

D2.5

National reports with a review and synthesis of the collated information

Finland





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Authors: Antti Rehunen, Teija Haavisto, Ritva Britschgi, Outi Pyy, Jari Rintala, Petri Shemeikka, Jos Brils, Linda Maring, Stephan Bartke

Contact: INSPIRATION Coordinators Detlef Grimski (UBA): detlef.grimski@uba.de or Stephan Bartke (UBA): stephan.bartke@uba.de

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1. Introduction

1.1 About INSPIRATION

The aim of INSPIRATION is to establish and promote the adoption of a strategic research agenda for land use, land-use changes and soil management in the light of current and future societal challenges. Main objectives are:

- **Formulate, consult on and revise an end-user oriented strategic research agenda (SRA);**
- **Scope out models for implementing the SRA;**
- **Prepare a network of public and private funding institutions willing to commonly fund the SRA.**

The proposed methodology is based on a multi-stakeholder, multi-national and interdisciplinary approach that covers the variety of stakeholders (public bodies, business, scientific community citizens and society) and the variety of relevant funders. The vehicle to engage with relevant stakeholders across the Member States is a National Focal Point (NFP) in 17 countries¹. Between March 2015 and March 2016 The NFP's interviewed National Key Stakeholders (NKS), performed a desk study and organized workshops with national stakeholders of funders, end-users and researchers across the various soil and land management disciplines. The goal of these exercises was to gather information and support the main objectives as stated above.

The collated results will be structured along four integrative themes: 1) resources demand and efficiency; 2) natural capital stewardship; 3) land management; 4) net impact on global, EU and local scale (see section 1.3) and merging into thematic knowledge needs to satisfy the as yet unmet societal challenges and to ensure that knowledge contributes primarily to enable meeting these challenges. Based on these results, a cross-border and cross-discipline dialogue will subsequently be organized among the relevant user communities, funding bodies and scientific communities in Europe in order to reach a trans-national, prioritized SRA as well as a model for execution of this SRA. Thus a SRA will be produced which will give national funders confidence that for each Euro they spend, they will get multiple Euros worth of knowledge in return in order to address their national societal challenges.

Learn more about the INSPIRATION coordination and support action on the project's website: www.inspiration-h2020.eu and follow us on twitter: [@inspiration4eu](https://twitter.com/inspiration4eu).

¹ The Swedish Geotechnical Institute (SGI) with support of Formas is currently mirroring the INSPIRATION approach in Sweden. SGI has proposed to act as Swedish National Focal Point and to become a full member of the INSPIRATION consortium. This has been welcomed by the consortium. Currently formal negotiations are in place between SGI, the consortium and the EC to effectively implement this collaboration. This report furthermore contains some information for Denmark and Luxemburg – representatives of both countries joined the Belgium workshop – and for the Republic of Ireland – representatives joined the UK workshop – see below.)

1.2 This report

This country report is an excerpt from the INSPIRATION Deliverable 2.5 “National reports with a review and synthesis of the collated information”, which integrates 17 national reports. These 17 countries, in alphabetical order, and respective report authors are:

1. **Austria**,
Pia Minixhofer, Sophie Zechmeister-Boltenstern, Rosemarie Stangl, Andreas Baumgarten, Martin Weigl, Peter Tramberend,
2. **Belgium** (including some information for **Denmark** and **Luxemburg**),
Nele Bal, Bavo Peeters,
3. **Czech Republic**,
Petr Klusáček, Stanislav Martinát, Bohumil Frantál,
4. **Finland**,
Antti Rehunen, Teija Haavisto, Ritva Britschgi, Outi Pyy, Jari Rintala, Petri Shemeikka,
5. **France**,
Marie-Christine Dictor, Samuel Coussy, Valérie Guerin, Corinne Merly,
6. **Germany**,
Uwe Ferber, Stephan Bartke, Detlef Grimski,
7. **Italy**,
Matteo Tabasso, Sarah Chiodi, Giulia Melis,
8. **Poland**,
Anna Starzewska-Sikorska,
9. **Portugal**,
Thomas Panagopoulos, Vera Ferreira, Dulce Antunes
10. **Romania**,
Mihail Dumitru, Sorin Liviu Stefanescu, Andrei Vranceanu, Valentina Voicu, Nicoleta Vranceanu,
11. **Slovakia**,
Maros Finka, Maria Kozova, Zita Izakovicova, Lubomir Jamecny, Vladimir Ondrejicka,
12. **Slovenia**,
Boštjan Cotič, Barbara Mušič, Ina Šuklje Erjavec, Matej Nikšič,
13. **Spain**,
Pierre Menger, Gemma Garcia-Blanco, Efren Feliu,
14. **Sweden**,
Yvonne Ohlsson, Lisa van Well, Kerstin Konitzer,
15. **Switzerland**,
Regula Brassel, Marco Pütz,
16. **The Netherlands**,
Linda Maring, Jos Brils
17. **The United Kingdom** (including some information on **the Republic of Ireland**),
Paul Nathanail, Matt Ashmore.



Deliverable D2.5 concludes the activities of INSPIRATION Work Package (WP) 2 “**Demands of research from industry, end-users and funders (State-of-the-art at national levels)**”, task 2.5 “**Review and synthesis of the collated information**”.

The WP2 activities were executed in the 1st year of the INSPIRATION project (month 1 – 12), i.e. in the period from March 2015 to February 2016. In the WP2 project description, the final task executed in this period is described in the following way:

“The NFPs will organize at national level a 2-day workshop, where the collated information (task 2.4) will be reviewed and synthesized and prioritized under guidance of the NFP by the NKSs. The WP-leader will prepare – in consultation with the INSPIRATION core group – a generic outline for the agenda of the 2-day national workshops. That outline will then be tailored to specific national situations by the NFPs. The results of the workshop – i.e. reviewed and synthesised information regarding topic a-d as mentioned under the WP2 objectives² – will be described in a national report (in English) by the NFPs. Before finalizing these reports, the NKSs as well as the International Advisory Board (IAB) will be given the opportunity to review the draft report. In these cases where English is not the native language, the national reports will also contain an executive summary (policy brief) of the report in the native language.” (INSPIRATION Grant Agreement - Description of Action - DoA).

Deliverable D2.5 describes the results of NKS interviews and of the desk-exercise as performed in participating countries aimed at collecting national research demands, science-policy-interface experiences and funding options. This report builds up on the interim results presented in Deliverable 2.4.³ The methodologies followed for the information collation and synthesis are presented in more detail for each country below. In general, the following approach was applied (see also Figure 1):

1. In each country, national key stakeholders (NKS) have been identified (in a way to ensure broad representation of soil and land-use/management topics and affiliations in research funding / end-use / science or policy making);
2. Interviews (structured according to a common template: see Annex I and II) with circa 20 NKS per country have been conducted in order to collect national research needs as well as information on science-policy-interface and financing options (with interim result presented as D2.4);
3. In each country, a national workshop with NKS was conducted. Basis for the workshops was the input provided in the NKS interviews before the workshop. It was presented in order to synthesize the collated info, discuss and review the key national research topics. The workshop thus aimed to check, verify and enrich, and in some cases also already prioritize the suggestions provided by the NKS;⁴

² See section 1.5 for a description of topic a-d.

³ Brils, J. et al. (2015): National report on collated information following the template. Final version as of 01.12.2015 of deliverable 2.4 of the HORIZON 2020 project INSPIRATION. EC Grant agreement no: 642372, UBA: Dessau-Roßlau, Germany.

⁴ In several countries besides the NKS interviewed also more stakeholders were invited (i.e. it were open events), and participated and contributed to the workshops.

4. The results of the interviewing plus workshop process were documented in a report to become the respective final national reports. A draft version was to be send nationally to the NKS for review;
5. The national reports were aggregated in a combined document, on which the International Advisory Board (IAB) of INSPIRATION was asked to give feedback, too;
6. The D2.5 report has been finalised taking into account the IAB recommendations.

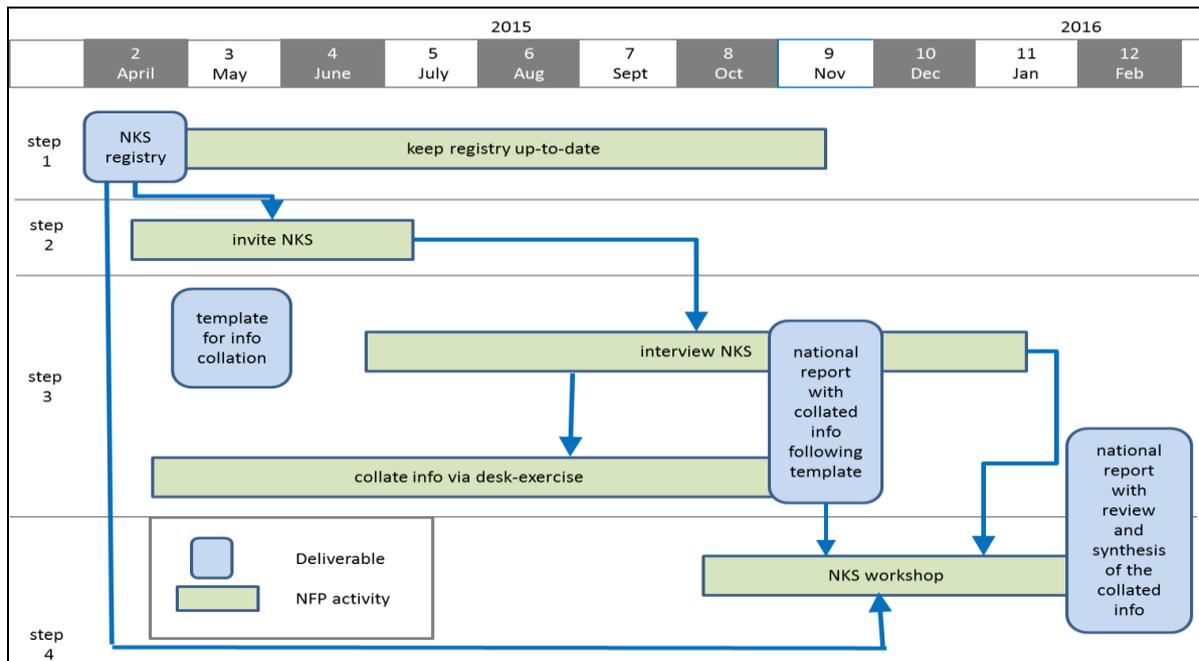


Figure 1: INSPIRATION's WP2 workflow.

The information collated in this report feeds into WP3 “Transnational commons aggregated under integrated themes”. According to the INSPIRATION DoA, the main objectives of WP3 will be to:

1. Achieve an overview of the transnational shared demands and experiences grouped under common themes based on the national state-of-the-art reports as produced by WP2,
2. Prioritise and elaborate the topics that could be included in the SRA (to be developed by WP4) under specific themes,
3. Elucidate the opportunity to match (to be done under WP4) individual stakeholders (as funders) to specific SRA topics that could be shared transnationally.” (INSPIRATION Grant Agreement - Description of Action - DoA).

Visit the INSPIRATION website for the up-coming deliverables of the network!

1.3 The INSPIRATION conceptual model and its themes

In order to identify cross-country and cross-sectorial knowledge gaps and research questions, the national Research and Innovation (R&I) needs will be analysed along four overarching themes identified in the INSPIRATION conceptual model. This model is presented in figure 2. It has been used to structure the information presented in this report on R&I needs following these guiding key-questions for each theme:

- **Demand:**
What does society demand from natural capital and ecosystem services including the SSW-system?
- **Natural capital:**
What has nature, including the Soil-Sediment-Water (SSW)-system, to offer and which determinants sustain the system?
- **Land management:**
What are options for an integrated, cross-sectorial land management to balance societal demands and natural capital?
- **Net-impacts:**
What are the impacts of different options of managing natural capital, including the SSW-system on global, regional and local as well as temporal scales?

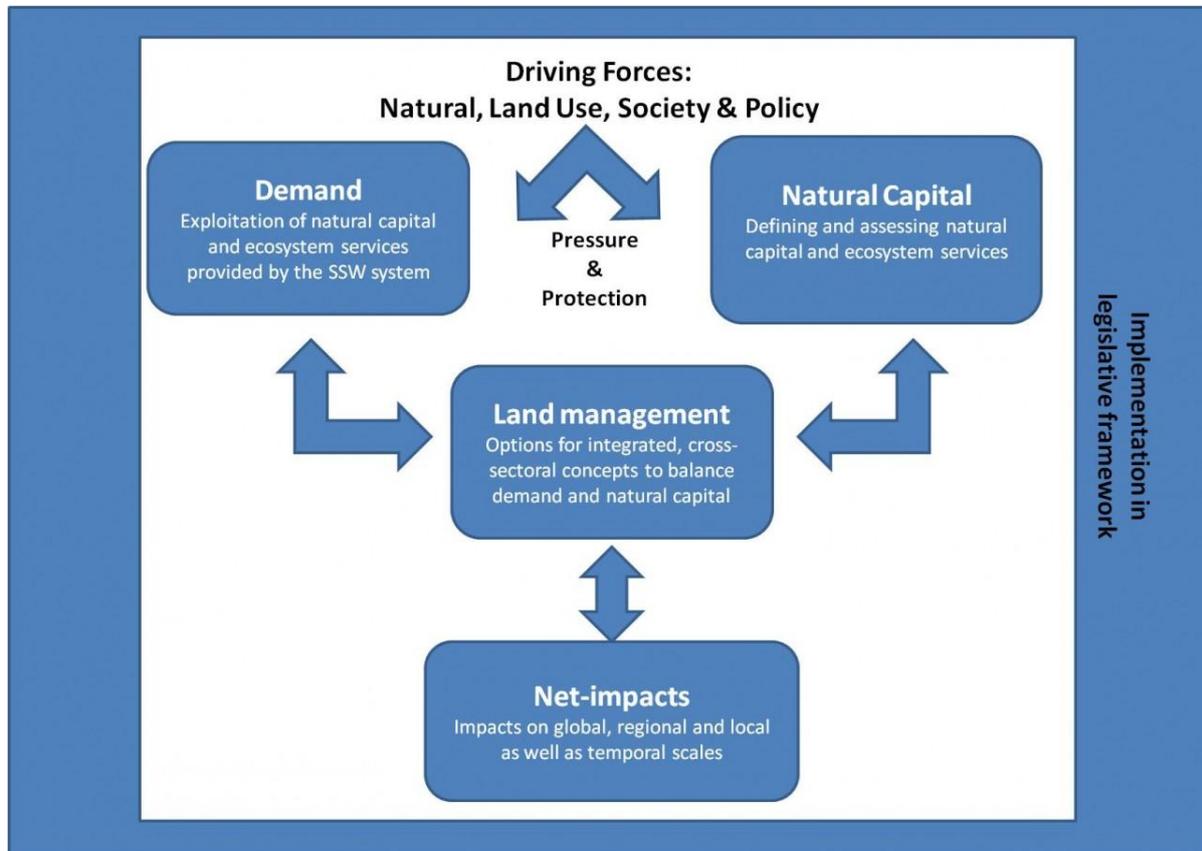


Figure 2: INSPIRATION's conceptual model.

