INtegrated Spatial PlanniNg, land use and soil management Research ActTION

INSPIRATION – Towards a Strategic Research Agenda on Soil, Land-Use and Land Management in Europe

On behalf of INSPIRATION consortium

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EEA Scientific Committee seminar "Land as a resource"
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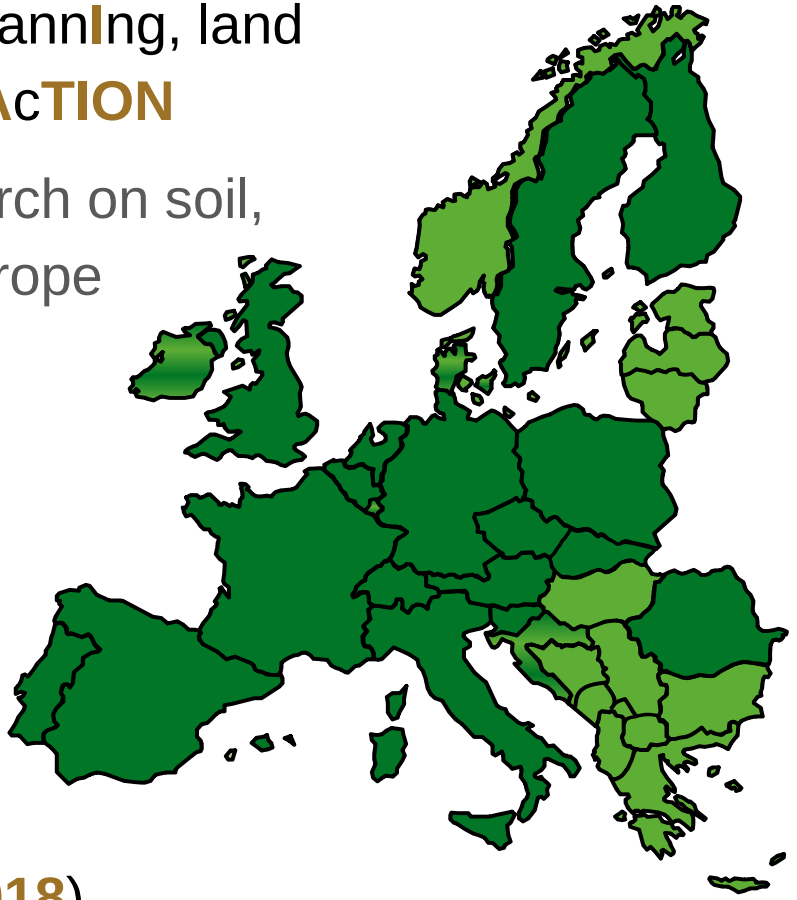
INSPIRATION

- **INSPIRATION** = **IN**tegrated **S**patial **P**lann**I**ng, land use and soil management **R**esearch **A**c**TION**
- Call SC5-10b-2014: Structuring research on soil, land-use and land management in Europe
- **17(+4) countries** and Advisory Board
- Coordinated by
  German Environment Agency
- Funded by EC as Coordination and Support Action under Horizon2020 grant agreement No. 642372
- Duration: 36 months (**03/2015 – 02/2018**)



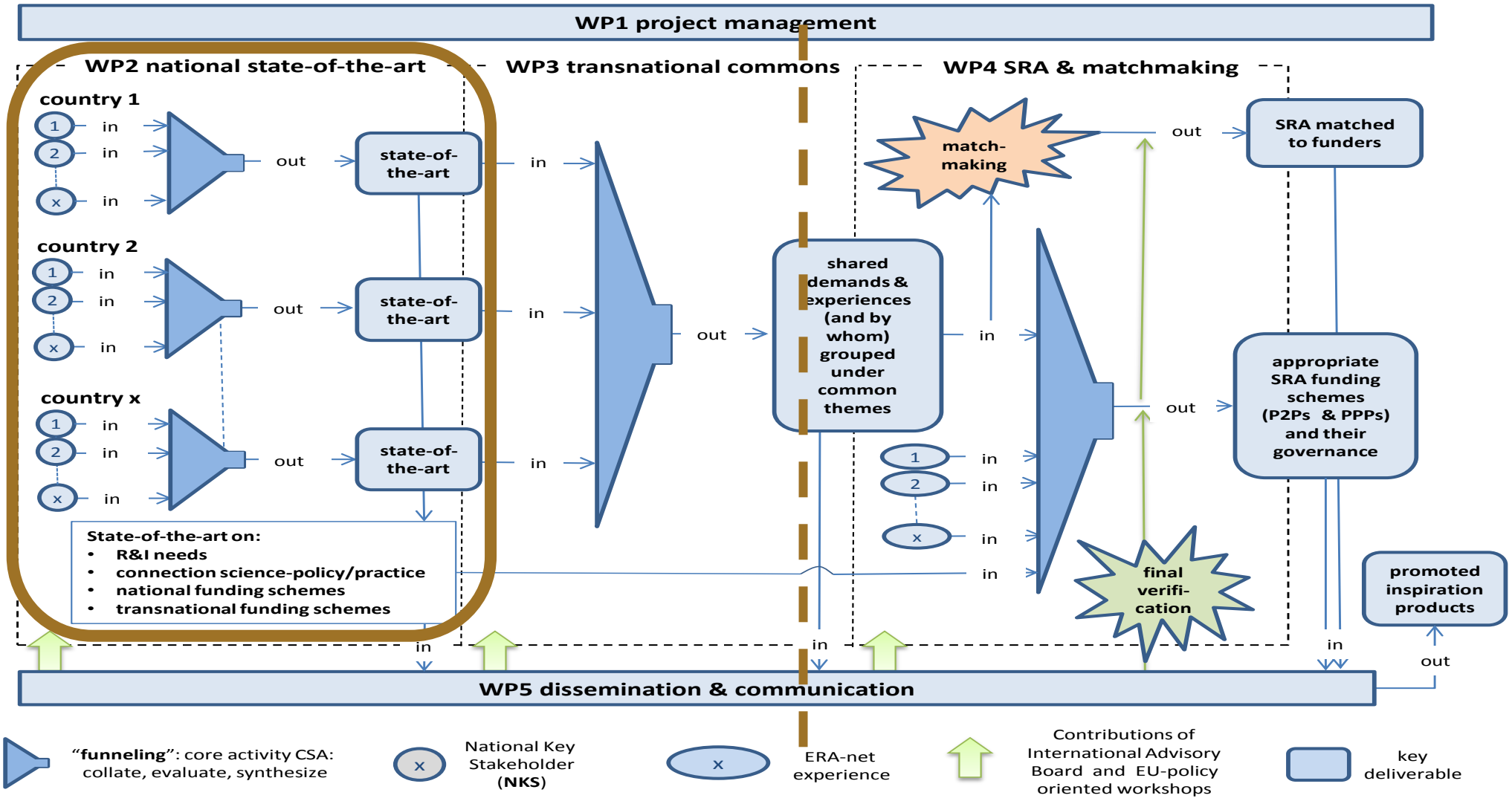
INtegrated Spatial PlannIng, land use and soil management Research ActTION

INSPIRATION goal

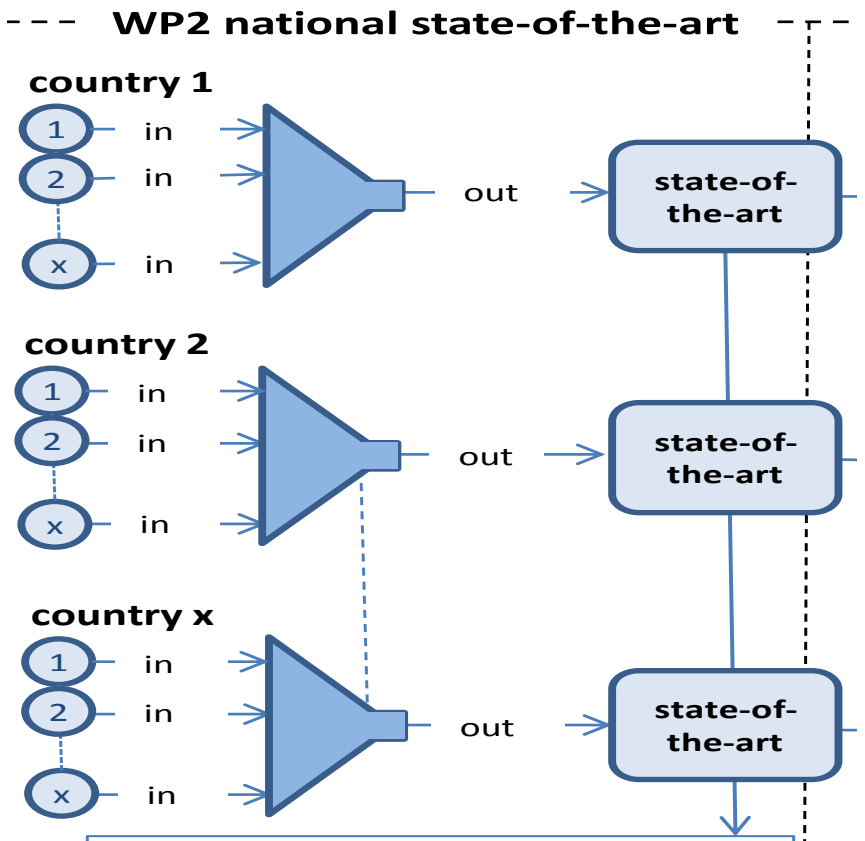
- **Establish & promote a Strategic Research Agenda (SRA) for Europe**
  - for **land use, land-use changes and soil management**
  - considering current & future **societal challenges***
  - Bottom-up and **demand-driven**
  - Establishing a **transnational network**

* In particular SC5: Growing a low carbon, resource efficient economy with a sustainable supply of raw materials

