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TESS
Transactional Environmental Support System

Gap analysis for ecosystem service models

2nd TESS Workshop Tallinn

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Kristjan Piirimäe

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Action 4.2.1. Methodology of gap analysis

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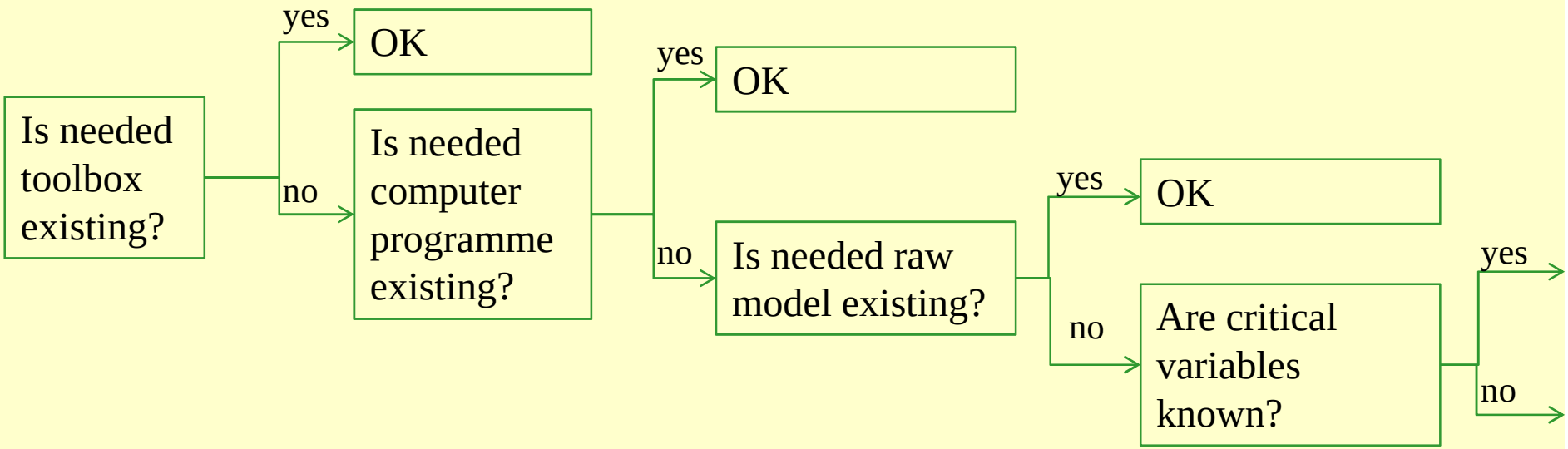
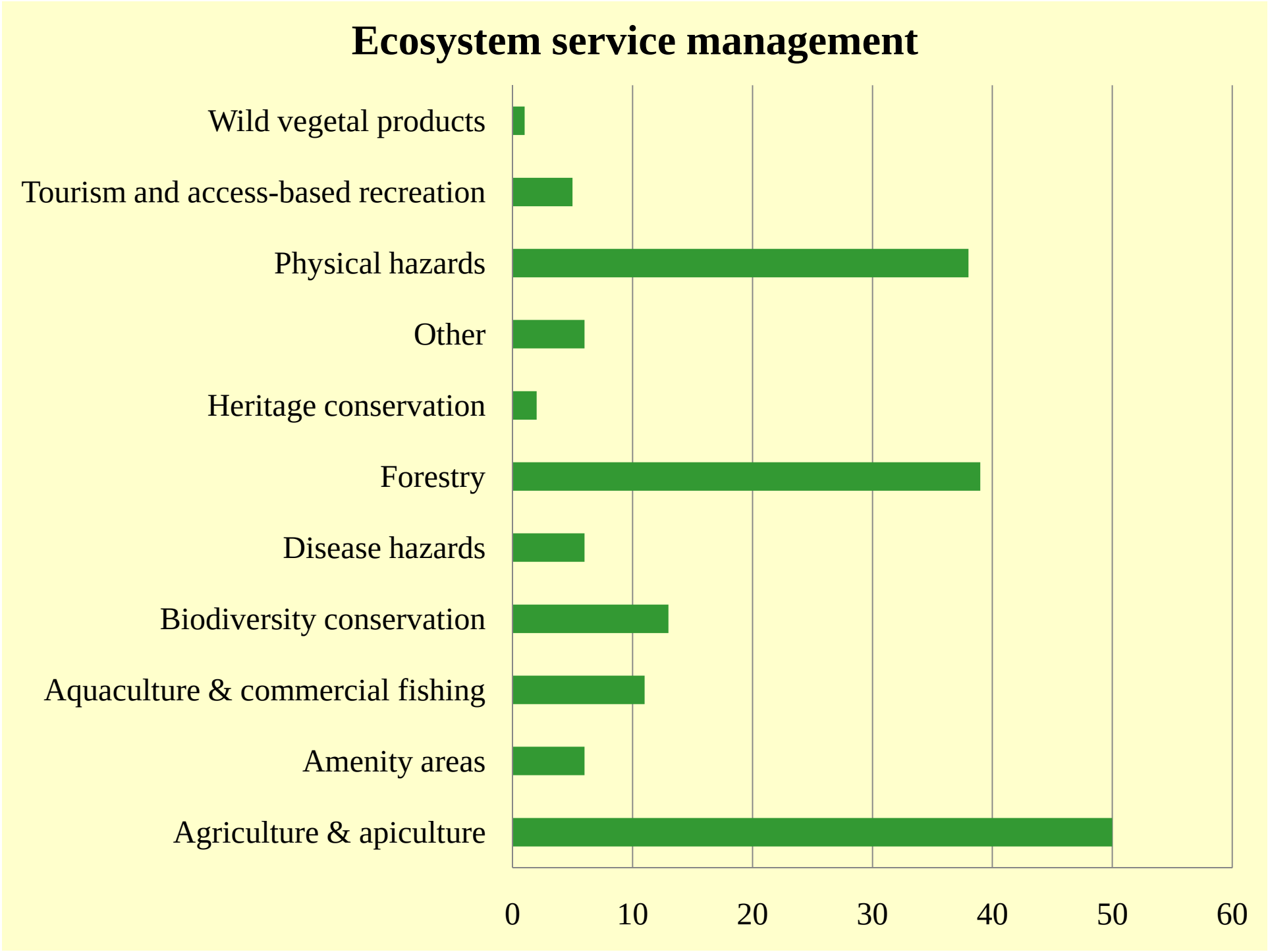
Along with vertical complexity, bridging the gaps should start from missing toolboxes, followed by missing computer programmes, followed by missing raw models, ending with missing variables and missing data




