

D2.5

National reports with a review and synthesis of the collated information

The United Kingdom





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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.

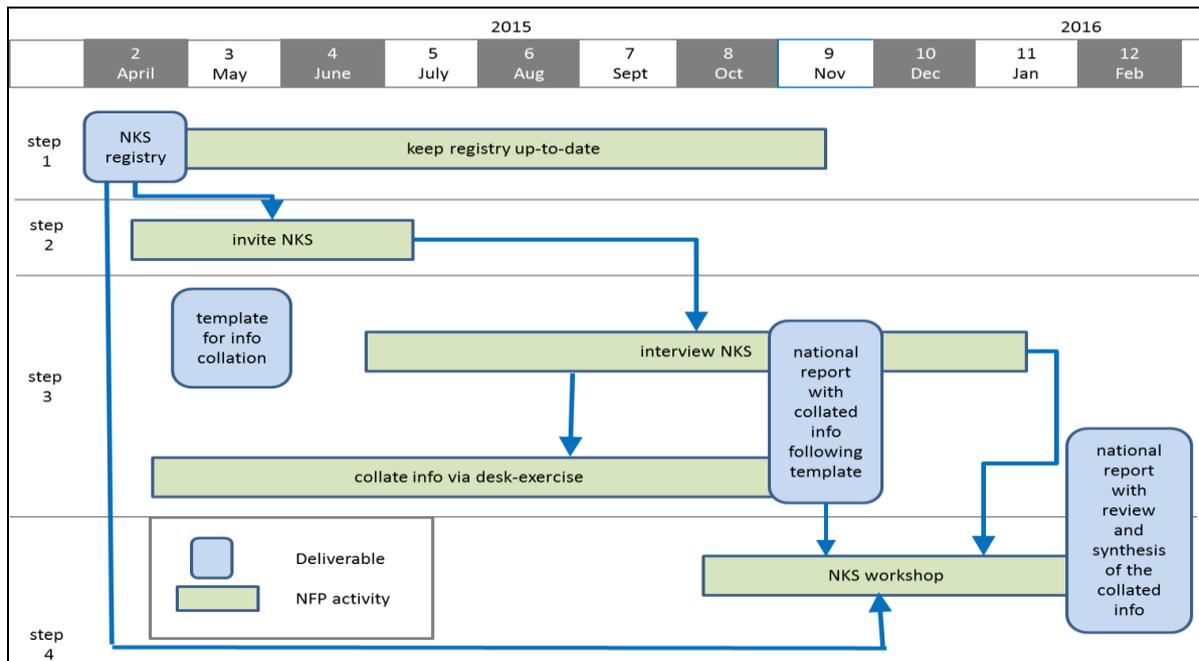


Figure 1: INSPIRATION's WP2 workflow.

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?

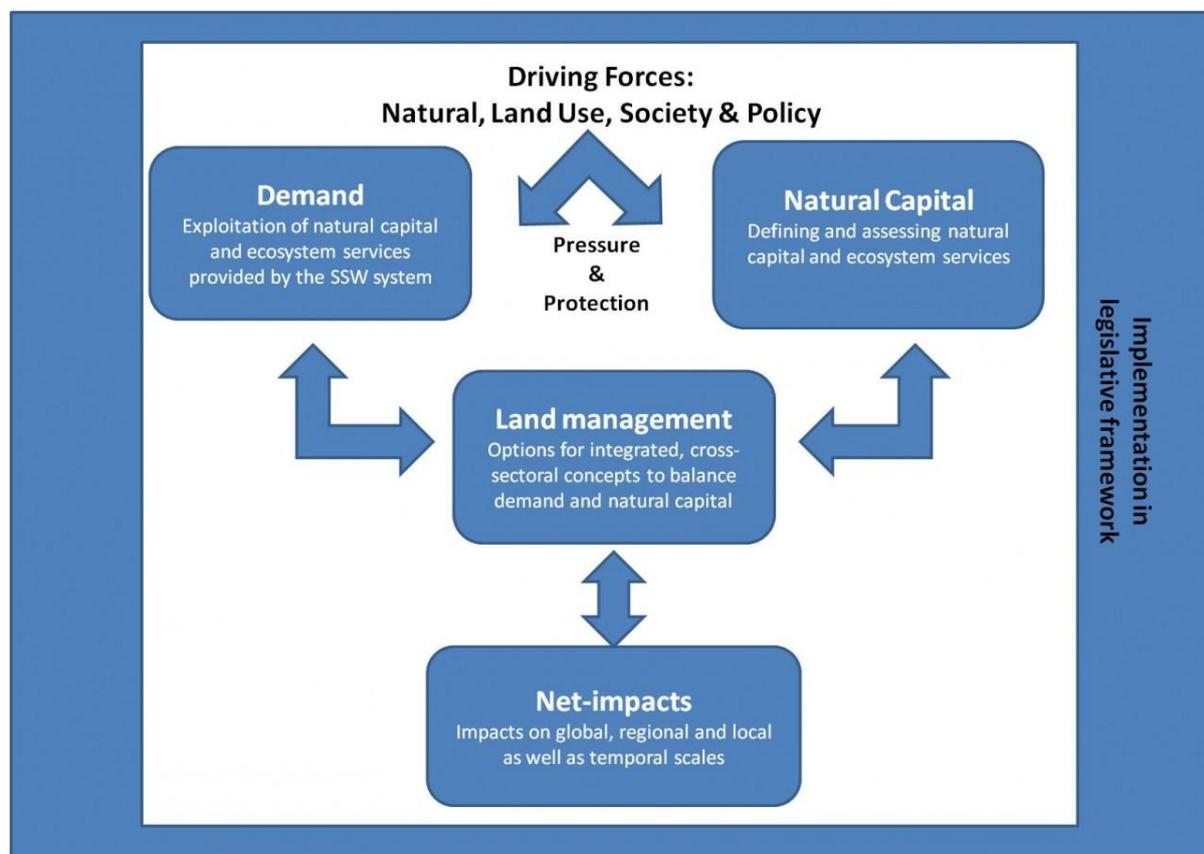


Figure 2: INSPIRATION's conceptual model.

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

INSPIRATION interview at a glance

Aim of INSPIRATION:

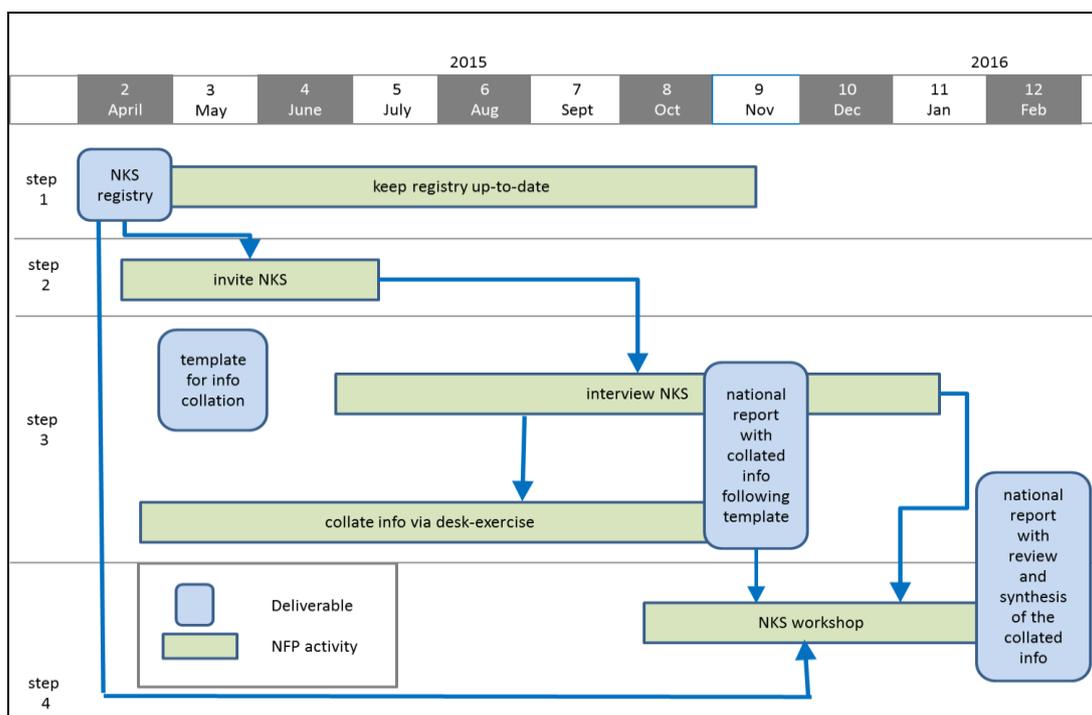
The main purpose of the EC-funded INSPIRATION project is to formulate an end-user driven strategic research agenda (SRA) for land-use, land-use changes and the related, impacted compartments of the Soil-Sediment-Water (SSW) system in order to meet current and future societal challenges and needs. Next 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. The United Kingdom

Report by Paul Nathanail, Matt Ashmore

2.1 Executive Summary

2.1.1 English version

Societal challenges

Given the overarching INSPIRATION challenge of growing a low carbon, resource efficient economy with a sustainable supply of raw materials, the UK realises that it can meet some of its own needs but also depends on imports from elsewhere.

The key theme is to ensure a firmer evidence base on which to make better decisions in the short term that will have long term consequences. This will allow the unavoidable conflicts between different land use decisions and the need for compromise at various scales to be made in a transparent, objective-oriented approach.

R&I priority topics

Several NKS independently highlighted the need for research into landscape scale processes and a deeper understanding of natural systems. The move towards understanding the services offered by ecosystems needs to be coupled to the emerging concepts of natural capital to that land use decisions can be made on a basis of an investment with clearly understood risks of adverse consequences and likely returns on investment over specific time scales. Such a value based approach builds on, but goes beyond, scientific knowledge.

The operationalisation of the related concepts of ecosystem services and natural capital will require both research and knowledge transfer activities if the worst decisions are to be avoided.

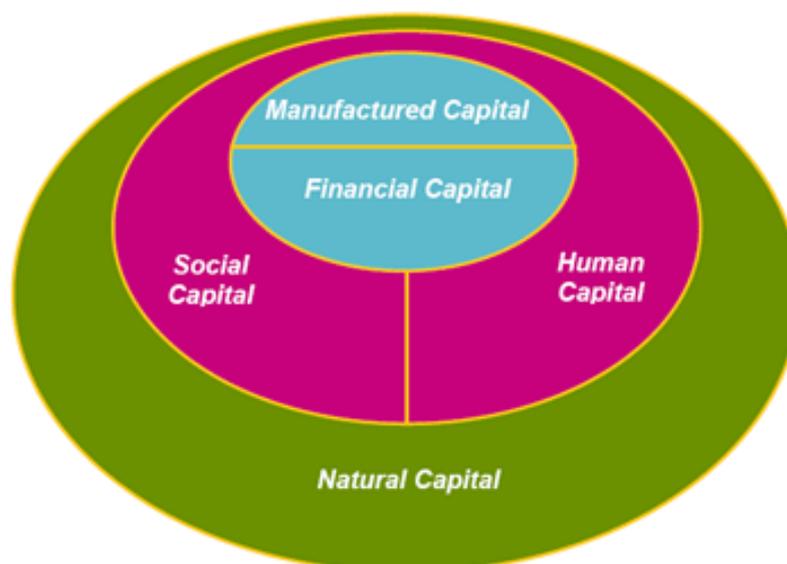




Figure 1 Five capitals (<https://www.forumforthefuture.org/project/five-capitals/overview>).

