

Minutes information meeting on ETC ULS task 1.8.2.1 and links to 1.8.2.2

1.8.2.1 Soil functions: the buffering and filtering of nutrients and pollutants

1.8.2.2 Integration of existing spatial data relevant to assess soil degradation in Europe

Location: Wageningen Campus, Lumen Building Droevendaalsesteeg 3a; room Lumen 6

Time: January 16, 2018

Participants: [REDACTED] (EEA), [REDACTED]

Participants re Task 1.8.2.1:

[REDACTED], Paul Romkens, [REDACTED]

);

Participants re Task 1.8.2.2:

Minutes

Opening: background and aim of the meeting; overarching objective setting for our work on soil: [REDACTED]

General comments: 2018 is the year to finalize the report on the status of EU soils which is to be published in 2019. Focus of the work in 2018 is therefore on completion of work (on nutrients and contaminants) rather than on starting new issues. The aim is to make 'soils' more visible within EEA both in view of expertise as well as to provide more input into the policy discussion on soil related topics. It is [REDACTED] believe that this team of project partners is capable of contributing to this, which of course requires close cooperation also to avoid overlap of activities.

1 Aim of the meeting and ETC soils work

Task 1.8.2.1. Focus on dynamics macro- and micronutrients and heavy metals in relation to soil quality/fertility and environment (air and water quality)

- 1 Inform what has been done in the past years with respect to current loads, critical loads and dynamic (risk) assessments of nitrogen, phosphorus and heavy metals (with a focus on cadmium) in agricultural soils in EU-27
- 2 Discuss the aim, and tasks for the various groups in 2018, including a data repository

Task 1.8.2.2. Focus on soil degradation mapping, integrating different soil threats into a single assessment.

- 1 Inform what has been done in the past years with respect to this topic: Land use efficiency report (LER).
- 2 Discuss the aim, and tasks for 2018 and possible interaction with task 1.8.2.1

Further details on aim of the meeting/ETC soils work (Information from [REDACTED])

General

1. This soil meeting is scheduled since not all participants could come to the NRC soil meeting next week nor to the ETC consortium meeting of end January. The idea started as a briefing meeting on Task 1.8.2.1 on "Soil functions: the buffering and filtering of nutrients and pollutants" to inform Rainer, but extended to a coordinated meeting with all soil experts, including task 1.8.2.2 on "Integrated soil degradation mapping".
2. Furthermore, ETC-ULS is in its last year and it is important to set the objectives and tasks for the next 4 years.

Discussion of topics and reporting

3. Working on nutrients and pollutants is a key issue. JRC has a lot of datasets available. [REDACTED] is looking for mutual benefits of available data (land use, farm structure etc.) and downscaling activities in view of nutrient work. There might be a role for adding SOC, but trends in SOC based on monitoring and predictions based on modelling is quite well covered by JRC. Adding SOC in the next ETC-ULS

period has to be substantiated. Furthermore, better P related soil data are needed (see below).

4. This year, there will be the 5 yearly EEA environment report (SOER). it is important to include results of the EEA work of last years on nutrients, pollutants and soil degradation mapping (land use efficiency report). Rainer is thus eager to understand the results of work on nutrients and pollutants and, where relevant, bring it into the SOER report, focusing on trends and risks.
5. There is a need for inclusion of soil biodiversity in the work. Soil threats on soil biodiversity are crucial but this is currently vague. The link between soil threats and soil functions is not yet elaborated.

Use of and need for datasets and monitoring

6. Crucial is to have a good overview of the (soil) datasets to be used in assessments and it is crucial that all groups can get access to it
7. Relevant is monitoring but then you need to know what to monitor and why. Wisdom does not come from monitoring per se. It needs ideas on what and why and how etc. One of the specific roles within EEA can be to provide support to Member States on monitoring protocols to optimize both the monitoring as well as to ensure that monitoring data serve their purpose in view of the relevant policy issues

Communication and cooperation

8. There is no a visible place of the ETC soils work in terms of use in policy or even in communication of the results, as a good website is lacking. [REDACTED] likes to see a team that works together and bring forward topics that are visible and can be used in the policy arena.
9. It is important to have a good connection between JRC and ETC. In terms of policy support, indicators etc. all is based on JRC work (Lucas database and information letter) and not at all by the work of ETC. JRC is willing to cooperate and we need to extend the contacts. One aspect could be adding the nutrients work.
10. There is need for cooperation with geochemists etc. at country level to enable more precise assessments. Crucial to get a task force at country level to make data available.

The overarching objective for the work on soil, including improved coordination with JRC, is to continue and deepen the linkage between human activities (land management) on soil functions via impacts on soil threats. We need to elaborate where soils are degraded, continue to degrade, and how this affects ecosystem health and functioning, forest and crop productivity and human health. This concerns especially nutrients and pollutants. Indicators frame our approaches and cooperation's, methodical choices and data needs.

Agreements:

1. We ([REDACTED] takes the lead) make a database of relevant experts, including names of experts, expertise involved, e-mails, related institutes etc. to have a common information base on network partners
2. We (Who take takes the lead?) make an overview of relevant meetings where the results of the current project activities are presented
3. Rainer contacts JRC for cooperation with European data collection etc
4. It is decided that WUR/WENR delivers all the data as geodatabase and Web Map Service (WMS) only for the (most relevant) maps that will be included in two final reports in 2018 on nutrients and cadmium (metals). WMS etc. are not needed for the 2016/2017 work. For 2018 WMS are only needed for maps in the main report.
5. [REDACTED] will inform [REDACTED] on this decision.

