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Enhancement of sustainable land soil resource management in agriculture - E2SOILAGRI

Project mid-term implementation review

NIBIO REPORT | VOL. 8 | NO. 149 | 2022

Geir-Harald Strand, Siri Svendgård-Stokke
Division of Survey and Statistics

TITTEL/TITLE

Enhancement of sustainable land soil resource management in agriculture - E2SOILAGRI. Project mid-term implementation review

FORFATTER(E)/AUTHOR(S)

Geir-Harald Strand, Siri Svendgård-Stokke

DATO/DATE:	RAPPORT NR./ REPORT NO.:	TILGJENGELIGHET/AVAILABILITY:	PROSJEKTNR./PROJECT NO.:	SAKSNR./ARCHIVE NO.:
09.12.2022	8/149/2022	Open	52351	20/01081

ISBN:	ISSN:	ANTALL SIDER/ NO. OF PAGES:	ANTALL VEDLEGG/ NO. OF APPENDICES:
978-82-17-03182-6	2464-1162	16	1

OPPDRAGSGIVER/EMPLOYER:	KONTAKTPERSON/CONTACT PERSON:
The Ministry of Agriculture of the Republic of Latvia	Lauris Leitāns

STIKKORD/KEYWORDS:	FAGOMRÅDE/FIELD OF WORK:
soil classification, soil information, soil carbon monitoring, GHG emissions	soil

SAMMENDRAG/SUMMARY:

Sammendrag

Dette er en midtveis-rapport for NIBIOs bidrag i prosjektet "E2SOILAGRI". Rapporten sammenfatter informasjon om prosessen og oppnådde resultater hittil, med kommentarer fra NIBIO. Arbeidet er definert som en underaktivitet 4.1 i Terms of Reference for NIBIOs rolle i prosjektet.

Summary

This is a mid-term report for the NIBIO assignment in "E2SOILAGRI". The report gives information on the process and the deliveries for the Latvian partners in the project and includes remarks from the review team. This task is defined as sub-activity 4.1 in the Terms of Reference for the NIBIO assignment.

LAND/COUNTRY:	Latvia
STED/LOKALITET:	

GODKJENT /APPROVED	PROSJEKTLEDER /PROJECT LEADER
HILDEGUNN NORHEIM	SIRI SVENDGÅRD-STOKKE

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Preface

NIBIO is a partner in the project "Enhancement of sustainable land soil resource management in agriculture" (E2SOILAGRI) implemented by the Ministry of Agriculture of the Republic of Latvia and funded under the Norwegian Financial Mechanism Program "Climate Change Mitigation, Adaptation and Environment". The main objective of the project is to improve Latvian soil data for the development and implementation of climate change policies. The project is managed by Latvian authorities. The project period is from February 2021 to January 2024.

NIBIO has an advisory role in the project. NIBIO is owned by the Norwegian Ministry of Agriculture and Food and has a role in contributing to food security and safety, sustainable resource management, innovation, and value creation in Norway. NIBIO is a partner in E2SOILAGRI due to its ongoing soil survey on agricultural land and the experience in making data from the survey easily accessible for different users.

The E2SOILAGRI project is supported by Norway through the Norway Grants. The Norway Grants, together with the EEA Grants, represent Norway's contribution towards a green, competitive, and inclusive Europe. Through the Norway Grants and the EEA Grants, Norway contributes to reducing social and economic disparities and to strengthening bilateral relations with beneficiary countries in Central and Southern Europe and the Baltics. Norway cooperates closely with the EU through the Agreement on the European Economic Area (EEA). Together with the other donors, Norway has provided €3.3 billion through consecutive grant schemes between 1994 and 2014.

Norway Grants are financed solely by Norway and are available in the countries that joined the EU after 2003. For the period 2014-2021, the Norway Grants amount to €1.25 billion. The E2SOILAGRI benefits from a EUR 1,56 million contribution from Norway Grants.

This report is a mid-term report from NIBIO and summarizes the information obtained within activity 4 in the project, "Exchange of experience of experts from NIBIO on sustainable management of soil resources", sub-activity 4.1, "Involvement of NIBIO experts into the implementation of the project", task 2, "Perform project mid-term implementation review".

