissions; in case of CO_2 there are too many groups involved to make such analysis realistic. Potential CH_4/N_2O production and consumption will be assessed on 15 ml samples by gas chromatography as described by Jaatinen et al. (2008) and Yrjälä et al. (2011). Potential denitrification will be assessed with the acetylene-based GC method. For molecular detection a small piece of each sample will be used for DNA extraction. DNA will be analyzed for the diversity and copy level of mcrA (CH_4 production), pmoA (CH_4 consumption), nirK, nirS (N_2O production through denitrification resulting from anaerobic C decomposition) and nosZ (N_2O consumption) through Illumina-based high-throughput sequencing methods (MiSeq platform) and qPCR (Juottonen et al., 2012). Sequencing data will be initially processed using FunFrame platform (Weisman et al., 2013). Due to the high expenses of these methods, sampling will be targeted on a subset of sites, chosen based on the first-year results of flux measurements on the sampling sites to capture the variation from high to moderate/low emissions in a representative manner.

2.1.5 Soil screening with infrared spectroscopy (IRS)

IRS has long been applied in characterization of samples with complex chemical composition, including peat (Hayes et al., 2015, 2015; Holmgren & Nordén, 1988; Krumins et al., 2012; Straková & Laiho, 2016). Infra-Red (IR) radiation is electromagnetic radiation with longer wavelengths than those of visible light. In this method, an IR beam of a known range of wave numbers is passed on the sample, and the absorption of the radiation by the sample is registered for defined wave number intervals. The power of IRS is based on each chemical bond present in a sample absorbing IR radiation in a specific manner that depends on the nature of the bond. Thus, an IR absorbance spectrum, showing for each wave-length or wave-number the proportion of radiation absorbed by the sample, shows the relative abundance of different chemical bonds in the sample. IR spectra thus summarize the whole chemical composition of the sample. The spectra can either be used for direct interpretation of the absorbance intensities at different wave-lengths, or be reduced into a smaller number of variables that contain summarized information on the systematic variation in the spectra by, e.g., Principal Component Analysis or other multivariate methods (Adamczyk et al., 2016). Such summary variables may then be used as predictive variables (e.g., Vávrová et al., 2008), in our case for GHG emissions. These approaches can be combined by first seeking for the characteristics of the spectra that have the best predictive power, and then interpreting them (Adamczyk et al., 2016). IRS is a fast and cheap method, once the spectrometer is available, as is for this project in both Luke and UT. Lack of scientifically approved, simple and inexpensive methods for characterization of peat properties affecting GHG emissions from organic soils is one of the main issues challenges hampering the development of unified GHG accounting and projections models for organic soils. The LIFE OrgBalt project will test IRS as such solution for cool temperate moist climate zone. If the comprehensive description of soil chemistry with IRS proves to have predictive power for soil GHG exchange, the methodology could revolutionize the estimation of these emissions.

2.1.6 Soil and water analyses

Comprehensive evaluation of soil properties down to 80 cm depth or down to a mineral layer will be done in the all gas fluxes measurement plots during the establishment of the reference and demonstration sites. The measurements will be repeated at a topsoil layer 3 times per vegetation season to estimate seasonal variations in soil properties; particularly, nitrogen (N), potassium (K) and phosphorus (P) content. Soil sampling and analyses will be performed according to ICP Forest guidelines (Cools & de Vos, 2010; König et al., 2010). Exchangeable nitrate (NO_3^-) and ammonia (NH_4^+) iones will be determined in potassium or sodium chloride solution.

During the initial evaluation of the measurement plots undisturbed samples will be taken from litter layer (in forest land) and from soil at 0-10 cm, 10-20 cm, 20-40 cm and 40-80 cm depth in 4 repetitions. Combined sample from different depths from each measurement plot will be used for chemical analyses. The repeated soil sampling during the vegetation season will be done at 0-20 cm depth. Parameters which will be determined in soil and reference methods are provided in Table 1.

Table 2: Parameters and reference methods of soil analyses

No.	Parameter	Reference method	Application[1]
1.	Sample pre-treatment	ISO 11464	IR
2.	Soil Moisture Content	ISO 11465	IR
3.	Bulk Density	ISO 11272 (adopted to organic material)	I
4.	pH	ISO 10390	IR
5.	Organic Carbon (C)	ISO 10694	I
6.	Total nitrogen (N)	ISO 13878	IR
7.	Aqua regia extractable phosphorus (P), potassium (K), calcium (Ca) and magnesium (Mg)	ISO 11466	IR[2]
8.	Ash content	ISO 1171	I
9.	NO_3^-, NH_4^+	ISO 14256	IR

Water samples will be collected 4 times during the vegetation season in every gas fluxes measurement site from permanent wells used for measurement of the groundwater level. Only 1 of 2 wells installed in every site will be used for water sampling, another will be left as a reference to obtain undisturbed time line of the groundwater level measurements. Data from both wells will be used for rough estimation of soil water permeability. Water analyses will be done according ICP Forest guidelines (König et al., 2010; Nieminen, 2011). Parameters which will be determined in water samples and reference methods are provided in Table 3.

Table 3: Parameters and reference methods of water analyses

No.	Parameter	Reference method
1.	Sample pre-treatment	ISO 10523, ISO 7888
2.	pH	ISO 10523
3.	Electrical conductivity	BS EN 27888
4.	NH4+	ISO 7150/1
5.	Total N, NO_3^-, DOC, TOC	ISO 10304-1, ISO 12260, BS EN 1484
6.	Dissolved K, Ca and Mg	ISO 7980, ISO 9964-3
7.	Total P	ISO 6878

2.2 Soci-economic monitoring (D2)

The objectives of the Action D2 – Monitoring of the socio-economic impact of the Project Actions are:

- to monitor the socio-economic impacts of the Project Actions for assessment of the success of the Project implementation;
- to evaluate the identified socio-economic impacts of the Project Actions in order to determine how their implementation has contributed to the Project objectives;

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[1] I – during initial evaluation of soil properties; R – soil samples collected in repeated sampling.

[2] Only P and K in samples collected from topsoil after initial evaluation of soil properties.

- to provide timely identification of the risks related to separate Actions or Project in general.