To conclude, the main activities for 2018 are:

1. Wrap up of all deliverables; finalization of reports/documents/papers on nutrients and contaminants
2. Contribute to ongoing policy issues (a.o. fertilizer discussion) via a.o. presentations at relevant platforms/fora/meeting. This also will make the activities from the project more 'visible' outside the project team.

2 Presentations and comments/agreements

Presentation Wim on critical loads and dynamic (risk) assessments of nitrogen, phosphorus and heavy metals

Discussion items (in brief)

1. Differences in results between approaches increase with scale level: differences using various approaches increase substantially from EU/NUTS/NCU level.
2. We should carefully consider which data are used in downscaling procedures to avoid double work with third parties which lead to more differences in results (issue: not all data are freely available for sharing between research groups)
3. This relates also to comparison of Integrator results with Member State results. At present there is no clear agreement on how to deal with this.
4. Can NCU based results serve as a new way of presenting results at EU level (kind of standard geographical representation)
5. In general, current models included in Integrator heavily depend on selected databases, sometimes based on Dutch data only (e.g. for P sorption in soils, quality of manure related to metals), which may cause implausible results. This, again calls for a more EU integrated modelling approach where member states can use their own data (in case of sources used in balances studies) and to be reported to Eurostat for use in EU-wide models (like in case of sorption of both nutrients and metals)
6. The results on Cd strongly depend on choice of model to calculate leaching. Linear models tend to results in higher leaching losses, hence lower accumulation levels and, as a result, higher acceptable levels of Cd in mineral P fertilizers when considering stand-still (of Cd in soil) as the prime criterion. Results based on non-linear models seem somewhat more plausible looking at long term changes of Cd in soil and reported leaching rates in the literature. This discussion will be continued in February (meeting with [REDACTED])

Presentation [REDACTED] on "Integrated accounting of land cover changes and soil functions data"

1. Organising Land cover changes to land cover flows (LCF). LCF refers to categorization of specific changes, such as vineyards to forest, into broader categories which are then also (dis)aggregated into major drivers, i.e. urbanization, agricultural changes (intensification, extensification, expansion) and forest changes (expansion, felling).
2. Soil functions: seven with sub-functions, based on a set of soil, climate, topography land cover and management with a code of 1-10, which was then be aggregated to good average and poor (land evaluation!). Most important for ETC is mapping of (lead by JRC):
 - Potential for biomass production, divided over arable land, grassland and forests (latter done by ETC). The work is related to qualitative land evaluation data work in countries in the 80^{ies}. Important to take it a step further to make the data or data integration relevant for quantitative global yield gap work and JRC-MARS yield predictions.
 - Soil carbon storage, being the difference between the current carbon pool and a potential carbon pool
 - Storing and filtering of water and nutrients (work of Mako et al 2017)
 - Soil biodiversity Then there is the function of

Presentation [REDACTED] on "Integration of (existing) spatial data relevant for assessing soil degradation"

The presentation is directly related to task 1.8.2.2, which is to produce a soil (land) degradation (indicator) map related to (ancillary) data on

- soil functions,
- soil threats,
- land cover flows,
- terrain, land cover and climate

Main discussion point were

- 1 How to prioritise soil functions, soil threats?
- 2 How to include the interaction of soil threats and soil functions: qualitative or quantitative

Comments that were made in this context

- 1 We have to be aware of ongoing work such as research within Landmark (lead by [REDACTED]), ISQUAPER (led by [REDACTED]) and INSPIRATION (DSSled by Wim de vries) including the development of knowledge based systems to assess impacts of measures on
 - Production: yield change
 - Nutrient cycling: assessing how much nutrients are taken up by N
 - Water filtration/purification: focus on P retention
 - Carbon sequestration: SOC pool change
 - (Soil) biodiversity (fauna)
- 2 A draft report has been written by WENR (led by [REDACTED]) that focuses on the link from management to soil threats at EU scale using a systematic approach (indicators, models, data) followed by a qualitative link from threats to functions (societal impacts) that would be of use in this context.

As a first idea it was suggested to start with:

- 1 Food and other biomass production: show the regions where the possibility to reach the yield gap potential is e.g. very low, low, intermediate, high and very high based on soil threats
- 2 Storage, filtering and transformation capacity: improve the approach by Mako et al by defined relevant impacts and compartments for the given nutrients/contaminants and then assess the relevant capacities

The key question is how to link data on one hand (on soil properties for example) and the impact on soil functions on the other hand. The main idea which could be used to do this is to establish the link between data -> processes (in soils/water) -> quantify threat -> establish impact on soil function. This requires that there should be a quantified critical limit for the relevant threats to establish whether there is currently a threat (values above such critical levels) or whether it will occur in time in case of dynamic changes like for P or Cd. If we can describe then the link between available data (both soil data but also loads to soils, losses from soil) and the level of the threat we need to derive approaches to quantify the impact on the soil function.

The objective for 2018 would then be to prepare a soil degradation map showing a selected number of threats and its potential impact on soil functions based on the approach described (linking data/processes to threats).

Additional issues: a

- aspect of interactions between threats;
- at what scale level can we distinguish threats based on data available and given the spatial and temporal dynamics of both data, management, processes?
- overlay of threats possible?

Annex 1 Relevant networks (to be expanded)

Annex 2 Relevant meetings (to be expanded)

2 - 4 May 2018: GSOP18, Global Symposium on Soil Pollution; FAO in Rome

25- 27June 2018: 20th Nitrogen Workshop. Le Couvent des Jacobins, Rennes – France

<https://workshop.inra.fr/nitrogenworkshop2018>