EUROPEAN FOREST INSTITUTE

Marcus Lindner, Paul Weaver, Diana Tuomasjukka

Plenary: Overview of instrument types and tools

Available instruments and tools

WP4 Plenary

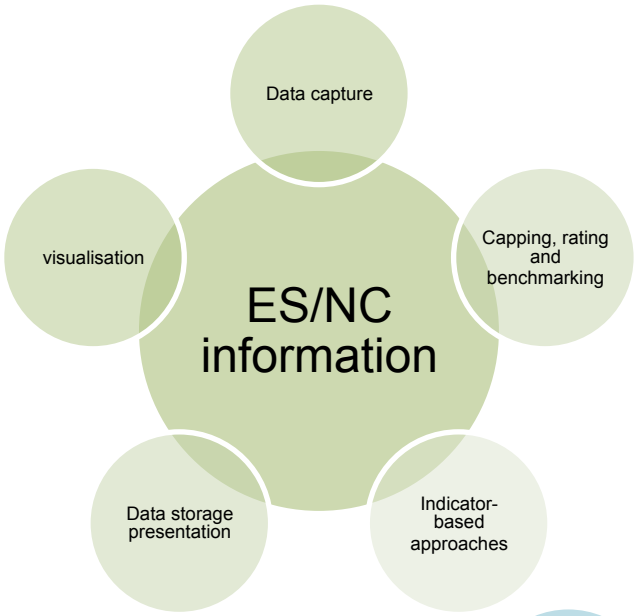
Tu 09.45 – 10.30 **Overview over instrument types with examples and knowledge needs with discussion (Paul Weaver/Marcus Lindner)**

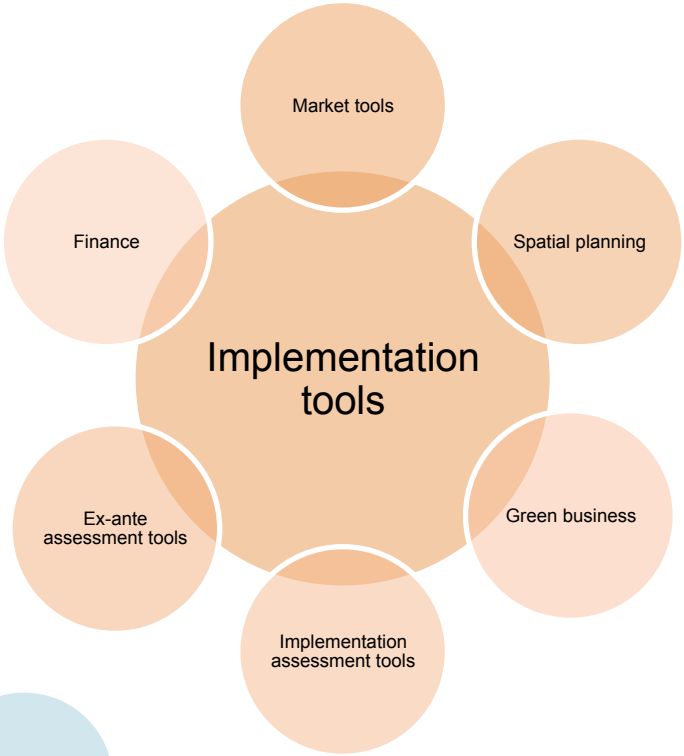
In preparation for

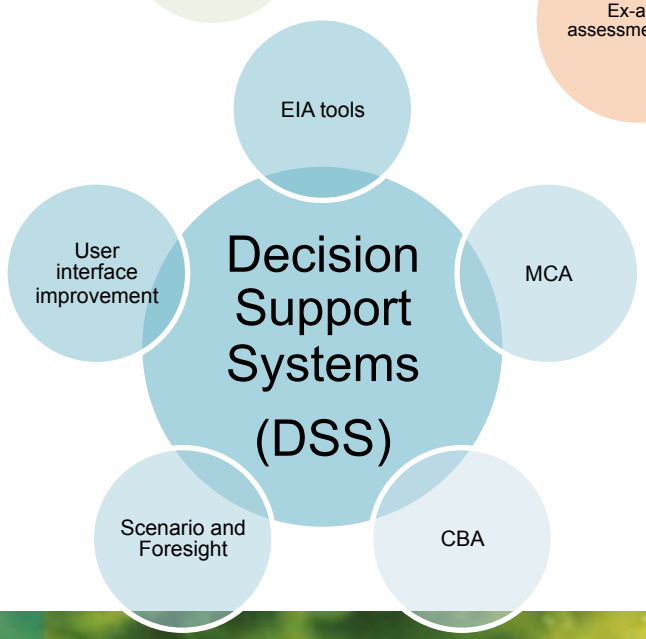
Tu 11.30 – 12.30 Exchange session: Instruments /Exemplar (data, information, decision support, implementation) (ALL)

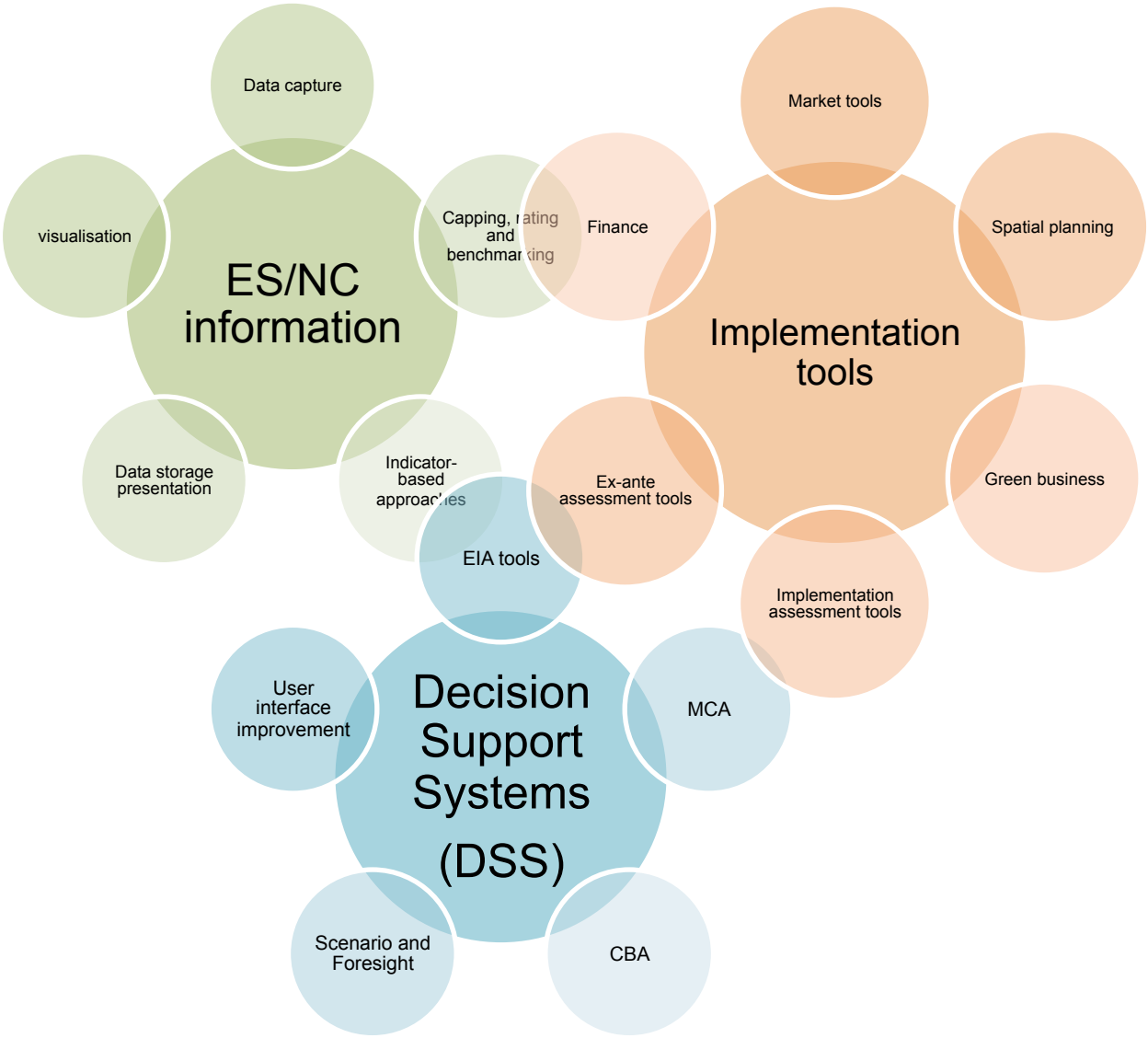
Aim of this session:

1. Introduce which tools and instruments exist, grouped into three groups:
    - ES Information (including Data capture)
    - DSS
    - Implementation
2. Map out what should happen in the Exchange session (11.30 – 12.30)?


Data capture
visualisation
Capping, rating and benchmarking
ES/NC information
Data storage presentation
Indicator-based approaches


Market tools
Finance
Spatial planning
Implementation tools
Ex-ante assessment tools
Green business
Implementation assessment tools


EIA tools
User interface improvement
Decision Support Systems (DSS)
MCA
Scenario and Foresight
CBA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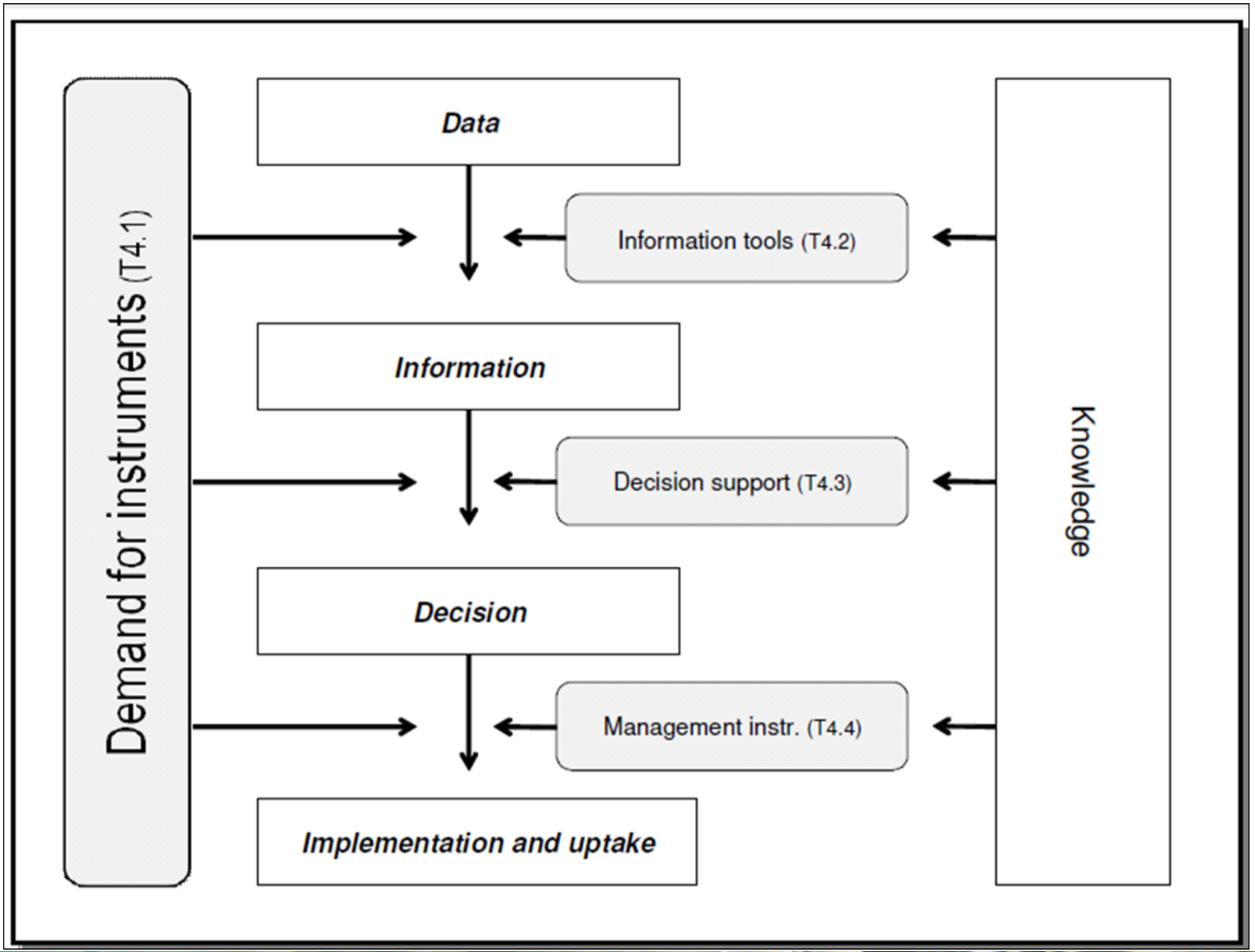
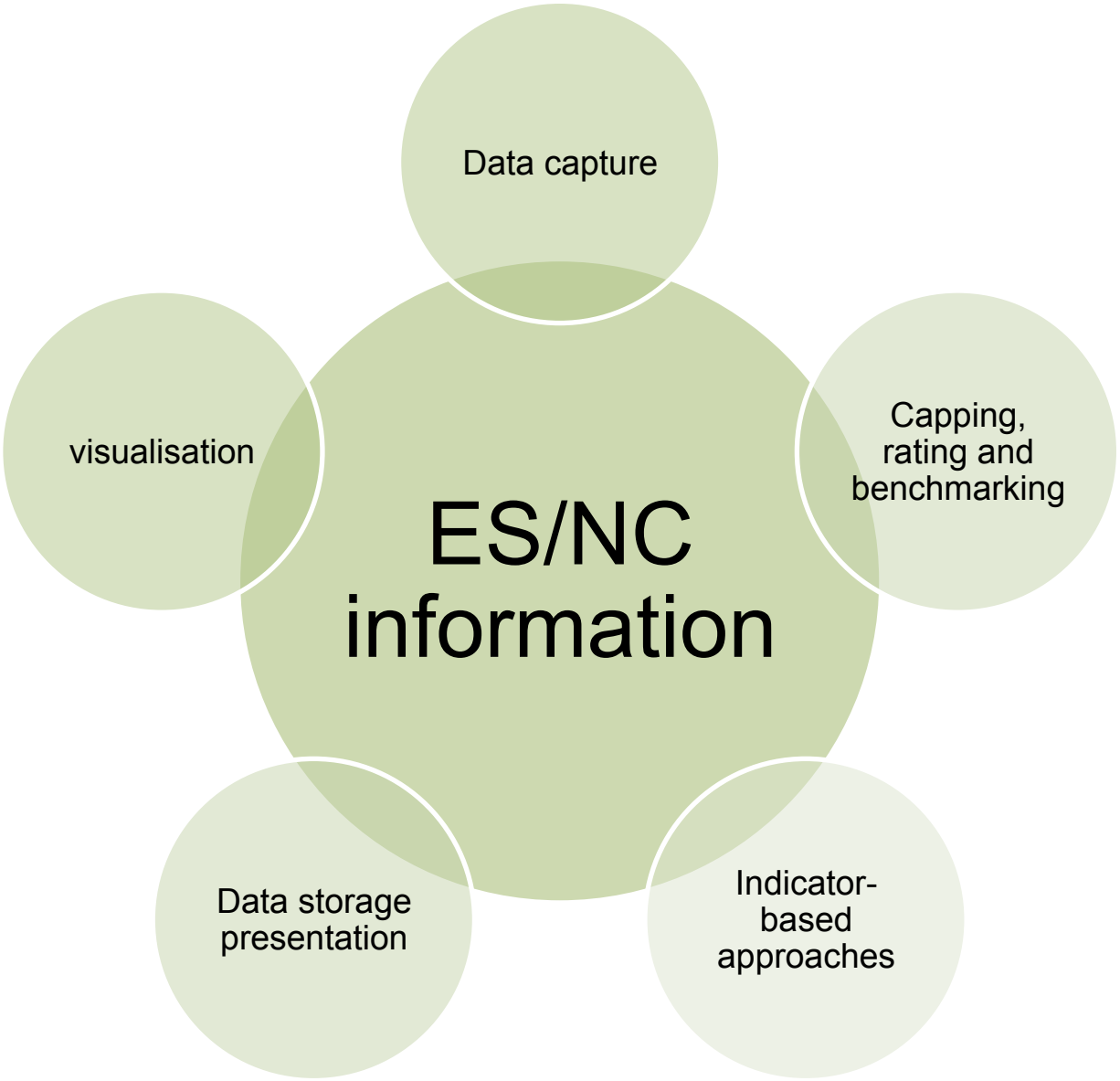

