BGI-U
A soil health index for urban soils

Lessons learned during the development of an assessment system for municipalities in the Netherlands

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WAGENINGEN
UNIVERSITY & RESEARCH





Outline

1. BGI (*bodemgezondheidsindex*) during the previous SOILveR webinar
2. Development and lessons learned
    1. BGI development over time
    2. Online system
    3. Contexts for assessment
    4. From land use to soil use
3. Plans for the future



1 - BGI during the previous webinar

- An index for assessing urban soil health in Amsterdam
- Uses measured physical, chemical and biological soil properties (laboratory, field) as *indicators*
- Data input and scoring via an excel sheet
- Selection of indicators is based on context: user's goals (specific use, optimal use, or re-use) and existing knowledge
- Developed for six different types of *land use*
  - Soil health is defined based on intended land use
- Management options are given per indicator, which can be implemented dependent on soil health scores

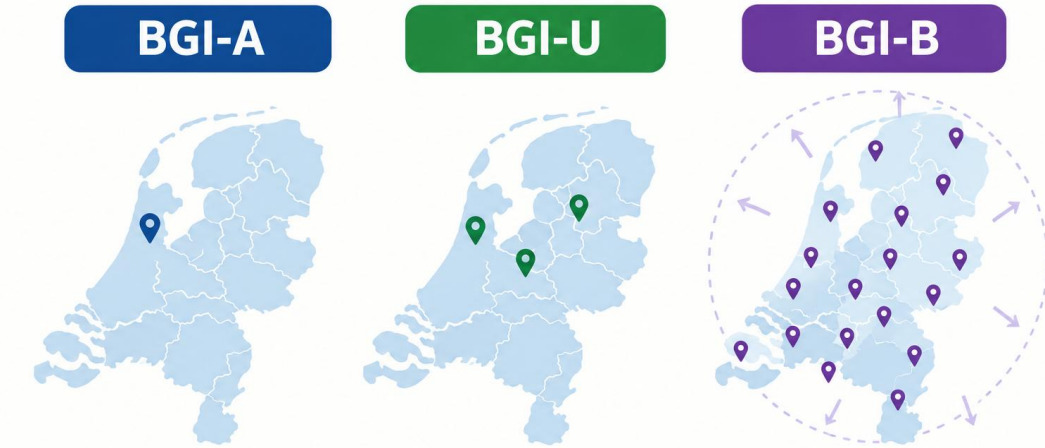


2 - Development and lessons learned

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2a - BGI development



BGI A*msterdam* - U*rbisoil* - B*ebouwd*)

BGI-A: initial content development and testing, one municipality

BGI-U: content adaptation, three municipalities and extensive interaction with stakeholders, **online tool**

BGI-B: content refinement, broader application area (testing in 12 municipalities but theoretically national)

