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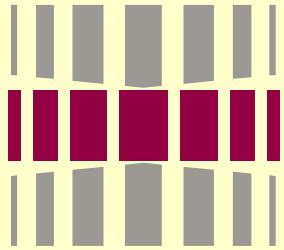


Gap analysis for ecosystem service models

2nd TESS Workshop Tallinn

October 7, 2010

Kristjan Piirimäe

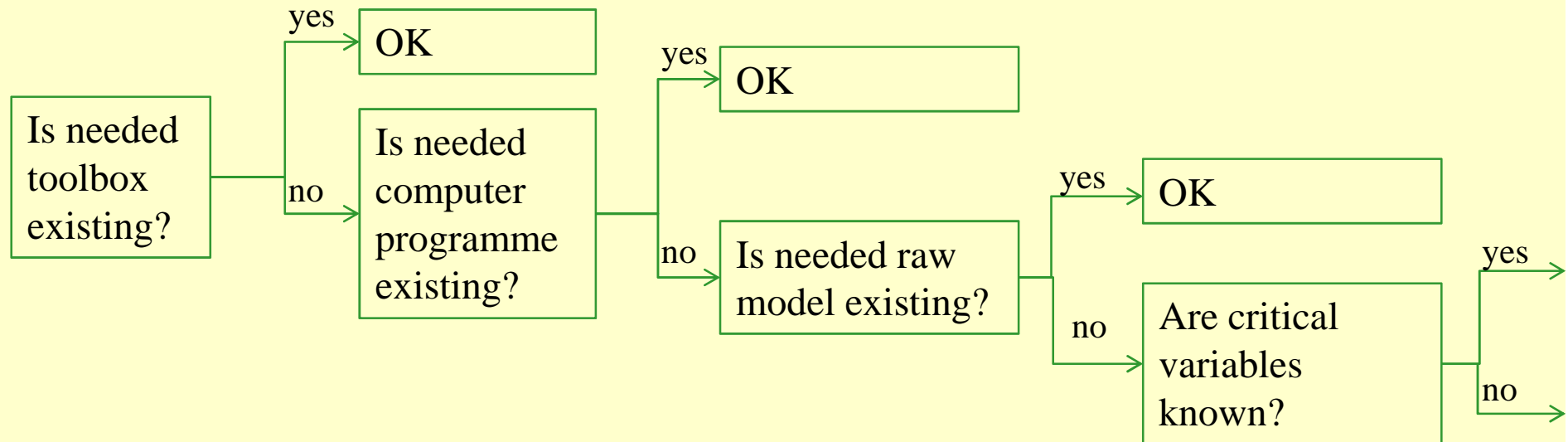


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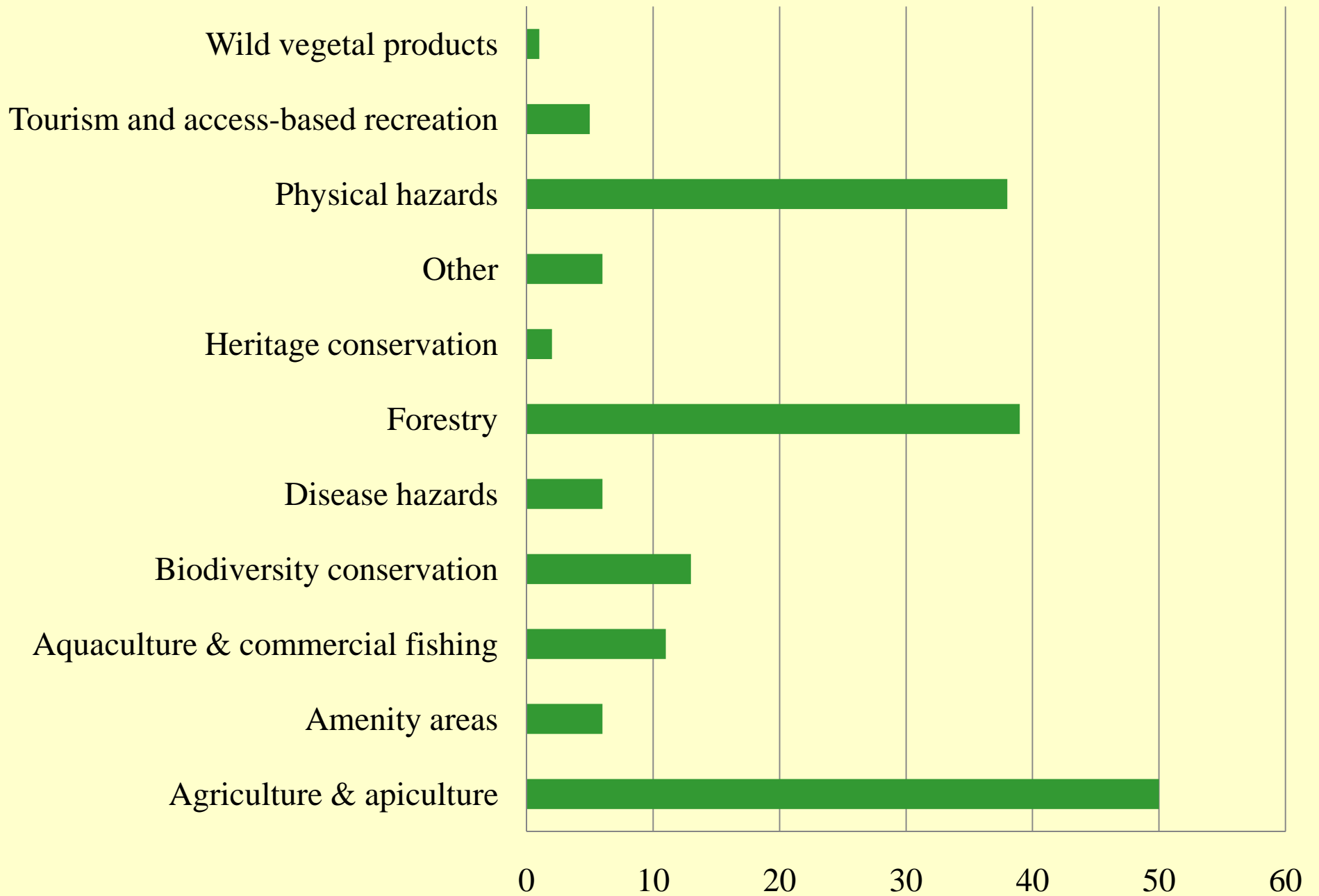
Action 4.2.1. Methodology of gap analysis