Workflow October 2016

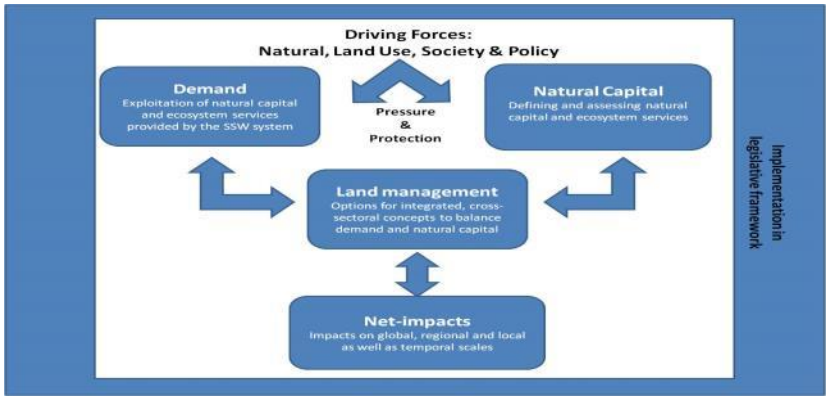


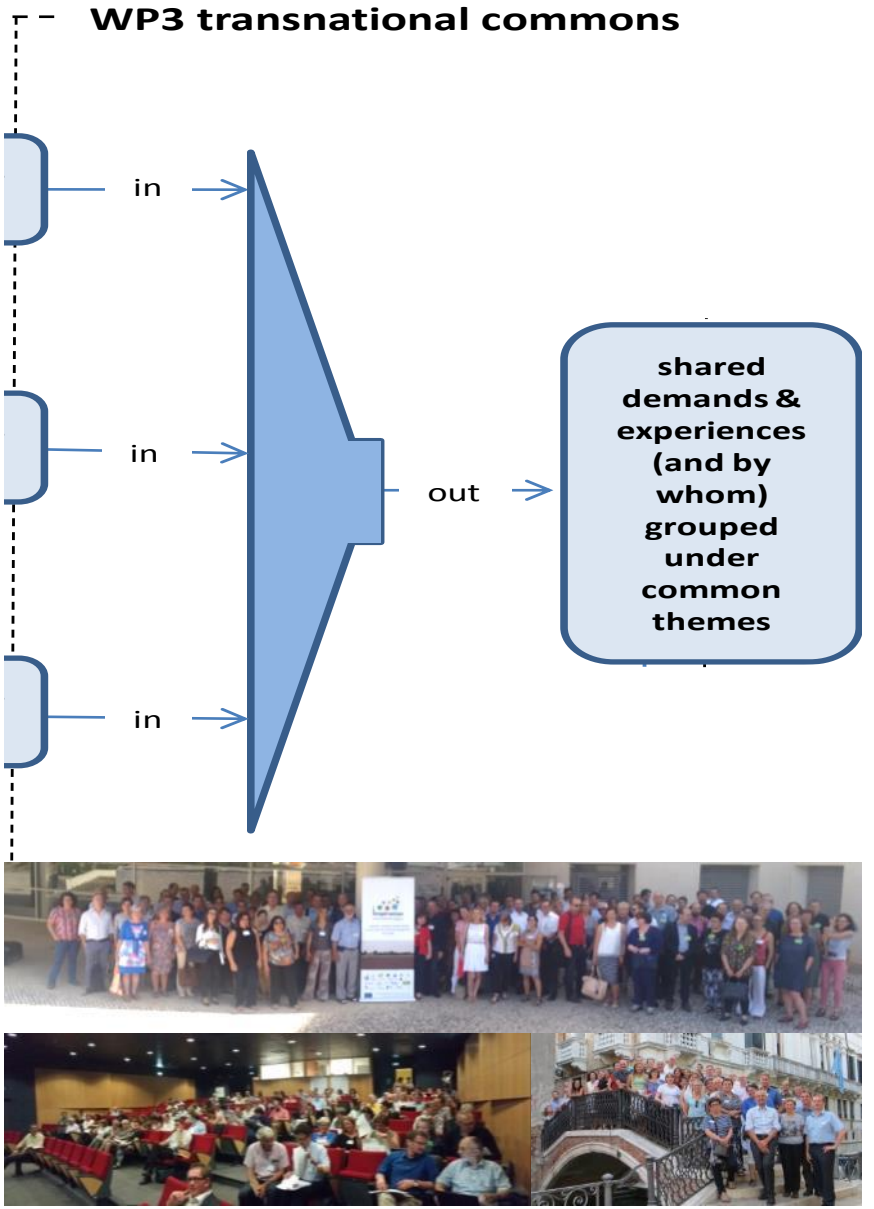
Workflow WP2: National Demands of research from industry, end-users and funders



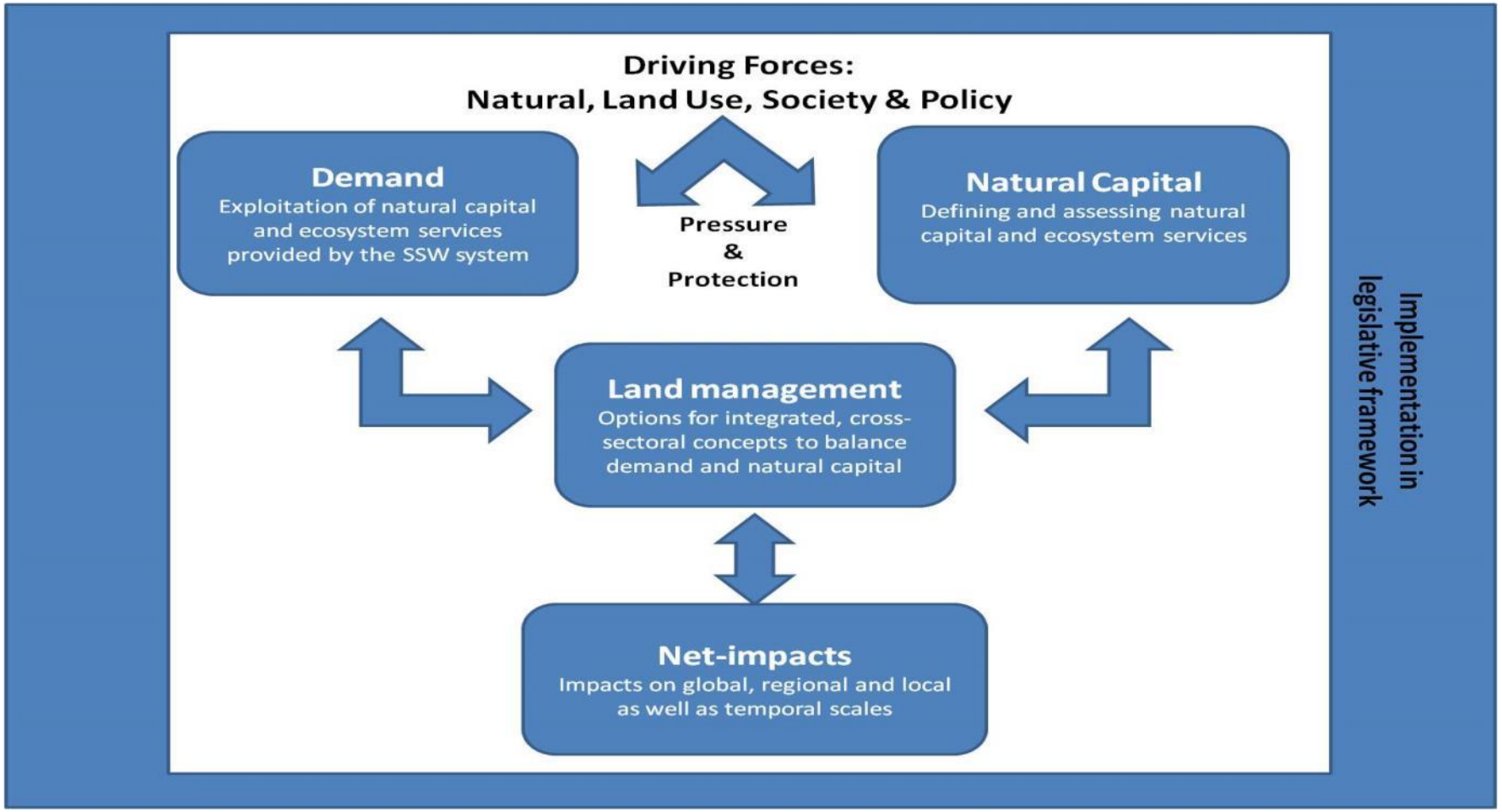
Workflow WP3: Transnational commons aggregated under integrated themes

