ANNEX 2: MINUTES OF THE FOLLOW-UP COMMITTEE MEETINGS

VERSLAG / REPORT

Report first ECORISK steering committee meeting (contract SD/RI/06)
Belgian Science Policy Office – Federaal Wetenschapsbeleid
Programma 7 SSD - BELSPO

The meeting was held on 14/9/2012 (afternoon) at the Drie Eiken Campus, University of Antwerpen in Wilrijk, Antwerpen

Participants: T. Al Mahayni (SCK-CEN), R. Ceulemans (UA), A. Deckmyn (KMI-IRM), G. Deckmyn (UA), T. De Groote (UA), J. Genon (UCL), Olivier Giot (KMI & UA), R. Hamdi (KMI-IRM), M. Jonard (UCL), Ch. Mathieu (Belspo), Q. Ponette (UCL), M. Smits (U.Hasselt), J. Vives i Batlle (SCK-CEN)

Apologies: R. De Vreese, V. Kint, M. Herman, N. Van Lipzig

During the first meeting of the ECORISK partners with the steering committee members, presentations were given by Christine Mathieu (BELSPO) and the participating groups. All presentations will be distributed to the steering committee and are attached to this report. The discussion points that were referred to during the meeting and after the presentations, are mentioned below.

1. *Mme. Christine Mathieu (BELSPO):* **About BELSPO and the 7th call of SSD**
   - ECORISK was selected from a large number of competing proposals within the Risk Assessment part of the 7th Call of SSD
   - Interactions with the steering committee are an important issue
   - On 22/10/12 there will be kick-off meeting with presentations of all the projects of the 7th Call of SSD in Brussels. All participating teams are invited.

2. *Prof. Dr. Reinhart Ceulemans (UA):* **General introduction to the ECORISK project**
   - Introduction of the main objectives, of the different partners and of the overall structure and approach of ECORISK.

3. *Dr. Rafiq Hamdi & Dr. Alex Deckmyn (KMI):* **Downscaling climate scenario's**
   - Discussion about which data are needed as input: radiation (total and Infra-Red), wind speed and wind direction, relative and specific humidity, temperature min-max- and mean, precipitation, atmospheric CO_2 for chosen sites (± 10 is possible).
   - Feedback of forests on regional climate simulations should not to be included, but possibly analysed
   - Run the forest model ANAFORE including the detailed soil water submodel from SCK, but also leave the option for using soil water from the regional climate simulations of KMI directly.

4. *Prof. Dr. Jordi Vives i Batlle & Dr. Talal Al Mahayni (SCK):* **Pollutant modelling**
   - Planning of the modelling work initiated, with initial emphasis on the hydrological part

- Data are available and analysed concerning uptake and allocation of different elements in pine (M.Sc. thesis Sienke Gielen due by June 2013)
- Discussion about Al found in roots, but not in other tissues: could be because Al is attached to particles in roots that are not perfectly washed, or in mycorrhizae attached to the roots
- Will the models be run independently? Feedback required from the root uptake; so a daily link seems necessary. This will need to be further discussed.

5. *Dr. Gaby Deckmyn (UA)*: **The ANAFORE forest model**
    - Emphasis on soil organic pools (hard to measure, science unsure) in a detailed forest simulation model
    - Calibration of ANAFORE for Norway spruce using data from thinning trails in Wallonia (UCL).

6. *Dr. José Genon, Dr. Mathieu Jonard, Prof. Dr. Quentin Ponette (UCL):* **Biogeochemical cycling in forests**
    - Quite good models exist for chemical processes in soils (ion exchange, adsorption, weathering)
    - Close link to ANAFORE needed because of feedbacks:
        i. Cation and anion uptake by roots / mycorrhizae from the soil solution
        ii. Nutrient availability influence growth of trees (+ or – effect)
        iii. Elements are allocated differently to the various tree pools (bark, branches, roots, leaves,…) and enter litter pools from there (after partial re-translocation of some nutrients)
        iv. Coupling of nutrient mineralization with the soil C fluxes described in ANAFORE using nutrient to C ratios of soil organic matter pools
        v. Both wet and dry deposition need to be modelled (currently not in ANAFORE)
    - Not all elements will be simulated to the same detail; first emphasis should be on major nutrients and Al, and on pH regulation (H+ sources and sinks).

General discussion and conclusions

It will not be possible to simulate all Belgian forests; emphasis will rather be on having reliable results on a few (10) typical sites (but with different climate and management scenarios).