Ecosystem service management
Wild vegetal products
Tourism and access-based recreation
Physical hazards
Other
Heritage conservation
Forestry
Disease hazards
Biodiversity conservation
Aquaculture & commercial fishing
Amenity areas
Agriculture & apiculture
0
10
20
30
40
50
60

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Integration gaps in the existing decision support toolboxes

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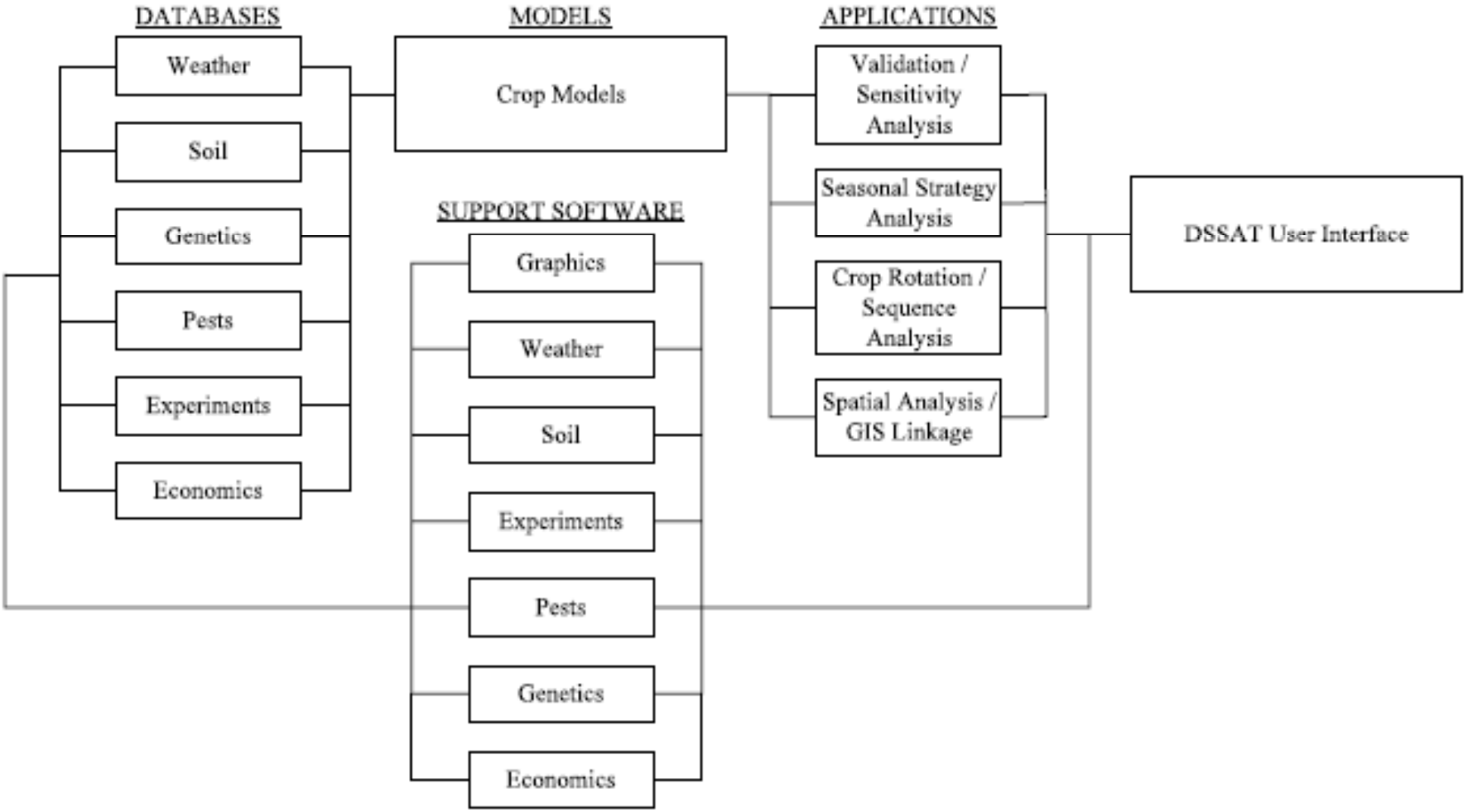
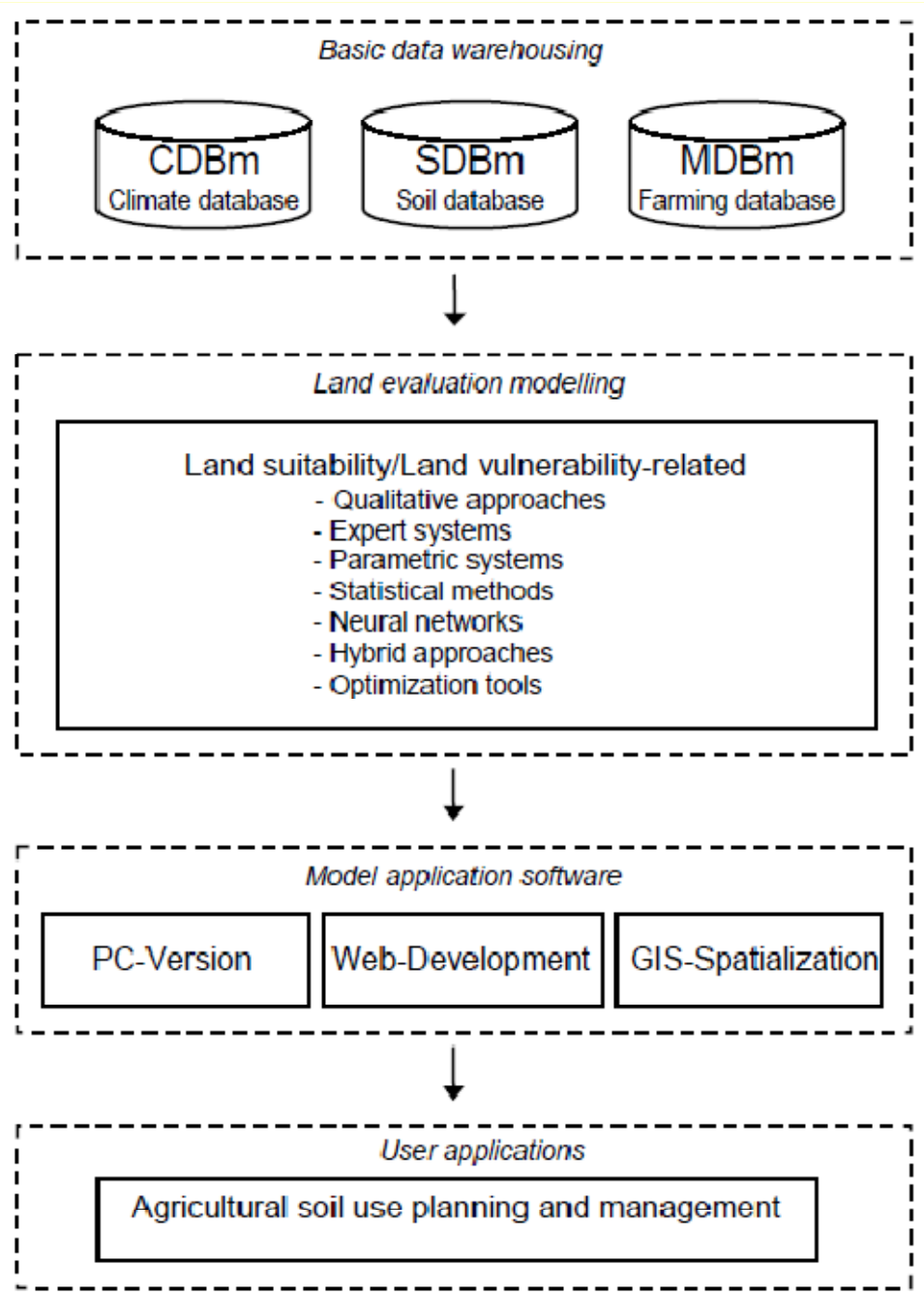
Field Health Toolkit	Forest Health Toolkit	Recreational Site Management Toolkit
DSSAT Apollo MicroLEIS DSS	SFM Toolkit BAP toolbox	*Integration gap!*

