REPORT

ON IMPLEMENTATION OF THE PROJECT

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

WORK PACKAGE

TOOLS FOR MODELLING OF THE IMPACT OF CLIMATE CHANGE ON GHG EMISSIONS (C 2/5)

ACTIONS

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Authors	Līga Brūniņa, Elīna Konstantinova, Andis Lazdiņš, Jyrki Jauhiainen
Photos and drawings	
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Organization	Latvia State Forest Research Institute "Silava"
Contact information	Riga street 111, Salaspils, LV-2169
	Phone: +37129183320
	E-mail: ieva.licite@silava.lv
	Web address: www.silava.lv
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LIFE OrgBalt compiled the first regional Baltic/Finnish GHG emission factors for managed nutrient-rich organic soils (current and former peatlands), which have been made available for the customary scientific review and further verification for national GHG inventories in the hemiboreal region in Finland and the Baltic countries. While the project analysed selected CCM measures for drained organic soils in agriculture and forestry and developed spatial models and tools, it also identified remaining knowledge gaps. To bridge the remaining limitations and fill the gaps, it is essential to continue GHG measurements and model development, as well as to broaden and complete the scope of the evaluated CCM measures in the after-LIFE-project period, notably by including rewetting and restoration of peatlands that are currently considered to be among the most recommended CCM measures on drained peatlands in the EU. In addition, the developed Simulation and PPC models still include limited macroeconomic considerations and lack an assessment of all environmental impacts. For all these reasons, these models should be used carefully in CCM strategy development for the identification of gaps in climate neutrality transition policy and funding frameworks and need further optimization for broader applicability as decision-making tools.

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List of Abbreviations and Acronyms

PPC	Private Public Communication
CCM	Climate Change Mitigation
GHG	Greenhouse gas
CO_2	Carbon dioxide
ROE	Return on equity
FNPV	Financial Net Present Value
FIRR	Financial Internal Rate of Return
ENPV	Economic Net Present Value
EIRR	Economic Internal Rate of Return

Annexes

1. Annex 1_ Current version of the model
2. Annex 2_ Overview of financial and socio-economic specific indicators for CCM measure implemented on agricultural land, forest land, wetland

INTRODUCTION

The report provides a description of the Private Public Communication (PPC) model structure and data, together with the sources from which data has been collected. The reader will be guided through its structure, input and output to understand the purpose of this tool along with its functioning. In Annex 1 the current version of the model is provided to give readers the possibility to test it. Questions and feedbacks can be sent to info@baltijaskrasti.lv . The model will be under constant revision until May 2024 to include updated and revised data and to take into consideration the project's findings. The model is based on the analysis of seventeen scientific scenarios derived from seventeen climate change mitigation (CCM) measures which have been implemented on sixteen demosites within the LIFE OrgBalt project's partners' territories [see chapter I]. Thirteen demosites are located in Latvia and three are located in Finland. An additional CCM measure has been taken from the project LIFE REstore. Each scenario derives from a combination of existing characteristics divided at first by type of land (agricultural land, forest land, wetland) and consequently into two data input levels (first and second), which eventually provides specific financial and socio-economic indicators for each CCM measure which can be applied on the given land plot.

First level input will define the type of CCM measure that can be implemented on a given territory. They are listed and described in chapter II and include land type, land use, management system and drainage system. Second level input will return financial, economic and socio-economic indicators to estimate the environmental, financial and socio-economic benefits of each CCM measure that will be evaluated as applicable under the given conditions. For a list and description of second level input see chapter III. The description of the model input is followed by a list of the model output which are described in chapter IV. Chapter V focuses on an analysis of the sources from which the model data have been collected. Finally, a first analysis of the costs and benefits of the tested CCM measures is provided for each land type through three pilot cases [see chapter VI]. A further and more detailed analysis will be provided in the future document "Report on economic benefits of CCM measures for nutrients-rich land management practices on farm level". Conclusions focus on an overall analysis of the most efficient CCM measures among the tested ones considering both financial and socio-economic aspects.

I. CCM measures

The demonstration of climate change mitigation (CCM) practices in nutrient-rich organic soils is one of the key objectives of the LIFE OrgBalt project. In total sixteen demonstration sites are established of which thirteen in Latvia and three in Finland, with additional reference sites across the Baltic States. By measuring the greenhouse gas (GHG) fluxes in the demonstration and reference sites, the results of implementing various CCM measures is continuously studied. LIFE OrgBalt developed 3 sites demonstrating continuous cover forestry (CCF) management aiming to reduce CO_2 emissions from forestry drained peat in Finland and 13 demonstration sites established in Latvia, both on agricultural and forest land. Moreover, GHG fluxes are monitored on a total of 36 reference sites providing comprehensive data for the whole area of the Baltic States, which are comparable with the data sets available in Finland and Germany. A detailed description of each CCM measure characteristics is provided in the following documents:

- "Report on implementation of CCM measures in demo sites in Latvia" and annex "Basic principles of establishment and management of paludicultures"
- "Report on implementation of CCM measures in demo sites in Finland".

In table 1 a list and a brief description of all measures is provided. Measures implemented in Latvia can be identified with the code "LVC…" while measures implemented in Finland follow the code "FIC…". A link to the specific LIFE OrgBalt webpage section has been provided. For each demosites indeed a specific website subpage has been prepared both in Latvian and English. Please note that these subpages will be updated during the whole project lifecycle to provide updated information on the activity in progress and final information on measurements' results. Moreover, a QR code which sends users to the specific CCM measure's page, has been added on the project notice boards which have been installed at each demosite. In this way interested users will be able to follow the demosites activities and the measurements results. Out of the 16 CCM measures tested in the LIFE OrgBalt project framework, nine have been implemented on forest land (6 in Latvia and 3 in Finland) and seven have been implemented in agricultural land. The additional measure taken from the project REstore have been implemented on wetland.

