

# LAND MANAGEMENT, ASSESSMENT, RESEARCH AND KNOWLEDGE

**18<sup>th</sup> December 2017**

*THE 2017 EU AGRICULTURAL OUTLOOK CONFERENCE,*

Room De Gasperi CHARLEMAGNE building

Rue de la Loi 170, 1040 Brussels

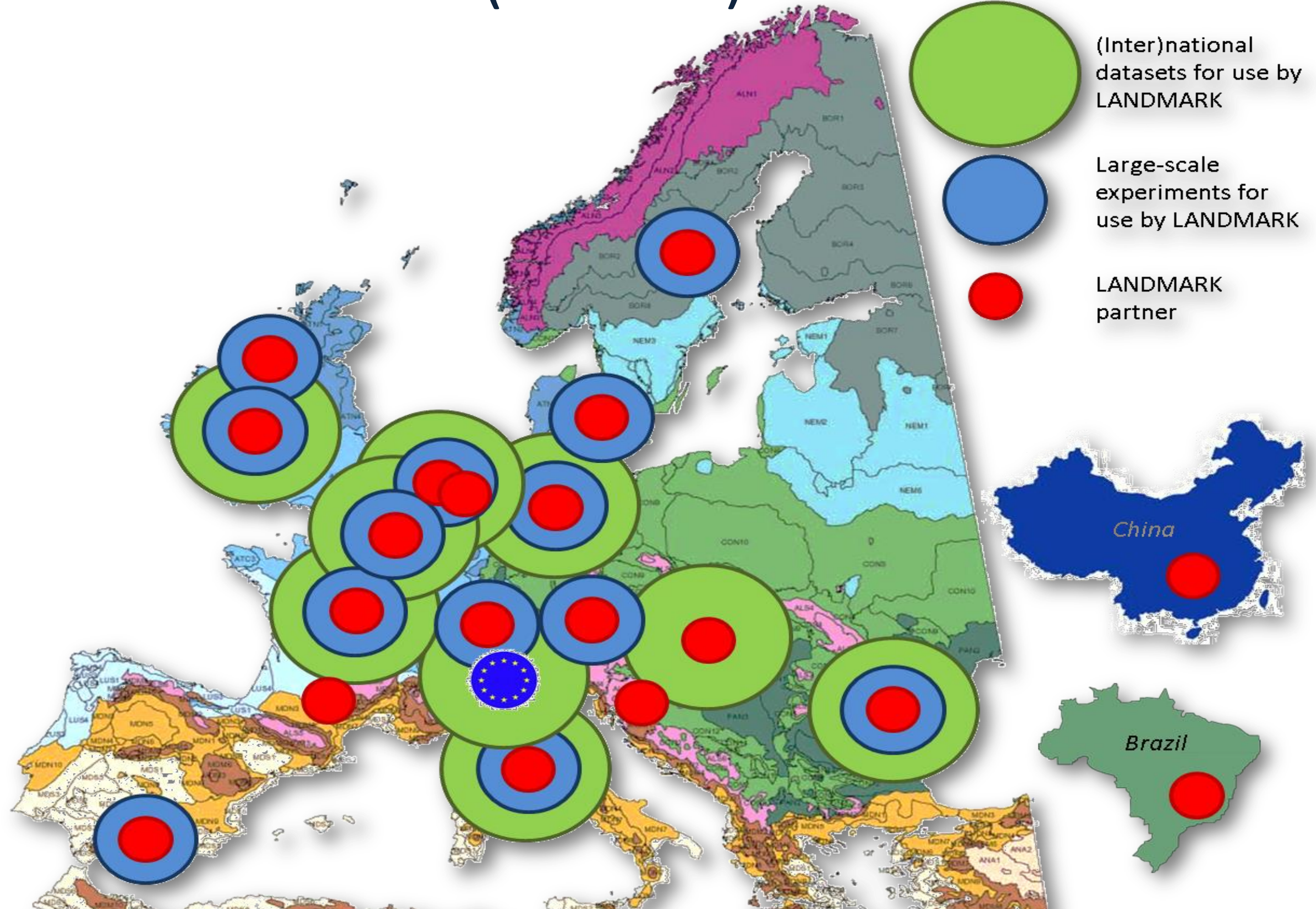


# LANDMARK

LAND MANAGEMENT: ASSESSMENT, RESEARCH, KNOWLEDGE BASE




# LANDMARK CONSORTIUM (635201)



How do we increase our productivity?



A photograph of a flooded residential street. In the foreground, a man in a dark jacket and orange beanie wades through the water. To his right, another man in a patterned sweater and dark pants carries a large, bundled-up piece of fabric. In the background, a third person in green waders is visible. The water is murky and reflects the sky. A semi-transparent text box is overlaid on the image.

We need better water regulation by our land...