Existing farm management toolbox: DSSAT

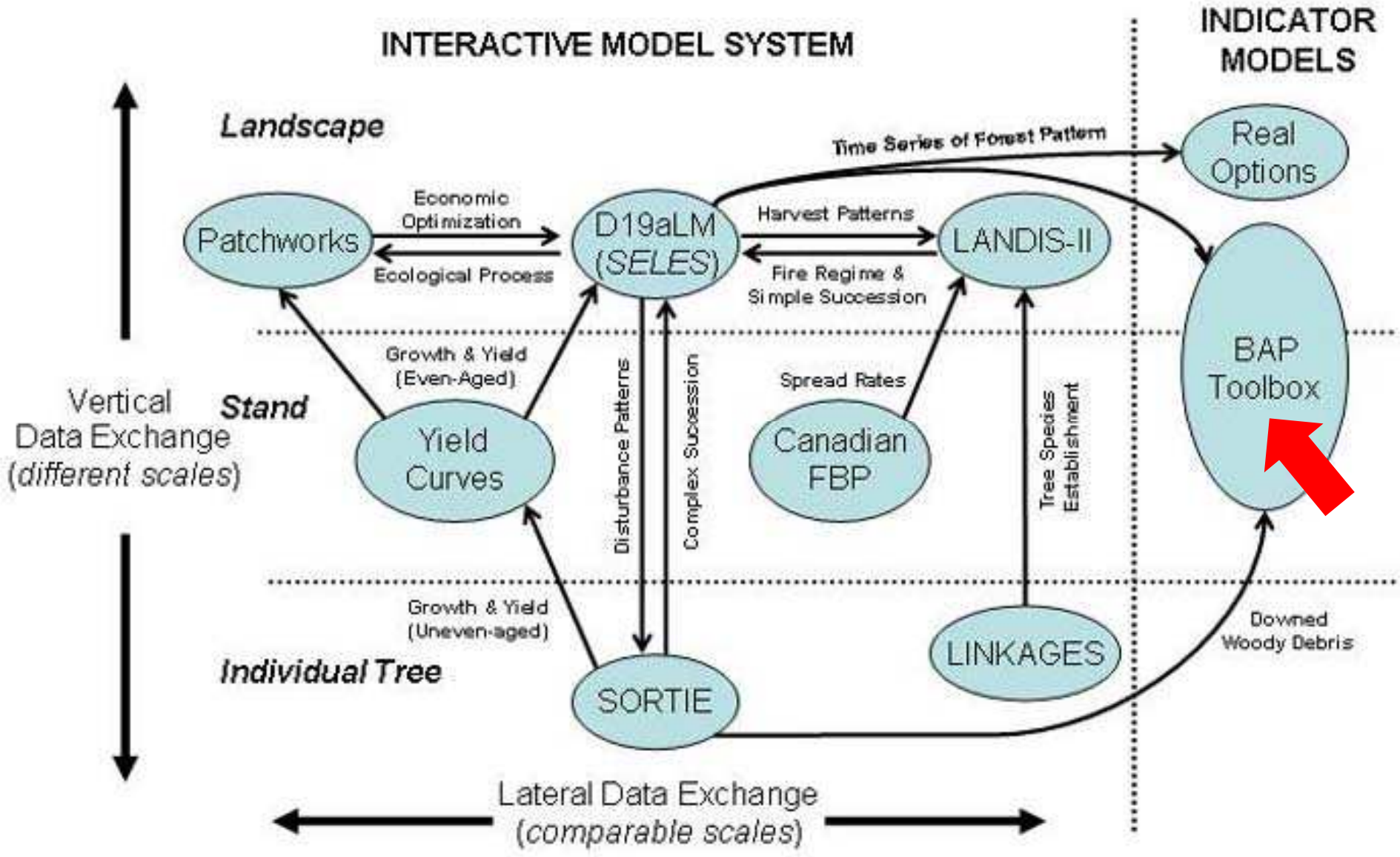


Conceptual design and component integration of the current status of MicroLEIS DSS land evaluation decision support system (from Rosa et al., 2003)

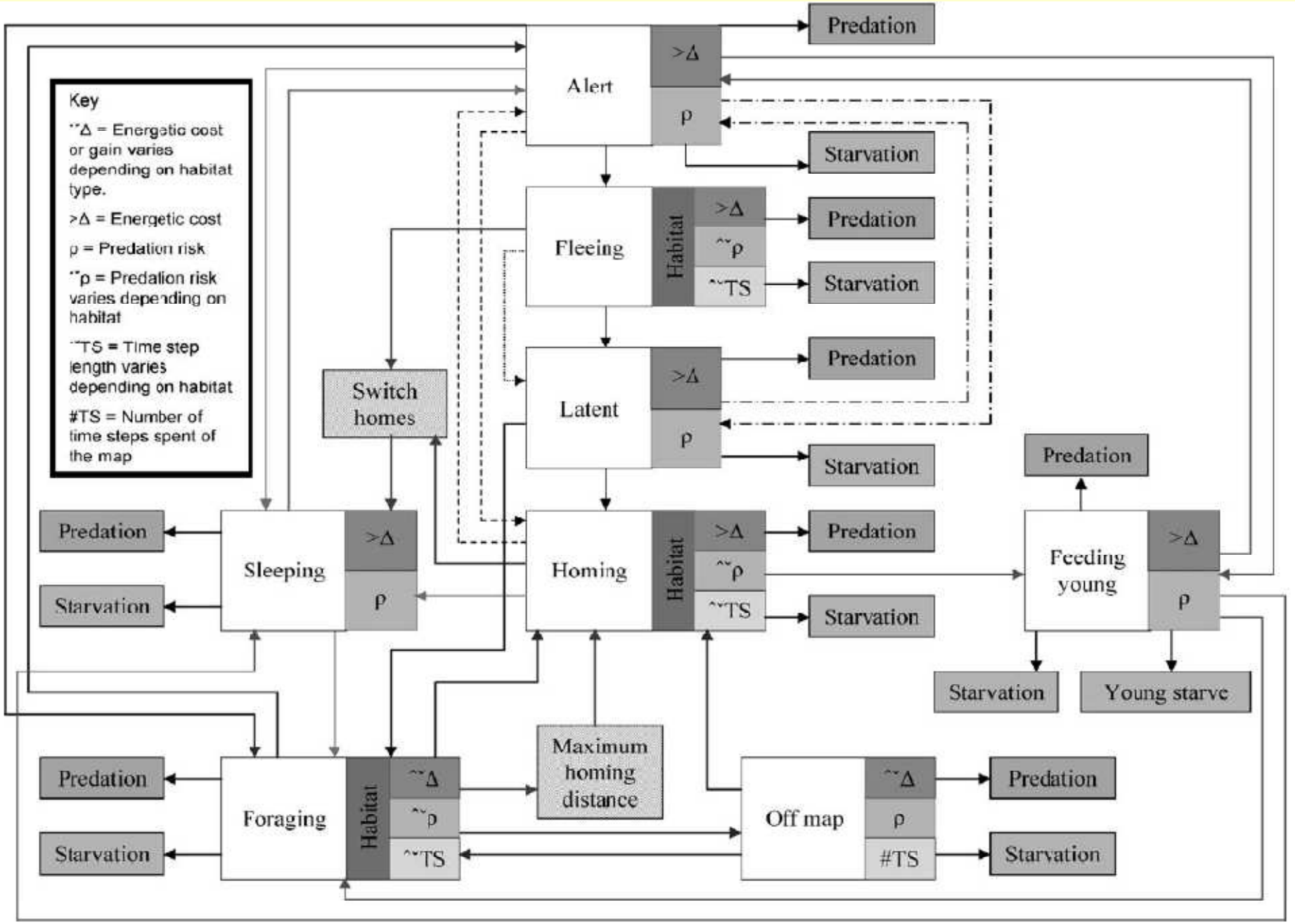
- The design philosophy follows a toolkit approach
- Data and knowledge engineering through the use of a variety of databases and innovative modelling techniques
- Scaling-up of process knowledge from the micro-scale to the landscape-scale (regional, national and continental);
- **Incorporating the soil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