1.4 Guide to the reader: outline of the country chapters

Each country chapter in Deliverable D2.5 follows a comparable outline:

Section X.1- Executive summary

This section provides an executive summary in English (X.1.1) as well as in the national language (X.1.2).

Section X.2 - Methodology followed

This section describes the methodology followed in the respective country including information on the stakeholder engagement (see also section 1.4).

The subsequent sections give a review and synthesis of the main results of the topics as mentioned under the WP2 objectives (see section 1.2).

Section X.3 Research and Innovation (R&I) needs

➤ **Topic a: Demand-driven*** suggestions for the Strategic Research Agenda (SRA), i.e. suggestions from the perspective of industry, end-users and funders.
*Related key question to be answered: **What (new) knowledge do these parties need to tackle societal challenges including the increase of job opportunities?***

* **Demand-driven** in INSPIRATION means focusing on the demands of those who are responsible or feel committed to tackle the societal challenges related to the INSPIRATION scope and themes, i.e. industry, end-users and funders. These parties could improve their business opportunities and/or take better informed decisions on what measures to take and execute in order to tackle other societal challenges if they would (be enabled to) use the knowledge as resulting from execution of the INSPIRATION SRA.

This section is divided in the sub-sections:

- Societal challenges and needs (X.3.1);
- Topics / research needs to include in the SRA (X.3.2).

The research questions under the topics in the X.3.2 sub-sections are divided by themes of the INSPIRATION conceptual model as described in section 1.3 of this chapter.

Section X.4 - Experiences regarding connecting science to policy/practice

➤ **Topic b:** Experiences regarding the exploitation of scientific knowledge to improve business opportunities and/or tackle other societal challenges.
*Related key question to be answered: **Where to improve the science-policy interface so that (new) knowledge can and will be more effectively exploited by the demand side?***

This section is divided in the sub-sections:

- Use of knowledge (X.4.1);
- Possibilities to set the agenda (X.4.2);
- Science – policy – practice (X.4.3).



Section X.5 National and transnational funding schemes

- **Topic c:** *Predominant, current as well as promising alternative funding schemes / mechanisms / programs for knowledge production and dissemination.*
*Related key question to be answered: **How to get with one Euro of national/regional funding a multitude of Euro's (from all sources) worth of knowledge in return contributing to EU and national demands? Or even how to get with one euro of EU funding a multitude of euro's (from national, regional, local, and private sector) worth of knowledge in return contributing to the R&I demands on Land and the Soil-Sediment-Water systems.***
- **Topic d:** *Experiences regarding the use of any trans-national, common budget for scientific knowledge production related to the scope of INSPIRATION.*
*Related key question to be answered: **How to set up/govern the appropriate funding option(s) resulting from INSPIRATION – based on previous learning experiences – so that: (1)the above demands will be fulfilled, (2) knowledge resulting from implementation of the SRA will be taken up and used and (3) funders experience that their invested, national Euros are indeed multiplied?"***

This section is divided in the sub-sections:

- Funding schemes and possibilities for research funding (X.5.1);
- Gaps in financial resources for research (X.5.2).

Section X.6 - Other remarks made by interviewees

This section is optional and is not taken up in all national reports. It contains remarks, points of attention and recommendations for INSPIRATION as given by the NKS.



1.5 Annexes

Annex I: NKS questionnaire template

This is the updated version of the questionnaire - reflecting inputs from the IAB and discussions at the NFP training in Vienna on 22nd – 23rd June 2015.

Note: this questionnaire template is meant to help National Focal Points (NFPs) to facilitate the interview/conversation with the National Key Stakeholders (NKS). Some questions are relevant to one NKS, other questions to another NKS. Hence, not all questions are relevant to each single NKS. The NFPs are required to adapt the template accordingly – keeping in it as many as possible of the issues to be addressed. If needed, the NFPs also translate the questionnaire into their national language.

The questionnaire (see next pages) has the following outline:

- A. **Interview information:**
To be filled out by the interviewer
- B. **Introduction:**
That the interviewer can use to start the NKS interview
- C. **Background information of the NKS interviewed:**
Mostly 'tick-boxes'
- D. **Strategic Research Agenda (SRA):**
NKS preferred topics, overarching themes and scope for the SRA and national state-of-the-art on research agendas that the NKS is aware of
- E. **Science-Policy-Interface:**
NKS experiences regarding the exploitation of scientific knowledge to: improve business opportunities; tackle other societal challenges; assist policy-implementation and/or policy revision
- F. **Funding:**
Predominantly used as well as promising alternative funding schemes / mechanisms / programs for knowledge production and dissemination that the NKS is aware of
- G. **Other:**
At the end there is some time advised to let the NKS give us their advice, some nice quotes (that we can use anonymously in our communications), examples etc.
- H. **Ending the interview:**
Explain follow up and if/how NKSs will be involved in the next steps of INSPIRATION

Questionnaire template

A. Interview information

Country:

Name of INSPIRATION researcher:

Date of Interview:

How does the NKS wish to be referred to: *[Anonymous, personal opinions, company's opinion. Choose when it is a good time to discuss this. In the beginning or later on.*

SHOW the interviewed NKS the ENGAGEMENT CONSENT FORM and ask him/her to fill it out. Please introduce the engagement consent form (available in 'D2.1 MoU' and editable by yourself) and hand a copy to the interviewee to read and fill in – make sure that you take this away with you and keep for your own records]

B. Introductions

[Please introduce your selves, the project and the purpose of the interview. You can use the handout as provided at the end of this template. This can also be sent beforehand to the NKS. Agree on a time span: approximately one and a half hour.]

C. Background information on the interviewee

1. Name of NKS interviewed:

2. Institution:

3. Role:

4. Are you a (multiple answers possible):

- National-regional-local authority
- University/research institute
- Small or Medium sized Enterprise (SME, i.e. < 500 employees) / consultant
- Business and industry
- Non-Governmental Organisation (NGO)
- Network representative / leader
- Other, specify: ...

5. Fields of expertise (multiple answers possible): *[Ask to specify background regarding the selected item(s) in order to understand expertise background of interviewee]*

- Soil
- Water
- Sediment
- Urban / spatial planning
- Landscape design
- Land management
- Other, specify:

6. Does your organisation provide external research funding?

- Yes. Please specify: ...
[e.g. as programme holder, public, private, ...]
- No

D. SRA

7. Which societal challenges do you regard as important?

[If needed, you can use the European Commissions (EC) list of societal challenges here. These EC themes are:]

- Contribute to food security and food safety;
- Ensure secure supplies of safe drinking water;
- Secure energy supply and distribution;
- Reduce raw material and resource consumption, Ensure efficient use of natural resources;
- Contribute to climate change mitigation and societal adaptation;
- Contribute to a healthy living environment;
- Ensure secure infrastructure

[Explain that these challenges may be used as bases for defining of the overarching themes for aggregating the research topics of our SRA.]

a. If applicable, what additional, other or alternative challenges would you suggest/prefer?

[When needed, you can mention challenges as nature conservation, sustainable use of ecosystem services, halting the loss of biodiversity]

8. Starting with your own experience: which specific topics (research needs) should be included in the SRA?

[For each single topic mentioned by the NKS, use the following follow-up questions. The a, b and c sub-questions are mandatory. The other sub-questions are optional]:

a. Explain – elaborate the topic

- *Who will be affected?*
- *Who is responsible?*
- *Is it a topic of concern of your organisation / department*
- *Is it only a national topic, or a shared topic by multiple countries?*
- *Where are we now, where do we want to be in x years (point on the horizon)?*
- *How can the newly gained knowledge be effectively used?*

b. Priority:

1. *High priority*
 2. *Some priority*
 3. *Neutral priority*
 4. *Low priority*
 5. *No priority*
- *What is the urgency, i.e. what goes wrong if we do nothing?*



c. Who wants to/should fund this kind of research?

*[Optionally: check the following WP3 key-words for relevance, i.e. if they raise any additional topics by the NKS. The key-words can be used as support / check list
Be sensible as interviewer if this is needed.]*

- *Assessment of land resources*
- *Potential productivity of land and soils*
- *Demand for soil/land resources, imports and exports*
- *Competition between land uses (land-use conflicts)*
- *Concepts to identify and quantify relevant impacts*
- *Instruments to avoid / minimize impacts (feedback to decision-making process)*
- *Opportunities of innovative land-use technologies*
- *Resource-oriented land management systems]*
- *Soil regeneration*
- *Soil and groundwater remediation*

9. Linked to topics mentioned by the NKS:

a. What are the important / relevant documents, research agendas, research programmes underpinning these topics? (state-of-the-art)

b. Related to these agendas and programmes: what are timelines of programming and windows-of-opportunities to influence agendas / programmes?

[Note: question 9b is input for work package 5]

E. Science-Policy-Interfacing (SPI)

10. How would you define 'scientific knowledge'?

11. For what do you use scientific knowledge in your job?

12. Which sources of (scientific) knowledge do you use for doing your job?

[Open question and you can mention some of the sources underneath as examples]

○ <i>scientific paper</i>	○ <i>newspapers</i>
○ <i>consultants</i>	○ <i>television</i>
○ <i>reports</i>	○ <i>conferences Involvement in research projects</i>
○ <i>colleagues</i>	○ <i>data (bases)</i>
○ <i>experiences /examples within my own country</i>	○ <i>websites, such as:</i>
○ <i>experiences /examples abroad</i>	○ <i>other, specify:</i>

13. To what extent do you use most recent/new scientific knowledge (i.e. state-of-the-art scientific insights/findings) for doing your job?

14. To what extent are you able to influence (and how) the setting of scientific research policies/agendas in our country?

15. To which extent do our national policies/agendas reflect your specific needs and priorities?

16. To what extent has been made use of the state-of-the art in scientific research for the formulation of existing policies in our country?

[Questions only for NKS from the non-science sector (business and policy):]

17. Have you ever been involved in:

- a. the formulation of scientific research questions?
- b. doing scientific research (i.e. knowledge co-creation)?
- c. synthesizing/wrapping-up of scientific knowledge, e.g. to feed into policy making or to increase business opportunities?

[When yes: Follow-up questions]

- How successful/satisfying was this, on a scale of 1-5?
 1. *Very successful/satisfying*
 2. *Successful /satisfying*
 3. *Neutral*
 4. *Unsuccessful/unsatisfying*
 5. *Very unsuccessful/unsatisfying*
- What went well
- What could be improved?
- What to avoid/not to do?
- Additional remarks?

[Question only to NKS who are likely to have insights here (e.g. research funders)]

18. (How) is the societal impact of scientific research related to the scope of INSPIRATION being assessed in our country?

[If they know: Follow-up questions:]

- How successful/satisfying is this, on a scale of 1-5?
 1. *Very successful/satisfying*
 2. *Successful/satisfying*
 3. *Neutral*
 4. *Unsuccessful/unsatisfying*
 5. *Very unsuccessful/unsatisfying*
- What indicators are used?
- What goes well?
- What can be improved?
- What to avoid/not to do?
- Additional remarks?

19. Which national Science-Policy-Interface documents do you know of / can you recommend?

F. Funding



20. Which experiences and expectations in funding schemes (public / private) do you have in your own field that could offer opportunities for future research on land-use and -management and related impacts to Soil-/Sediment-/Water-systems:

- Sub-nationally/regionally?
- Nationally?
- European? [e.g. H2020, Interreg, multi-lateral such as the Joint Programming Initiatives]
- International? [e.g. Belmont Forum, Foundations.]

[For all R&I questions aiming at achieving policy targets in the Land & SSW related system (like e.g. Sustainable Development Goals on soils, existing EU directives such as the Environmental Liability Directive, etc.) consider all Public and Private funding sources. Please ask to provide details and give most important references (documents, website) that could be relevant for explaining the answer]

21. How to increase the added value of different financial resources (i.e. achieve a multiplier) for doing research that contributes to EU and national demands, in particular to the R&I demands on Land and the SSW-system?

[CONSTRUCTIONS that (could) work. PP, PPI, etc. Just ask for, as open as possible for suggestions, ideas, experiences, good examples]

22. Are there areas of research and innovation (R&I) that you are aware of that are not (yet) covered by current funding mechanisms and which would need new/different funding schemes / infrastructures?

23. Integrated approaches (necessary for addressing particular societal challenges related to the use and management of land and related impacts to SSW systems) are usually difficult to fund / get recognized by the research funding communities. What would be necessary to improve this?

24. Based on previous learning experiences that you are aware of: how to best set up / govern funding option(s), so that societal demands will be fulfilled, knowledge resulting from execution of the SRA will be taken up and used; and funders experience that their invested, national Euros are indeed multiplied? *[if they know: follow-up questions]*

- How successful/satisfying was this, on a scale of 1-5?
 1. *Very successful/satisfying*
 2. *Successful/satisfying*
 3. *Neutral*
 4. *Unsuccessful/unsatisfying*
 5. *Very unsuccessful/unsatisfying*
- What went well?
- What could be improved?
- What to avoid/not to do?
- Additional remarks?

G. Other (remarks, suggestions, examples):

H. Ending the interview

Thank you for taking the time to participate in this interview:

- Would you like us to keep you updated about INSPIRATION progress?
- Would you suggest anyone else who we should be interviewed by us?
- Do you have further questions arising from this interview, or would you like to add anything else?
- What information are you interested in, and willing to give feedback on?