- Demand orientation
- Clustering of topics to conceptual model

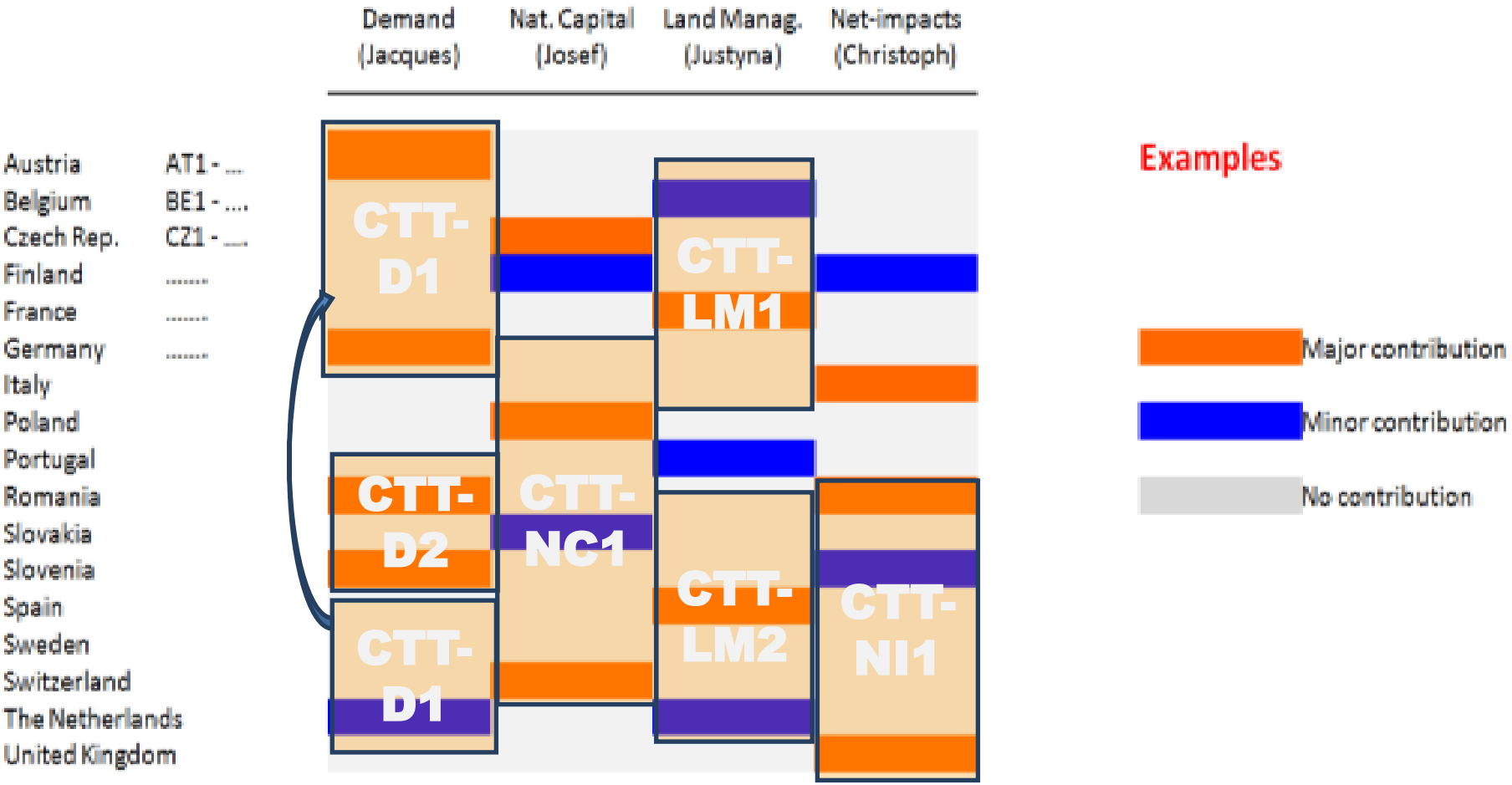




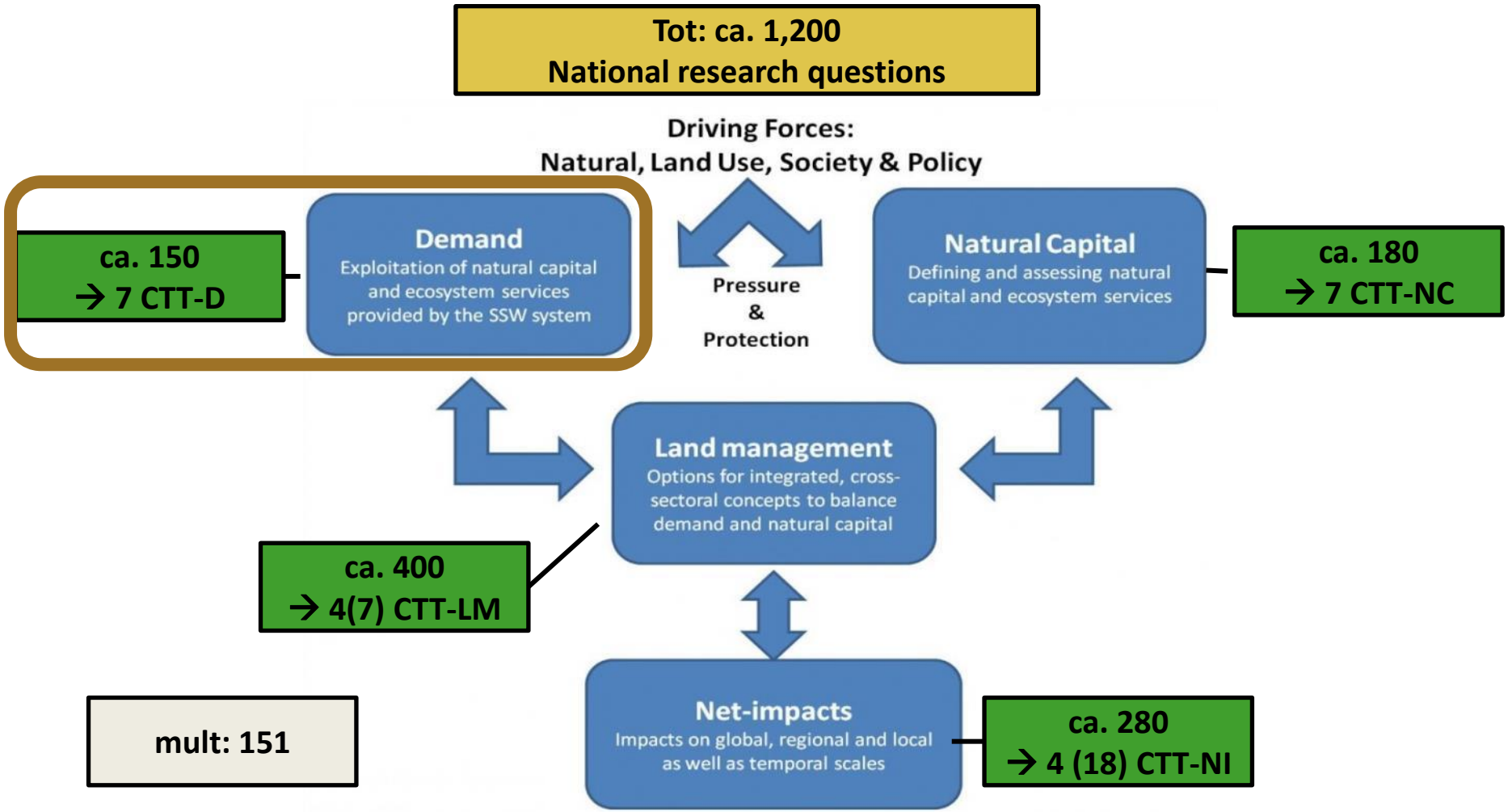
INSPIRATION Conceptual Model



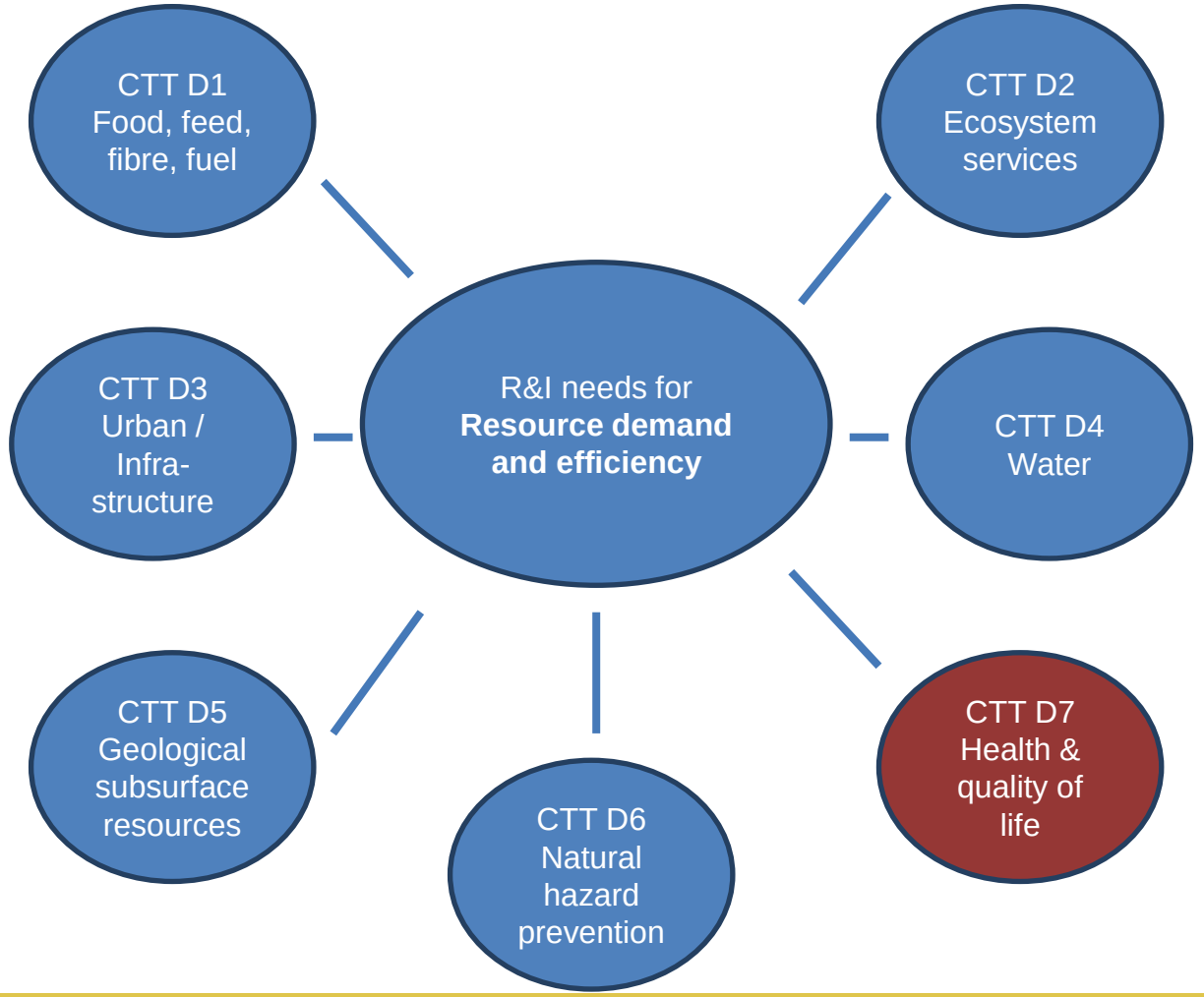
Clustered Thematic Topics – CTTs



Overview of identified CCT per theme



CTTs Demand


CTT D1
Food, feed, fibre, fuel
CTT D2
Ecosystem services
CTT D3
Urban / Infra-structure
R&I needs for
Resource demand and efficiency
CTT D4
Water
CTT D5
Geological subsurface resources
CTT D6
Natural hazard prevention
CTT D7
Health & quality of life