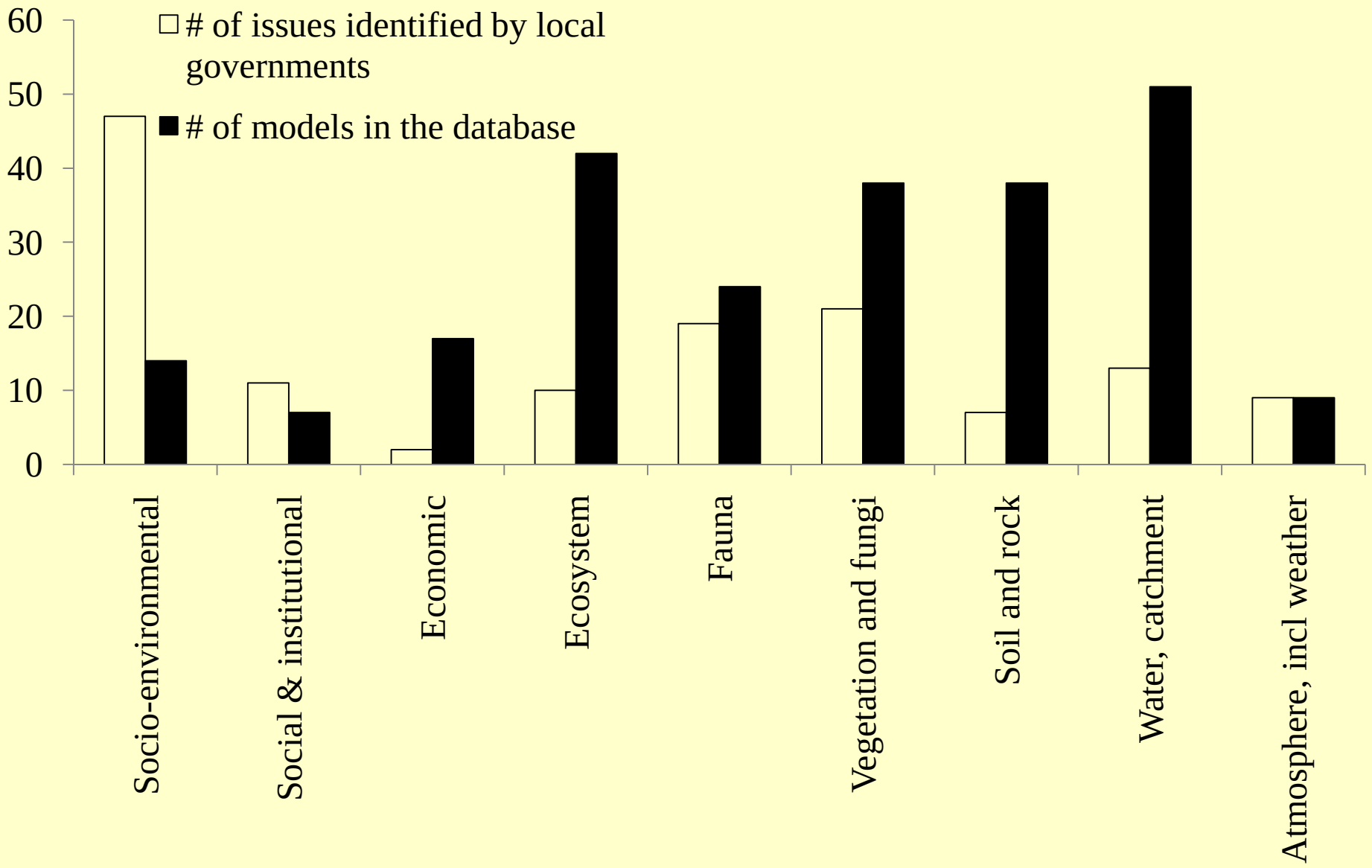
SFM Toolkit (from Sturtevant et al., 2007)