Natural capital is environmental assets, such as soils, from which beneficial services flow supplying resources to the economy, for example, agricultural crops, and disposing of its wastes, such as treated sewage effluent (POST 2011).

Science-policy-interface

Scientists need to be encouraged to deepen our understanding of complex natural systems and develop predictive models that can inform decision makers, including policy formulation. As such researchers need to be able to catalyse challenges to existing policy and practice without crossing the line into pure advocacy or activism.

Funding options

The UK has a long history of varied funding mechanisms and the key funders expressly welcomed the opportunity to collaborate with partners to co-fund research of mutual interest.

The funding mechanisms need to be such that the bureaucratic effort of implementing them is commensurate with the amount being distributed and the need to maintain fiscal prudence and accountability.

A greater degree of flexibility in the medium term (2-3 years) is needed to respond to rapidly emerging societal concerns such as epidemics or natural disasters.

Republic of Ireland

The evidence from one workshop delegate and one interviewee from the Republic of Ireland are included in this report but this is not intended to be a representative statement on the situation in Ireland.



2.2 Methodology followed

This national report (i.e. INSPIRATION deliverable 2.5) reports the information collated for The UK from the national workshop (8 & 9 July 2016) and 17 national key stakeholder (NKS) interviews (Annex Ia) through a series of semi structured interviews. The information was collated in accordance with INSPIRATION D2.3 “Template for national information collation”. Details of these NKS are provided in Annex I. The desk study was based on documents as suggested by NKS. These are listed in Annex II. NKS were offered anonymity with respect to their comments and are hence referred to in this report by a code.

A copy of this report has been sent to the workshop attendees and NKS. An update will be produced if any substantive comments are received.

The United Kingdom has a central government and devolved administrations for Scotland, Wales and Northern Ireland (Cabinet Office 2010). Environment and land use planning are in general devolved matters. Some NKS represent bodies with remits limited to one of the four countries whereas others have remits extending across the whole of the UK and potentially beyond that too. Where a comment is limited to one of the countries of the UK this is reported.



2.3 Research and Innovation (R&I) needs

2.3.1 Societal challenges and needs

The UK has a long standing plan led approach to land use management. This has been essential in ensuring the complex, inter-related and often conflicting demands for land are balanced and benefits maximised while impacts minimised. At present there is an overarching planning policy but land use plans are devolved to local authority and county council (waste and minerals) level.

The Centre for the Protection of National Infrastructure (CPNI) (Cabinet Office 2010) protects national security advises on 'putting in place, or building into design, security measures or protocols such that threats may be deterred, detected, or the consequences of an attack minimised'. The national infrastructure is categorised into thirteen sectors (with those of most relevance to Inspiration highlighted in bold):

communications	transport
emergency services	water
energy	defence
financial services	civil nuclear
food	space
government	chemicals
health	

The Cabinet Office (2010) recognises soil dessication as a threat to CNI

An analysis of the UK National Risk Register of Civil Emergencies (Cabinet Office 2015) shows that water as a hazard and a life essential, energy and food security are key concerns.

Under the overall societal challenge being tackled by INSPIRATION of “Growing a low carbon, resource efficient economy with a sustainable supply of raw materials” the workshop and various NKS identified a range of challenges that require fundamental research or knowledge transfer or some combination.

The workshop attendees expressed that there was a pressing need for a “National Plan” – Land Use Strategy – for the UK with a full understanding of land uses/ land use changes and the costs and benefits associated with each.

Contribute to food security and food safety (151109, 151104); 151124 – in the context of land contamination.

The workshop indicated that food security must also be seen in the context of biocrops and biofuels: which of these resources are we content to import and which should we produce and why? How should this policy be encouraged/ enforced? Should impacts be quoted *per capita*? Ultimately, how much do we want to consume? How do we optimise the location, bearing in mind that this includes the low-carbon, resource-efficient, sustainable supply chain and its vulnerability, and the consumers? How do we encourage the production’s siting in this optimum location?



Ensure secure supplies of water for a range of purposes. ‘Safe and sufficient drinking water’ is cited, with 151109 including irrigation water for crop production and water for livestock health. The workshop expressed the need to understand the land use impacts on water resources, and vice versa.

Reduce raw material and resource consumption, Ensure efficient use of natural resources; 151104. 151109 indicated water as a natural resource of concern, and also nutrients, particularly Phosphorus and Nitrogen use efficiency.

How should use and impacts be measured and quoted? Per capita? How do we optimise the location, bearing in mind that this includes the low-carbon, resource-efficient, sustainable supply chain and its vulnerability, and the consumers? How do we encourage the production’s siting in this optimum location?

In the case of finite resources, which does the UK possess? Which are exploitable economically and which are exploitable in ways that are socially acceptable? For example unconventional gas exploitation, or particular materials or aggregates are heavily contested. Different countries have taken different approaches. For example Scotland actively seeks to develop conventional oil and gas – both onshore and offshore – but has banned unconventional gas exploration. England has a small but growing on shore conventional hydrocarbon sector but government is keen to encourage unconventional gas exploration. The planning permission for the first groundwater quality monitoring boreholes for shale gas were awarded in early 2016 and the outcome of the planning permission for the first exploratory boreholes is currently pending. An exploration borehole for onshore oil was recently reported to have been successful.

For each of energy, water and other material requirements the key societal challenges to understand and seek to mitigate were identified by the NKS and workshop.

Contributing to climate change mitigation and societal adaptation (151109, 151104);

Contributing to a healthy living environment. 151104. 151109 recognised that there are challenges to be faced in the national diet that farmers, as primary producers, could help address. 151124 noted the need to mitigate the effects of land contamination and water pollution.

Ensuring a secure infrastructure for distribution of energy and water as well as interception of waste and pollutants. 155109 indicated the importance of an efficient energy and water supply network.

151104 highlighted the protection of ‘intrinsically valuable natural features/assets’.

151109 noted the need for climate change related maintenance of food supply. The link between Food & health would have impacts on primary food production. Soil degradation and soil health, including biocontrol of soil pathogens, was a prerequisite to maintaining domestic yields. The availability of and competing demands on water was becoming a pressing issue that the present strategy for unconventional gas exploration may well exacerbate.



151109: Funding for the work of AHDB comes from Industry Levies and is ring-fenced for the particular sector. AHDB then prioritise investments in research and knowledge transfer (KT) taking into account overlaps between sectors. All investments are intended to help produce profitable businesses whilst being aware of the environmental and societal drivers are around the decisions being made.

151112A: Contributes to food security and food safety to a much lesser extent. We have, along with other public bodies, a role in ensuring secure supplies of safe drinking water. We also carry out peripheral work on biomass, some activity in waste reduction, and efficient natural resource consumption. 151112A contributes to climate change mitigation and societal adaptation in terms of GHG emissions, carbon accounting, reducing fertiliser use, runoff into water courses. This contribute to a healthy living environment and has marginal feed into extreme events with respect to climate change and infrastructure.

Natural Capital accounting and valuation of all benefits and services is of growing importance and is trying to move towards a systems approach. The science needs to move away from easily seen entities (bee counts; location of nature reserves). We are still some distance away from being able to apply this understanding to decision making and as such is a key research need.

151112B: feeds into “Contribute to food security and food safety”; Ensure secure supplies of safe drinking water; Reduce raw material and resource consumption, Ensure efficient use of natural resources; Contribute to climate change mitigation and societal adaptation; and indirectly contributes to a healthy living environment;

In addition ‘Protection of the environment’ was given – the currently being formulated “25 year Environment Plan” that DEFRA is producing does not cover Wales which has its own plans: Natural Resource Management approach and statement that are broader as they cover more factors and not just biodiversity⁵.

151118: Contribute to food security and food safety, Reduce raw material and resource consumption, Ensure efficient use of natural resources and Contribute to climate change mitigation and societal adaptation. In addition, Resource efficient circular economy in the UK was an extra challenge.

⁵ An animation explaining the Welsh Government’s approach towards natural resource management is at: <http://gov.wales/topics/environmentcountryside/consmanagement/natural-resources-management/?lang=en>



2.3.2 Topics / research needs to include in the SRA

UK-1 Efficiency of primary food producers, while recognising the associated environmental and societal needs.

There are primary food producer organisations across Europe aiming to provide the same function using a variety of mechanisms, as well as links to bodies in for example South Africa, Australia and Canada where similar problems are faced, and all divisions work or collaborate internationally where there is a benefit to UK producers to do so.

Greenhouse emissions from livestock and broadacre arable crops are key drivers, but it's important to recognise where improvements in business efficiency, for example crop nutrient management plans, can reduce emissions.

How does improving supply chain efficiency affect the pressure on land use (e.g. by ensuring more, good quality produce reaches the ultimate consumer?)

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Demand for food will grow with the population. However improved efficiency can reduce demand by reducing wastage.
Natural capital	Improving primary production efficiency will help in the stewardship of natural capital so that it continues to be able to offer beneficial services.
Land management	The way land is managed influences the efficiency of primary production.
Net impacts	Improved primary production will help contain our ecological footprint.
Justification	Of interest to all in the supply chain.



UK-2 Soil and groundwater remediation

Soil and groundwater remediation is difficult to achieve so it is best to preserve what we already have. Recent reviews of progress in groundwater remediation in the USA and elsewhere have shown that at the present rate, we are centuries away from restoring the groundwater to the quality before industrial pollution took place. Technological advancements with new materials and novel combinations of pre treatment, treatment and post treatment technologies could help accelerate progress.

How can new treatment materials, new technologies and new combinations of technologies be brought to market more quickly in more EU MS than has been the case in recent decades?

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Demand for water will be mitigated by better groundwater remediation.
Natural capital	Rapid and more effective progress on soil and groundwater remediation will help steward our natural capital.
Land management	Remediated soil can be reused helping avoid urban sprawl and the consumption of green field (previously undeveloped) land. The innovation requested would help improve economic performance, reduce environmental impact and amplify the social licence to operate and hence contribute to more clearly sustainable land management.
Net impacts	Reduced resource consumption and enhanced soil and groundwater resource.
Justification	The present rate of progress is too slow and the net impact of current approaches to soil and groundwater remediation is not optimal.