Demand for instruments (T4.1)
Data
Information tools (T4.2)
Information
Decision support (T4.3)
Decision
Management instr. (T4.4)
Implementation and uptake
Knowledge

Overview of Instrument Types / Tools

Disclaimer:

- Compiled based on slides submitted by partners before the meeting
- Task 4.1 will carry out a needs assessment (incorporating also Meta-analysis results from WP2)
- Selection and prioritization of Tools requires more discussion within WP4, but also across WPs in OPERAs (=> Exchange Session…)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visualisation
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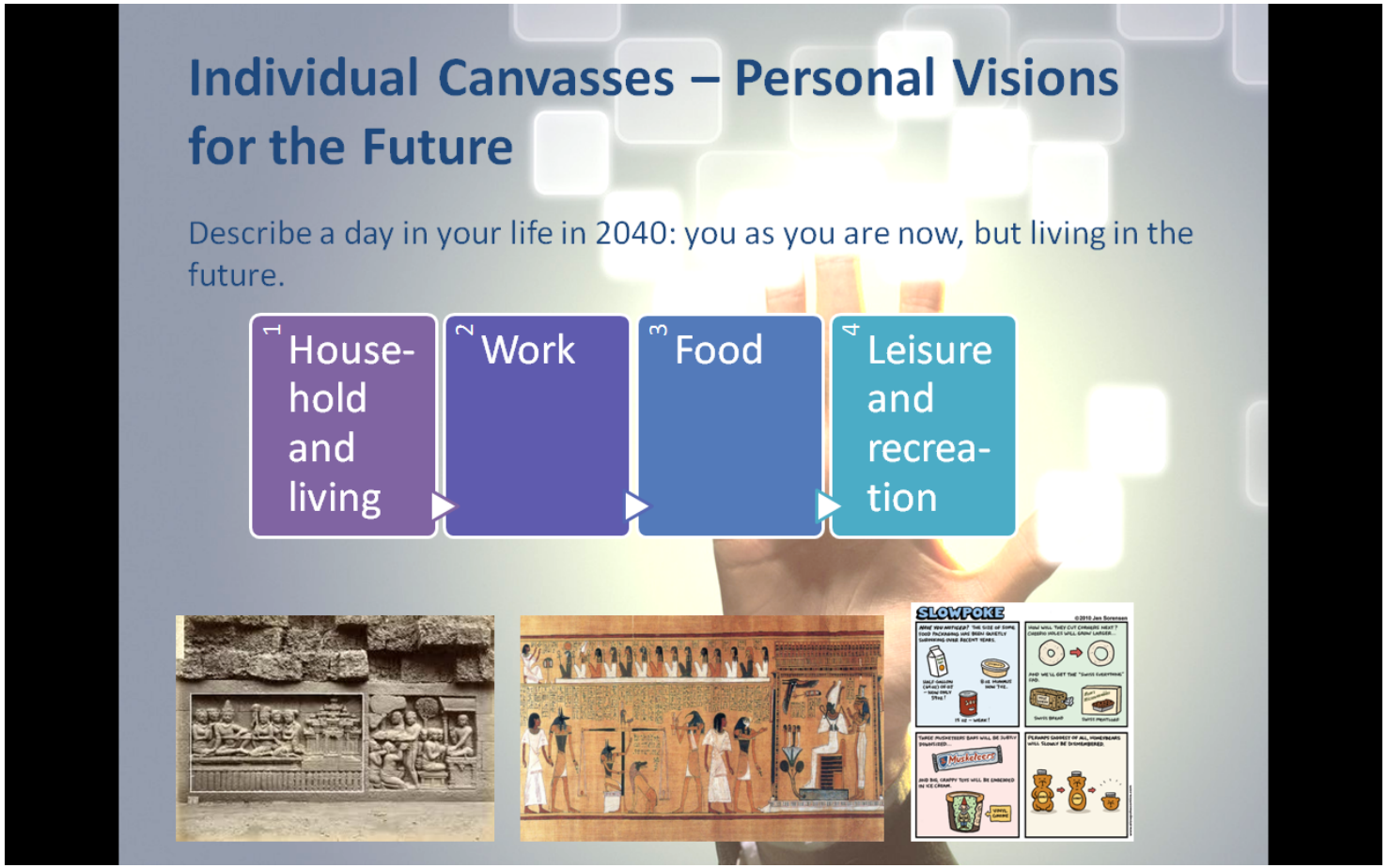
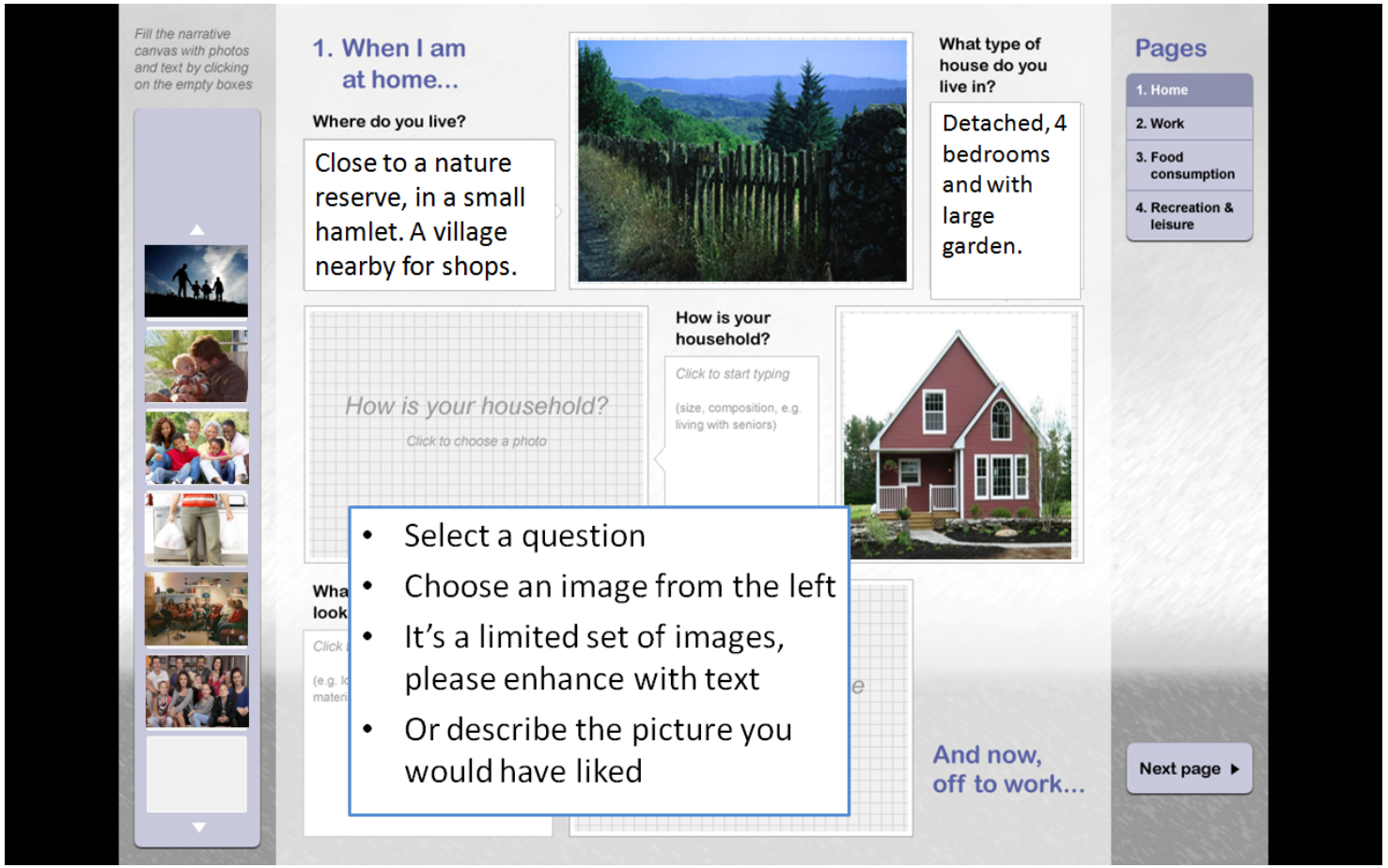
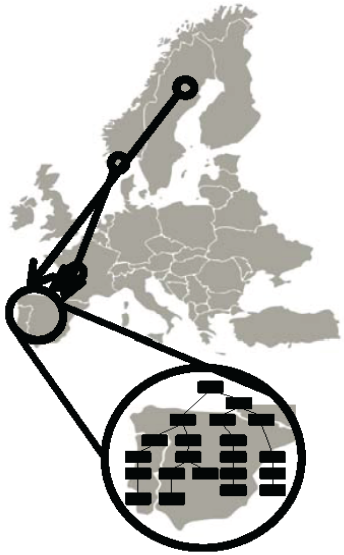
Data Capture
Crowd Sourcing Tools cf. VOLANTE CANVAS tool




Fill the narrative canvas with photos and text by clicking on the empty boxes
1. When I am at home...
Where do you live?
Close to a nature reserve, in a small hamlet. A village nearby for shops.
What type of house do you live in?
Detached, 4 bedrooms and with large garden.
How is your household?
Click to start typing
(size, composition, e.g. living with seniors)
How is your household?
Click to choose a photo
Pages
1. Home
2. Work
3. Food consumption
4. Recreation & leisure
Select a question
Choose an image from the left
It's a limited set of images, please enhance with text
Or describe the picture you would have liked
And now, off to work...
Next page

Indicator frameworks (one ToSIA example)



Indicators

Economic

- Gross value added
- Production costs
- Resource use
- Total production
- Labour productivity
- Investment, Research and Development
- Trade balance
- Enterprise structure
- Husbandry herd balance
- Loss and compensation of reindeer
- Innovation

Environmental

- Energy generation and use
- Greenhouse gas emissions and carbon stocks
- Transport distance and freight
- Forest biodiversity
- Forest resources
- Water and Air pollution
- Generation of waste
- Forest damage
- Soil condition
- Water use
- Foraging resources

Social

- Employment
- Wages and salaries
- Occupational health and safety
- Education and Training
- Consumer behaviour and attitude
- Corporate social responsibility
- Provision of public forest services
- Quality of employment
- Recreational value and Aesthetics

Indicators can be defined and selected to suit any particular study.
Other qualitative and cultural indicators are also possible to include.