Table 1. LIFE OrgBalt CCM measures I

Name of the CCM measure ENG	Name of the CCM measure LV	Code	Land type
Conversion of cropland used for cereal production to grassland considering periodic ploughing	Aramzemes pārveide par zālāju	LVC301	Agricultural land
Conventional afforestation considering shorter rotation conventional afforestation (spruce)	Plantāciju meža ieaudzēšana (egle)	LVC302	Agricultural land
Paludiculture – afforestation of grassland with black alder and birch	Meža paludikultūras (lapu koku) ieaudzēšana pārslapinātā augsnē	LVC303	Agricultural land
Controlled drainage of grassland considering even groundwater level during the whole vegetation period	Kontrolētās drenāžas sistēmas ierīkošana zālājā	LVC305	Agricultural land
Agroforestry – fast growing trees and grass	Agro-mežsaimniecība – ātraudzīgu kokaugu stādījums ar zālaugu pasēju	LVC306	Agricultural land
Fast growing species in riparian buffer zones	Atraudzīgu kokaugu stādījums buferjoslā gar ūdensobjektiem	LVC310	Agricultural land
Introduction of legumes in conventional farm crop rotation	Tauriņziežu audzēšana augu maiņā	LVC304	Agricultural land
Application of wood ash after commercial thinning in spruce stand	Koksnes pelnu izmantošana skuju koku audzēs	LVC307	Forest land
Continuous forest cover as a forest regeneration method in spruce stand	Pakāpeniska izlases cirte egļu audzēs	LVC308	Forest land
Semi-natural regeneration of regeneration felling site with grey alder without reconstruction of drainage systems	Melnalkšņa un bērza audžu atjaunošana purvaiņos	LVC309	Forest land
Riparian buffer zone in forest land planted with black alder	Melnalkšņa stādījums uz pacilām meliorācijas sistēmas buferjoslā	LVC311	Forest land
Forest regeneration (coniferous trees) without reconstruction of drainage systems	Mērķtiecīga priežu audžu atjaunošana purvaiņos	LVC312	Forest land
Strip harvesting in pine stand	Pakāpeniskā joslu izlases cirte (priede)	LVC313	Forest land
Continuous forest cover without full ditch network maintenance in spruce stands using selective felling	Izlases cirte kā alternatīva egļu audžu apsaimniekošanas metode meža zemē ar meliorētu organisko augsni	FIC301	Forest land
Continuous forest cover (utilization of existing spruce understorey) as a forest regeneration method in originally mixed forest dominated by scots pine	Pāreja uz izlases ciršu saimniecību mežā ar organisko augsni	FIC302	Forest land
Continuous forest cover (small gaps) as a forest regeneration method in mixed stands	Izlases cirte kā alternatīva meliorētas organiskās augsnes apsaimniekošanas metode	FIC303	Forest land
Growing blueberries and cranberries in wetlands	Mellenu un dzērveņu audzēšana mitrājā	RESTORE	Wetland

II. PPC model first level input data

After choosing the land type a first level input data window is provided. First level data are necessary to understand which CCM measure can be implemented on a given territory. For first level data we have several restrictive criteria, since the CCM measures included in the model can be implemented only on lands with certain given characteristics. The model includes a "Verification of limit values" page which can be used by users to check input validity. In addition, in the model guidelines additional information will be provided for those parameters who do not fit any of the CCM measures tested in the project. In this way users can know in advance if their land is not suitable for the implementation of the CCM measures included in the model. The scope of the current model is to analyse the CCM measures implemented within the projects and therefore no alternative opportunities nor analysis of the actions needed to make the land suitable for the implementation of the project CCM measures is provided at this stage. However, the "Verification of limit values" page provides a quick and easily accessible overview of the first level input characteristics that fit each CCM measures. Below more detailed information on first level input is provided for each land type.

Agricultural land – first level data

For agricultural lands, users are required to enter the following type of information to evaluate which CCM measures will be implementable on the identified land plot: type of agricultural land, soil type, land use assessment, management system, drainage system, restrictions on economic activity. In Table 2 a list of all first level input data is provided along with limit values. For agricultural land restriction criteria do not differ according to the selected CCM measures, i.e., restrictive criteria are the same for all scenarios.

Table 2. Agric. land first level input 1

Main input (ENG)	Main input (LV)	Given options (ENG)	Given options (LV)	Limit values (ENG)
Type of agricultural land	Lauksaimniecības zemes veids	• Lawn • Arable	• Zālājs • aramzeme	Not a restrictive criterion
Soil type	Augsnes tips	• The soil complies with the organic soil criteria of the IPCC 2006 • The soil does not meet the organic soil criteria of the IPCC 2006	• Augsne atbilst organiskās augsnes kritērijiem IPCC 2006 • Augsne neatbilst OAK IPCC 2006	The soil complies with the organic soil criteria of the IPCC 2006
Land use assessment	Zemes lietošanas vērtējum	• Coptic • Not cleaned • Overgrown (may meet the definition of forest stand)	• Kopta • Nekopta • Aizaugusi (var atbilst mežaudzes definīcijai)	Not a restrictive criterion
Management system	Apsaimniekošanas sistēma	• Integrated • Organic	• Integrētā • Bioloģiskā	Not a restrictive criterion
Drainage system	Meliorācijas sistēma	• Functional ditches • Non-functioning ditches • Functional closed drainage • Non-functioning closed drainage • There is no drainage system	• Funkcionējoši grāvji • Nefunkcionējoši grāvji • Funkcionējoša slēgta drenāža • Nefunkcionējoša slēgta drenāža • Nav meliorācijas sistēmas	Not a restrictive criterion
Restrictions on economic activity	Saimnieciskās darbības ierobežojumi	• There are no restrictions on economic activity • Maintenance / renewal of drainage systems is prohibited • Installation of drainage systems is prohibited • Prohibited economic activity	• Nav saimnieciskās darbības ierobežojumu (Nav SDI) • Aizliegta meliorācijas sistēmu uzturēšana / atjaunošana • Aizliegta meliorācijas sistēmu ierīkošana • Aizliegta saimnieciskā darbība	There are no restrictions on economic activity

Forest land – first level data

For forest land users are required to enter the following type of information to evaluate which CCM measures will be implementable on the identified land plot: forest type, drainage system status, dominant species, age of stand, restrictions on economic activity, quality[i], presence of natural watercourse. In table 3 a list of all first level input data is provided, while limit values are provided in table 4. For forest land indeed, each CCM measures have specific limit values.