UK-3 Soil ‘Regeneration’

It is widely claimed that an increase of soil organic matter (SOM) by 20% would be beneficial but how much this is needed is contested. Research is being carried out at Rothamsted & Lancaster University in this area. However a lot of resources and money could be committed without understanding what will be delivered. The origin of the 20% figure is unclear.

How to increase to Soil Organic Matter in poorer soils, and what level is achievable, desirable, beneficial? Sharing lessons in best practice, costs & benefits in peatland restoration would be valuable.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	By restoring local soil, the need to exploit and perhaps consume soil elsewhere is reduced. The amount of soil restored is likely to be a fraction of any soil conserved elsewhere giving a synergistic return on soil restoration investment.
Natural capital	Soil is a limited, quasi-non-renewable resource and improving its fertility and ability to act as a physical and chemical buffer will enhance natural capital. To what level should soil organic matter be increased?
Land management	Improved soil would yield enhanced ecosystem services, including yields, and hence reduce demands on land elsewhere. How should soil organic matter content be increased?
Net impacts	Improved soil would be able to offer enhanced ecosystem services and locally to the point of demand.
Justification	The requested research would deliver a better evidence base for specific policy targets on soil organic matter content.



UK-4 Natural systems

A better understanding of how natural systems behave and what processes are operating is needed to understand better the effects of different courses of action (deliberate or accidental) in order to inform Policy- and decision- makers in the UK and abroad in trying to avoid ‘unintended consequences’ arising from the complexity of natural systems.

How can we link in ideas on ecosystem services and ‘soil resilience’? How does soil quality affect the wider system (and vice versa)? What are the economic implications of soil degradation, and what evidence and indicators should be used to quantify degradation?

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Life depends on healthy functioning of natural systems. Rapid, particularly anthropogenic, perturbations of these systems create consequences in excess of the benefits of the actions that led to the perturbations.
Natural capital	Unforeseen or unintended degradation of the environment erodes natural capital unnecessarily.
Land management	Predictive models based on a better understanding of natural systems will help inform land use management.
Net impacts	Better understanding and associated predictions to inform decision making will reduce unintended or unforeseen environmental degradation.
Justification	Competing demands on land use are growing in many parts of Europe and in the UK. We now realise that natural systems are complex and operate at various scales – and we only have partial understanding of their behaviour.



UK-5 Demand for soil/ land resources, imports and exports

The international dimension of food supply and hence food security is important. The UK does not see itself as being isolated in terms of food – it both imports and seeks to export foodstuff).

Need a better understanding of the whole life cycle of food production, transport, consumption and waste to discern the balance between domestic, import and export.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Land owner recognise that soil is a finite resource but one with a long tail of productivity. Improved understanding of the life cycle of soil related
Natural capital	How can stewardship of the soil component of natural capital be improved to help food security in the EU and in countries which export food to the EU?
Land management	Improved understanding of the geography of soil services (including of the products we obtain from soil) will help allocate resources and reduce unnecessary consumption & waste.
Net impacts	Reducing over consumption and waste will mean reduced environmental impacts and deliver savings to those behaving profligately.
Justification	A whole life cycle approach to food will reduce inefficiency, including waste, and thereby release resources for others and other purposes.



UK-6 Competition between land-uses (land-use conflicts)

It is recognised that there are competing and often mutually excluding land uses. How should land use conflicts be resolved? E.g. Is it more appropriate to build on poor quality agricultural soils rather than brownfield land? What instruments are needed to avoid / minimise impacts (feedback to decision-making process). Spatial analysis of distribution and level of Natural Capital to inform decision making. Techniques and technologies to assess (productivity) and value land resources.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Better understanding of the consequences of alternative uses of land are needed to ensure the most important – rather than obvious or even urgent – land use is permitted to proceed.
Natural capital	Better survey of the distribution of natural capital is needed to inform decisions on competing land uses.
Land management	Predictive models of ecosystem services associated with natural capital would help inform decision makers and help prevent inadvertent consumption of natural capital.
Net impacts	Better instruments are needed to avoid negative impacts.
Justification	There is an urgent need to improve the basis and robustness of land use allocation among competing land uses.



UK-7 Targeting outputs

Practical, pragmatic effort needs to be expended in targeting outputs to relevant end-users and in linking the fundamental science through to policy and (improving) regulation.

Growing awareness of the need to actively protect and restore our natural capital and to foster and maintain ecosystem services has been met with growing efforts to regulate activities that could unnecessarily erode capital or hinder the delivery of services. The interdependency and interconnectedness within natural systems is beginning to be understood however policy instruments and their implementation is likely to be lagging behind this understanding.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	How can the impact of policies intended to protect natural capital and foster ecosystem services be reliably predicted over medium term timescales?
Natural capital	How can natural capital be understood in ways that help policy formulation and implementation over short timescales when the impact of these timescales may not be fully realised until much later?
Land management	Land use policies involving the erosion of natural capital have lasting, occasionally permanent, effects on land. How can those effects be predicted and properly evaluated before policies are implemented?
Net impacts	There is a hunger in government to identify and modify or eliminate unnecessary regulatory burdens however demonstrably satisfying this hunger is proving challenging.
Justification	Increasingly sophisticated and multiple land uses require more interconnected and agile policies and implementation of those policies.



UK-8 Competition between land uses (land-use conflicts)

The effects of loss of high quality agricultural land to other land uses, e.g. forestation and to development. There appears to be a lack of research in the UK. There is no research quantification of loss of good quality agricultural land to development.

Some forms of natural capital are non renewable and some are interchangeable. Discerning the scale and nature of capital erosion by some land uses at the expense of others requires a deeper understanding of the natural processes land uses create, foster and hinder.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Many forms of land use are possible on any specific parcel of land but not all are necessarily desirable... there.
Natural capital	The forms, nature and immutability of different forms of natural capital need to be mapped and evaluated if loss of one form of capital can be justified by creating another form which offers essential services or enhanced value.
Land management	Understanding the site specific springs of natural capital can help inform decisions about the net effect of alternative land use futures.
Net impacts	By better understanding the springs of value associated with different land uses, unwanted adverse impacts can be avoided or reduced.
Justification	When alternative land uses are competing for the same space, criteria and constraints must be selected to help inform decision making. In the absence of deeper scientific understanding of the link between the environment (including the sub surface environment) and the value or services other criteria will dominate the decision making process.



UK-9 Important areas of technical innovation include new techniques to understand

The microbiology of soil to help assess biodiversity and so understanding impacts and optimisation of land management.

A growing understanding of the potential for natural attenuation of groundwater pollution over the past two decades has allowed less intensive remediation solutions to be more widely deployed. A transition from empirical observations of contaminant loss to mathematically describable understanding of the biological processes causing that loss have facilitated targeted biostimulation and on occasion bioaugmentation.

The microbial biomass of soil is appreciated as being an important component of the processes that deliver valued ecosystem services. However there are challenges in understanding how soil bacteria and fungi behave and how they respond to different land uses.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Making more effective use of soil microbial biomass to achieve desired goals of soil restoration or conservation can be achieved if the inter relationship between soil function and microbial biomass is mathematically describable.
Natural capital	Microbial biomass is both part of natural capital and a contributor to other forms of such capital.
Land management	Better understanding of the behaviour and resilience of soil microbial biomass can help optimise soil and groundwater intervention measures.
Net impacts	Better characterisation of soil microbial biomass will enable more targeted interventions to protect or restore degraded or polluted soil.
Justification	Improved understanding of soil microbial biomass is an essential objective if the response of natural systems to perturbations are to be reliably predicted and hence taken into account in land management decision making.



UK-10 Landscape scale solutions

Solutions across multiple farms that improve biodiversity and soil management and productivity are needed to replace field or farm scale intervention. Funding farmers has had only a modest/ limited impact. Such an approach would sit comfortably within the Defra Sustainable Intensification Platform (SIP) and is endorsed by the WRAP *Food futures* report (WRAP 2015). Integration has the potential to manage at the landscape scale and not the individual environmental media or simply to maximise crop yields. This can be at catchment-scale with management involving collaboration of individual farmers. The role of Precision Agriculture in the improvement/conservation of soil quality – new techniques and technologies to assess/map – needs to be more fully explored and then put into operation.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	How can the Fusion of geospatial intelligence and deeper understanding of how natural systems function be used to maintain ecosystem services with a lighter hand intervention?
Natural capital	How can precision agriculture contribute to natural capital stewardship?
Land management	How can automated, accurate precision agriculture techniques be used to increase the granularity of land management decisions?
Net impacts	Better use of precision agriculture coupled with higher resolution understanding of how natural systems vary can help optimise the benefits of chosen land use trajectories.
Justification	There is an opportunity for SMART farming.



UK-11 Assessing the values of primary and secondary production

For example, a high value secondary producer may rely on a relatively low value primary producer, e.g. Scottish Barley is an essential feedstock for the Scotch Whisky sector that is reportedly worth £5billion per year to the UK economy (Scotch Whisky Association 2015).

A “follow the thing” approach to high value products can help identify vulnerabilities and areas where improvements in what at first sight seems a low value part of the process can deliver significant dividends.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	How can the production high value products such as luxury foodstuffs be improved?
Natural capital	Natural capital combined with intellectual capital and scarcity can result in high value products from seemingly low value raw materials. Such value can be used to protect natural capital.
Land management	Improved production of low value raw materials can help maintain traditional industries and the landscapes they both depend on and help conserve.
Net impacts	Seemingly unworthy investments in improving low value products can have much greater benefits down the line and up the value creating chain.
Justification	High value products can provide substantial social benefits and contribute to the local economy thereby reducing the need for local communities to turn to more detrimental and less sustainable activities.



UK-12 Farming practices to create valuable (enjoyed) environments

E.g. uplands and grouse shooting, sheep grazing and patchwork of fields and river margins in the low lands are very dependant on how farmers perceive themselves as guardians to their environment.

Long-time horizons often matter in agriculture – succession from generation to generation is important in some cases, whereas businesses renting land brings about shorter time horizons. Business (land rental over a series of say 3-5 year sequences) and land owning (estate management) objectives need to be managed.

Farming is increasingly being seen as a way of not only delivering food (and perhaps biofuel) but also as a means of mitigating natural hazards (notably flooding), enhance biodiversity and support leisure activities in the countryside.

A systematic understanding of these environments is needed. Natural England has carried this out using “Landscape Character Areas”. “These are single unique areas which are the discrete geographical areas of a particular landscape type. Each has its own individual character and identity, even though it shares the same generic characteristics with other types” (Natural England 2014).

How does each of these elements value the other, and how should they value it? How can multiple land uses be managed in ways that optimises their value and reduces their adverse impact? Given the slow rates at which change often comes about, how can reliable predictive models be used to inform decision making? Can these models be used at different scales – from field scale to national character area⁶ scale?