Within this Action two deliverables will be prepared:

1. Initial monitoring report on socio-economic impact of Project Actions which has to be prepared by 1st July of 2021;
2. Final monitoring report on socio-economic impact of Project Actions which has to be prepared by the end of the project at 1st July of 2023.

To achieve the goal several socio-economic monitoring tasks has to been done:

1. To evaluate socio-economic effects of implemented CCM measures in demo sites.
2. To assess socio-economic effects of the Project outcomes in policy planning.

According to the Project proposal the analysis of direct and indirect socio-economic effects will be performed within socio-economic monitoring assessment. Project-related direct socio-economic effects will be assessed to measure effects on people and communities that are directly related with Project activities. And indirect socio-economic monitoring indicators will measure overall effects on people and communities.

2.3 Data collection methods

The data collection will be handled in all Project countries where demo sites and direct implementation activities will be organised. To gather the data, several data collection methods will be used and both qualitative and quantitative data will be obtained. Quantitative data comes in the form of numbers, quantities and values will be gathered to collect concrete and easily measurable and comparable information. By analysing quantitative data, insights that can help better understand the audience can be uncovered. Qualitative data is descriptive, rather than numeric, data is less concrete and less easily measurable than quantitative data. But at the same time qualitative data helps explains the "why" behind the information quantitative data reveals.

To collect data, surveys will be prepared with standardised questions to gather quantitative and also qualitative data, that results could be compared between countries. If necessary, focus group discussion or interviews will be organised to gather more detailed results.

Data and information will be gathered also through desk research. This method represents an efficient and cost-effective way to capitalise on already existing knowledge, with no need to invest time and resources on designing new primary data collection surveys.

All Project partners will contribute to data collection by conducting data about situation in each country.

2.4 Indicators and criteria

According to the Project proposal and planned Project activities it is assumed that the Project impact will be direct and also indirect.

The land use change and adopted management practices will provide alternative options for using the existing properties for different purposes, therefore resulting in different varieties of crops and varieties creating alternative/supplementary income opportunities. At the community level, climate-smart land use development can possibly increase farm productivity, reduce food deficits, increase food surpluses and raise incomes.

Direct socio-economic effects of implemented CCM measures in demo sites will be measured by detailed analysis of demo sites (for example: investment, expected returns, employment, costs for territory establishment; awareness and knowledge raising, behavioural changes, etc.) Six main criterions have been identified to analyse direct Project socio-economic impacts (Table 4). To gather data and to evaluate changes information will be obtained at least twice per year to analyse present situation and changes that will occur during Project implementation phase.

Table 4: Socio-economic effects of implemented CCM measures in demo sites

Criteria	Indicators
Income	• Agriculture and forestry production • Gross value • Other income • Income from quota or other supporting funding's • Etc.
Territory establishment	• Seeds and planting costs • Soil preparation • Ploughing • Levelling • Manuring • Harvesting costs • Etc.
Maintenance costs	• Maintenance of established culture • Repair and maintenance costs • Etc.
Employment	• Engaged employee • Total hours worked per year • Personnel costs • Unpaid labour • Etc
Other costs	• Lease/rental payments • Other payments (variable/non-variable costs) • Capital costs

Rural Development Plans and CCM action plans are selected in the Project as catalysts of the process of integration of the Project results, approaches and proposed measures in the decision and policy planning. The Project will provide information on quantitative assessment of CCM effect, which is mandatory for implementation of the measures within the scope of Rural Development Programmes and LULUCF action plans.

To assess socio-economic effects of the Project outcomes in policy planning several indicators has been set in Table 5 – recommendations developed based on Project results, as well as stakeholder and society involvement will be analysed (for example: stakeholder involvement, they expectation regarding Project results, etc.).

Table 5: Socio-economic effects of the Project outcomes in policy planning

Criterion	Indicators
Policy planning	• Recommendations developed based on Project results • Developed documents related with the Project • Advisory for policy planning
Stakeholder and society involvement	• Involvement of private farmers and formation of cooperatives • Networks, groups of interest • Involved stakeholders • Transfer of knowledge • Awareness rising • Alternative land management and use practices • behavioural changes

2.5 Monitoring and measuring the LIFE key performance indicators (D3)

In order to monitor LIFE key performance indicators, the Project application identifies indicators to analyse the success of the Project implementation. Part of the indicators are directly related with reduction of greenhouse gas emissions, sustainable land use management and economic improvements, but part of them are directly related with dissemination and communication activities.

Methods and procedures how to measure indicators related to GHG emission and socio-economic effects are described in previous chapters. Methods for data gathering to monitor LIFE key performance indicators related with communication and dissemination are described below.

2.6 Data collection methods

To analyse successes of communication and dissemination activities surveys will be used directly asking participants and involved stakeholders about the gained benefits and knowledge from participating in Project events. Surveys will be constructed to collect both quantitative and qualitative data. Survey method of primary data collection will be used in order to reflect attitude of people, determine the level of knowledge and awareness of the participants, as well as to conduct other necessary information. Survey responses would be gathered both by online surveying and distributing paper format questionnaires at the end of each event.

To gather information about use of website, reached respondents by online materials, newsletters and film broadcasts, online tracking will be used. This kind of data collection method allows collection of necessary data in a quick and easy manner. Online tools are excellent for collecting data about stakeholders. Accessing this data allows to see how many people visited online site, how long they spent on it, what articles they clicked on and materials downloaded, and what information they were interested in and more. All these data will be used to improve content of materials – not only online materials, but also printed materials and events.

To analyse effectiveness of the reach of the Project Twitter and Facebook accounts summarising the Project followers and to see what characteristics they have in common to enhance better understanding the interests of target audience that follows the

Project and what kind of information should be presented in social media. Mentioned social media sites provide analytics about how posts perform, and this kind of information also will be used to analyse the effectiveness of communication efforts.

To analyse whether the LIFE key indicators related to the number of conference participants have been achieved, list of participants will be used.

2.7 Indicators and critera

Indicators that have to be measured and achieved during the Project implementation process have been identified and described in the Project proposal. Those are indicators that will be analysed to assess the successes of the Project implementation. According to LIFE programme application guidelines these indicators have been set for two periods:

1. indicators that have to be achieved at the end of the Project (Table 6);
2. indicators that have to be achieved within 3 years after the Project (Table 7).