Along with vertical complexity, bridging the gaps should start from missing toolboxes, followed by missing computer programmes, followed by missing raw models, ending with missing variables and missing data



Ecosystem service management





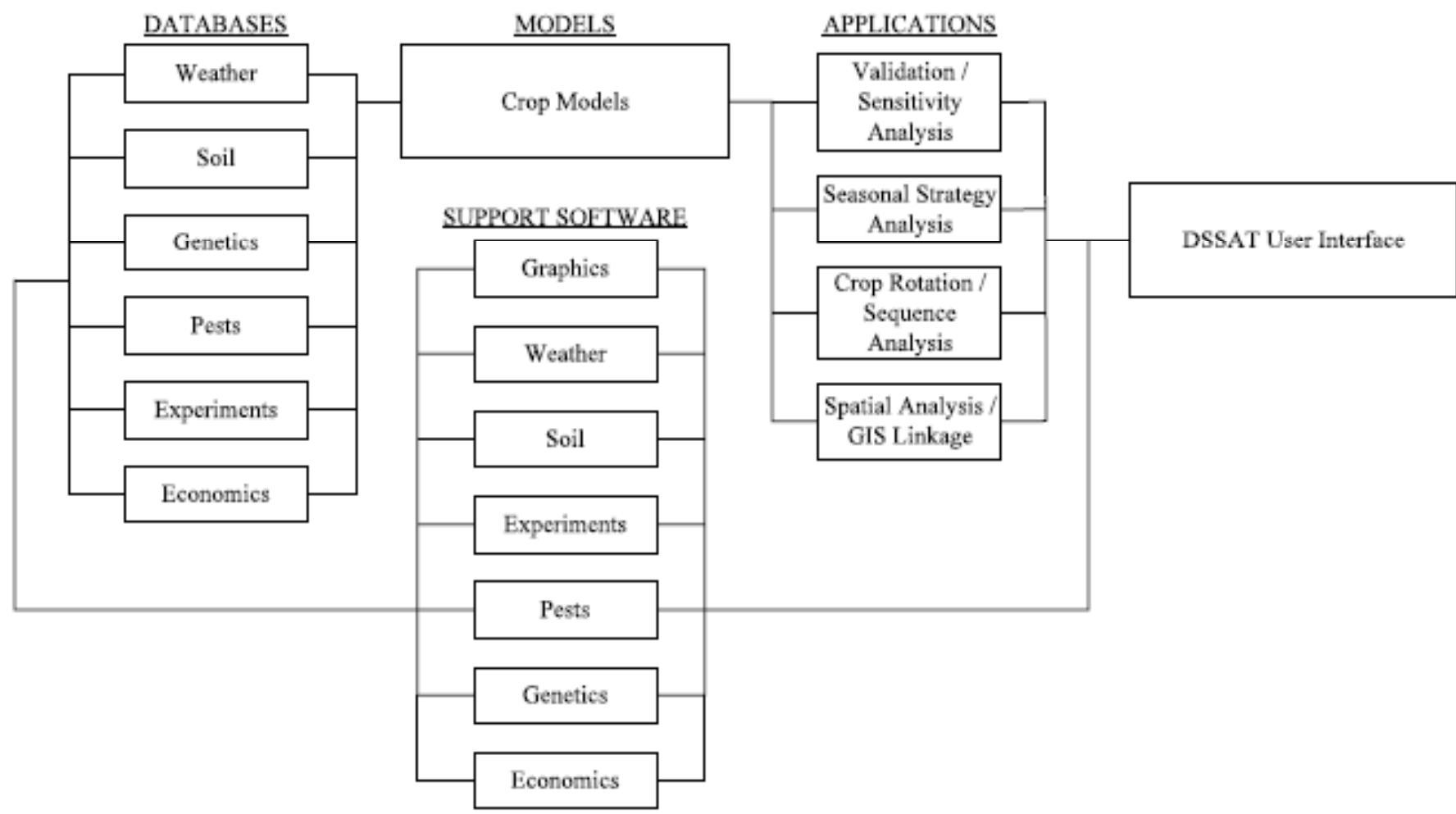
Integration gaps in the existing decision support toolboxes



