Report for annual networks

Submit the report to sns@slu.se by 24:00 CET, 1st of March the year after the network period.
The report should not exceed 2000 words.

Please adjust the size of the boxes to the length of your answer.

1. Title of the network:	**Biochar in forestry**
2. Network code:	**N2022-7**

3. Main applicant:	**Kjersti Holt Hanssen**
Email:	**kjersti.hanssen@nibio.no**
Institution:	**Norwegian Institute of Bioeconomy Research**

Activities

4. Place of the activities:	**Workshop in Kringler guesthouse, Gardermoen. Online Teams-meetings.**
Duration of the activities (start date, end date):	**Workshop: 15.-16. June 2022. Online meetings and report writing February 2022-February 2023.**

5. Provide a short network summary, including:

a) The purpose of the network/main problems/background

Biochar is charred material formed by pyrolysis of organic materials. Biochar has a range of applications, including soil amendment and water purification. In addition to improving soil physical and chemical properties and plant growth, biochar is a promising negative emission technology for storing carbon in soils, as it is very resistant to degradation. Most biochar studies have so far been conducted on agricultural soils. However, the use of biochar for soil amendment and for climate mitigation in forests are equally relevant. Research on the use of biochar in forestry has now started to develop in the Nordic-Baltic countries. Present projects are looking into the effects of biochar on e.g. forest and seedling growth, soil carbon stores, soil respiration, nutrient cycling, nutrient leaching and biodiversity. In this new and emerging field of research, there is a need for networking, knowledge exchange and cooperation across the Nordic-Baltic countries.

b) A description of the main activities of the network

The main aim for the biochar network in 2022 was to have a workshop in Norway in the summer of 2022, to come together to discuss and exchange knowledge and experiences in this relatively new and quickly evolving field, where the potential positive effects on forest growth and climate change mitigation are large and development is going fast. Furthermore, we wanted to make a short report on the status of biochar in boreal forestry and a database of biochar experiments. We also wanted to discuss future research, looking at the possibilities for research applications.

c) Did the network develop and deliver as planned? If not, please explain why

We have fulfilled the planned activities, arranging a two-day workshop in Norway in June 2022, with presentations, discussions, and an excursion to a new biochar production facility. We have written a joint report (in the NIBIO Report series), published in February 2023. An overview of biochar experiments in forestry in the Nordic-Baltic countries is compiled and attached to the report in an appendix. Future research questions are also discussed in the report. We have not found relevant calls for an application, but we believe our networking activities will facilitate cooperation in this field in the future.

Outcomes

6. Published outputs achieved as a consequence of the network (peer-reviewed articles, other publications)
Hanssen, K. H., Bruckman, V. J., Gundale, M., Indriksons, A., Ingerslev, M., Kaivapalu, M., Lazdina, D., Makovskis, K., O'Toole, A., Ots, K., Palviainen, M., Stokland, J. and Varnagiryte-Kabasinskiene, I. 2023. Biochar in forestry. Status in the Nordic-Baltic countries. NIBIO Report 31/2023. 50 pp.

7. Other practical outputs of the network (workshops, conferences, scientific meetings, policy recommendations, conferences, large-scale project applications, websites or databases etc.)
Workshop 15-16 June 2022, "Biochar in forestry", Kringler Guesthouse, Gardermoen, Norway. Database on biochar field experiments in forestry in the Nordic-Baltic countries (available in the report, and at: https://docs.google.com/spreadsheets/d/1YWOJ1V77UmVlJWSunjSC-Iv_xQ3g8XksVrb8kvw8ikU/edit#gid=1987430557

8. How and within which areas was the network beneficial for the Nordic region (Denmark, Finland, Iceland, Norway, Sweden and the autonomous areas of the Faroe Islands, Greenland and Åland Islands)?
The activities that have been carried out are beneficial for the Nordic region as the use of biochar in forests may have a large potential for climate change mitigation, as well as having a positive effect on forest growth and nutrient leaching. Development is happening fast, and establishing networks is crucial to the development of this new field of research. The network activities have strengthened existing contacts between researchers from different countries and also promoted new contacts between practitioners and researchers, expected to promote future research projects within the field.

Participation

9. Number of participants

Country	PhD students & Post-docs	Other researchers	Stakeholders	Communication officers	Gender			Total
					Women	Men	Other	
Denmark		3				3		3
Finland		3			3			3
Norway	1	5	2		3	5		8
Sweden		1				1		1
Estonia	1	1			2			2
Latvia		3			1	2		3
Lithuania	1	1			2			2
Austria*		1				1		
Total	3	18	2		11	12		23

* Invited speaker, Dr.Viktor Bruckman from Austrian Academy of Sciences.