[Discuss the feedback mechanism and if they have expressed their opinions as a person or as a representative of their organisation/network. Checklist:]

a. Information to exchange / willingness to give feedback on:

- (complete interview, not recommended)
- summary of main conclusions
- national report, national contribution to D2.4
- complete D2.4, all countries

b. Preferred level of feedback:

- no feedback
- informal feedback
- formal feedback (e.g. on behalf of represented organisation)

[Check: have you discussed consent form / how to refer to interviewee]

INSPIRATION acknowledges the received funding from the
European Community's HORIZON2020 Framework Programme
under grant agreement no 642372





Annex II: NKS hand-out: INSPIRATION interview at a glance

INSPIRATION interview at a glance

Aim of INSPIRATION:

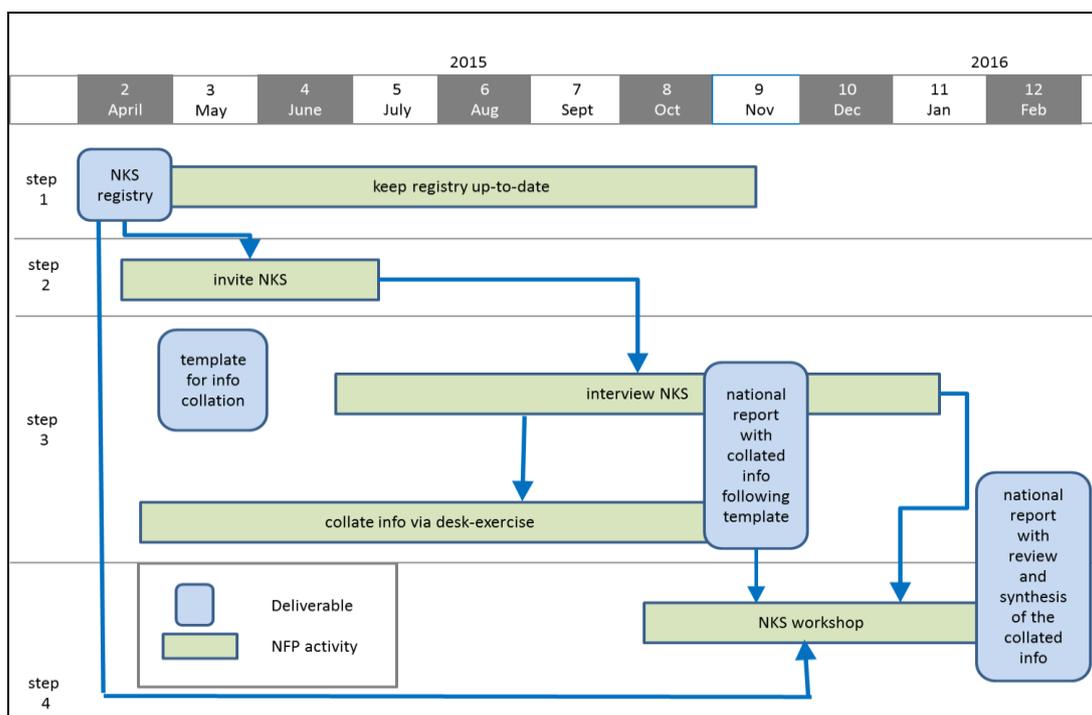
The main purpose of the EC-funded INSPIRATION project is to formulate an end-user driven strategic research agenda (SRA) for land-use, land-use changes and the related, impacted compartments of the Soil-Sediment-Water (SSW) system in order to meet current and future societal challenges and needs. Next to that, the project aims to scope out models of implementing the SRA and to prepare a network of public and private funding institutions willing to commonly fund the execution of the SRA.

National Key Stakeholders (NKS):

In a series of NKS interviews across EU nations the “National Focal Points (NFP) gather for nations individually information related to the INSPIRATION scope (land and SSW-system use and management) on:

- Research and Innovation (R&I) needs
- Experiences regarding connecting science to policy/practice
- National and transnational funding schemes

In the interviews we focus at NKS – like you – positioned at a strategic level, i.e. leading persons in their field of profession; with a good overview on opportunities; a clear vision on, and insight in knowledge demands (short, middle and long-term). Furthermore, these NKS are well positioned and participate in relevant professional network(s) and may also have potential to become an ambassador for INSPIRATION. We selected NKS to represent different disciplines and institutional backgrounds including: land-use planners; managers; soil, sediment and water experts; researchers, funders and regulators/policy makers.



Workflow in the first year of INSPIRATION



This interview:

Collecting input from you – an expert in your field – is crucial for the project in order to help us describing the state-of-the-art in our country as input into the European research agenda. In the interview we will go through a series of topics and questions: The interviews of NKS (ca. 20 per nation), together with a desk study on research needs and funding possibilities will be synthesized to a 'national report'. This synthesis will be reviewed in a national workshop, to prioritize the topics for the suggested Strategic Research Agenda (SRA) from our country's point of view. The national reports will finally be used as input for elaborating the European SRA and cross-nation matchmaking (matching research needs to possible funding).

Example questions:

Research and Innovation (R&I) needs

- Which societal challenges do you regard as important?
- Starting with your own experience: which specific topics (research needs) should be included in the SRA?

Experiences regarding connecting science to policy/practice

- How would you define 'scientific knowledge'?
- To what extent has been made use of the state-of-the art in scientific research for the formulation of existing policies in our country?

National and transnational funding schemes

- Does your organisation provide external research funding?
- Which experiences and expectations in funding schemes (public / private) do you have in your own field that could offer opportunities for future research on land-use and -management and related impacts to Soil-/Sediment-/Water-systems

Your benefits from participating:

- A chance to influence the European SRA on land and SSW management in the light of societal challenges and needs;
- Being able to make use of the results of the project: overview of research need and of existing and promising funding schemes on different levels (sub-national, national, European, international) and opportunities for a better connection between science and policy/practice;
- Use the matchmaking opportunity to get in contact with other networks in- and outside our country, and countries learn which shared challenges can be taken up jointly.

Contact and further information:

For general information on the INSPIRATION project visit our website: www.inspiration-h2020.eu

Contact the National Focal Point:	Contact the general project coordination:
See the INSPIRATION website for contacts	Stephan Bartke stephan.bartke@uba.de



2. Finland

Report by Antti Rehunen, Teija Haavisto, Ritva Britschgi, Outi Pyy, Jari Rintala, Petri Shemeikka

2.1 Executive summary

2.1.1 English version

This report describes the Finnish results of the NKS interviews, the desk exercise and national workshop carried out in INSPIRATION project. Altogether 14 interviews took place with 23 experts. Interviewed stakeholders represented quite equally funders (7 stakeholders), end users of knowledge (9 stakeholders), and knowledge producers (5 stakeholders). Workshop had 32 participants of which 4 were representatives of funders, 15 end users of research data and 13 knowledge providers.

As important societal challenges, most often mentioned by the NKS were reduction of raw material and resource consumption, resource efficiency and circular economy. Also climate change mitigation and adaptation to change were considered important issues in future research activities. Food and drinking water safety were regarded highly important, but risks related to them were thought to be only moderate at the national level, but critical globally. Healthy living environment was seen as a general goal of urban development requiring sufficient data and methods for integrated planning. Research needs related to biodiversity, green infrastructure and ecosystem services were also mentioned particularly in connection with fitting different land uses with each other. Security of infrastructure and energy distribution was considered as a less stressed issue from land use, soil and land management perspective, but the impacts of infrastructure development and energy production were mentioned as essential theme.

Research and innovation needs were summarized under 16 research topics and grouped in six thematic areas. Under each research topic, 4-8 most essential research questions were formulated.

Under the theme of data gathering, analysis and assessment methods, need for impact assessment of different land uses and climate change on quality and quantity of surface waters and groundwaters was stressed. Development of new sampling and analysis methods to improve monitoring cost efficiency and measurement reliability in low concentrations was also considered important. The gathering, use and synthesizing of data on the state of soil and waters from multiple sources and research fields was seen essential for policy formulation in complex environmental issues and in different scales from regional to international level.

The theme of soil and water ecosystem functions includes research needs related to changes and interactions of biogeochemical cycles, soil carbon dynamics and climate change impacts on it, balancing bioeconomy pressures with needs to adapt to climate change and protect biodiversity in forests and mires, identification of soil-related preconditions for sustainable intensification of food production, and assessment and mapping of soil ecosystem services.



Circular economy and sustainable management of soils and waters theme included two research topics: innovative ways of material recycling and re-using land areas to prevent depletion of minerals and nutrients and minimise land uptake, and improved risk management and sustainable remediation of soils and waters.

Sustainable urbanisation and infrastructure development theme was discussed from different angles. Guaranteeing healthy environment, reduction of carbon emissions and use of natural resources and the functioning of green infrastructure were identified as main research challenges. Also infrastructure development and maintenance were seen to require new and sustainable solutions.

Under the theme of integrative land use policies and planning, methods to integrate targets of different land uses and create shared understanding, use of policy instruments both in growing and declining regions, and defining of best locations for new developments and infrastructure were emphasised as research topics. Also ways to enhance social acceptance and develop environmental regulation and de-regulation were considered important.

Climate change mitigation was included in practically all earlier mentioned research themes, but climate change adaptation was also identified as a separate cross-cutting theme to which many other topics were related to. Especially questions from adaptation capabilities in Nordic conditions were raised here.

Science-policy/practice interface includes many channels through which research findings are conveyed to decision-making and practical operations. Scientific research is used and accessible mainly to knowledge producers in universities and research institutes, but scientific research lies often in the background of more practical publications that are used by other knowledge users in public and private sector. For many stakeholders, guidelines, surveys, professional journals and web pages are the main sources of knowledge and they are complemented by direct contacts and meetings with researchers, easily accessible research reports and reviews gathered in consultant works.

Knowledge end users express the need to receive the essential knowledge in a concise and easily understandable form. They also need help in assessing the quality of the available information. Knowledge users hope that research findings and datasets would be gathered under a common web portal and new communication channels would be used more often. Illustrative examples of good practices, maps, graphs and other visual material are found useful in communicating results to decision-making in a compact form.

Ministries and other funder organisations are able to direct funding to questions that they emphasise. End user and knowledge provider organisations have more limited and indirect opportunities to influence research agendas.

Synthesising research findings to decision-making and communicating about the synthesis appeared as a key aspect in science–policy/practice interface. Relevant and easily applicable knowledge like policy briefs and interpreted scientific data should be available more openly. Research institutes and universities should communicate more actively about most recent and relevant research findings and consider the usability of their research findings more extensively. Visibility in the media contributes significantly to the functioning of science–policy/practice interface. Science–policy/practice interaction should happen more in



two ways. Stakeholders pointed out that researchers should be more involved in the planning of research programmes and articulate their interpretations more explicitly

Several sources of funding were identified regionally, nationally and internationally. The alignment and interfaces of different funding systems should be considered more carefully in the future. Competition for research funding was considered by the stakeholders to be getting more intense. The profitability of large project calls was questioned due to the huge amount of wasted work done for abandoned project applications. According to stakeholder representatives, research calls should be more often carried out in stages, with more elaborate contents only in later stages, and well rated but unsuccessful proposals could be gathered into a project bank for some time, waiting for funding opportunities.

Merging public and private funding was seen necessary by the stakeholders. Private investments to research foundations could be favoured in taxation. One way to channel private funding to research could be through foundations or funds, where both private and public sector could invest. Public fundraising was also mentioned as an opportunity.

Soil and land as a resource was thought by many stakeholder representatives to be partly neglected topic in large scale research agendas. Many experts expressed worries over the funding of basic research, monitoring and maintenance of data pools, which were regarded as a publicly funded task. Soil monitoring is lacking permanent funding. Synthesis of existing data and integrated approaches combining different fields of expertise, were noted to deserve more attention.

2.1.2 Finnish version

EU:n Horisontti 2020 -ohjelmasta rahoitetussa INSPIRATION-hankkeessa on kartoitettu keskeisimpiä maankäyttöön ja maaperään liittyviä tutkimustarpeita yhteensä 16 Euroopan maassa. Kartoituksen perusteella laaditaan strateginen eurooppalainen tutkimusohjelma, joka vastaa aihepiiriin liittyviin nykyisiin ja tuleviin tarpeisiin yhteiskunnassa. Lisäksi hankkeessa selvitetään tutkimusohjelman toteuttamistapoja sekä kootaan julkisten ja yksityisten tahojen yhteistyöverkostoa ohjelman rahoittamiseksi.

Hankkeessa käsiteltiin laajasti maaperään ja maankäyttöön liittyviä kysymyksiä. Tarkastelun kohteina ovat esimerkiksi maa-alueiden käyttö rakentamiseen ja elinkeinotoimintaan, maankäytön suunnittelu, maaperän laatu ja suojele, maa-aineshuolto, maisemanhoito, pilaantuneiden maa-alueiden käyttö ja pohjavesien suojele. Tärkeitä näkökohtia ovat luonnonvarojen käytön kestävyys sekä eri maankäyttömuotojen yhteensovittaminen ja vaikutusten arviointi. Hankkeessa arvioitiin, mitkä ovat tällä hetkellä pahimpia tiedon puutteita ja millaista uutta tutkimustietoa tarvitaan, jotta voidaan ratkaista yhteiskunnallisia haasteita ja tuottaa uusia innovaatioita ja liiketoimintamahdollisuuksia.

Kussakin maassa tietojen keruusta ja analysoinnista vastasi kansallinen yhteistyötaho, jollaisena Suomessa toimii Suomen ympäristökeskus SYKE. Tutkimustarpeiden kokoaminen toteutettiin yhteistyössä tiedon loppukäyttäjien, tutkimusrahoittajien ja tiedontuottajien kanssa. SYKEN tutkijat kokosivat yhteen olemassa olevaa tietoa, haastattelivat keskeisten sidosryhmien edustajia, järjestivät sidosryhmien edustajille kansallisen työpajan. Haastatteluja tehtiin yhteensä 14 kpl ja niihin osallistui yhteensä 23 henkilöä. Haastatellut asiantuntijat edustivat melko tasaisesti rahoittajatahoja (seitsemässä haastattelussa), tiedon



loppukäyttäjiä (yhdeksässä haastattelussa) ja tiedon tuottajia (viidessä haastattelussa). Työpajaan osallistui yhteensä 32 henkilöä, joista neljä edusti rahoittajatahoja, 15 tiedon loppukäyttäjiä ja 13 tiedon tuottajia.

Erilaisten sidosryhmien ja näkökulmien tavoittaminen oli olennaista, jotta kansallisesti tärkeät asiat ovat esillä pohdittaessa eurooppalaisen tutkimuksen asialistaa. Haastateltavat asiantuntijat valittiin siten, että monenlaiset eri toimialat ja tieteenalat sekä organisaatiot ovat edustettuina. Haastateltaviksi pyydettiin maankäytön suunnittelijoita, yritysten ja etujärjestöjen edustajia, maaperä- ja vesiasiantuntijoita, tutkijoita, rahoittajia, säädösvalmistelijoita ja poliittisia päättäjiä.

Yhteiskunnallisista haasteista haastatteluissa useimmin mainittuja olivat raaka-aineiden ja resurssien kulutuksen vähentäminen, resurssitehokkuus ja kiertotalous. Myös ilmaston muutoksen lieventämistä ja siihen sopeutumista pidettiin tärkeänä tulevaisuuden tutkimusaiheena. Ruuan ja juomaveden turvallisuutta pidettiin hyvin tärkeänä globaalisti, mutta Suomessa niihin ei koettu kohdistuvan kovin suurta uhkaa. Kaupunkien kehittämisessä elinympäristön terveellisyyteen liittyvistä kysymyksistä nähtiin tarvittavan lisää tietoa ja parempia, integroivia työtapoja. Erilaisten maankäyttömuotojen yhteen sovittamisessa nousivat esille luonnon monimuotoisuuteen, vihreään infrastruktuuriin ja ekosysteemipalveluihin liittyvät asiat.

Suomen osalta haastattelujen, kirjallisuusselvityksen ja työpajan tulokset koottiin käsillä olevaan kansalliseen raporttiin. Kansallisia raportteja käytetään pohjana laadittaessa eurooppalaista strategista tutkimusohjelmaa ja tunnistettaessa ylikansallisia yhteistyömahdollisuuksia.