Ås, 09.12.22

Hildegunn Norheim

Content

1 Introduction

The project "Enhancement of sustainable land soil resource management in agriculture" E2SOILAGRI is funded under the Norwegian Financial Mechanism Program "Climate Change Mitigation, Adaptation and Environment" and implemented by Latvian authorities. The project promotor is the Ministry of Agriculture of the Republic of Latvia. Several Latvian public institutions participate in the implementation of the project. The task of conducting a midterm implementation review and evaluation of the project is assigned to the Norwegian Institute of Bioeconomy Research through a partnership agreement between Ministry of Agriculture of the Republic of Latvia and the Norwegian Institute of Bioeconomy Research (signed 22.02.2021).

This assignment is described in the partnership agreement:

> *To help project steering group follow up and evaluate project implementation progress it is expected to develop two stage project implementation reviews. Mid-term project implementation review (PIR) will assess project implementation progress towards its goals and expected results mentioned before in these ToR and give recommendations for improvement.*
>
> *Mid-term PIR will be carried out in following stages:*
> *a) Review of written project progress reports;*
> *b) 3 days in-country mission to perform stakeholder and project implementation partner interviews;*
> *c) Perform initial finding discussion with representatives from project steering group at the end of in-country mission;*
> *d) Prepare and deliver written mid-term PIR report.*
> *[…]*

The mid-term evaluation concentrated on project activities 2, 3 and 4. Remaining activities: project coordination, participation in international events, dissemination and publicity, are given rudimentary attention.

There is a mismatch in the numbering of activities in the partnership agreement and in the working documents of the project, including the project plan. The reason is that project coordination has been labelled Activity 0 (instead of Activity 1). The activities labelled 2, 3 and 4 in the partnership agreement is therefore labelled 1, 2 and 3 in other project documents. The change has no consequences for the project implementation. We will use the labelling 1, 2 and 3 in this report, understanding that this corresponds to “activities 2, 3 and 4” when described in the partnership agreement.

The in-country mission to perform stakeholder and project implementation partner interviews, was extended, from three days stated in the Terms of Reference, to five days (travel included). The agenda for the in-country mission is shown in the appendix. Written project process reports (as mentioned in a) were not made available for the review team in time for reviewing, hence they are not reviewed. This is not a critical issue.

2 Upgrading reliable, country-specific soil information of agricultural land (activity 1)

Activity 1 is implemented by the University of Latvia.

2.1 Upgrading of the historical soil information database

The objective of this task is to georeference (add digital spatial coordinates to) existing soil profile descriptions. The result is a (digital) list of profiles with coordinates attached. Basic information from the soil profiles (e.g., soil type) is added in the digital list, but the complete profile description remains in a paper-based archive. Cross-reference between the digital list and the paper archive is maintained by a profile identification code.

The georeferenced soil profile list will make it easy to a) find profiles for a certain region or soil type in the paper archive; and b) locate a particular profile from the paper archive on digital maps and in the field (using GPS). This service will be valuable in future soil mapping and modelling exercises.

Remarks from the review team:

- According to the project plan, 12 000 (of total 15 000) profiles should be georeferenced by the end of 2022. 9 000 were georeferenced by the end of October. This is slightly (less than 10 %) behind schedule and the backlog is not critical. The progress will inevitably vary according to the quality/precision of the site description in the original profile documents.
- The georeferenced soil profiles constitute a valuable national asset. The management of these data should be secure and professional. It is important with proper documentation and that regular backup is taken and stored in a secure place. We understand that the University of Latvia has the necessary routines, but the data safety should also be checked by the project management.
- In a longer perspective, the soil profile database and the digital information held by the University of Latvia should be integrated in the national soil information system in Latvia. This is not a task for the E2SOILAGRI project, but the project should prepare for this integration through development of proper documentation of the data and storage of digital information in a suitable format (by agreement with the State Plant Protection Service). Digitizing all the information in the historical soil profiles is not feasible, but the profile information could be scanned, and the images stored in a digital repository using the coordinates as a direct link between the repository and map services.

2.2 Development of a national soil classification system

University of Latvia has revised the existing Latvian soil classification system. A draft has been developed and the feasibility of the revised classification system is tested by the University of Latvia. Approbation followed by publication of a final version of the Latvian soil classification system is planned to take place in 2023.