Specific research questions (following the conceptual model of INSPIRATION)

Demand	By looking for synergies between farming for food and other benefits, local supply of services will be greater and hence demand will be reduced.
Natural capital	Farming practices that deliver a range of benefits will enhance both the stock of natural capital and the allocation of funds to protect natural capital.
Land management	How can multiple land management objectives be achieved in a reasonable manner?
Net impacts	How can making optimal use of land for a variety of purposes be done in a way that makes for better stewardship?
Justification	The long timescales over which farming practices affect change represent a considerable challenge.

⁶ English Nature (now Natural England) has developed a landscape classification for England – while the research need came from Ireland the National Character Area approach is extendible to other MS. <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making>



IR-1 (Generic) Risk Assessment of Contaminated Soils

Management of contaminated land in Ireland lags behind much of Europe, partly because it has a less-industrial past than many partners. It lacks almost all necessary elements from primary legislation to practical tools and guidance and, though it is a sporadic problem, each instance entails a lot of time, money and effort because of the lack of a coherent approach. It requires research to transfer basic tools and processes into an Irish context, eg geology, population, demographics etc.

Specific research questions (following the conceptual model of INSPIRATION)

Demand	Improved soil and groundwater will allow demand to be met more locally than would otherwise be the case.
Natural capital	Natural capital would be enhanced.
Land management	A closer proximity between supply and demand would mean less need for land for ancillary activities to overcome greater separation.
Net impacts	Improved soil and groundwater quality will contribute to better stewardship.
Justification	Many countries have mature contaminated land management policies and practices (e.g. UK & NL) while others have dysfunctional ones or effectively none at all. Considerable funds are spent by both private and public sector and knowledge transfer is needed to help ensure that expenditure delivers tangible returns.



IR-2 Pragmatic appraisal of environmental technologies in an Irish setting

There is inertia in the application of technologies such as remediation methods and investigation techniques in Ireland, either because people are unwilling to try ‘new’ techniques, or try new techniques that are wholly inappropriate – eg for the problematic drift geology in much of Ireland. Pragmatic appraisals of the capabilities and limitations of technologies would help better application.

What problem does any specific technology aim to address? What evidence of its performance is there? To what extent is that evidence relevant to Ireland (and other MS)? What extra evidence is needed to improve confidence in the performance and that any residual negatives will be tolerable?

Specific research questions (following the conceptual model of INSPIRATION)

Demand	
Natural capital	Ireland’s natural capital will be enhanced by appropriate deployment of environmental technologies but it would be degraded by inappropriate use of perhaps even the same technologies.
Land management	Making better use of existing technologies will help keep more of Ireland’s land in beneficial use.
Net impacts	Better use of technology will help improve Ireland’s soil environment.
Justification	National contexts still vary despite increasing similarity in legislation across EU MS. Climate, culture and geology will influence the operating window of any technology hence the need to demonstrate that for Ireland, and indeed other MS, circumstances any given technology is fit for purpose.



2.4 Experiences regarding connecting science to policy/practice

2.4.1 Use of knowledge

The understanding of science varied among the NKS, reflecting their disciplinary background. General trends of objectivity, neutrality and meticulously obtained were detected.

151109: existing and new science and its interpretation with respect to specific sectors and integration across disciplines (soil science, crop physiology, genetics etc.). New knowledge must be built on to deliver additionality.

151112A: knowledge that arises from the scientific process, testing a hypothesis. Turning that into knowledge via peer review, published, debated and accepted. One of the things we constantly say is that there is no certainty in science and you are not seeking certainty and there must always be explanations of uncertainty, errors and caveats.

151112B information or evidence that helps inform change.

151118 experimentation – hypothesis formulation and testing – evidence based conclusion – iterative

151124 evidence-based decision making

Scientific knowledge is an essential foundation for most of the NKS. It could be argued that the funders seek to support the creation of knowledge that is of societal value.

151109: within the organisation with respect to the research it commissions, they would expect to see technical reports, briefing notes, peer review papers, publicity and outreach materials (for farming press), it would also be used to respond to consultations, inform policy. New information would be interpreted to farmers, growers and supply chain to improve business performance.

151104 uses 'scientific knowledge' to inform policy formulation and negotiations at a National and trans-national level.

151112A: scientific knowledge is used to communicate with (non-scientific) policy teams and inform ministers and their responses to e.g. parliamentary questions. Robust transparent science is needed, often from first principles.

151112B is the core of what they do, whether at operational or policy level, everything is subject to challenge and needs to be properly evidenced to back that up.

151124: decision making process for risk assessment or remediation strategies, for example in signing off sites.



There is a widespread realisation that there is a large amount of even reliable peer reviewed literature and some sign posting to the most relevant and reliable was needed. A wide range of sources of (scientific) knowledge were reported by the NKS as being useful in their daily work. For the end user and funders however reliance of a close network of specialists, often researchers, in identifying new knowledge was very important.

151109: in addition to the information gained from commissioned research, they also acquire information from scientific papers; cost of access is an issue but literature review is part of commissioned research to establish knowledge gaps. Business consultants are also used to understand implications of the commissioned research and understand the return on investments. Internal expertise and communication is good, and ad hoc working groups may be convened.

Television and local radio are used to convey information to the public, where they have wider interest, e.g. items on potatoes and health, and the recent concern over the carcinogenicity of sausages and bacon.

Key portal websites are used to keep abreast of what is considered to be significant and noteworthy, including: Europa, RCUK, ENDSReport, US EPA.

151104: Journal papers are used.

151112A: Consulting our network of subject specialists, sometimes yet-unpublished work scientific articles; scientific papers are useful but they need to be simplified for a non-technical audience; along with grey literature⁷.

151112B: knowledge is acquired from multiple sources: from peer reviewed research, specialists, colleagues, undertaking research independently. JRC and EEA reports are strategically important. Searching for peer reviewed literature is difficult, but obtaining it isn't – we need to know what the paper is before they can obtain it.

151118: takes information from most avenues, from peer-reviewed research, to experts, experience and both academic and industrial conferences.

151124: tends to get knowledge from consultants, and other industry professionals (via word of mouth or networks/conferences/training courses), from secondary websites such as US EPA, ATSDR and EA.

⁷ Grey literature has been defined as: 'That which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers.'¹

Grey literature has also been broadly defined to include everything except peer-reviewed books and journals... It has not been published in a conventional way, and can be difficult to identify and obtain through the usual routes, and for this reason it is known as 'grey literature.'
<http://www.healthknowledge.org.uk/public-health-textbook/research-methods/1a-epidemiology/grey-literature>



Recent, new scientific knowledge (i.e. state-of-the-art scientific insights/findings) while important for many NKS is not as important as making sure that knowledge is relevant and able to be operationalised. There is also a question of the ease with which the non specialist can penetrate the disciplinary jargon that of necessity characterises peer reviewed literature.

151109: Use conferences on hands on involvement to keep up to date on science, policy and practice. There is a 2 way dialogue between them and stakeholder organisation dialogue (eg Dairy UK will talk to AHDB Dairy sector directly).

151112B keep up to date by having strong links with the research community in Wales, e.g. by having academic members of stakeholder groups when policy is being developed. The academic community are comfortable challenging their position.

151118: has links with Academia to keep up to date with relevant cutting edge knowledge

151124: is more interested in applied knowledge, so tends to interact with practitioners in established contaminated land regimes practice such as the UK

State-of-the art scientific research can help shape the formulation of policies. However there is a time lag between new knowledge being created, applied and becoming mainstream. While used to be estimated at taking about a decade, it can happen much quicker. The increasing use of open access publication is helping but the great increase in publication outlets and papers is not.

151104: Good use is made of both peer reviewed literature and by close links with researcher and practitioner thought leaders in relevant areas.

151118: Policy lags science and is driven by evidence of good practice (S&W policy on Waste – increase food recycling and reduce landfilling; carrier bag policy); elsewhere could do better.



2.4.2 Possibilities to set the agenda

The ability to influence setting of scientific research policies and agendas has grown in recent years as a result of systematic changes put in place by the major research funders. The use of idea generation and topic prioritisation events such as sandpits⁸ has become almost routine when trying to establish research priorities for a funder.

To broaden the base of those undertaking research, town meetings are used to inform interested researchers on the aims of a call for research, specific rules and general advice on what should and should not be included in proposals.

151104: We set national policy which is informed by emerging research. We partner with research funders and researchers. We appreciate early involvement in research project formulation. We offer support in staff time, data and letters of support to many researchers. We sit on research council (RC) committees.

151112B: We have influence in RCUK funding In Wales, and contribute directly through joint funding. Senior staff represent the organisation on programme steering or project advisory boards.

151112B:evidence showed that our nature based Peatland restoration policy was cost effective in helping combat climate change. Ministers (in ca 2014) felt the evidence was sufficiently strong to restore Welsh peatlands by 2020 and the policy was rapidly implemented.

More recently we been looking at fungal DNA assessments in soil samples to assess how habitats have been damaged by agricultural activities. This work is in its infancy and may possibly be extended to using plant DNA to assist in impact assessment and hence feed into mitigation policy measures..

In general NSK felt their needs were reflected in national research agendas however there is a gap between the research produced and the ability of end users to adopt that knowledge in many cases.

⁸ EPSRC defines sandpits as: “residential interactive workshops over five days involving 20-30 participants; the director, a team of expert mentors, and a number of independent stakeholders. Sandpits have a highly multidisciplinary mix of participants, some active researchers and others potential users of research outcomes, to drive lateral thinking and radical approaches to address research challenges... Sandpits are intensive discussion forums where free thinking is encouraged to delve into the problems on the agenda to uncover innovative solutions.
<https://www.epsrc.ac.uk/funding/howtoapply/routes/network/ideas/whatisasandpit/>

2.4.3 Science – policy – practice

The UK has a strategic approach to governance that is becoming increasingly cross-sectoral. HM Treasury (2015) reported “The government will publish a new long-term National Infrastructure Plan for the key economic infrastructure sectors – transport, energy, flood defences, water, waste, communications and science.” Priority is focused on those areas most critical to national well being. For example a country as rich in surface and ground water resources as the UK merits a single reference by HM Treasury to water whereas energy merits 31 mentions.

NKS appreciate the role of science in informing policy and in policy driving the need for new knowledge. An increasingly strategic approach is being adopted by the major research funders. A wide breadth of topics is funded by individual research councils (e.g. Figure 2).