Kerätyn aineiston pohjalta tunnistettiin tärkeimpiä tutkimusaihepiirejä ja esitettiin niihin liittyviä keskeisimpiä tutkimuskysymyksiä. Suomen kansallisessa raportissa eriteltiin kaikkiaan 16 tutkimusaihepiiriä, jotka sijoitettiin kuuden teemakokonaisuuden alle. Kustakin aihepiiristä esitettiin 4-8 tutkimuskysymystä.

Tiedon kokoamiseen, analysointiin ja arviointimenetelmiin liittyvässä teemassa painotettiin tutkimustarpeina eri maankäyttömuotojen ja ilmastonmuutoksen vesistö- ja pohjavesivaikutusten arviointia, luotettavien ja kustannustehokkaiden näytteenotto- ja analyysimenetelmien kehittämistä sekä tiedon kokoamista ja yhteen vetämistä politiikkatoimien tueksi.

Maaperä- ja vesiekosysteemien toimintaan keskittyvässä teemassa esitettiin tutkimustarpeita, jotka liittyvät maaperän ja vesien geokemialliseen kierron vuorovaikutuksiin ja muutoksiin, maaperän hiilen dynamiikkaan, metsien ja suoalueiden muutoksiin ja käytön haasteisiin, ruuantuotannon maaperään liittyviin edellytyksiin sekä maaperän ekosysteemipalvelujen arviointiin.

Kiertotalouden ja maaperän ja vesien kestävään hallinnan teemassa nostettiin esille maa- ja kiviaineksen kierrätykseen ja maa-alueiden uusiin käyttömuotoihin sekä maaperän ja pohjavesialueiden riskinhallintaan ja kestävään kunnostukseen liittyviä tutkimustarpeita.

Kestävään kaupungistumiseen ja infrastruktuurin kehittämiseen keskittyvässä teema-alueessa käsiteltiin monelta kannalta kaupungistumiseen ja terveelliseen elinympäristöön liittyviä tutkimuskysymyksiä sekä esitettiin infrastruktuurin rakentamisen ja ylläpidon



tutkimuksessa huomioon otettavia asioita ja kiinnitettiin huomiota vihreä infrastruktuurin toimivuuteen.

Integroivan maankäyttöpolitiikan ja -suunnittelun teemassa korostettiin eri maankäyttömuotojen yhteensovittamisen menetelmiin liittyviä tutkimuskysymyksiä, ohjauskeinojen suuntaamiseen ja suunnittelumenetelmien kehittämiseen kytkeytyviä tutkimustarpeita sekä yhteiskunnalliseen hyväksyttävyyteen ja sääntelyyn liittyviä tutkimushaasteita. Kasvavien ja supistuvien alueiden erot tuotiin esille.

Ilmastomuutokseen hillintään liittyviä tutkimuskysymyksiä sisältyi hyvin monen aihepiirin alle. Ilmastomuutokseen sopeutumisen haasteet nostettiin esille erityisesti Pohjois-Euroopan näkökulmasta muita tunnistettuja aihepiirejä poikkileikkaavana teemana.

Tutkimustieto välittyi päätöksentekoon ja käytännön operatiiviseen toimintaan monen eri kanavan kautta. Tieteelliset artikkelit ovat käytössä ja saatavilla lähinnä tiedon tuottajilla yliopistoissa ja tutkimuslaitoksissa. Tieteellinen tutkimustieto on kuitenkin monien käytännöllisempien julkaisujen pohjana. Monet sidosryhmät hyödyntävät ohjeita, ammatillisia julkaisuja ja lehtiä sekä verkkosivustoja tärkeinä tiedon lähteinä, minkä lisäksi tutkimustiedon saantia täydensivät suorat yhteydet ja tapaamiset tutkijoiden kanssa, helposti saatavilla olevat tutkimusraportit ja konsulttien kokoamat koosteet tutkimustiedosta.

Tiedon loppukäyttäjät toivoivat saavansa olennaisen tiedon tiiviissä ja helposti ymmärrettävässä muodossa. He myös tarvitsevat apua saavan tiedon laadun arvioinnissa. Tiedon loppukäyttäjät ehdottivat, että tutkimustulokset ja tietoaineistot tulisi koota yhteen portaaliin ja uusien tiedonvälityskanavien käyttöä tulisi lisätä. Havainnolliset esimerkit hyvistä käytännöistä, kartat, kaaviokuvat ja muu visuaalinen materiaali ovat hyödyllisiä esiteltäessä tuloksia tiivistetysti päätöksentekijöille.

Ministeriöt ja muut rahoittaja tahot pystyvät suuntamaan rahoitusta tärkeänä pitämiinsä tutkimuskysymyksiin. Tiedon loppukäyttäjät ja tiedontuottajaorganisaatiot pystyvät vaikuttamaan tutkimusohjelmien sisältöön rajoitetummin ja epäsuorasti.

Tieteen ja politiikan / käytännön rajapinnassa keskeistä on tutkimustulosten yhdistely ja niistä viestiminen päätöksentekijöille. Olennaista, selkeästi esitettyä ja tulkittua tietoa tulisi olla koottuna tiiviissä ja hyvin perustellussa muodossa päättäjille ja asiantuntijoille suunnattuina kannanottoina (policy brief) ja muina vastaavina koosteina. Tutkimuslaitosten ja yliopistojen tulisi viestiä aktiivisemmin viimeaikaisista, keskeisistä tutkimustuloksista ja niiden tulisi miettiä tutkimustulosten hyödynnettävyyttä entistä kattavammin. Näkyvyys tiedotusvälineissä on edistää merkittävästi tutkimustiedon välittymistä päätöksentekoon ja käytännön toimintaan. Tieteen ja politiikan tai käytännön välisen vuorovaikutuksen tulisi olla kaksisuuntaista. Sidosryhmien edustajien mielestä tutkijoiden tulisi osallistua enemmän tutkimusohjelmien suunnitteluun ja kertoa näkemyksistään avoimemmin.

Tutkimuksen rahoituslähteitä tunnistettiin useita alueellisesti, kansallisesti ja kansainvälisesti. Lisäksi hankkeessa selvitettiin, miten sekä millaisia kansallisia ja kansainvälisiä rahoitusjärjestelmiä tarvitaan tulevaisuudessa. Erilaisten rahoitusjärjestelmien yhdistelmiä ja kytkentöjä nähtiin tarpeelliseksi tarkastella huolellisesti. Yhteiskunnallisten haasteiden tulisi hankkeeseen osallistuneiden sidosryhmien edustajien mielestä olla tutkimusaiheiden määrittelyn lähtökohtana.



Kilpailun tutkimusrahoituksesta koettiin kiristyneen. Suurten tutkimushakujen kannattavuus kyseenalaistettiin hylättyihin hakemuksiin käytetyn suuren työmäärän vuoksi. Sidosryhmien edustajat ehdottivat tutkimushakuihin vaiheittaista toimintatapaa, jossa yksityiskohtaiset hakemukset jätettäisiin vasta loppuvaiheessa. Ehdotettiin myös, että hyviksi arvioidut hankkeet, jotka jäävät ilman rahoitusta, voisi koota projektipankkiin joksikin aikaa odottamaan uusia rahoitusmahdollisuuksia. Julkisen ja yksityisen rahoituksen yhdistämistä pidettiin tarpeellisena. Ehdotettiin, että verotuksessa voitaisiin suosia yksityisten tahojen tutkimussäätiöihin tekemiä sijoituksia. Yksityistä rahoitusta voitaisiin ohjata tutkimukseen säätiöiden tai rahastojen kautta, mikä mahdollistaisi yksityisen että julkisen sektorin investoinnit. Joukkorahoitus mainittiin myös yhtenä mahdollisuutena.

Monet sidosryhmien edustajista pitivät maaperä ja maa-alueresursseihin kohdistuvia tutkimusaiheita laiminlyötyinä. Monet asiantuntijat ilmaisivat huolensa perustutkimuksen, seurantojen ja tietovarantojen ylläpidon rahoituksesta, joka tulisi tapahtua julkisin varoin. Maaperäseurannoilta puuttuu kuitenkin pysyvä rahoitus. Synteesien tekoon olemassa olevasta tiedosta sekä eri asiantuntemusaloja yhdistäviin integroituihin lähestymistapoihin tarvittaisiin enemmän panostusta.



2.2 Methodology followed

This national report (i.e. INSPIRATION deliverable 2.5) reports the information collated for Finland. The information was collated in accordance with INSPIRATION D2.3 “Template for national information collation”. In Finland, totally 14 NKS interviews were accomplished. The number of people interviewed was 26. In several interviews, two or more representatives of the organisation participated in the interview. The interviewees represented altogether 11 different organisations. When several people were interviewed from one organisation, they were selected by the interviewer or by the organisation to represent different departments or areas of expertise. The interviewed experts represented quite equally three target groups: funders (7 stakeholders), end users of knowledge (9 stakeholders), and knowledge producers (5 stakeholders) . The Details on these NKS are provided in Annex I.

The national key stakeholder workshop was organised on November 19th-20th in 2015 in Finnish Environment Institute (SYKE) in Helsinki. The workshop had altogether 32 participants who were present on either of the days or both of them. 13 of the participants represented knowledge producers, 15 end users and 4 funders. Several people had more than one role. Invitations to the workshop were send emphasising also funders, but the distribution of registered participants was different from invitations. Nobody interested was however denied from taking part in the workshop. The Details on NKSs who participated in the workshop are provided in Annex II.

The desk study was based on documents as suggested by NKS and identified by the project researchers. These are listed in Annex III.

The draft of this Finnish national part of this deliverable 2.5. was sent twice for a review to all NKS who were previously interviewed or participated in the workshop. The NKS had an opportunity to comment on the draft firstly in the end of January and secondly in the middle of February 2016. Seven people sent their comments. Three of these experts who commented were from one organisation and had collected their comments in one document.



2.3 Research and Innovation (R&I) needs

2.3.1. Societal challenges and needs

Reduction of raw material and resource consumption, resource efficiency and circular economy was mentioned most often by the stakeholders as the important societal challenge. Climate change mitigation and adaptation to change were also considered by many as a societal challenge that the future research activities should contribute to. Food and drinking water safety were regarded highly important, but risks related to them were thought to be only moderate at the national level, but critical globally. Healthy living environment was seen as a general goal of urban development requiring sufficient data and methods for integrated planning. Research needs related to biodiversity, green infrastructure and ecosystem services were also mentioned particularly in connection with fitting different land uses with each other. Security of infrastructure and energy distribution was considered as a less stressed issue from land use, soil and land management perspective, but the impacts of infrastructure development and energy production was mentioned as essential theme.

2.3.2. Topics / research needs to include in the SRA

Research topics suggested to the SRA have been gathered on the basis of NKS interviews, national NKS workshop and literature review focusing on research strategies and agendas of different research institutions and administrative sectors. Identified research needs are summarized under 16 research topics with specified research questions under each topic. Research topics are grouped in six thematic areas.

The main research agendas and strategies were reviewed and taken into account when defining the research topics. The Academy of Finland provides funding for academic research covering the full spectrum of scientific disciplines and also defines themes for strategic research calls that are aimed to support long-term and programme-based research. Research topics are considered in the strategies and particularly in R&D strategies of different ministries. Sectoral research institutes working under the ministries also specify their focus areas. In addition, Government working group for the coordination of research, foresight and assessment activities specifies research themes for its own funding activities. The important and relevant documents, research agendas, research programmes underpinning these considered topics are found in Annex II.



Thematic area A: Data gathering, analysis and assessment methods

FI-1 Assessing the impacts of different land uses and climate change on the quality and quantity of surface waters and groundwaters

The allocation of different land uses and vegetation on different kinds of soils has a crucial impact on the quality of runoff waters and groundwater. Finnish aquifers are small, shallow and scattered formations. Because of glaciofluvial origin their permeability is also quite high so they are very sensitive to contamination. The nutrient runoff from fields depends on where the fields are located and the ways in which they are farmed. Vegetation can be used to infiltrate waters, but it may act as a source of natural runoff of nutrients in the autumn. Most discharges of nutrients and impurities often originate from a rather small part of the total area. Acid sulphate soils in Baltic Sea coastal areas are particularly sensitive to land use changes and infrastructure developments that can cause considerable leaching of metals in those areas. More knowledge is needed on what the exact effects of specific land uses are, how they may change due to climate change and through what means harmful effects can be minimised.

Possible research questions may be:

Net impacts

- How to identify the short and long term impacts of certain land use changes on the quality, quantity and temperature of surface and groundwater?
- How to identify the impacts of storm water drainage on waters?
- How to observe land use impacts on water ecosystems and groundwater depending ecosystems?
- How do different land use policies, such as agricultural policy and city planning policy, contribute to the environmental impacts of land use?

Land management

- How to detect the most effective ways to improve water quality e.g. through modelling and systemic approaches?



FI-2 Development of reliable sampling and analysis methods

Increasing pressures on renewable natural resources emphasise the need to monitor the impacts of resource use more closely than before. Meanwhile, the amount of financial resources to organise monitoring are decreasing. This calls for developing and harmonizing monitoring and improving the cost efficiency of data production through joint acquisition of data and combination of data from different sources. Data collection should also be prioritised on the basis of the definition of essential parameters.

Automation, remote sensing techniques and modelling help to cut the expenses of sampling, but there is also a need for quick, light and movable sampling methods and analysis techniques. Time and money are saved and changes in sample quality could be avoided if samples were analysed on site without transportation to laboratory. Challenges are related e.g. to reliable and more accurate measurements of low concentrations of various substances (e.g. available phosphorus, other nutrients, and hazardous substances), and the analysis of rock aggregate quality. Development of sampling and analysis methods should be done in wide co-operation between research institutes, universities and developers of measuring instruments.

Current complex environmental problems need also more comprehensive research methods to be resolved. New methods to use big data resources and integrate data from different fields of knowledge can open up new ways to carry out cost-efficient research. Combining study results from different research sectors might open brand new ways to solve problems in sustainability issues. Possible research questions may be:

Net impacts

- What are the essential parameters which describe the harmful short- and long-term effects and combined effects of substances?
- How to detect harmful substances and determine concentrations of available phosphorus in soils, groundwaters and surface waters as reliably, cost-effectively and as much in real time as possible?

Land management

- How to develop on site sampling and analysis methods for different relevant substances, anaerobic samples, and soil and rock samples?
- How to organize joint production of field data, where samples are taken, observations are made or automated monitoring is used for multiple needs (soils, waters, land use, biodiversity) at one occasion?
- How to improve analysis methods and multidisciplinary use of different sources of data – field observations, geophysical mapping, observations made by citizens, remote sensing and other GIS-based data as well as modelling and model-based data?
- How to find new ways to produce, use and manage big data resources concerning soils, land use, groundwater and surface water interactions for various needs of the society?
- How to process and use real time data on environmental conditions for different operational purposes in forestry, agricultural and other sectors?



FI-3 Gathering and synthesizing data on the state of soils and waters for policy formulation

Policy formulation concerning land use and soil-sediment-water systems in both European and national levels calls for a holistic view on the current state of soils and waters in different areas. The identification of biggest challenges should be based on a synthesis of research findings in different disciplines.