Information tools to support accounting and rating systems

denkstatt
sustainable thinking

- Stakeholder consultation and engagement
- Life cycle thinking based
  - Life cycle assessment
  - Environmental product declaration
  - Carbon footprint

- Greenhouse gases inventories
- Environmental and social impact assessment
- Management systems (incl. certification phase)
- Sustainability reporting

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E office@denkstatt.bg W www.denkstatt.bg

a member of Inogen

Information and decision-support tools

Life cycle thinking based

Client	Project / Activity / Contacts
Solvent Resin Manufacturers/Polyester Powder Resin Manufacturers Sector Group	Calculation of the carbon footprint of resins and binders
European Silicones Centre	Calculation of the carbon footprint of the silicone industry
Knauf	Environmental Product Declaration of gypsum fibre boards
Borealis / AMI	Calculation of the carbon footprint of 3 chemical products of the chemical industry
Coca-Cola	Water Footprint Sustainability Assessment Calculation of the water footprint of sugar

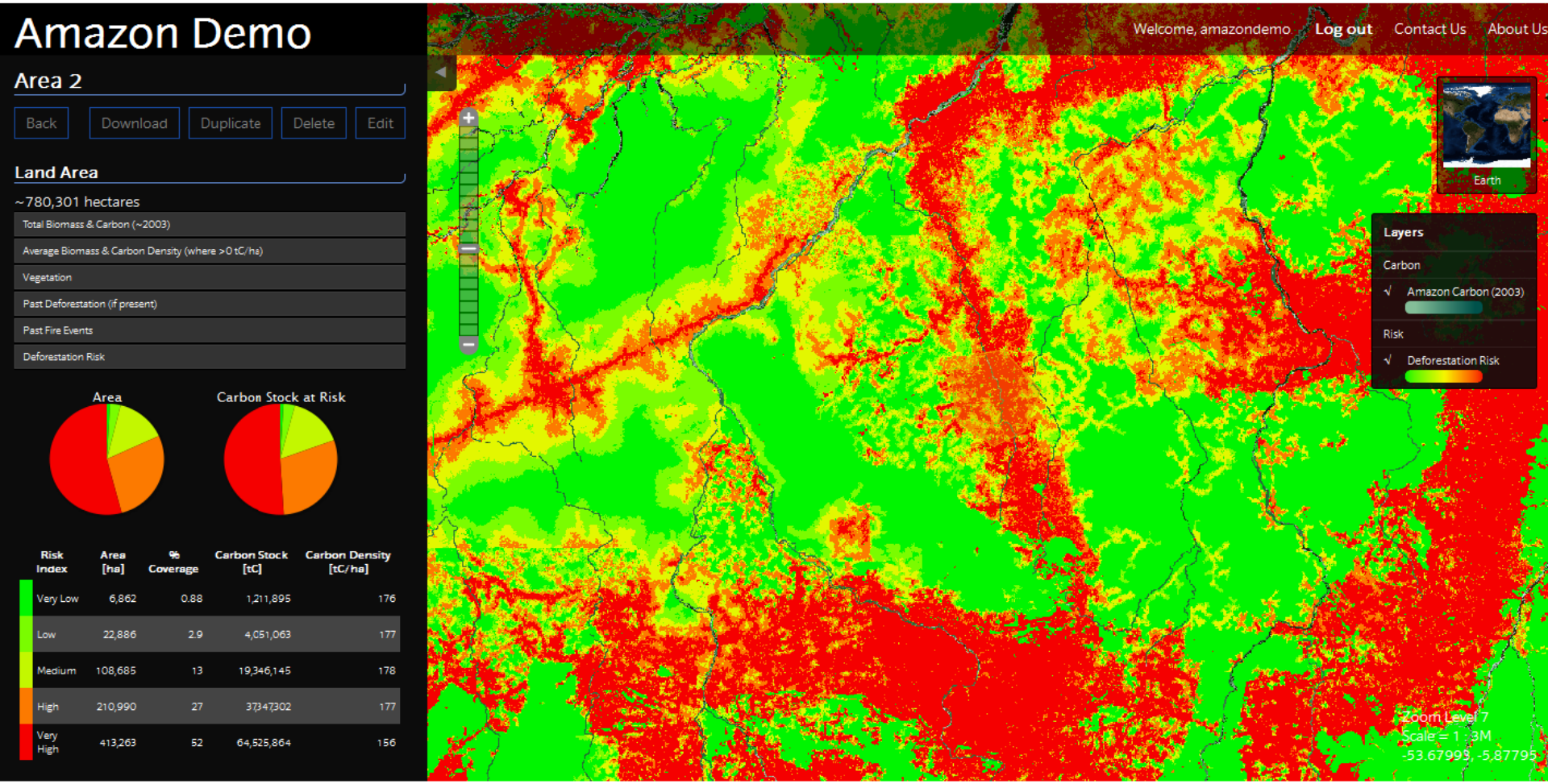
Information and decision-support tools

Greenhouse gas inventories

Client	Project / Activity / Contacts
Bulgarian Executive Environmental Agency	Inventory of the national GHG emissions for 1995-2010 (sector Energy incl. subsector Transport) (3 projects) Inventory of the national F-gases emissions (HFCs, SF6, PFCs) for 1995-2010 (3 projects) Uncertainty assessment of the GHG emissions for the period 1988-2009 for all sectors using the Monte Carlo method
Sofia Municipality	Inventory of GHG emissions of the city of Sofia 2007-2011
GLOBUL & GERMANOS	Inventory of GHG emissions (GHG Protocol, Scope 1+2)
Chelopech Mining	Inventory of greenhouse gas emissions and elaboration of a Carbon Management Plan (EBRD requirement; Scope 1+2+3)

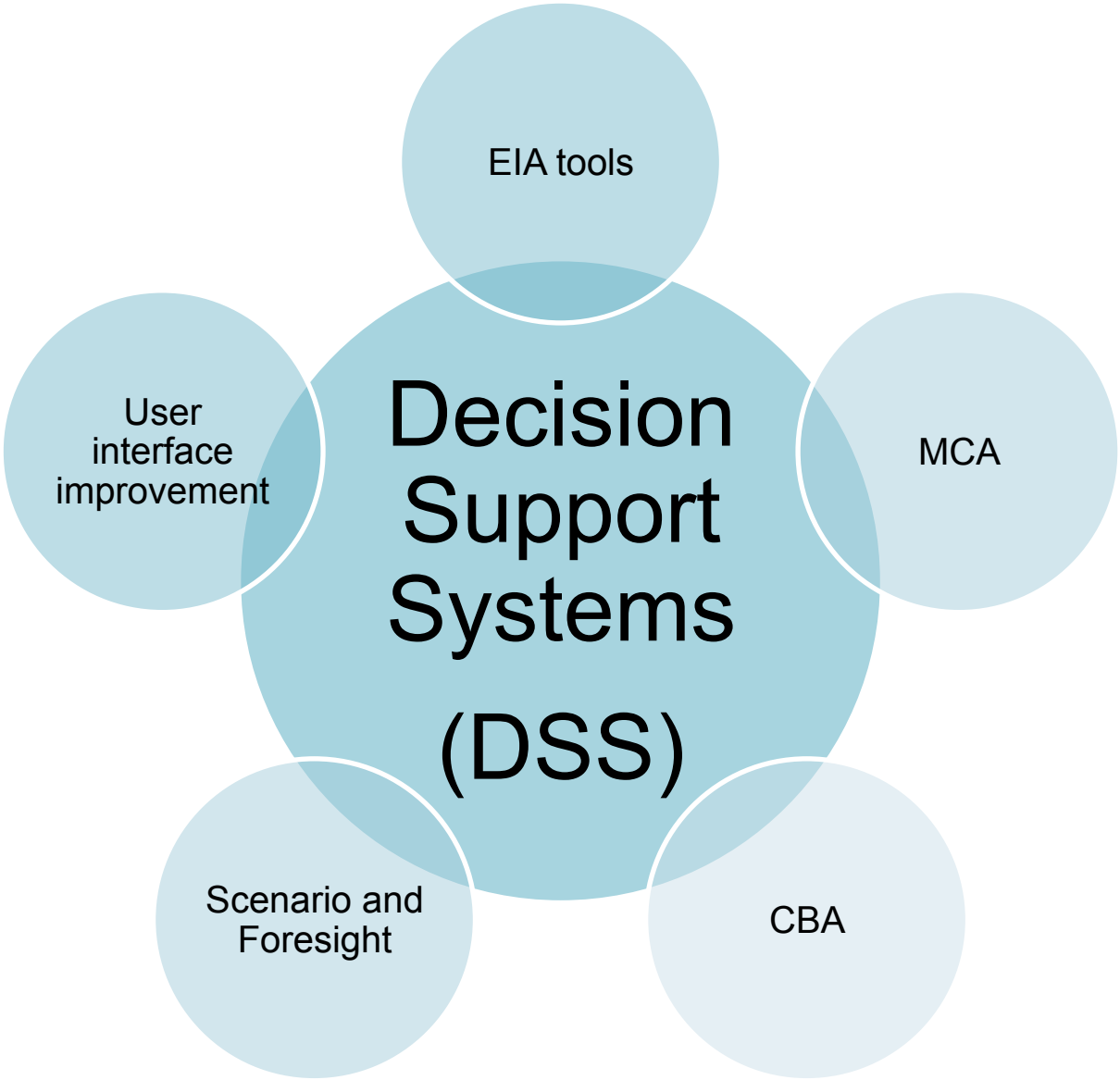
Amazon Demo
Welcome, Karin. Log out Contact Us About Us
Earth
Layers
Carbon
Carbon (2003)
Risk
Simamazonia Deforestation Risk
Deforestation
Past Deforestation
Amazondemo Vector Layers
Project Boundary
Project Locations
Fire Event Density
Fire Density in 2011
oe
An example of an *Our Ecosystem (OE)* carbon-mapping application is shown on the following slides.
•The map interface is easy to use
•Data layers can be queried through user-uploaded vector layers, or by user-drawn areas of interest.
•Data layers can be combined in a single query
1000 km
1000 mi
Ecometrica / Karin Viergever
ecometrica

Example query result: Risk of deforestation



ecometrica

Karin Viergever, 14 Jan 2013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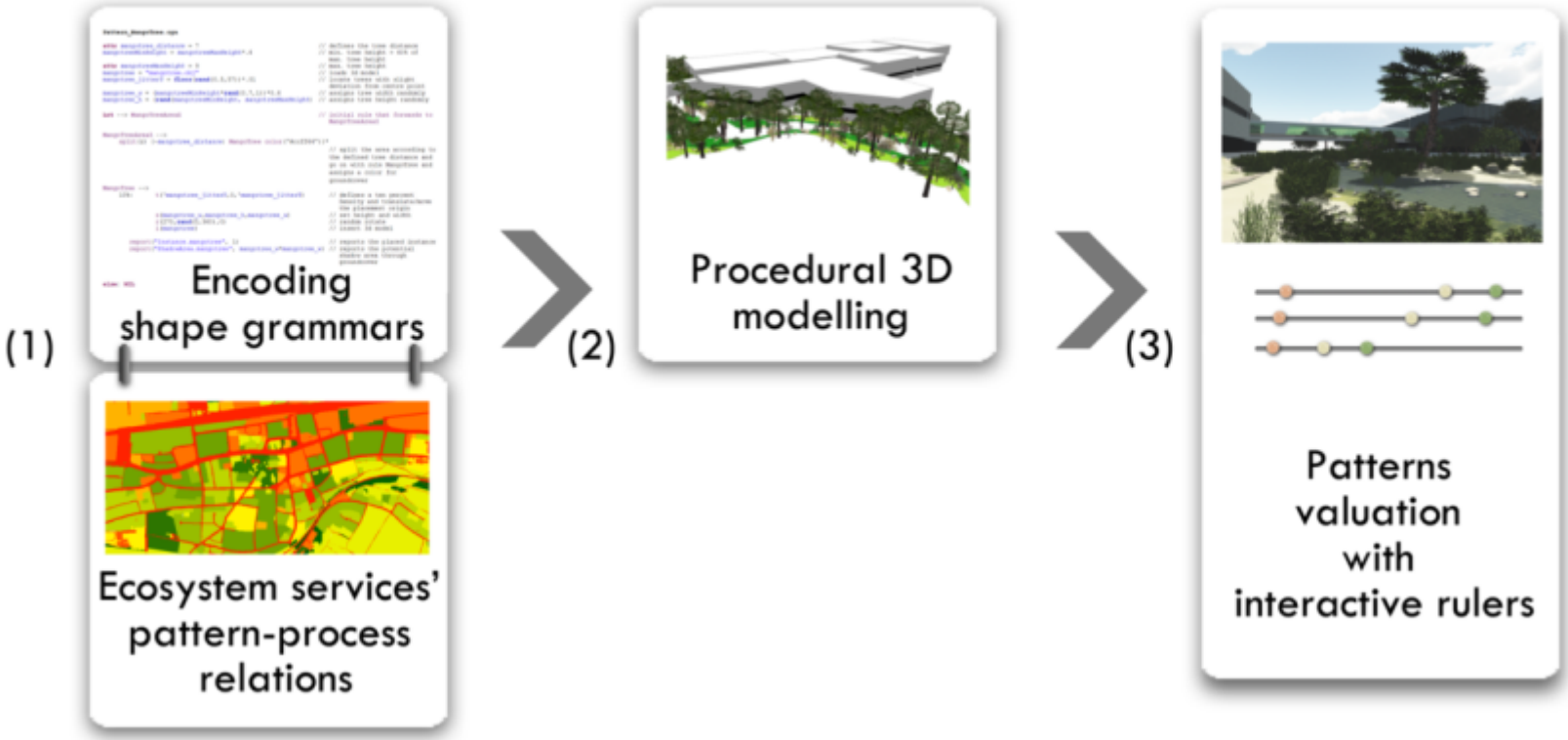
ETH-PLUS / Adrienne Gret-Regamey, Tom Klein, Sibyl Brunner