Time table for monitoring data gathering is presented in Annex 3.

Table 6: LIFE performance indicators have to be achieved by the end of the project

Objective	Indicators	Measurement unit	Estimated Impact (absolute values)	Estimated Impact (in %)	Comment and brief explanation of assumptions used for the calculation
Improved Environmental and Climate Performance (including resilience to climate change)	Reduction of greenhouse gas emissions (GHG)	CO_2	338 tons CO_2 / year	40 % change	Default emission factors for nutrients-rich organic soils in cool temperate moist climate zone provided in the IPCC 2014 Wetlands supplement are used for calculation of impact of the implemented measures in case of land use changes. Literature reviews are used to estimate impact of wood ash application, changes in crop rotation and replacement of clear-felling with selective felling in spruce stands and gap-felling in pine stands. Following to approach applied in IPCC 2006 guidelines Tier 1 methods no transitional period is applied. Growth curves of trees on drained or wet organic soils are considered in calculation of contribution of the living biomass o CO_2 removals. However, the most of reduction of CO_2 emissions is reached by reduction of CO_2 emissions from soil. Role of living and dead biomass will increase in 20-40 years after afforestation. Estimated impact is calculated as difference between projected and current emissions.
		Methane	35 tons CO_2 eq. / year	85 % change	Several measures are associated with rewetting or temporal increase of groundwater level; therefore, methane emissions will increase after implementation of the measures. The default emission factors for nutrients-

Objective	Indicators	Measurement unit	Estimated Impact (absolute values)	Estimated Impact (in %)	Comment and brief explanation of assumptions used for the calculation
					rich organic soils in cool temperate moist climate zone provided in the IPCC 2014 Wetlands supplement are used for calculation of impact of the implemented measures in case of land use changes. Literature review was used in calculation of impact of variation of groundwater level. No transition period is applied according to Tier 1 methods of IPCC 2006 guidelines. Estimated impact is calculated as difference between projected and current emissions.
		Other GHG (N_2O)	47 tons CO_2 eq. / year	33 % change	Default emission factors for nutrients-rich organic soils in cool temperate moist climate zone provided in the IPCC 2014 Wetlands supplement are used for calculation of impact of the implemented measures in case of land use changes. Literature reviews are used to estimate impact of introduction of legumes into a rotation cycle. No transition period is applied according to Tier 1 methods of IPCC 2006 guidelines. Reduction of N_2O emissions mostly relates to measures associated to land us changes and rewetting. Estimated impact is calculated as difference between projected and current emissions.
Sustainable land use, agriculture and forestry	Forestry	Reforested areas; increase in area under sustainable forest management	28 ha	100 % change	According to the work plan 10 ha will be afforested during Project implementation in Latvia and other climate change mitigation targeted measures will be implemented in 18 ha of forest lands. Estimated impact is calculated as difference between proposed area of demo sites and area of demo sites established within the scope of the Project.
	Agriculture	Areas of agricultural land under sustainable management	17 ha	100 % change	Climate change mitigation targeted measures will be implemented in 17 ha of cropland and grassland. Management of these areas according to recommendations elaborated by the Project will be continued as a part of program of maintenance of long-term research plots by Latvian University of Life Science and Technologies and agency “Forest research station”. Estimated impact is calculated as difference between proposed area of demo sites and area of demo sites established within the scope of the Project.
Economic Performance,	Employment	Jobs created	FTE 7	3 % change	Calculations are based on internal estimations of the Partner

Objective	Indicators	Measurement unit	Estimated Impact (absolute values)	Estimated Impact (in %)	Comment and brief explanation of assumptions used for the calculation
Market Uptake, Replication					organisations and assumptions that the sustainable approaches in land management will be integrated more
	Replication / Transfer	No of organizations	15	100 % change	Organisations/ institutions to be involved in the further implementation of the Project results – the Partner organisations and in addition 2 from each participating country
Communication, dissemination, awareness rising	Awareness raising	Number of entities/individuals reached/ made aware	500	5 % change	This number is based on estimated reach of individuals via social media accounts, taking into consideration previous experience with communication feedback within similar projects.
	Website	total website hits	1 00 00	n/a	
	Behavioural change	Number of entities/individuals changing behaviour	300	5 % change	
Other tools for reaching/raising awareness of the general public	reach, print media, no of copies	no. of individuals	20 00,00		
	reach, e-update, no of downloads	no. of individuals	25 00,00		
	reach, film, broadcasts	no. of individuals	1 00 00,00		
	reach, manual, no of copies	no. of individuals	20 00,00		
	conference	no. of individuals	1 50,00		
	Twitter followers	no. of individuals	2 00,00		
	Facebook followers	no. of individuals	2 00,00		

Table 7: LIFE performance indicators that have to be achieved 3 years after the project

Objective	Indicators	Measurement unit	Estimated Impact (absolute values)	Estimated Impact (in %)	Comment and brief explanation of assumptions used for the calculation
Improved Environmental and Climate Performance (including resilience to climate change)	Reduction of greenhouse gas emissions (GHG)	CO_2	1041 tons CO_2 in 3 years period	40 % change	Further reduction of GHG emissions due to implementation of the proposed measures in research forests and farmlands managed by the Project partners. According to Tier 1 method proposed in IPCC 2006 guidelines no transition period is applied to the GHG emission factors, therefore the projected impact in 3 years after implementation of the Project is equal to the impact directly after implementation of the Project. Only emission reduction in demo sites is considered in calculation, respectively,