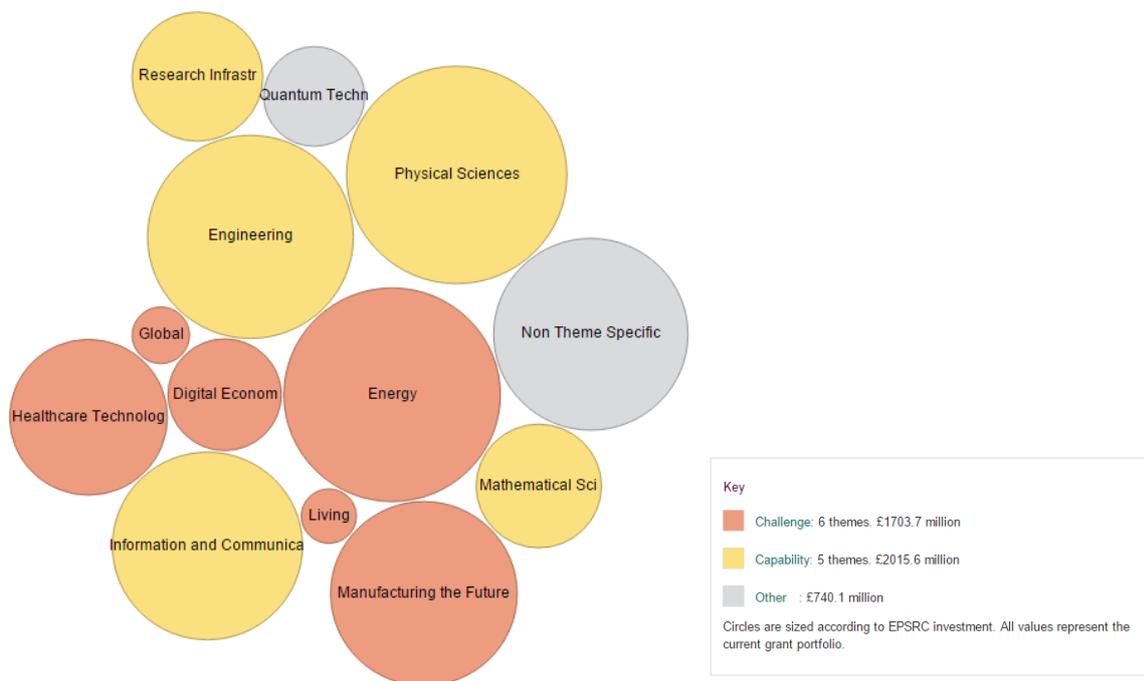


Figure 2: EPSRC Research portfolio (<https://www.epsrc.ac.uk/research/ourportfolio/vop/>)

151109 carries out a wide range of dissemination and abstraction in order to achieve specific goals. For example, 151109 produced an assessment of the impacts of loss of the use of endocrine disrupting chemicals to the industry, the findings of which were relayed to stakeholders, DEFRA and the EC. This was successful because they were in a position to bring together an agriculture-wide impact assessment. It was a challenge to interpret the findings for several different, including non-specialist, audiences. Some findings however will only be of interest to relatively few stakeholders.

151104: is involved in formulating research questions, knowledge creation and feeding research findings in policymaking. The view was expressed that a range of views is welcome in these processes but ultimately a decision needs to be made in the knowledge that not all stakeholders will be satisfied on every occasion.



The societal impact of scientific research related to the scope of INSPIRATION is increasingly needing to be assessed in the UK. This in part reflects a greater desire from HM Treasury for a deeper understanding of the benefits research funding brings about. Impact is also a key indicator that is used to judge the quality of research by universities during the four yearly research excellence framework process. Some third sector funders however actively seek to fund 'risky' and even blues skies research where the outcome is not necessarily obvious nor its achievement entirely predictable.

151104: Certain issues such as energy and climate change are high on the political agenda, along with food quality and diet. We already have in place good natural resource protection measures. We are putting in place Natural Capital auditing and exploitation mechanisms that will foster its stewardship. However, the interface between the natural sciences, economics and governance could usefully be better understood.

151112A: the last Research Programme 2011 did not have enough evaluation mechanisms were built in. Slightly different approach adopted now, Performance Management Framework in terms of a Logic Model Process (input – outputs – outcomes – long term impacts – can be a long way down the line). Pathways to impact should be built in up front. Learning what other funding organisations are implementing (as long as these are not too onerous).

151112B: no formal mechanism, but up-front the project has to be justified.

151118: 'sporadically' and perhaps unavoidably so. We could look at uptake of findings into the sector. Universities are not incentivized to do that (beyond use of IP).

Several Science-Policy-Interface documents were recommended by NKS or identified during the literature review stage:

151109: Defra's Food and farming plan is currently being drafted⁹, H2020, Ireland's Agri food strategy (Republic of Ireland 2015).

151104: the emerging Defra 25 year environment plan¹⁰ and the National Planning Policy Framework (CLG 2012).

1511218: FORESIGHT reports – eg *future of food* (Beddington);

⁹ <https://www.gov.uk/government/news/great-british-food-and-farming-plan-events-held-across-the-country>

¹⁰ A recent update was provided on 23 February 2016: <http://www.ciwm-journal.co.uk/defra-to-publish-25-year-environment-plan/>



2.5 National and transnational funding schemes

2.5.1 Funding schemes and possibilities for research funding

The UK has a long history of funding pure and applied research in the soil-sediment-water nexus and its relationship with land use and land management. Funders include public, private and third sector organisations. Collaborative funding is being increasingly seen as attractive despite the associated added bureaucracy. Organisational remits may preclude funding research in a cross disciplinary topic and collaboration can help bridge any such barriers. Collaboration is seen as leveraging third party funds. Collaboration is seen as an indicator that the research is of interest and therefore worth funding.



Table 1 R&I funding options collated for country: UNITED KINGDOM

R&I funding options collated for country:		UNITED KINGDOM	
Name*	Research and Innovation funder**	What and/or whom do they fund?***	More info****
Regional			
1	SNIFFER (formerly Scotland and Northern Ireland Forum for Environmental Research)	Funder and knowledge transfer	Sniffer delivers knowledge-based solutions to resilience and sustainability issues in Scotland www.sniffer.org.uk
2	Agriculture and Horticulture Development Board (AHDB)	Statutory levy body	We are a statutory levy board, funded by farmers, growers and others in the supply chain. Our purpose is to equip levy payers with independent, evidence-based information and tools to grow, become more competitive and sustainable. http://www.ahdb.org.uk/
3	Regional charities	Various	There are many regional funds for research or knowledge transfer within specific parts of the UK. Various
4	Trade associations	Various	Trade associations, whose members are predominantly companies rather than individuals, commission research on topics of relevance to their members. Various.
5	Professional bodies	Various	Professional bodies commission topical research on matters of interest to their members. Various

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National				
1	Research Councils UK	Umbrella body for all research councils	The primary role of Research Councils UK (RCUK) is to fund research. Each year a total of around £3 billion is invested in research conducted at UK universities, Research Council Institutes, and in securing access to international facilities for UK researchers. This money is used to fund the very best world-class research as judged by independent, expert peer review.	www.rcuk.ac.uk
2	Natural Environment Research Council (NERC)	Research council	NERC funds world-leading basic, strategic and applied research, survey and long-term environmental observation and monitoring of the whole Earth system.	www.nerc.ac.uk
3	Economic and Social Research Council (ESRC)	Research council	We fund research across a wide range of social science topics.	esrc.ac.uk
4	Engineering and Physical Sciences Research Council (EPSRC)	Research council	EPSRC supports excellent, long term research and high quality postgraduate training in order to contribute to the economic competitiveness of the UK and the quality of life of its people.	epsrc.ac.uk
5	Biological and Biosciences Research Council (BBSRC)	Research council	We fund world-class bioscience research that helps to tackle major challenges such as the impact of climate change, a healthier old age, and sustainable food production, land use and energy production.	bbsrc.ac.uk
6	Arts and Humanities Research Council (AHRC)	Research Council	The AHRC seeks to promote and support high quality arts and humanities research through a variety of funding opportunities across its schemes from postgraduate studentships to large scale collaborative research grants, specialist training schemes to strategic programmes, fellowships to research networking.	http://www.ahrc.ac.uk/
7	Leverhulme Trust	Charity	The Leverhulme Trust was established at the wish of William Hesketh Lever and makes awards for the support of research and education. The Trust emphasises individuals and encompasses all subject areas.	https://www.leverhulme.ac.uk/

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8	CIRIA	Charity	Working with our members and the wider industry, our varied programme of research projects encourage industry collaboration and help improve the quality, efficiency, cost effectiveness and safety of the modern built environment.	http://www.ciria.org /
9	Innovate UK	Government innovation fund allocation. Co-funds innovation projects with public and private sector partners.	Innovate UK is the UK's innovation agency	www.innovateuk.gov.uk
10	Government Departments	Central Government and other emanations of the state	Individual departments commission research or contribute to collaborative research funding programmes or projects. The activities of individual bodies are accessible through the pull down menu at the URL on the right.	https://www.gov.uk/government/policies/research-and-development



There was no barrier or reluctance to engage in collaborative funding with other organisations, including from other EU MS or beyond where there were clear synergies and no conflicts with for example national security issues or strategic interests. This was a reassuring finding and should help in the final stages of INSPIRATION.

151109 has no barriers to co-funding in EU or elsewhere. These can be bilateral or multilateral. For example they work with Danish partners on pork production, with French, Belgians and Dutch on potato blight and with Aus/NZ/CAN voluntary contribution programme (VC) co-funding of a programme in UK and other partners led by AUS. 151104: Central government funding of research is limited and will increasingly focus on co-funded activities to leverage the benefit of available funds. 151104 has co-funded European projects, including Interreg.

151112A: have scope to collaborate on funding for work aligned with their goals.

151118: *Working with businesses is effective... use advisory committees to help dissemination. 'Bigger issues' (inc MNC) that are solutions that can be 'exported' or trialled in multiple EU countries is useful (and EU funded).*

160126a,b,c reported a mix of funding schemes including curiosity driven bottom-up and thematic top down funding. The 'world changing' impact of funded research and evidence of the value of the research outcomes is becoming increasingly important when deciding which proposals to fund. A more strategic approach to funding costly research infra-structure has been implemented in recent decades. In this way while infra-structure, including high cost analytical equipment, may be located at one institution researchers from all eligible institutions can apply to use the facilities. In a way the Large Hadron Collider¹¹ represents the extreme example of how such co-funding can work across many countries.

Increasing the added value of different financial resources (i.e. achieve a multiplier) was seen as a key positive for co-funding. The key was to make the additional administrative burden as light and fast as possible to ensure the maximum resource is allocated to research activities rather than in running the co-funding process.

151104: Early involvement of policy makers can ensure both a better targeted research proposal and maximise the magnitude of support that can be mobilised. Late or last minute approaches cannot be so well supported. Given the growing importance of impact, letters of support are given, often to competing proposals, on a non-exclusive basis to demonstrate end user interest in the potential research findings. Responses to direct approaches for financial support are however subject to strict single tender action constraints in place for the public sector.

