

## Dynamic modelling

- Update on ICP MM/CCE activities, Thomas Scheushner, Germany (not available)
- Summary of CDM Meeting 2022 (Filip Moldan)
- DAEMONS modelling, Martyn Futter, Sweden (online) (not available)



## Summary of the 3rd meeting of the Centre for Dynamic Modelling held in Sitges, Spain, April 6-8

Filip Moldan and Sara Jutterström, CDM, IVL, Sweden



# Summary

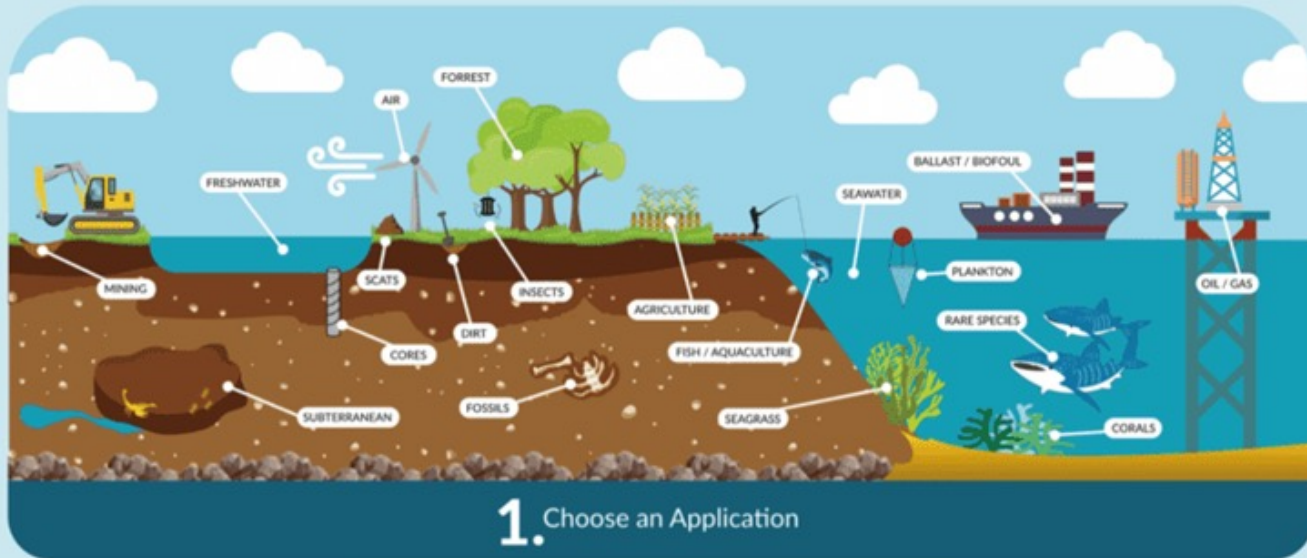
- Twenty-six experts attended, 14 personally and additional 12 participants attended online during the second day morning and afternoon sessions.
- Following parties of the Convention were represented: Bulgaria, Czech Republic, Denmark, France, Germany, The Netherlands, Norway, Spain, Sweden, UK and USA. Following parts of CLRTAP were represented: WGE bureau, ICP Forests, M&M, IM, Waters and Vegetation, and CIAM
- 20+ presentations, focus on scientific findings, monitoring data and results, model development, activities outside CLRTAP and more.
- “Biodiversity” probably most common key word but focus not only on biodiversity. Nitrogen, soils, modelling, interactions between nutrients, heavy metals and more

- Biodiversity modelling can serve as a basis for setting critical loads for nitrogen and sulphur, but it also provides a **dynamic picture of how biodiversity will evolve** in the future under various scenarios. **Modelling biodiversity change could be an additional tool for policy purposes!**
- Biodiversity modelling is progressing in several countries, it is likely that not all parties to the Convention will be interested to use biodiversity modelling for setting critical loads. **Not a problem at all, it is an additional option to calculate CL, not replacement of the existing methods.**
- Results from the 1000-lakes survey in Norway revealed some unforeseen patterns in data which are likely to be driven by climate change. These results illustrate **the necessity of including climate** in modelling work even when primary focus is on air pollution effects. Models can provide both insights of relative importance of the individual drivers and the overall result of the environmental change. **Monitoring over long time and repeated surveys are essential for model development!**
- Nitrogen deposition trends interpolated from measured data does not correspond well with modelled deposition. Such **discrepancies are important to further investigate** also for work at CDM as the outcomes of effect models are dependent on the atmospheric deposition used as model input. **Similar as above: it is a combination of data and models which is most powerful! (And experiments.)**

