Applied Decision Support Tools to promote water protection measures

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Landwirtschaftskammer Niedersachsen = Chamber of Agriculture in Lower Saxony (GE)

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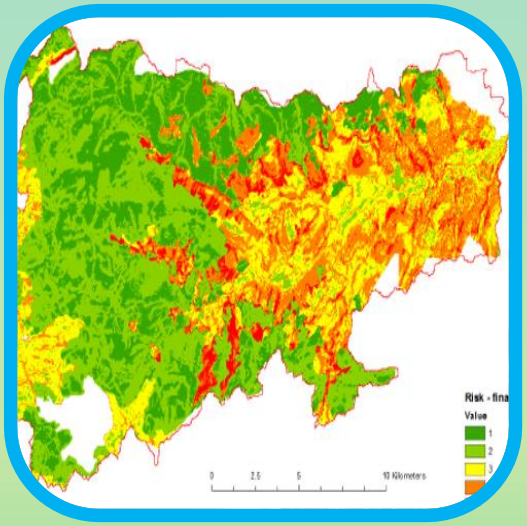

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What is a Decision Support Tool?

"Any bespoke or generic software, email/text alerts, online calculator or guidance, phone app, and paper-based guidance that could contribute to an end user decision affecting surface or ground water quality"

Fairway report D5.1 "Survey and Review of Decision Support Tools"

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End users of Decision Support Tools

- Farmers
- Agronomists and other farm advisors
- Water quality managers
- Policy makers
- Fertiliser/pesticide manufacturers or suppliers
- Researchers, Model developers

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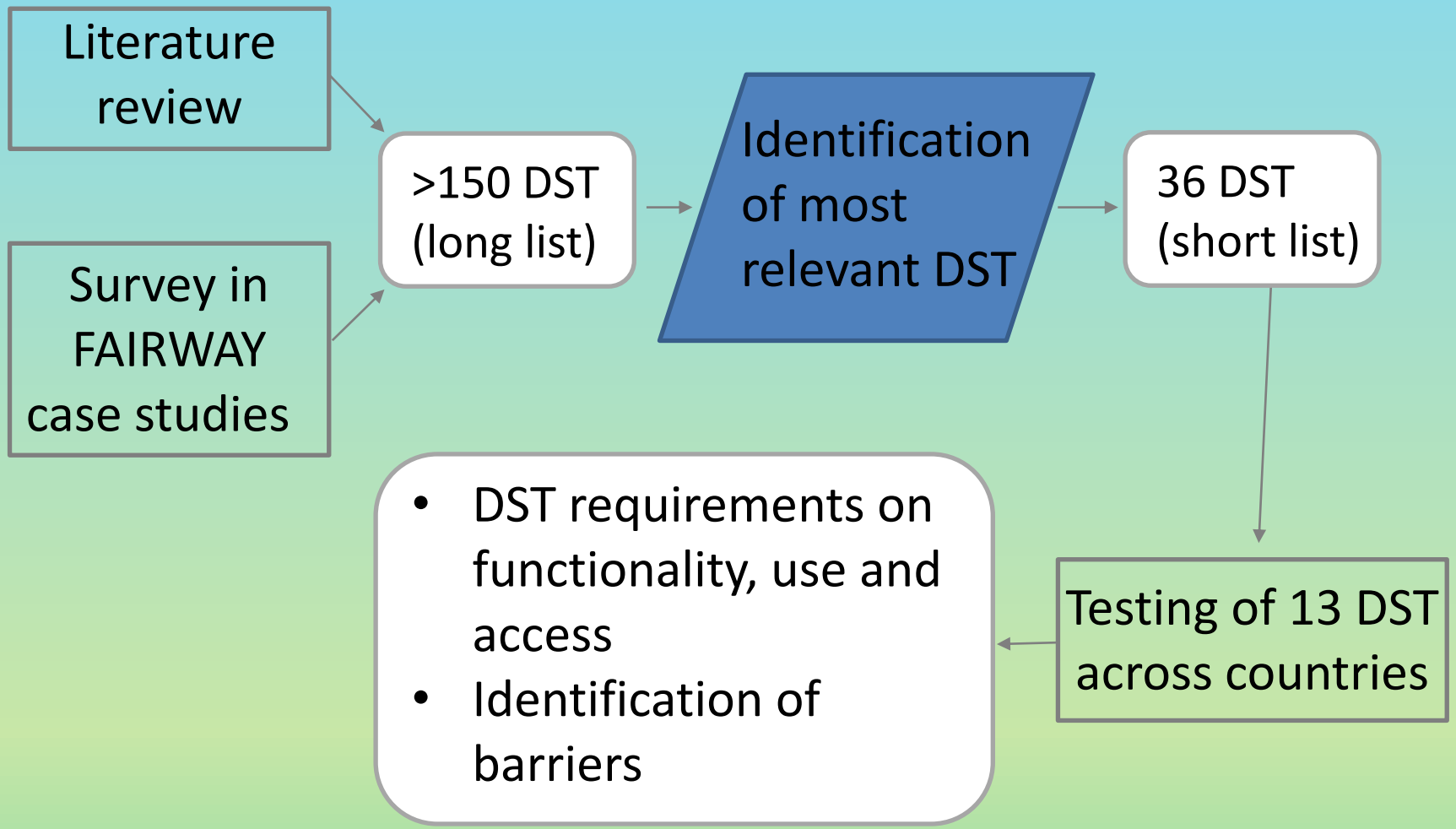
Methodology