Objective	Indicators	Measurement unit	Estimated Impact (absolute values)	Estimated Impact (in %)	Comment and brief explanation of assumptions used for the calculation
					further implementation of the measures within the scope of the Rural Development Plan will increase climate change mitigation effect.
		Methane	105 tons CO_2 eq. in 3 years period	85 % change	Further reduction of GHG emissions due to implementation of the proposed measures in research forests and farmlands managed by the Project partners. No transition period is applied to the GHG emission factors, therefore the projected impact in 3 years after implementation of the Project is equal to the impact directly after implementation of the Project. Explanation of the assumptions is provided earlier.
		Other GHG (N_2O)	141 tons CO_2 eq. in 3 years period	33 % change	Further reduction of GHG emissions due to implementation of the proposed measures in research forests and farmlands managed by the Project partners. No transition period is applied to the GHG emission factors, therefore the projected impact in 3 years after implementation of the Project is equal to the impact directly after implementation of the Project. Explanation of assumptions is provided earlier. Explanation of the assumptions is provided earlier.
Sustainable land use, agriculture and forestry	Forestry	Reforested areas; increase in area under sustainable forest management	84 ha	304% change	20 more hectares will be afforested after Project implementation in Latvia by Joint stock company "Latvia state forests" and other climate change mitigation targeted measures will be implemented in 32 ha of state forest lands. Estimated impact is calculated as difference between proposed area of demo sites and area of demo sites established within the scope of the Project.
	Agriculture	Areas of agricultural land under sustainable management	17 ha	100 % change	Climate change mitigation targeted measures will be implemented in 17 ha of cropland and grassland. Management of these areas according to recommendations elaborated by the Project will be continued as a part of program of maintenance of long term research plots by Latvian University of Life Science and Technologies and agency "Forest research station". Estimated impact is calculated as difference between proposed area of demo sites and area of demo sites established within the scope of the Project.
Economic Performance, Market Uptake, Replication	Employment	Jobs created	FTE 15	5 % change	Calculations are based on internal estimations of the Partner organisations and assumptions that the sustainable approaches in land management will be integrated more

Objective	Indicators	Measurement unit	Estimated Impact (absolute values)	Estimated Impact (in %)	Comment and brief explanation of assumptions used for the calculation
	Replication / Transfer	No of organizations	30	200% change	Organisations/ institutions to be involved in the further implementation of the Project results. State governmental organisations (ministries and agencies), universities and research institutions, non-governmental organisations involved in climate change reduction and adaptation (6 organisations in each of 5 partner countries). Organisations will use the measurements developed within Project and replicate the scenarios tested.
Communication, dissemination, awareness rising	Awareness raising	Number of entities/individuals reached/ made aware	20 00	7 % change	This number is based on estimated reach of individuals via social media accounts, taking into consideration previous experience with communication feedback within similar projects.
	Website	total website hits	4 00 00	n/a	
	Behavioural change	Number of entities/individuals changing behaviour	1500	7 % change	

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Annex 1:   Project work plan

Table 8: Project work plan

Action No	Action title	Responsible partner per action	Tasks	Responsible partner per task	2019							2020												2021												2022												2023						
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Nov
A. Preparatory actions																																																						
A.1	Development of the project framework	SILAVA	Task 1: Maintenance of the Work Plan (WP) during the implementation of the Project Actions	Silava	Project work plan including monitoring guidelines 2019-12-31																																												
					Project framework developed 2019-12-31																																																
			Task 2: Development of project impact monitoring guidelines and set of indicators	BaltCoasts	Project work plan including monitoring guidelines 2019-12-31																																																
			Task 3: Analysis of existing national and international management practices and previous experiences, as well as applicable normative documents	Luke	Report on the identified climate change mitigation targeted management practices on organic soils 2019-12-31																																																
					Report on current situation – applied emission factors and projections of GHG emissions from organic soils 2019-12-31																																																
A.2	Elaboration of the project communication platform	BaltCoasts	Task1: Development of the Project Communication Strategy (CS)	BaltCoasts	Communication strategy 2020-03-31																																																
					Project communication platform developed 2020-03-31																																																
			Task 2: Development of Stakeholder network	MA	Plan for awareness rising and stakeholder engagement plan 2019-12-31																																																
			Task 3: Development of Replicability and Transferability Plan (R&T Plan)	BaltCoasts	Replicability and Transferability Plan 2020-03-31																																																
C. Implementation actions																																																						
C.1	Filling knowledge gaps on GHG emissions from organic soils	Luke	Task 1: Improvement of GHG EFs for nutrient-rich organic soils	Luke					Interim draft report on improved GHG emission factors for nutrient-rich managed organic soils in Baltic states 2021-08-31																				Report on improved GHG emission factors for nutrient-rich managed organic soils in Baltic states 2022-10-31																							
									Report on carbon inputs with litter and fine roots in forests on organic soils 2021-08-31																				GHG emission factors for nutrient-rich managed organic soils in Baltic states improved 2022-10-31																							
			Task 2: Geospatially explicit activity data of drained nutrient-rich organic soils	Silava					Interim draft report on improved methodologies for GHG inventory reporting and related national reports 2021-08-31																				Improved methodologies for GHG inventory reporting and related national reports 2022-12-31																							
									Methodologies for GHG inventory reporting and relevant national reports improved 2022-12-31																																													
			Task 3: Catalogue of CCM measures	Luke					Catalogue of climate change mitigation actions 2021-08-31																																													
									Catalogue of CCM actions elaborated																																													