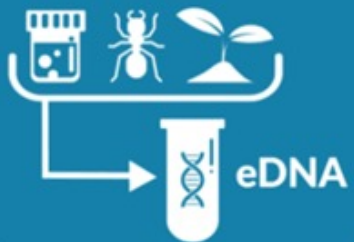
- Change of deposition model can have major impact on exceedance calculations. **Uncertainty is not a reason to question our results, but it needs to be handled.**
- Focusing on biodiversity might generate need for **modification of the existing data collection** towards habitats not currently covered. ICP IM Extended network: including non-forest sites such as grasslands, wetlands or coastal habitats. Important step which will strengthen our ability to carry out modelling of air pollution impact on biodiversity. **Are our monitoring programs flexible enough? (Thumbs up for IM extended.)**
- Cooperation with researchers who conduct the experiments has been of high importance for model development and the combination of models, monitoring and experiments is still the most powerful tool in generating new insights in ecosystem functioning. **Experimental work is not in focus of CLRTAP, we benefit from co-operation outside LRTAP.**

# New tools:

## Environmental DNA (eDNA) Applications and Workflow



### 2. Collect Samples and Extract DNA



### 3. Amplify Target DNA 'Barcodes'



### 4. Sequence and Interpret DNA Barcodes

- Species assemblage
- Baseline biodiversity surveys
- Impact assessment
- Invasive / feral species detection
- Endangered species detection
- Disease and pathogen detection
- Food webs