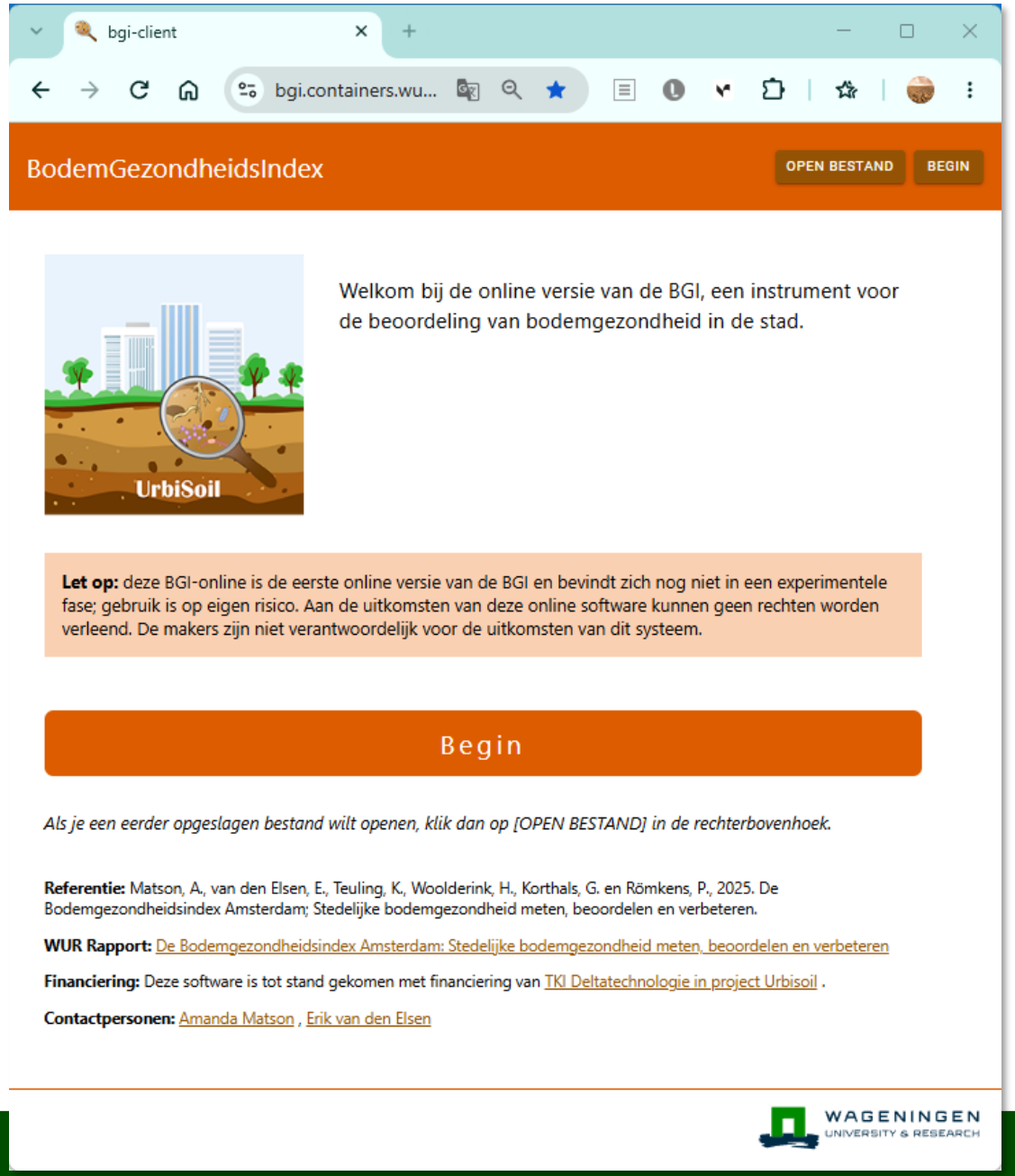
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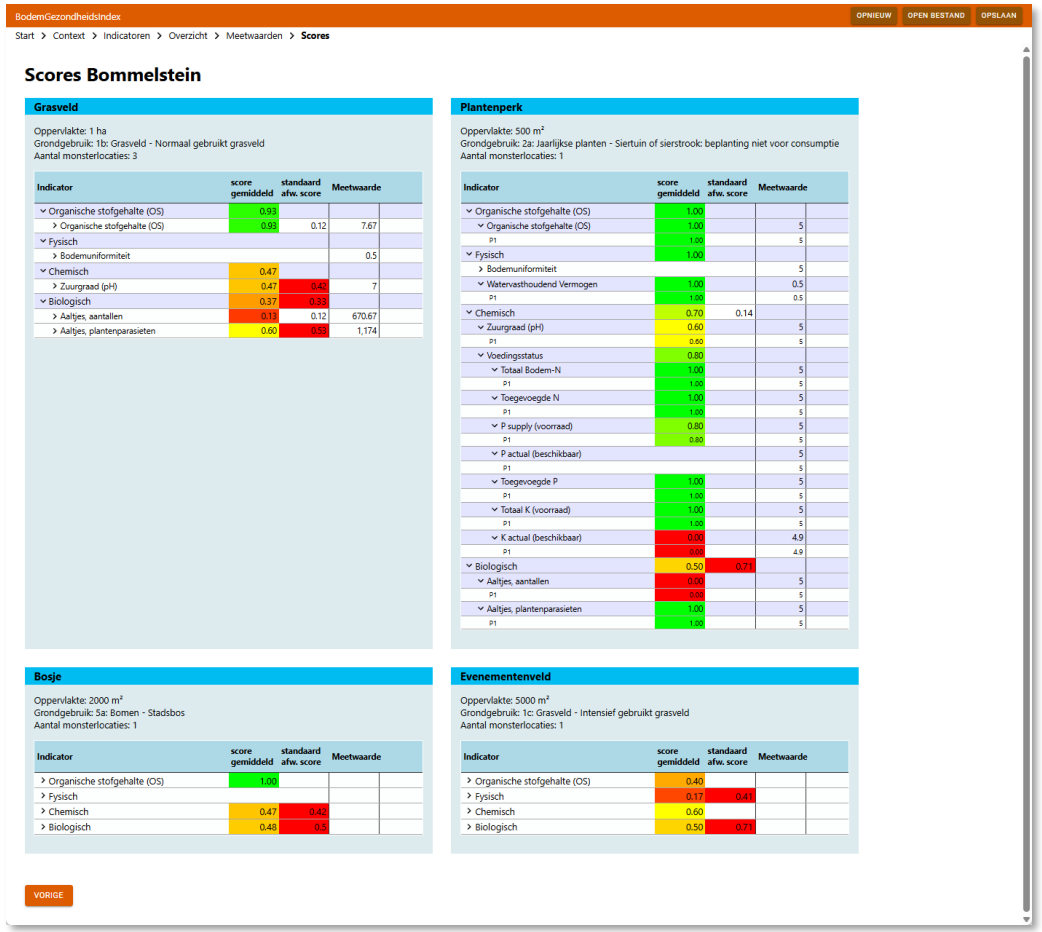