Field Health Toolkit	Forest Health Toolkit	Recreational Site Management Toolkit
DSSAT Apollo MicroLEIS DSS	SFM Toolkit BAP toolbox	<i>Integration gap!</i>

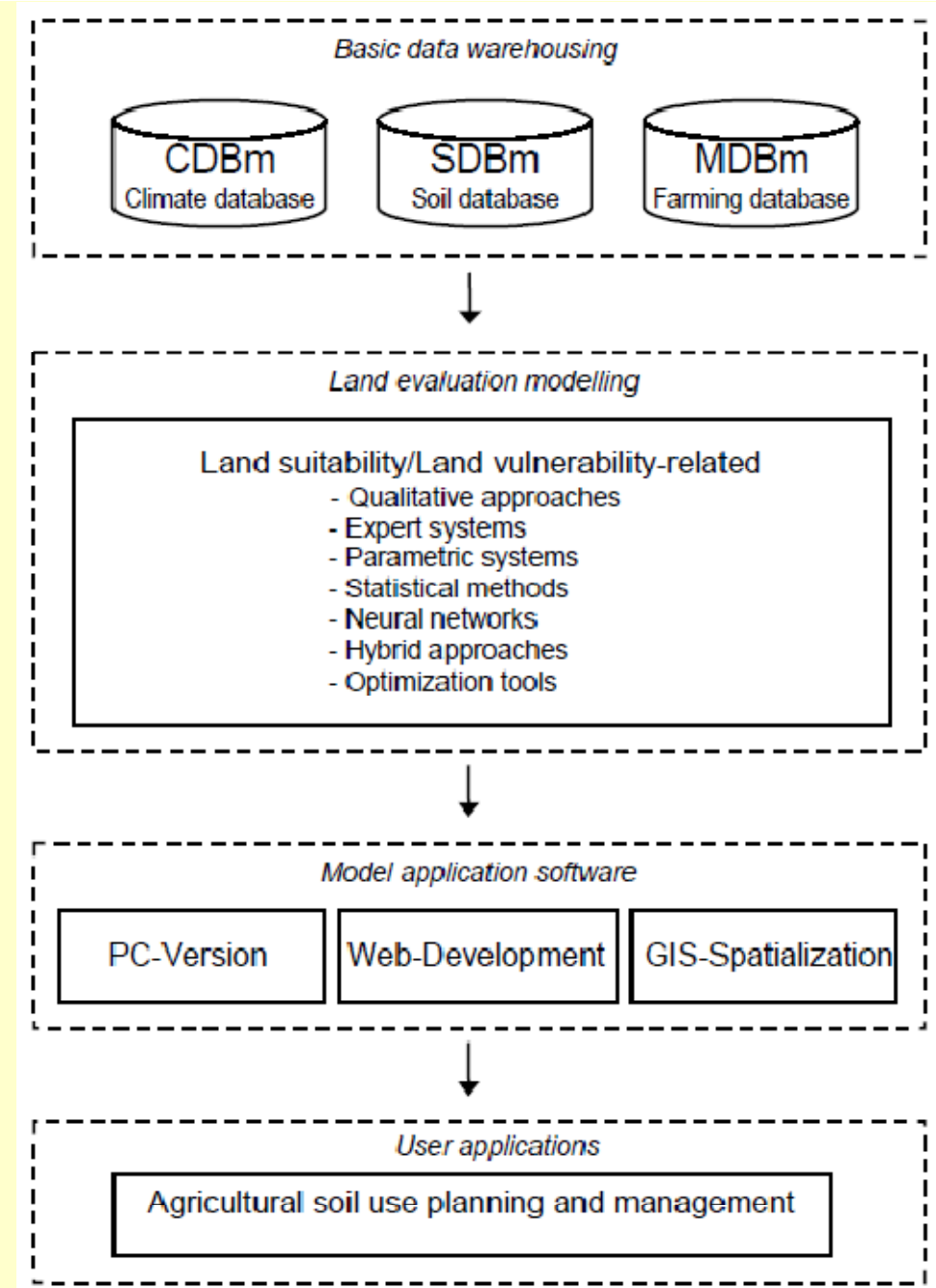