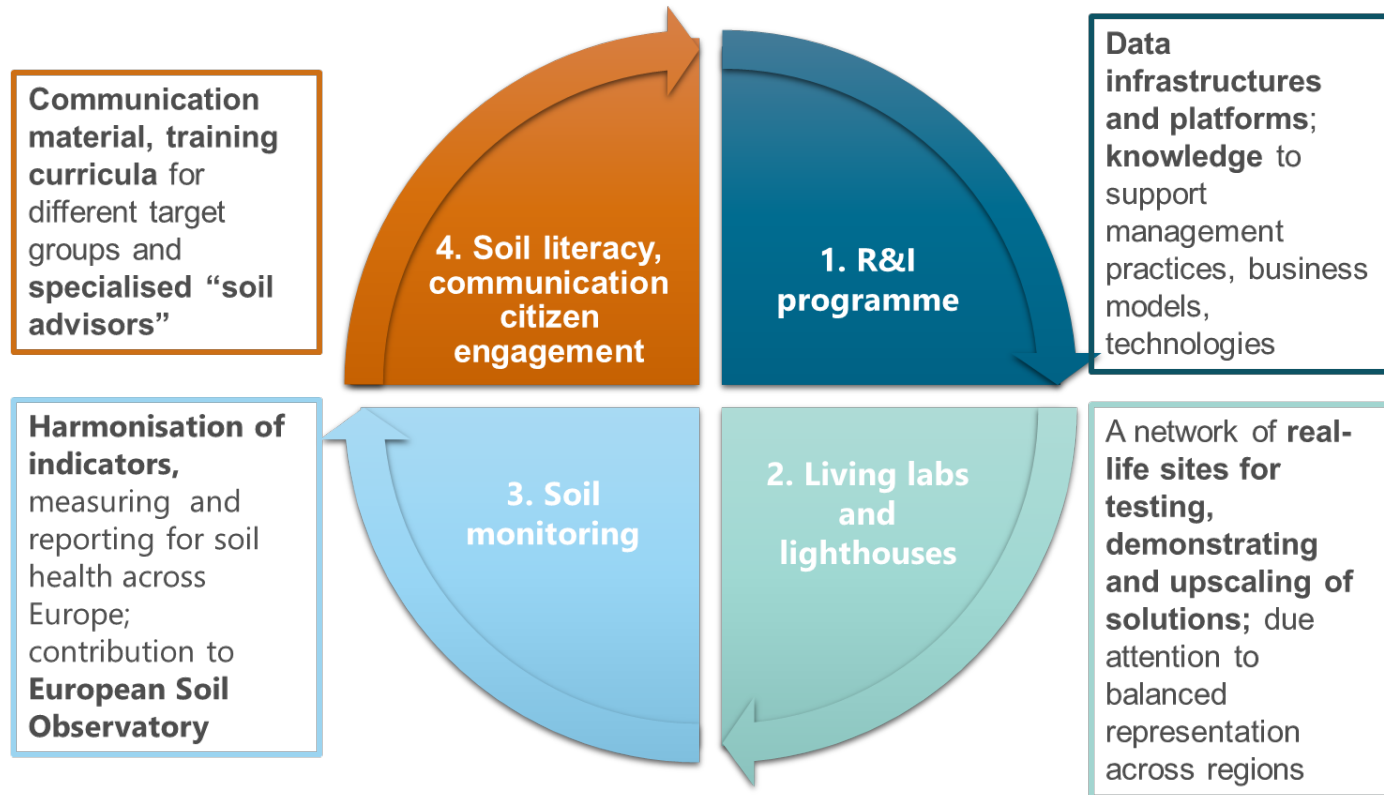


- A powerful tool for surveying taxonomic groups that are difficult to identify
- Several taxonomic groups can be identified from one sample
- Sampling can be done during most parts of the year
- Little impact on the sampled environment
- DNA samples can be stored and analysed later if additional species need investigating
- Currently mostly used in aquatic environments
- Soil and air sampling is also possible, and methods are quickly developing

- **Further development of biodiversity metrics needs to be undertaken.** It is of crucial importance to define biodiversity targets, indicators and numerical values of indicators that will be used as criteria for modelling. HQI (habitat quality index) has been proposed as alternative to HSI (habitat suitability index). **Progress, but more work needed on AP impact on biodiversity indicators.**
- Choice of organisms or organism groups is also of high importance as sensitivity to air pollution vary, data availability and political relevance vary. **This is difficult issue as all these demands needs to be met at the same time!**
- Several studies presented extension of data collection not only in time but also in scope. This adds value to the existing data series and is successful (and cost-efficient) way to generate new understanding and knowledge. **Opening “our” sites to other research is to be promoted.**
- Work on ozone and on heavy metals was presented. **Most interesting from modelling perspective and welcomed 😊**

# New EU initiative: mission on soils

The group received information about **the EU mission on soils – A Soil Deal for Europe**. CDM will follow up this development and seek areas of mutual interest where modelling undertaken within CLRTAP overlaps with the mission’s objectives.





# Some personal reflections

- Several other issues were discussed at the meeting, in more or less spontaneous discussions, in the sessions and outside, in the whole group or in smaller clusters. **Reminded us about the value of meeting personally to agree on things and to find ways forward and further inspiration for our work. And how much we missed that over the last 2+ years.**
- Meeting reminded us also about the width of CLRTAP and WGE operation and role of CDM. And what potential and benefits and obligations that means. **Very inspiring group of experts and three days of interesting science. Thanks to ICP M&M, CCE and all who contributed.**
- CDM has been in place for a little more than 2 years, but it is a part of ICP M&M and it builds on former JEG DM, that is a lot to build upon. **Key question: what can CDM do for CLRTAP?**

Thank you for your attention.

# Biodiversity modelling in the next call for data (WP 2024-2025)?

- Not as an obligation, as everything else: voluntary contribution.
- Does not replace the existing methods, outcomes are compatible, could be used in IAM with other critical loads without any problem. It is up to countries.
- Not realistic to have complete and agreed methodology in place at that time. Perhaps not necessary to have that at this stage? Should we aim at extending the Manual?
- After that: evaluate and define next steps.
- **Questions for now: How to formulate the call? What steps needs to be taken to give best chance to those who are interested to get a call formulated in the best way?**