Table 3. Forest land first level input 1

Main input (ENG)	Main input (LV)	Given options (ENG)	Given options (LV)
Forest type	Meža tips	• Caricoso — phragmitosa • Dryopterioso — caricosa • Filipendulosa • Callunosa mel. • Vacciniosa mel. • Myrtillosa mel. • Mercurialiosa mel.	• Niedrājs • Dumbrājs • Liekņa • Viršu ārenis • Mētru ārenis • Šaurlapju ārenis • Platlapju ārenis
Drainage system	Meliorācijas sistēma	• Functioning • Worn out • Not built	• Funkcionējoša • Nolietota • Nav
Dominant species	Valdošā suga	• Pine tree • Spruce • Birch • Black alder • Aspen • White alder	• Priede • Egle • Bērzs • Melnaksnis • Apse • Baltnaksnis
Age of stand	Audzes vecums	• Young generation • Middle-aged stand • Adult stand	• Jaunadze • Vidēja vecuma audze • Pieaugusi audze
Restrictions on economic activity	Saimnieciskās darbības ierobežojumi	• There are no restriction on economic activity • Seasonal restrictions on economic activity • Clear felling is prohibited • Main felling is prohibited • Care felling is prohibited • Prohibited economic activity	• Nav saimnieciskās darbības ierobežojumu • Sezonāli saimnieciskās darbības ierobežojumi • Aizliegta kailcirte • Aizliegta galvenā cirte • Aizliegta kopšanas cirte • Aizliegta saimnieciskā darbība
Quality	Bonitāte	• I, II, III, IV	• I, II, III, IV
The area borders a natural watercourse	Platība robežojas ar dabisku ūdensteci	• Yes • No	• Jā • Nē

Table 4. Forest land limit values 1

Scenario:	LVC307	LVC308	LVC309	LVC311	LVC312	LVC313	FIC301 – FIC302	FIC303
Forest type:	Callunosa turf.mel. or Vacciniosa turf.mel. or Myrtillosa turf. mel. or Oxalidosa turf.mel.	Callunosa turf.mel. or Vacciniosa turf.mel. or Myrtillosa turf. mel. or Oxalidosa turf.mel.	Caricoso-phragmitosa or Sphagnosa or Dryopteriosac ariosa or Filipenulosa	Callunosa turf.mel. or Vacciniosa turf.mel. or Myrtillosa turf. mel. or Oxalidosa turf.mel.	Caricoso-phragmitosa or Sphagnosa or Dryopteriosac ariosa or Filipenulosa	Callunosa turf.mel. or Vacciniosa turf.mel. or Myrtillosa turf. mel. or Oxalidosa turf.mel.	Vacciniosa turf.mel. or Myrtillosa turf. mel. or Oxalidosa turf.mel.	Vacciniosa turf.mel. or Myrtillosa turf. mel. or Oxalidosa turf.mel.
Drainage system:	Working or Used	Working or Used	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion	Working or Used	Not a restrictive criterion	Not a restrictive criterion
Dominant species:	Pine or spruce	Spruce	Black alder or birch	Black Alder	Pine or spruce	Pine	Pine tree	Spruce
Age of stand:	Middle-aged stand or Adult stand (meets the criteria for main felling)	Adult stand (meets the criteria for main felling)	Adult stand (meets the criteria for main felling)	Adult stand (meets the criteria for main felling)	Adult stand (meets the criteria for main felling)	Adult stand (meets the criteria for main felling)	Middle-aged stand or Adult stand (meets the criteria for main felling)	Middle-aged stand or Adult stand (meets the criteria for main felling)
Restrictions on economic activity:	No restrictions on economic activity or Seasonal restrictions on economic activity or Prohibited clear-cutting or Prohibited main felling	No restrictions on economic activity or Seasonal restrictions on economic activity or Prohibited clear-cutting	No restrictions on economic activity or Seasonal restrictions on economic activity	No restrictions on economic activity or Seasonal restrictions on economic activity	No restrictions on economic activity or Seasonal restrictions on economic activity	No restrictions on economic activity or Seasonal restrictions on economic activity or Prohibited clear-cutting	No restrictions on economic activity or Seasonal restrictions on economic activity	No restrictions on economic activity or Seasonal restrictions on economic activity or Prohibited clear-cutting or Prohibited main felling
Quality:	II or III or IV	I or II or III	I or II or III	I or II or III	I or II or III	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion
The area borders a natural watercourse	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion	Not a restrictive criterion

Wetland – first level data

For wetland users are required to enter the following type of information to evaluate which CCM measures will be implementable on the identified land plot: location and basis of the reclaimed territory, irrigation of the reclaimed area, type of top layer of peat, thickness of the remaining peat layer, PH value of the upper peat layer, average groundwater level, number of days in a year when the area is flooded, degree of decomposition of peat, peat deposit yield. Currently the model includes one measure for wetlands whose data, as already mentioned, have been taken from the project LIFE Restore. In table 5 a list of first level input data and related limit values is provided.

Table 5. Wetland first level input 1

Main input (ENG)	Main input (LV)	Given options (ENG)	Given options (LV)	Limit values ((ENG)
Location of the reclaimed territory	Rekultivējamās teritorijas atrašanās vieta	• In the airport security zone • Outside the airport security zone	• Lidostas aizsargjoslā • Ārpus lidostas aizsargjoslas	Not a restrictive criterion
Basis of the reclaimed territory	Rekultivējamās teritorijas pamatne	• Water permeable primer • Waterproof bottom	• Ūdeni caurlaidīga grunts • Ūdeni necaurlaidīga grunts	Not a restrictive criterion
Irrigation of the reclaimed area	Rekultivējamās teritorijas apūdeņošana	• Only from atmospheric feeding • From other types of feeding	• Tikai no atmosfēriskās barošanās • No citiem barošanās veidiem	Not a restrictive criterion
Type of top layer of peat (up to 0.3m)	Virsējā kūdras slāņa (līdz 0,3 m) tips	• High type peat • Transition type peat	• Augstā tipa kūdra • Pārejas tipa kūdra	High type peat
Thickness of the remaining peat layer, m	Atlikušā kūdras slāņa biezums, m			>=0.5
PH value of the upper peat layer	Virsējā kūdras slāņa pH vērtība			2.7 - 5.0
Average groundwater level (from the surface), m	Vidējais gruntsūdens līmenis (no virsmas), m			>=0.35
Number of days in a year when the area is flooded	Dienu skaits gadā, kad teritorija ir applūdusi			<=14
Degree of decomposition of peat	Kūdras sadalīšanās pakāpe	• Poorly decomposed peat • Peat decomposed on average • Well decomposed peat	• Mazsadalījusies kūdra • Vidēji sadalījusies kūdra • Labi sadalījusies kūdra	• Poorly decomposed peat • Peat decomposed on average
Peat deposit yield, %	Kūdras iegulas celmainība, %			Not a restrictive criterion

III. PPC model second level input data

Once first level input data are entered all possible implementable CCM measures are shown in a separate window. For each implementable CCM measures second level data have to be entered so to obtain financial and socio-economic indicators. There are no restrictive criteria for second level data.

Agricultural land – second level input data

For agricultural lands users are required to enter the following type of information to obtain financial and socio-economic data on the chosen CCM measures, i.e. to understand the costs related to each selected measure, but also the return on investment and the measure's impact in terms of GHG emissions (potential GHG emissions reduction): area of the field to be recultivated, territory condition, management system, drainage system, land value in points[ii], legal form of the activity, public co-financing of capital investments, support payments. In Table 6 a list of all second level input data for CCM measures to be implemented on agricultural land is provided.