Consequences of policies, both direct and indirect, should be studied carefully, because causal chains can be long. E.g. the areal allocation of agricultural subsidies has resulted in spatial differentiation of animal husbandry from plant production in Finland, causing problems to find sufficient amount of fields for spreading manure in the areas of intensive animal production, which has led to an increase in the clearing of peatlands with consequent high greenhouse gas emissions.

Furthermore, the coverage and compatibility of basic datasets, such as geographic data on European soils, needs to be enhanced. At the moment, the data on minerogenic soil characteristics in EU countries are not in line with each other and are not suitable e.g. to define agricultural risk areas. Current names of soil types don't take into consideration soil moisture which might become more important along with changing climate. Organic soil classification varies considerably from country to country and this leads e.g. differences in calculations of GHG-emissions.

Possible research questions may be:

Net impacts, demand:

- What would the criteria and ways to comprehensively assess the use of natural resources?
- How to maintain and combine different time series data to detect long-term changes?

Land management:

- How to promote the harmonisation of classifications (e.g. organic soils) and gather comparable attribute data on soils and other surficial deposits?
- How to gather evidence base for decision making and summarise diverse research findings in a comprehensive way?
- How is the knowledge used in policy formation and how are the consequences of chosen policies considered?
- How to combine the various information resources together so that they would be widely and easily accessible as possible and combinable e.g. in a common research portal?



Thematic area B: Soil and water ecosystem functions

FI-4 Interactions, changes and resilience of biogeochemical cycles in soil-water-sediment system

Biogeochemical cycles are the basis of the provision of ecosystem services and healthy living environment. Human activities have many impacts on biogeochemical cycles, and it is not sufficiently known how different impacts together change the cycles and their interconnections. The resilience of soils is also becoming increasingly important as environmental conditions are changing because of climate change. Soil-groundwater-surface water interactions are poorly known, because there is a lack of both field investigations and models which really take into account these interactions.

Possible research questions may be:

Natural capital:

- How do soil biogeochemical cycles operate as a whole and how can their resilience be determined?

Net impacts:

- How does the human impact change biogeochemical cycles?
- How to identify soil-groundwater-surface water interactions in different kind of ecosystems?

Land management:

- How the resilience of soils is enhanced in changing circumstances, such as in warming climate?
- What could be done to promote the adaption of society to changes in biogeochemical cycles?

FI-5 Soil carbon dynamics

Soil acts as a major carbon storage and soil carbon is an important factor in global carbon balance and management. Present methods to assess soil carbon amounts and changes are however uncertain and in many ways insufficient. Soil carbon dynamics has been modelled (such as YASSO model of Finnish Environment Institute), but the application of models in different land use types and wider geographical contexts requires further development and more knowledge of the significance of the soil type, climate factors and e.g. nitrogen dynamics. Soil carbon sensitivity to temperature varies according to climate zone, soil structure and the type of carbon input. In the case of soil carbon accounting of agricultural soils, there are only few coefficients divided by climate zones. More precise inspection by climate zones and other factors is needed. Previous studies have suggested that boreal forest soils may release much more carbon in the future, as the climate change proceeds. The ways to mitigate climate change by increasing carbon in soils requires more attention in the future studies.



Soil carbon has importance also in terms of soil structure, productivity, biodiversity, erosion reduction, water quality and water balance. The whole soil-sediment water system needs to be addressed when examining soil carbon, because carbon flows also with water. The impacts of land use changes on soil carbon circulation need to also be better understood.

Possible research questions may be:

Natural capital:

- What is the amount of soil carbon storage and how does it change in areas of different land use?

Net impacts:

- What is the precise role of soil carbon in climate change mitigation in areas of different land use (possibly using BioSoil-data and other sources of data)?
- What are possibilities to restore or increase the amount of soil carbon storages?
- How to improve the soil carbon assessment methods that e.g. Intergovernmental Panel on Climate Change (IPCC) is using?

Land management:

- How to develop a life-cycle analysis (LCA) based model of soil carbon for minerogenic soil and peat?

FI-6 Changes and challenges in forests and mires

In forested and relatively sparsely populated countries, such as Finland, the use and refinement of forest biomass has been a significant cornerstone of the economy for a long time. Forest management practices, including drainage of much of the mires, have aimed to intensify the wood biomass production. Today, new economic growth and jobs are sought through an increase in the bioeconomy businesses that encompasses all kinds of production based on renewable natural materials, including the further development and use of innovations and technologies related to such materials. The aim is to secure the competitiveness of the existing industries and provide them with opportunities to grow. Bioeconomy is also expected to enhance the viability of regions by promoting regional self-sufficiency and assuring that the benefits from the activities remain in the area. Much of the targeted growth in bioeconomy relies on the introduction of high added value products and services as well as new uses of wastes and industrial side streams. However, bioeconomy will also increase the financial use of forests. Due to forest management, the biomass growth has accelerated, but in terms of carbon sinks and biodiversity protection, more intensified use sets also challenges. There is a need to foster site productivity and environmental sustainability. Intensive removal of biomass from forests takes away considerable amounts of nutrients. Intensive collection of biomass from previously drained mires now growing forest can also result in major impacts on waters.



Northern forests and mires are also facing challenges caused by climate change that is predicted to lead to more than average warming particularly in the northern parts of Europe. This will cause increase in forest growth, but also alteration of habitats, introduction of new species, and spreading of alien species. New insect pests could possibly cause damage on a massive scale.

Land use changes from forest and mire areas to agricultural land and built-up areas have mostly already taken place, but particularly around growing urban centres and in areas of intensifying agriculture, new developments are taking place. Land use changes have made the landscape structure fragmented and future challenges lie in the integration of green structure. Also the restoration of altered habitats, especially drained peatlands, is an important question. As peatlands have stored massive amounts of carbon, their use, restoration and protection is globally a crucial issue.

Possible research questions may be:

Natural capital

- In what ways will forests and mires change along with climate change, what are the consequences of the changes and how to prepare for them?
- Through what ways can decentralised, resource-efficient bioeconomy enhance the viability of regions?

Land management

- How can intensified use of forest biomass be balanced with objectives related to biodiversity, carbon sinks, site productivity and environmental sustainability?
- How to promote integrated green structure, restoration of drained mires and other critically altered habitats and manage pressures towards land use changes?
- How to develop policy instruments to minimise negative environmental impacts of the bioeconomy development?

Net impacts

- What are the impacts of forest cutting, forest renewal and ditch network maintenance on runoff waters from drained mires?



FI-7 Soil-related preconditions for sustainable intensification of food production

Importance of food safety is increasing due to climate change and population increase. It is important to maintain and when necessary to improve soil functions and also intensify farming where possible. In the Northern Europe, agriculture should adapt to changes like shortening of frozen ground periods and increasing rains which can cause deterioration of soil granular structure and leaching of nutrients. Warming climate enables growing of new crops but these southern plants might not adapt to northern longer day. Organic farming has increased, but its effects to soil are not well known. Circular economy will increase demands to recycle manure and wastes and more data is needed how make it safely and cost efficiently.

Possible research questions may be:

Natural capital

- How to assess the resources of soils to foster productivity in different types of areas and according to soil properties and biodiversity?

Demand:

- Where and how sustainable intensification of food production is possible?
- How can the use of fertilizers be substituted by recycling nutrients from suitable biomasses, such as improving the managing of manure?

Net impacts:

- What are the impacts of nutrient recycling and organic farming to soil functions, ecosystem services and national economy?
- How much can productivity and crops be improved with soil management and crop rotation and what would be the alternative methods and measurements?

Land management:

- What kind of cultivation methods are environmentally and economically sustainable in changing climate?



FI-8 Assessment of soil ecosystem services and biodiversity

Soil ecosystem services have not been researched as extensively as superterranean ecosystem services, despite soil and groundwater constitute an integral part of most ecosystem functions. Soil contributes to e.g. ecosystem productivity, efficient use of nutrients, cleaning harmful substances from waters. The biodiversity of soils is a precondition for the production of ecosystem services. The diversity of species in the soil has an impact on soil structure and resilience, particularly in changing environmental conditions. The connection of soil genetic diversity to soil biological functions and ecosystem services needs also particular attention. Gene-mining and exploitation potential of genetic diversity can open new business possibilities e.g. new drugs. This can be supported by the establishment of national biodatabank and maintaining microbe stocks that have been isolated, identified and already utilised. Potential beneficiary and financer is pharmaceutical industry.

Possible research questions may be:

Demand:

- How soil and water-related ecosystem services can be mapped, assessed, monitored, valued, productized?

Natural capital

- What are soil functional and genetic diversity's connections to ecosystem processes and – services?
- How to identify in different areas the most important ecosystem services to be secured and what are necessary measures to maintain and increase them?

Land management

- How to use soil genetic diversity to promote new businesses in a sustainable way e.g. through identifying potentially exploitable microbes, maintaining already identified and utilised microbe stocks and establishing a national biodatabank?
- How soil and water-related ecosystem services can be taken into account in land use planning?



Thematic area C: Circular economy and sustainable management of soils and waters

FI-9 Innovative ways of recycling materials and re-using land areas

Depletion of many non-renewable natural resources, such as minerals and nutrients, is an increasing problem. Sand and gravel has been used for decades in the construction of buildings and infrastructure. Some resources, such as gravel and good quality aggregates, have become scarce close to their consumption in cities and have to be transported considerable distances. Promoting the recycling of materials can help to guarantee their availability and decrease environmental impacts, but methodology and procedures need to be further developed. As extraction activities are often only temporary, the re-use of land areas is an important issue and can provide new opportunities.

Possible research questions may be:

Demand:

- How to manage the supply and demand of soil and aggregates in local and regional level through effective and appropriate re-use of various types of excavated soil, and organisation of temporary storage for classified materials?
- How to advance the recycling of limited mineral and nutrient resources (e.g. through capturing phosphorous from wastewater or landfill mining)?

Land management:

- Which are the most effective policy instruments to promote the use of substitutive products and excavated soils especially for gravel and restrict the disposing of excavated soil materials at landfills?
- How to take the supply and demand of soil and aggregate resources into account in land use planning already in the early phase?
- How to ensure that the best available technology is used and lifecycle sustainability is taken into account reuse/recycling of excavated contaminated soil materials?
- How to realise new ways to re-use brownfields, mines and aggregate extraction areas, e.g. in urban development, recreation or as restored nature areas?



FI-10 Risk management and sustainable remediation of soils and groundwater

Many risks are connected to different land uses, soil and water properties and emissions from different sources. To adopt sustainable risk management, new knowledge is needed on the recognition of risks, dealing with different types of risk areas, defining responsibilities, communication on risks, and the procedures and target levels of remediation. Risk sites need to be identified, investigated and remediated systematically. Risks need to be considered more comprehensively. E.g. risk assessment for waters should take into consideration both water supply, groundwater depending ecosystems and river basin – not just one of these.

Information on risks is important to be available in a user-friendly way. Restoration methods should be cost-efficient, save on natural resources, minimise adverse environmental impacts and promote circular economy. Land use and risk management need to support each other. Efficient risk management and remediation requires also interactive procedures, co-operation of public authorities and other stakeholders, and transparent communication.

Possible research questions may be:

Land management

- How to improve risk-assessment methods, promote the use of databases and models in the assessment, and make the assessment more systematic and comprehensive to deal with different kinds of (ecological, technological and economic) risks?
- What new policy instruments are needed and how the existing instruments should be developed to support sustainable risk management - the most effective administrative, economic and informative instruments?
- How can sensitive areas and functions be dealt with in risk management and land use planning?
- How to communicate about risks openly, transparently and interactively paying attention to the availability of data and privacy protection?
- How to organize remediation activities in a cost-efficient way minimising the use of natural resources and environmental impacts and learning from failed projects?
- How to define sufficient level of purification for contaminated areas?
- Which in situ and on-site remediation methods are suitable to northern soils and groundwaters and how to ensure that the most sustainable remediation methods are used?



Thematic area D: Sustainable urbanisation and infrastructure development

FI-11 Sustainable urbanisation and healthy living environments

The future success and welfare of the society is greatly dependent on how the urbanisation process is carried out. To promote sustainable urbanisation, more knowledge is required on drivers and trends related to urbanisation and opportunities to create healthy environments, reduce carbon emissions, use of natural resources sustainably and integrate built and green infrastructure. The ageing of population and advancements in technology change the way of living in urban areas. The quality of environment is becoming increasingly important for cities to be attractive. Noise, impurities in the air, heat periods and lack of connections to nature will continue to be urban challenges in the future. Green infrastructure and nature-based solutions can be used to alleviate problems and produce new benefits in the form of recreation opportunities and other ecosystem services. Health issues are receiving growing attention, and the location of sensitive functions and population groups is emphasised.

Possible research questions may be:

Demand

- How will the continuation of the urbanisation process change the need for natural resources and ecosystem services in the future?
- How to better understand processes and interconnections related to urbanisation?

Net impacts

- How to prevent urban sprawl, minimise land take and support sustainable use of built-up areas?
- What are the appropriate methods, models and tools to assess sustainability of urban development?
- How to use green infrastructure and technical solutions to tackle problems with noise, and poor air quality and create pleasant environments for everyday life?

Natural capital:

- How to guarantee and improve the functioning of ecosystem services in urban areas?
- How to introduce market mechanisms for compensating harms to nature areas e.g. through improvements in other areas or use of temporary “ecosystem hotels”?

Land management

- How to secure water supply around big cities (e.g. considering both the changing environment and climate and the use of gravel/aggregates)?



FI-12 Sustainable infrastructure development and maintenance

Environmental impacts of infrastructure development are less well known than impacts from energy production, building construction or vehicles. However, infrastructure investments and maintenance costs are considerable. The state, regions and municipalities are forced to carefully consider and prioritise budgeting for infrastructure. Climate change causes new pressures and disturbances on the infrastructure, which should be taken into account. In the transport sector, new infrastructure development concentrates on growing urban regions and their connections. Elsewhere, the focus is on the maintenance of present infrastructure. In energy sector, the need for district heating networks is changing due to increased energy efficiency of buildings and the development of new energy sources, such as geogeneity. Groundheat use sets new requirements on planning of subterranean land use and on the assessment of environmental impacts of heatwells. Green infrastructure is being used to substitute technical grey infrastructure e.g. in stormwater management. Nature-based solutions can provide alternatives to traditional technical solutions with less development costs and multiple benefits.

Possible research questions may be:

Land management

- How to increase the resilience of infrastructure to extreme weather events and changing climatic conditions, such as increasing rainfalls?
- How to assess the carbon footprint and material consumption of infrastructure development and maintenance and promote low carbon and resource efficient solutions, e.g. in the transport sector?
- How to take advantage of nature-based solutions in infrastructure development, e.g. in water management
- How to sustainably promote geogeneity and shallow groundheat use? How to find suitable areas for different geogeneity and groundheat use methods?