CTT-D 7
Health and quality of life

CTT D7
Health &
quality of life

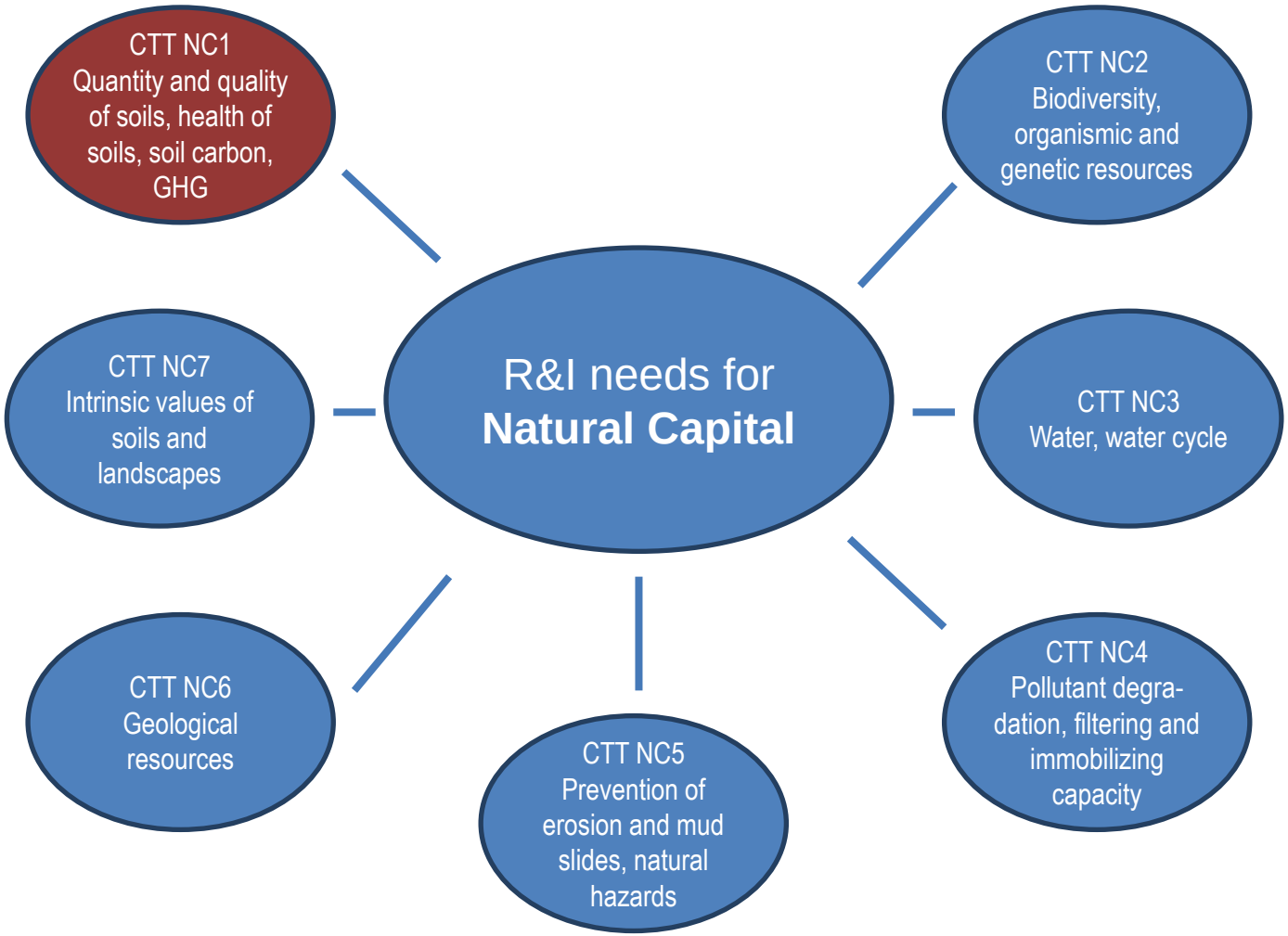
- Environmental quality and wellbeing are essential factors for living.
- Challenged in deprived urban areas, rural areas characterized by intensive agricultural land use.
- Research and practice often separated (medium, politics, discipline).
- Integrated approach requires data, indicators and related tools - integrative, practical and able to be communicated to the public and decision makers
- Example research questions include:
  - How clean is clean?
  - Food first? How prioritize soil and land use?
  - Trends in demands (e.g. diets, energy, urbanization)?

CTT-D 7
Health and quality of life

CTT D7
Health &
quality of life

AT-13:	How can uniform laws and regulations for soil management and spatial planning be achieved in Austria? What pre-requisites are necessary?
AT-14:	How can we resolve conflicts of interest around soil as private property with public value? How do we handle land use rights and public interest legally?
BE-5:	The combination of soil and sediment remediation with other activities (e.g. energy production) could give a positive imago to remediation actions which are usually only considered as a “cost”. It can also inspire and convince “less experienced” countries/regions/enterprises to start with remediation. What kind of research is needed to develop and test the win-win-situations and disseminate the knowledge and inspiring examples?
BE-18:	What is the potential of soil biodiversity for the development of new pharmaceuticals?
CZ-6:	Cities need to communicate their attractiveness to potential tourists, but also problems to be solved to local population. Such communication flow, which enables participation of local population in public matters, is still quite underestimated. Marketing of cities/urban regions is the topic, which needs more attention. This is mainly case of rather smaller cities.
FI-9:	How will the continuation of the urbanisation process change the need for natural resources and ecosystem services in the future? How to better understand processes and interconnections related to urbanisation?
FR-1:	Increase in research type questions on landscape planning about trade-offs between wellbeing and cost of services in low density areas, carbon foot print of commuting, and more specifically for soil about trade-offs between wellbeing and food supply (it’s cheaper to build settlements on flat areas, which are also those with the higher crop potential).
IT-1:	Genetic selection practices and techniques: The challenge of Genetically Modified Organisms is to mitigate farming impacts and to increase crop production; GMOs are able to make plants more resistant, so reducing the use of chemicals. In Italy GMOs field trials are forbidden, but genetics is a research priority for some NKS
PT-3:	Strategies for minimization and remediation of soil/water pollution: Assessing the main pollution sources (activities), the pollution hotspots and new (emerging) pollutants to understand the dimension and trends of the issue.
PT-5:	Integrate green-infrastructure in spatial planning, identifying and mapping green infrastructure elements and requirements/opportunities to understand the current state of green infrastructure and to estimate its value under different scenarios.
RO-2:	Improve the level of awareness and understanding regarding the environmental benefits of organic farming in agricultural schools and universities and among farmers by a multi-leveled curriculum developed for technical, vocational and continuing training.
SI-1:	Comprehensive understanding of the concept of healthy living environment. There is a lack of comprehensive understanding what the healthy living environment is, how it is related to the spatial, social and other contexts and, what are the aspects and relationship between urban development and health/wellbeing.
ES-3.1:	Life cycle thinking applied to land use. It relates to the efficient use of resources, i.e. the consideration of the 4Rs concept (reduce, reuse, recover, recycle) to non-marketable products such as land, and minimizing generation of waste and emissions)
ES-3.12:	Relationship between climate change and tourism: R&I topics. This is a critical issue in coastal areas in particular and more research is required in terms of adaptation (beach defences, adaptation in residential areas)
ES-4:	ICT knowledge applied to the development of early warning systems. It relates to the need of improving methodologies in land use planning and land-use management with better integration/consideration of risk parameters, i.e. vulnerability and risk due to impacts of climate change, floods, fire, landslides, summer tourism peaks, depopulation etc. need of RTD for developing key indicators and associated metrics and threshold values. Need for short-medium and long term indicators depending on risk parameters
SE-3:	How to assess the intrinsic value of the environment, e.g. the value of nature in areas sparsely populated (today) in comparison to densely populated areas or the value of nature for today’s population versus future generations?
SE-7:	Research related to the “risk concept”: Probability and consequences; what are acceptable levels of risk? How can we “live” with risks? Individual or societal level views in risk assessment. What is the intrinsic value of the environment?; What environmental ethics aspects are relevant in contaminated land management and how can we take long term responsibility for “new” solutions – in the light of history and related to the use of ecosystem services; How can we re-use excavated soil and minimize excavation of “clean” soil. How can we make use of contaminated sites as such (fit-for-purpose).
CH-2.1:	Develop visions for spatial planning: Develop visions of how land in Switzerland is to be used in future, how cities and municipalities are to be planned, how the landscape in Switzerland is to be developed, and how mobility in the country is to be refined.
NL-1:	What are trends in diets and what do they entail for soil and water use and health. How can people be convinced to change to a diet with less animal proteins?; Who are the winners and losers in the food chain in the transition to a more healthy (for people and the environment) diet and sustainable agriculture? How to take care of the losers? What can be the role of the common agricultural policy (CAP) in this transition?
NL-2:	How can we improve the quality of life in rural areas by making the best use of the soil-sediment-water system and land management, taking into account natural and cultural values and economic and social factors that determine the location of businesses and individuals?
NL-15:	What is the vision on the use of space in the Netherlands (this vision needs to address sustainable urbanization, the future of the agricultural sector, the role of landscapes and the place of subsurface functions (and ecosystem services) in relation to land)?
UK-8:	Many forms of land use are possible on any specific parcel of land but not all are necessarily desirable… there.

CTT-NC Natural Capital



CTT-NC 1
Quantity & quality of soils

- Soil quantity (m^2) AND quality are essential in agriculture and forestry as well as for housing, firms and infrastructure.
- Scarcity of land (with an adequate quality) triggers land use conflicts.
- Sustainable land use concepts are of paramount importance.
- Fertile soil provides structures (e.g. habitat for organisms) and functions (e.g. catalyse biogeochemical cycles; ability to store carbon).
- Example research questions include:
  - What are soil functions driving soil ecosystem services?
  - What is potential and limits of soil in carbon cycle?
  - How to assess, monitor health of soils?

CTT-NC 1
Quantity & quality of soils

CTT NC1
Quantity and quality of soils, health of soils, soil carbon, GHG

AT-7: (i) Develop a guideline to assess the soil quality on large construction sites in view of resilience. (ii) How can re-cultivation of soil be achieved in a way to save the most resources? (challenge: to achieve this for large construction sites as well as for small gardens; assess the added value for spatial planning). (iii) Assessment of pollutants (e.g. long-term impact of heavy metals or pesticides in soil; pollution load of high current masts, wood impregnation)

BE-10: Models calculate the C-evolution in soil. How should the model results be monitored in the field allowing an evaluation of these models? How can soil help to reduce the impact of climate change? The C-storage capacity of specific soils needs to be quantified. LULUCF: mapping Land use, Land use Change and Forestry on European level: (i) Data on land use and on land use change, (ii) Data on the evolution of C in soil, (iii) How to process and analyse these data? How to conclude on measures needed?

BE-15: How to raise awareness on the importance of soil, sediment and their (ecosystem) services? How can we highlight its/their positive and fundamental role in order to protect (and restore) them? How to map and assess soil ecosystem services? How to value soil ecosystem services? All stakeholders (including policymakers) need to take into account the value of the different soil ecosystem services in their processes and projects: how to do that?

FI-4: How do soil biogeochemical cycles operate as a whole and how can their resilience be determined?

FI-5: What is the amount of soil carbon storage and how does it change in areas of different land use?

FI-6: In what ways will forests and mires change along with climate change, what are the consequences of the changes and how to prepare for them? Through what ways can decentralised, resource-efficient bioeconomy enhance the viability of regions?

FI-7: How to assess the resources of soils to foster productivity in different types of areas and according to soil properties and biodiversity?

FR-1: Assessment of ecological state or soil quality by choosing specific criteria, in relation with French policy (law on biodiversity). Focusing on compensation structures.