Gender equality actions

In the beginning of the network period, you were introduced to the gender equality guidelines and asked to perform at least one action point from each step during your network period. Fill in the following evaluation scheme with the actions performed and the outcome. It is new for SNS to introduce these gender equality guidelines to our funded networks, so SNS would really appreciate your feedback on the guidelines and how they have worked for you.

11. Evaluation scheme	
a) Outcome of completed	We wanted to have an equal share of men of women as applicants and in

planning step:	the network, and we succeeded with that.
b) Outcome of completed action step (at least one action point):	
c) How did the actions/tools work for your network:	As our network consisted of about as many men as women, both genders represented with active and experienced researchers, one could say that our network did not need specific actions on gender equality. But such measures can be important in other fields of forestry networks.
d) How could SNS provide more support to your network in the work toward gender equality:	
e) General feedback to the gender equality guidelines:	

Economic report

12. Received grant from SNS (SEK):
200 000 SEK

13. Costs	**SNS funding**	**Co-financing**	**Total**
Travel and accommodation	**106 000**		**106 000**
Meeting costs	**30 000**		**30 000**
Communication		**10 000**	**10 000**
Other costs (specify)			
Work cost, participants in workshop*		**367 000**	**367 000**
Work costs, main applicant (organizing, report writing and editing)		**166 000**	**166 000**
Total SUM (SEK)	**136 000**	**533 000**	**679 000**

* Estimated work costs for attending the workshop. Hours for writing the report is not included for other participants than the main applicant.

14. Allocation of SNS funding		
Country	**Partner organization**	**% of total**
Denmark	**University of Copenhagen, Aarhus University**	**17**
Finland	**University of Helsinki**	**17**
Sweden	**Swedish University of Agricultural Sciences**	**3**
Norway	**Norwegian Institute of Bioeconomy Research**	**25**
Estonia	**Estonian University of Life Sciences**	**11**

Latvia	Latvia University of Life Sciences and Technologies, Latvian State Forest Research Institute "Silava"	11
Lithuania	Lithuanian Research Centre for Agriculture and Forestry	11
Austria	Austrian Academy of Sciences	5
Total SUM		136 000

15. Economic result (deficit or surplus)
Surplus concerning the SNS funding

16. Optional: Comments to the economic reporting

17. Provide a popular science piece for dissemination in SNS' various channels (maximum 700 words) ***with emphasis on application of results and benefits for the Nordic society.***
Please see separate document for instructions

I hereby declare that the above statements are true to the best of my knowledge
(Please adjust the number of signature boxes to the number of applicants)

Signature of the main applicant

Kjersti H. Hanssen — Norwegian Institute of Forest Research — 21.02.23

Signature | Organization | Date

Kjersti Holt Hanssen

Printed name

Signature of the department head at the department of the main applicant

Bjørn Håvard Evjen — Norwegian Institute of Forest Research — 22/2-23

Signature | Organization | Date

Bjørn Håvard Evjen

Printed name

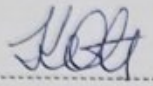
Second applicant's signature, place and date

	University of Copenhagen	22/02-2023
Signature	Organization	Date

Morten Ingerslev

Printed name

Third applicant's signature, place and date

	Estonian University of Life Sciences	23/02/23
Signature	Organization	Date

Katri Ots

Printed name

Forth applicant's signature, place and date

	University of Helsinki	24.2.2023
Signature	Organization	Date

Marjo Palviainen

Printed name

Fifth applicant's signature, place and date

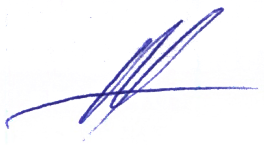
	Latvia University of Life Sciences and Technologies	23.02.2023.
Signature	Organization	Date

Aigars Indriksons

Printed name

Sixth applicant's signature, place and date		
	Lithuanian Research Centre for Agriculture and Forestry	22/02 2023
Signature	Organization	Date
Iveta Varnagiryte-Kabasinskiene		
Printed name		

Seventh applicant's signature, place and date		
	SLU	27.02.23
Signature	Organization	Date
Michael Gundale		
Printed name		

Eight applicant's signature, place and date		
	Latvian State Forest Research Institute "Silava"	21.02.23
Signature	Organization	Date
Andis Lazdins		
Printed name		