Action No	Action title	Responsible partner per action	Tasks	Responsible partner per task	2019							2020												2021												2022												2023						
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Nov
																													2021-08-31																									
C.2	Tools for modelling of impact of climate change on GHG emissions	LAMMC	Task 1: Integration of GHG EFs and CC scenarios	LAMMC																							Harmonised methodology for characterisation of peat properties using infrared screening method 2021-06-30														Report on integration of climate scenarios and projections of GHG emissions from organic soils 2022-08-31											Further testing, verification and adoption of developed tools and models by application within the Project actions implemented 2023-07-31		
																																									GHG emission factors and climate change scenarios integrated 2022-08-31													
			Task 2: Elaboration of tools for GHG projections	LLU																	Activity data for accounting & projections of GHG emissions from organic soils 2020-12-31							Mathematical equations and tools (spreadsheets and R scripts) for elaboration of projections of GHG emissions from organic soils. 2021-06-30		GHG emission projection tools elaborated 2021-08-31																									
																					Activity data for accounting & Projections of GHG emissions from organic soils to contribute to impact assessment of RDPs and LULUCF action plans in the 2013-2020 commitment period 2020-12-31																																
			Task 3: Elaboration of methodology for socio-economic analysis of the proposed measures	BaltCoasts																																						Methodology for socio-economic analysis of the proposed measures 2022-08-31													
																																								Methodology for socio-economic analysis of the proposed measures elaborated 2022-08-31													
C.3	Implementation of climate change mitigation measures in selected demo sites	Silava & LULSaT																				Report on implementation of CCM measures in demo sites in Latvia 2021-01-01																															
																						Report on implementation of CCM measures in demo sites in Finland 2021-01-01																															
																						CCM measures on demo sites implemented 2021-01-01																															
C.4	Strategies and action plans	MA	Task 1: Development of supplements for national climate strategies and action plans	MA																								Report on public communication with the main stakeholders groups 2021-07-01													Interim draft report on proposals for improvement of sectoral strategies and action plans to reduce GHG emissions from organic soils 2022-08-31										Report on proposals for improvement of sectoral strategies and action plans to reduce GHG emissions from organic soils 2023-06-30			
																																																			Improvements adopted in National forestry accounting plans and forest management reference levels in Baltic countries 2023-06-30			
																																																			Improvements adopted in National LULUCF action plan progress reports in Baltic countries and Finland 2023-06-30			
																																																			Improvements adopted in Biannual reports and national reporting in Baltic countries 2023-06-30			
																																																			Improvements adopted in GHG emissions and CO_2 removals due to cropland and grassland management 2023-06-30			
			Task 2: Demonstration of Public and private sector cooperation (PPC) model	BaltCoasts																		Proposal for PPC model and adopting of the Project results in Rural Development Plan 2021-01-01						Public communication with the main stakeholder groups within the demonstration of PPC model implemented 2021-07-01													Report on economic benefits of CCM measures for nutrients-rich land management practices on farm level 2022-08-31													
																						Proposal for PPC model and adopting of the Project results in Rural Development Plan elaborated 2021-01-01																															
C.5	Replicabil	LLU	Task 1: Elaboration of	LLU																																					Interim draft report on development of Simulation model										Simulation model with spreadsheet interface for a		Develope	

					2019							2020												2021												2022												2023						
Action No	Action title	Responsible partner per action	Tasks	Responsible partner per task	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Nov
	ity tools		a Simulation model (SM) for a single field and regional level projections of GHG emissions and socio-economic outputs																																		2022-08-31										single parcel based calculations of business as usual scenario and different management options 2023-06-30		d Simulation tool applied in real life conditions at least 5 times in partner countries (1 per partner country 2023-08-31	
																																																			Simulation model tool elaborated 2023-06-30			
																																																			Application of the developed planning tool-Simulation. model integrated into policy planning 2023-06-30			
																																																			Simulation model, different management options and tables with default parameters for calculations of efficiency of CCM measures with integrated data from Finland and Baltic States available 2023-06-30			
			Task 2: Default parameters for calculation of CCM effect	Silava																																	Interim draft report on development of Tables with default parameters for calculations of efficiency of the climate change mitigation measures 2022-08-31												Tables with default parameters for calculations of efficiency of the climate change mitigation measures 2023-06-30 Proposed CCM measures integrated in Rural Development Programmes for the post 2020 planning 2023-08-31	
																																					Default parameters for calculation of CCM effects as supplement for model tool elaborated and provided 2022-08-31												Ministry of Agriculture of Latvia has taken over and applied implementation measures for CCM 2023-08-31	
			Task 3: Integration of the SMl in the policy planning	MA																																	Interim draft report on development of Framework for training sessions for individual stakeholders for application of the developed tool 2022-08-31												Final framework for training sessions for individual stakeholders for application of the developed tool 2023-06-30 Developed tools applied at end users’ level at least 10 times 2023-08-31	
																																					Initial framework for training sessions for individual stakeholders elaborated 2022-08-31											Two-level training sessions organised and held 2023-03-31 Framework for training sessions for individual stakeholders elaborated 2023-06-30 At least 20 individual users in each of Baltic States representing at least 10000 ha of organic soils in forest and agricultural lands applied the planning tool-Simulation model 2023-06-30		
																																																		Data utilised in the model published in 2 peer reviewed articles by Luke, Silava, UT and LAFRC and presented in at least 2 international scientific conferences 2023-06-30			
D. Monitoring of the impact of the project actions																																																						
D.1	Monitoring of the implementation of project activities	UT	Task 1: Monitoring of GHG emissions in the demo sites	UT																		Initial monitoring report 2021-01-01												Midterm monitoring report 2022-01-01																		Final monitoring report 2023-07-01		
			Task 2: Validation of the CCM measures and reporting of monitoring results	Silava																		Report on implementation of CCM measures in demo sites in Finland 2021-01-01																														Monitoring of the Project impacts implemented 2023-07-01		
D.2	Monitoring of the socio-economic impact of	BaltCoasts	Task 1: - Evaluation of socio-economic effects of implemented CCM measures in demo	BaltCoasts																								Initial monitoring report on socio-economic impact of project actions 2021-07-01																								Final monitoring report on socio-economic impact of project actions 2023-07-01		

Action No	Action title	Responsible partner per action	Tasks	Responsible partner per task	2019							2020												2021												2022												2023						
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Nov
			sites																																																			
	the Project actions		Task 2: Assessment of socio-economic effects of the application of the Project outcomes in policy planning	BaltCoasts																																												Monitoring of project's socio-economic impact implemented 2023-07-01		
D.3	Monitoring and measuring the LIFE key performance indicators	SILAVA															Report on progress regarding LIFE key performance indicators 2020-08-31												Report on progress regarding LIFE key performance indicators 2021-08-31												Report on progress regarding LIFE key performance indicators 2022-08-31												Report on progress regarding LIFE key performance indicators 2023-08-31	
E. Communication and dissemination of results																																																						
E.1	Information and dissemination	BaltCoasts	Task 1: Project web site and social media accounts	Silava					Project website and social media accounts developed and published 2019-12-31																																													
									Corporate design and visual identity of the Project developed 2019-12-31																																													
			Task 2: Scientific publications	Luke																																					Scientific publication on carbon inputs and soil carbon stock changes in forests on drained nutrient-rich organic soils 2022-09-01			Scientific publication on GHG emission factors for nutrient-rich organic soils in temperate and hemi-boreal climate zone 2022-12-31									
																											Scientific publication on impact of climate change on GHG emissions from organic soils 2021-06-30															Scientific publications produced and published 2022-09-01												
			Task 3: Information and education materials	BaltCoasts																								Short documentary about demo sites and climate change mitigation measures 2021-07-01														Printed booklet on GHG emissions' mitigation measures 2022-09-01											Production and distribution of e-Newsletters 2023-08-31	
																												Documentary shot, broadcasted and distributed 2021-07-01														Printed project booklet with summaries of main results 2022-09-30											Artcles, publications, e-newsletters published 2023-08-31	
																																																				Project printed materials produced and distributed 2023-08-31	
			Task 4: Layman`s report	BaltCoasts																																																	Layman`s report 2023-08-31	
			Task 5: Notice boards and information signs for demonstration sites	BaltCoasts					Notice boards 2019-12-31																																													
									Notice boards 2019-12-31																																													
E.2	Dissemination and training events		Task 1: Planning and organisation of national workshops	MA											First National workshops on climate change mitigation meas																																		Second National workshops on climate change mitigation measures for nutrient-rich organic soils held 2023-03-31						