FR-2: Understand soil carbon dynamic in the critical zone, biogeochemical mechanisms involved using integrated approaches and new tools. Need to research substitution solutions to conventional herbicides, insecticides and fungicides, antiobiotics. Need to research alternative solution to inorganic nitrogen and phosphorus fertilization.

FR-3: Better knowledge of natural environment, kinetics of pollutants transfer in soils (in particular urban soils), development of models integrating all the critical zone compartments (biological, mineral, atmosphere, hydrosphere). Characterization and evaluation of the hazard of new pollutants (emerging / persistent) especially in groundwater. Characterization of diffuse pollution: on line monitoring, in situ metrology, integrative/passive sampling.

FR-4: Set up monitoring devices of soil conditions, the balance genesis vs erosion, the carbon content and carbon stock and the GHG emissions using instrumentation at different scales.

DE-4.1: How can we maintain soil quality in Europe and worldwide (system understanding) and how can we secure the status (monitoring)? When will system boundaries of soil quality be exceeded, e.g. intensive uses (system understanding) and can we quantify these (tipping points)?

DE-4.2: What effects do climate change and climate extremes (erosion events and the loss of humus, intrusion of materials beyond system boundaries) have upon the quality of soil and how can we quantify and foresee these effects? How can we connect soil quality goals such as erosion protection and carbon dioxide sequestration to each other and integrate them into land use concepts? What potentials exist to reach out to various societal groups for the securing of the soil quality and to integrate them into the evaluation process of soil quality?

DE-4.2: What quantitative threshold values exist for the securing of soil quality and how can we quantify and integrate these into a sustainable soil and land management? In this context, how can we better understand the ecological structures of soil organisms and the role they play in the maintenance of soil quality and in turn use this understanding?

DE-4.2: How can soil quality goals take into consideration the anthropological input of harmful soil material and create a transparent basis for the evaluation of soil pollution as well as create the respective pollution-related measures for the various sources of these elements? How can soil quality be renovated and degraded land areas be brought back to value again?

DE-4.2: What contributions to an improved system understanding can offer experimental approaches (Ecotron, FACE/FATE units, long-term study, experimental agricultural operations, Reallabore)?

PL-3: A multi-functional role of soil in urban areas becomes more and more important especially in the climate change conditions and the need for adaptation to this change. Also agricultural valuable soil is threatened in urban areas. In Poland 30% of agricultural land is within urban areas. On urban areas an ecosystem should be kept, better soils should be protected on these areas to keep the habitat, to provide ecosystem functioning. There is a need for raising awareness among administration and land use planning professionals on the role of soil in urban areas. Therefore there is a need for better identification and evaluation of the role of soil in urban areas.

PT-1: Assess key indicators of soil quality (chemical, physical, and biological properties) and carbon sequestration potential.

PT-2: Evaluate the potential productivity of land, which cultures can be successfully adapted to local conditions and waste compost alternatives.

PT-4: Identify and investigate the desertification effects, analysing economic impacts (e.g. in terms of soil ability to support current and future crops), environment issues (e.g. ecological misbalances) and social impacts (e.g. human health, migration).

PT-3: Identify pollution impacts on natural resources, understanding how it affects the provision of ecosystem services (analysis of ecological, social and economic aspects).

RO-2: Organic farming: The key questions/issues to be answered on this topic are related with (i) establish at least two long term trials/demo fields (in plain and hilly side of the country, respectively) for organic vs. conventional farming, to get a multidisciplinary approach in terms of soil quality, environmental impact of inputs use, energy consumption, productivity levels, biodiversity conservation or restoration and trends of GHG emissions, (ii) improve the level of awareness and understanding regarding the environmental benefits of organic farming in agricultural schools and universities and among farmers by a multi-leveled curriculum developed for technical, vocational and continuing training, (iii) develop a large-scale research, extension and implementation program for small and medium grassland holdings converting to organic farming and (iv) develop a private-public partnership cluster research/inspection bodies/farmers associations for organic farming inputs certification.

RO-3: Raw material and resource consumption. Nutrients: maintain and improve soil fertility under the increased demand of higher yields and increased rates of nutrients export. The related key questions/issues refer to (i) the optimized use of synthetic fertilizers under the global climate change impact, (ii) waste recycling: a better use of soil as bio-geo-chemical reactor to prevent its contamination and sustain its productive potential and (iii) climate change: how soils productivity and resilience will be affected?

SR-7: Approaches, methods and instruments for identification of complex caring capacity of urban landscape and for monitoring and provision of the data on environmental quality incl. the risks accessible for all stakeholders in real time.

ES-3.13: Better understanding of the cause-effect relationship between soil degradation and health/quality of life would enable decision makers to manage land with more security on short medium and long term. Clear understanding and low uncertainty on health impacts would favor swift decisions and flexibility in delivering permits for specific uses on land for limited periods (interim use of land) and (if necessary) under specific servitudes.

ES-3.15: New metrics are required in response to new challenges i.e. climate change adaptation, ecosystem services). There is a need to better understand and monitor the relation between policies and soils uses and the derived impacts for resources, environment (i.e. ecosystem services) and society – i.e. climate change policies. Need for developing a whole new "value" framework, enabling better balance of benefits vs costs (i.e. valuation of benefits on the long term are difficult to assess and are more often underestimated; i.e. "bank rate", so that actual costs and benefits do prevail vs future benefits. CBA alike tools should give more weight to health and environment parameters vs economic parameters. Valuation frameworks should also take ethic parameters into account. There is a need for further research on the development indicators that better respond to regional specificities. This could be illustrated in the context of the WFD and the assessment of ecological state of water bodies. The regional specifies of certain water bodies and systems may require the development of specific indicators.

SE-5: What are the functions of different kinds of organisms and populations in real production systems? How can crop species and varieties, and livestock species and breeds, be adapted to new climatic conditions, such as higher temperatures, longer drought periods and extreme weather events, and what is the potential for domesticating 'new' species, e.g. to utilize marginal areas or organic waste? How can resource use efficiency and production be increased on agricultural land while maintaining ecosystem services, biodiversity and animal welfare? How can integrated systems, at different scales, for crop, livestock and energy production be designed and evaluated? Which options for new land uses are available and what are the potential advantages and disadvantages of using more land for different types of agricultural production?

SE-6: Is the long-term sustainability of base cations threatened by biomass removal and how does this affect soil and surface water acidification? How is biomass grown and utilized as efficiently as possible from an economical as well as environmental viewpoint and how can forest residues, for example stumps, be used in bioenergy production (in a lifecycle perspective)?

SE-8: Which are the functional links and causal relationships between biodiversity, ecosystem functioning, ecosystem services and benefits? How can ecosystem functions in practice be measured and compared and how can awareness be raised of what can be measured at present? Which are the thresholds related to ecological and social resilience, with focus on how the concept resilience can become operational and used as a communication tool? How can/is/should less evident/visible ecosystem functions and services be included/accounted for, such as soil processes and certain cultural ecosystem services?

CH-3.2: Material flows in the soil: (i) Role of soil organic matter: Gain a better understanding of the role soil organic matter plays in the soil and its impacts on the agricultural production. (ii) Quantitative change of material flows: Study how the quantity of material flows changes under modified conditions. (iii) Impact on biochemical processes: Understand how the bio-geochemical processes in the soil can be impacted and controlled.

CH-3.3: Impact of stress factors on ecosystems: (i) Dynamics and connections in the Soil-Sediment-Water-System: Gain a better understanding of the dynamics and connections in the Soil-Sediment-Water-System. (ii) Material flow of pesticides and antibiotics: Gain a better understanding of the material flow of pesticides and antibiotics in ecosystems across all environmental compartments. (iii) Methods for measuring contaminants in ecosystems: Improve and supplement the methods for measuring contaminants in ecosystems through biological indicators (biological tests). Study the effect of pesticide components (e.g. neonicotinoids) on ecosystems. (iv) Effect of climate change on the Soil-Sediment-Water-System: Study the effect of climate change on Swiss agriculture and its impact on the Soil-Sediment-Water-System.

CH-4.1: Soil Data: (i) Data acquisition and interpolation methods for soil maps: Develop new, feasible data acquisition methods using drones and satellites for digital soil mapping. Develop new and improved interpolation and modelling methods to obtain area information from point data. Integrate these new methods into the conventional soil mapping methods. (ii) Improve the soil information data base: Use conventional mapping of new soil points to improve the data density.