Thematic areas E: Integrative land use policies and planning



FI-13 Integration of different land uses

Integration of different land use targets is the main purpose of land use planning. New and expanding ways of using natural resources together with sustainable development objectives have increased the need to integrate different targets in both rural and urban areas. Controversies are related e.g. to mining, energy production, and the extraction of aggregates. Information on planned areas and impacts of alternative solutions is a necessary basis for integration. A common knowledge base may also help to create shared understanding of planning situation.

Possible research questions may be:

Demand:

- In what ways to address the integration of land uses from a 3D or 4D perspective paying also attention to competing uses of subterranean spaces?

Land management:

- How to learn from best practices of cross-sectoral integration of targets and creation of common understanding with the help of shared knowledge?
- What kind of new cost-benefit analysis and impact assessments are needed to integrate and value different kind of land use solutions (e.g. community development/water supply)?
- How to develop and promote integration in all the phases of land use management – in land policy, planning, decision-making, plot assignment and implementation?

Net impacts

- How to develop assessment tools that consider the sustainability impacts of alternative land use solutions?



FI-14 Development of land use policies and planning methods

Integrative governance of land use and spatial structure calls for new planning methods and ways of using policy instruments. Many and often controversial objectives are related to land use choices, and decisions are often based on difficult weighing of benefits and disadvantages. One of the biggest challenges related to land use planning is considering urban region as a whole. Most urban regions consist of several municipalities that compete with each other trying to attract new jobs and inhabitants. There are significant differences between municipalities in land use policy. Because of the lack of common master planning and co-operation, the development has led to suboptimal results in the whole urban region. Consolidation of the urban form should be based on an analysis of urban region to determine best locations for future development.

There are big differences between growing and declining areas, and same policy instruments don't work for both of them. Land use policies need to better enable and support the choosing of sustainable options.

Possible research questions may be:

Land management

- How to enhance integrated governance of urban regions, policy coherence and co-operation of different administrative bodies?
- How to deal with different values and objectives in decision-making e.g. with the help of multiple-criteria decision analysis?
- How to target policy instruments to different areas taking into consideration the differences between growing urban regions and sparsely populated rural areas.
- How to develop the use policy instruments to enable sustainability transitions?
- How to define best locations for new developments and infrastructure in order to consolidate the existing of urban form?
- How to take into account the geotechnical properties of development sites?
- How to take into account cultural historically and archaeologically valuable areas in land use planning?



FI-15 Social acceptance and environmental regulation

Social acceptance of decisions affecting the environment is receiving increasing attention, as social sustainability and participation in planning are emphasised. Also the increasing scale of construction projects has highlighted the need to deal with social impacts. The social acceptance has been discussed e.g. in connection with mining and industrial activities affecting the quality of water, contaminated lands and wind mill construction. In sparsely populated Nordic areas, where people's subsistence may depend on large areas, e.g. in reindeer-herding, social impacts should be considered broadly.

New tools and methods, such as e-participation and the use of social media, are being introduced to deal with social acceptability. Environmental regulation and de-regulation are also related to social acceptance. Functioning regulation can help to achieve social acceptance, but strict norms can also lead to outsourcing of jobs and negative impacts elsewhere.

Possible research questions may be:

Land management:

- What contextual factors have an effect on the acceptance of different land use and soil management issues by local residents and other stakeholders?
- Through what kind of measures and processes can social acceptance be addressed and achieved?
- How to develop the use of new participatory tools to promote the active role of citizens and stakeholders in planning processes and to increase common understanding of solutions?
- How to reconcile potential conflicts through negotiations and consensus-building methods?
- How to introduce new market-based mechanisms through which consumers can make sustainable choices?
- How to formulate environmental regulation nationally and internationally in order to avoid the loss of competitiveness in global markets and outsourcing of jobs and negative impacts elsewhere?

Cross-cutting theme: Climate change adaptation

FI-16 Climate change adaptation

Climate change mitigation and adaptation are related to all research topics. Some research questions rise particularly from adaptation capabilities in Nordic conditions and they can include:

Net impacts, land management:

- What are the consequences of decreasing ground frost to soil quality, geotechnical properties, nutrient leaching and agriculture?

Land management

- How to improve preparation for unexpected climate conditions in agriculture, forestry and built-up areas?
- How to organize storm water drainage and water supply to take into account more frequent extreme weather events?
- How to predict and prepare for increasing leaching of harmful substances from contaminated soils when sea levels and river flood levels are expected to rise?
- How to improve resilience/adaptation capacity through land use planning by paying attention to flood management and other ecosystem-based ways of adaptation?

Net impacts

- What are the impacts of increasing runoff waters during wintertime, more frequent and severe flood events and increased erosion?
- How does the climate change and extreme weather events affect the sufficiency of groundwater in relatively shallow aquifers and groundwater depending ecosystems?



2.4 Experiences regarding connecting science to policy/practice

2.4.1 Use of knowledge

Sources of knowledge

Scientific knowledge was seen by the national key stakeholders as knowledge produced by universities and research institutes. End users seldom search scientific knowledge from peer-reviewed articles, but many of them follow news about published research and learn about findings also through many sources, such as seminars and personal contacts.

Scientific articles are used, or overall accessible, mainly only in universities and research institutes. Researchers and other knowledge producers use many different kinds of data in their work. International research literature is the backbone of the work, and researchers often seek research findings that are comparable to their own work.

Scientific research results constitute only a part of the knowledge base that the end users take advantage of. Scientific publications are often quite extensive and results are explained thoroughly. For end users working with practical questions, it is important to receive the essential knowledge in a concise and easily understandable form. For practitioners, main sources of scientific knowledge are typically direct contacts and meetings with researchers, easily accessible research reports and reviews gathered in consultant works. Other sources of knowledge, such as guidelines, surveys, professional journals and web pages, are much more commonly used than scientific knowledge. However, scientific research lies often in the background of more practical publications that are used by public and private sector.

Some stakeholders, such as the ministries, have very good contacts to researchers and no difficulties in finding the data they needed. Some stakeholders have researchers also taking part in the development projects in a bigger or smaller role. Consultant work was often commissioned by some stakeholders, but it was seen to be restricted only to the questions mentioned in the commissioning.

Ways of using knowledge

Scientific knowledge is usually acquired for a particular purpose and used together with other data on the circumstances related to the issue that is under consideration. New case-specific data is often collected and analysed according to the principles developed in scientific research.

The use of scientific knowledge takes place in a certain context. The ministries use research findings to support policy preparation. Many stakeholders need scientific knowledge for the impact assessment of planned activities. Entrepreneurs use research-based standards and guidelines when applying for permits and planning their activities.

The level of research use varies in political decision-making. National and regional decision-making is usually based on knowledge acquired from different types of studies, but it is not always sure, whether the most relevant studies are used.

The interpretation of research findings is another challenge. When it is sometimes difficult for researchers to formulate conclusions in a way that is both informative and based firmly on



findings, it may be much more difficult for knowledge users to interpret the meaning of the findings in their own context. Particularly in small organisations and units, knowledge users are often responsible for many different types of tasks and lack the competence to understand and apply research knowledge on issues that require specific expertise.

Knowledge is used for many different purposes. For example, ministries often use research data in the preparation of legislation and national programmes. Regions and municipalities concentrate on their own strategies and plans. Enterprises use knowledge in product development, operation and as a competing factor. Citizens and interest groups look for data that considers their own point of view.

Many end users of knowledge reported that they would need support in assessing the quality of the available knowledge. They regarded it important to distinguish, which research results are based on solid proof and can be generalised, which findings are more uncertain and context-specific and which results are produced in a survey without any particular scientific background or methodology. Interviewed stakeholder representatives also saw it essential to separate research pursuing objectivity from lobbying of different interest groups. Research knowledge should also be reliable, independent and transparent.

Promotion of knowledge use

Knowledge users hope that research findings and datasets would be gathered under a common web portal. Illustrative examples of good practices, maps, graphs and other visual material are found useful in communicating results to decision-making in a compact form. Data sharing and open data policies are also highlighted.

Small and medium-sized enterprises are reported to have limited resources to find latest research results. Linking the supply of knowledge to the processes, such as permit applications, where the knowledge is required is seen as the most efficient method of conveying research results to this audience. The enterprises are also said to benefit from clear, research-based standards and guidelines.

The use of research knowledge can be enhanced through careful planning of research projects and communication and interaction related to the project. When project proposals are assessed, attention should be paid to the usability of results in different areas and sectors. During the project period, it is crucial to have a steering group consisting of professionals of different expertise to guide the research work. Research projects should also be able to apply the latest methods and technologies to create sustainable solutions.

The ways that research-based knowledge is disseminated to end users, needs to be developed. Articles, reports and web pages continue to be important ways to publish, but research projects and their results should be presented to stakeholders more in common events, such as exhibitions, conferences and co-operation meetings. Also different ways of using social media in communication and marketing needs to be promoted. Also web-based tools, planning games and other knowledge applications are potential channels to bring research findings to end users.

The exchange of national and international experiences and knowledge is an important way to acquire state-of-the-art knowledge for end users. Gathering data on research projects and their findings on a common web portal would help to find relevant knowledge to a



particular purpose. Also the geographic datasets on land use and soils should be easily available, extensive, up-to-date and rich in content.

The processing and dissemination of data could be sectorally centered (e.g. land use and soil portal). Knowledge producer institutions could employ experts that concentrate on gathering and refining knowledge to usable packages. This would help to bring out research findings of all accomplished projects to a wider audience than to the contact networks of single research group.

2.4.2 Possibilities to set the agenda

Stakeholders have very different opportunities to set the agenda for research projects depending on their role as a knowledge end user or funder, but also on their networking and representation in different working groups. Ministries have rather good opportunities to influence research agendas. Other funder organisations are able to direct funding to questions that they emphasise, too. Representatives of funder organisations are usually involved in specifying the topics for research & development project calls, and they also participate in the steering groups of the projects. End user and knowledge provider organisations have more limited and indirect opportunities to influence research agendas.

Soil and land management have seldom been in the centre of research programme agendas. According to the stakeholders that participated in INSPIRATION activities, there is a need to emphasise the significance of underlying soil and land as an issue in other research themes, such as urban development, resource efficiency etc. It was also noted that it is important to have several approaches to certain research problems so that decision-making is not relying only on single type of research methodology.

Research projects are increasingly cross-disciplinary and often rather extensive. Coordination of research calls and projects could be improved by developing co-operation between research organisations, public authorities, consultancies and enterprises. Preparing and carrying out of research projects requires good professional skills, and necessary know-how should be systematically acquired. Also ways of commissioning research projects are important. In addition to research agenda, conditions related to immaterial rights to use and publish results and copyright ownership are essential issues to define. When enterprises commission studies, the results can remain in their own use only.

Private-public partnerships and other co-operative ways of funding can solve some of the problems related to sufficiency of funding and involve necessary networks of knowledge users.



2.4.3 Science – policy – practice

Functioning and improvement of science–policy/practice interface

According to some stakeholders involved in INSPIRATION activities, research findings don't always end up in practical use, because funders and knowledge users are unaware of them, and similar research is carried out many times without researchers knowing from each other. This highlights the need for broad review studies on what is already known on basis of numerous studies that have been accomplished previously.

Synthesising research findings to decision-making and communicating about the synthesis appeared as a key aspect in science–policy/practice interface. Decision-makers often need relevant and easily applicable knowledge, and quickly. Stakeholders emphasise the need for policy briefs and interpreted scientific data. Research institutes and universities should communicate more actively about most recent and relevant research findings that are done by themselves or discussed in international scientific journals and conferences. From stakeholders' point of view, researchers ought to consider the usability of their research findings more extensively during the research process. Clear messages were hoped from the research projects, not new questions.

Visibility in the media contributes significantly to the functioning of science–policy/practice interface. The societal impact and topicality of the research influences the attention that its results receive. The steering group and communication experts can significantly promote the use of research results in decision-making. Policy makers and interest groups need to be addressed in communication about the results.

Science–policy/practice interaction should happen more in two ways. Stakeholders pointed out that researchers should be more involved in the planning of research programmes and articulate their interpretations more explicitly. Furthermore, some stakeholder representatives saw that policy objectives should have an effect on what kind of research is funded, and some thought that research needs should come more from enterprises. Worries were also expressed over emphasising merely societal influence, which could restrict the research topics too much and prevent new innovative openings.

Influencing research agendas

Funder organisations have experience on the formulation of scientific research topics and questions in the preparation of research calls and in steering groups of research projects. Some ministries are also steering the research institutes working under them. Large research and development projects often involve national or regional authorities as partners, identified stakeholders or steering group members. This settlement facilitates the use of research results in decision-making.

Political decision-making can be influenced in many ways. Many research institutes have representatives in working groups of the ministries, and research institutes have an opportunity to give statements on the legislation renewal, strategies and guidelines. Frontline researchers are often also heard in the committees of the parliament.

Political decision-making influences the ways that the research funding is carried out. During recent years, there has been a growing emphasis on the research serving the strategic and operational needs of the government. Researchers have also been asked to



propose themes for future research calls. The decision-makers' trust in researchers and their results has great significance in terms of functioning science–policy interphase.

International co-operation is required to import latest research findings to national discussions and also improve the international relevance of national research. European and international projects may serve the national needs of knowledge and enable studies that are not capable of getting national funding. The national dissemination of research results should be highlighted also in international projects.

Evaluation of the societal impact of research

The societal impact of scientific research is difficult for the stakeholders to evaluate. Ministries assess their own research and development activities and the Academy of Finland has carried out an assessment on the state of scientific research in Finland, first time in year 2014 and an update will follow in year 2016. In the assessment by the Academy of Finland, attention is paid to citation indicators, publications created in international cooperation, research infrastructures and division of work between universities. The assessment uses a categorisation of disciplines into 54 groups. It is stated that it is difficult to place interdisciplinary and phenomenon-based research in a traditional classification of disciplines. Soil and land use research falls very often into this kind of group and is included in disciplines of Environmental science, Forest sciences, Geosciences, Ecology, evolutionary biology, Agricultural sciences, Other natural sciences, Social and economic geography, Industrial and environmental biotechnology, Environmental engineering and Architecture, but also potentially in several other categories.



2.5 National and transnational funding schemes

2.5.1 Funding schemes and possibilities for research funding

Funding schemes in regional, national and international level

There are several funding opportunities in many presently used funding schemes for future research on the themes considered in the INSPIRATION project. The stakeholders have recognised the need for both national and European research funding, and in some cases also regional funding. National and European projects should deal also with global issues and challenges.

Possible sources of national funding include: the Academy of Finland, Finnish Technology Funder Tekes, Government working group for the coordination of research, foresight and assessment activities, sectoral funding from ministries and state administration as well as funding from cities, regional councils and regional Centres for Economic Development, Transport and the Environment. In some projects, funding has been successfully gathered from many different funders, ranging from cities to ministries.