Action No	Action title	Responsible partner per action	Tasks	Responsible partner per task	2019							2020												2021												2022												2023						
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Nov
															ures for nutrient-rich organic soils held 2020-12-31																																							
			Task 2: Organisation of Final international conference	BaltCoasts																																															Final international conference held 2023-07-31		
		BaltCoasts	Task 3: Planning and organisation of the information and dissemination events	BaltCoasts																																	Presentation of the project results in relevant international and local events performed 2022-08-31												Educational events for students of universities held 2023-05-31 Framework for training sessions for individual stakeholders elaborated and first training sessions organised 2023-06-30 Presentations and participants lists of the events (published on the of the Project website) 2023-08-31	
E.3	Networking	Luke	Task 1: Identification of relevant projects and networks, exchange of experience to create synergy between activitie	Luke																																					Experience exchange meetings held 2023-01-31								
			Task 2: Dissemination actions targeting the competent EC authorities	MA																																																
			Task 3: Elaboration of joint Baltic and Finnish Action program	Luke																																															Joint Baltic and Finnish Climate Change Mitigation Actio Program 2023-07-31 Joint Baltic and Finnish Climate Change Mitigation Actio Program Establisfed 2023-08-31		
F. Project management (obligatory)																																																						
F.1	Project management by SILAVA	SILAVA	Task 1: Setting up management structure														List of demo sites in the partner countries including location and driving distances 2020-08-31																																						
			Task 2: Coordination and Day-to Day management																																																	All project actions are implemented, expected project results and objectives reached 2023-08-31	
			Task 3: Reporting														Progress report 31.08.2020												Mid-term Report 31/08/2021												Progress report 31/08/2022												Audit report 2023-08-31	Final Report 30/11/2023
			Task 4: After-LIFE plan																																																	After-LIFE Plan 2023-08-31	

Annex 2: Deadline of Project deliverables and milestones

Table 9: Deadline of Project deliverables

Name of deliverable	Project action	Deadline
Notice boards	E1	31.12.2019
Report on the identified climate change mitigation targeted management practices on organic soils	A1	31.12.2019
Report on current situation – applied emission factors and projections of GHG emissions from organic soils	A1	31.12.2019
Project work plan including monitoring guidelines	A1	31.12.2019
Plan for awareness rising and stakeholder engagement plan	A2	31.12.2019
Communication strategy	A2	31.03.2020
Replicability and Transferability Plan	A2	31.03.2020
List of demo sites in the partner countries including location and driving distances (included in the Progress Report)	F1	31.08.2020
Report on progress regarding LIFE key performance indicators	D3	31.08.2020
Activity data for accounting & projections of GHG emissions from organic soils	C2	31.12.2020
Initial monitoring report	D1	01.01.2021
Report on implementation of CCM measures in demo sites in Latvia	C3	01.01.2021
Report on implementation of CCM measures in demo sites in Finland	C3	01.01.2021
Proposal for PPC model and adopting of the Project results in Rural Development Plan	C4	01.01.2021
Mathematical equations and tools (spreadsheets and R scripts) for elaboration of projections of GHG emissions from organic soils.	C2	30.06.2021
Scientific publication on impact of climate change on GHG emissions from organic soils	E1	30.06.2021
Harmonised methodology for characterisation of peat properties using infrared screening method	C2	30.06.2021
Short documentary about demo sites and climate change mitigation measures	E1	01.07.2021
Report on public communication with the main stakeholders groups	C4	01.07.2021
Initial monitoring report on socio-economic impact of project actions	D2	01.07.2021
Report on progress regarding LIFE key performance indicators	D3	31.08.2021
Report on carbon inputs with litter and fine roots in forests on organic soils	C1	31.08.2021
Catalogue of climate change mitigation actions	C1	31.08.2021
Interim draft report on improved methodologies for GHG inventory reporting and related national reports	C1	31.08.2021
Interim draft report on improved GHG emission factors for nutrient-rich managed organic soils in Baltic states	C1	31.08.2021
Midterm monitoring report	D1	01.01.2022
Report on integration of climate scenarios and projections of GHG emissions from organic soils	C2	31.08.2022
Interim draft report on proposals for improvement of sectoral strategies and action plans to reduce GHG emissions from organic soils	C4	31.08.2022
Report on economic benefits of CCM measures for nutrients-rich land management practices on farm level	C4	31.08.2022
Report on progress regarding LIFE key performance indicators	D3	31.08.2022
Interim draft report on development of Simulation model	C5	31.08.2022