Table 6. Agric. land 2nd level input 1

Main input (ENG)	Main input (LV)	Given options (ENG)	Given options (LV)
Area of the field to be recultivated (ha)	Rekultivējamā teritorijas lauka platība (ha)		
Territory condition	Teritorijas stāvoklis	• No cleaning required • The area needs to be cleaned up • Overgrowth needs to be removed	• Sakopšanas darbi nav nepieciešami • Ir nepieciešama teritorijas sakopšana • Ir nepieciešama aizauguma likvidēšana
Management system	Apsaimniekošanas sistēma	• Integrated • Organic	• Integrētā • Bioloģiska
Drainage system	Meliorācijas sistēma	• The drainage system is in good condition • Ditches need to be reconstructed • A new system of ditches needs to be created • Reconstruction of the closed drainage system must be performed • A new closed drainage system needs to be set up	• Meliorācijas sistēma ir laba stāvoklī • Ir jāveic grāvju rekonstrukcija • Ir jāizveido jauna grāvju sistēma • Ir jāveic grāvju slēgtās drenāžas sistēmas rekonstrukcija • Ir jāizveido jauna slēgtās drenāžas sistēma
Land value in points	Zemes vērtība ballēs	• 0-10 • 11-20 • 21-30 • 31-40 • 41-50 • 51-60 • More than 60	• 0-10 • 11-20 • 21-30 • 31-40 • 41-50 • 51-60 • vairak par 60
Legal form of the activity	Darbības juridiskā forma	• Individual farmer • Farmers' Cooperative • Other legal forms	• Individuāls lauksaimnieks • lauksaimnieku kooperatīvs • citas juridiskās formas
Public co-financing of capital investments	Kapitālieguldījumu publiskais līdzfinansējums	• With public funding • Without public funding	• Ar publisko finansējumu • Bez publiska finansējuma
Support payments	Atbalsta maksājumi	• With support payments • Without support payments	• Ar atbalsta maksājumiem • Bez atbalsta maksājumiem

Forest land – second level input data

For forest lands users are required to enter the following type of information to obtain financial and socio-economic information on the chosen CCM measures, i.e. to understand the costs related to each selected measure, but also the return on investment and the measure's impact in terms of GHG emissions (potential GHG emissions reduction): area of the field to be recultivated, territory condition, management system, drainage system, land value in points, legal form of the activity, public co-financing of capital investments, support payments. In Table 7 a list of all second level input data for CCM measures to be implemented on forest land is provided.

Table 7 – Forest land second level input 1

Main input (ENG)	Main input (LV)	Given options (ENG)	Given options (LV)
Area of the field to be recultivated (ha)	Rekultivējamā teritorijas lauka platība (ha)		
Territory condition	Teritorijas stāvoklis	• No cleaning required • The area needs to be cleaned up	• Sakopšanas darbi nav nepieciešami • Ir nepieciešama teritorijas sakopšana
Management system	Apsaimniekošanas sistēma	• Integrated • Organic	• Integrētā • Bioloģiska
Drainage system	Meliorācijas sistēma	• The drainage system is in good condition • Ditches need to be reconstructed • A new system of ditches needs to be created	• Meliorācijas sistēma ir laba stāvoklī • Ir jāveic grāvju rekonstrukcija • Ir jāizveido jauna grāvju sistēma
Legal form of the activity	Darbības juridiskā forma	• Individual forester • Foresters' Cooperative • Other legal forms	• Individuāls mežsaimnieks • Mežsaimnieku kooperatīvs • Citas juridiskās formas
Public co-financing of capital investments	Kapitālieguldījumu publiskais līdzfinansējums	• With public funding • Without public funding	• Ar publisko finansējumu • Bez publiska finansējuma
Support payments	Atbalsta maksājumi	• With support payments • Without support payments	• Ar atbalsta maksājumiem • Bez atbalsta maksājumiem

Wetland – second level input data

For wetlands users are required to enter the following type of information to obtain financial and socio-economic data on the chosen CCM measures, i.e. to understand the costs related to each selected measure, but also the return on investment and the measure's impact in terms of GHG emissions (potential GHG emissions reduction): area of the field to be recultivated, drainage system, vegetation in the reclaimed area, alignment of the field to be reclaimed, blueberry variety, watering, fertilization, legal form of the activity, public co-financing of capital investments, support payments. In Table 8 a list of all second level input data for CCM measures to be implemented on wetland is provided.

Table 8. Wetland second level input data 1

Main input (ENG)	Main input (LV)	Given options (ENG)	Given options (LV)
Area of the field to be recultivated (ha)	Rekultivējamā teritorijas lauka platība (ha)		
Drainage system	Meliorācijas sistēma	• The drainage system is in good condition • The drainage system needs to be reconstructed • The drainage system needs to be rebuilt	• Meliorācijas sistēma ir laba stavokli • Meliorācijas sistēma ir jārekonstruē • Meliorācijas sistēma ir jāizveido no jauna
Vegetation in the reclaimed area	Veģetācija rekultivējamajā teritorijā	• Vegetation has not formed • Vegetation has developed	• Veģetācija nav izveidojusies • Veģetācija ir izveidojusies
Alignment of the field to be reclaimed	Rekultivējamā lauka līdzināšana	• Field alignment is not required • Field alignment is required	• lauka līdzināšana nav nepieciešama • lauka līdzināšana ir nepieciešama
Blueberry variety	Audzējamu melleņu šķirne	• Large blueberries • Narrow-leaved blueberries	• Lielogu krūmmellenes • Šaurlapu krūmmellenes
Watering	Laistīšana	• Watering is not done • Watering is done	• Laistīšana netiek veikta • Laistīšana tiek veikta
Fertilization	Mēslošana	• Conventional fertilizers • Organic fertilizers	• Parastais mēslojums • Ekoloģiskais mēslojums
Legal form of the activity	Darbības juridiskā forma	• Individual farmer • Farmers' Cooperative • Other legal forms	• Individuāls lauksaimnieks • lauksaimnieku kooperatīvs • citas juridiskās formas
Public co-financing of capital investments	Kapitālieguldījumu publiskais līdzfinansējums	• With public funding • Without public funding	• Ar publisko finansējumu • Bez publiska finansējuma
Support payments	Atbalsta maksājumi	• With support payments • Without support payments	• Ar atbalsta maksājumiem • Bez atbalsta maksājumiem

IV. PPC model output data

The model calculates the costs and benefits of each chosen CCM measure for the following six different time periods: 5 years, 10 years, 25 years, 50 years, 100 years and 200 years, according to the following key indicators.