Horizon 2020, European Regional Development Fund (ERDF) and European Innovation Partnerships (EIP) are important as European sources of funding. In addition, different sectors, such as the transport sector, have their own international funding networks. Also funding from programmes related to agriculture and rural areas have significance. Some stakeholder representatives hoped that regional development funds could be more than presently directed to research that is relevant in different regions.

R&I funding options collated for country:

Name	Research and Innovation funder	What and/or whom do they fund?	More info
Regional			
Cities and municipalites	studies with their own resources and sometimes with private or public parties	They can finance studies on issues relating to city development and environment.	
Regional councils	There are 18 regions in mainland Finland, and the Åland Islands. A regional council is the region's statutory joint municipal authority; every local authority must be a member of a regional council. The councils have two main functions laid down by law: 1) regional development and 2) regional land use planning.	Regional councils can finance projects relating to regional land use planning or certain theme e.g. climate change adaptation or low carbon society.	
Companies	studies with private or public parties	case specific / made-to-measure research	
Project based research	public and / or private parties	Ad hoc / made-to-measure research	



<p>The Finnish Cultural Foundation - Regional funds</p>	<p>Foundation's 17 regional funds concentrate on promoting and developing the arts, the sciences, and other fields of endeavour at the regional level through annual grants and awards. In addition, regional funds also organise their own events and develop and manage their own projects.</p>	<p>Science grants are primarily intended for dissertations and post-doctoral research. Priority is given to applicants born or residing in the region, work carried out in the region, work relevant to the region and cultural projects that are particularly important to the region.</p>	<p>https://skr.fi/en/finnish-cultural-foundation/regional-funds</p>
<p>National level</p>			
<p>Academy of Finland</p>	<p>An agency within the administrative branch of the Finnish Ministry of Education, Science and Culture.</p>	<p>It funds high-quality scientific research and people's working at universities and research institutes in Finland. Funding is directed to Academy Programmes with a view to directing research and allocating research funding to fields that are considered of key importance in terms of the regeneration of science and the foresighting of future research needs. A major emphasis in Academy Programmes is on multi- and transdisciplinarity approaches as well as international cooperation. An Academy Programme is a thematic, target-oriented and coordinated body of research projects that are provided with funding for at least four years. In 2015, the Academy funds 13 Academy Programmes.</p>	<p>http://www.aka.fi/en/ http://www.aka.fi/en/research-and-science-policy/academy-programmes/</p>
<p>Academy of Finland / Strategic research funding</p>	<p>An agency within the administrative branch of the Finnish Ministry of Education, Science and Culture. The projects to be funded are selected by the Strategic Research Council (SRC), which consists of a chair and eight members appointed by the Finnish Government.</p>	<p>The funding instrument for strategic research is designed to support long-term and programme-based research.</p>	<p>http://www.aka.fi/en/research-and-science-policy/strategic-research-funding/</p>
<p>Academy of Finland / Key project funding</p>	<p>An agency within the administrative branch of the Finnish Ministry of Education, Science and Culture. The funding decisions will be made by a subcommittee appointed by the Academy Board.</p>	<p>The objective of the Programme of the current Finnish Government concerns a 'key project' aimed at strengthening the cooperation between higher education institutions and business life to bring innovations to the market. The funding is designed to support the strengthening of the quality and impact of research. It promotes competence-based growth, establishment of international centres of excellence and active collaboration with end-users and beneficiaries of research. The funding can be applied for by researchers who have been principal</p>	<p>http://www.aka.fi/en/research-and-science-policy/key-project-funding-by-the-academy-of-finland/</p>



		investigators for Academy-funded research projects in 2015 or by the end of the call in 2016. Also eligible are researchers who in 2015 or by the end of the call have received funding from a foreign or international funding agency similar to the Academy.	
Government working group for the coordination of research, foresight and assessment activities	The Government working group for the coordination of research, foresight and assessment activities (TEA Working Group) is a body facilitating cooperation and exchange of information between the Finnish ministries. It aims to strengthen horizontal monitoring of research, foresight and assessment activities, improve the information base for decision making and develop new ways of distributing information on research, foresight and assessment activities to decision makers and society at large. The group serves as the collective contracting authority for the coordination of research, foresight and assessment activities.	As part of Government's Comprehensive Reform of State Research Institutes and Research Funding, the Government annually adopts a plan for analysis, assessment and research in support of its decision making to steer studies and research towards specific priority areas selected by the Government. On the 2016 plan for analysis, assessment and research consists of eight main elements and of 56 themes for analysis, assessment and research e.g.: Wellbeing and health and Bioeconomy and clean solutions. The studies and research projects will be put out to open tender. The most recent application period was on 7 December 2015 - 18 January 2016.	http://vnk.fi/en/government-working-group-for-the-coordination-of-research-foresight-and-assessment-activities# http://vnk.fi/documents/10616/1034423/Government+plan+for+analysis%2C+assessment+and+research+in+support+of+decision+making.pdf/389a9aa6-4bd6-493c-90bf-e89d7b8b4009
Tekes – the Finnish Funding Agency for Innovation	Publicly funded expert organisation for financing research, development and innovation in Finland. It finances wide-ranging innovation activities in research communities, industry and service sectors.	Tekes provides innovation funding for companies, research organisations, and public sector service providers. Its' main target group consists of SMEs seeking growth in internationalisation. Companies can use funding for R&D, business and organisational development, and in planning for global growth. Universities, educational institutes, and research units are eligible for Tekes research funding for high-quality research activities that generate new business opportunities for Finnish companies. Public service providers such as towns and cities, municipalities, and hospital districts can use Tekes funding to develop high-quality services, organisational management, and in the implementation of public sector projects.	http://www.tekes.fi/en/tekes/ http://www.tekes.fi/en/programmes-and-services/tekes-programmes/



<p>Ministry of Agriculture and Forestry</p>	<p>At the Ministry of Agriculture and Forestry, the core task of research and development activities is to proactively produce knowledge, expertise and innovations to support decision-making, promote the competitiveness of economic activities and ensure the sustainable use of renewable natural resources.</p>	<p>The Ministry's research and development appropriation is used, in particular, to fund research, development and study projects that support planning, foresight, monitoring and impact assessment activities concerning policy measures and legislation.</p> <p>The Development Fund for Agriculture and Forestry (Makera) grants R&D funding for research activities that benefit the agri-food sector across a broad front. The main focus is on research concerning the sustainable development of the profitability and competitiveness of livelihoods.</p>	<p>http://mmm.fi/en/research-and-development/funding-for-projects</p>
<p>Ministry of The Environment</p>	<p>The Ministry of the Environment is responsible for preparing matters to be submitted for consideration by the Government and Parliament, such as matters concerning communities, the built environment, housing, biodiversity, sustainable use of natural resources and environmental protection. The ministry aims at using the produced information in its operations as efficiently and systematically as possible.</p>	<p>The Ministry of the Environment finances research, foresight, assessment and analysis (TEAS) activities that serve governance by supporting: forecasting of operations, preparation, development and implementation of national and international environmental policy and legislation and decision-making.</p>	<p>http://www.ym.fi/en-US/The_Ministry/Financing_and_subsidies/Funding_for_research_and_development</p>
<p>Ministry of Employment and the Economy</p>	<p>The Ministry of Employment and the Economy (MEE) is responsible, within its purview, for the availability of sufficient financial resources to both domestic-supply and export enterprises with regard to the enterprises' needs in general and any restrictions imposed by the international financial and legal framework.</p>	<p>the MEE controls and manages the regional Centres for Economic Development, Transport and the Environment with regard to the subsidies these grant for enterprises' use to develop their operations. The Ministry of Employment and the Economy is responsible for implementing the EU's regional development and social fund programmes in Finland. In respect of the related issues, it also steers other actors participating in such work.</p>	<p>http://www.tem.fi/en/enterprises/financing</p> <p>http://www.tem.fi/en/regional_development</p>
<p>Ministry of Transport and Communication</p>	<p>The Ministry's responsibilities include transport systems and networks, transport of people and goods, traffic safety, and issues relating to climate and the environment.</p>	<p>Ministry of Transport and Communication finances research, foresight, assessment and analysis (TEAS) activities that serve governance by supporting preparation and implementation of transport policies and legislation and decision-making.</p>	<p>http://www.lvm.fi/en/the-ministry</p>



<p>Finnish Transport Agency</p>	<p>The focus of research and development at the Finnish Transport Agency lies on finding new innovations for traffic and transport infrastructure and developing the Finnish Transport Agency's operations. Research functions focus on the following research themes: evolving data-based mobility services, intelligent infrastructure and a well-functioning transport system, effective transport infrastructure management and life cycle management, and adjustment to climate change and climate change mitigation.</p>	<p>The interdisciplinary research and development work is carried out in cooperation with other actors in the field.</p>	<p>http://www.liikenn evirasto.fi/web/en /research-and-development</p>
<p>Finnish Transport Safety Agency (Trafi)</p>	<p>Trafi develops the safety of the transport system, promotes environmentally friendly transport solutions and is responsible for transport system regulatory duties. Research and development funding supports Trafi's operations. Funding is allocated to following themes: diminishing environmental impacts of transport, improvement of transport safety, digitalization and new services in transport, state and actors of transport system and development of Trafi's activities.</p>	<p>The interdisciplinary research and development work is carried out in cooperation with other actors in the field.</p>	<p>http://www.trafi.fi/en/about_trafi</p>
<p>Partnership Agreement for Finland 2014-2020</p>	<p>The PA covers four funds: the European Regional Development Fund (ERDF), the European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). The Centres for Economic Development, Transport and the Environment (ELY Centres) play a significant role as authorities granting EU funding and as drivers of regional development. The ELY Centres come under the administrative branch of the Ministry of Employment and the Economy.</p>	<p>Sustainable growth and jobs 2014 - 2020 - Finland's structural funds programme' has five priority axes and 13 specific objectives. Applicants can be educational establishments, associations, research institutes, municipalities, companies and other incorporated societies. In the Rural Development Programme (RDP) for mainland Finland the largest part of funding is targeted to agricultural areas with natural constraints (ANC). In this context, Finland aims to have 83% of its agricultural area under contracts of agri-environment-climate measure and will provide more funds for organic farming. Funding is available for developing enterprises in rural areas and among others development projects relating to the state of the environment, services and ja pleasant environment.</p>	<p>https://www.rakennerahastot.fi/web/en/#.Vp5X9GOCXq4</p> <p>http://ec.europa.eu/agriculture/rural-development-2014-2020/country-files/fi_en.htm</p>



<p>The Finnish Energy</p>	<p>The Finnish Energy (ET) is a sector organisation for the industrial and labour market policy of the energy sector. It represents companies that produce, acquire, transmit and sell electricity, district heat and district cooling and offer related services.</p>	<p>Environmental pool is a cooperation agreement on energy sector. It coordinates environmental research on energy sector, launches necessary projects and intensify the use of research- and development resources among pool partners. Finance is available to wide variety of issues like climate change prevention, corporate social responsibility on energy sector, future environmental solutions and - technologies. In 2016 priorities are e.g. interaction in society and environmental communication supporting decisions, biomass sustainability - northern point of view, circular economy and resource efficiency. Finance can be applied by every one continuously.</p>	<p>http://energia.fi/en http://energia.fi/energiateollisuus/utkimus/ymparistopooli (only in Finnish)</p>
<p>SITRA</p>	<p>SITRA is a fund operating directly under the Finnish Parliament. Its' decision-making processes are tied to parliamentary systems and administration includes a Supervisory Board, Board and President. Administration and accounts are audited by accountants appointed by the Parliament.</p>	<p>Sitra provides funds for surveys, forward-thinking activities, experiments, and shared strategy processes that promote well-being and are ecologically and socially sustainable. Project funding must be related to Sitra's themes or key areas. Sitra does not provide funds for academic research projects, dissertations, or commercial research and development projects. There is no fixed application period or form for funding applications. Take your idea for a project directly to one of our contact persons.</p>	<p>http://www.sitra.fi/en/about-sitra/project-funding</p>
<p>Maj ja Tor Nessling Foundation</p>	<p>Foundation supports scientific research concentrating on environmental problems and their solutions.</p>	<p>The Foundation emphasizes on environmental research that is solution-oriented and promotes collaboration. Grants for research projects can be applied for PhD- or Post doctoral projects. The applicant is the PhD- or post doctoral researcher her-/himself. Research grants are only awarded to researchers with a higher academic degree or doctoral degree. Grants for communication of scientific environmental information or other projects that support the aims of the Foundation can be applied by private persons, communities or organizations.</p>	<p>http://www.nessling.fi/grants-2/?lang=en</p>

K.H. Renlund Foundation	Foundation enhances the inventories and utilisation of ores and useful minerals and technically useful rock-, soil- and groundwater resources. Foundation also sponsors technical innovations on sectors of mineralogy and geology as well as geologically oriented environmental projects.	Not mentioned on website.	http://web.abo.fi/siftelser/renlund/historia_ ja_tarkoitu s.shtml (only in Finnish)
Kone foundation	It is an independent and unaffiliated organisation, which e.g. awards grants to promote academic research, culture, art and the popularisation of research. Besides regular funding rounds, foundation organizes thematic grant calls, the purpose of which is to draw attention to current themes in academic and cultural life.	Grants are awarded for research in the humanities, social sciences, for environmental research and for artistic research. Grants are also awarded for popularising research and for art and culture projects.	http://www.konee nsaatio.fi/en/tue mme/formsupport/
Maa- ja vesitekniikan tuki (Support of soil- ja water technics)	Association that supports water technics and environmental technics relating to it and also soil protection. It can support arranging of education, give grants to researchers, institutes and universities, support study- and congress travels, finance research and research publications.	Private persons, work- and research groups and communities can apply for grand.	http://www.mvtt.fi/fi/etusivu/ (only in Finnish)
Water Utilities Development Fund	Finnish Water Utilities Association (FIWA) is the co-operation and member association of the Finnish water and wastewater utilities. Association has a development fund and all the ordinary members of the association are also fund members. The annual fee is 0,1 cent per sold water cubic metre. All the funds without deductions are used for development projects.	It supports research and development projects which are relevant to develop utilities. Two kind of projects are financed: projects in origin of specific water and wastewater utility and projects of open application according the area of focus (twice a year).	http://www.vvy.fi/in_english
Jenny and Antti Wihuri foundation	The Jenny and Antti Wihuri Foundation is a non-profit cultural foundation that supports activities of a broad spectrum. The Foundation fulfills its purpose among others by distributing grants and prizes in the fields of science, art and other societal activity.	Private persons, working group and communities (e.g. non-profit association and cooperative) can apply for grand for scientific or artistic work and project in field of science, art and culture. Grand in science priorities preparation of doctoral thesis and scientific work after that (person or research group).	http://wihurinrahasto.fi/?lang=en
The Finnish Cultural Foundation	Private trust dedicated to promoting art, science, and other fields of intellectual and cultural endeavor in Finland. The Foundation provides grants from a central fund and 17 regional funds.	Grand can be applied by private individual for their own work and/or for expenditures of a project, a working group for a group member's work and/or for expenditures of a project and a registered legal entity (such as association or cooperative) for expenditures of a project. The	https://skr.fi/en



		majority of the grants are awarded to private persons and working groups.	
Fundamental research of universities	Most of this research is financed by society (public money)	Basic research and applied research, needed to maintain knowledge base	-
Research of research institutes	Partly financed by society (government budgeting) and partly project-based	Research institutes	-
3rd flow of funds (universities and research institutes)	Increasing source of finance, public, private, industries and government	Project oriented research	

Experiences of funding schemes

The alignment and interfaces of different funding systems were raised by the stakeholders as a matter to consider more carefully when preparing future funding agendas. Several separate aims were seen to be related to the setting of research targets. It was considered useful to start from societal challenges rather than from interests of a single industry or promotion of only business activities. In addition, action-based research carried out with stakeholders was seen increasingly important.