Name of deliverable	Project action	Deadline
Interim draft report on development of Framework for training sessions for individual stakeholders for application of the developed tool	C5	31.08.2022
Interim draft report on development of Tables with default parameters for calculations of efficiency of the climate change mitigation measures	C5	31.08.2022
Methodology for socio-economic analysis of the proposed measures	C2	31.08.2022
Scientific publication on carbon inputs and soil carbon stock changes in forests on drained nutrient-rich organic soils	E1	01.09.2022
Printed booklet on GHG emissions’ mitigation measures	E1	30.09.2022
Printed project booklet with summaries of main results	E1	30.09.2022
Report on improved GHG emission factors for nutrient-rich managed organic soils in Baltic states	C1	31.10.2022
Scientific publication on GHG emission factors for nutrient-rich organic soils in temperate and hemi-boreal climate zone	E1	31.12.2022
Improved methodologies for GHG inventory reporting and related national reports	C1	31.12.2022
Tables with default parameters for calculations of efficiency of the climate change mitigation measures	C5	30.06.2023
Report on proposals for improvement of sectoral strategies and action plans to reduce GHG emissions from organic soils	C4	30.06.2023
Simulation model with spreadsheet interface for a single parcel-based calculations of business as usual scenario and different management options	C5	30.06.2023
Data utilised in the model published in 2 peer reviewed articles by Luke, Silava, UT and LAFRC and presented in at least 2 international scientific conferences	C5	30.06.2023
Final framework for training sessions for individual stakeholders for application of the developed tool	C5	30.06.2023
Final monitoring report	D1	01.07.2023
Final monitoring report on socio-economic impact of project actions	D2	01.07.2023
Joint Baltic and Finnish Climate Change Mitigation Action Program	E3	31.07.2023
After-LIFE Plan	F1	31.08.2023
Audit report	F1	31.08.2023
Developed Simulation tool applied in real life conditions at least 5 times in partner countries (1 per partner country	C5	31.08.2023
Layman`s report	E1	31.08.2023
Production and distribution of e-Newsletters	E1	31.08.2023
Report on progress regarding LIFE key performance indicators	D3	31.08.2023
Presentations and participants lists of the events (published on the of the Project website)	E2	31.08.2023

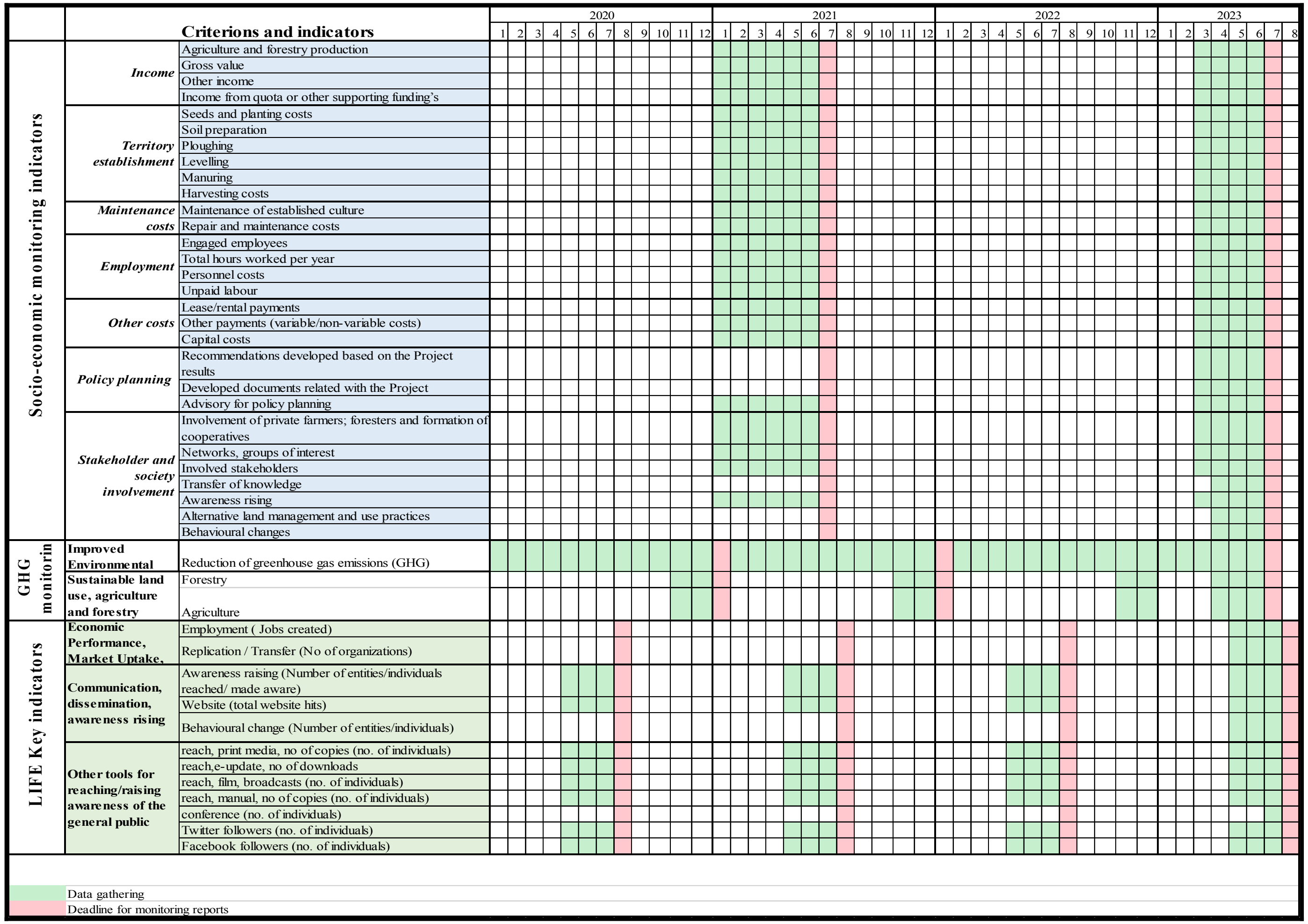
Table 10: Deadline of Project milestones

Name of milestone	Project action	Deadline
Corporate design and visual identity of the Project developed	E1	31.12.2019
Project framework developed	A1	31.12.2019
Project website and social media accounts developed and published	E1	31.12.2019
Notice boards installed	E1	31.12.2019
Project communication platform developed	A2	31.03.2020