We need to protect our  
carbon resources

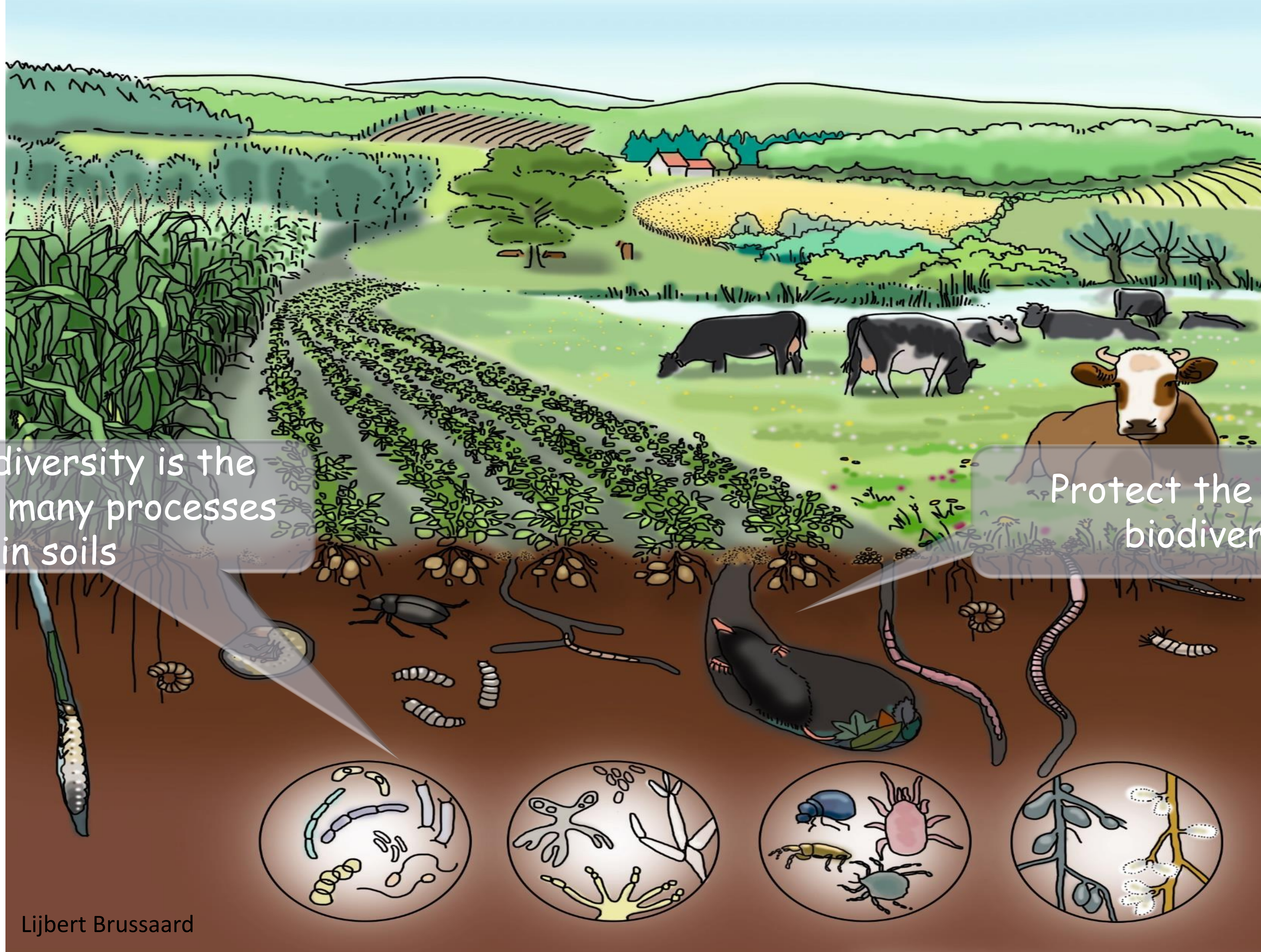


We need to find a home  
for our waste...



Soil biodiversity is the driver of many processes in soils

Protect the home of biodiversity



# WHAT CAN OUR LAND SUPPLY?

All soils / land perform all functions...

...but different parts of the land(scape) are better at delivering different functions



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## Functional land management: A framework for managing soil-based ecosystem services for the sustainable intensification of agriculture<sup>☆</sup>

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# WHAT CAN OUR LAND SUPPLY?



# MAIN OUTCOMES

**Pillar 1: Farm scale:** Develop an agricultural Decision Support Tool (DST) for soil management

**Pillar 2: Country scale:** Design a monitoring scheme for Soil Functions that is applicable at regional scale, for a range of soil types, land uses and pedo-climatic zones;

**Pillar 3: EU scale:** Develop a policy framework for 'Functional Land Management' at European scale that aims to optimise the sustainable use of Europe's soil resource