Remarks from the review team:

- The drafts have been prepared according to the project plan. It is important that the other project participants and the various stakeholders contribute to the approbation process by reviewing, testing, and commenting on the draft document. The draft of the national soil classification system has not been made available (is not translated) for the review team. Therefore, the draft is not reviewed

- The review team has noticed that the project has decided to make a revision of the existing Latvian soil classification system rather than developing a new national soil classification system (based on WRB). The connection to WRB will be maintained through a conversion table where each Latvian soil type will be linked to a WRB unit. This conversion table will allow Latvia to convert soil information and statistics based on the national Latvian soil classification system into a format suitable for international reporting and cooperation. The review team has not been involved in the process of establishing the conversion table. Therefore, this is not part of the review.
- Up to now, some remarks have been made that one Latvian soil type can be classified as several units according to WRB (2014). This seems strange, given that *"The user should go through the Key systematically, starting at the beginning and excluding one by one all RSGs for which the specified requirements are not met. The soil belongs to the first RSG for which it fulfils the criteria"* (World Soil Resources Reports 106, 2014). Note: RSG = Reference Soil Group. A unique classification can therefore be done by adhering to the WRB guidelines.
- The decision to build on the existing Latvian soil classification system has merit. Many (probably most) users are familiar with the existing system and will be comfortable with a revised version. Training users in WRB is far more difficult.
- Changes in soil classification systems are costly. They require retraining of personnel and can create compatibility problems. Changes and revisions are sometimes necessary (as Latvia is doing now) but they should be handled with great care and frequent adjustments should be avoided. The new national soil classification system and the adoption of a WRB conversion table must be developed with a long (at least ten years) perspective. This includes a decision to select a particular version of WRB.

2.3 Development of soil mapping methodology on agricultural land

A soil mapping methodology at 1:10 000 scale using Latvian and WRB (2014) soil classification, including methodology for soil description, classification, and mapping at 1:10 000 scale, is under development by the University of Latvia. The drafts have been developed and the implementation is tested by the University of Latvia and Silava in other parts of the project. Approbation, followed by publication of a final version of the Latvian soil classification system, a description of the methodology and guidelines for practical use is planned for 2023.

Remapping of soils, redescription of selected old soil profiles and description of additional soil profiles is ongoing in two administrative areas. These two administrative areas represent the variation found in Latvian agricultural soil conditions. The purpose is manyfold: a) to check the quality of the historical soil profile descriptions; b) to complement the soil profile collection – especially for organic soils; c) provide support for remapping; and d) test the new mapping guidelines. The activity is mainly planned for 2023.

The remapping of selected existing soil profiles and the description of new soil profiles is ongoing, and the progress is according to schedule (110 profiles in 2022). A profile database will be available in 2023, when all profile descriptions are completed.

New soil maps for two administrative parishes (Platone and Vecpiebalga) will be created in 2023, using the new mapping instructions and the revised Latvian soil classification system. Results will provide a basis for comparing maps produced according to the old and the revised system, as well as estimates for the cost of soil description and mapping according to the new system.

Remarks from the review team:

- It is important that the other project participants and the various stakeholders contribute by reviewing, testing, and commenting on the methodology described in the draft documents.
- The draft of the soil mapping methodology has not been made available (was not translated) for the review team. Therefore, the draft is not reviewed.
- Based on experience with the Norwegian mapping and description system, the review team will emphasize the importance of instructions getting a status as a national standard maintained by a mandated organization and remaining intact over a long period.

2.4 Mapping of peatland distribution

A methodology for peatland mapping using satellite imagery and artificial intelligence has been developed by the University of Latvia and the results look promising. The product is a "probability map" showing the probability of finding peat soils.

A collection of new peat soil profiles is being established. Approximately half are redescriptions of existing profiles, the other half are new profiles. The activity is progressing according to the plan.

Remarks from the review team:

- The description of profiles is done according to the new standard developed under task 1.3 (chapter 2.3 in this report). These soil profiles should be managed as part of the larger soil information system developed by the State Plant Protection Service (SPPS). The new peatland maps should, along with the digitized soil maps, be managed by a mandated organization (probably SPPS) as parts of the new soil information system.
- Verification is an important part of the documentation of a new product. The verification of the new peatland probability maps should be documented as part of the overall documentation of the methodology.

2.5 Training in soil description and mapping on a scale of 1:10,000 in accordance with the soil classification of Latvia and WRB (WRB 2014)

The curriculum has been developed and the course has been arranged by the University of Latvia.