2b - Online tool

Nr	Indicator	Data	Score
Organische stof indicatoren			
1	Organische stofgehalte (OS)	5.5	
Fysische indicatoren			
2	Textuur (Korrelgrootteverdeling)		
3	Indringingsweerstand	2.1	
4	Infiltratie capaciteit	32	
5	Porositeit	0.12	
Chemische indicatoren			
6	Zuurgraad (pH)	6.5	
7	Bodemvruchtbaarheid		
8	Verontreiniging		
Biologische indicatoren			
9	Aaltjes, aantallen	1754	
10	Aaltjes, plantenparasieten	103	
Overige indicatoren			
11	Grondwaterniveau	>1	
12	Landgebruik historie		

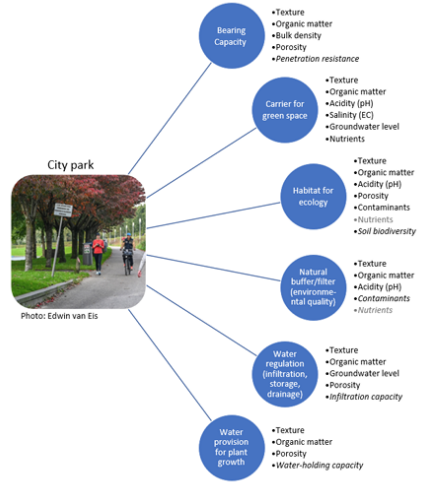


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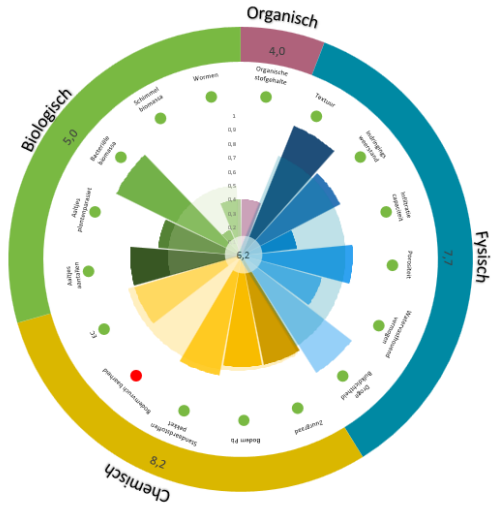
Results and scores are shown:

- per sample
- per indicator (i.e. replicates combined)
- per group (physical, chemical biological)



Future plans:

- general visual
- per soil function or ecosystem service
- overall

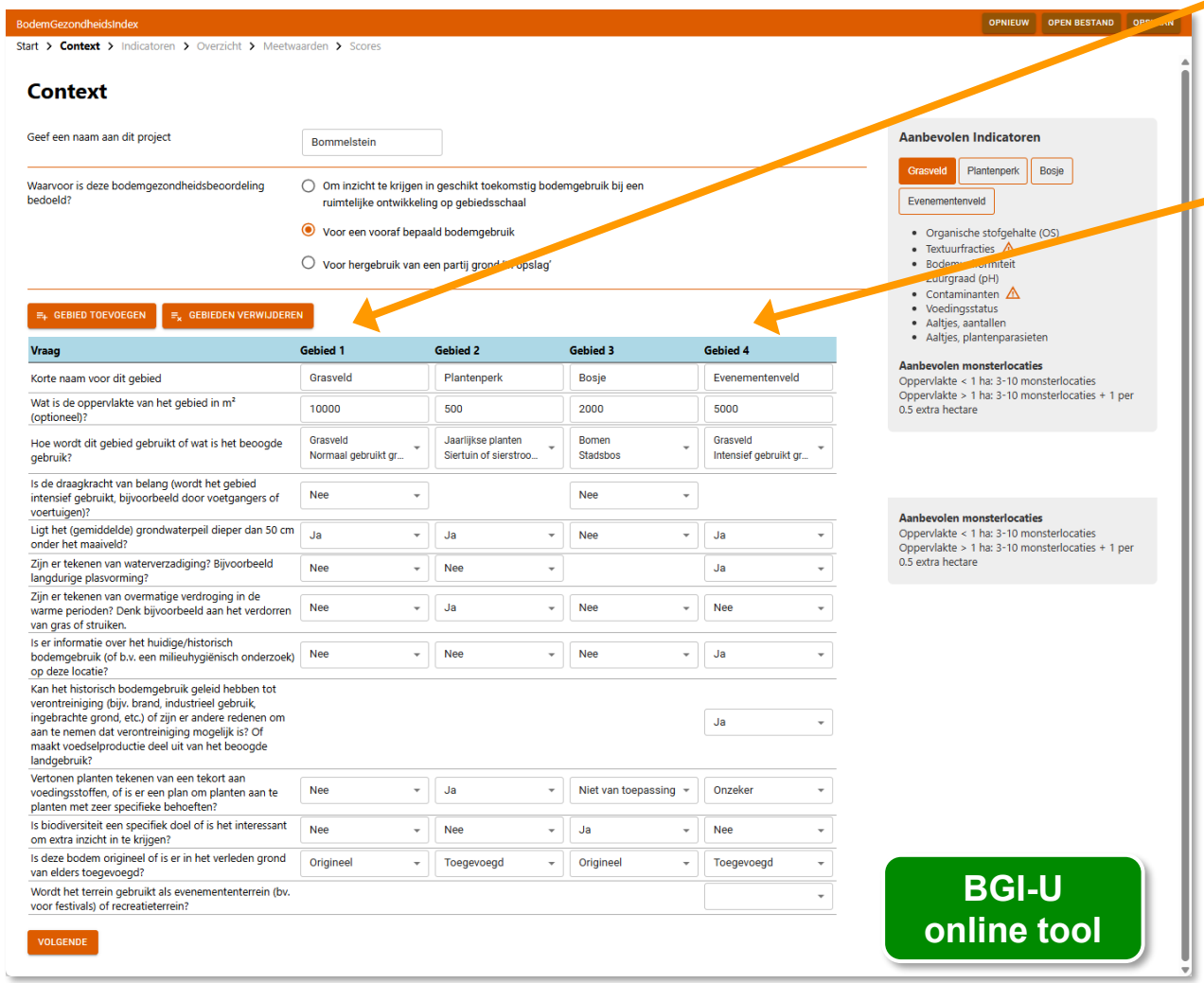


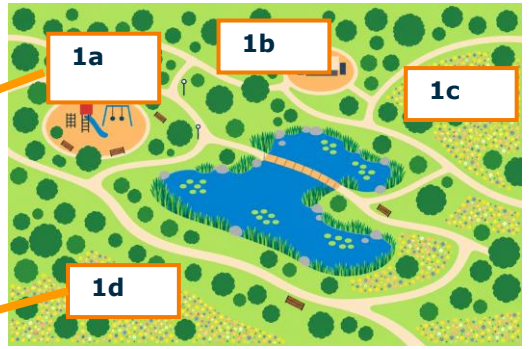
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2c - Context





Online tool:

- Flexible number of areas within a site
- Each area be defined differently (indicators, scores)
- Problem-oriented

Future plans:

- Monitoring (SMD)
- Quick scan
- Spatial planning



2c - Context: undecided



					Gemiddelde Meetwaarde	GROEN EVENEMENTERREIN		STADSPARK		BUURTGROEN		TUIN (zonder MOESTUIN)		MOESTUIN/VOLKSTUIN		ONDER VERHARDING	
						Gemiddelde Score	Standaard-afwijking Score	Gemiddelde Score	Standaard-afwijking Score	Gemiddelde Score	Standaard-afwijking Score	Gemiddelde Score	Standaard-afwijking Score	Gemiddelde Score	Standaard-afwijking Score	Gemiddelde Score	Standaard-afwijking Score
		Org.Stof				1,00		1,00		1,00		1,00		1,00		0,00	
		Fysisch				0,85		0,71		0,71		0,86		0,71		0,73	
		Chemisch				1,00		0,91		0,91		0,91		0,91			
		Biologisch				0,80		0,80		0,80		0,80		0,80			
OS	1	Organische stofgehalte (OS)	[%]	zand klei	5,67	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	0,00	0,00
Fysisch	2	Korrelgrootteverdeling	[D60/D10]														
Fysisch	3	Indringingsweerstand	[Mpa] [cm]	weerstand diepte	2,90 20,67	1,00 0,67	0,00 0,12	0,13 0,67	0,12 0,12	0,13 0,67	0,12 0,12	1,00 0,67	0,00 0,12	0,13 0,67	0,12 0,12		