151112A: was involved in an ERA NET called Urban NET, stakeholders were more interested in what they wanted to change rather than new knowledge they needed. But ultimately wasn't able to take it forward as there wasn't a policy dept. interested in the (Urban) field.

151112B: there are two or 3 projects such as INTERREG being scoped out, and are becoming increasingly active, there are no real barriers to European collaboration.

¹¹ <http://www.stfc.ac.uk/research/particle-physics-and-particle-astronomy/particle-physics/lhc-large-hadron-collider-resource-portal/>



Currently try to match and leverage funding from other funders such as NERC.

151124: Rather see money going into research in to pragmatic training, techniques, rather than high tech remediation techniques. training in pragmatic decisions : dissemination, knowledge transfer.

There is no single way on 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?

Recent thematic calls have been used to support both targeted and urgent research.



2.5.2 Gaps in financial resources for research

The following areas of research and innovation (R&I) that are not (yet) covered by current funding mechanisms and which would benefit from new/different funding schemes / infrastructures were identified by NKS.

151109: Crop rotation aspects of production, though is being address, needs on-going input – how to integrate farming and distribution to improve business efficiency; then scale out to how land is used for farming... how do we use land for multiple purposes...

151104: The challenge is the increasing scope of research activities and the decreasing funding for it. Current funding mechanisms are changing. Increasingly 151104 expects industry to fund or at least substantially co fund research activities.

151112B: there has been a gap in the assessment of soil biodiversity, though NERC is beginning to address this. There used to be a UK soils forum to share information on what was being funded, though that closed ~5years ago.

151118: Embedding systems thinking intonew sectors – eg sust intensification (reducing farm waste); 4th ind rev into agri & food (robotics and automation)... linking projects are missing. Getting out of compartmentalised thinking.

Ways of funding traditionally challenging integrated approaches to address particular societal challenges related to the use and management of land and related impacts to SSW systems were identified by NKS.

151109: Bid preparation is time consuming so needs to be prioritized. Supporting others proposals into RCUK (eg BBSRC) in terms of research or KT activities needs careful thought of what will be achieved/delivered by this engagement. There needs to be clear evaluation procedures and transparent mapping on to the call criteria. Consistent decision making is needed. Peer reviewers (not involved in the original call) need to be well briefed on the call intentions.

151104: Proposals need to justify the societal, environmental and economic benefits/ value of their work.

151104: The UK has a long track record of building policy on research based evidence and on funding research projects to support the implementation of such policy. This work has been published and is now freely available online.

The outcomes need to be robust (including being published in peer review journals), widely accessible (eg through open access publishing) and widely understandable (non-technical and short summaries of the main findings are essential if they are to be taken on board by non-specialists and if they are to change opinions or inform policy formulation).

151112A: better metrics of impact are needed.

151112B: interdisciplinary work is a challenge, but is being addressed more and more. And is important in the face of shrinking budgets.



2.6 Other remarks made by interviewees

Additional remarks of particular note included:

151109: Bio controls; soil loss; nutrient efficiency.

In terms of rotational contexts: We need to know what a healthy soil is and how to get there; eg SOM content is only one part of it. This is an immensely challenging question. We need to know what is going on at sub soil level. National databases and soil maps/ reference collections need to be more widely used by growers and practitioners (need to take them out the research community) – could help practitioners.

151104: There is a willingness to cooperate, including through joint funding, on research with partners outside the UK where there are overlapping interests.

151112A: Soils – an area of science which Scotland has much to offer and collaboration would be welcome.

151112B there's a small, strong soils community which knows each other, and to an extent throughout the UK.

151118: “we take soil for granted and we shouldn't and mustn't” soil as water and air as a resource; exploiting natural capital in soil, not preserving let alone enhancing it.

2.7 Annexes

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Annex Ia: NKS interviews in the UK

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
09/11/2015	AHDB	Mike Storey	1		1							1	1			1
29/10/2015	TCPA	Katy Lock		1						1						1
04/11/2015	DEFRA	Judith Stewart	1		1	1							1	1	1	1
04/11/2015	DEFRA	Maggie Chamley	1		1	1							1	1	1	1
12/11/2015	Scottish Body	Anon	1		1	1							1	1	1	1
12/11/2015	Welsh Govt	Jame Skates	1		1	1							1	1	1	1
12/11/2015	Welsh Govt	Ian Rugg	1		1	1							1	1	1	1
24/11/2015	Irish Practitioner	Kevin Motherway		1	1	1		(1)			1		1	1	1	1
18/11/2015	WRAP	Richard Swannell	1							1			1	1	1	
26/01/16a	EPSRC	Roger Singleton	1									1	1	1	1	1
26/01/16b	NERC	Simon Kerley	1									1	1	1	1	1
26/01/16c	BBSRC	Brian Harris	1									1	1	1	1	1
26/01/16d	ESRC	Hannah Collins	1									1	1	1	1	1
19/11/15a	Environment Agency	Danielle Ashton		1	1	1								1	1	
19/11/15b	Environment Agency	Ian Martin		1	1	1								1	1	
19/11/15c	Landscape Institute	Merrick Denton-Thompson		1						1						1
19/11/15d	National Farmers Union	Martin Rogers		1					1			1	1			1



Annex Ib: NKS questionnaire template

See Chapter 1, Annex I

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

See Chapter 1, Annex II



Annex II: Documents used for the UK desk study

BBSRC. 2013. The age of bioscience: Strategic plan.
<http://www.bbsrc.ac.uk/documents/strategic-plan-pdf/>

Cabinet Office. 2010. Strategic Framework and Policy Statement on Improving the Resilience of Critical Infrastructure to Disruption from Natural Hazards.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62504/strategic-framework.pdf

Cabinet Office. 2015. National Risk Register of Civil Emergencies 2015 edition.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/419549/20150331_2015-NRR-WA_Final.pdf

CLG. 2012. National Planning Policy Framework.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf (a consultation proposing changes to this closed on Monday 22 February 2016¹²).

EPSRC. 2015. Strategic Plan 2015. <https://www.epsrc.ac.uk/newsevents/pubs/strategic-plan-2015/>

EPSRC. 2016. Research. <https://www.epsrc.ac.uk/research/>

ESRC. 2015. Strategic plan - 2015. <http://www.esrc.ac.uk/files/news-events-and-publications/publications/corporate-publications/strategic-plan/esrc-strategic-plan-2015/>

HM Government. 2011. The Natural Choice: securing the value of nature (White Paper).
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228842/8082.pdf

HM Treasury. 2015. Fixing the foundations: Creating a more prosperous nation.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/443898/Productivity_Plan_web.pdf

Natural England. 2014. An Approach to Landscape Character Assessment. Author: Christine Tudor.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/396192/landscape-character-assessment.pdf

NERC. 2013. The business of the environment: Our strategic direction.
<http://www.nerc.ac.uk/latest/publications/strategy/corporate/strategy/the-business-of-the-environment/>

POST. 2011. Natural Capital Accounting. Parliamentary Office of Science and Technology. Note 376. http://www.parliament.uk/documents/post/postpn_376-natural-capital-accounting.pdf

¹² <https://www.gov.uk/government/consultations/national-planning-policy-consultation-on-proposed-changes>



Republic of Ireland Department of Agriculture, Food and the Marine . 2015. AGRI-FOOD STRATEGY 2025 Strategic Environmental Assessment Draft Environmental Report.

<https://www.agriculture.gov.ie/media/migration/agri-foodindustry/foodwise2025/environmentalanalysis/AgriFoodStrategy2025SEADRAFT300615.pdf>

Scotch Whisky Association. 2015. The Economic Impact of Scotch Whisky Production in the UK. http://www.scotch-whisky.org.uk/media/70581/economic_impact_web.pdf

WRAP. 2015. Food futures: from business as usual to business unusual. http://www.wrap.org.uk/sites/files/wrap/Food_Futures_%20report_0.pdf and online at <http://www.wrap.org.uk/content/food-futures>



Annex III: List of key societal challenges and related questions as mentioned in the interviews (See Section 2.2 for further details)

United Kingdom

UK-1 efficiency of primary producers, while recognising the associated environmental and societal needs. – Of interest to all in the supply chain. How does improving supply chain efficiency affect the pressure on land use (e.g. by ensuring more, good quality produce reaches the ultimate consumer?)

UK-2 Soil and groundwater remediation is difficult to achieve so best to preserve what we already have.

UK-3 Soil 'Regeneration' – how to increase to Soil Organic Matter in poorer soils, and what level is achievable, desirable, beneficial? Etc. Best practice, costs/benefits in peatland restoration – are there international lessons to learn?

UK-4 Natural systems: A better understanding of how natural systems behave and what processes are operating is needed to understand better the effects of different courses of action. How does soil quality affect the wider system (and vice versa) What are the economic implications of soil degradation, and what evidence and indicators should be used to quantify degradation?

UK-5 Demand for soil/land resources, imports and exports: (the international dimension of food supply and hence food security is important. Need a better understanding of the whole life cycle of food production, transport, consumption and waste to discern the balance between domestic, import and export.

UK-6 Competition between land-uses (land-use conflicts): It is recognised that there are competing and often mutually excluding land uses. How should land use conflicts be resolved? E.g. Is it more appropriate to build on poor quality agricultural soils rather than brownfield land? What instruments are needed to avoid / minimise impacts (feedback to decision-making process). Spatial analysis of distribution and level of Natural Capital to inform decision making. Techniques and technologies to assess (productivity) and value land resources.

UK-7 Targeting outputs: practical, pragmatic effort needs to be expended in targeting outputs to relevant end-users and in linking the fundamental science through to policy and (improving) regulation

UK-8 Competition between land uses (land-use conflicts) : The effects of loss of high quality agricultural land to other land uses, e.g. forestation and to development. There appears to be a lack of research in the UK. There is no research quantification of loss of good quality agricultural land to development.

UK-9 Important areas of technical innovation include new techniques to understand the microbiology of soil to help assess biodiversity and so understanding impacts and optimisation of land management.



UK-10 Landscape scale solution – improve biodiversity and soil management and productivity; funding farmers has modest/ limited impact; LANDSCAPE: WRAP Food futures report. Integration to manage a landscape not the media and not just maximise crop. The role of Precision Agriculture in the improvement/conservation of soil quality – new techniques and technologies to assess/map. Catchment-scale management involving collaboration of individual farmers.

UK-11 assessing the values of primary and secondary production: for example, a high value secondary producer may rely on a relatively low value primary producer, e.g Scottish Barley for Scotch Whisky,

UK-12 Farming practices create valuable (enjoyed) environments – eg uplands and grouse shooting, sheep grazing and patchwork of fields and river margins in the low lands are very dependant on how farmers perceive themselves as guardians to their environment.

Long-time horizons often matter in agriculture – succession from generation to generation is important in some cases, whereas businesses renting land brings about shorter time horizons. Business (land rental over a series of say 3-5 year sequences) and land owning (estate management) objectives need to be managed. How does each of these elements value the other, and how should they value it?