Introduction

Knowledge

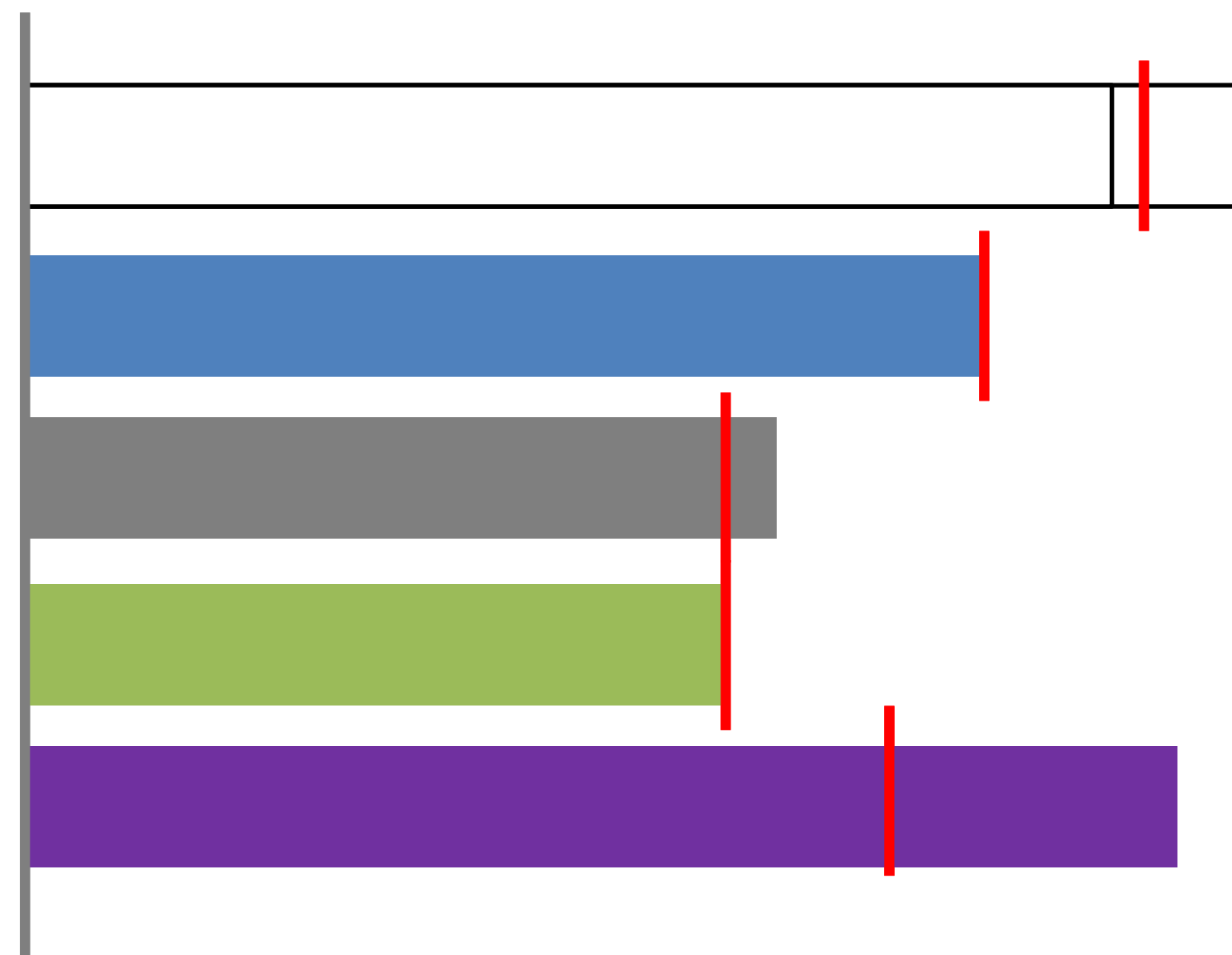
Regional

European

Discussion

# PILLAR 1: FARM SCALE

## THE SOIL NAVIGATOR: INTERFACE



### Recommendations:

- Buffer strips
- Nutrient management plan
- Minimum tillage
- Lime application



# PILLAR 2: REGIONAL SCALE- MONITORING




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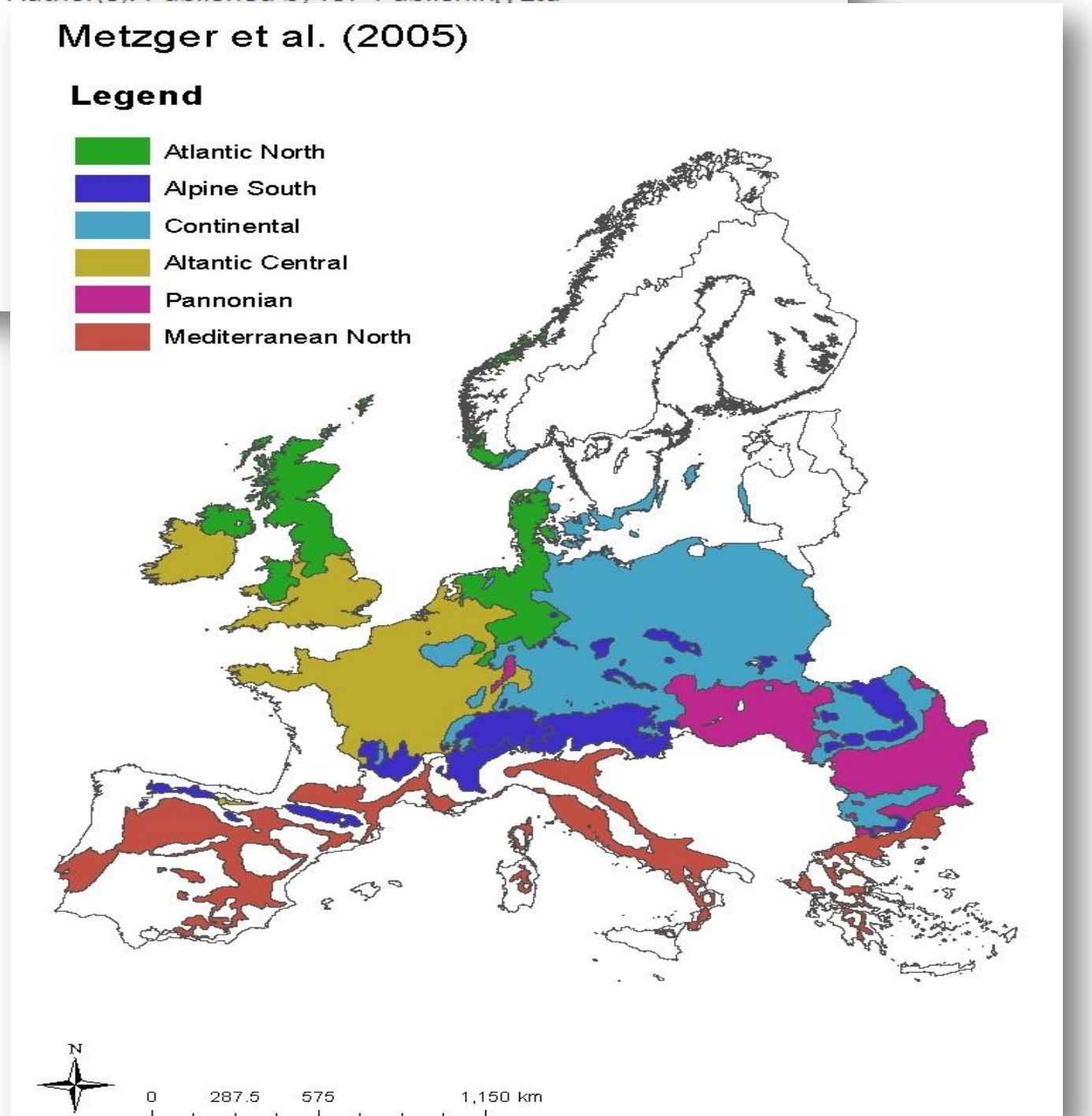
## Gap assessment in current soil monitoring networks across Europe for measuring soil functions

Jeroen P van Leeuwen<sup>1</sup>, Nicolas Saby<sup>2</sup>, Arwyn Jones<sup>3</sup>, Geertrui Louwagie<sup>4</sup>, Erika Micheli<sup>5</sup>, Michiel Rutgers<sup>6</sup>, Rogier P.O. Schulte<sup>7</sup>, Adelheid Spiegel<sup>8</sup>, Gergely Toth<sup>9</sup> and Rachel Creamer<sup>10</sup> 

Accepted Manuscript online 22 November 2017 • © 2017 The Author(s). Published by IOP Publishing Ltd

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# PILLAR 3: EU POLICY OPTIONS



Article

## The Impact of Policy Instruments on Soil Multifunctionality in the European Union

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Academic Editor: Vincenzo Torretta  
Received: 26 January 2017; Accepted: 2 March 2017; Published: 9 March 2017

**Abstract:** Agricultural ecosystems provide a range of benefits that are vital to human well-being. These benefits are dependent on several soil functions that are affected in different ways from the European Union, national, and regional levels. We evaluated current EU soil-related legislation and examples of regional legislation with regard to direct and indirect impacts on five soil functions: the production of food, fiber, and fuel; water purification; carbon sequestration and climate regulation; habitat for biodiversity provisioning; and of nutrients/agro-chemicals. Our results illustrate the diversity of existing policies and their interactions present between different spatial and temporal scales. The impact of a policy, positive or negative, on a soil function is usually not established, but depends on the implementation by local authorities and the farmers. This makes it difficult to estimate and trends of the different soil functions in agricultural ecosystems. To implement and sustainable use of the different soil functions in agricultural ecosystems, more knowledge is needed on the policy interactions as well as on the impact of management options on the different soil functions.