Financial indicators / Finanšu rādītāji

- Average investment costs / Vidējās investīciju izmaksas (EUR)[iii]: the average amount of money spent for the investment.

The model calculates the average amount of money who needs to be invested to implement the chosen CCM measure on a x ha land. The amount varies and is influenced by the average costs of territory cleaning, the type of management chosen (for agricultural land - integrated vs organic) the status of the drainage system (in good conditions, reconstruction needed, new ditch system required) the type of planting culture, the presence or the absence of public fundings.

- Average notional profitability on net profit / Vidējā nosacītā neto peļņas rentabilitāte: the average notional amount of revenue calculated after deducting all expenses.

The profitability on net profit is calculated by dividing the cash flow (total revenue - total expenditures) by total revenue. The obtained value is divided by the number of years of the analysed time period (5,10,25,100,200 years) to obtain the average profitability. Total revenue include revenue from sales and support payments if any.
If total revenue are equal to 0 the profitability on net profit is 0. If this value is negative, the average expenditure is higher than the average revenue. If this value is positive the average revenue overpasses the average expenditure.
N.B. In case the symbol # N / A appears, the revenue of the scenario is not enough to ensure the return on investment!

- Average notional ROE / Vidējā nosacītā ROE: a measure of financial performance calculated by dividing net income by shareholders' equity.

The average notional return on equity (ROE) is calculated by dividing the cash flow (total revenue - total expenditures) by the investment costs. The obtained value is divided by the number of years of the analysed time period (5,10,25,100,200 years) to obtain the average ROE. Total revenue include revenue from sales and support payments if any.

- FNPV (EUR) Financial Net Present Value (real discount rate: 4%) / FNPV (EUR) Finanšu tīrā šodienas vērtība (reālā diskonta likme: 4%)[iv]: the net present financial value of the project's investment [the difference between the cash inflows and cash outflows].

This is calculated using a real financial discount rate of 4.0%. A negative net present value NPV forecasts loss, while a positive NPV forecasts profitability. The project qualifies for attracting public funding if the FNPV is less than 0 EUR.

- FIRR Financial Internal Rate of Return / Finanšu iekšējā peļņas norma, (%)[v]: the financial profitability of project investments.

If the FIRR is higher than the discount rate used in the calculation (4%), then the project has sufficient revenue to cover the investment and operating costs, and possibly EU co-financing is not needed or is needed in a smaller amount.

Economic indicators / Ekonomiskie rādītāji

- Reduction of GHG emissions (tonnes / year) / SEG emisiju samazināšanās (tonnas/gadā)[vi]: the total reduction of GHG emissions in tons obtained as a result of the CCM measure implementation.

For each period the sum of the reduction of GHG emissions estimated for each year is returned. The GHG emissions reductions currently included in the model are taken from researches from the Latvian State Forest Research Institute "Silava". If feasible the model will be tested in addition with data on GHG emissions, obtained as a results of the LIFE OrgBalt project's research conducted on the project demosites where CCM measures' impact is studied.

- Revenue from sales of products (EUR) / Produkcijas realizācijas ieņēmumi (EUR) [vii]: the money earned from the sale of products.

For scenarios implemented on agricultural land, revenue from sales are obtained as the product of culture's price, productivity's points and the land area. For information on sources see chapter 5.

- GHG emission reduction value (EUR) / SEG emisiju samazināšanās vērtība (EUR) [viii]: the economic value attributed to obtained GHG emissions reduction.

The yearly economic benefits for the reduction of GHG emissions (EUR) is calculated by multiplying the predicted GHG emissions reduction value (t/ha), by the price attributed to that reduction (EUR/t CO2 ekv.) and by the size of the land area (ha). A sum of the yearly values is returned for each time period analysed in the model (5, 10, 25, 50, 100, 200). For information on sources see chapter 5.

- Value of ecosystem services (EUR) / Ekosistēmas pakalpojumu vērtība (EUR)[ix]: an estimation of the value of ecosystem services.

The model takes into consideration entered monetary values of regulating and cultural ecosystem services. Data are secondary since currently there are no definitive results for ecosystem services indicators from the LIFE OrgBalt project demosites. This data is not statistic, but rather dynamic since it takes into consideration the development of culture and forest. For information on sources see chapter 5.

- ENPV: total value (EUR) Economic Net Present Value (real discount rate 5%) / ENPV: kopējā vērtība (EUR) Ekonomiskā tīrā šodienas vērtība (reālā diskonta likme 5%)[x]: the net present economic value of the project.

In the model this is calculated using a real economic discount rate of 5.0%. A project is attractive from a socio-economic point of view if the ENPV is greater than 0. In addition to revenue from sales and support payments which are considered for the calculations of revenues in the Financial Net Present Value of the project (FNPV) the Economic Net Present Value includes the benefits from the reduction of GHG emissions and the benefits from ecosystem services.

- EIRR: Economic Internal Rate of Return total value (%) / ERR: ekonomiskā tīrā šodienas vērtība - kopējā vērtība (%)[xi]: economic profitability of project investments. If the ERR is greater than the social discount rate, then the project is socio-economically beneficial for society.

In this case also the benefits from the reduction of GHG emissions and the benefits from ecosystem services are taken into consideration in the evaluation of the economic profitability of the project.

- ENPV: without the benefits of ecosystem services (EUR) (real discount rate 5%) / ENPV: bez ekosistēmas pakalpojumu ieguvumiem (reālā diskonta likme 5%)[xii].

The Economic Net Present Value is calculated also excluding the benefits of ecosystem services. In this case, the benefit for the reduction of GHG emissions only is taken into account.

- EIRR: without the benefits of ecosystem services (%) / ERR: bez ekosistēmas pakalpojumu ieguvumiem (%)[xiii]: the Economic Internal Rate is calculated also excluding the benefits of ecosystem services.

In this case also benefits of ecosystem services are excluded in the calculation of the profitability of the project. Therefore, the benefit for the reduction of GHG emissions only is taken into account.

Funding gap / Finansējuma deficits

- Eligible costs (EUR) / Attiecināmās izmaksas (EUR)[xiv]: the amount of costs that can be considered for a funding request.

The amount of necessary fundings is calculated for the all period. If FNPV has a negative value, eligible costs corresponds to the amount of investments costs for the entire period. If FNPV is equal or higher than 0, the project doesn't qualify for public fundings, being profitable.

- Financing deficit rate (%) / Finansējuma deficīta likme (%)[xv]: the financial deficit is the part of the investment costs that is not covered by the project's net income.