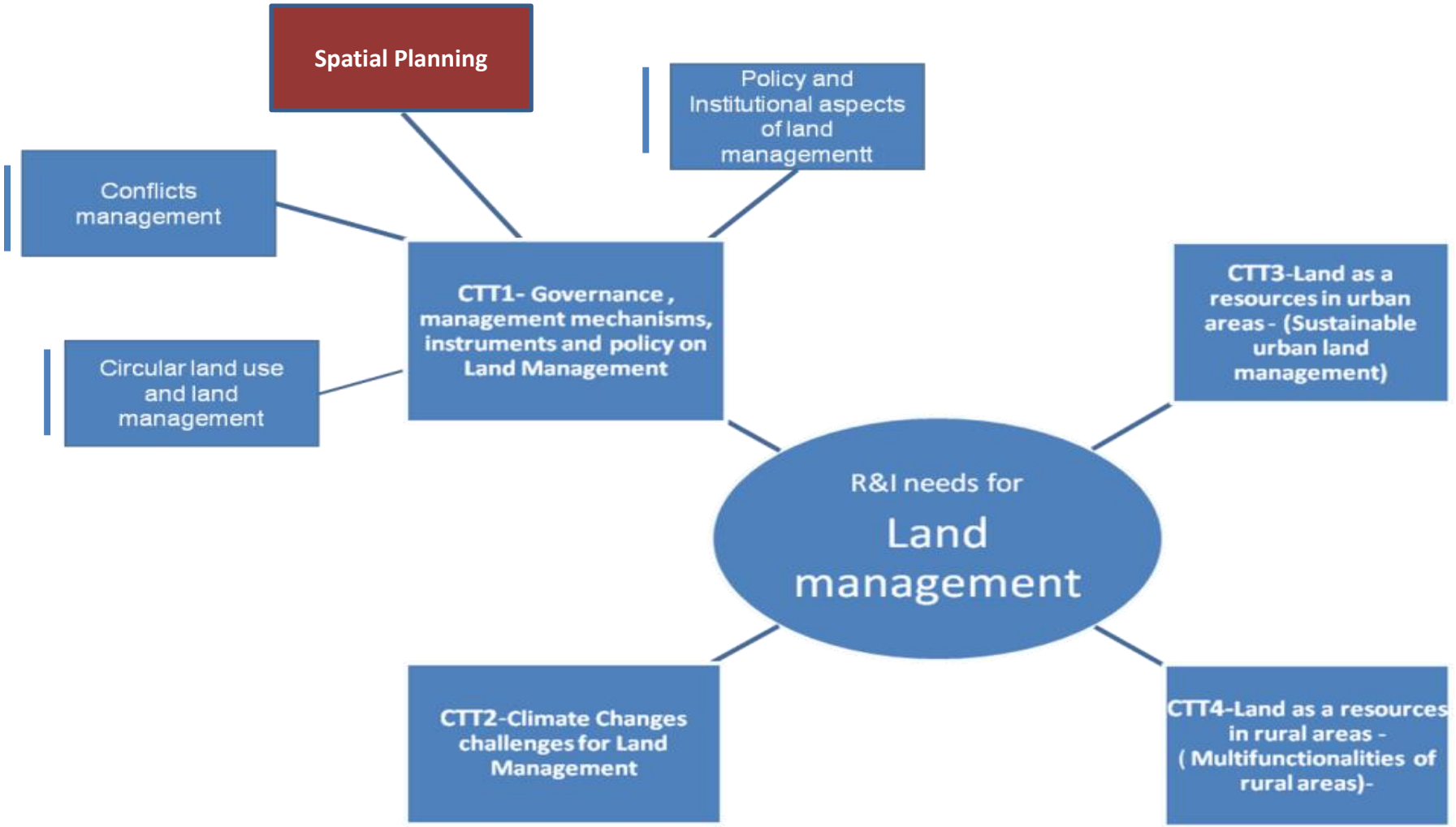
CH-4.4: Harmonisation: (i) Missing basis documents on the Soil-Sediment-Water-System: There is a lack of basis documents interlinking soil, sediment and water. (ii) Missing harmonisation in the field of ecosystems: Standardise the vocabulary used by different scientific disciplines and also by the administrative authorities. Standardise the sampling methods between cantons and between states for collecting ecosystem data. Standardise the methods for assessing and analysing ecosystem data. Develop binding standards for biological tests to identify stress factors in ecosystems. (iii) Missing harmonisation in the field of soils: Develop binding soil description standards. Bring existing soil data records together. Coordinate the soil strategies between different states.

NL-1: What is a healthy soil? And, more specific: What is the condition of the soil (soil life, structure, quality, amount and quality of the soil organic matter etc., integrated fysical-chemical-biological) connected to the agricultural function and other ecosystem services (water storage, biological control, soil fertility, productivity, etc.)? How can natural processes being used to recover degraded soils and maintain healthy soils? What is the effect of good soil quality for emissions of nitrogen and phosphate from agriculture and horticulture?

NL-3: Elaborate how the soil-sediment-water system can contribute to challenges posed by climate change. Specific research questions: (i) What opportunities do soil and subsurface offer for climate adaptation and mitigation (optimising land use to lower greenhouse gases, increase organic matter content, decrease the loss of organic matter, increase water storage potential, water safety, stability of soil, etc.)? (ii) Is organic matter the point of reference for climate change for the soil sector?

NL-13: What is the (main) contribution of the soil ecosystem to natural capital and which are the system characteristics determining this? How can we optimize or recover system characteristics features? Is organic matter such a system characteristic (role of organic matter for soil functions: soil fertility, infiltration, carbon storage, filtration, soil resilience)? What is the significance of soil (life) for societal challenges? What can be an indicator for good soil quality and can it used for communication, monitoring and threshold value?

CTT-LM Land Management



CTT-LM 1.2
Spatial Planning

Spatial Planning

- Spatial relationships between societal needs, economic activities and natural capital stewardship to regulate use of land balancing private and public interests.
- Soil protection in spatial planning varies from system to system.
- Growing complexity and speed of changing processes require real-time and flexible response to problems and opportunities.
- Multi-purpose support strengthening the ability to deal with spatial, temporal and sectoral interdependencies
- Operational elements of spatial planning, e.g. new agencies and revolving funding instruments, are required.

CTT-LM 1.2
Spatial Planning

Spatial Planning

SI: How to improve spatial planning effectiveness to respond to social challenges?

FI: How to consider soil & water-related ecosystem services in land use planning?

BE: How to develop decision supporting tools to optimize land use and spatial planning, taking into account different societal needs at system level? How to link spatial planning with environmental concerns and raise awareness?

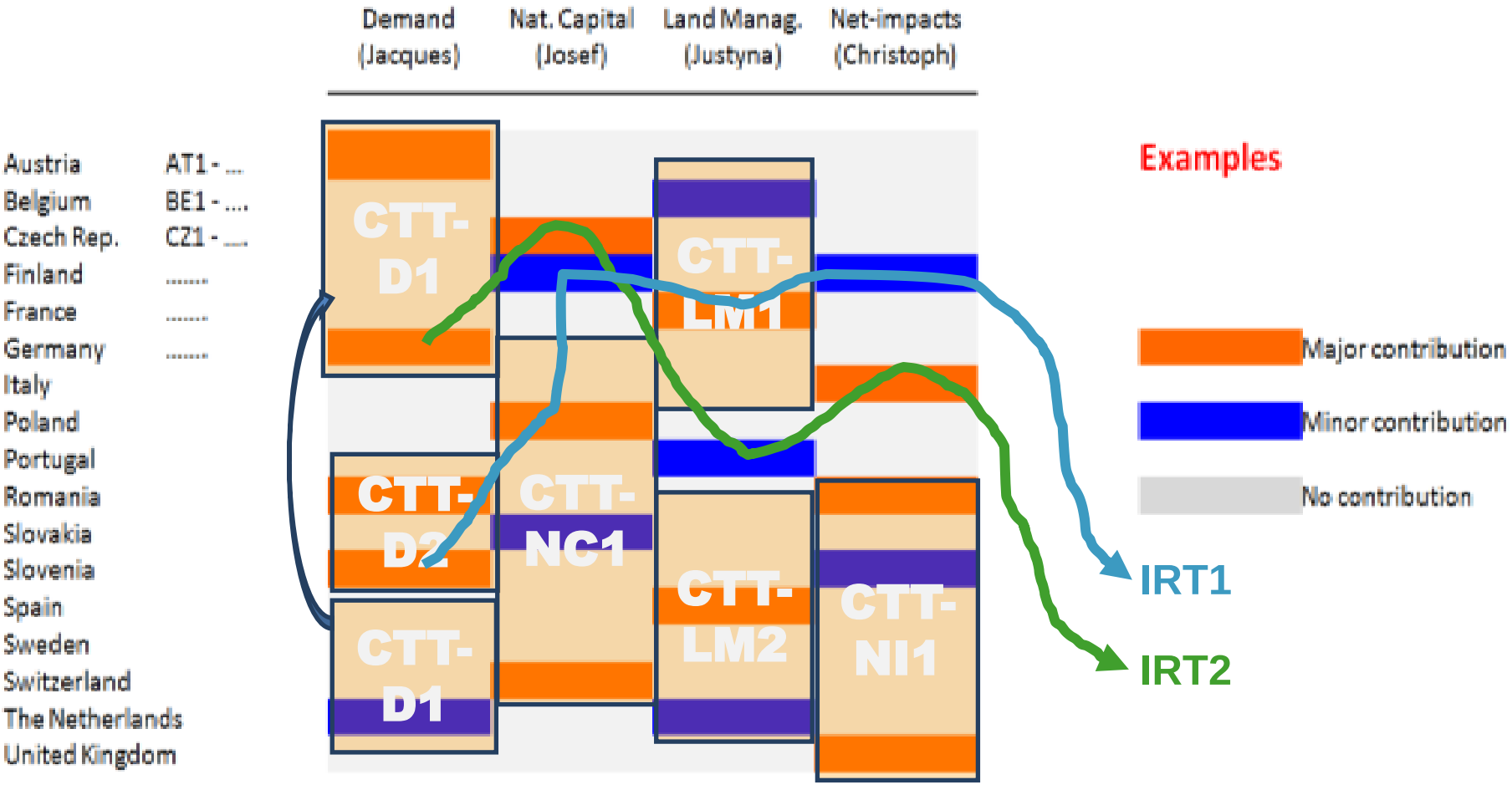
PL: What kind of a guidebook should be worked out of good practices presenting examples of good planning regarding soil management?

DE: Which level of planning is most effective for planning instruments?
What standards are to be used in the evaluation/weighting of spatial decision processes and conflicts? How to integrate sectoral expert planning in spatial planning and development?

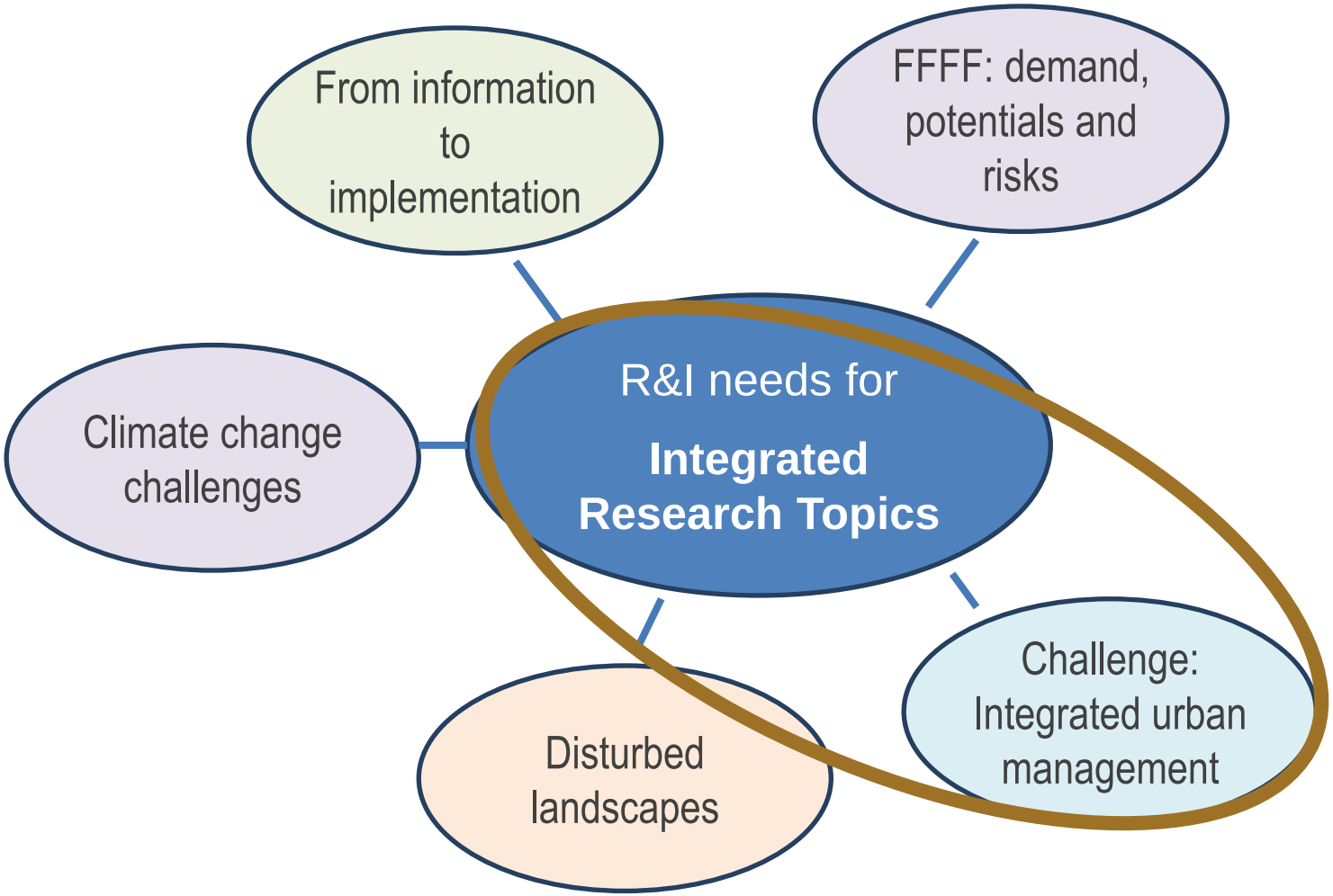
CH: How will land use develop in the future? How can spatial planning instruments consider soil functions?