Remarks from the review team:

- The training course should undergo a formal evaluation by the participants with the aim to provide information that allows the University of Latvia to further improve the curriculum. This may have been done, but we are not aware of it.
- The training course was held for two weeks. The course consisted of lectures on diagnostics and criteria, classification, mapping, the peat model data, GIS, and field works. The content of the course seems adequate. Being a fully trained person in both soil description and soil mapping demands a lot more time. If fulfilling the training course is sufficient for being responsible for both soil description and soil mapping, there is a risk that the quality of the work is poor.
- Practice and repeated training will be needed for the participants to maintain and further improve their skills. It is therefore important to follow up the training with practical mapping assignments. The University of Latvia should also aim to offer the course on a regular basis in order to strengthen and develop the contents of the course.

2.6 Development of proposals for the improvement of regulatory enactments on soil governance issues

The regulatory enactments on soil governance issues are will be developed by the Ministry of Agriculture (MA) in 2023.

Remarks from the review team:

The review team has not seen the draft and would not have the competency to assess it. A general viewpoint from the review team is, however, that the regulatory enactments should provide solid basis for the overall goal (a Latvian soil information system) with its components and provide a mandate for the responsible organization to develop and manage this system. The regulatory enactments should not be concerned with how this is done but leave the content and details to the implementing agency.

3 Establishment of a national soil carbon monitoring system (activity 2)

Activity 2 is implemented by the State Plant Protection Service (SPPS).

3.1 Establishment of a soil carbon monitoring network on agricultural land

Soil carbon monitoring points in agricultural land are under establishment. The plan is to have 160 points by the end of 2022, with additional 40 monitoring points planned for 2023. The data collection also encompasses the collection of data on economic activity from the farmers managing the areas where the points are located. The progress is close to the plan.

Soil sample physio-chemical analyses (for 0-10; 10-20 and 20-40 cm depths) is carried out by an accredited laboratory. The analysis of the data and implementation in GHG Inventory report together with a scientific report on the results will be done by Silava in 2023.

Remarks from the review team:

- The sampling strategy, field data collection routines and laboratory analysis are sound as far as we can understand. The samples and sample analysis are valuable assets and must be stored and managed accordingly.
- The soil profiles used in this activity are described by a small group of employees trained under activity 1.5 (chapter 2.5 in this report), but with limited practical experience with soil profile descriptions. Systematic quality checks including validation of selected profile descriptions is therefore recommended. For the soil carbon monitoring system to be fully valuable, it is extremely important that the quality of profile descriptions is high.

3.2 Establishment of the Soil Carbon Monitoring Database of agricultural land, which is integrated into the State Crop Monitoring Information System (KUVIS)

A prototype of the Soil Carbon Monitoring Database of agricultural land has been developed and can be integrated into the State Crop Monitoring Information System (KUVIS) together with an agricultural land soil organic carbon monitoring database. Implementation and installation will take place in 2023.

Remarks from the review team:

The database application appears appropriate for the task. Data from the various parts of the project should be brought together for common management in the KUVIS database

4 Development of GHG emission factors and drafting of proposals for the inclusion of the elaborated emission factors into the national GHG inventory report (activity 3)

Activity 3 is implemented by the Silava and consists of three tasks:

3.1. Test site selection, characterization, GHG measurement equipment installation
3.2. GHG emission (CO_2, CH_4, N_2O) measurements in test sites
3.3. Development of GHG emission factors for organic soil in permanent grassland and implementation in GHG Inventory report

Test sampling sites have been selected and the necessary equipment is installed (Task 3.1). Data collection is ongoing with progress according to plan (Task 3.2). The data analysis and calculation of emission factors, and the consequent implementation in the GHG Inventory report are scheduled for 2023.

Remarks from the review team:

The progress in this activity is according to plan. There is still risk linked to this activity:

- The activity relies on a very small sample (three measurement sites with three sample plots at each site). The statistical properties of this data collection are uncertain. It is important that the information used in Task 3.1 is thoroughly documented in order to allow assessment of the representativeness and possible bias.
- For the GHG emission (CO_2, CH_4, N_2O) measurements in the test sites to be fully valuable, it is extremely important that the descriptions of the soils on the sites are of high quality. This is best secured if the descriptions are done by highly skilled persons.
- In task 3.3 the assessment of the uncertainty of the emission factors developed in the project should include the uncertainty associated with the sampling design. This assessment may be qualitative.
- The development of the GHG emission factors should be published in a respected international journal to have the work assessed by a qualified international review team. This review process is time-consuming. It is, however, possible to start the process now. The description of the background, material and methods constitute a substantial part of such a paper and can be written now. The framework for the presentation of the results can probably also be added. The tasks following the data analysis (results, discussion, and conclusion) will be limited and it is possible to speed up the publication process at the end of the project.