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Classification of DSTs

1. DSTs for risk assessment of pesticide applications

2. DSTs to identify cost-effective measures to reduce nitrate and pesticide loads to water

3. DSTs to identify cost-effective allocation, location and choice of nitrogen (N) mitigation measures in order to reduce N loads to waters

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Example 1:
DST testing in Aalborg case study

DSTs for risk assessment of pesticide applications:

- Tools tested: Environmental Yardstick for pesticides (“*EYP*”, NL), SIRIS (FR), Plant Protection Online (*“PPO”,* DK)
- Risk assessment for pesticide “Boxer” (prosulfocarb):

Result

		Environmental effects			Associated risks		
Pesticides	Active substance(kg/ha)	Aquatic organisms	Soil organisms	Groundwater	Pollinators	Natural Enemies	Applicator
BOXER	4.000	320	170	0	B	?	I

EYP: low

Skadegørere	Tidspunkt	Løsning	Dosis pr. ha	Pris
Burresnerre, sort natskygge	Efter afgrødens fremspiring	Boxer	2-3	360-540

PPO: high

nom SIRIS 2012	Famille Chimique	Activité biologique	Koc (mL.g-1)	Solub (mg.L-1)	DT50 champ (jours)	Hydrolyse à pH 7	CL50 poisson (mg.L-1)	CI50 daphnie (mg.L-1)	CE50 algues (mg.L-1)	CL50 min	DJA (mg.kg-1.j-1)
prosulfocarbe	Thiocarbamate	Herbicide	1693	13	9,8	TS	0,113	1,3	0,113	0,113	0,005

SIRIS: medium

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Example 1:
DST testing in Aalborg case study

<u>DSTs for risk assessment of pesticide applications:</u>

- Tools tested: Environmental Yardstick for pesticides ("*EYP*", NL), *SIRIS* (FR), Plant Protection Online (*"PPO",* DK)

- Main findings:
  - DSTs risk assessment differ tremendously
  - Due to differing pesticide accreditation systems, recommendations of EYP are of no use for Denmark
  - Illustration used in EYP could be useful to make outcome of PPO more understandable for end user