Existing farm management toolbox: DSSAT

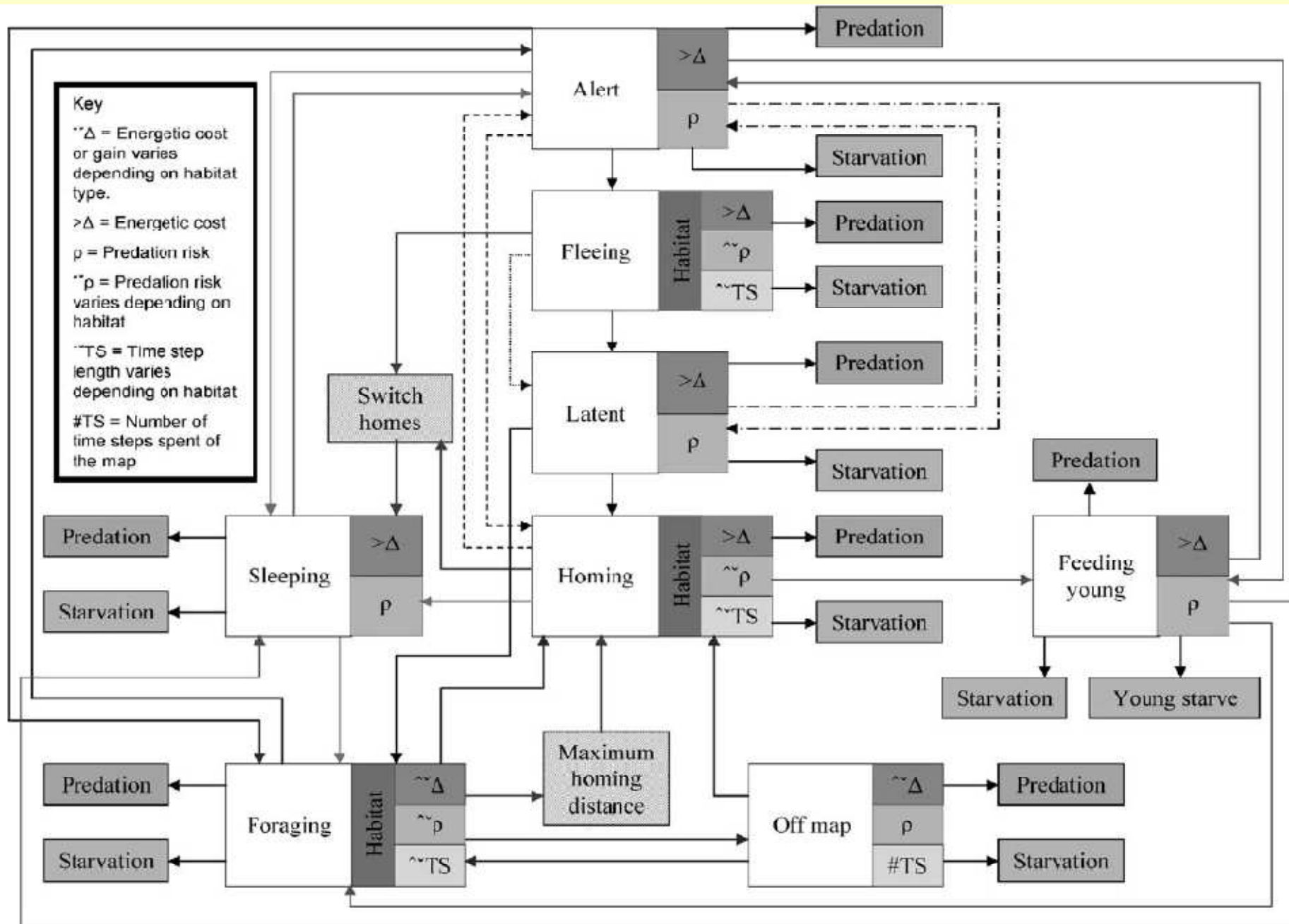


Conceptual design and component integration of the current status of MicroLEIS DSS land evaluation decision support system (from Rosa et al., 2003)