Republic of Ireland

IR-1 (Generic) Risk Assessment of Contaminated Soils. Management of contaminated land varies across Europe. Research is needed to transfer basic tools and processes into an Irish context, eg geology, population, demographics etc from the UK and other EU countries.

IR-2 Pragmatic appraisal of environmental technologies in an Irish setting: there is inertia in the application of technologies such as remediation methods and investigation techniques in Ireland, either because people are unwilling to try 'new' techniques, or try new techniques that are wholly inappropriate – eg for the problematic drift geology in much of Ireland. Pragmatic appraisals of the capabilities and limitations of technologies would help better application.



Annex IVa: Agenda of National Workshop held on 8 & 9 July 2015 at the University of Nottingham

8th July	11:00	Registration
	11:30-13:00	Introduction to INSPIRATION; feedback on ACS, GSW & Policy workshops
	13:00-14:00	Lunch
	14:00-15:30	SRA: Soil and Land Use Research - state of the art in the UK
	15:30 - 17:00	SRA: Future Research Needs
	19:30	Dinner
9th July	09:00-10:30	SRA: UK research capacity and capability
	10:30 - 12:00	Research: Policy Interface - experience and suggestions
	12:00-13:00	Lunch
	13.00 – 14.00	Funding Mechanisms: Current Future, Innovation
	14:00 - 14:30	Implementation

Annex IVb: Summary of INSPIRATION displayed as posters during the UK workshop



INtegrated Spatial Planning, land use and
soil management Research ActTION

Societal Challenges 5: Growing a low carbon, resource efficient economy with a sustainable supply of raw materials

10b-2014: Structuring research on soil, land-use and land management in Europe



www.inspiration-h2020.eu 1

Figure 1 Title Slide



INtegrated Spatial Planning, land use and
soil management Research ActTION

Objectives of Call SC5-10b-2014

- Better **coordination** of often **fragmented research**
- Innovative ways to **mobilise** all relevant **actors**, **increase policy coherence**, resolve trade-offs, manage conflicting interests, increase participation of citizens in decision-making and improve public awareness and business uptake of research results.
- **Creation of European networks to facilitate dialogue among the relevant scientific communities, funding bodies and user communities in Europe**



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Figure 2 Objectives of Call


 INtegrated Spatial Planning, land use and
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Objectives of Call SC5-10b-2014

- Clustering, coordinating and creating synergies between international, European and nationally funded research and innovation actions,
- Developing **joint programmes and projects**,
- Creating links with related international programmes,
- Improve science-policy interface
- Aligning research with decision-making requirements.


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Figure 3 Objectives of Call continued


 INtegrated Spatial Planning, land use and
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SC5-10b-2014: Expected Products & Impacts

- **Network** of funding agencies and other key players in Europe
- **Strategic Research Agenda (SRA)**
- Evidence-based policy and appropriate, cost-effective management, planning and adaptation decisions


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Figure 4 Expected products and impacts



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SC5-10b-2014: Expected Products & Impacts

- Enhanced impact of research and innovation activities through
 - better identification of R&I priorities,
 - improved coordination of EU and Member State/Associated Country research and innovation programmes and funded activities,
- Synergies with international research and innovation programmes.



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Figure 5 Expected products and impacts continued



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INSPIRATION Key Challenges

1. Identify **societal challenges** related to soil, land use and land management
2. Identify **research and stakeholders** for structuring
3. Contribute to **EU policy and research**



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Figure 6 Key challenges

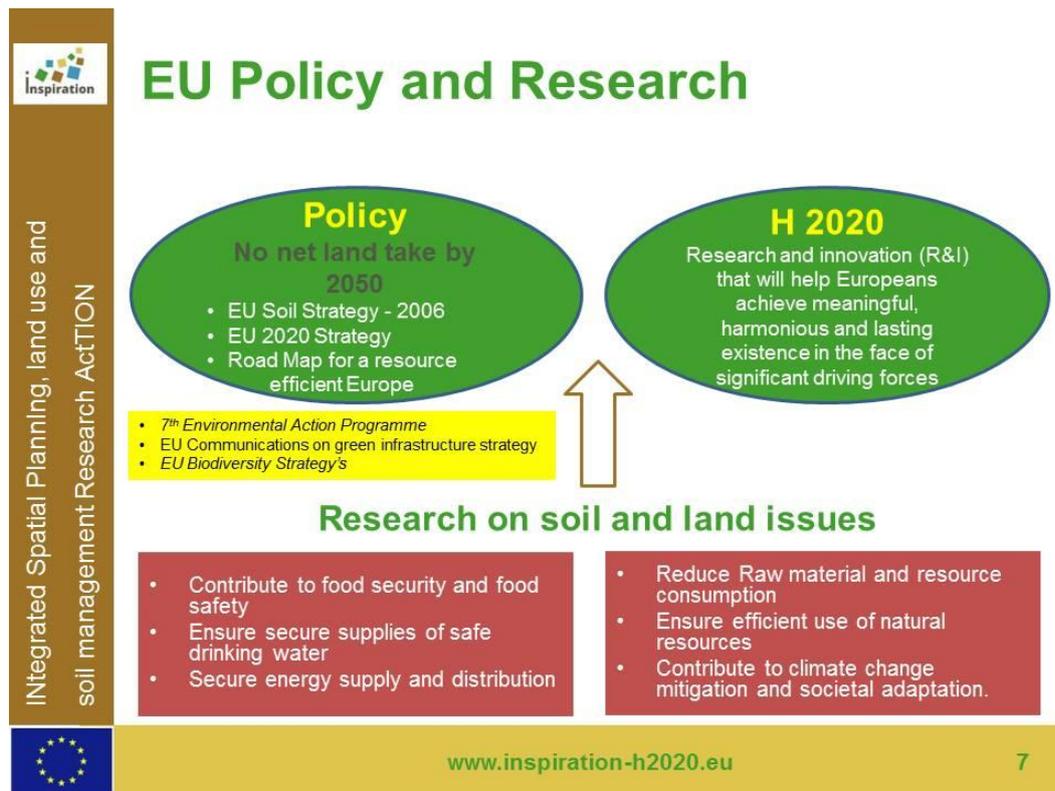


Figure 7 EU policy and research

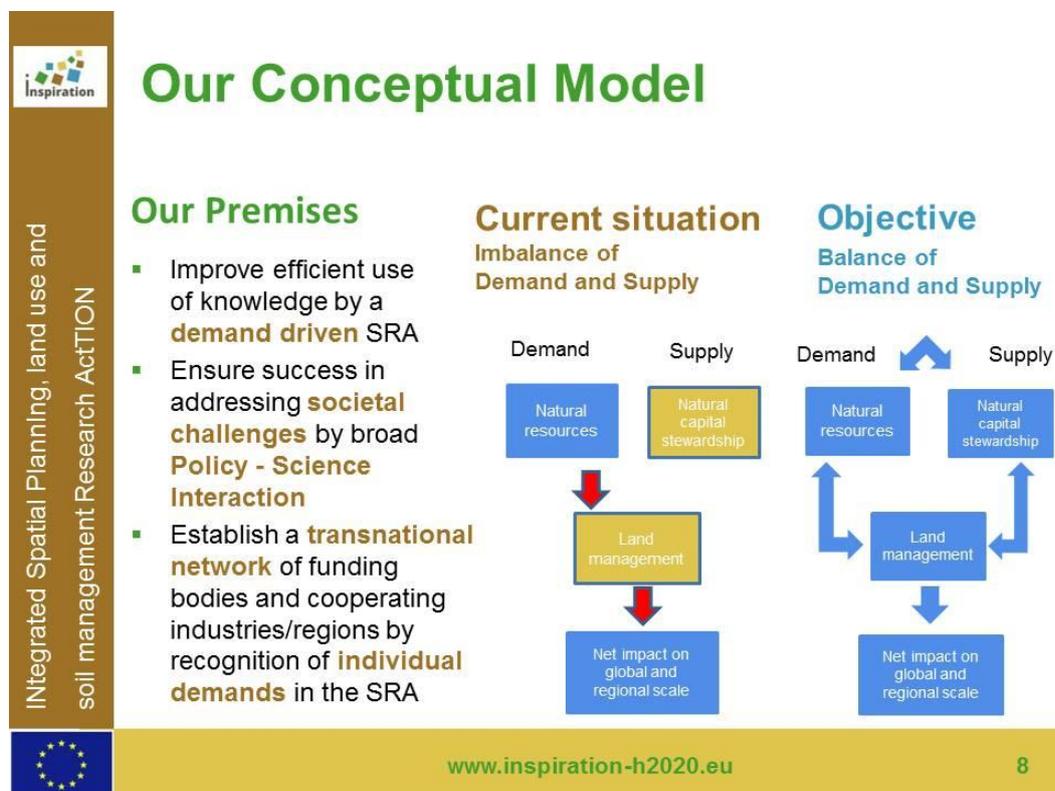


Figure 8 Our conceptual model: Premises

Integrated Spatial Planning, land use and
soil management Research Action

Our Work Packages

WP1: Project management

WP2: Demands of research from industry, end-users and funders

National Focal Points for 16 countries

approx. 20 external key stakeholders per country
in national WS

WP3: Transnational commons aggregated under 4 integrated
themes / 8 thematic issues