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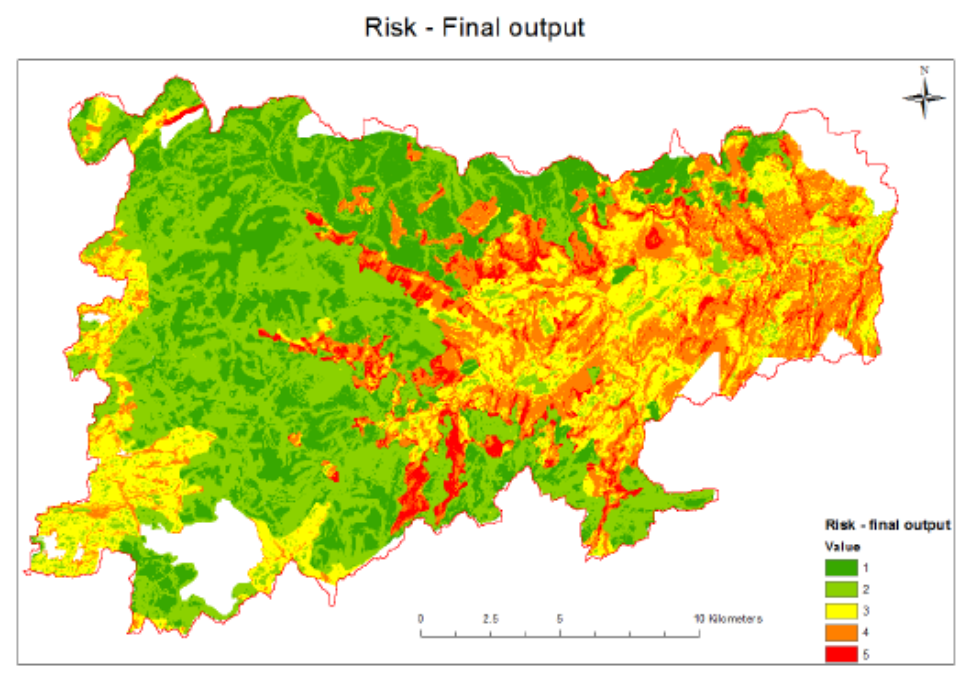
Example 2:
DST testing in N.I. case (Derg catchment)

<u>DSTs to identify cost-effective measures to reduce pesticide loads</u>

- Tools tested: *Farmscoper* (UK), *Phytopixal* (FR), *SCIMAP* (UK)
- Main findings:
  - All tools are suitable to model risk and suggest suitable measures.
  - Poor input data quality limits the explanatory power of results.
  - Spatial models require a lot of expert knowledge.



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Example 3:
DST testing in Lower Saxony case

<u>DSTs to identify cost-effective allocation, location and choice of N mitigation measures</u>

- Tools tested: *Mark Online* (DK), *Düngeplanung* (GE)
- Main findings:
  - Some aspects of Danish fertilization law are easier to implement, manage and control than in Germany.
  - In most cases, arable farmers in Lower Saxony comply with Danish regulations.
  - The use of one comprehensive tool is more popular among farmers than using several small tools.