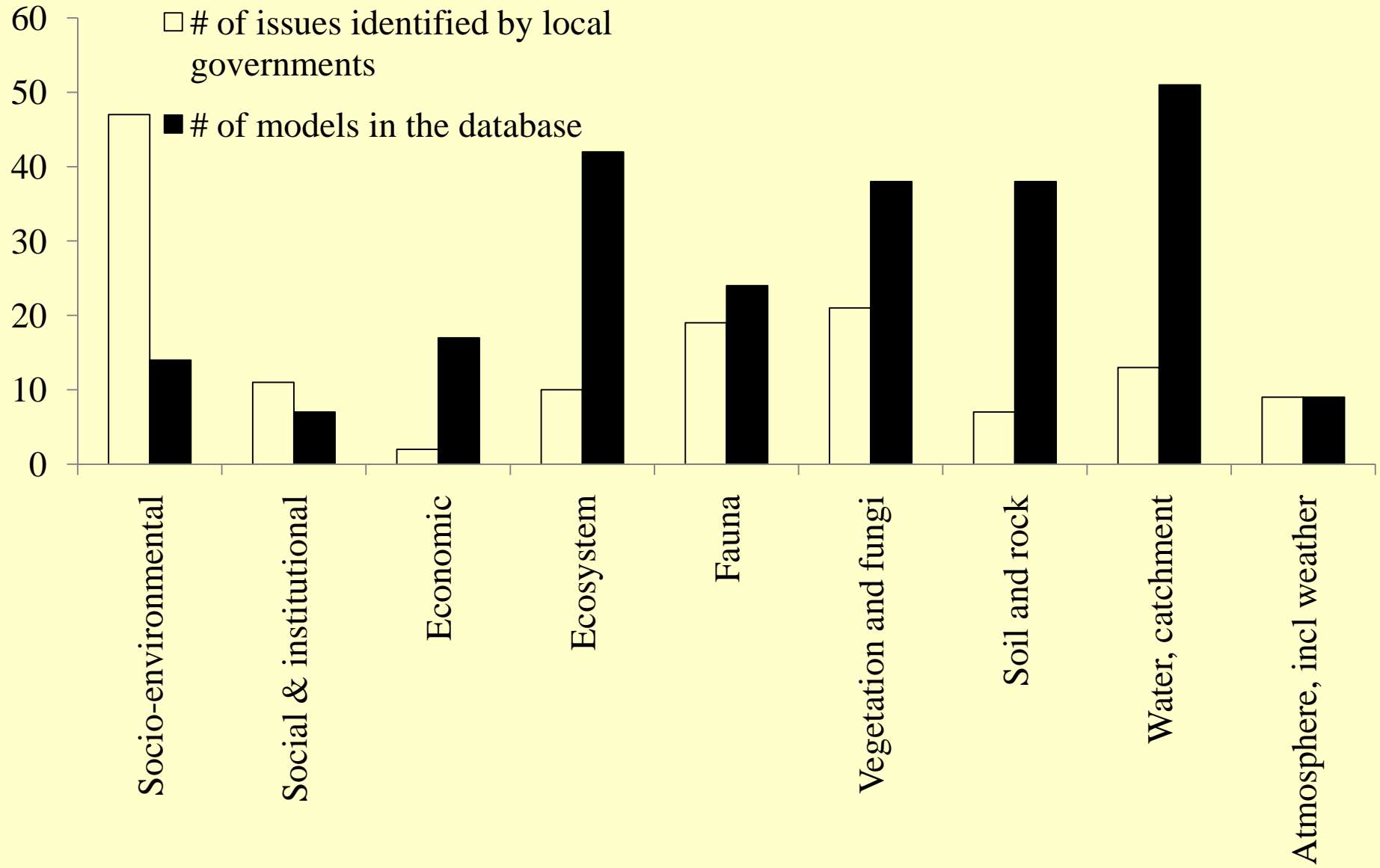
- The design philosophy follows a toolkit approach
- Data and knowledge engineering through the use of a variety of databases and innovative modelling techniques
- Scaling-up of process knowledge from the micro-scale to the landscape-scale (regional, national and continental);
- **Incorporating the soil quality and sustainable agriculture concepts**, towards an agro-environmental decision support system