**Keywords:** soil function; European legislation; regional legislation; multifunctionality; soil policy

### 1. Introduction

Agricultural ecosystems provide a range of benefits that are vital to human well-being [1]. These benefits encompass provisioning ecosystem services, such as food, wood, fibers, fuel, and drinking water, but also regulating and cultural services such as carbon storage and aesthetics [2,3]. In turn, a range of ecosystem services and functions affect agricultural productivity [4]. This is

Sustainability 2017, 9, 407; doi:10.3390/su9030407

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**Table 1.** Overview of 35 policy documents, which were analyzed for effects on soil functions. For each of the documents the general title, document type, and official number are given. For each document their impact, direct (dark gray) or indirect (light gray), on each of the five soil functions is given. If a direct impact is considered relevant, then the article numbers are given. In some cases almost the entire document has an impact on a function. In that case not all the article numbers are given, but a reference “Directive” or “Strategy” is given in the table.

Agricultural Policies	Type	No.	Production of Food, Fiber and (Bio)Fuel	Water Purification and Regulation	Carbon Sequestration	Habitat for Biodiversity	Recycling of (External) Nutrients/Agro-Chemicals
European Agricultural Fund for Rural Development	Regulation	1305/2013	Directive		Article 5, 34	Article 5	
Financing Management and monitoring	Regulation	1306/2013	Directive	Article 93, 94: Annex II	Article 93, 94: Annex II	Article 93, 94: Annex II	
Direct Payment	Regulation	1307/2013	Directive	Article 44, 45	Article 44, 45	Article 44, 45	
Common organization of the markets	Regulation	1308/2013	Directive	-	-	-	-
Plant Protection Products Directive	Directive	91/414/EEC	Article 4,b	Article 4,b		Article 4,b	Article 4,b
Nitrates Directive	Directive	1991/676/EEC	Article 2				Article 2
GMO Directive	Directive	2001/18/EC	Directive	Article 2-Annex II	Article 2-Annex II	Article 2-Annex II	Article 2-Annex II
Pesticide Use Directive	Directive	2009/128/EC	-	-	-	Article 12	-
<b>Industrial policies</b>							
Industrial Emissions Directive	Directive	2010/75/EU	-		-	-	Annex II
Landfill Directive	Directive	1999/31/EC	-	-	-	-	-
Mining Waste Directive	Directive	2006/21/EC	-	-	-	-	-
<b>Industrial Policies</b>							
Biocidal Products Regulation	Regulation	528/2012	-	Article 19	-	Article 19	Article 19
Waste Directive	Directive	2008/98/EC	ANNEX II	-	-	-	-
<b>Urban policies</b>							
Sewage Sludge Directive	Directive	86/278/EEC	Article 6, 7				Article 8
Urban Waste Water Directive	Directive	91/271/EEC	Directive	-	-	-	-
<b>Climate policies</b>							
Carbon Storage Directive	Directive	2009/31/EC	-	-	-	-	-
Renewable Energy Directive	Directive	2009/28/EC	Article 17				
Monitoring and reporting greenhouse gas emissions	Regulation	529/2013/EU			Article 7		
Monitoring and reporting greenhouse gas emissions	Communication	COM/2016/479	-	-	-	-	-
2030 climate & energy framework	Communication	COM(2014) 15	-	-	Section 2.4	-	-

35 different overarching-legislative-financial/research policy areas recognised as important for their potential impact on soil functions in agricultural areas:

- 22 Directives and 8 Regulations
- 4 Communications and 1 Decision

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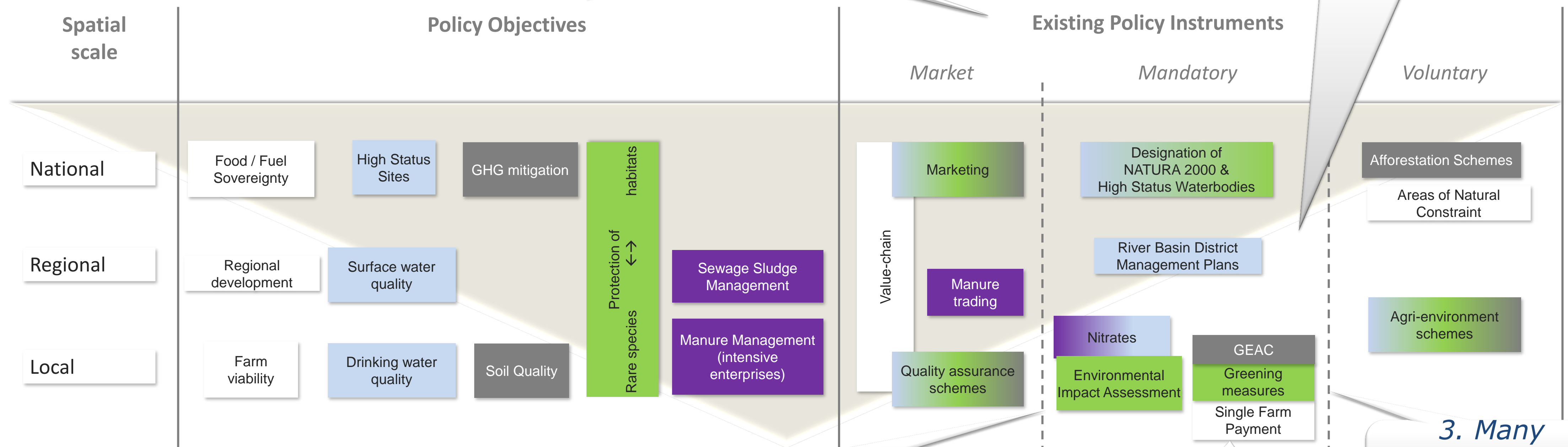


# PILLAR 3: EU POLICY OPTIONS



1. No 1:1 alignment of objectives and instruments

2. Few regional / collaborative instruments



5. Room for more alignment?

4. Some alignment between instruments

3. Many (enough?) instruments at farm level



# STRATEGIC RESEARCH AGENDA

## Communication:

how can talk about Soil Functions in a way that makes sense to farmers?

## On farm observations:

How can farmers measure soil quality on their own farm?

## Incentivisation:

How can we encourage farmers to ascribe value to all 5 Soil Functions?

## SCIENTIFIC RESEARCH AGENDA

- 1. Farm scale:** Develop an agricultural Decision Support Tool (DST) for soil management
- 2. Country scale:** Design a monitoring scheme for Soil Functions that is applicable at regional scale, for a range of soil types, land uses and pedo-climatic zones;
- 3. EU scale:** Develop a policy framework for 'Functional Land Management' at European scale that aims to optimise the sustainable use of Europe's soil resource



## Measurements:

Can we measure Soil Functions or soil processes, in addition to soil attributes?

## Threats:

How can we integrate the threats to Soil Functions into the FLM framework?



## Land take:

How can we monitor & mitigate the sealing of productive farmland?



## Known unknowns:

What questions are outside the scope of LANDMARK?  
(domain delineation)

## Legacy:

How can we embed the LANDMARK outcomes in future education, advisory and policy briefs?

## Future proofing:

Can we assess the effectiveness of our outcomes in the context of a changing environment (policy and natural) ?

## Evaluation:

How can we assess (and improve) the effectiveness and flexibility of policies?

## Valorisation:

Can we assign a value to the supply of each of the 5 soil functions?