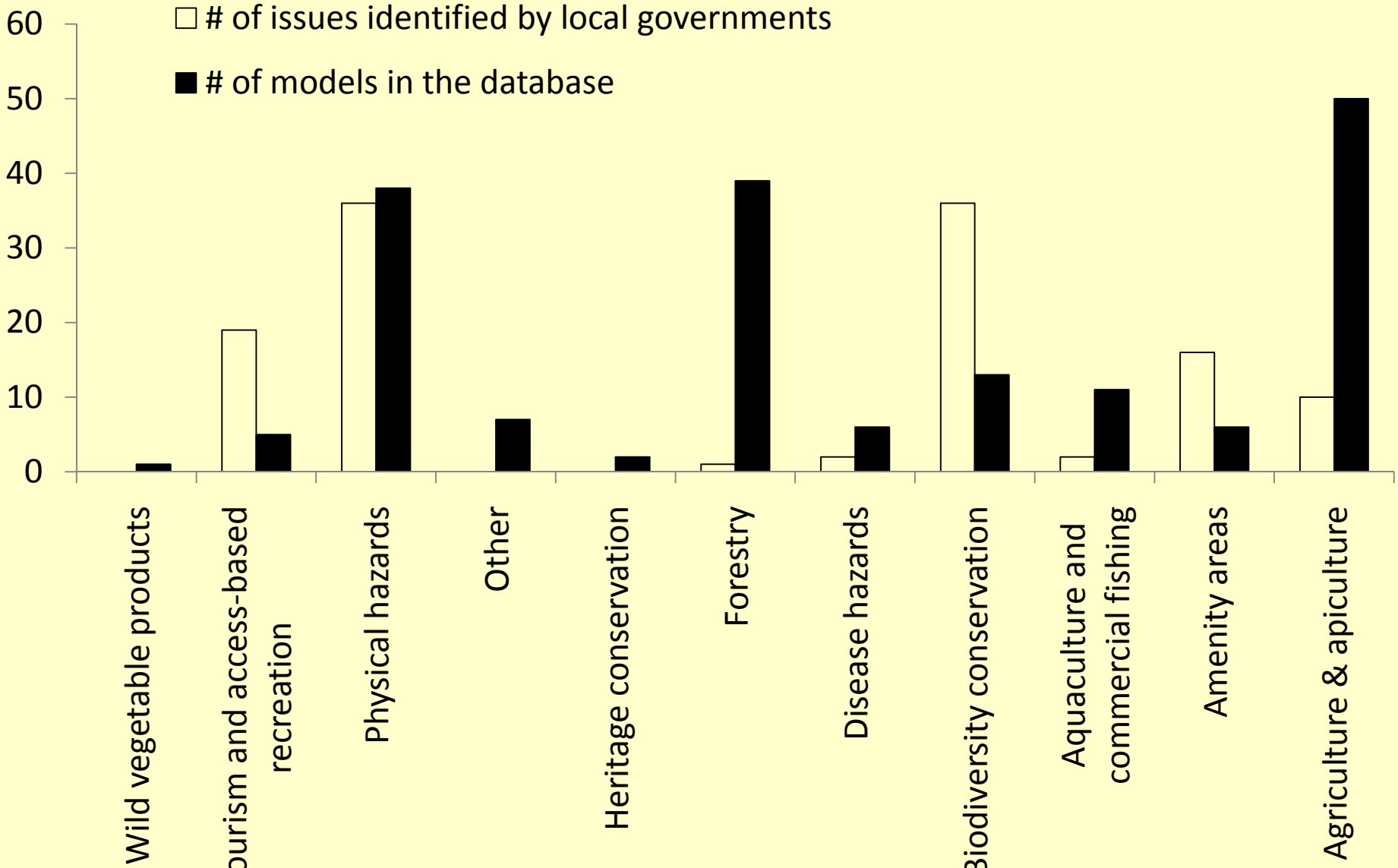
Simulation of Disturbance Activities (SODA)



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/LUCC	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 issues	Models							
special nature surveys, land use planning, building	1	SELES	AMAP	ABM/LUCC					
Water supply	3	SAMS							
Contaminated land	3	RISC	FITORISC	CABOTO	MECOTER				
Recreational areas and routes	1	RBSIM	SODA	TourSim	Wilderness	WUSM	Landscape Management Checklist	Cudgen Lake Bn	
Public access	6	Patchworks							
Protected areas	2	NATURNET-REDIME	MORFDD						
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	Lenne3D	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							
Afforrestation	1	CASMOFOR							
Impact on Bird Species	1	Bird							