The financing deficit is the amount of public financing for the project to be profitable for its implementer (FNPV = 0 EUR). The financial deficit determines the maximum amount of public funding to be attracted for project implementation.

- Decision amount (EUR) (Relative amount funding gap rate)[xvi]/ Lēmuma summa (EUR)(Attiec. izm. finansējuma deficīta likme)

If the project foresees a loss, an estimation of the amount of needed fundings is returned by the model basing on the uncovered investment costs.

Cost effectiveness / Izmaksu efektivitāte

- Investment payback period (years) / Investīciju atmaksāšanās (gadi).

This value provides the number of years which are necessary for the project to become profitable.
N.B. In case the symbol # N / A appears, the revenue of the scenario is not enough to ensure the return on investment!

- GHG reduction costs (EUR / tonne) / SEG emisiju samazināšanas izmaksas (EUR/tonna): the total reduction of GHG emission costs obtained as a result of the project implementation in EUR.

V. The PPC model: data and sources

Agricultural land

In Annex 2 an overview of financial and socio-economic specific indicators is provided for each CCM measure implemented on agricultural land. In table 9 sources are provided for each data group. Currently Latvian resources have been analysed to build the model database. This data is considered comparable for the Baltic States. Different indicators are entered for the three CCM measures implemented in Finland (FIC301, FIC302, FIC303).

Table 9. Agricultural land data sources 1

Financial analysis		
Indicator	**Unit**	**Source**
Investment costs		
Territory cleaning works / Overgrowth elimination	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://www.llu.lv/sites/default/files/files/lapas/Preciza-mineralmeslojuma-lietosana.pdf https://www.zlm.lv/wp-content/uploads/2019/09/zlm_darbu_pakalpojumu_cenas_2019.pdf https://www.zlm.lv/wp-content/uploads/2021/01/Meza_apsaimniekosanas_izmaksas_2021.pdf https://new.llkc.lv/lv/nozares/ekonomika/bruto-segumu-aprekini-par-2022-gadu https://www.lbtu.lv/sites/default/files/files/projects/Pētījuma%20pārskats_S330_Atskaite%202018.pdf
Management system	EUR/ha	https://www.llu.lv/sites/default/files/files/lapas/Preciza-mineralmeslojuma-lietosana.pdf https://online.kruza.lv/katalogs/drzam/augu-aizsardzbas-ldzeki-mslojums/granultais-mslojums-azafoska-hortis-npk-16-16-16-2kg-ds0084/ https://www.lbtu.lv/sites/default/files/files/projects/Pētījuma%20pārskats_S330_Atskaite%202018.pdf
Drainage system (reconstruction, development, creation)	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://likumi.lv/ta/id/182311-valsts-un-eiropas-savienibas-atbalsta-pieskirsanas-administresanas-un-uzraudzibas-kartiba-pasakuma-infrastruktura-kas-attiecas-uz-lauksaimniecibas-un-mezsaimniecibas-attistibu-un-pielagosanu-istenosanai - "State and European Union support allocation, administration and monitoring procedure for the implementation of the measure "Infrastructure relating to the development and adaptation of agriculture and forestry"
Purchase and Planting culture	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://www.finieris.lv/docs/Dokumenti/Citi/Zabaki_stadu_cenas_2022.pdf http://llkc.lv/lv/nozares/mezsaimnieciba/sakas-meza-stadisanas-sezona
Public co-financing of capital invest.		
Intensity (drainage system reconstruction)	%	Latvian State Forest Research Institute "Silava"'s research
Amount of eligible costs (drainage system reconstruction)	EUR	Latvian State Forest Research Institute "Silava"'s research
Support payments	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://likumi.lv/ta/id/275943-kartiba-kada-pieskir-administre-un-uzrauga-valsts-un-eiropas-savienibas-atbalstu-pasakuma-ieguldijumi-meza-platibu-paplasinasana
Maintenance costs		https://www.zlm.lv/wp-content/uploads/2021/01/Meza_apsaimniekosanas_izmaksas_2021.pdf https://www.lvm.lv/seklas-un-stadi/meza-stadi
Renewal costs		Latvian State Forest Research Institute "Silava"'s research Official Statistics Portal of Latvia
Production costs	EUR/t	Latvian State Forest Research Institute "Silava"'s research
Productivity	t/ha	https://www.seklas.lv/produkcija/p2-maisijums-zales-lopbaribas-ieguvei/ https://silvaprim.lv/pakalpojumi/apalkoku-un-skeldas-iepirksana-osta https://llufb.llu.lv/proceedings/n20/6/LLU-proceeding-nr20-53-65.pdf
Benefit: Price	EUR/t	https://www.seklas.lv/produkcija/p2-maisijums-zales-lopbaribas-ieguvei/ https://silvaprim.lv/pakalpojumi/apalkoku-un-skeldas-iepirksana-osta https://llufb.llu.lv/proceedings/n20/6/LLU-proceeding-nr20-53-65.pdf
Socio-economic analysis		

Benefits: reduction of GHG emissions		Latvian State Forest Research Institute "Silava"'s research
Emission reduction price	EUR/ha	https://8billiontrees.com/carbon-offsets-credits/new-buyers-market-guide/carbon-credit-pricing/ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020SC0176 https://secondnature.org/climate-action-guidance/purchasing-carbon-offsets-faqs/
Fiscal adjustment factor		Official Statistics Portal of Latvia
Monetary value of ecosystem services	EUR/ha	https://petijumi.mk.gov.lv/node/4023

Forest land

In Annex 3 an overview of financial and socio-economic specific indicators is provided for each CCM measure implemented on forest land. In table 10 sources are provided for each data group.