NL: How can decisions in spatial planning be made in relation to energy functions (production, transport and storage) in the subsurface or aboveground (interference - competition - exclusion of functions and effects of interventions)?

Clustered Thematic Topics – CTTs



Integrated Research Topics



IRT-12: Environmentally friendly and socially sensitive urban development

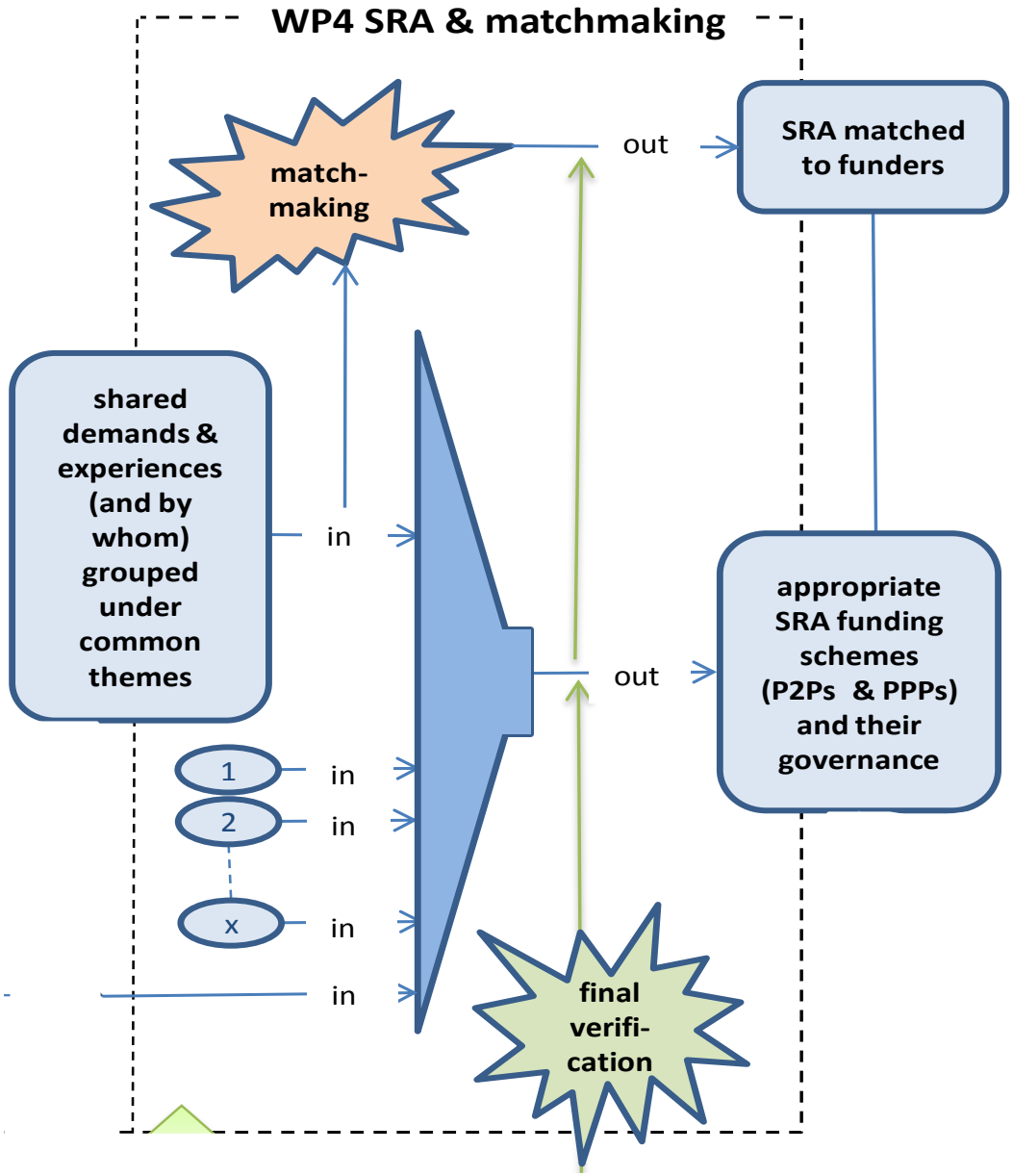
- Urban development must consider environmental and social conditions. Goals can be synergistic (environmental justice) or conflicting (energy poverty).
- IRT-Goal: Better understand potential synergies and trade-offs. Identify and more clearly describe conflicting goals and measures with sufficient indicators and find solutions to reduce and dissolve them.
  - Which settlement and building structures allow land-saving, dense and at the same time healthy, high quality urban living conditions?
  - What are drivers (markets and economy, regulation [local, EC], awareness of ecosystem services in cities, ecology)?
  - What facilitates awareness of environmental and social dimensions equally (urban agriculture, climate/weather extremes, education)?
  - How to balance strict environmental protection/ precaution without limiting societal discourse on desired urban development?

IRT-12: Environmentally friendly and socially sensitive urban development

Links to identified research gaps		Indicated are numbers of relevant research topics from National Reports (cf. D2.5, Brils et al. 2016) AND for the relevant Clustered Thematic Topics :
	National research topics	AT 5, 10, 11, 14; BE 6, 9, 13, 22, 24, 26, 27; CZ 1, 6, 8; FI 3, 11, 14, 15; FR 5; DE 1.1, 2.1, 2.2, 2.5, 3.4, 6.1, 6.2, 6.3; IT 3, 4; PL 1, 3, 4; PT 5, 6; SR 2; SI 1, 4; ES 2, 3.9, 3.13; SE 2, 4, 7, 9; CH 1.2, 2.1, 2.3, 2.11, 2.12, 5.1; NL 5, 8, 10; UK 6
	Clustered thematic topics	**Demand: CTT-D2 (ESS), 3 (Infrastructure), 6 (hazards), 7 (quality of life)** **Natural Capital: CTT-NC1 (soil quality), 7 (values)** **Land Management: CTT-LM 1.2 (planning), 1.3 (conflicts), 3 (urb land)** **Net Impact CTT-NI 1.1, 1.3, 1.5, 1.6, 2.2, 2.4, 3.1, 3.3, 4.2 (multiple)**
Further Characteristics		
	Science fields	☒ Natural sciences | ☒ Social sciences | ☒ Engineering
	Addressees	☐ Policy | ☒ Administration | ☐ Business | ☒ Civil Society
	Regional scope	☐ Global | ☒ European | ☒ Multinational (ca. 4-8 countries)| ☒ Tri-/Bilateral
	Duration of projects	☐ Short (< 1 year) | ☐ Medium (1 – 3 years) | ☒ Long (>3 years) | ☐ Very long (>6 year)

Workflow WP4: Strategic Research Agenda and match-making

- **Strategic Research Agenda** to be verified
- Match-making of potential funders
- Funding schemes
- Implementation Plan



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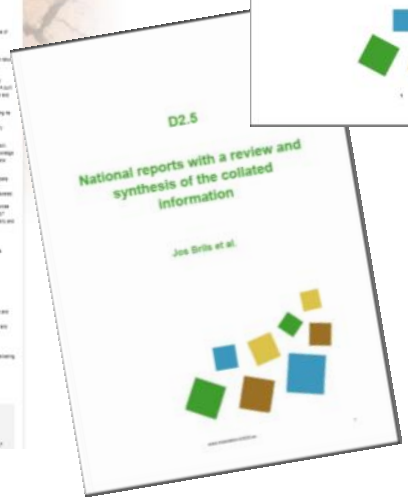

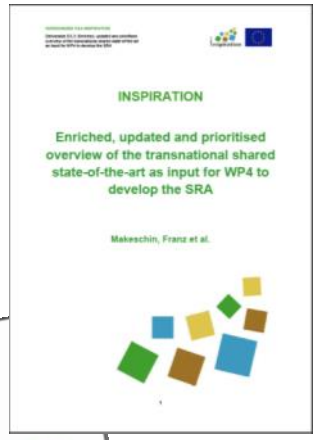

INtegrated Spatial PlannIng, land use and soil management Research ActTION

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EU H2020 Societal Challenge 5: Growing a low carbon, resource efficient economy with a sustainable supply of raw materials

Call SC5-10b-2014: Structuring research on soil, land-use and land management in Europe

Better **coordination** of often **fragmented research**

Innovative ways to **mobilize** all relevant **actors, increase policy coherence**, resolve trade-offs, manage conflicting interests, increase participation of citizens in decision-making