4 Theme leaders, one per integrated theme

4 key stakeholders, 1 per theme

WP4: Developing, Delivering and **Match-Making of a Strategic
Research Agenda**

WP5: International Dissemination and Communication

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Figure 9 Our work packages

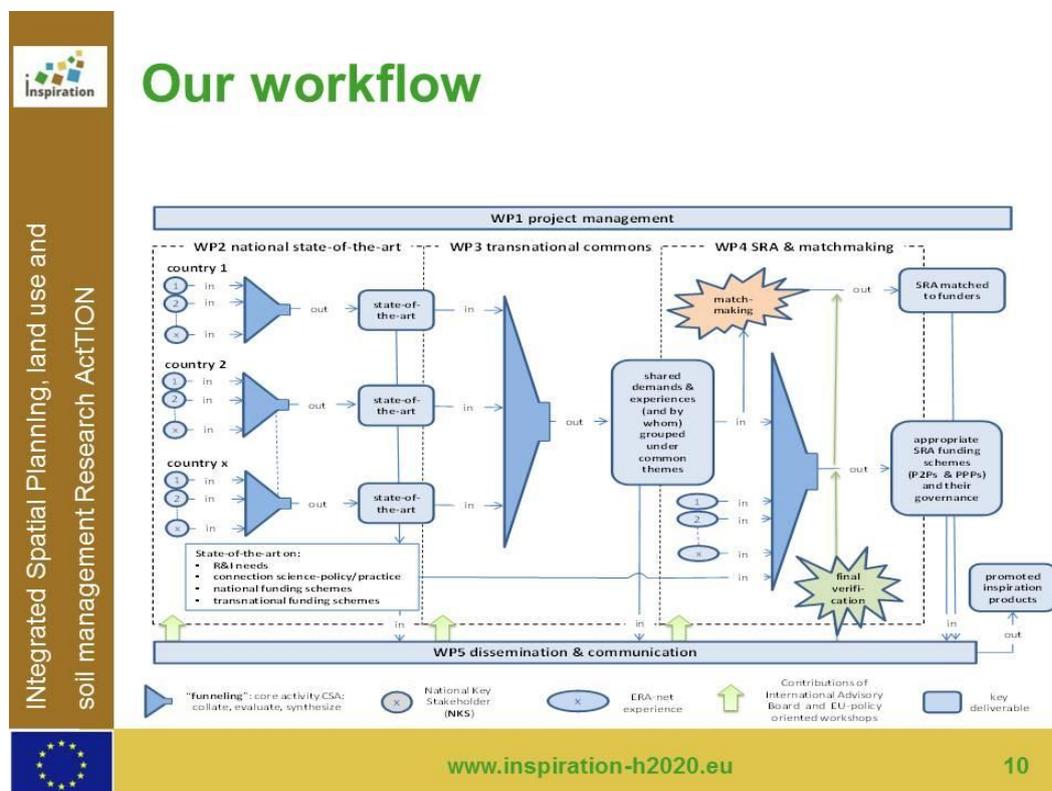


Figure 10 Our workflow



INtegrated Spatial Planning, land use and
soil management Research ActTION

Societal challenges: Urban sprawl

Land

- Biodiversity
- Renewable energy production
- Climate adaption area (flooding)

Agricultural land

- food and or biomass production capacity

More traffic

- more Infrastructure needed

Soil Sealing

- loss of water infiltration capacity
- adverse climate change effects
- diminishing drinking water supply

Loss of soil

- ecosystem services (e.g. carbon storage)
- Less organic matter leads to desertification (requiring extra fertilizer & pesticides)



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Figure 11 Societal challenges: Urban Sprawl



INtegrated Spatial Planning, land use and
soil management Research ActTION

INSPIRATION Baseline

Land and Soil services are fundamental for:

- **Meeting societal needs** (food, drinking water, energy production, shelter, infrastructure)
- Overcoming **societal challenges** (climate change mitigation and adaptation, increasing demands on non-renewable natural resources, environmental justice)

Our Premises

- Improving efficient use of knowledge by a demand driven and **bottom up** SRA
- Ensuring success in addressing **societal challenges** by a **Policy Science** Interaction and **interaction with stakeholders**
- Establishing a **transnational network** of funding bodies and cooperating industries/regions by recognition of **individual demands** in the SRA



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Figure 12 Baseline

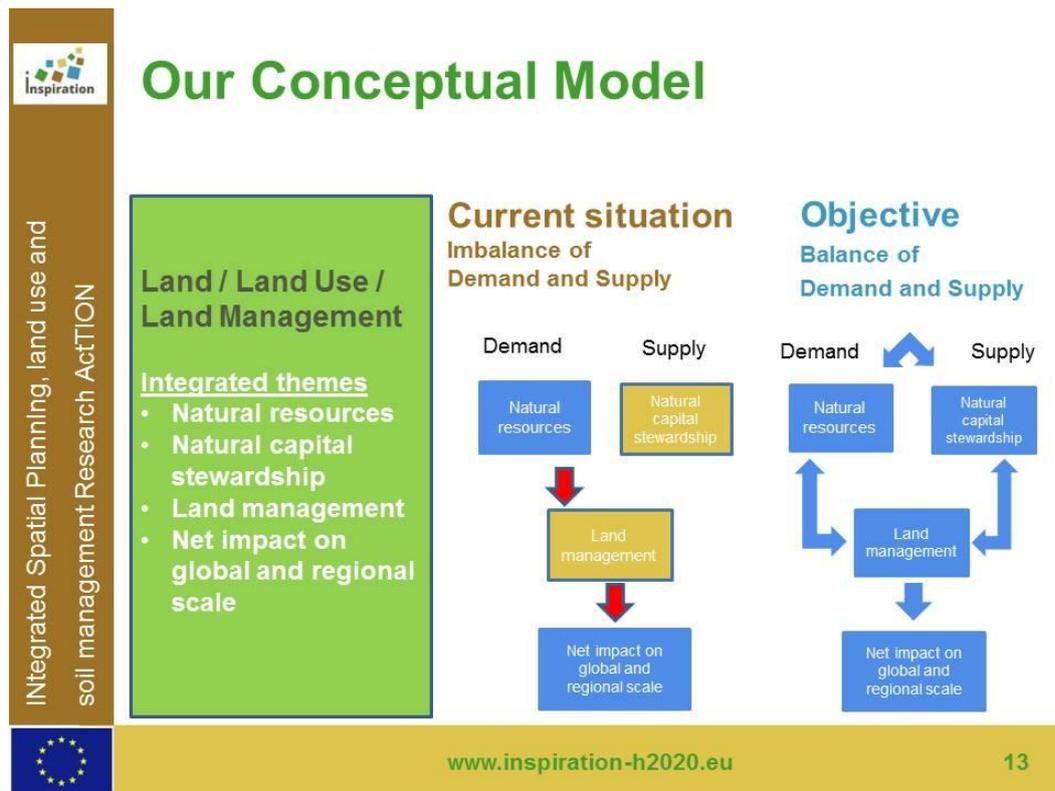


Figure 13 Our conceptual model Integrated Themes

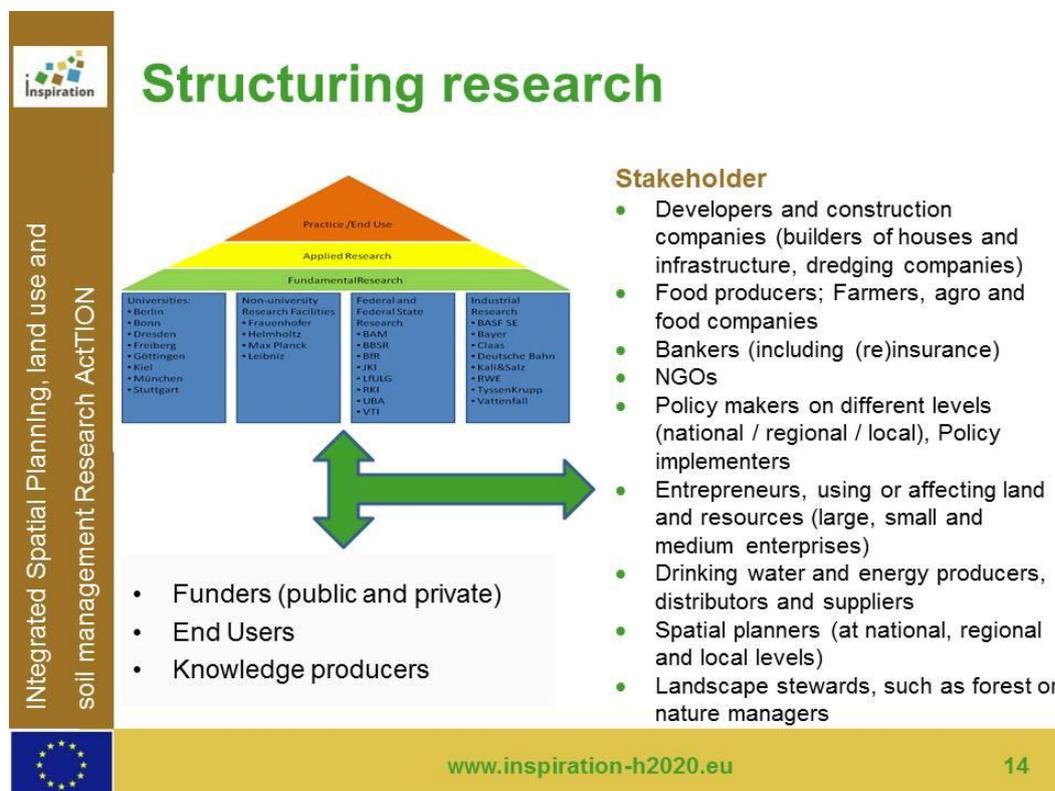


Figure 14 Structuring research

Thematic issues

- 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



Figure 15 Thematic issues

Our Work Packages

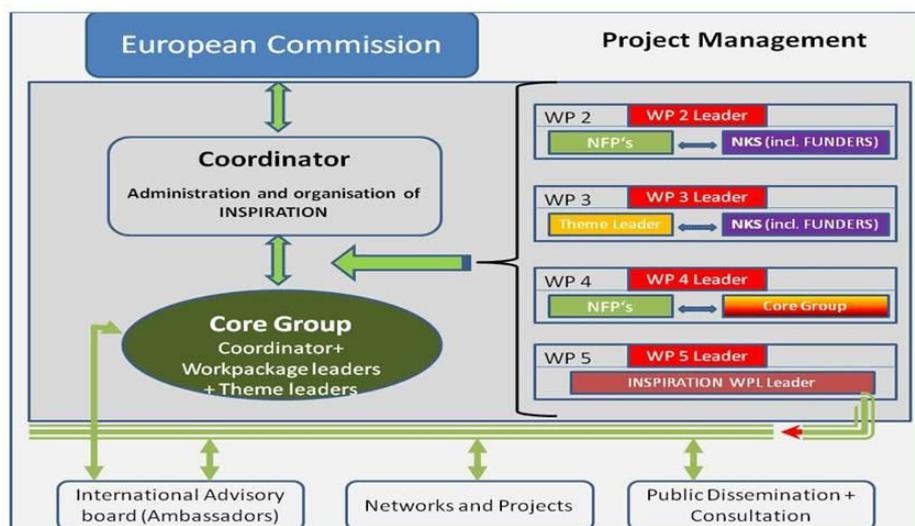


Figure 16 Workpackage linkages



Annex IVc Delegates at the National Workshop

Name	Organisation	Country	Nature
Pól Ó Seasnáin,	Ireland EPA	Ireland	Regulator
Danielle Ashton	EA	UK	Regulator
Michael Williams	Landmark Information	UK	End user
Rob Sweeny	CL:AIRE	UK	Researcher
Rob Howells	NFU	UK	End user
Stephen Austin	Bramcote Community Association	UK	End user/ citizen
Richard Boyle	HCA	UK	End user
Euan Hall	Land Trust	UK	End user
Andy Moffat	BLRS	UK	Researcher
Matt Ashmore	University of Nottingham	UK	Researcher
Paul Nathanail	University of Nottingham	UK	Researcher

The names of those invited but were unable to attend or declined to attend are not listed above. Some of the invitees were interviewed as National Key Stakeholders.



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