1. **Multicriteria decision analysis**
   - *a. supported by interactive rulers and 3D visualizations*
   - *b. based on procedural 3D visualizations*
2. **(Environmental assessments) Probabilistic approaches**
   - *Spatially explicit Bayesian Networks with update by local actors*
3. **Economic modeling**
   - *Spatially explicit agent-based mathematical programming*
4. **(Scenario tools) Backcasting – inverse modeling**
   - *a. Inverse modeling of econometric models*
   - *b. Backcasting of future visions based on agent-based ALUAM*
5. **Collaborative platforms**

1a. MCDA with 3D visualizations

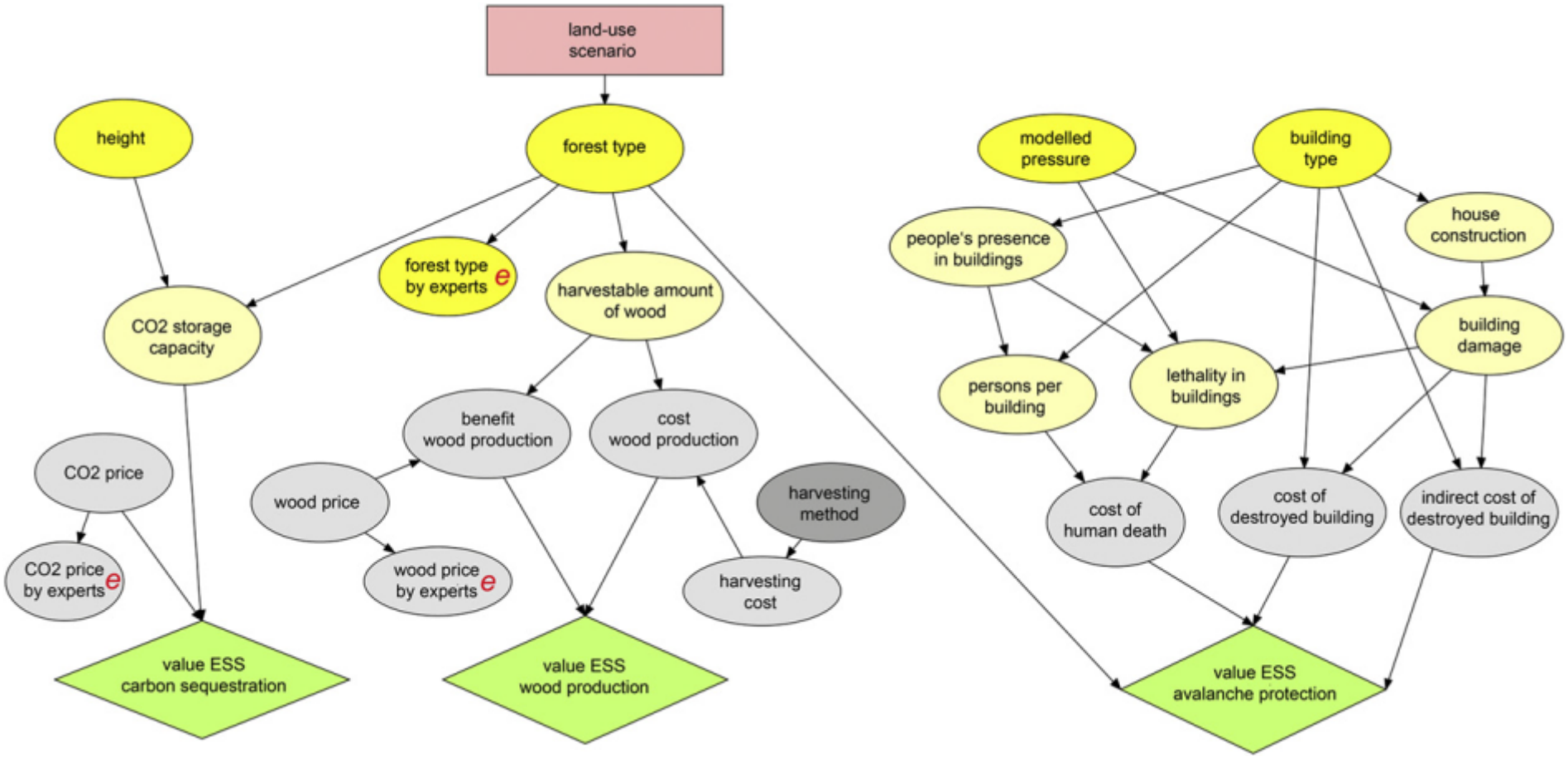
Grêt-Regamey and Wissen Hayek.,Taylor and Francis book, 2012

1b. Procedural modelling with 3D visualiz.



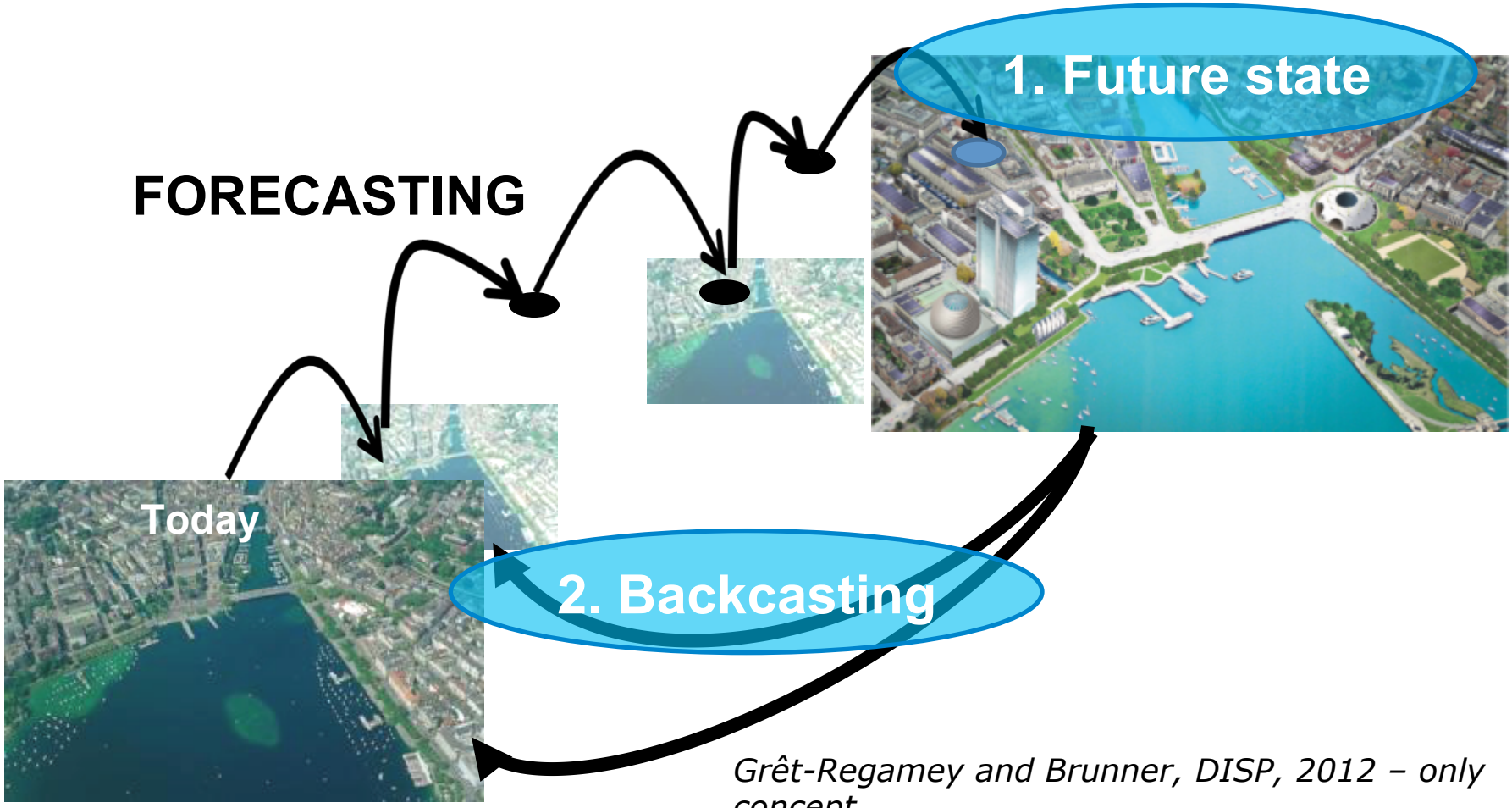
Grêt-Regamey et al., Landscape and Urban Planning, 2013

2. Probabilistic approaches



Grêt-Regamey et al., Journal of Environmental Management, 2012

4b.Backcasting of ALUAM



Grêt-Regamey and Brunner, DISP, 2012 – only concept

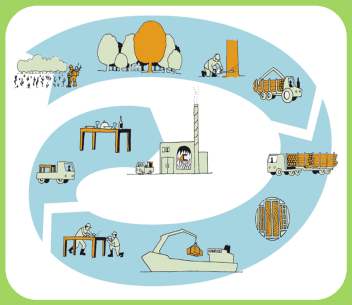
5. Collaborative platforms

5. Collaborative platforms

European Forest Institute / Marcus Lindner, Bernhard Wolfslehner, Diana Tuomasjukka

Forest ecosystem service assessment

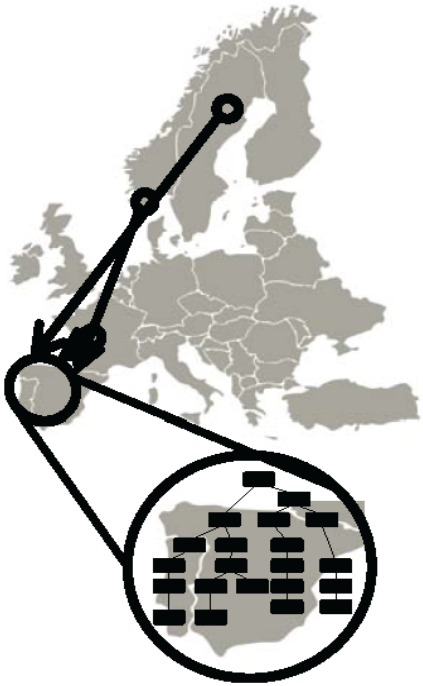
- ES quantification at European level unsing EFISCEN
- Trade-offs between ES, regions, policy options…



Sustainability impact assessment

- Tool for Sustainability Impact Assessment (ToSIA)
- Ex-ante assessment of sustainability impacts in value chains (wrt. policy or technology/management changes)
- Applied to forest-based, bioenergy sector and beyond