Table 10a . LV Forest land data source 1

Financial analysis		
Indicator	**Unit**	**Source**
Investment costs		
Territory cleaning works	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://new.llkc.lv/lv/nozares/ekonomika/bruto-segumu-aprekini-par-2022-gadu https://www.seklas.lv/produkcija/sarkana-auzene/ https://agrimatco.lv/produkti/seklas/zalajs/1/2473/auzene-sarkana--1kg https://new.llkc.lv/lv/nozares/ekonomika/bruto-segumu-aprekini-par-2022-gadu
Management system	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://online.kruza.lv/katalogs/drzam/augu-aizsardzbas-ldzeki-mslojums/granultais-mslojums-azafoska-hortis-npk-16-16-16-2kg-ds0084/
Drainage system (reconstruction, development, creation)	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://likumi.lv/ta/id/182311-valsts-un-eiropas-savienibas-atbalsta-pieskirsanas-administresanas-un-uzraudzibas-kartiba-pasakuma-infrastruktura-kas-attiecas-uz-lauksaimniecibas-un-mezsaimniecibas-attistibu-un-pielagosanu-istenosanai - "State and European Union support allocation, administration and monitoring procedure for the implementation of the measure "Infrastructure relating to the development and adaptation of agriculture and forestry"
Purchase and Planting (dominant species)	EUR/ha	Latvian State Forest Research Institute "Silava"'s research Joint Stock Company "Latvia's State Forests" (LVM) https://www.lvm.lv/seklas-un-stadi/meza-stadi https://www.srcplus.eu/images/WP5/D5_3/LV/2ndPresentations/4.-Ekonomiskie-modeli-atraudzigo-kokaugu-audzesanai.pdf
Public co - financing of capital investments		
Intensity (drainage system reconstruction)	%	Latvian State Forest Research Institute "Silava"'s research
Amount of eligible costs (drainage system reconstruction)	EUR	Latvian State Forest Research Institute "Silava"'s research
Support payments	EUR/ha	Latvian State Forest Research Institute "Silava"'s research https://new.llkc.lv/lv/nozares/mezsaimnieciba/es-un-valsts-atbalsts-mezsaimniecibai https://likumi.lv/ta/id/275943-kartiba-kada-pieskir-administre-un-uzrauga-valsts-un-eiropas-savienibas-atbalstu-pasakuma-ieguldijumi-meza-platibu-paplasinasana

Dominant specie's characteristics		Latvian State Forest Research Institute "Silava"'s research
Age of stand		Latvian State Forest Research Institute "Silava"'s research https://likumi.lv/ta/id/2825-meza-likums
Productivity		Latvian State Forest Research Institute "Silava"'s research
Maintenance costs		Latvian State Forest Research Institute "Silava"'s research
Renewal costs		Latvian State Forest Research Institute "Silava"'s research
Classification of wood materials	EUR/t	Latvian State Forest Research Institute "Silava"'s research Joint Stock Company "Latvia's State Forests" (LVM)
Benefit: Price	EUR/t	Law on Forests, (Republic of Latvia approved on 24/02/2000) https://stat.gov.lv/lv/statistikas-temas/noz/mezsaimnieciba?themes=#tabulas https://new.llkc.lv/lv/nozares/mezsaimnieciba/2022-gada-apalo-kokmaterialu-produktu-cenu-tendences https://stat.gov.lv/lv/statistikas-temas/noz/mezsaimnieciba/tabulas/mei020-apalkoku-videjas-iepirkuma-cenas-eurm3-bez-pvn https://www.db.lv/zinas/koksnes-cena-latvija-piedzivojusi-vel-nepieredzetas-svarstibas-508867
Dominant specie's production costs	t/ha	Official Statistics Portal of Latvia https://data.stat.gov.lv/pxweb/lv/OSP_PUB/START__NOZ__ME__MEI/MEI010/table/tableViewLayout1/
Socio-economic analysis		
Benefits: reduction of GHG emissions		Latvian State Forest Research Institute "Silava"'s research
Emission reduction price	EUR/ha	https://8billiontrees.com/carbon-offsets-credits/new-buyers-market-guide/carbon-credit-pricing/ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020SC0176 https://secondnature.org/climate-action-guidance/purchasing-carbon-offsets-faqs/
Fiscal adjustment factor		Official Statistics Portal of Latvia
Monetary value of ecosystem services	EUR/ha	https://petijumi.mk.gov.lv/node/4023

Table 10b . FI Forest land data sources 1

Financial analysis		
Indicator	**Unit of measurement**	**Source**
Investment costs		
Territory cleaning works	EUR/ha	https://www.upmmetsa.fi/metsapalvelut/metsanhoito/maanmuokkaus/ https://www.metsateho.fi/puunkorjuu-ja-kaukokuljetus-tilasto-2019-julkaistu/ https://forest.fi/article/condition-of-forestry-roads-causes-bottlenecks-in-timber-procurement-more-attention-to-road-maintenance-is-needed/#66610975 https://www.frontiersin.org/articles/10.3389/fenvs.2022.837878/full
Management system	EUR/ha	https://www.metsateho.fi/puunkorjuu-ja-kaukokuljetus-tilasto-2019-julkaistu/
Drainage system (reconstruction, development, creation)	EUR/ha	https://www.ymparisto.fi
Purchase and Planting (dominant species)	EUR/ha	
Public co - financing of capital investments		
Intensity (drainage system reconstruction)	%	https://www.metsakeskus.fi/en/forestry-subsidies/afforestation-support
Amount of eligible costs (drainage system reconstruction)	EUR	https://www.metsakeskus.fi/en/forestry-subsidies/afforestation-support
Support payments	EUR/ha	https://www.metsakeskus.fi/en/forestry-subsidies/afforestation-support
Dominant specie's characteristics		Latvian State Forest Research Institute "Silava"'s research
Age of stand		Latvian State Forest Research Institute "Silava"'s research
Productivity		https://llufb.llu.lv/proceedings/n20/6/LLU-proceeding-nr20-53-65.pdf
Maintenance costs		https://www.upmmetsa.fi/tietoa-ja-tapahtumia/artikkelit/taimikonhoidon-tietopaketti-metsanomistajalle/
Renewal costs		https://www.upmmetsa.fi/metsapalvelut/metsanhoito/taimet/ https://www.frontiersin.org/articles/10.3389/fenvs.2022.837878/full
Classification of wood materials	EUR/t	https://www.luke.fi/en/statistics/volumes-and-prices-in-industrial-roundwood-trade/volumes-and-prices-in-roundwood-trade-2021
Benefit: Price	EUR/t	https://www.luke.fi/en/statistics/volumes-and-prices-in-industrial-roundwood-trade/volumes-and-prices-in-roundwood-trade-2021
Dominant specie's production costs	t/ha	https://www.salaryexpert.com/salary/job/forester/finland
Socio-economic analysis		
Benefits: reduction of GHG emissions		Latvian State Forest Research Institute "Silava"'s research Natural Resources Institute Finland (Luke)
Emission reduction price	EUR/ha	https://8billiontrees.com/carbon-offsets-credits/new-buyers-market-guide/carbon-credit-pricing/ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020SC0176 https://secondnature.org/climate-action-guidance/purchasing-carbon-offsets-faqs/
Fiscal adjustment factor		https://www.salaryexpert.com/salary/job/forester/finland
Monetary value of ecosystem services	EUR/ha	

Wetland

In Annex 4 an overview of financial and socio-economic specific indicators is provided for each CCM measure implemented on- wetland. Sources have been taken from the project LIFE Restore https://restore.daba.gov.lv/public/lat/optimizacijas_modelis1/

VI. Pilot cases

In order to test the model and compare the outcomes of the different scenarios one pilot case for each land type has been created basing on the characteristics of the project demosites. Below a description of each pilot case. In brackets the number of demosites who corresponds to the identified characteristics. A complete analysis of the identified pilot cases is expected to be completed by September 2023.