The resulting decision support tool would not contain the models, but a database of model simulation results. These results will be linked to a graphic user interface, possibly illustrated by GIS-like themed maps. It may include forest management regimes – such as silvicultural treatment, harvesting intensity, density management, rotation length, etc. – as a result of effects on forest biomass and contaminant distributions of the various climate simulations (e.g. sustained drought, etc.). A full two-way coupling of all the models is not explicitly promised in the proposal, as the tool itself is de-coupled for the models, allowing flexibility of use. The number of scenarios will be limited, but a special effort will be made to characterize the uncertainty associated to the predictions.

Interaction with the steering committee

From the steering committee members we would like suggestions concerning the following questions:

1. Is there a need to include any other climate variable in the output of the climate modelling (see the list above)?
2. Which 10 'typical' sites should be analyzed in more detail? The proposal is to use established level II-plots and some plots with available data.
    a. A spruce stand (even-aged), and a mixed oak & beech stand in Wallonia on acid soils; Scots pine & oak stand in Brasschaat; Scots pine in Hasselt; Scots pine stand on a sandy soil in Mol (SCK study site)
    b. In addition: beech stand in Zoniënwoud or Meerdaelwoud? beech & oak stand in Gontrode? Other species?
3. Which managements should we simulate? Only thinning/rotation or also regeneration, uneven-aged forests, liming,… ?
4. Which output is the most interesting for the end-users? Yearly pools and/or fluxes of the elements, forest growth, yield, water quality, leaching,…?
5. Which time frame should we simulate? We suggest a time frame till 2100 in yearly time steps (although the models will run with a daily time intervals).

We will make a short poll to allow all members to answer these questions by Christmas 2012. The next meeting with the steering committee will be held – at the BELSPO office in Brussels – in spring 2013. This meeting will concentrate on the results of the questionnaire (concerning the output of the model runs), but also on discussing some fundamental science concerning the selected models and model simplifications. A few additional members will be invited for this purpose.

Questionnaire

Dear member of the ECORISK steering committee

As mentioned in the report of our first steering committee meeting we would like to have your suggestions concerning the model runs we will perform during the ECORISK project. The purpose of this questionnaire is to evaluate where your main interests lie. Please remember that we will not be able to include new field work or analyses. The uncertainty for model runs with no or limited validation data will be very high. Please give a short answer to the following questions:

1. Concerning the modelling of the future **climate** is there any specific atmospheric variable we need to include besides temperature (min, max, average), precipitation, humidity, wind speed and wind direction, solar radiation, CO_2 concentration?
2. We suggest as **tree species** to run the simulation models: Scots pine, beech, poplar, oak and spruce. Is there a specific need for another tree species? (only if at least one relevant dataset can be supplied for that species)
3. We will focus on ± 10 **forest plots** that will be used for validation of the models concerning forest growth. We would be happy to have well documented sites added, preferably plots with a lot of available data (for example ICP Forest level II plots). Currently we have already chosen:
    a. Scots pine + oak on sandy soil (Brasschaat)
    b. Scots pine on SCK study site
    c. Scots pine site in Hasselt
    d. Spruce on stony loam with phyllite in Willerzie (Gedinne)
    e. Pure oak, pure beech and mixed oak and beech on stony loam with sandstone and slate in Baileux (Chimay)

    Can you suggest an additional site with detailed management, growth and soil data that could be included?
4. Do we need to include **mixed and uneven-aged forests** or is a virtual even-aged forest indicative enough for forest responses.

5. Which **forest management** types should we include? Simulating 5-10 management types per species is possible (a management type will be defined as a combination of management options). Obviously we will include the most common practices but which alternative management options would you prefer, bearing in mind that the goal could be to suggest management alternatives under global change conditions.
    a. Initial density
    b. Density management: 1st thinning, cutting cycle, thinning intensity
    c. Rotation length
    d. Species composition management (also see 6 herebelow)
    e. Harvesting regime
    f. Liming - Fertilization

6. Concerning the **initial forest.** It will not be possible to simulate all possible current forest situations. We propose to simulate:
    a. from clearcut in 2015, for all species,
    b. from 50 year old stands (in 2015) of oak and beech (so as to include final harvest),
    c. and possibly from an uneven-aged stand.

Does this seem acceptable or can you suggest an alternative?