Systematic Sustainability Impact Assessment approach by (To)SIA



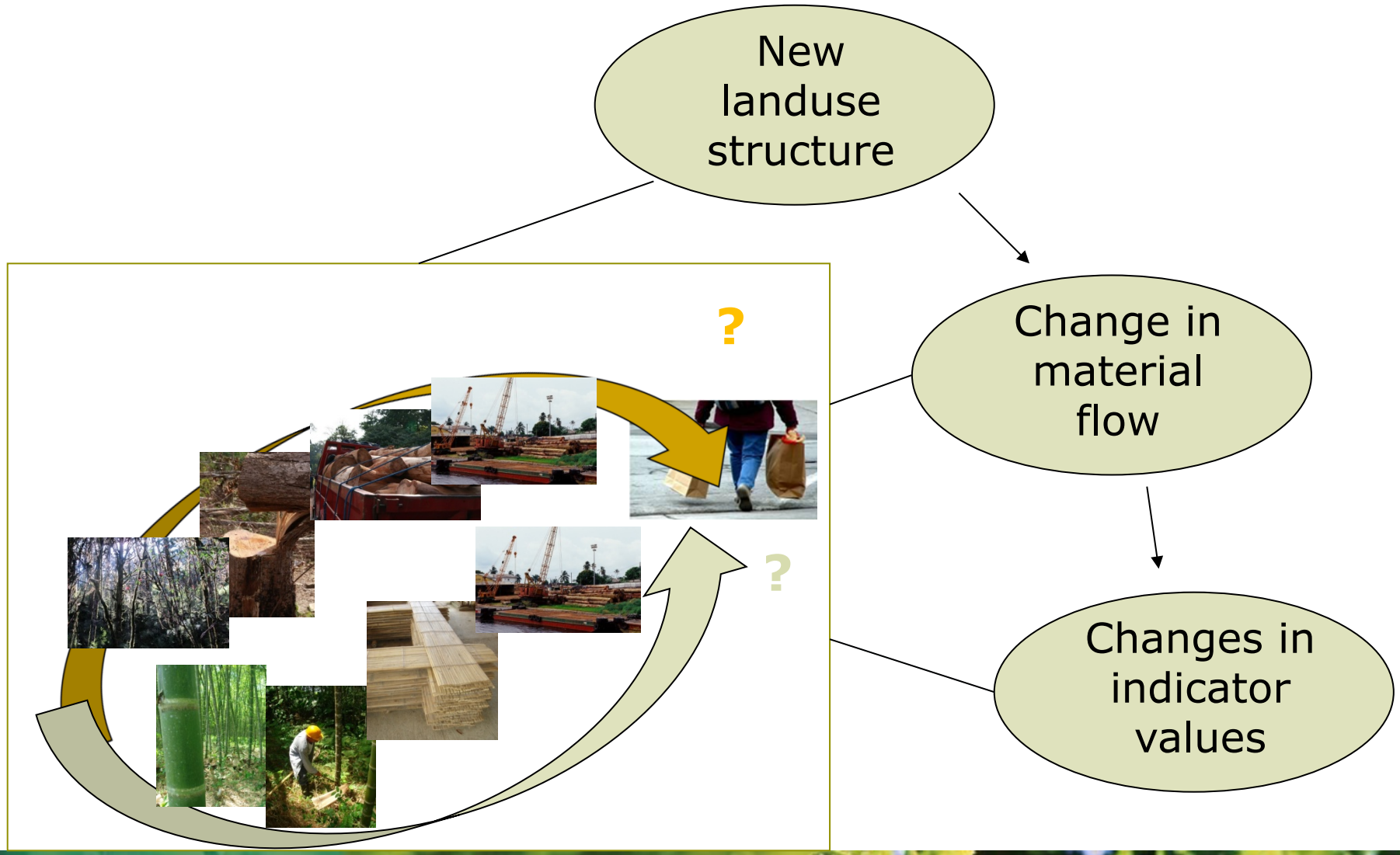
ToSIA is a flexible tool, based on three concepts:

1. Alternative process chains
2. Material flow along the chain
3. Indicators per process multiplied with the material flow

ToSIA assesses the sustainability impacts of alternative value chains.

Source: EFI

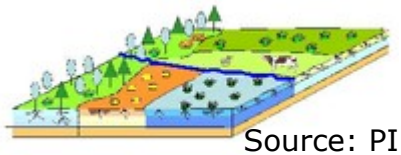
Systematic framework for ex-ante assessments



Uni Potsdam / Ariane Walz

- LPJmL model: **Lund-Potsdam-Jena managed Land Dynamic Global Vegetation and Water Balance Model**
  - for global ecosystem assessments under climate and land use change
  - Plan to develop post-processing scripting for the deduction of ecosystem services.

    MCA-based methods for the social valuation.
- Plan to develop such a tool



Source: PIK

University of Edinburgh / Marc Metzger, James Paterson

Aim: to support *Ecosystem Services* strategic assessment, planning and management through the development of a scenarios toolbox

- To facilitate stakeholder engagement and 'buy in' for ecosystem services strategic planning
- To provide excellent policy-relevant decision-support
- Aid evidence-based decision-making by exploring uncertainties and drawing on latest knowledge
- Enable inter-operability among practitioner organisations, researchers and stakeholders
- Draw on existing ecosystem services based scenario studies (e.g., UK NEA and MA)
- Explore use of quantitative tools (e.g., GIS, BBNs) to aid integration of Ecosystem Services data into future scenarios

Cost Benefit Analyses

- Operationalising CBA for ES/NC assessment

Special attention will be given to discounting factors
and distributional impacts using weightings for different socio-economic groups

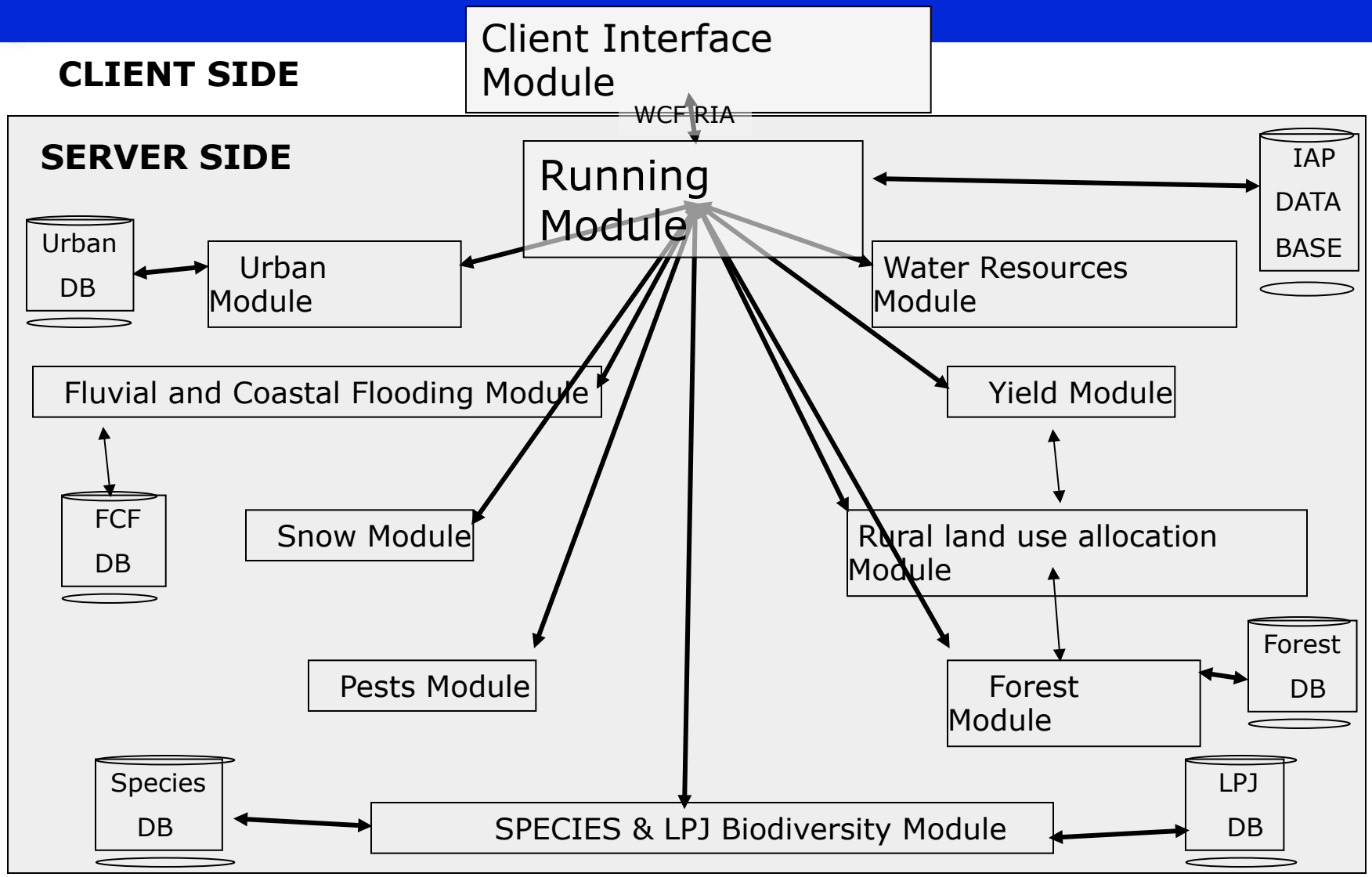
- Coupling of CBA and MCDA

1. CLIMSAVE – IAP : multi-scale modelling framework

2. *m*DSS : spatial multi-criteria decision analysis

3. Icarus : participatory web platform

CLIMSAVE IAP – General workflow



Client/Server architecture using an across platform software solution: Microsoft Silverlight
consuming Windows Communication Foundation (WCF) /Rich Internet Application (RIA) services and ESRI&Bing map services

The CLIMSAVE project

Climate Change Integrated Assessment Methodology for Cross-Sectoral Adaptation and Vulnerability in Europe

IAP Home About

Save scenario | Load scenario | Help | Export | Map | Chart | Table

Scenario selection Timeslice: Baseline

Indicator: Elevation

Annual Temperature changed = 0 °C

0 °C — 6 °C

Winter Precipitation ch.= 0 %

-50 — 50

Summer Precipitation ch.= 0 %

-50 — 50

CO2 concentration = 350 ppm

350 — 700

Sea level change = 0 m

0 — 2

Socio-economic scenario settings Hide details

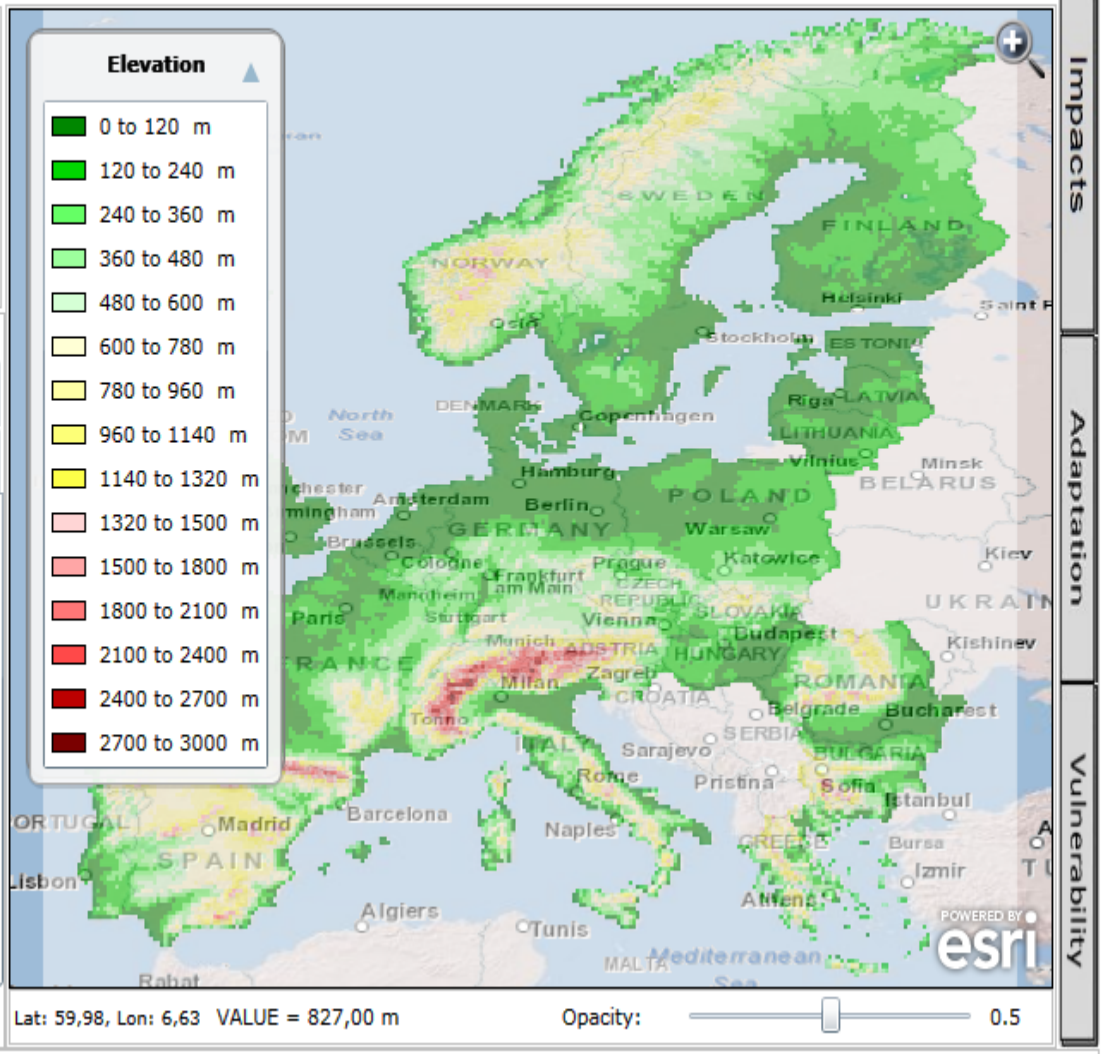
Economic (2) | Environmental(1) | Policy governance | Capitals

Guidance | Social | Technological | Economic (1)

The sliders and buttons on these tabs determine the scenario setting used by the models to determine impacts. You can change them to:

- **Carry out a Sensitivity Analysis** – under the baseline / current climate, investigate the response of the indicators to changes in the settings
- **Explore the effects of uncertainty within a socio-economic scenario** - the CLIMSAVE socio-economic scenarios have been developed by stakeholders, assisted by the CLIMSAVE team. They represent contrasting alternative futures within which to explore the potential impacts of future change. They are not predictions of the future. You can explore the effects of uncertainty within a scenario by moving the sliders within the green range. These values are