Fysisch	4	Infiltratie capaciteit	[mm/h]	festival recreatie	174,67 174,67	1,00 1,00	0,00 0,00	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00		
Fysisch	5	Porositeit	[m^3/m^3]		0,44	0,53	0,12	0,53	0,12	0,53	0,12	0,53	0,12	0,53	0,12		
Fysisch	6	Watervasthoudend Vermogen	[m^3/m^3]	zand klei	0,44	1,00	0,00	0,93	0,12	0,93	0,12	0,93	0,12	0,93	0,12		
Fysisch	7	Droge bulkdichtheid	[kg/dm^3]		1,37	0,73	0,12	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	0,73	0,12
Chemisch	8	Zuurgraad (pH)	[-]	OM<5% OM>5%	6,43	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00		
Chemisch	9	*Bodem Pb*	*[mg/kg]*														
Chemisch	10	Contaminanten															
Chemisch	11	Voedingsstatus						0,72	0,03	0,72	0,03	0,72	0,03	0,72	0,03		
Chemisch	12	Zoutgehalte (EC)	[dS/m]			1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00		
Biologisch	13	Aaltjes, aantallen	[n/100g]	zand klei	900,00	0,20	0,00	0,20	0,00	0,20	0,00	0,20	0,00	0,20	0,00		
Biologisch	14	Aaltjes, plantenparasieten	[n/100g]	zand klei	121,67	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00		
Biologisch	15	Bacteriële biomassa	[µg/g]	zand klei	26,67	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00		
Biologisch	16	Schimmelbiomassa	[µg/g]	zand klei	2,20	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00	1,00	0,00		
Biologisch	17	Wormen, aantallen	[n/m^3]	zand klei													