Agricultural land

First level data:

- Type of agricultural land: arable (7)
- Soil type: The soil complies with the organic soil criteria of the IPCC 2006 (7)
- Land use assessment: Overgrown- may meet the definition of forest stand (7)
- Management system: Integrated (7)
- Drainage system: Non-functioning ditches (6)
- Restrictions on economic activity: There are no restrictions on economic activity (7)

Second level data:

- Area of the field to be recultivated (ha): 10
- Territory conditions: No cleaning required(7)
- Management system: Integrated (6)
- Drainage system: the drainage system needs to be reconstructed (6)
- Land value in points: 21-30 (7)
- Legal form of the activity: other legal forms (7)
- Public co-financing of capital investments: without public funding (7)
- Support payments: With support payments (7)

Forest land

First level data:

- Type of forest: Caricoso — phragmitosa (3)
- Drainage system: Functioning (8)
- Dominant species: Black alder (3)
- Age of stand: Adult stand (meets the criteria for main felling)- (8)
- Restrictions on economic activity: There are no restrictions on economic activity (8)
- Quality: III (8)
- The area borders a natural watercourse: Yes (8)

Second level data

- Area of the field to be recultivated (ha): 10
- Territory conditions: No cleaning required (8)
- Drainage system: the drainage system is in good condition (8)
- Legal form of the activity: Foresters' Cooperative (8)
- Public co-financing of capital investments: without public funding (8)
- Support payments: With support payments (8)

Wetland

First level data

- Location of the reclaimed territory: Outside the airport security zone
- Basis of the reclaimed territory: Water permeable primer
- Irrigation of the reclaimed area: Only from atmospheric feeding
- Type of top layer of peat (up to 0.3 m): High type peat
- Thickness of the remaining peat layer, m: 1
- PH value of the upper peat layer: 3
- Average groundwater level (from the surface), m: 4
- Number of days in a year when the area is flooded: 7
- Degree of decomposition of peat: Peat decomposed on average
- Peat deposit yield, %: 20

Second level data

- Area of the field to be recultivated (ha): 10
- Drainage system: The drainage system is in good condition
- Vegetation in the reclaimed area: Vegetation has developed
- Alignment of the field to be reclaimed: Field alignment is not required
- Blueberry variety: Large blueberries
- Watering: Watering is done
- Fertilization: Conventional fertilizers
- Legal form of the activity: Other legal forms
- Public co-financing of capital investments: without public funding
- Support payments: With support payments

Conclusions

The PPC model has been developed to allow farmers and foresters to evaluate the costs and benefits related to the implementation of CCM measures both in the short-term and in the long-term. Within the model indeed financial and socio-economics indicators' values are estimated including environmental benefits. The model therefore allows landowners to analyse costs on the one end, and provides public authorities with useful data on the other. The estimation of GHG emissions provided within the model, allows in fact to evaluate the potential inclusion of these measures in policy documents and national plans, such as the Nature Restoration Plan which will be adopted by states following the enforcement of the EU Nature Restoration Law. In addition, policy makers will be able to evaluate the necessary support payments and public co-financing measures, including GHG credit selling opportunities, to make those measures implementable and profitable for landowners. Training sessions have been planned in spring 2024 to train final users, but also to make the model a valuable instrument for policy makers and consultancy and training services who could use this tool to assist farmers in making projections to evaluate the implementation of mitigation measures which would bring to a GHG reduction. In addition to provide a set of specific, concrete data to start reflecting on the potential that CCM measures could bring in terms of GHG reductions, the model aims to convey a discussion on the necessity to start planning land management practices so to meet current and future EU environmental requirements.

The current document is presented in the form of a draft which will be revised in September 2023, when the analysis of the identified pilot cases is expected to be completed, and during 2024 to include in the model updated data and/or important results from the project. Finally, it's important to highlight that the data of the model are subjected to periodical changes due to new regulations, price fluctuations and their subsequent impact on costs and benefits. For this reason, the model provides two types of access: one as users which does not allow to modify the data basis and one as administrator which allows trained users to modify the data basis so to update it basing on current real data. In this way the continuity of the model is ensured making it a long-term tool whose scope goes beyond the project time boundaries. The model is therefore structured to be replicated within the Baltic States and transferred to other contexts. Data can indeed be updated to different national and local – specific data sets.

[i] The terms derives from the latin word "bonitas", good quality, It describes the growth effect of forest stands under certain growing conditions. Different methods have been used during the years. The model takes into account the method currently used in Latvia which was developed by Professor M. Orlova in 1911 and its supplement developed in 1931. https://www.mf.lbtu.lv/sites/mf/files/files/lapas/Mezsaimniecības%20pamati_apskates.pdf (Chapter paragraph 3.5.6).

The model is based on a rating scale going from I to V which correlates the height of the stands with its age. In the scale I corresponds to better quality and V to worse. https://www.mf.lbtu.lv/sites/mf/files/files/lapas/meza_taksacija_PRINT.pdf , (Chapter 3.7).

[ii]The quality of agricultural land is influenced by the type of soils and its composition and the condition of the drainage system. The land use assessment is expressed in points and is evaluated by the State Land Service of Latvia through soil mapping and land assessment cartographic materials. https://new.llkc.lv/lv/nozares/mezsaimnieciba/kas-ir-zemes-balles-un-kur-tas-var-apskatit . An average qualitative assessment of agricultural land for specific land unit is provided at https://www.kadastrs.lv/

[iii] The indicator is calculated using the average investment costs

[iv] The indicator is calculated using the average investment costs

[v] The indicator is calculated using the average investment costs

[vi] Total GHG emissions reduction (tonnes) from year 2

[vii] Discounted value of revenues used in the calculation of the ENPV

[viii] Discounted value of revenues used in the calculation of the ENPV

[ix] Discounted value of revenues used in the calculation of the ENPV

[x] The indicator is calculated using the average investment costs

[xi] The indicator is calculated using the average investment costs

[xii] The indicator is calculated using the average investment costs

[xiii] The indicator is calculated using the average investment costs

[xiv] The indicator is calculated using the average investment costs

[xv] The indicator is calculated using the average investment costs

[xvi] estimated, not automatically available aid amount