RUN

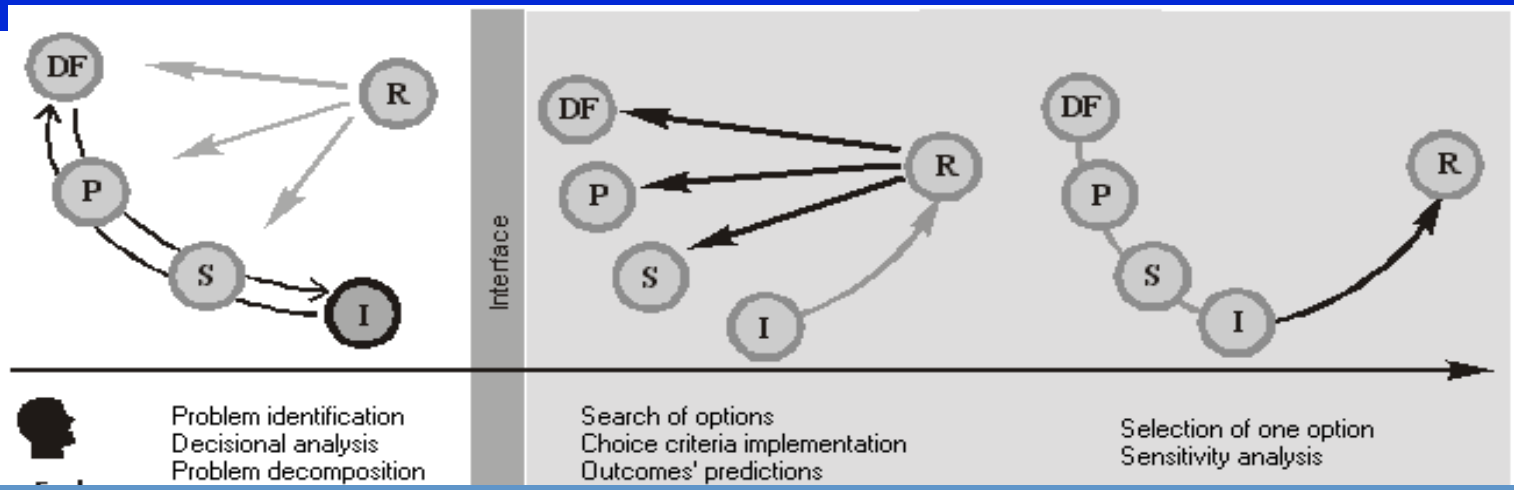


Lat: 59,98, Lon: 6,63 VALUE = 827,00 m

Opacity: 0.5

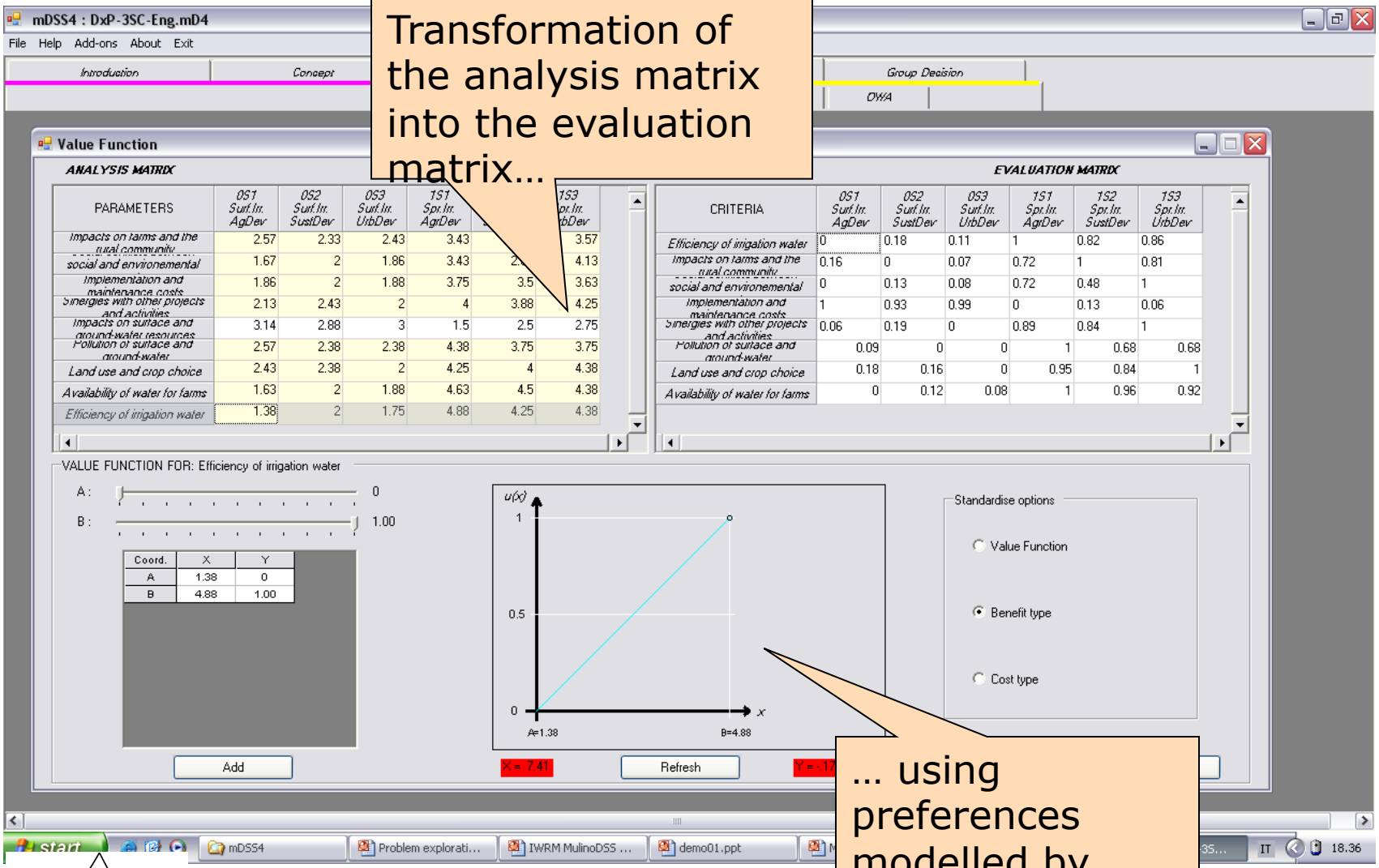
Impacts | Adaptation | Vulnerability

Typical mDSS application by End Users



1) ***Conceptual Phase***: the competent authority (CA) investigates the problem, by identifying pressures and impacts, possible alternative response options, and decision criteria with the adequate involvement of stakeholders;
2) ***Design Phase***: the technical staff implements the decision problem in *m*DSS, collects indicator data, defines the details and finds practical solutions to the decisional criteria previously identified;
3) ***Choice Phase***: the CA and the stakeholders investigate the decision, evaluate the responses, analyse robustness, conflicts, and select the preferred option (with iterations).

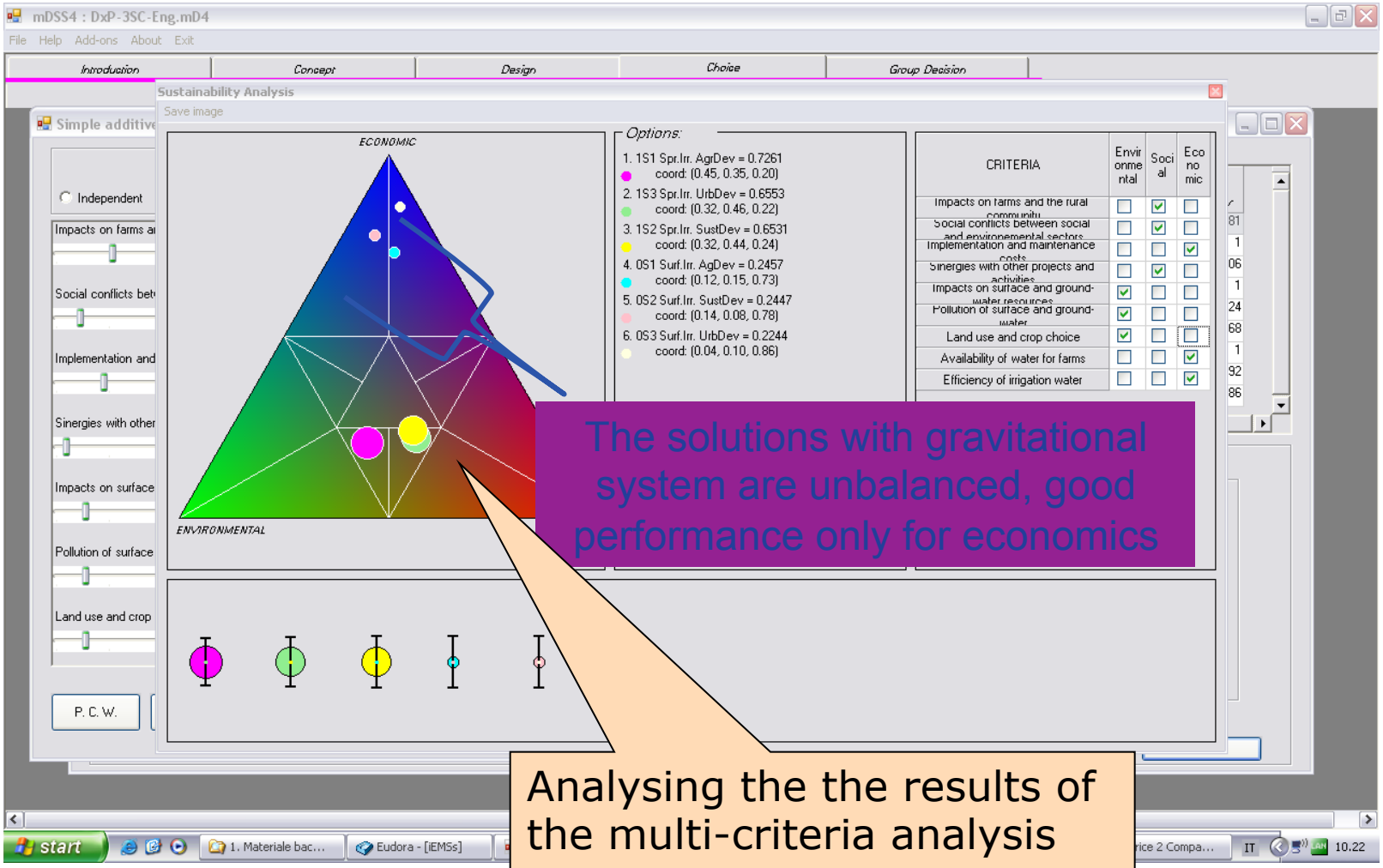
mDSS: Value functions and evaluation matrix



Transformation of the analysis matrix into the evaluation matrix…

… using preferences modelled by value functions or by normalisation

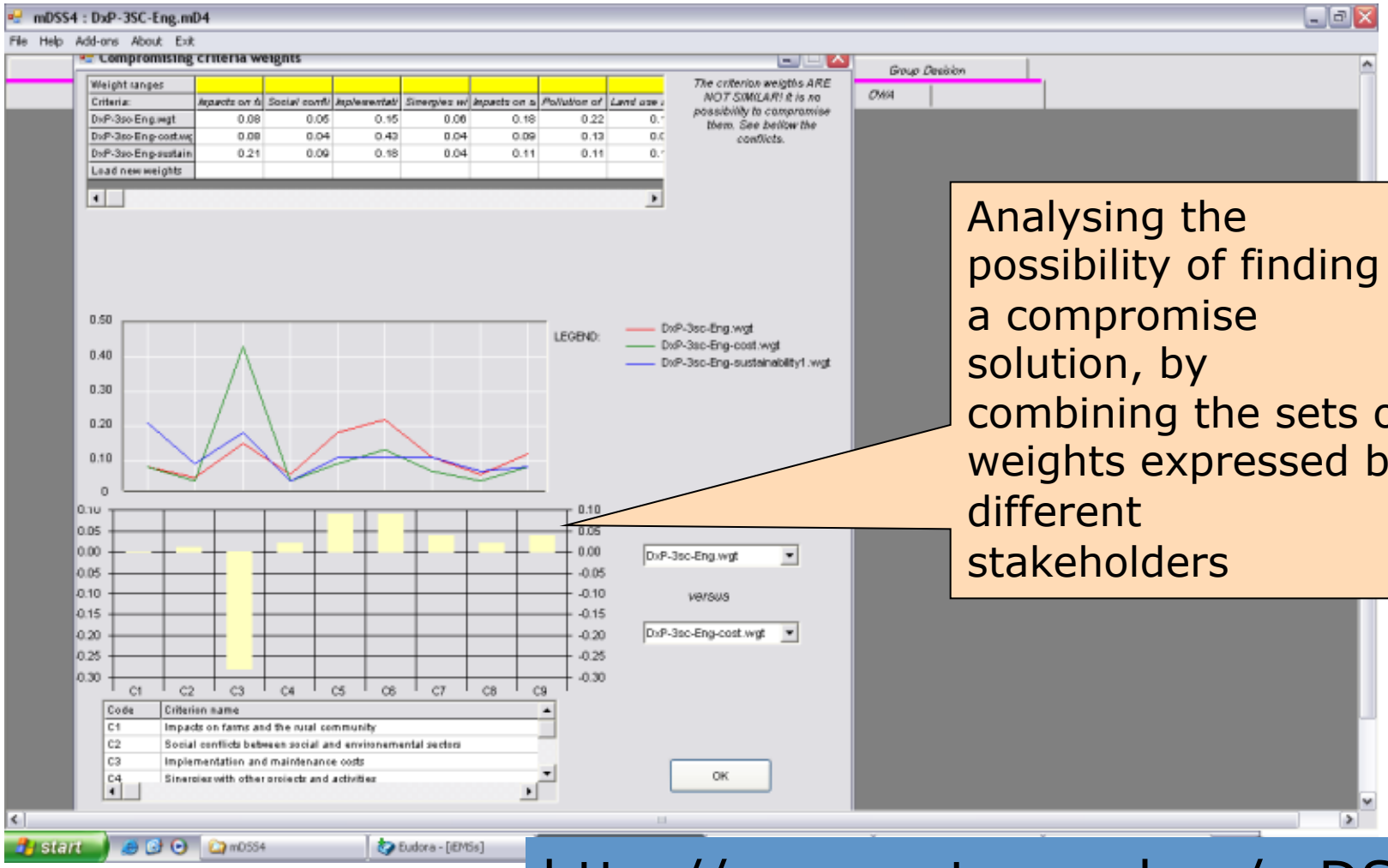
mDSS: Sustainability analysis



The solutions with gravitational system are unbalanced, good performance only for economics