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2d - From land use to soil use



Grass
- intensive
- normal
- extensive

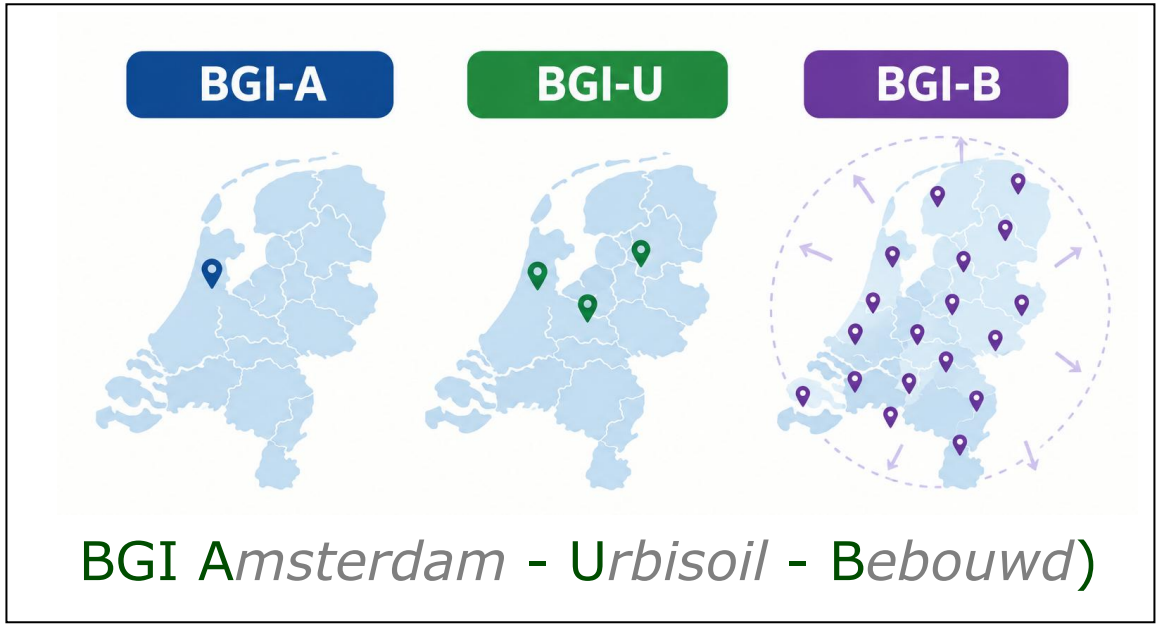
Annual plants
- ornamental
- food

Perennial plants (hedges, bushes, etc)

Sealed soils

Trees
-forest
- single

3 Plans for the future



BGI *Amsterdam* - *Urbisoil* - *Bebouwd*)

DATA

- Sample collection across larger area and different contexts

TRAINING

- Refining of system (theory, methods, costs)
- Training modules with education partner(s)

CO-CREATION

- Co-creation
  - Municipalities and advisory services
  - User experience in the online system
  - Links with policy (i.e. SMD) and data systems

Questions?