Name of milestone	Project action	Deadline
First National workshops on climate change mitigation measures for nutrient-rich organic soils held	E2	30.06.2020
Activity data for accounting & Projections of GHG emissions from organic soils to contribute to impact assessment of RDPs and LULUCF action plans in the 2013-2020 commitment period	C2	31.12.2020
Proposal for PPC model and adopting of the Project results in Rural Development Plan elaborated	C4	01.01.2021
CCM measures on demo sites implemented	C3	01.01.2021
Documentary shot, broadcasted and distributed	E1	01.07.2021
Public communication with the main stakeholder groups within the demonstration of PPC model implemented	C4	01.07.2021
GHG emission projection tools elaborated	C2	31.08.2021
Catalogue of CCM actions elaborated	C1	31.08.2021
GHG emission factors and climate change scenarios integrated	C2	31.08.2022
Presentation of the project results in relevant international and local events performed	E2	31.08.2022
Initial framework for training sessions for individual stakeholders elaborated	C5	31.08.2022
Default parameters for calculation of CCM effects as supplement for model tool elaborated and provided	C5	31.08.2022
Methodology for socio-economic analysis of the proposed measures elaborated	C2	31.08.2022
Scientific publications produced and published	E1	01.09.2022
GHG emission factors for nutrient-rich managed organic soils in Baltic states improved	C1	31.10.2022
Methodologies for GHG inventory reporting and relevant national reports improved	C1	31.12.2022
Experience exchange meetings held	E3	31.01.2023
Two-level training sessions organised and held	C5	31.03.2023
Second National workshops on climate change mitigation measures for nutrient-rich organic soils held	E2	31.03.2023
Educational events for students of universities held	E2	31.05.2023
Simulation model tool elaborated	C5	30.06.2023
Framework for training sessions for individual stakeholders elaborated and first training sessions organised	E2	30.06.2023
Improvements adopted in National forestry accounting plans and forest management reference levels in Baltic countries	C4	30.06.2023
Improvements adopted in National LULUCF action plan progress reports in Baltic countries and Finland	C4	30.06.2023
Improvements adopted in Biannual reports and national reporting in Baltic countries	C4	30.06.2023
Improvements adopted in GHG emissions and CO_2 removals due to cropland and grassland management	C4	30.06.2023
Framework for training sessions for individual stakeholders elaborated	C5	30.06.2023
At least 20 individual users in each of Baltic States representing at least 10000 ha of organic soils in forest and agricultural lands applied the planning tool-Simulation model	C5	30.06.2023
Simulation model, different management options and tables with default parameters for calculations of efficiency of CCM measures with integrated data from Finland and Baltic States available	C5	30.06.2023
Application of the developed planning tool-Simulation. model integrated into policy planning	C5	30.06.2023

Name of milestone	Project action	Deadline
Monitoring of the Project impacts implemented	D1	01.07.2023
Monitoring of project's socio-economic impact implemented	D2	01.07.2023
Further testing, verification and adoption of developed tools and models by application within the Project actions implemented	C2	31.07.2023
Final international conference held	E2	31.07.2023
Joint Baltic and Finnish Climate Change Mitigation Action Program established	E3	31.08.2023
All project actions are implemented, expected project results and objectives reached	F1	31.08.2023
Proposed CCM measures integrated in Rural Development Programmes for the post 2020 planning	C5	31.08.2023
Ministry of Agriculture of Latvia has taken over and applied implementation measures for CCM	C5	31.08.2023
Developed tools applied at end users' level at least 10 times	C5	31.08.2023
Articles, publications, e-newsletters published	E1	31.08.2023
Project printed materials produced and distributed	E1	31.08.2023
Information on progress regarding LIFE key performance indicators submitted along with the Progress, Mid-term and Final reports	D3	30.11.2023

Annex 3: Monitoring time table



			2020												2021												2022												2023							
		Criterions and indicators	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
Socio-economic monitoring indicators	***Income***	Agriculture and forestry production													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Gross value													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Other income													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Income from quota or other supporting funding's													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
	Territory establishment	Seeds and planting costs													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Soil preparation													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Ploughing													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Levelling													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Manuring													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Harvesting costs													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
	Maintenance costs	Maintenance of established culture													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Repair and maintenance costs													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
	Employment	Engaged employees													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Total hours worked per year													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Personnel costs													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Unpaid labour													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
	Other costs	Lease/rental payments													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Other payments (variable/non-variable costs)													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Capital costs													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
	Policy planning	Recommendations developed based on the Project results																			🟥																				🟩	🟩	🟩	🟩	🟥	
		Developed documents related with the Project																			🟥																				🟩	🟩	🟩	🟩	🟥	
		Advisory for policy planning													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
	Stakeholder and society involvement	Involvement of private farmers; foresters and formation of cooperatives													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Networks, groups of interest													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Involved stakeholders													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Transfer of knowledge																			🟥																					🟩	🟩	🟩	🟥	
		Awareness rising													🟩	🟩	🟩	🟩	🟩	🟩	🟥																				🟩	🟩	🟩	🟩	🟥	
		Alternative land management and use practices																			🟥																					🟩	🟩	🟩	🟥	
		Behavioural changes																			🟥																					🟩	🟩	🟩	🟥	
GHG monitorin	**Improved Environmental**	Reduction of greenhouse gas emissions (GHG)	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟥	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟥	
	Sustainable land use, agriculture and forestry	Forestry											🟩	🟩	🟥										🟩	🟩	🟥										🟩	🟩				🟩	🟩	🟩	🟥	
		Agriculture											🟩	🟩	🟥										🟩	🟩	🟥										🟩	🟩				🟩	🟩	🟩	🟥	
LIFE Key indicators	**Economic Performance, Market Uptake,**	Employment (Jobs created)								🟥												🟥												🟥									🟩	🟩	🟩	🟥
		Replication / Transfer (No of organizations)								🟥												🟥												🟥									🟩	🟩	🟩	🟥
	Communication, dissemination, awareness rising	Awareness raising (Number of entities/individuals reached/ made aware)					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥
		Website (total website hits)					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥
		Behavioural change (Number of entities/individuals)								🟥												🟥												🟥									🟩	🟩	🟩	🟥
	Other tools for reaching/raising awareness of the general public	reach, print media, no of copies (no. of individuals)					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥
		reach,e-update, no of downloads					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥
		reach, film, broadcasts (no. of individuals)					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥
		reach, manual, no of copies (no. of individuals)					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥
		conference (no. of individuals)								🟥												🟥												🟥											🟩	🟥
		Twitter followers (no. of individuals)					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥
		Facebook followers (no. of individuals)					🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥									🟩	🟩	🟩	🟥

🟩 Data gathering

🟥 Deadline for monitoring reports

Figure 3: Monitoring time table.

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