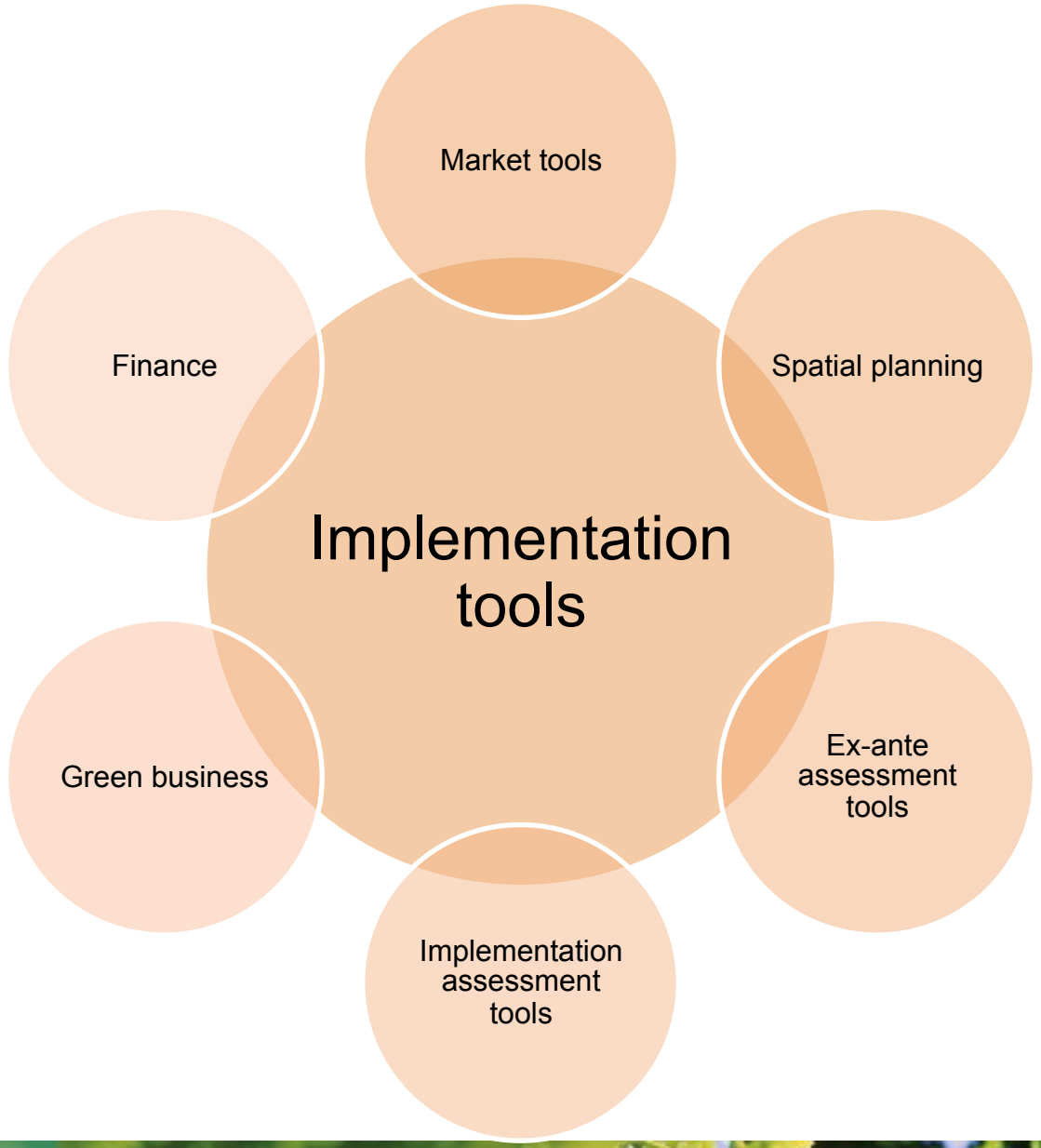
Analysing the the results of the multi-criteria analysis with respect to the three pillars of sustainable development

mDSS: Group decision analysis



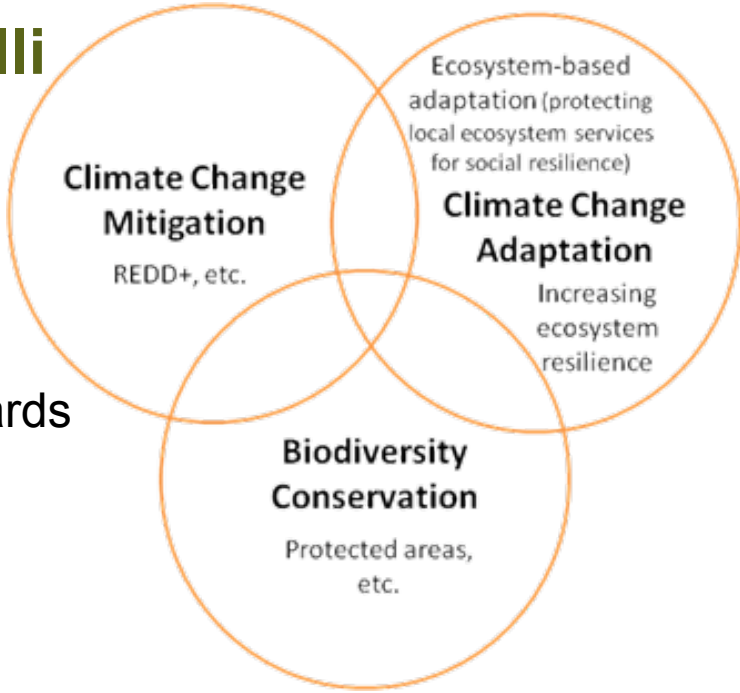
Analysing the possibility of finding a compromise solution, by combining the sets of weights expressed by different stakeholders

http://www.netsymod.eu/mDSS


Market tools
Finance
Spatial planning
Implementation tools
Green business
Ex-ante assessment tools
Implementation assessment tools

CIFOR, Indonesia / Bruno Locatelli

Implementation instruments



Climate –change related:

- REDD+ scheme: funding and certifications/standards
- Adaptation funds and policies

Others:

- Payment for Ecosystem Services (PES).
- Environmental labels and Eco-certification schemes (e.g. FSC, Fairtrade)
- Payment for Conservation schemes (e.g. Bolsa Floresta in Brazil)
- Responsible investment schemes (e.g. Proactive Investment in Natural Capital – PINC).
- Policy network analysis.
- Social Return on Investment (SROI - http://www.thesroinetwork.org) evaluative or forecast analysis of interventions with ES components.

VU / Mark Koetse

Knowledge of valuation instruments within IVM

Stated preferences

1. Contingent valuation analysis
2. Conjoint analysis (choice experiments)
3. Meta-analysis

Revealed preferences

1. Travel cost analysis
2. Hedonic pricing analysis
3. Meta-analysis

Knowledge of regulating instruments within IVM

1. Payments for ecosystem services (PES)
2. Consumer coalitions for financing payments for ecosystems

Iodine / Rob Tinch

Useful for ex ante assessment of exogenously-specified changes in ecosystem management

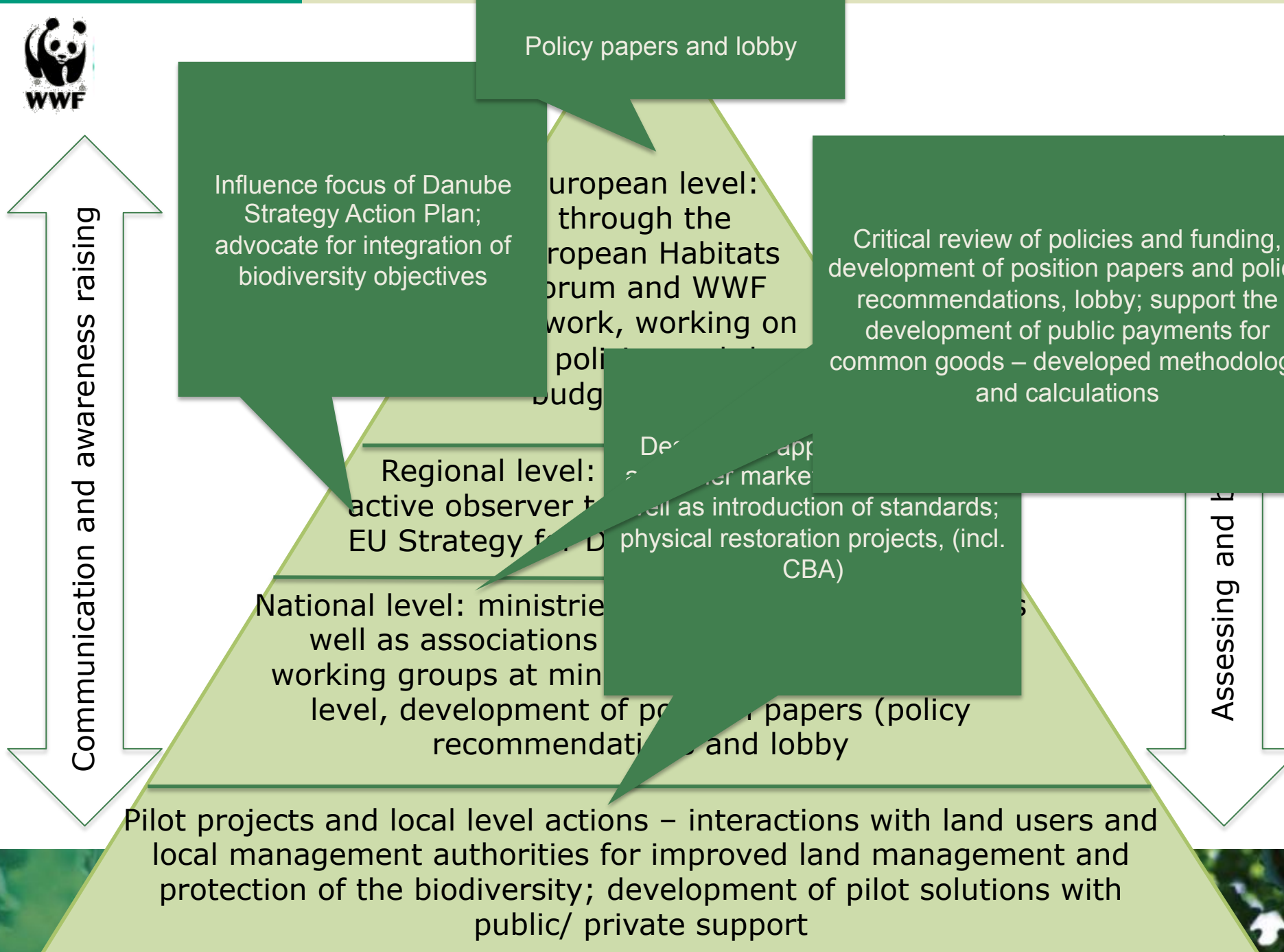
InVEST:

family of tools to map and value the goods and services from nature which are essential for sustaining and fulfilling human life. InVEST enables decision-makers to assess the tradeoffs associated with alternative choices and to identify areas where investment in natural capital can enhance human development and conservation in terrestrial, freshwater, and marine ecosystems.