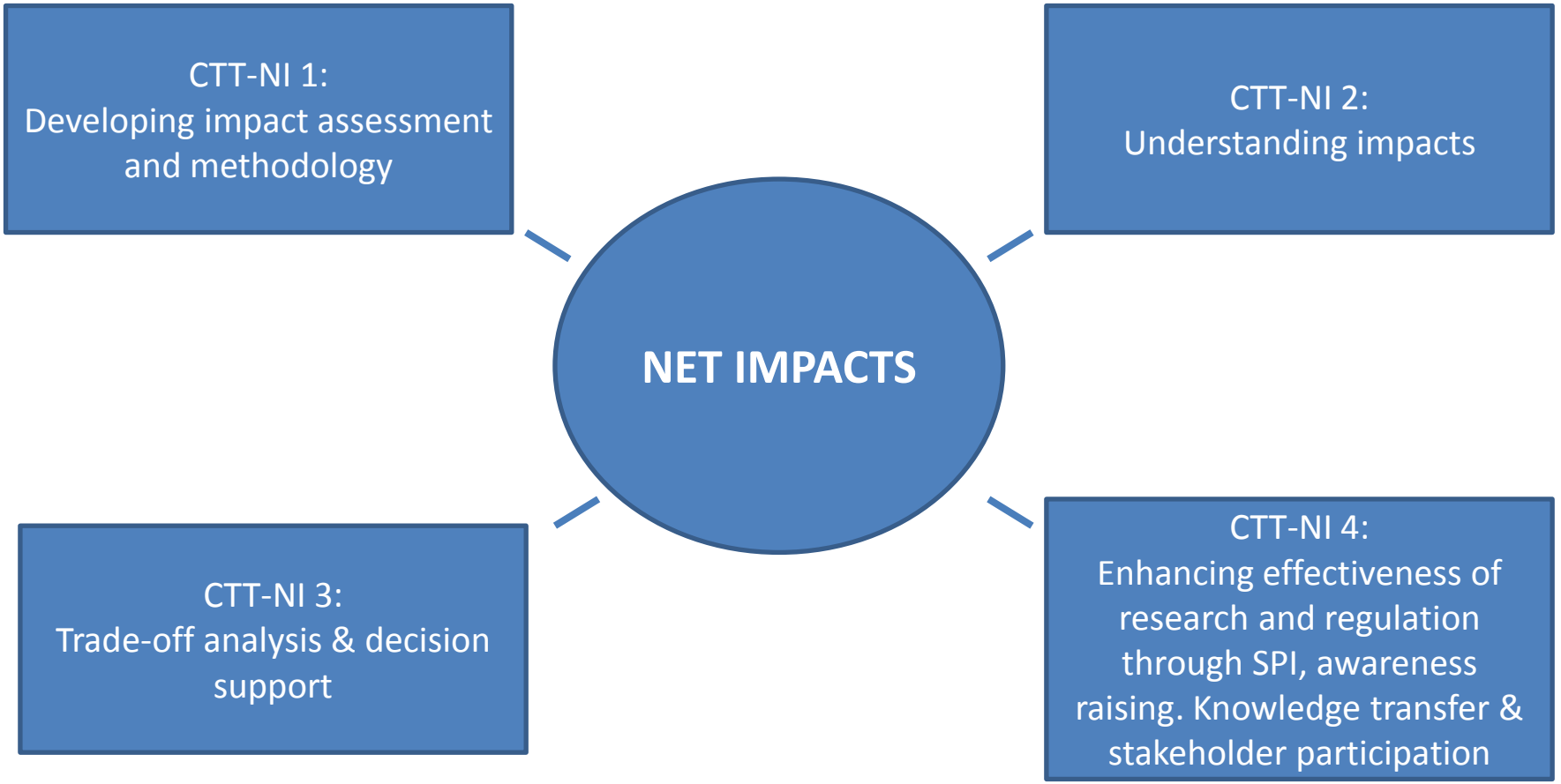
Creation of European networks to facilitate dialogue among the relevant scientific communities, funding bodies and user communities in Europe

Clustering, coordinating and creating synergies between international, European and nationally funded research and innovation actions,

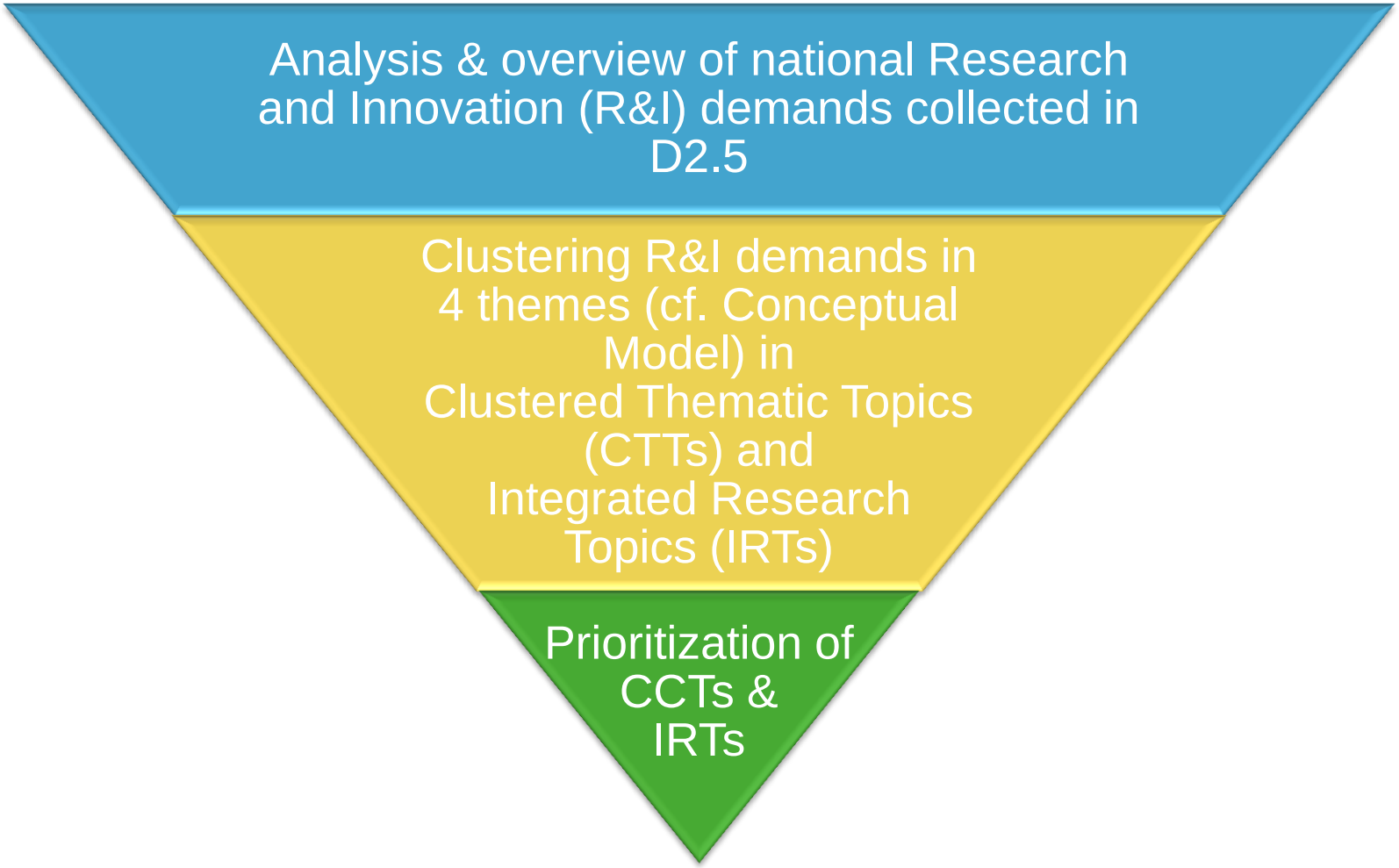
Developing **joint programs and projects,**

Improve science-policy interface

CTT-NI NET IMPACTS on global, regional and local scale



Work flow of Work Package 3



Input WP4: SRA writing & match-making

Work flow of Work Package 3

Analysis of national inputs

- Scan potential analysis methods and **selection of approach**
- **Desk study** of national research topics collated in D2.5
- First **structuring of national research topics** in form of Clustered Thematic Topics (CTTs) presented with NFP in Zurich workshop (Apr 2016) – **verification of approach**
- **1st revision**: Incorporation of NFP feed-back to adjust CTTs

Completeness and relevance

- Approach and revised CTTs discussed with NKS in Faro workshop (Jun 9-10) – **First stakeholder check for completeness & relevance**.
- **2nd revision**: Report considering NKS feedback from Faro meeting (Jul 15)
- **Consultation phase**: NFP & NKS comments on completeness/ relevance (Jul 20 - Aug 10)
- **3rd revision** = Venice background document: Revised CTTs and presentation of Integrated Research Themes (IRTs) (Aug 29)
- Discussion of IRTs and input on **state-of-the-art in European** research projects in WP3-NKS workshop in Venice (Sep 8-9)
- 4th and **final revision**: D3.3 (Sep 30)

Prioritization of R&I needs

- **Prioritization** of CCTs & IRTs in survey based on D2.5 and D3.3
- Core Gourp meeting of INSPIRATION in Berlin (Oct 13) to analysis the prioritization results and advise on **next steps and selection of topics** for the SRA and match-making for WP4
- Selection of **themes for SRA** (Oct 31)

Overview of IRTs

From information to implementation

IRT-1: Integrated Environmental Assessment and Soil Monitoring for Europe

IRT-2: Recognizing the value of ecosystem service in agricultural land use

IRT-3: From indicators to implementation: Integrated tools for a holistic impact and land use assessment

FFFF: demand, potentials and risks

IRT-4: Bio-Economy – unleashing the potentials while sustaining soils

IRT-5: Integrated scenarios for the Soil-Water-Food nexus under societal challenges

IRT-6: Assessing the efficiency of the Soil-Sediment-Water nexus of resources

IRT-7: Maintaining soil fertility by organic farming to attain food security

Challenge: Integrated urban management

IRT-8: Circular land management

IRT-9: Developing effective policies to combat urban sprawl

IRT-10: Facilitating the implementation of urban green infrastructure through stakeholder participation

IRT-11: Integrated management of soils in urban areas

IRT-12: Environmentally friendly and socially sensitive urban development

IRT-13: Urban Metabolism – Enhance resource efficiency through a closing of urban material loops

Disturbed landscapes

IRT-14: 'Emerging contaminants' in soil and groundwater

IRT-15: Sustainable management and valorization of degraded land

IRT-16: Innovative technologies and eco-engineering 4.0: Challenges for a sustainable use of rural and urban landscapes and the SSW system

Climate change challenges

IRT-17: Climate change challenges - improving preparedness, response for climate conditions and related hazards