Issue	# of issues	Models							
Relative values of different habitats for wildlife and humans	1	BAP Toolbox	Landuse Hungary	Biomapper	MABES				
Livestock and impacts hereof	2	APEX	PolFlow						
Soil protection, erosion prevention	4	APEX	CENTURY	CropSyst	EPIC	EUROSEM			
Forest fire prevention	1	ABM/LUCC	Fire Behavior	FVS-TWIGS	Land Clim	LANDIS	LANDIS-II	Prediction	SELES
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	SWAT	RISC	MECOTER	SWAP	BALANCE	
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 uncontolled

The negative effect from permanent residential buidings for recreation and tourism

Information about communities

invasive plants

Control of Heracleum montegazzianum

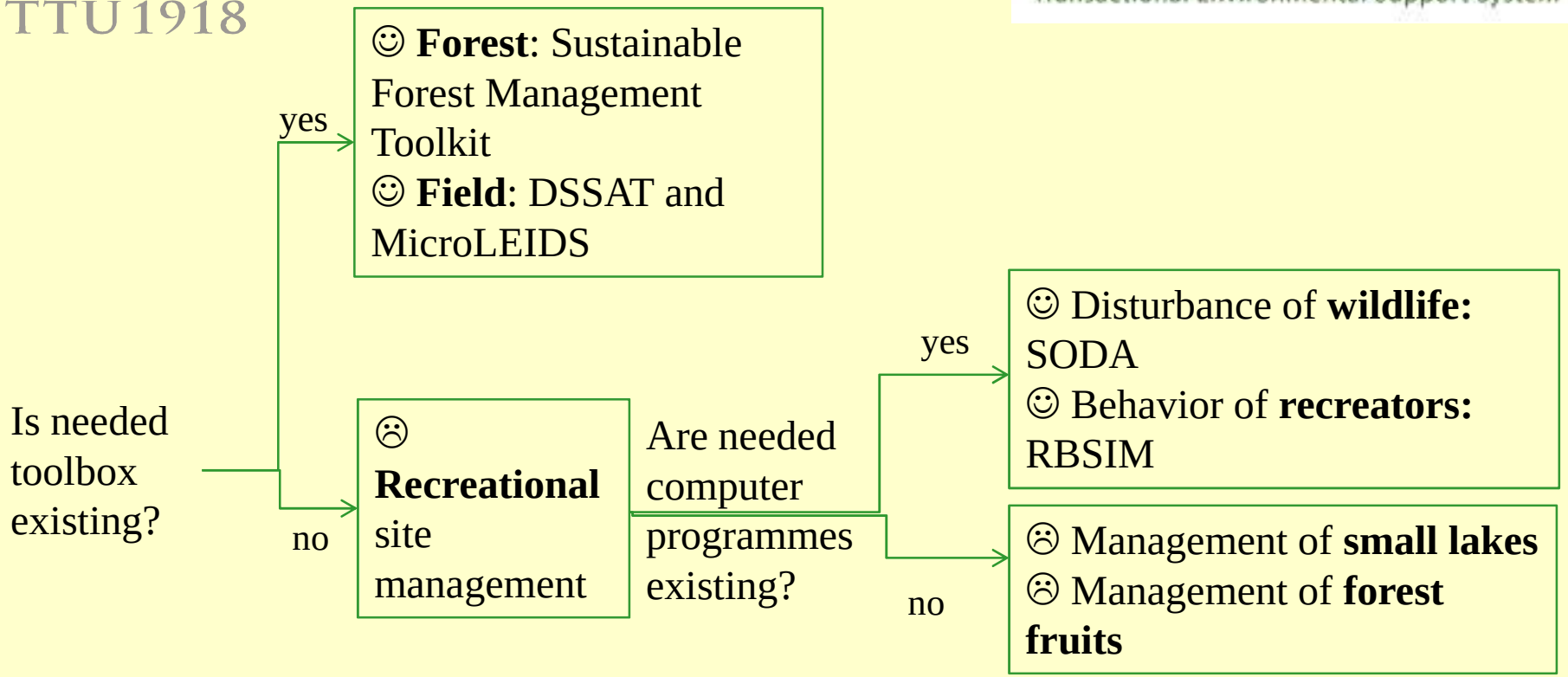
Environmental management of energy supply green energy (solar, wooden chips and so on)

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.

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!