WWF / Maya Todorova

WWF & Instruments

- Testing and widely promoting successful pilot solutions in media, to markets, to decision-makers
- Work on policies and lobby at national, Danube region and EU level to promote ecosystem sustainable policies or cease ones degrading our natural capital


Policy papers and lobby
Influence focus of Danube Strategy Action Plan; advocate for integration of biodiversity objectives
uropean level:
through the
ropean Habitats
orum and WWF
work, working on
poli
budg
Critical review of policies and funding, development of position papers and policy recommendations, lobby; support the development of public payments for common goods – developed methodology and calculations
Regional level:
active observer t
EU Strategy f
De
app
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ell as introduction of standards; physical restoration projects, (incl. CBA)
National level: ministrie
well as associations
working groups at min
level, development of po
papers (policy
recommendati
and lobby
Pilot projects and local level actions – interactions with land users and local management authorities for improved land management and protection of the biodiversity; development of pilot solutions with public/ private support
Communication and awareness raising
Assessing and

What should happen in the Exchange session (11.30 – 12.30)?

Mapping of questions to ask during ("Speed Dating") Exchange session:

1. What can the tool / instrument do?

   -> Type of assessment / knowledge. Suitable for which exemplars?
2. For which application field?

   -> sectoral, landuse-specific, geographical, ... Suitable for which exemplars?
3. What are the data needs?

   -> roughly; more detailed bilateral discussion to follow
4. Who could use the tool (level of expertise needed)?

   -> follow up in bilateral discussion may be needed

Speed Dating during Exchange session:

Which instruments for which case?

1. What can the tool / instrument do?

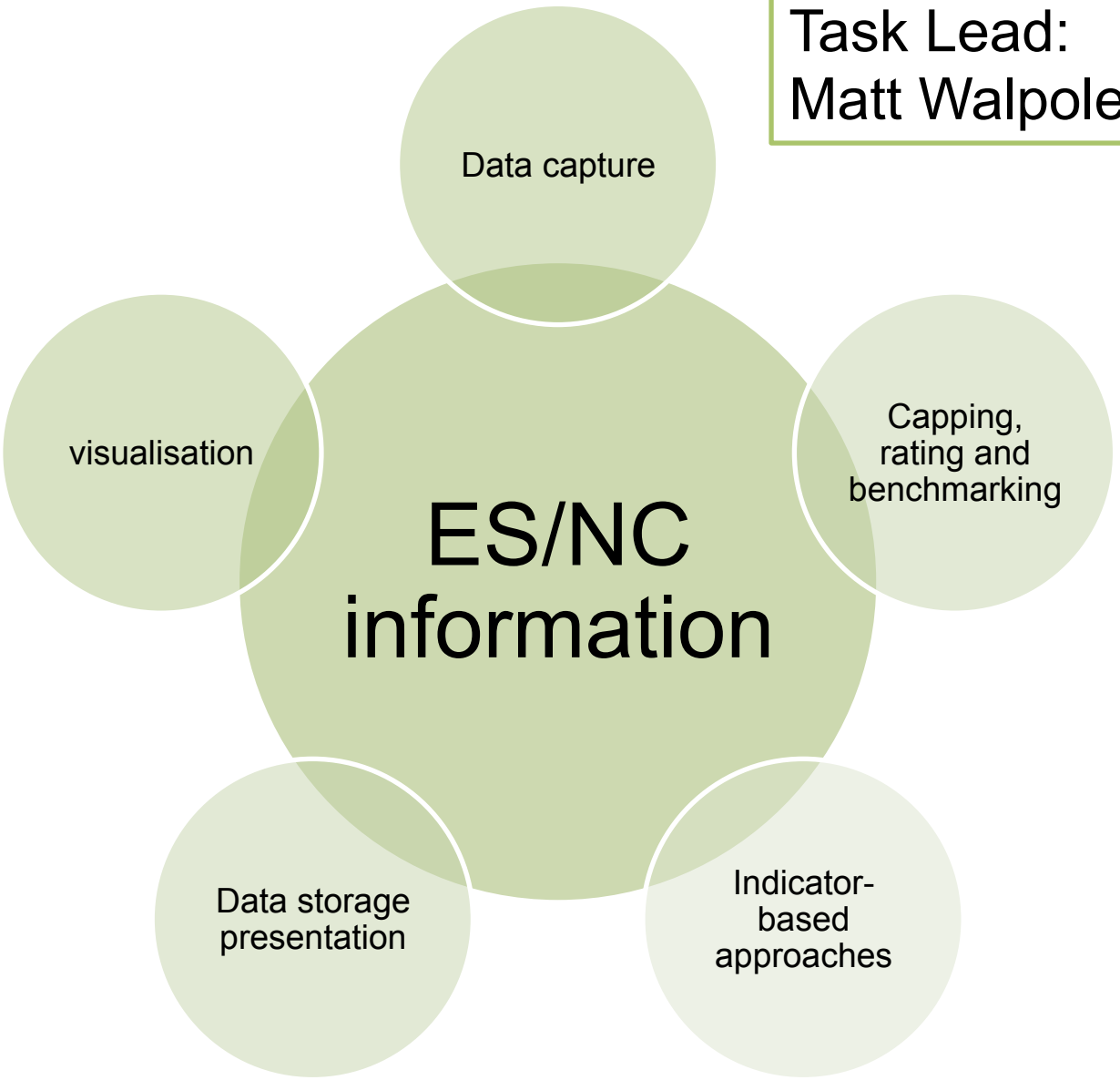
   -> Type of assessment / knowledge.

2. For which application field?

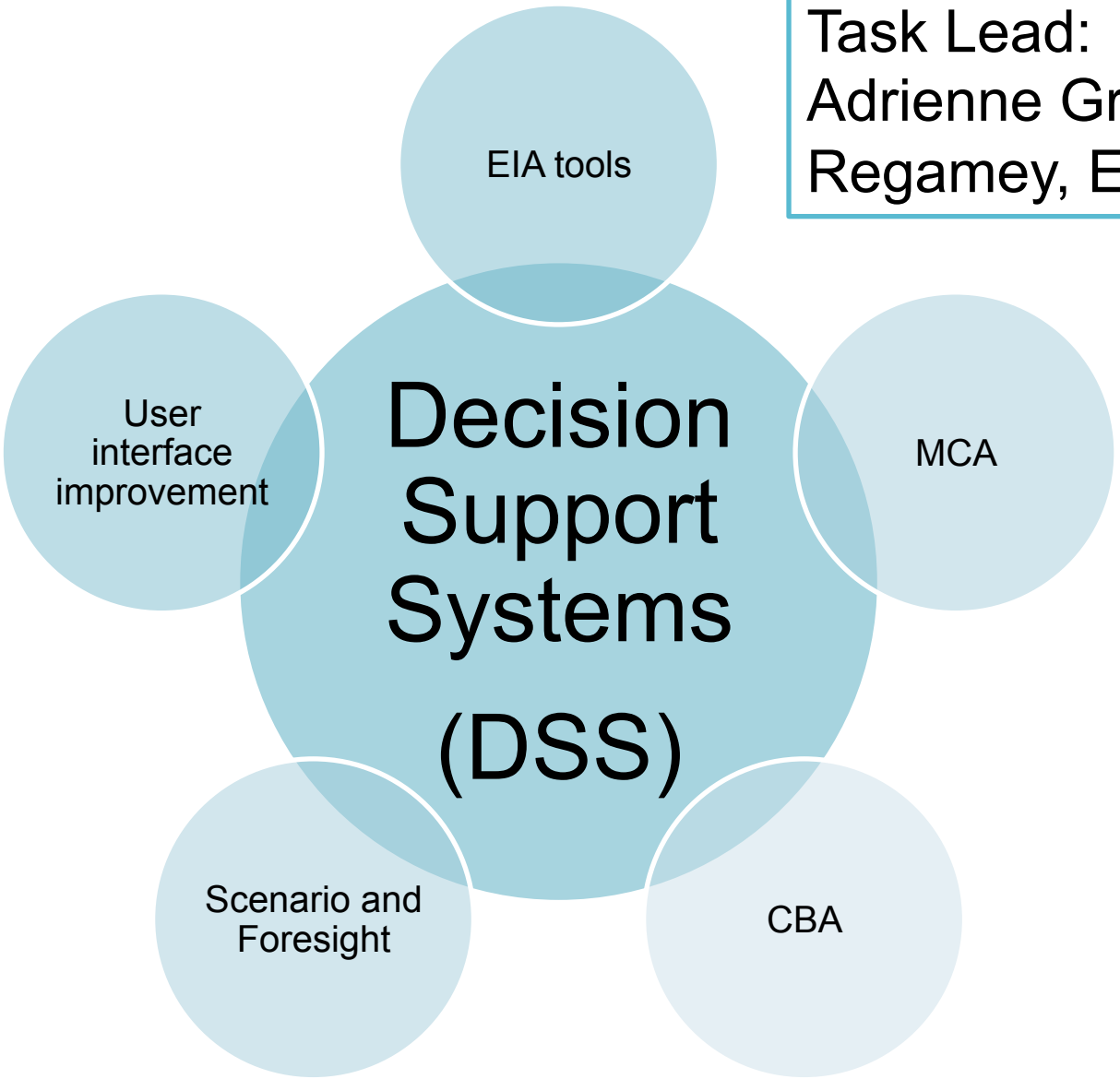
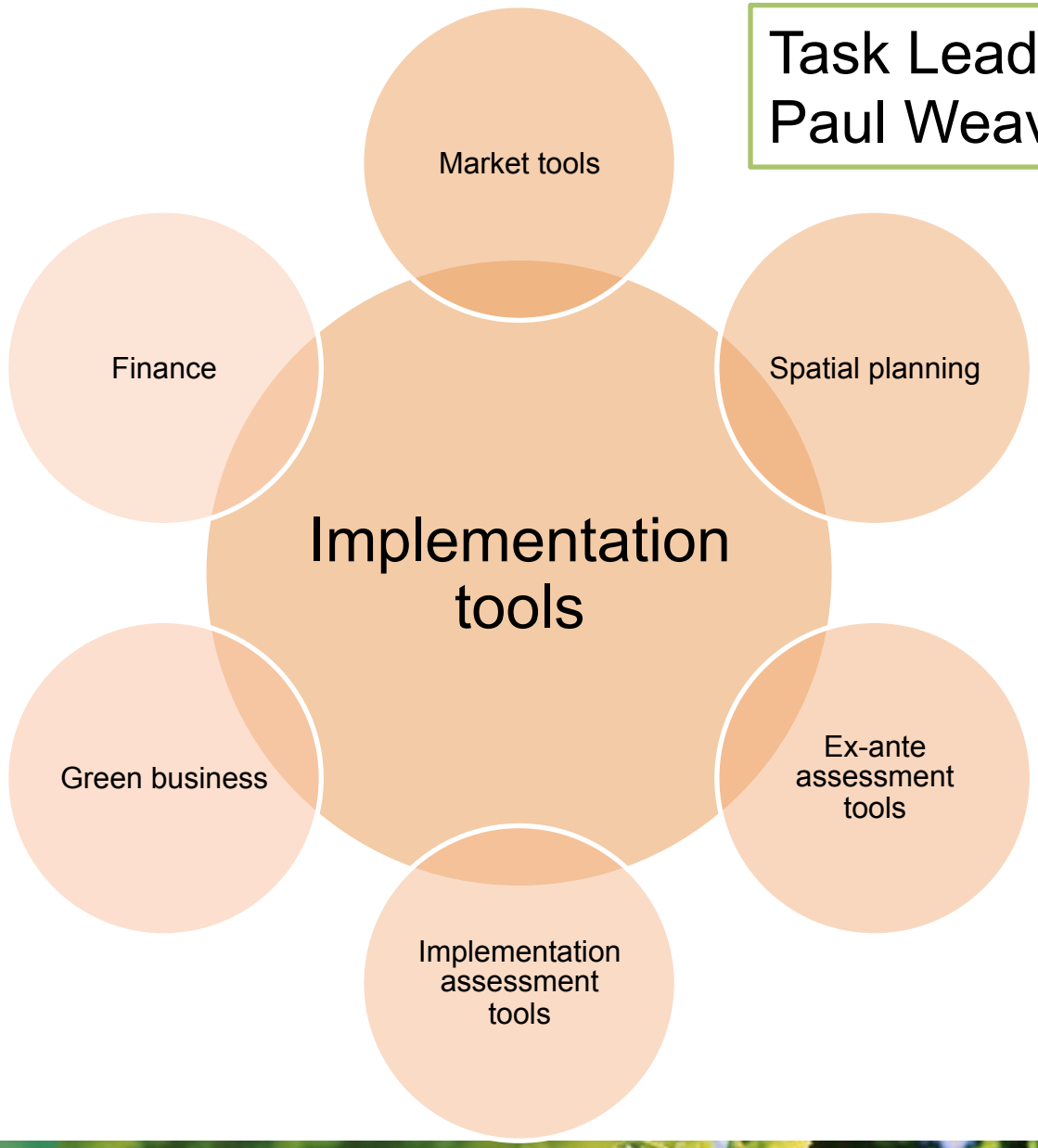
   -> sectoral, landuse-specific, geographical, ...

Type of tool	tool	Exemplar 1	Exemplar 2	Exemplar 3	Exemplar 4	...	Exemplar 11
ES info	<name>	x					
	<name>		x		x		
DSS	<name>			x			
	<name>	x	x	x	x		
Implementation	<name>		x		x		

Task Lead:
Matt Walpole, WCMC



Task Lead:
Adrienne Gret-Regamey, ETH



Task Lead:
Paul Weaver, ULUND