Competition for research funding was considered by the stakeholders to be getting more intense. Preparing applications consumes considerable resources, which can decrease the efficiency of research work in the large scale. The profitability of large project calls was questioned due to the huge amount of wasted work done for abandoned project applications. Separate funding for preparation of research proposals was suggested.

Short-term project world and hard competition may also reduce the interests of potential researchers to enter the researcher career. That’s why the creation of “science career paths” were suggested for young researchers.

The research calls of EU were seen to be too all-embracing entities aiming to support a selected policy. Interests of a single country may not be interesting in the European level, which is a problem, if the proportion of European funding of all funding is increasing. This also stresses the participation in the preparation and evaluation of EU research calls. There is also a need for national and regional sources of funding, so that projects can be targeted at research questions that are relevant from national point of view.



Developing funding mechanisms and increasing their effectiveness

According to stakeholder representatives, research calls should be more often carried out in stages, with more accurate contents only in later stages. This would decrease the spending of too much efforts on failed proposals. It also was suggested that well rated proposals that still didn't receive funding could be gathered to a project bank for some time, and when there is a need and funding opportunity for new research projects, some funding might be directed to already ready proposals in that project bank.

It was seen useful to investigate how research funding is organised outside Europe. In the USA, systems may not be as bureaucratic as in EU.

The productivity of research funding needs improvements. Stakeholder representatives saw that basic research is most efficient to organise on the basis of budget funding. Administration and reporting in research projects was suggested to be lightened, so that resources would be directed to research, not project paper work. Compensation of project costs would be good to take place as real-time as possible. Long delays in payments may prevent participation of some stakeholders in certain calls and projects. Professional support personnel are needed to help the tasks of researchers in the projects.

Stakeholder representatives expressed worries over the accumulation of funding to a limited number of state-of-the-art projects and organisations, leaving other actors that have important tasks e.g. in the education without funding. While many EU-funded projects are relatively large, the need for smaller projects and consortia was also expressed. Smaller projects could be easier to set up and could produce results more quickly.

Merging public and private funding was seen necessary by the stakeholders. Private investments to research foundations could be favoured in taxation. The interviewed stakeholder representatives pointed out that small and medium-sized enterprises have limited resources for research and development, approximately within the range of 10 000–100 000 euros. That is why combined funding models need to be preferred. Big companies often have their own research units, but their research results are usually not openly published.

One way to channel private funding to research could be through foundations or funds, where both private and public sector could invest. The foundation or fund could offer small and medium-sized companies a chance to support the research that serves them. Public fundraising was also mentioned as an opportunity.

Some stakeholder representatives held the opinion that research calls shouldn't be too narrowly focused to allow space for new innovations. Others thought that when research funding is getting more limited, research should be more focused. Focusing the topics could also help to get concrete results.

New working practices were suggested for laboratories, sample taking and data management. New types of services could be piloted and productised.

It was also pointed out that there is a need to get information of unsuccessful projects, so that same mistakes wouldn't be repeated in the future.



There was also noticed to be a need for an independent body without any connections to businesses or other interest groups to take responsibility for research funding allocation. A new “Science Ministry” was suggested to be founded for this type of coordination activities.

2.5.2 Gaps in financial resources for research

Soil and land as a resource was thought by many stakeholder representatives to be partly neglected topic in large scale research agendas. Many experts expressed worries over the funding of basic research, monitoring and maintenance of data pools, which were regarded as a publicly funded task. Soil monitoring is lacking permanent funding. Applied research can more often receive funding from the users of research results. However, it was noted that applied research is often based on basic research, monitoring and databases. New study- and analysis methods need to be developed to create more cost efficient solutions for monitoring, but it is difficult to find financier for the task.

Meta-analysis based on already gathered results, such as synthesis of existing monitoring data, was noted to deserve more attention. Integrated approaches combining different fields of expertise e.g. in a river basin context were seen to be appreciated today, but they would require also cross-sectoral funding and co-operation.

Big financial values were seen to be related to the built environment and industries relying on land and soil. According to interviewed stakeholder representatives, the significance of land and soil issues for these values should be more explicitly argued to organise sufficient funding for relevant research questions.

Stakeholder representatives remarked that short-term and applied research activities have become more common during last years. Long-term basic research has lost its resources, which was seen problematic by the research institute representatives. Also high quality basic research was seen to be needed to support decision-making in the future.

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2.6 Annexes

Annex I: NKS interviews in Finland

Date of interview	Organisation	Interview	funder	end user	knowledge provider	Nat.reg.loc. authority	Univ./research inst	SME /consultant	business & industry	NGO	network	other	soil	sediment	water	land use-management
17-06-15	City of Helsinki, City Planning Department	Kaarina Laakso	x	x		x										x
18-06-15	Association of Finnish Local and Regional Authorities	Miira Riipinen, Ulla Hurmeranta	x	x		x							x			x
29-10-15	Infra Contractors Association in Finland	Eija Ehrukainen		x					x				x			x
29-10-15	City of Helsinki, Public Works Department	Mikko Suominen	x	x		x							x	x		x
04-11-15	University of Helsinki, Department of Food and Environmental Sciences	Markku Yli-Halla			x		x						x			
06-11-15	Finnish Transport Agency	Arto Hovi, Soile Knuuti, Tuula Säämänen	x	x		x										x
06-11-15	University of Helsinki, Department of Geosciences and Geography	Kirsti Korkka-Niemi			x		x						x	x	x	
09-11-15	Finnish Water Utilities Association	Riina Liikanen, Osmo Seppälä		x							x				x	
13-11-15	Geological Survey of Finland	Ossi Ikävalko, Jaana Jarva			x		x						x	x	x	x

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17-11-15	Ministry of Agriculture and Forestry	Maisa Tapio-Biström, (agriculture), Niina Riissanen (forestry), Jaana Kaipainen (climate change adaptation, soils), Ville Keskisarja (waters), Elina Nikkola (research)	x	x		x							x	x	x	x
19-11-15	Natural Resources Institute Finland	Kristiina Regina			x		x						x			x
23-11-15	Ministry of Employment and the Economy	Kirsti Loukola-Ruskeeniemi	x	x		x										x
25-11-15	Ministry of Environment	Anna-Maija Pajukallio	x	x		x							x	x	x	x
26-11-15	Natural Resources Institute Finland	Tiina M. Nieminen			x		x						x			

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Annex II: NKS participants in the national workshop in Finland

Organisation	Participant	funder	end user	knowledge provider	Nat.reg.loc. authority	Univ./ research inst	SME /consultant	business & industry	NGO	network	other	soil	sediment	water	land use-management
Natural Resources Institute Finland	Antti-Jussi Lindroos			x		x						x			
Golder Associates Oy	Erkki Paatonen		x				x					x			
Finnish Consulting Group	Helena Ylinen		x				x								x
The National Board of Antiquities	Marianna Niukkanen	x			x							x			x
Geological Survey of Finland	Ossi Ikävalko			x			x					x			
The Centre for Economic Development, Transport and the Environment of Pirkanmaa	Satu Honkanen		x		x							x			
Finnish Consulting Group	Arto Itkonen		x				x								x
The Regional Council of Häme	Harriet Lonka		x		x							x		x	
Aalto University	Jaana Sorvari			x		x						x			
The Finnish Water Utilities Association	Osmo Seppälä		x					x		x				x	
The National Board of Antiquities	Petri Halinen	x			x										x

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Ramboll	Teppo Moisio		x				x					x		x	
Natural Resources Institute Finland	Tiina Nieminen			x		x						x		x	
The Villages of Central-Pohjanmaa	Esa Erkkilä		x							x	x				x
Geological Survey of Finland	Jaana Jarva			x		x						x			
Natural Resources Institute Finland	Kristiina Regina			x		x						x			
University of Helsinki / Cooperative Bionautit	Marja Tuomela			x		x	x					x			
Ministry of Environment	Merja Laitinen	x				x									x
The soil reseach and remediation society	Raakel Jaloniemi		x						x		x		x		
Finnish Consulting Group	Risto Tilli		x				x					x			x
Infra Contractors Association in Finland	Eija Ehrukainen		x						x				x		
Natural Resources Institute Finland	Hannu Fritze			x		x						x			
Populus Group Oy	Kim Yrjälä			x		x	x					x			
Lemminkäinen Infra	Lasse Vilhunen		x						x			x			

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Pöyry	Maarit Korhonen		x				x					x			x
Geological Survey of Finland	Paavo Härmä			x		x						x			
Baltic Sea Action Group	Eija Hagelberg		x						x	x		x			x
Aalto University	Eeva Säynäjoki			x		x									x
Natural Resources Institute Finland	Hannu Ilvesniemi			x		x						x			
University of Vaasa	Heli Siirilä			x		x									x
Ministry of Environment	Nunu Pesu	x				x									x
The Villages of Länsi-Uusimaa	Pirkko Kaskinen		x						x	x		x			



Annex III: Documents used for the FI desk study

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Annex IV: National workshop programme (in Finnish)

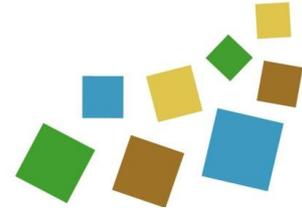
MAANKÄYTTÖ JA MAAPERÄ TUTKIMUSKOHTENA TYÖPAJA JA VERKOSTOITUMISTILAISUUS

19.-20.11.2015

Suomen ympäristökeskus

kokoushuone Tervapääsky

Mechelininkatu 34a, Helsinki



Suomen ympäristökeskus SYKE järjestää työpajan ja verkostoitumistilaisuuden, jonka aiheena ovat maankäyttöön ja maaperään liittyvät tutkimustarpeet. Työpaja on osa EU-rahoitteista INSPIRATION-hanketta, jossa tunnistettujen tietotarpeiden perusteella laaditaan eurooppalaista strategista tutkimusohjelmaa. Tarkoituksena on, että tutkimusohjelma vaikuttaa tulevaisuudessa tutkimusrahoituksen suuntaamiseen.

Maankäyttöä ja maaperää lähestytään työpajassa hyvin monesta eri näkökulmasta ja asiantuntemusalueesta käsin. Tarkastelun kohteina ovat esimerkiksi maa-alueiden käyttö rakentamiseen ja elinkeinotoimintaan, maankäytön suunnittelu, maaperän laatu ja suojele, maa- ja kiviaineshuolto, maisemanhoito, pilaantuneiden maa-alueiden käyttö ja pohjavesien suojele.

Työpajaan on kutsuttu keskeisten sidosryhmien edustajia: tiedon loppukäyttäjiä eri toimialoilta, tutkimusrahoittajia ja tiedontuottajia.

Työpajassa pohditaan, mitkä ovat tällä hetkellä pahimpia tiedon puutteita ja millaista uutta tutkimustietoa tarvitaan, jotta voidaan ratkaista yhteiskunnallisia haasteita sekä tuottaa uusia innovaatioita ja liiketoimintamahdollisuuksia. Lisäksi keskustellaan siitä, miten tutkimustieto parhaiten välittyy päätöksentekoon ja käytännön toimintaan sekä millaisia tutkimuksen rahoitusjärjestelmiä tarvitaan.

Tilaisuus tarjoaa mahdollisuuden tutustua eri alojen osaajiin ja hakea uudenlaisia yhteistyömahdollisuuksia. Tavoitteena on synnyttää maankäyttö- ja maaperäkysymyksiin keskittyvä verkosto, jonka piirissä voidaan osaamista yhdistämällä ja tietotarpeisiin vastaamalla löytää uusia ratkaisuja.

Lisätietoja:

Inspiration-hankkeen Suomen yhdyshenkilö: erikoistutkija Antti Rehunen, Suomen ympäristökeskus

sähköposti: etunimi.sukunimi@ymparisto.fi, puhelin: 0295 251 550

INSPIRATION-hankkeen esittely: <http://www.inspiration-h2020.eu/>

INSPIRATION-hanke Suomessa: <http://www.inspiration-h2020.eu/page/finland>

OHJELMA

Torstai 19.11.2015 Teema: Tutkimustarpeet

- 12.00-12.30 Salaattilounas
- 12.30-12.50 Tilaisuuden avaus ja osanottajien esittäytyminen
- 12.50-13.10 INSPIRATION-hankkeen esittely
- 13.10-13.40 Poimintoja hankkeessa toteutetuista haastatteluista ja kirjallisuusselvityksestä
- 13.40-14.10 Keskustelukierros tutkimusaiheista
- 14.10-14.30 Kahvi
- 14.30-16.00 Tutkimustarpeiden kartoitus Learning cafe -menetelmän avulla
- tutkimusaiheet: maa ja maaperä resurssina (25 min.)
 - tutkimusaiheet: yhteensovittaminen maankäytössä (25 min.)
 - tiedon käyttö päätöksenteossa (20 min.)
 - rahoitusmahdollisuudet (20 min.)
- 16.00-16.10 Tauko
- 16.10-16.40 Yhteenveto Learning cafe-työskentelystä ja yhteiskeskustelu tutkimustarpeista
- 16.40-17.00 Työpajan päätössanat ja keskustelu maankäyttö- ja maaperäkysymyksiin keskittyvästä verkostosta
- 17.00-21.00 Illallinen ja vapaata keskustelua

Perjantai 20.11.2015 Teema: Ehdotukset tutkimusohjelmaan

- 09.00-09.30 Päivän avaus, esittäytyminen ja hankkeen esittely
- 09.30-10.20 Näkökulmia maankäyttö ja maaperä -teeman tutkimukseen ja tietopohjaan
Riina Antikainen, SYKE; Ossi Ikävalko GTK; Antti Rehunen SYKE; Eeva Säynäjoki Aalto-yliopisto; Petri Shemeikka & Anna Strandell, SYKE
- 10.20-11.30 Tutkimusohjelmaan tehtävien ehdotusten pohdinta learning cafe -menetelmän avulla
- 11.30-12.00 Yhteenveto ja keskustelu Learning cafe-työskentelyn pohjalta
- 12.00-12.15 Keskustelu yhteistyön tiivistämisestä
- 12.15-13.00 Lounas SYKE:n alakerran ravintolassa

HORIZON2020 CSA INSPIRATION

Deliverable D2.5 –
National reports with a review and synthesis
of the collated information



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