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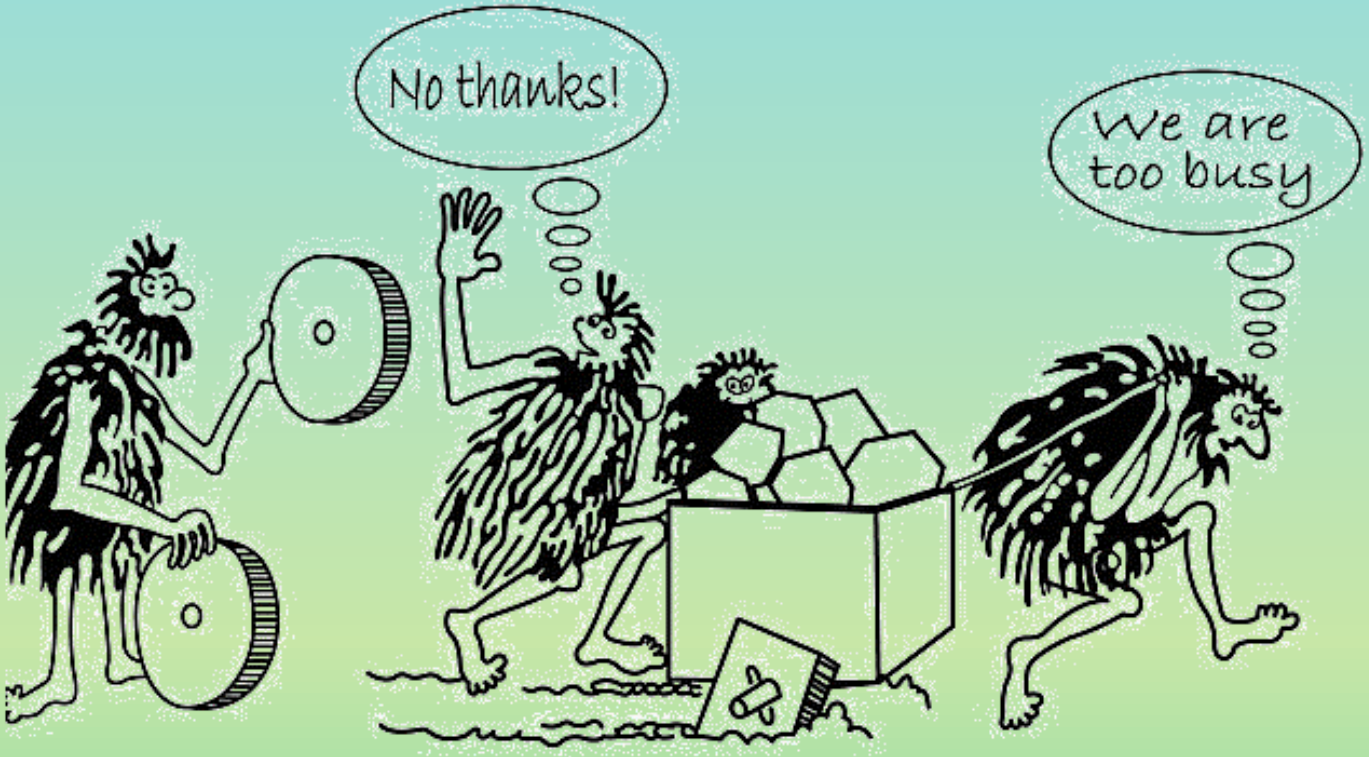
General findings

1. Countries have developed similar tools to address similar problems...



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General findings

… but many **barriers** exist why DST cannot be implemented 1:1

- Language
- Country specific legislation
- Differences in pedoclimatic situation and agricultural structure
- Data requirements
- Specialist software/IT-skills required
- Software access/financial costs
- Lack of support/documentation

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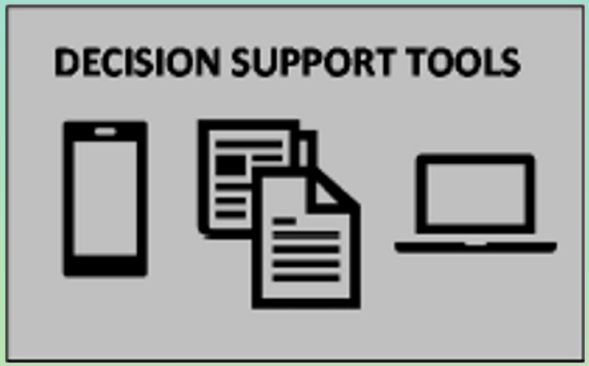
General findings

USE
- Continous update, improvement, maintenance of software
- Direct assistance from advisor with appropriate training
- Handbook/additional information in national language

ACCESS
- Free access of DST and additional information
- preferably web-access
- Open source format



FUNCTIONALITY
- Simple, self-explanatory
- Able to handle complexity
- Holistic approach („All-in-one-tool“)
- Flexibility of data in-/output
- Reality/consistency checks
- Clear references of data

OUTPUT
- Reliable and understandable results/recommendations
- Information if regulation are met
- Graphical presentation of results
- Financial gain + Public recognition

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Take home messages

- Decision Support Tools can help to reduce diffuse nutrient and pesticide pollution from agriculture.
- There is a gap between DST in (scientific) literature and those used in practice.
- The effectiveness of a specific tool in tackling pollution depends on
  - the presence of a skilled advisor,
  - the tool‘s design concerning access, functionality and use,
  - the regional adaptation of a specific DST.
- Cross-border exchange can inspire end users to improve existing DST.

→ Get inspired by our DST framework!

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Thank you for listening

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