5 Conclusions

This project mid-term implementation report summarizes the information obtained within the in-country mission in Latvia in October 2022. The review team concludes that the progress of E2SOILAGRI is in line with the project plan.

References

Strand, G.H. and Svendgård-Stokke, S. 2022. Enhancement of sustainable land soil resource management in agriculture - E2SOILAGRI. NIBIO Inception report. Nibio Report 024/2022

World Soil Resources Reports 106. 2014. Food and Agriculture Organization of the United Nations, Rome 2014

Appendix: Agenda for mid-term evaluation visit to Latvia

Monday, October 24 Arrival at 13:10

Tuesday, October 25

10:40 – 12:10	Interview with Latvian Forest Research Institute Silava *Rīgas iela 111, Salaspils (~30min from Riga, https://goo.gl/maps/21NXnpzsfv5qJrVy5)*
12:10 – 13:00	Drive to test site *Ogresgala parish (~40min from Salaspils, https://goo.gl/maps/MRBt8U6ANQBYimzP7)*
13:00 – 14:00	Practical demonstration of GHG test site by Latvian Forest Research Institute Silava Joined by Ine Måreng, Ambassador of Norway to Latvia *Ogresgala parish (~1h from Riga, https://goo.gl/maps/MRBt8U6ANQBYimzP7)*
14:00	Meeting / lunch with the Ambassador *TBD*
Wednesday, October 26	
11:00 – 15:00	Practical demonstration of soil profiles by the University of Latvia *Taurene parish, Lodesmuiža (~2h from Riga, https://goo.gl/maps/jtrt9hstZrHjDuQg8)*
Thursday, October 27	
10:00 – 10:30	Practical demonstration of soil carbon monitoring system by State Plant Protection Service *Sigulda parish (~1h from Riga, https://goo.gl/maps/B1NqsGUTV5f5n9PB6)*
10:30 – 11:30	Drive to State Plant Protection Service *Lielvārdes iela 36, Rīga (~1h from site, https://goo.gl/maps/NsTcggjJ1baXJqoM7)*
11:30 – 13:00	Interview with State Plant Protection Service
13:00 – 14:00	Lunch *Ēlande, Brīvības iela 249, Rīga (https://goo.gl/maps/EtYgYJGTDN4ikUis8)*
14:00 – 15:30	Interview with Ministry of Agriculture
Friday, October 28	
09:00 – 10:30	Interview with University of Latvia *Jelgavas iela 1, Rīga (https://goo.gl/maps/EzJGE5Y9xB2U8W2z9)*
	Departure at 13:55

Epilogue

This report is based on the knowledge and understanding that the NIBIO review team obtained during the in-country mission, 24th-28th of October.

Key words:	soil classification, soil information, soil carbon monitoring, GHG emissions
Other publications:	NIBIO Report Vol. 8, No. 24, 2022. Enhancement of sustainable land soil resource management in agriculture – E2SOILAGRI. NIBIO Inception report NIBIO Report Vol. 8, No. 67, 2022. The Norwegian Soil Information System. Data capture, Data management, Data processing and Dissemination.

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NIBIO - Norwegian Institute of Bioeconomy Research was established July 1 2015 as a merger between the Norwegian Institute for Agricultural and Environmental Research, the Norwegian Agricultural Economics Research Institute and Norwegian Forest and Landscape Institute.

The basis of bioeconomics is the utilisation and management of fresh photosynthesis, rather than a fossile economy based on preserved photosynthesis (oil). NIBIO is to become the leading national centre for development of knowledge in bioeconomics. The goal of the Institute is to contribute to food security, sustainable resource management, innovation and value creation through research and knowledge production within food, forestry and other biobased industries. The Institute will deliver research, managerial support and knowledge for use in national preparedness, as well as for businesses and the society at large.
NIBIO is owned by the Ministry of Agriculture and Food as an administrative agency with special authorization and its own board. The main office is located at Ås. The Institute has several regional divisions and a branch office in Oslo.

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