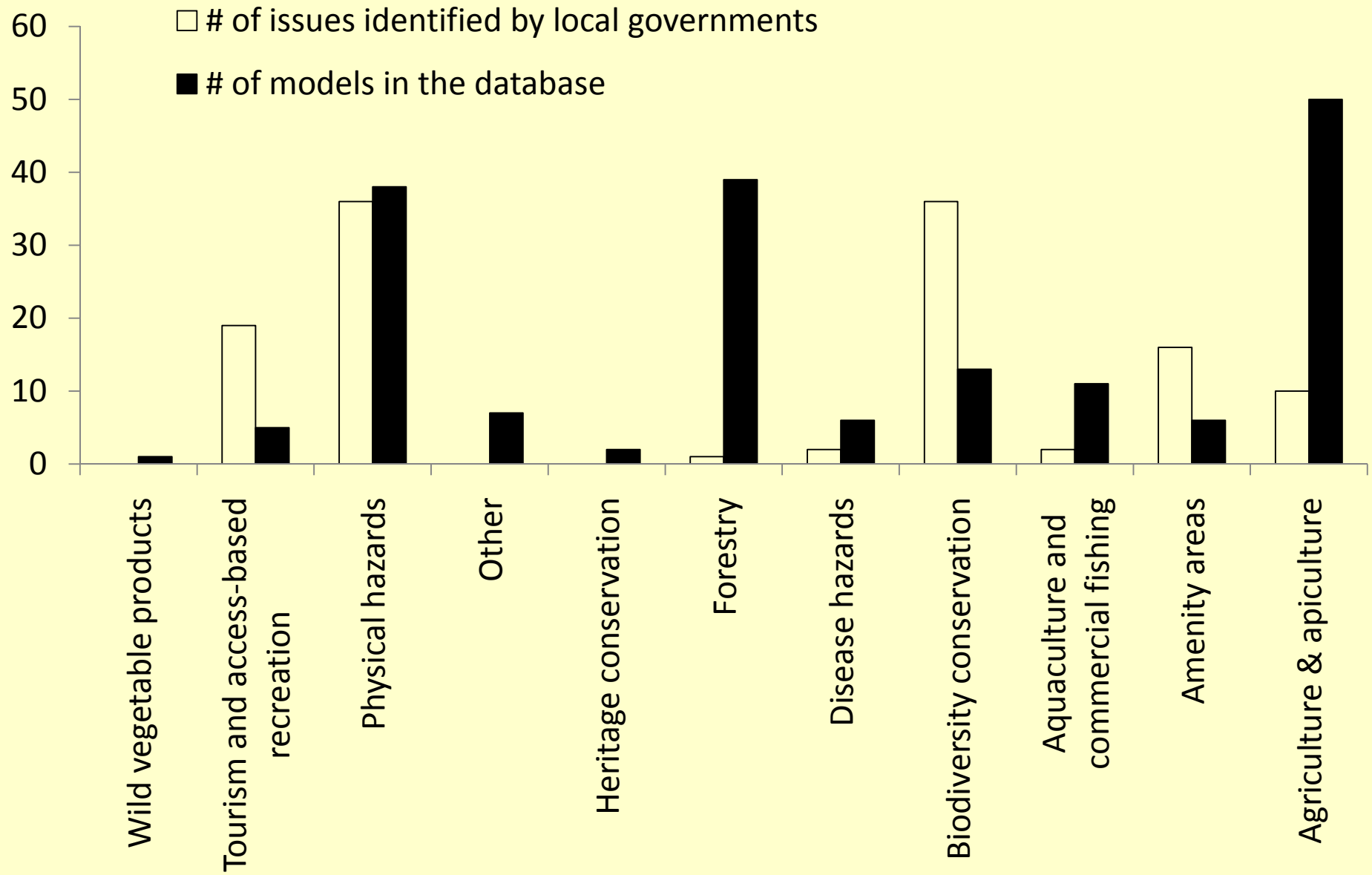
Simulation of Disturbance Activities (SODA)



Fulfilment of stakeholder needs



Fulfilment of stakeholder needs (continued)



Thematic gap analysis

Themes	# of issues	# of models
water quality; fisheries resources	1	51
Rivers and streams	3	51
Agricultural changes	3	50
Environmental issues in general	2	42
Information regarding habitats on regional scale	1	17
Demographic	1	14
Species conservation	4	13
Biodiversity conservation	6	13
Fauna and Flora	1	13
Amenity areas	6	7
impact of tourism and recreation	3	5