7. Which **timeframe and time step** is most appropriate? Although the models run at daily steps, we would suggest to save data at yearly intervals only, until 2100. What is your idea about this?
8. Which **soil elements** are in your opinion the most important to simulate besides C, N and P?
9. Please indicate which **forest output data** that you would find most interesting (suggestions: total yield, standing volume, tree height, yield quality, transpiration, LAI, GPP, NPP, total C, pollutant/mineral content of wood, pollutant/mineral amount removed by harvesting, …)
10. Please indicate which **other output** data you would find most interesting: soil content of a specific element, leaching of elements, soil respiration, soil water, pH, synthetic soil fertility indexes…
11. All output data will be available through a user-friendly database. **How would you prefer the data to be available?** Graphs, tables, maps (based on soil map), …?

Notes from BELSPO meeting 23/4/2013

Meeting went to 12 pm. Prof. Ceulemans chairing. C. Mathieu did not show-up, presumably due to some private issue. Low turnout – maybe propose next time to do this by videoconference? Not much we can do about this unfortunately.

Introduction – Prof Reinhart CEULEMANS

In the introduction, ProfRC gave background of project, explaining how global change influences climate and we want to know how forests react to local climate changes – can we change the response by applying different management options. The project is framed within vulnerability of ecosystems to extreme climate events.

We are to model risks to forests as result of ECE's and the output is a decision support tool (DSS)., fed by a database in turn produced by the models to be integrated.

Gaby will present the results of the opinion poll about tree species and soil types and management options to be focussed upon.

We want to focus not on expanding the project but on staying focussed and getting the steering committee to focus down to the essentials what we are trying to do.

UA presentation – Gaby DECKMYN

Forestry model. Presented very nice improvements on ANAFORE. Main work on validation N cycle, paper on Simfortree DST for another project which can help on the present one, and new ANAFORE version with P and 'ready for' external additions.

Experience from Simfortree suggests need to limit the number of soils. Choosing 36 soils not necessary as one just can't keep all the data.

Question by SC – what is the method for evaluating the forest model. Gaby responded that she has dara for 35 sites and checking for Kempen pine forests and Braaschaat forests.

Q2: what are the key improvements with the forest model?

A2: soil water triggers a lot of effects and this is what is being developed. Also adding more elements and understanding better what triggers tree height, which is also another important issue to consider. At present the model cannot predict this perfectly.

SCK presentation (Talal, Savas, Jordi)

I write nothing because we know what we did already

Discussed report – SCK report – 2 papers

UCL presentation

They consider two climate scenarios to address if forest soil can withstand increased nutrient demand caused by the climate events to be modelled.

Jordi Q – In coding with Phreeqc, how do you decide what reactions to include and which not?

Climate modellers

Very nice climate modelling developed with a downscaling technique (SURFEX-ALARO); they already have done validation using various sites with observations e.g. frequency distributions of temperature, the model underestimates the precipitation in summer a bit but this can be corrected. The model projects on a daily timescale.

Some technical details: Downscaling technique: daily reinitialisation vs. free surface. They can do parallel computations: Model works best for 6 cpu's running in parallel. Simulatting 1 day takes 2 hours, so 30 y would take 2.5 years which is too much – they will try to implement their program in Ghent where they have a faster computer. The downscaling goes from a 20 km scale down to a 4 km scale.

Next challenge is how to take the output out of the climate model and putting into Anafore.

Jordi Q: Model is to do projections, rather than predictions.

ECORISK Steering Committee: meeting - Ukkel - 26.05.2014

Name	Affiliation	SC = Steering Committee PP = Project Partner
Andivia Enrique	Université Catholique de Louvain (UCL)	PP
Almahayni Talal	SCK/CEN	PP
Ceulemans Reinhart	UAntwerpen	PP
Deckmyn Alex	KMI/RMI	PP
Deckmyn Gaby	UAntwerpen	PP
Genon José	Université Catholique de Louvain (UCL)	PP
Gielen Sienke	SCK/UCL	PP
Giot Olivier	RMI/UAntwerpen	PP
Hamdi Rafiq	KMI/RMI	PP
Jonard Mathieu	UCL-Eli-e	PP
Ponette Quentin	UCL-Eli-e	PP
Vincke Caroline	Université Catholique de Louvain (UCL)	PP
Vives Jordi	SCK/CEN	PP
de Thysebaert Didier	Service Public de Wallonie - DG03-DEMNA	SC
Herman Marc	Service Public de Wallonie - DG03-DEMNA	SC
Kint Vincent	Agency for Nature & Forests	SC
Mathieu Christine	BELSPO	SC
Mertens Patrick	Service Public de Wallonie - DG03-DEMNA-DMF	SC
Smits Mark	UHasselt	SC
Terlinden Michel	Soc. Roy. Forestière de Belgique	SC
Weyens Nele	UHasselt	SC
Berckmans Julie	RMI/KMI	/
De Troch Rozemien	KMI/RMI	/
Horemans Joanna	UAntwerpen	/
Schaubroeck Thomas	UGent	/