Issue	# of issues	Models			
Landslide risks	2	TERRARISC			
Drainage systems	7	SWMM			
Flood prediction and risk assessment	13	SWMM	MECOTER		
Impact of agriculture & industry changes in land use on environment/people	3	SODA	SELES	ABM/LU CC	AMAP
Impact of recreational/housing/business building development on environment	1	SODA			
Trails and exposure to wear on nature areas	1	SODA			
Impact of camping on environment	3	SODA			
Land use	2	SELES	AMAP	ABM/LUCC	

Issue	# of issuesModels							
special nature surveys, land use planning, building	1	SELES	AMAP	ABM/LUCC				
Water supply	3	SAMS						
Contaminated land	3	RISC	FITORIS C	CABO TO	MECO TER			
Recreational areas and routes	1	RBSIM	SODA	TourSim	Wilder-ness	WUSM	Landscape Management Checklist	Cudgen Lake Bn
Public access	6	Patchworks						
Protected areas	2	NATURNET-REDIME	MORFD D					
The development of specific areas (eg. A belt of green spaces)	1	MICROLEIS						
contamination of groundwater	2	MECOTER						

Issue	# of issues Models								
Visual Impact on Environment	1	L-VIS	Silvisio	TREE VIEW	WUSM	AMAP	Lenn e3D	SELES	STELLA
Gardens restoration	1	Lenne3D							
quality of sea water	1	ECOPATH							
fishing restrictions, land use planning	1	ECOPATH	FISAT II						
quality of soil for the farming community	1	DSSAT	Apollo	MICROLEIS					
Historical Issues	1	CLUE							
Afforestation	1	CASMOFOR							
Impact on Bird Species	1	Bird							

Issue	# of issues	# of Models
Relative values of different habitats for wildlife and humans	1	BAP Toolbox Landuse Hungary Bioma pper MAB ES
Livestock and impacts hereof	2	APEX PolFlow
Soil protection, erosion prevention	4	APEX CENTURY CropSystem EUROSE EPICM
Forest fire prevention	1	ABM/LUC C Fire Behavior FVS-TWIGS Land Clim LAN DIS LAN DIS II Predi ction SEL ES
Impact of building development & urbanization on people, environment and transport	1	ABM/LUCC
Polluted soils	2	ABM/LUCC
Impact of agriculture on environment	2	51 water quality models Landuse Hungary
ground water	2	2D_V_HYDRO_S PolFlow SWA T RISC MEC OTE SWA P BAL ANC E
water quality; fisheries resources	1	51

Issues that have not been addressed in the database	# of issues
Roads, transport, traffic, mobility	27
Mining	9
Waste management	9
Wastewater	8
Roadsides	6
Conseravtion of trees	6
Hogweed	5
Landfills, communal waste deposite	5
The weather and damages	5
Heritage sites	4
Common land	4
dredging, cleaning of riverbed	3
noise and air pollution	3
Deforestation	2
Water and sewage issues	2
Infrastructure	2
Impact on archaeology	2
EIA, incl. habitats and protected species	2
Impacts of resort, holiday and business properties	2
Powerstation	2
Planning for windmillparks	2
rubbish	2
Smells	2

Issues that have not addressed in the database (continued)

Geology

Values of natural resources

Forest expansion

Pollution of lakes

Maintenance of water courses and gullies

River and lake restoration

water protection and restauration; assistance to voluntary associations

ground water areas

Fakia River - construct a supportive wall

Maintenance of sewing systém

Drinking water quality

Overfishing

Gutter keeping - when and how often eskers

Hedge management- cutting, laying (costs, impacts)

Dumping rubble (boulders, rocks and soil) in valley streams

Gully maintenance – when and how often

Impact of the industry nearby, air polution, smells

Mitigation of wild mammals road casualties

Impact on designated sites

Settlements in nature areas

Impact of builing, housing, vacation, business

Impact of holiday/residential/business properties

Impact of housing and urban development transport, mobility of people and environment

Allotments

Animal pests (mammals, birds, insects)

Lopping of olive trees/burning of agricultural residues in the fields

Horticulture rehabilitation and development

Plantations

playing field for agricultural circuit

burning of agricultural residues in the fields

Impact of skiing slope on habitats of protected species

Ecotourism development

Issues that have not addressed in the database (continued)

Green area maintenance (cost, impact)

Regulation of populations of wild species (polecat, wild boar) habitats according to the forest act (protected)

Homeless animals Impact of domestic animals (dogs, cats, horses)

Permanent damages related to horses left uncontrolled

The negative effect from permanent residential buildings for recreation and tourism