9h30 – 10h Welcome and Coffee
10h – 11h30 Invited Presentations

- Prof. Dr. Reinhart Ceulemans (UA) Welcome and introduction.
- Dr. Nele Weyens (UHasselt) Uptake and effects of heavy metals on trees.
- Dr. Mark Smits (UHasselt) Mycorrhizal transport of Al through soil profiles.

• Thomas Schaubroeck (UGent) Simulating particulate matter deposition in forest ecosystems.
• Dr. Vincent Kint (KUL) Sim4Tree v2 forest model/database.
• Michel Terlinden (SRFB-KBBM)
11h30 – 11h45 Coffee break
11h45 – 13h ECORISK Presentations
• Dr. Gaby Deckmyn Introduction.
• Prof. Dr. Jordi Vives i Batlle Latest developments in flow and transport modelling.
• Dr. José Genon (UCL) Coupling ANAFORE and PHREEQC; Modelling of the soil solutions collected at test-sites.
• Dr. Enrique Andivia (Uhasselt) General description of the nutrient uptake and distribution in the tree.
• Olivier Giot (UA, RMI) Climate input to ANAFORE. 13h – Lunch and discussion

Steering committee meeting 30/5/2016

Monday 30 May 2016 at 14:00 hr

- **Location: BELSPO Office, Louizalaan 231 – Avenue Louise, 1050 Brussels**
- **Meeting room A (www.belspo.be)**

Attended

Hans Verbeeck, Joris Vanacker, Marc Smits

Follow-up

Dear Sir, Madam,

- *Ref.: Steering Committee ECORISK – Belgian Science Policy research project, contract SD/RI/06 (Programme 7 SSD, BELSPO)*
- *Title: A decision support tool to manage climate change risks to forest ecosystems (ECORISK)*

Because of several reasons (incl. a strike of public transportation) very few members of the Steering Committee were present at our meeting of 30 May 2016. More in particular we missed, but we needed, the input from the end users in order to finalize the output of our ECORISK project. The project is coming to an end in October 2016 and we are thus in the last months before final delivery.

We therefore like to ask you, the end-users or stakeholders of the Steering Committee, to answer the below, multi-choice questions. It takes you only five minutes to provide us with the necessary feedback.

In ECORISK we now have a working model which can predict growth, nutrient cycles and pollution cycles for oak, beech, pine and spruce forests under specific future climate scenario's. We can perform some final runs with the model this summer/autumn (September at the latest), on top of the runs that we are doing for validation.

In the multi-choice list below you can tick more than one option, but please try to limit your choices for each question.

1. Which pre-defined scenarios do you prefer?
    a. Evaluating the effects of climate scenario's on forest growth
    b. Evaluating the effects of climate change depending on soil fertility
    c. Evaluating the effects of climate change depending on forest management
    d. Evaluating the response of soil fertility to changes in forest management practices

2. Which output do you like to get?
    a. Net primary productivity
    b. Tree stem height
    c. Tree stem diameter
    d. Total standing biomass

e. Biomass increment
f. Carbon storage in the forest
g. Wood volume production
h. Soil fertility (N, P, Ca, Mg, K)
i. Nutrient storage (N, P, Ca, Mg, K) in the forest
j. Nutrient leaching (N, P, Ca, Mg, K)
k. Uptake of pollutants

3. Is it useful to provide changes to the parameters describing growth-and-yield curves instead of the complete model results to describe the effects of climate change? (results per site index class)
    a. Yes
    b. No

4. What do you intend to use the output and the model runs for?
    a. Management predictions
    b. Policy outline
    c. Other:

Can we please get your replies before 27 June 2016? Thanks in advance for your cooperation and your replies.

Reinhart Ceulemans and Gaby Deckmyn
On behalf of the ECORISK consortium