Information about communities

invasive plants

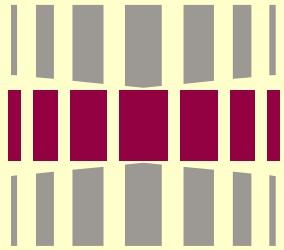
Control of *Heracleum montegazzianum*

Environmental management of energy supply green energy (solar, wooden chips and so on)

Renewable energy Communal waste transportation problems

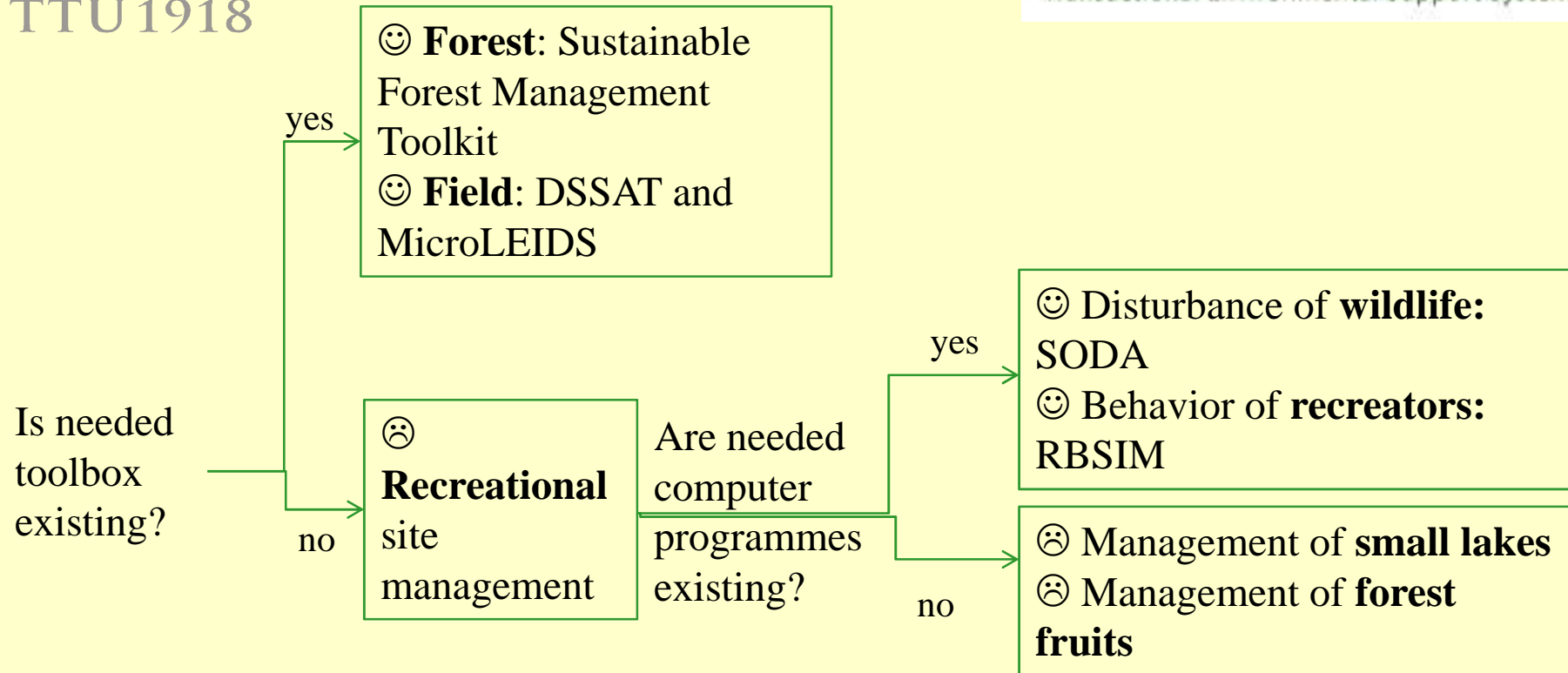
Results of gap analysis

- The existing **crop management toolkits** well cover soil health issues but lack wider field health issues such as ecosystems around the fields (grassy field margin etc.) providing biodiversity, biocontrol agents, pollinators and other services
- An existing **Sustainable Forest Management Toolkit** well addresses forest health issues. However, it has been applied mostly in Canada. Hence, adaption to the European conditions might appear challenging.
- There's no comprising **recreational site management toolkit** yet existing. Thus, such a toolkit needs to be created. The core models for that might be RBSIM and SODA.



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Conclusions





Results of thematic gap search



Ecosystem service type	Information demand	Information supply	Conclusion
Biodiversity	high	low	thematic gap!
Provisioning	low	high	ok
Regulating	medium	low	thematic gap!
Supporting	medium	high	ok
Cultural	medium	low	thematic gap!